Pinnacle
ENVIRONMENTAL SOLUTIONS

a division of EMCON

3858

April 22, 1999
Project 20805-123.006

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

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

Dear Mr. Supple:

Pinnacle Environmental Solutions, a division of EMCON (Pinnacle), is submitting the attached report which presents the results of the first 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.

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

Valli Voruganti, P.E.
Project Engineer

Attachment: Quarterly Groundwater Monitoring Report, First Quarter 1999

cc: Barney Chan, ACHCSA

144-A Mayhew Way Walnut Creek, California 94596 (510) 977-9020 (510) 977-9030 Fax

Date: April 22, 1999

ARCO QUARTERLY GROUNDWATER MONITORING REPORT

Station No.:	2035	Address:	1001 San Pablo Avenue, Albany, California
		Pinnacle Project No.:	20805-123.006
		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 (FIRST - 1999):

1. Prepared and submitted quarterly groundwater monitoring report for fourth quarter 1998.
2. Performed quarterly groundwater monitoring and sampling for first quarter 1999.
3. Continued bubbling air into well RW-1 to introduce dissolved oxygen into the groundwater, thereby enhancing biodegradation of petroleum hydrocarbon in groundwater in the vicinity of the well.

WORK PROPOSED FOR NEXT QUARTER (SECOND - 1999):

1. Prepare and submit quarterly groundwater monitoring report for first quarter 1999.
2. Perform quarterly groundwater monitoring and sampling for second quarter 1999.
3. Start up SVE system and operate continuously if hydrocarbon removal rates warrant.
4. Continue bubbling air into well RW-1.

QUARTERLY MONITORING:

Current Phase of Project:	Quarterly Groundwater Monitoring and Operation and Maintenance of Remediation Systems SVE and Enhanced Bioremediation
Frequency of Sampling:	Annual (Second Quarter): MW-5 Quarterly: MW-1 through MW-4, 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 Bubbling air in RW-1
Average Depth to Groundwater:	8.9 feet
Groundwater Flow Direction and Gradient (Average):	0.03 ft/ft toward west

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):	NA
Benzene Conc. End of Period (lab):	NA
SVE Flowrate End of Period:	0 cfm
Total HC Recovered This Period:	0 pounds
Total HC Recovered to Date:	3103.3 pounds
Utility Usage	
Electric (KWH):	0 KWH
Gas (Therms):	0 Therms
Operating Hours This Period (SVE):	0 hours
Operating Hours to Date (SVE):	8536.00 hours
Percent Operational (SVE):	0.0%
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:	90% - 97%
Percent TPH Conversion:	NA
Average Stack Temperature:	NA
Average SVE Source Flow:	NA
Average SVE Process Flow:	NA
Average Source Vacuum:	NA

ATTACHMENTS:

- Table 1 - Historical Groundwater Elevation and Analytical Data, Petroleum Hydrocarbons and Their Constituents
- 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

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	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-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	--	--
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	--	--

not confirmed

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1995 - Present*

ARCO Service Station No. 2035
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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	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	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-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-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	--	--
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							

need confirmation

Pinnacle

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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	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-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-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							
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							

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1995 - Present*

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1001 San Pablo Avenue, Albany, California

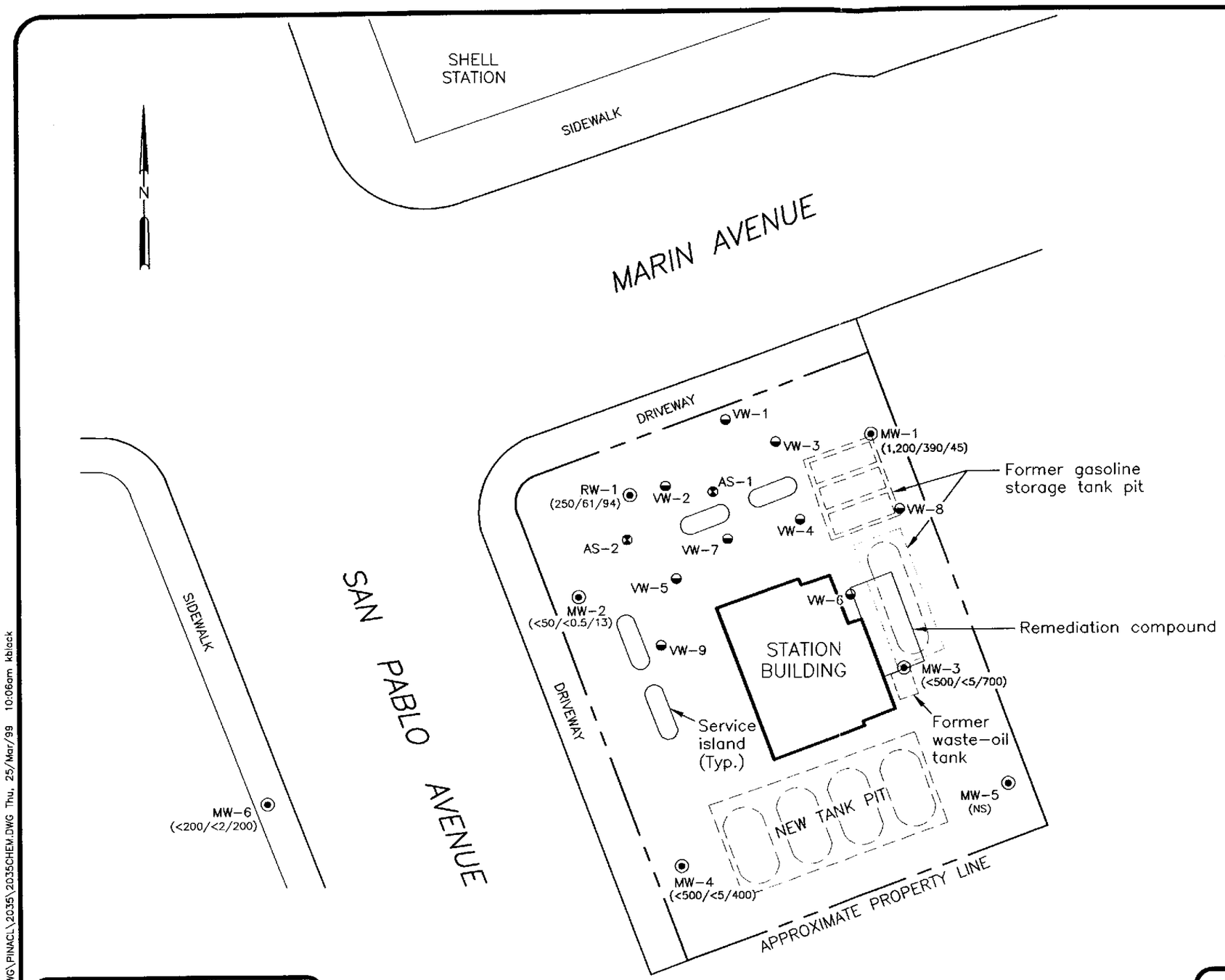
Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	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-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	--	--
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	--	--
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	--	--

