2201 Broadway, Suite 101
Oakland, CA 94612-3023
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the IT group

December 8, 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, Third 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 third 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.

The ACHCSA has approved changing monitoring from quarterly to semi-annual (September 3, 1999). Sampling will be conducted during 2nd and 4th quarters.

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.

99 DEC 13 AM 9:51

ENVIRONMENTAL PROTECTION

Please call if you have questions.

Sincerely,

Pinnacle

Dan Lescure
Project Manager

Dan Easter, R.G.
Project Geologist

Attachment: Quarterly Groundwater Monitoring Report, Third Quarter 1999

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

Date: December 8, 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.:	Dan Lescure /(510) 740-5804
		Primary Agency/Regulatory ID No.:	ACHCSA /Barney Chan

WORK PERFORMED THIS QUARTER (THIRD - 1999):

1. Prepared and submitted quarterly groundwater monitoring report for second quarter 1999.
2. Performed quarterly groundwater monitoring and sampling for third 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. Designed and managed construction of tank backfill well connection to the SVE system.
6. Started SVE system on 09/09/99 after connection of tank backfill well. Operated SVE system for remainder of the third quarter 1999, to extract from the tank backfill well only.

WORK PROPOSED FOR NEXT QUARTER (FOURTH - 1999):

1. Prepare and submit quarterly groundwater monitoring report for third quarter 1999.
2. Perform semi-annual groundwater monitoring and sampling for fourth quarter 1999.
3. Continue bubbling air into well RW-1.
4. Operate SVE system, if influent concentrations and mass extraction rate warrants.

QUARTERLY MONITORING:

Current Phase of Project:	Groundwater Monitoring and Operation and Maintenance of Remediation Systems SVE and Enhanced Bioremediation
Frequency of Sampling:	Annual (2nd quarter): MW-5 Semi-annual (2nd/4th quarter): MW-1 through MW-4, MW-6, RW-1
Frequency of Monitoring:	Semi-Annual (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:	10.7 feet
Groundwater Flow Direction and Gradient (Average):	0.01 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):	249 ppmv
Benzene Conc. End of Period (lab):	0.7 ppmv
SVE Flowrate End of Period:	92.1 cfm
Total HC Recovered This Period:	19.46 pounds
Total HC Recovered to Date:	3,241 pounds
Utility Usage	
Electric (KWH):	Not available
Gas (Therms):	Not available
Operating Hours This Period (SVE):	289.43 hours
Operating Hours to Date (SVE):	9162.06 hours
Percent Operational (SVE):	13.6%
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:	90%
Average Stack Temperature:	746.3°F
Average SVE Source Flow:	90 cfm
Average SVE Process Flow:	92.1 cfm
Average Source Vacuum:	15.4 inches of water

DISCUSSION

- ACHCSA has approved changing monitoring from quarterly to semi-annual (September 3, 1999). Sampling will be conducted during 2nd and 4th quarters.

ATTACHMENTS:

- Table 1 - Historical Groundwater Elevation and Analytical Data, Petroleum Hydrocarbons and Their Constituents
- Table 2 - Groundwater Flow Direction and Gradient
- Table 3 - Operational Uptime Information for the SVE System
- Table 4 - Flow Rates and Analytical Results of Air Samples
- Table 5 - Extraction Rates, Emission Rates, Destruction Efficiency, and Mass Removed
- 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 Number	Date Gauged	TOC Elevation (ft-MSL)	Depth to Water (feet)	FP Thickness (feet)	Groundwater Elevation (ft-MSL)	Date Sampled	TPH Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE 8020 (µg/L)	MTBE 8240/8260 (µg/L)	TRPH (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
MW-1	03-24-95	41.41	6.21	ND	35.20	03-24-95	8,800	3,600	<50	62	99	--	--	--		
MW-1	05-24-95	41.41	9.37	ND	32.04	05-24-95	4,800	2,000	<20	52	<20	--	--	--		
MW-1	08-22-95	41.41	10.30	ND	31.11	08-22-95	780	310	<2.5	12	<2.5	14	--	--		
MW-1	11-09-95	41.41	12.25	ND	29.16	11-09-95	58	14	<0.5	<0.5	<0.5	--	--	--		
MW-1	02-27-96	41.41	9.08	ND	32.33	02-27-96	2,700	930	12	18	32	51	--	--		
MW-1	04-22-96	41.41	9.11	ND	32.30	04-22-96	2,700	1,000	<10	22	<10	<60	--	--		
MW-1	08-15-96	41.41	10.37	ND	31.04	08-15-96	300	52	<0.5	0.9	<0.5	22	--	--		
MW-1	12-10-96	41.41	8.79	ND	32.62	12-10-96	270	63	0.7	<0.5	1	25	--	--		
MW-1	03-27-97	41.41	9.80	ND	31.61	03-27-97	1,500	610	<5	15	7	56	--	--		
MW-1	05-22-97	41.41	9.65	ND	31.76	05-22-97	110	6	<0.5	<0.5	0.7	10	--	--		
MW-1	09-04-97	41.41	10.22	ND	31.19	09-04-97	180	40	<0.5	1.2	0.5	26	--	--		
MW-1	11-03-97	41.41	10.68	ND	30.73	11-03-97	83	8	<0.5	<0.5	<0.5	13	--	--		
MW-1	02-20-98	41.41	6.92	ND	34.49	02-20-98	1,800	540	7	27	31	46	--	--		
MW-1	05-18-98	41.41	9.28	ND	32.13	05-18-98	4,500	1,300	20	57	20	<60	--	--		
MW-1	08-20-98	41.41	10.05	ND	31.36	08-21-98	530	110	<5	<5	<5	400	--	--		
MW-1	10-20-98	41.41	10.42	ND	30.99	10-20-98	66	9.1	<0.5	<0.5	<0.5	8	--	--		
MW-1	02-16-99	41.41	8.10	ND	33.31	02-16-99	1,200	390	<5	<5	6	45	--	--		
MW-1	05-24-99	41.41	9.53	ND	31.88	05-24-99	1,300	600	3	13	3	26	--	--		
MW-1	08-24-99	41.41	10.03	ND	31.38	08-24-99	100	21	1.3	<0.5	<0.5	8	--	--	0.55	P
MW-2	03-24-95	40.38	6.96	ND	33.42	03-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--		
MW-2	05-24-95	40.38	10.02	ND	30.36	05-24-95	Not sampled: well sampled semi-annually, during the first and third quarters									
MW-2	08-22-95	40.38	10.87	ND	29.51	08-22-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--		
MW-2	11-09-95	40.38	13.12	ND	27.26	11-09-95	Not sampled: well sampled semi-annually, during the first and third quarters									
MW-2	02-27-96	40.38	10.25	ND	30.13	02-27-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--		
MW-2	04-22-96	40.38	9.98	ND	30.40	04-22-96	Not sampled: well sampled semi-annually, during the first and third quarters									
MW-2	08-15-96	40.38	11.10	ND	29.28	08-15-96	<50	<0.5	<0.5	<0.5	<0.5	4	--	--		

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Well Number	Date Gauged	TOC Elevation (ft-MSL)	Depth to Water (feet)	FP Thickness (feet)	Groundwater Elevation (ft-MSL)	Date Sampled	TPH Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE 8020 (µg/L)	MTBE 8240/8260 (µg/L)	TRPH (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
MW-2	12-10-96	40.38	10.00	ND	30.38	12-10-96	Not sampled: well sampled semi-annually, during the first and third quarters									
MW-2	03-27-97	40.38	10.38	ND	30.00	03-27-97	<50	<0.5	<0.5	<0.5	<0.5	12	--	--		
MW-2	05-22-97	40.38	10.65	ND	29.73	05-22-97	Not sampled: well sampled semi-annually, during the first and third quarters									
MW-2	09-04-97	40.38	10.87	ND	29.51	09-04-97	<50	<0.5	<0.5	<0.5	<0.5	19	--			
MW-2	11-03-97	40.38	11.25	ND	29.13	11-03-97	<50	<0.5	<0.5	<0.5	<0.5	18	--	--		
MW-2	02-20-98	40.38	7.69	ND	32.69	02-20-98	<50	0.5	<0.5	<0.5	<0.5	12	--	--		
MW-2	05-18-98	40.38	9.88	ND	30.50	05-18-98	<50	<0.5	<0.5	<0.5	<0.5	10	--	--		
MW-2	08-20-98	40.38	10.62	ND	29.76	08-21-98	<50	<0.5	<0.5	<0.5	<0.5	3	--	--		
MW-2	10-20-98	40.38	11.00	ND	29.38	10-20-98	<50	<0.5	<0.5	<0.5	<0.5	31	--	--		
MW-2	02-16-99	40.38	9.04	ND	31.34	02-16-99	<50	<0.5	<0.5	<0.5	<0.5	13	--	--		
MW-2	05-24-99	40.38	9.90	ND	30.48	05-24-99	<50	0.6	<0.5	<0.5	<0.5	47	--	--		
MW-2	08-24-99	40.38	10.60	ND	29.78	08-24-99	<50	<0.5	<0.5	<0.5	<0.5	20	--	--	0.88	P
MW-3	03-24-95	41.44	7.29	ND	34.15	03-24-95	51	0.8	<0.5	2.4	<0.5	--	--	<500		
MW-3	05-24-95	41.44	9.53	ND	31.91	05-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	<500		
MW-3	08-22-95	41.44	11.19	ND	30.25	08-22-95	<50	<0.5	<0.5	<0.5	<0.5	79	--	<500		
MW-3	11-09-95	41.44	12.77	ND	28.67	11-09-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	600		
MW-3	02-27-96	41.44	9.41	ND	32.03	02-27-96	120	3.6	<0.5	2.2	3.7	90	--	<0.5		
MW-3	04-22-96	41.44	9.63	ND	31.81	04-22-96	<50	<0.5	<0.5	<0.5	<0.5	90	--	--		
MW-3	08-15-96	41.44	11.12	ND	30.32	08-15-96	<50	<0.5	<0.5	<0.5	<0.5	54	--	--		
MW-3	12-10-96	41.44	10.34	ND	31.10	12-10-96	71	<0.5	<0.5	<0.5	<0.5	130	--	--		
MW-3	03-27-97	41.44	10.28	ND	31.16	03-27-97	<100	<1	<1	<1	<1	170	--	--		
MW-3	05-22-97	41.44	10.40	ND	31.04	05-22-97	<100	<1	<1	<1	<1	95	--	--		
MW-3	09-04-97	41.44	10.75	ND	30.69	09-04-97	<50	<0.5	<0.5	<0.5	<0.5	37	--	--		
MW-3	11-03-97	41.44	11.44	ND	30.00	11-03-97	<200	<2	<2	<2	<2	130	--	--		
MW-3	02-20-98	41.44	7.48	ND	33.96	02-20-98	<200	<2	5	<2	8	140	--	<0.5		
MW-3	05-18-98	41.44	9.87	ND	31.57	05-18-98	<100	<1	<1	<1	<1	150	--	<0.5		