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	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	02-16-99	40.33	7.70	32.63	ND	W	0.03	02-17-99	250	61	2	2	19	94	--	--

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
TPHD: total petroleum hydrocarbons as diesel, California DHS LUFT Method
SM: standard method
ft/ft: foot per foot
µg/L: micrograms per liter
mg/L: milligrams per liter
ND: none detected
NR: not reported; data not available
W: west
- -: 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 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



EXPLANATION

- ◉ Groundwater monitoring well
- ◒ Vapor extraction well
- ⊗ Air sparge well
- (1,200/390/45) Concentration of total petroleum hydrocarbons as gasoline (TPHG), benzene, and MTBE in groundwater (ug/L); samples collected 2/16/99
- < Not detected at or above the indicated laboratory detection limit
- NS Not sampled

Pinnacle
ENVIRONMENTAL SOLUTIONS
A DIVISION OF EMCON

DATE MAR. 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
FIRST QUARTER 1999

IMAGE Files: <No Images>
XREF Files: <No Xrefs>
Dimscale: 30 Ltscale: 30 Psltscale: 0
SANJOSE/CADD: N:\DWG\PINACL\2035\2035CHEM.DWG Thu, 25/Mar/99 10:06am kblack

1" 1/2" 0" 1"

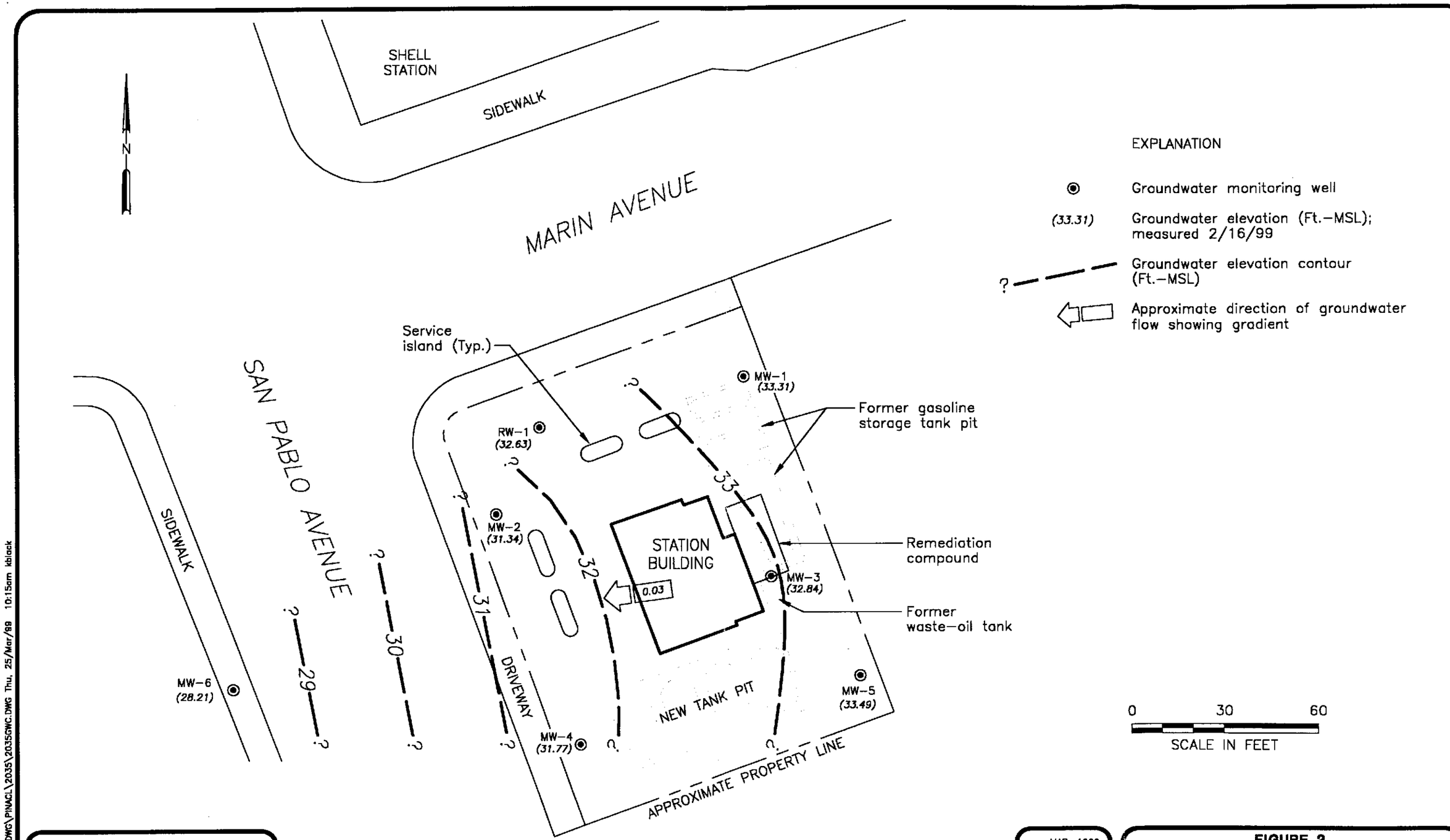


IMAGE Files: <No Images>
XREF Files: <No Xrefs>
Dimscale: 30 Ltscale: 30 Paltscale: 0
SANJOSE/CADD: N:\DWG\PINACL\2035\2035GWC.DWG Thu, 25/Mar/99 10:15am kblack

1" 1/2" 0" 1"

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DATE MAR. 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
FIRST QUARTER 1999

APPENDIX A

SAMPLING AND ANALYSIS PROCEDURES

APPENDIX A

SAMPLING AND ANALYSIS PROCEDURES

The sampling and analysis procedures for water quality monitoring programs are contained in this appendix. The procedures provided for consistent and reproducible sampling methods, proper application of analytical methods, and accurate and precise analytical results. Finally, these procedures provided guidelines so that the overall objectives of the monitoring program were achieved.