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MW-3	08-20-98	41.44	10.72	ND	30.72	08-21-98	<200	<2	<2	<2	<2	210	--	<0.5		
MW-3	10-20-98	41.44	11.30	ND	30.14	10-20-98	<200	<2	<2	<2	<2	270	--	<0.5		
MW-3	02-16-99	41.44	8.60	ND	32.84	02-16-99	<500	<5	<5	<5	<5	700	--	--		
MW-3	05-24-99	41.44	9.87	ND	31.57	05-24-99	<50	<0.5	<0.5	<0.5	<0.5	150	140	--		
MW-3	08-24-99	41.44	10.83	ND	30.61	08-24-99	<50	<0.5	<0.5	<0.5	<0.5	54	71	--	0.41	P
MW-4	03-24-95	40.33	5.92	ND	34.41	03-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--		
MW-4	05-24-95	40.33	9.23	ND	31.10	05-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--		
MW-4	08-22-95	40.33	10.61	ND	29.72	08-22-95	<50	<0.5	<0.5	<0.5	<0.5	99	--	--		
MW-4	11-09-95	40.33	11.97	ND	28.36	11-09-95	<50	<0.5	<0.5	<0.5	<0.5	--	89	--		
MW-4	02-27-96	40.33	8.84	ND	31.49	02-27-96	<50	0.8	<0.5	<0.5	<0.5	<3	--	--		
MW-4	04-22-96	40.33	9.15	ND	31.18	04-22-96	Not sampled: well sampled annually, during the first quarter									
MW-4	08-15-96	40.33	10.35	ND	29.98	08-15-96	Not sampled: well sampled annually, during the first quarter									
MW-4	12-10-96	40.33	8.70	ND	31.63	12-10-96	Not sampled: well sampled annually, during the first quarter									
MW-4	03-27-97	40.33	9.75	ND	30.58	03-27-97	<5,000	<50	<50	<50	<50	4,200	--	--		
MW-4	05-22-97	40.33	9.91	ND	30.42	05-22-97	Not sampled: well sampled annually, during the first quarter									
MW-4	09-04-97	40.33	10.25	ND	30.08	09-04-97	Not sampled: well sampled annually, during the first quarter									
MW-4	11-03-97	40.33	10.79	ND	29.54	11-03-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--		
MW-4	02-20-98	40.33	6.78	ND	33.55	02-20-98	<2,000	<20	<20	<20	<20	3,300	--	--		
MW-4	05-18-98	40.33	9.26	ND	31.07	05-18-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--		
MW-4	08-20-98	40.33	10.10	ND	30.23	08-21-98	<50	<0.5	<0.5	<0.5	<0.5	9	--	--		
MW-4	10-20-98	40.33	10.43	ND	29.90	10-20-98	<50	<0.5	<0.5	<0.5	<0.5	17	--	--		
MW-4	02-16-99	40.33	8.56	ND	31.77	02-16-99	<500	<5	<5	<5	<5	400	--	--		
MW-4	05-24-99	40.33	9.52	ND	30.81	05-24-99	<50	<0.5	<0.5	<0.5	<0.5	10	7.6	--		
MW-4	08-24-99	40.33	9.99	ND	30.34	08-24-99	<2,500	<25	<25	<25	<25	1,200	1,300	--	0.84	NP
MW-5	03-24-95	41.84	6.23	ND	35.61	03-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--		

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Well Number	Date Gauged	TOC Elevation (ft-MSL)	Depth to Water (feet)	FP Thickness (feet)	Groundwater Elevation (ft-MSL)	Date Sampled	TPH Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE 8020 (µg/L)	MTBE 8240/8260 (µg/L)	TRPH (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
MW-5	05-24-95	41.84	9.61	ND	32.23	05-24-95	Not sampled: well sampled annually, during the first quarter									
MW-5	08-22-95	41.84	11.12	ND	30.72	08-22-95	Not sampled: well sampled annually, during the first quarter									
MW-5	11-09-95	41.84	12.52	ND	29.32	11-09-95	Not sampled: well sampled annually, during the first quarter									
MW-5	02-27-96	41.84	9.52	ND	32.32	02-27-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--		
MW-5	04-22-96	41.84	9.44	ND	32.40	04-22-96	Not sampled: well sampled annually, during the first quarter									
MW-5	08-15-96	41.84	10.83	ND	31.01	08-15-96	Not sampled: well sampled annually, during the first quarter									
MW-5	12-10-96	41.84	9.20	ND	32.64	12-10-96	Not sampled: well sampled annually, during the first quarter									
MW-5	03-27-97	41.84	10.10	ND	31.74	03-27-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--		
MW-5	05-22-97	41.84	10.28	ND	31.56	05-22-97	Not sampled: well sampled annually, during the first quarter									
MW-5	09-04-97	41.84	10.73	ND	31.11	09-04-97	Not sampled: well sampled annually, during the first quarter									
MW-5	11-03-97	41.84	11.23	ND	30.61	11-03-97	Not sampled: well sampled annually, during the first quarter									
MW-5	02-20-98	41.84	6.67	ND	35.17	02-20-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--		
MW-5	05-18-98	41.84	9.61	ND	32.23	05-18-98	Not sampled: well sampled annually, during the first quarter									
MW-5	08-20-98	41.84	10.58	ND	31.26	08-21-98	Not sampled: well sampled annually, during the first quarter									
MW-5	10-20-98	41.84	10.66	ND	31.18	10-20-98	Not sampled: well sampled annually, during the first quarter									
MW-5	02-16-99	41.84	8.35	ND	33.49	02-16-99	Not sampled									
MW-5	05-24-99	41.84	9.95	ND	31.89	05-24-99	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--		
MW-5	08-24-99	41.84	10.51	ND	31.33	08-24-99	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	0.79	NP
MW-6	03-24-95	40.13	9.03	ND	31.10	03-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--		
MW-6	05-24-95	40.13	12.45	ND	27.68	05-24-95	Not sampled: well sampled annually, during the first quarter									
MW-6	08-22-95	40.13	13.32	ND	26.81	08-22-95	Not sampled: well sampled annually, during the first quarter									
MW-6	11-09-95	40.13	14.13	ND	26.00	11-09-95	Not sampled: well sampled annually, during the first quarter									
MW-6	02-27-96	40.13	11.86	ND	28.27	02-27-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--		
MW-6	04-22-96	40.13	12.35	ND	27.78	04-22-96	Not sampled: well sampled annually, during the first quarter									
MW-6	08-15-96	40.13	13.18	ND	26.95	08-15-96	Not sampled: well sampled annually, during the first quarter									
MW-6	12-10-96	40.13	11.94	ND	28.19	12-10-96	Not sampled: well sampled annually, during the first quarter									