The following documents have been used as guidelines for developing these procedures:

- Procedures Manual for Groundwater Monitoring at Solid Waste Disposal Facilities, Environmental Protection Agency (EPA)-530/SW-611, August 1977
- Resource Conservation and Recovery Act (RCRA) Groundwater Monitoring Technical Enforcement Guidance Document, Office of Solid Waste and Emergency Response (OSWER) 9950.1, September 1986
- Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, EPA SW-846, 3rd edition, November 1986
- Methods for Organic Chemical Analysis of Municipal and Industrial Waste Water, EPA-600/4-82-057, July 1982
- Methods for Organic Chemical Analysis of Water and Wastes, EPA-600/4-79-020, revised March 1983
- Leaking Underground Fuel Tank (LUFT) Field Manual, California State Water Resources Control Board, revised October 1989

Sample Collection

Sample collection procedures include equipment cleaning, water level and total well depth measurements, and well purging and sampling.

Equipment Cleaning

Before the sampling event was started, equipment that was used to sample groundwater was disassembled and cleaned with detergent water and then rinsed with deionized water. During field sampling, equipment surfaces that were placed in the well or came into contact with groundwater during field sampling were steam cleaned with deionized water before the next well was purged or sampled.

Water Level, Floating Hydrocarbon, and Total Well Depth Measurements

Before purging and sampling occurred, the depth to water, floating hydrocarbon thickness, and total well depth were measured using an oil/water interface measuring system. The oil/water interface measuring system consists of a probe that emits a continuous audible tone when immersed in a nonconductive fluid, such as oil or gasoline, and an intermittent tone when immersed in a conductive fluid, such as water. The floating hydrocarbon thickness and water level were measured by lowering the probe into the well. Liquid levels were recorded relative to the tone emitted at the groundwater surface. The sonic probe was decontaminated by being rinsed with deionized water or steam cleaned after each use. A bottom-filling, clear Teflon® bailer was used to verify floating hydrocarbon thickness measurements of less than 0.02 foot. Alternatively, an electric sounder and a bottom-filling Teflon bailer may have been used to record floating hydrocarbon thickness and depth to water.

The electric sounder is a transistorized instrument that uses a reel-mounted, two-conductor, coaxial cable that connects the control panel to the sensor. Cable markings are stamped at 1-foot intervals. The water level was measured by lowering the sensor into the monitoring well. A low-current circuit was completed when the sensor contacted the water, which served as an electrolyte. The current was amplified and fed into an indicator light and audible buzzer, signaling when water had been contacted. A sensitivity control compensated for highly saline or conductive water. The electric sounder was decontaminated by being rinsed with deionized water after each use. The bailer was lowered to a point just below the liquid level, retrieved, and observed for floating hydrocarbon.

Liquid measurements were recorded to the nearest 0.01 foot on the depth to water/floating product survey form. The groundwater elevation at each monitoring well was calculated by subtracting the measured depth to water from the surveyed elevation of the top of the well casing. (Every attempt was made to measure depth to water for all wells on the same day.) Total well depth was then measured by lowering the sensor to the bottom of the well. Total well depth, used to calculate purge volumes and to determine whether the well screen was partially obstructed by silt, was recorded to the nearest 0.1 foot on the depth to water/floating product survey form.

Well Purging

If the depth to groundwater was above the top of screens of the monitoring wells, then the wells were purged. Before sampling occurred, a polyvinyl chloride (PVC) bailer, centrifugal pump, low-flow submersible pump, or Teflon bailer was used to purge standing water in the casing and gravel pack from the monitoring well. Monitoring wells were purged according to the protocol presented in Figure A-1. In most monitoring wells, the amount of water purged before sampling was greater than or equal to three casing volumes. Some monitoring wells were expected to be evacuated to dryness after removing fewer than three casing volumes. These low-yield monitoring wells were allowed to recharge for up to 24 hours. Samples were obtained as soon as the monitoring wells recharged to a level sufficient for sample collection. If insufficient water recharged after 24 hours, the monitoring well was recorded as dry for the sampling event.

Groundwater purged from the monitoring wells was transported in a 500-gallon water trailer, 55-gallon drum, or a 325-gallon truck-mounted tank to EMCON's San Jose or Sacramento office location for temporary storage. EMCON arranged for transport and disposal of the purged groundwater through Integrated Waste Stream Management, Inc.

Field measurements of pH, specific conductance, and temperature were recorded in a waterproof field logbook. Figure A-2 shows an example of the water sample field data sheet on which field data are recorded. Field data sheets were reviewed for completeness by the sampling coordinator after the sampling event was completed.

The pH, specific conductance, and temperature meter were calibrated each day before field activities were begun. The calibration was checked once each day to verify meter performance. Field meter calibrations were recorded on the water sample field data sheet.

Well Sampling

A Teflon bailer was the only equipment acceptable for well sampling. When samples for volatile organic analysis were being collected, the flow of groundwater from the bailer was regulated to minimize turbulence and aeration. Glass bottles of at least 40-milliliters volume and fitted with Teflon-lined septa were used in sampling for volatile organics. These bottles were filled completely to prevent air from remaining in the bottle. A positive meniscus formed when the bottle was completely full. A convex Teflon septum was placed over the positive meniscus to eliminate air. After the bottle was capped, it was inverted and tapped to verify that it contained no air bubbles. The sample containers for other parameters were filled, filtered as required, and capped.

When required, dissolved concentrations of metals were determined using appropriate field filtration techniques. The sample was filtered by emptying the contents of the Teflon bailer into a pressure transfer vessel. A disposable 0.45-micron acrylic copolymer filter was threaded onto the transfer vessel at the discharge point, and the vessel was sealed. Pressure was applied to the vessel with a hand pump and the filtrate directed into the appropriate containers. Each filter was used once and discarded.

Sample Preservation and Handling

The following section specifies sample containers, preservation methods, and sample handling procedures.

Sample Containers and Preservation

Sample containers vary with each type of analytical parameter. Container types and materials were selected to be nonreactive with the particular analytical parameter tested.

Sample Handling

Sample containers were labeled immediately prior to sample collection. Samples were kept cool with cold packs until received by the laboratory. At the time of sampling, each sample was logged on an ARCO chain-of-custody record that accompanied the sample to the laboratory.

Samples that required overnight storage prior to shipping to the laboratory were kept cool (4° C) in a refrigerator. The refrigerator was kept in a warehouse, which was locked when not occupied by an EMCON employee. A sample/refrigerator log was kept to record the date and time that samples were placed into and removed from the refrigerator.

Samples were transferred from EMCON to an ARCO-approved laboratory by courier or taken directly to the laboratory by the environmental sampler. Sample shipments from EMCON to laboratories performing the selected analyses routinely occurred within 24 hours of sample collection.

Sample Documentation

The following procedures were used during sampling and analysis to provide chain-of-custody control during sample handling from collection through storage. Sample documentation included the use of the following:

- Water sample field data sheets to document sampling activities in the field
- Labels to identify individual samples
- Chain-of-custody record sheets for documenting possession and transfer of samples
- Laboratory analysis request sheets for documenting analyses to be performed

Field Logbook

In the field, the sampler recorded the following information on the water sample field data sheet (see Figure A-2) for each sample collected:

- Project number
- Client's name
- Location
- Name of sampler
- Date and time
- Well accessibility and integrity
- Pertinent well data (e.g., casing diameter, depth to water, well depth)
- Calculated and actual purge volumes
- Purging equipment used
- Sampling equipment used
- Appearance of each sample (e.g., color, turbidity, sediment)
- Results of field analyses (temperature, pH, specific conductance)
- General comments

The water sample field data sheet was signed by the sampler and reviewed by the sampling coordinator.

Labels

Sample labels contained the following information:

- Project number
- Sample number (i.e., well designation)
- Sample depth
- Sampler's initials
- Date and time of collection
- Type of preservation used (if any)

Sampling and Analysis Chain-of-Custody Record

The ARCO chain-of-custody record initiated at the time of sampling contained, at a minimum, the sample designation (including the depth at which the sample was collected), sample type, analytical request, date of sampling, and the name of the sampler. The record sheet was signed, timed, and dated by the sampler when transferring the samples. The number of custodians in the chain of possession was minimized. A copy of the ARCO chain-of-custody record was returned to EMCON with the analytical results.

Groundwater Sampling and Analysis Request Form

A groundwater sampling and analysis request form (see Figure A-3) was used to communicate to the environmental sampler the requirements of the monitoring event. At a minimum, the groundwater sampling and analysis request form included the following information:

- Date scheduled
- Site-specific instructions
- Specific analytical parameters
- Well number
- Well specifications (expected total depth, depth of water, and product thickness)

MONITORING WELL PURGING PROTOCOL

OWT

MEASURE AND RECORD DEPTH TO WATER AND WELL TOTAL DEPTH

CHECK FOR FLOATING PRODUCT

YES

MEASURE AND DOCUMENT FLOATING PRODUCT THICKNESS. DO NOT SAMPLE WELL FOR DISSOLVED CONSTITUENTS.

NO

CALCULATE PURGE VOLUME BY USING THE FOLLOWING EQUATION:

$P = \pi r^2 h \times 7.48 \times 3$

where:

P = calculated purge volume (gallons)

$\pi = 3.14$

r = radius of well casing in feet

h = height of water column in feet

EVACUATE WATER FROM WELL EQUAL TO THE CALCULATED PURGE VOLUME WHILE MONITORING GROUNDWATER STABILIZATION INDICATOR PARAMETERS (pH, CONDUCTIVITY, TEMPERATURE) AT INTERVALS OF ONE CASING VOLUME.

WELL EVACUATED TO PRACTICAL LIMITS OF DRYNESS BEFORE REMOVING CALCULATED PURGE VOLUME

NO

FINAL TWO SETS OF GROUNDWATER STABILIZATION INDICATOR PARAMETER MEASUREMENTS MEET THE FOLLOWING CRITERIA:

pH = ± 0.1 pH units

COND. = ± 10 %

TEMP. = ± 1.0 °F

YES

WELL PURGING CRITERIA MET; PROCEED TO WELL SAMPLING.

NO

CONTINUE PURGING; EVACUATE ADDITIONAL CASING VOLUME OF WATER, MONITORING INDICATOR PARAMETERS FOR STABILITY.

YES

WELL RECHARGES TO A LEVEL SUFFICIENT FOR SAMPLE COLLECTION WITHIN 24 HOURS OF EVACUATION TO DRYNESS.

YES

FIELD TEST FIRST RECHARGE WATER FOR INDICATOR PARAMETERS, THEN PROCEED TO WELL SAMPLING.

NO

RECORD WELL AS DRY FOR PURPOSES OF SAMPLING.

EMCON

MONITORING WELL PURGING PROTOCOL

FIGURE

A-1

WATER SAMPLE FIELD DATA SHEET

Rev. 5/96

OWT

PROJECT NO : _____ SAMPLE ID : _____

PURGED BY : _____ CLIENT NAME : _____

SAMPLED BY : _____ LOCATION : _____

TYPE: Groundwater _____ Surface Water _____ Leachate _____ Other _____

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

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

DEPTH OF WELL (feet) : _____ CALCULATED PURGE (gal.) : _____

DEPTH OF WATER (feet) : _____ ACTUAL PURGE VOL. (gal.) : _____

DATE PURGED : _____ END PURGE : _____

DATE SAMPLED : _____ SAMPLING TIME : _____

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	TURBIDITY (visual/NTU)	TIME (2400 HR)

OTHER: _____ ODOR: _____ (COBALT 0-100) (NTU 0-200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1) : _____

PURGING EQUIPMENT

_____ 2" Bladder Pump _____ Bailer (Teflon)

_____ Centrifugal Pump _____ Bailer (PVC)

_____ Submersible Pump _____ Bailer (Stainless Steel)

_____ Well Wizard™ _____ Dedicated

Other: _____

SAMPLING EQUIPMENT

_____ 2" Bladder Pump _____ Bailer (Teflon)

_____ Bomb Sampler _____ Bailer (Stainless Steel)

_____ Dipper _____ Submersible Pump

_____ Well Wizard™ _____ Dedicated

Other: _____

WELL INTEGRITY: _____ LOCK: _____

REMARKS: _____

pH, E.C., Temp. Meter Calibration: Date: _____ Time: _____ Meter Serial No.: _____

E.C. 1000 _____ / _____ pH 7 _____ / _____ pH 10 _____ / _____ pH 4 _____ / _____

Temperature °F _____

SIGNATURE: _____ REVIEWED BY: _____ PAGE _____ OF _____

EMCON

WATER SAMPLE FIELD DATA SHEET

FIGURE A-2

OWT

EMCON - SACRAMENTO
GROUNDWATER SAMPLING AND ANALYSIS REQUEST FORM

PROJECT NAME :

SCHEDULED DATE :

SPECIAL INSTRUCTIONS / CONSIDERATIONS :

Project Authorization: _____
EMCON Project No.: _____
OWT Project No.: _____
Task Code: _____
Originals To: _____
cc: _____

Well Lock Number (s)

☐ CHECK BOX TO AUTHORIZE DATA ENTRY

Site Contact: _____ Name _____ Phone #

Well Number or Source	Casing Diameter (inches)	Casing Length (feet)	Depth to Water (feet)	ANAYSES REQUESTED

Laboratory and Lab QC Istructions:

EMCON

SAMPLING AND ANALYSIS REQUEST FORM

FIGURE
A-3

APPENDIX B

CERTIFIED ANALYTICAL REPORTS, AND CHAIN-OF-CUSTODY DOCUMENTATION

Columbia Analytical Services INC.
An Employee-Owned Company

March 2, 1999 Service Request No.: S9900553

Mr. Glen Vanderveen
PINNACLE
144 A Mayhew Wy.
Walnut Creek, CA 94596

RE: 20805-123.005/TO #24118.00/RAT8/2035 ALBANY

Dear Mr. Vanderveen:

The following pages contain analytical results for sample(s) received by the laboratory on February 17, 1999. 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 14, 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,

Bernadette T. Cox
Project Chemist

Regional QA Coordinator

COLUMBIA ANALYTICAL SERVICES, Inc.
Acronyms

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9900553
Project:	20805-123.005/TO #24118.00/RAT8/2035 ALBANY	**Date Collected:**	2/16/99
Sample Matrix:	Water	**Date Received:**	2/17/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-4(9)	Units:	ug/L (ppb)
Lab Code:	S9900553-001	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	10	NA	2/27/99	<500	C1
Benzene	EPA 5030	8020	0.5	10	NA	2/27/99	<5	C1
Toluene	EPA 5030	8020	0.5	10	NA	2/27/99	<5	C1
Ethylbenzene	EPA 5030	8020	0.5	10	NA	2/27/99	<5	C1
Xylenes, Total	EPA 5030	8020	0.5	10	NA	2/27/99	<5	C1
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	10	NA	2/27/99	400	

C1 The MRL was elevated due to high analyte concentration requiring sample dilution.

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9900553
Project:	20805-123.005/TO #24118.00/RAT8/2035 ALBANY	**Date Collected:**	2/16/99
Sample Matrix:	Water	**Date Received:**	2/17/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-1(29)	Units:	ug/L (ppb)
Lab Code:	S9900553-002	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	10	NA	2/26/99	1200	
Benzene	EPA 5030	8020	0.5	10	NA	2/26/99	390	
Toluene	EPA 5030	8020	0.5	10	NA	2/26/99	<5	C1
Ethylbenzene	EPA 5030	8020	0.5	10	NA	2/26/99	<5	C1
Xylenes, Total	EPA 5030	8020	0.5	10	NA	2/26/99	6	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	10	NA	2/26/99	45	

C1 The MRL was elevated due to high analyte concentration requiring sample dilution.

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9900553
Project:	20805-123.005/TO #24118.00/RAT8/2035 ALBANY	**Date Collected:**	2/16/99
Sample Matrix:	Water	**Date Received:**	2/17/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-2(28)	Units:	ug/L (ppb)
Lab Code:	S9900553-003	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	2/27/99	ND	
Benzene	EPA 5030	8020	0.5	1	NA	2/27/99	ND	
Toluene	EPA 5030	8020	0.5	1	NA	2/27/99	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	2/27/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	2/27/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	2/27/99	13	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9900553
Project:	20805-123.005/TO #24118.00/RAT8/2035 ALBANY	**Date Collected:**	2/16/99
Sample Matrix:	Water	**Date Received:**	2/17/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-6(12)	Units:	ug/L (ppb)
Lab Code:	S9900553-004	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	4	NA	2/27/99	<200	C1
Benzene	EPA 5030	8020	0.5	4	NA	2/27/99	<2	C1
Toluene	EPA 5030	8020	0.5	4	NA	2/27/99	<2	C1
Ethylbenzene	EPA 5030	8020	0.5	4	NA	2/27/99	<2	C1
Xylenes, Total	EPA 5030	8020	0.5	4	NA	2/27/99	<2	C1
Methyl *tert* -Butyl Ether	EPA 5030	8020	3	4	NA	2/27/99	200	

C1 The MRL was elevated due to high analyte concentration requiring sample dilution.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9900553
Project:	20805-123.005/TO #24118.00/RAT8/2035 ALBANY	**Date Collected:**	2/16/99
Sample Matrix:	Water	**Date Received:**	2/17/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-3(32)	Units:	ug/L (ppb)
Lab Code:	S9900553-005	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	10	NA	2/27/99	<500	C1
Benzene	EPA 5030	8020	0.5	10	NA	2/27/99	<5	C1
Toluene	EPA 5030	8020	0.5	10	NA	2/27/99	<5	C1
Ethylbenzene	EPA 5030	8020	0.5	10	NA	2/27/99	<5	C1
Xylenes, Total	EPA 5030	8020	0.5	10	NA	2/27/99	<5	C1
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	10	NA	2/27/99	700	

C1 The MRL was elevated due to high analyte concentration requiring sample dilution.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9900553
Project:	20805-123.005/TO #24118.00/RAT8/2035 ALBANY	**Date Collected:**	2/17/99
Sample Matrix:	Water	**Date Received:**	2/17/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	RW-1(24)	Units:	ug/L (ppb)
Lab Code:	S9900553-006	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	4	NA	2/26/99	250	
Benzene	EPA 5030	8020	0.5	4	NA	2/26/99	61	
Toluene	EPA 5030	8020	0.5	4	NA	2/26/99	2	
Ethylbenzene	EPA 5030	8020	0.5	4	NA	2/26/99	2	
Xylenes, Total	EPA 5030	8020	0.5	4	NA	2/26/99	19	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	4	NA	2/26/99	94	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9900553
Project:	20805-123.005/TO #24118.00/RAT8/2035 ALBANY	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank (GC2)	Units:	ug/L (ppb)
Lab Code:	S990226-WB4	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	2/26/99	ND	
Benzene	EPA 5030	8020	0.5	1	NA	2/26/99	ND	
Toluene	EPA 5030	8020	0.5	1	NA	2/26/99	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	2/26/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	2/26/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	2/26/99	ND	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9900553
Project:	20805-123.005/TO #24118.00/RAT8/2035 ALBANY	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank (GC1)	Units:	ug/L (ppb)
Lab Code:	S990225-WB2	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	2/25/99	ND	
Benzene	EPA 5030	8020	0.5	1	NA	2/25/99	ND	
Toluene	EPA 5030	8020	0.5	1	NA	2/25/99	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	2/25/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	2/25/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	2/25/99	ND	

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-123.005/TO #24118.00/RAT8/2035 ALBANY
Sample Matrix: Water

Service Request: S9900553
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: NA

Surrogate Recovery Summary
BTEX, MTBE and TPH as Gasoline

Prep Method: EPA 5030
Analysis Method: 8020 CA/LUFT

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery	
			4-Bromofluorobenzene	a,a,a-Trifluorotoluene
MW-4(9)	S9900553-001		90	83
MW-1(29)	S9900553-002		97	95
MW-2(28)	S9900553-003		88	84
MW-6(12)	S9900553-004		90	80
MW-3(32)	S9900553-005		90	76
RW-1(24)	S9900553-006		100	90
MW-4(9)	S9900553-001MS		85	90
MW-4(9)	S9900553-001DMS		83	86
Method Blank (GC2)	S990226-WB4		87	87
Method Blank (GC1)	S990225-WB2		104	87
CAS Acceptance Limits:			69-116	69-116

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-123.005/TO #24118.00/RAT8/2035 ALBANY
Sample Matrix Water

Service Request: S9900553
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 2/27/99

Matrix Spike/Duplicate Matrix Spike Summary
TPH as Gasoline

Sample Name: MW-4(9)
Lab Code: S9900553-001MS, S9900553-001DMS
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
Gasoline	EPA 5030	CA/LUFT	50	250	250	ND	230	230	92	92	75-135	<1	

DMS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-123.005/TO #24118.00/RAT8/2035 ALBANY

Service Request: S9900553
Date Analyzed: 2/26/99

Initial Calibration Verification (ICV) Summary
BTEX, MTBE and TPH as Gasoline

Sample Name: ICV
Lab Code: ICV1
Test Notes:

Units: ug/L (ppb)
Basis: NA

ICV Source:

Analyte	Prep Method	Analysis Method	True Value	Result	CAS Percent Recovery Acceptance Limits	Percent Recovery	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	250	230	90-110	92	
Benzene	EPA 5030	8020	25	24	85-115	96	
Toluene	EPA 5030	8020	25	24	85-115	96	
Ethylbenzene	EPA 5030	8020	25	24	85-115	96	
Xylenes, Total	EPA 5030	8020	75	72	85-115	96	
Methyl *tert*-Butyl Ether	EPA 5030	8020	25	22	85-115	88	

ICV032196

ARCO Products Company
Division of Atlantic/Richfield Company

S9900553 Task Order No. 24118.00

Chain of Custody

ARCO Facility no. 2035	City (Facility) Albany	Project manager (Consultant) Glen VanderVeen	Laboratory Name CAS
ARCO engineer Paul Supple	Telephone no. (ARCO)	Telephone no. (Consultant) (408) 453-7300	Fax no. (Consultant) (408) 437-9526
Consultant name EMCON		Address (Consultant) 144-A Mayhew Way, Walnut Creek, CA 94596	Contract Number

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH incl. MTBE EPA M8020/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM 503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Semi Metals ☐ VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org/DHS ☐ Lead EPA 7420/7421 ☐			
MW-4 (9')	2	1	X			X	HCl	2/16/99	1225		X												
MW-1 (8')	2	2	X			X	HCl		1205		X												
MW-7 (8')	2	3	X			X	HCl		1300		X												
MW-6 (12')	2	4	X			X	HCl		1315		X												
MW-3 (32')	2	5	X			X	HCl	↓	1405		X												
RW-1 (24')	2	6	X			X	HCl	2/17/99	0955		X												

Method of shipment: Sampler will deliver

Special Detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: RAT 8
2-40ml/HCl VOAs
420805-123005

Lab Number

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

Condition of sample:

Temperature received: Due: 3/3/99 R11D3

Relinquished by sampler: Manuel L. Molloy	Date 2/16/99 Time	Received by: Joseph Pacheco CAS 2/17/99 1835	
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory	Date Time

Distribution: White Copy – Laboratory: Canary Copy – ARCO Environmental Engineering: Pink Copy – Consultant

APPENDIX C

FIELD DATA SHEETS

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : **21775-217.004** STATION ADDRESS : **101 San Pablo Avenue, Albany** DATE : **2/16/99**

ARCO STATION # : **2035** FIELD TECHNICIAN : **Manuel Gallegos** DAY : **Tuesday**

DTW Order	WELL ID	Well Box Seal	Type Of Well Box	Well Box Secure	Lock Number	Type Of Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-5	OK	15/14	YES	ARCO	LWC	8.35	8.35	ND	NR	25.1	
2	MW-4	OK	15/10	YES	ARCO	LWC	8.56	8.56			24.7	
3	MW-1	OK	15/10	NO	~~ARCO~~ none	LWC	8.10	8.10			29.4	Needs new box.
4	MW-2	OK	15/10	YES	ARCO	LWC	9.04	9.04			28.5	
5	MW-6	OK	15/14	OK	ARCO	LWC	11.92	11.92			24.0	
6	MW-3	OK	15/14	OK	ARCO	LWC	8.60	8.60			32.6	
7	RW-1	OK	3/4	OK	None	LWC	7.70	7.70			24.9	

SURVEY POINTS ARE TOP OF WELL CASINGS

WATER SAMPLE FIELD DATA SHEET

Rev 1/97

OWT

PROJECT NO 21775-217.004 | SAMPLE ID MW-1 (29')
PURGED BY M. Gallegos | CLIENT NAME ARCO # 2035
SAMPLED BY ↓ | LOCATION Albany, CA

TYPE Groundwater X | Surface Water ____ | Leachate ____ | Other ____

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

CASING ELEVATION (feet/MSL)	NR	VOLUME IN CASING (gal.)	13.91
DEPTH OF WELL (feet)	29.4	CALCULATED PURGE (gal.)	41.74
DEPTH OF WATER (feet)	8.10	ACTUAL PURGE VOL. (gal.)	42.0

DATE PURGED: 2-16-99 | END PURGE: 1157
DATE SAMPLED: ↓ | SAMPLING TIME: 1205

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1148	14.0	6.34	842	62.2	Cloudy	Light
1152	28.0	6.58	848	64.4	Brn	Heavy
1157	42.0	6.60	839	64.4	"	"

OTHER: DO = 1 | ODOR: Strong | NR (COBALT 0-100) | NR (NTU 0-200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

PURGING EQUIPMENT

____ 2" Bladder Pump | ____ Bailer (Teflon)
X Centrifugal Pump | ____ Bailer (PVC)
____ Submersible Pump | ____ Bailer (Stainless Steel)
____ Well Wizard™ | ____ Dedicated
Other: ____

SAMPLING EQUIPMENT

____ 2" Bladder Pump | ✓ Bailer (Teflon)
____ Bomb Sampler | ____ Bailer (Stainless Steel)
____ Dipper | ____ Submersible Pump
____ Well Wizard™ | ____ Dedicated
Other: ____

WELL INTEGRITY: OK | LOCK: ____

REMARKS: all Samples taken

pH, E.C., Temp. Meter Calibration: Date 2/16/99 | Time 1140 | Meter Serial No. 87m
E.C. 1000 1003 / 1000 | pH 7 7.02 / 7.00 | pH 10 10.02 / 10.00 | pH 4 4.01 / 4.00
Temperature °F 56.0

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WATER SAMPLE FIELD DATA SHEET

Rev 1/97

OWT

PROJECT NO 21775-217.004 | SAMPLE ID MW-2 (28')
PURGED BY M. Gallegos | CLIENT NAME ARCO # 2035
SAMPLED BY ↓ | LOCATION Albany, CA

TYPE: Groundwater X | Surface Water ____ | Leachate ____ | Other ____

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

CASING ELEVATION (feet/MSL)	NR	VOLUME IN CASING (gal.)	12.71
DEPTH OF WELL (feet)	28.5	CALCULATED PURGE (gal.)	38.14
DEPTH OF WATER (feet)	6.04	ACTUAL PURGE VOL. (gal.)	38.5

DATE PURGED: 2-16-99 | END PURGE: 1251
DATE SAMPLED: ↓ | SAMPLING TIME: 1300

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1241	13.0	6.53	783	62.6	clear	clear
1246	26.0	6.57	794	63.2		
1251	38.5	6.57	799	63.1	↓	↓

OTHER: DO = .5 | ODOR: None | NR (COBALT 0-100) | NR (NTU 0-200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

PURGING EQUIPMENT

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

SAMPLING EQUIPMENT

____ 2" Bladder Pump | ✓ Bailer (Teflon)
____ Bomb Sampler | ____ Bailer (Stainless Steel)
____ Dipper | ____ Submersible Pump
____ Well Wizard™ | ____ Dedicated
Other: ____

WELL INTEGRITY: OK | LOCK: ARCO

REMARKS: All Samples taken

pH, E.C., Temp. Meter Calibration: Date 2/16/99 | Time ____ | Meter Serial No. 67m
E.C. 1000 1000 | pH 7 700 | pH 10 1000 | pH 4 400
Temperature °F ____

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WATER SAMPLE FIELD DATA SHEET

Rev 1/97

OWT

PROJECT NO 21775-217.004 | SAMPLE ID MW-3 (32')
PURGED BY M. Gallegos | CLIENT NAME ARCO # 2035
SAMPLED BY ↓ | LOCATION Albany, CA

TYPE Groundwater X Surface Water ____ Leachate ____ Other ____

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

CASING ELEVATION (feet/MSL)	NR	VOLUME IN CASING (gal.)	15.68
DEPTH OF WELL (feet)	32.6	CALCULATED PURGE (gal.)	47.04
DEPTH OF WATER (feet)	8.60	ACTUAL PURGE VOL. (gal.)	47.5

DATE PURGED 2-16-99 | END PURGE 1357
DATE SAMPLED ↓ | SAMPLING TIME 1405

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1345	16.0	6.69	661	62.7	cloudy	mod
1351	32.0	6.62	650	63.0	clear	Light
1357	47.5	6.69	648	62.9	TAN	mod

OTHER: DO = 1 | ODOR: moderate | NR (COBALT 0-100) | NR (NTU 0-200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): 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
____ Bomb Sampler
____ Dipper
____ Well Wizard™
✓ Bailer (Teflon)
____ Bailer (Stainless Steel)
____ Submersible Pump
____ Dedicated
Other: ____

WELL INTEGRITY: OK | LOCK: ARCO

REMARKS: all samples taken

pH, E.C., Temp. Meter Calibration: Date 2/16/99 | Time ____ | Meter Serial No. 67m
E.C. 1000 1000 | pH 7 7.00 | pH 10 1000 | pH 4 4.00
Temperature °F

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WATER SAMPLE FIELD DATA SHEET

Rev 1/97

OWT

PROJECT NO 21775-217.004 SAMPLE ID MW-4 (9')
PURGED BY M. Gallegos CLIENT NAME ARCO # 2035
SAMPLED BY ↓ LOCATION Albany, CA

TYPE Groundwater X Surface Water ____ Leachate ____ Other ____
CASING DIAMETER (inches) 2 ____ 3 ____ 4 ✓ 4.5 ____ 6 ____ Other ____

CASING ELEVATION (feet/MSL)	NR	VOLUME IN CASING (gal.)	~~10.454~~
DEPTH OF WELL (feet)	24.7	CALCULATED PURGE (gal.)	31.65
DEPTH OF WATER (feet)	8.56	ACTUAL PURGE VOL. (gal.)	↓

DATE PURGED 2-16-99 END PURGE ←
DATE SAMPLED ↓ SAMPLING TIME 1225

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
	~~10.5~~	6.52	425	62.4	BRN	hi
	~~21.0~~					
	~~32.0~~					
1225	~~Grab~~	6.52	1125	62.4	↓	Heavy

OTHER: DO = 1 ODOR: none

NR (COBALT 0-100)	NR (NTU 0-200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

PURGING EQUIPMENT

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

Other: ____

SAMPLING EQUIPMENT

____ 2" Bladder Pump	X Bailer (Teflon)
____ Bomb Sampler	____ Bailer (Stainless Steel)
____ Dipper	____ Submersible Pump
____ Well Wizard™	____ Dedicated

Other: ____

WELL INTEGRITY: OK LOCK: OK

REMARKS: all samples taken

pH, E.C., Temp. Meter Calibration: Date 2/16/99 Time ____ Meter Serial No. 870

E.C. 1000 1/1000 pH 7 1/700 pH 10 1/1000 pH 4 1/400

Temperature °F ____

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WATER SAMPLE FIELD DATA SHEET

Rev 1/97

OWT

PROJECT NO 21775-217.004 | SAMPLE ID MW-6 (12')
PURGED BY M. Gallegos | CLIENT NAME ARCO 2035
SAMPLED BY ↓ | LOCATION Albany CA

TYPE Groundwater X | Surface Water ____ | Leachate ____ | Other ____

CASING DIAMETER (inches) 2 ✓ | 3 ____ | 4 ____ | 4.5 ____ | 6 ____ | Other ____

CASING ELEVATION (feet/MSL)	NR	VOLUME IN CASING (gal.)	NR
DEPTH OF WELL (feet)	24.0	CALCULATED PURGE (gal.)	↓
DEPTH OF WATER (feet)	11.92	ACTUAL PURGE VOL. (gal.)	↓

DATE PURGED: 2-16-99 | END PURGE: ____
DATE SAMPLED: ↓ | SAMPLING TIME: 1315

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1315	GRAB	6.69	754	61.7	Clear	Clear

OTHER: DO = .5 | ODOR: none | NR (COBALT 0-100) | NR (NTU 0-200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

PURGING EQUIPMENT

____ 2" Bladder Pump | ____ Bailer (Teflon)
____ Centrifugal Pump | ____ Bailer (PVC)
____ Submersible Pump | ____ Bailer (Stainless Steel)
____ Well Wizard™ | ____ Dedicated
Other: ____

SAMPLING EQUIPMENT

____ 2" Bladder Pump | ✓ Bailer (Teflon)
____ Bomb Sampler | ____ Bailer (Stainless Steel)
____ Dipper | ____ Submersible Pump
____ Well Wizard™ | ____ Dedicated
Other: ____

WELL INTEGRITY: OK | LOCK: ARCO

REMARKS: all samples taken

pH, E.C., Temp. Meter Calibration Date: 2/16/99 | Time: ____ | Meter Serial No: 87m
E.C. 1000 1000 | pH 7 1700 | pH 10 1000 | pH 4 1400
Temperature °F ____

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WATER SAMPLE FIELD DATA SHEET

Rev 1/97

OWT

PROJECT NO 21775-217.004 | SAMPLE ID ~~MW~~ RW-1 (24')
PURGED BY M. Gallegos | CLIENT NAME ARCO # 2055
SAMPLED BY √ | LOCATION Albany, CA

TYPE Groundwater X · Surface Water ____ Leachate ____ Other ____
CASING DIAMETER (inches) 2 ____ 3 ____ 4 ____ 4.5 ____ 6 X Other ____

CASING ELEVATION (feet/MSL)	N/R	VOLUME IN CASING (gal.)	26.79
DEPTH OF WELL (feet)	24.9	CALCULATED PURGE (gal.)	80.39
DEPTH OF WATER (feet)	6.67	ACTUAL PURGE VOL. (gal.)	80.5

DATE PURGED: 2-16-99 | END PURGE: 0948
DATE SAMPLED: √ | SAMPLING TIME: 0955

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
0936	27.0	7.82	754	63.6	cloudy	mod
0942	54.0	7.66	814	64.9	clear	Light
0948	80.5	7.58	859	65.2	"	"

OTHER: DO = 1 | ODOR: Slight | N/R (COBALT 0-100) | N/R (NTU 0-200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): N/R

PURGING EQUIPMENT

____ 2" Bladder Pump
√ Centrifugal Pump
____ Submersible Pump
____ Well Wizard™
____ Bailer (Teflon)
____ Bailer (PVC)
____ Bailer (Stainless Steel)
____ Dedicated
Other: ____

SAMPLING EQUIPMENT

____ 2" Bladder Pump
____ Bomb Sampler
____ Dipper
____ Well Wizard™
√ Bailer (Teflon)
____ Bailer (Stainless Steel)
____ Submersible Pump
____ Dedicated
Other: ____

WELL INTEGRITY: OK | LOCK: none

REMARKS: all Samples taken

pH, E.C., Temp. Meter Calibration: Date 2/16/99 | Time 0917 | Meter Serial No 27m
E.C. 1000 1003/1000 | pH 7 6.98/7.00 | pH 10 9.97/10.00 | pH 4 4.03/4.00
Temperature °F 56.6

SIGNATURE: [signature] | REVIEWED BY MA | PAGE 6 OF 6

EMCON Associates - Field Services | Historical Monitoring Well Data

1921 Ringwood Avenue | 1999 | ARCO 2035

San Jose, California | 21775-217.004

Well ID	Quarter	Date	Purge Volume (gallons)	Did well dry	Well Contained Product	
						Gallons
						First 208.50
						Second 197.50
						Third 119.00
						Fourth 73.00
MW-1	First	02/16/99	42.00	NO	NO	
	Second	05/12/98	40.00	NO	NO	
	Third	08/20/98	39.00	NO	NO	
	Fourth	10/20/98	38.00	NO	NO	
MW-2	First	02/16/99	38.50	NO	NO	
	Second	05/12/98	37.50	NO	NO	
	Third	08/20/98	36.00	NO	NO	
	Fourth	10/20/98	35.00	NO	NO	
MW-3	First	02/16/99	47.50	NO	NO	
	Second	05/12/98	46.00	NO	NO	
	Third	08/20/98	44.00	NO	NO	
	Fourth	10/20/98	30.00	NO	NO	
MW-4	First	02/16/99	0.00	GRAB	NO	
	Second	05/12/98	0.00	GRAB	NO	
	Third	08/20/98	0.00	GRAB	NO	
	Fourth	10/20/98	0.00	GRAB	NO	
MW-5	First	02/16/99	0.00	NA	NO	
	Second	05/12/98	0.00	NA	NO	
	Third	08/20/98	0.00	NA	NO	
	Fourth	10/20/98	0.00	NA	NO	
MW-6	First	02/16/99	0.00	GRAB	NO	
	Second	05/12/98	0.00	GRAB	NO	
	Third	08/20/98	0.00	GRAB	NO	
	Fourth	10/20/98	0.00	GRAB	NO	
RW-1	First	02/16/99	80.50	NO	NO	
	Second	05/12/98	74.00	NO	NO	
	Third	08/20/98	0.00	GRAB	NO	
	Fourth	10/20/98	0.00	GRAB	NO	
						Steam water (gal) _____

ARCO Products Company
Division of Atlantic/Richfield Company

Task Order No. 24119.CC

Chain of Custody

ARCO Facility no. [illegible]
City (Facility) Albany
Project manager (Consultant) Glen VanderVeen
Laboratory Name CAS

ARCO engineer Paul Supple
Telephone no. (ARCO)
Telephone no. (Consultant) (408) 453-7300
Fax no. (Consultant) (408) 437-9526
Contract Number

Consultant name EMCON
Address (Consultant) 144-A Mayhew Way Walnut Creek, CA 9459[illegible]

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM 503E	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☐			
MW-4	(9)	2		X		X	HCl	2/16/99	1225		X												
MW-16	(9)	2		X		X	HCl	↓	1205		X												
MW-2	(28)	2		X		X	HCl	↓	1300		X												
MW-[illegible]	(12)	2		X		X	HCl	↓	1315		X												
MW-[illegible]	(32)	2		X		X	HCl	↓	1405		X												
MW-16	(X)	2		X		X	HCl	2/17/99	0955		X												

Method of shipment: Sampler will deliver

Special Detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: [illegible] 2 - 40ml HCl VOAs [illegible]

Lab Number

Turnaround Time:

Priority Rush 1 Business Day ☐

Rush 2 Business Days ☐

Expedited 5 Business Days ☐

Standard 10 Business Days ☑

Condition of sample:

Temperature received:

Relinquished by sampler	Date	Time	Received by
[signature]	2/16/99		[illegible]
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory / Date / Time

Distribution: White Copy – Laboratory: Canary Copy – ARCO Environmental Engineering: Pink Copy – Consultant