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 Number	Date Gauged	TOC Elevation (ft-MSL)	Depth to Water (feet)	FP Thickness (feet)	Groundwater Elevation (ft-MSL)	Date Sampled	TPH Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE 8020 (µg/L)	MTBE 8240/8260 (µg/L)	TRPH (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
MW-6	03-27-97	40.13	13.10	ND	27.03	03-27-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--		
MW-6	05-22-97	40.13	13.00	ND	27.13	05-22-97	Not sampled: well sampled annually, during the first quarter									
MW-6	09-04-97	40.13	13.30	ND	26.83	09-04-97	Not sampled: well sampled annually, during the first quarter									
MW-6	11-03-97	40.13	13.42	ND	26.71	11-03-97	<50	<0.5	<0.5	<0.5	<0.5	19	--	--		
MW-6	02-20-98	40.13	10.57	ND	29.56	02-20-98	<100	<1	<1	<1	<1	95	--	--		
MW-6	05-18-98	40.13	12.64	ND	27.49	05-18-98	<100	<1	<1	<1	<1	180	--	--		
MW-6	08-20-98	40.13	13.13	ND	27.00	08-21-98	<100	<1	<1	<1	<1	180	--	--		
MW-6	10-20-98	40.13	13.48	ND	26.65	10-20-98	<100	<1	<1	<1	<1	180	--	--		
MW-6	02-16-99	40.13	11.92	ND	28.21	02-16-99	<200	<2	<2	<2	<2	200	--	--		
MW-6	05-24-99	40.13	12.80	ND	27.33	05-24-99	<50	<0.5	<0.5	<0.5	<0.5	120	--	--		
MW-6	08-24-99	40.13	13.03	ND	27.10	08-24-99	<50	<0.5	<0.5	<0.5	<0.5	44	--	--	0.46	NP
RW-1	03-24-95	40.33	9.32	0.01	31.02**	03-24-95	11,000	560	660	150	1,700	--	--	--		
RW-1	05-24-95	40.33	9.75	0.03	30.60**	05-24-95	Not sampled: well contained floating product									
RW-1	08-22-95	40.33	10.86	0.02	29.48**	08-22-95	Not sampled: well contained floating product									
RW-1	11-09-95	40.33	20.61	ND	19.72	11-09-95	1,600	79	46	13	240	--	--	--		
RW-1	02-27-96	40.33	16.56	ND	23.77	02-27-96	210	44	7.5	2.5	24	29	--	--		
RW-1	04-22-96	40.33	9.65	ND	30.68	04-22-96	36,000	7,400	3,700	580	3,400	<300	--	--		
RW-1	08-15-96	40.33	10.60	ND	29.73	08-15-96	1,800	31	38	15	150	<30	--	--		
RW-1	12-10-96	40.33	8.72	ND	31.61	12-10-96	25,000	1,900	1,000	330	3,200	<100	--	--		
RW-1	03-27-97	40.33	10.33	ND	30.00	03-27-97	7,200	1,900	59	95	240	480	--	--		
RW-1	05-22-97	40.33	10.10	ND	30.23	05-22-97	3,000	630	84	45	340	<60	--	--		
RW-1	09-04-97	40.33	10.42	ND	29.91	09-04-97	7,100	120	55	14	160	<60	--	--		
RW-1	11-03-97	40.33	9.10	ND	31.23	11-03-97	<200	14	19	3	19	140	--	--		
RW-1	02-20-98	40.33	7.49	ND	32.84	02-20-98	3,800	1,000	85	64	220	950	--	--		
RW-1	05-18-98	40.33	8.90	ND	31.43	05-18-98	<200	45	<2	2	4	220	--	--		
RW-1	08-20-98	40.33	11.06	ND	29.27	08-21-98	480	200	<2	<2	30	180	--	--		

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 Number	Date Gauged	TOC Elevation (ft-MSL)	Depth to Water (feet)	FP Thickness (feet)	Groundwater Elevation (ft-MSL)	Date Sampled	TPH Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE 8020 (µg/L)	MTBE 8240/8260 (µg/L)	TRPH (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
RW-1	10-20-98	40.33	11.12	ND	29.21	10-20-98	110	36	2.9	<0.5	4.1	5	--	--		
RW-1	02-16-99	40.33	7.70	ND	32.63	02-17-99	250	61	2	2	19	94	--	--		
RW-1	05-24-99	40.33	11.12	ND	29.21	05-24-99	4,500	2,000	7	<2	180	35	--	--		
RW-1	08-24-99	40.33	10.15	ND	30.18	08-24-99	2,600	1,100	6.3	2.3	17	39	--	--	0.52	NP

TOC: top of casing
ft-MSL: elevation in feet, relative to mean sea level
TPH: total petroleum hydrocarbons as gasoline, California DHS LUFT Method
BTEX: benzene, toluene, ethylbenzene, xylenes by EPA method 8020
MTBE: Methyl tert-butyl ether
TRPH: total recoverable petroleum hydrocarbons, by EPA method 418.1
µg/L: micrograms per liter
mg/L: milligrams per liter
ND: none detected
--: not analyzed or not applicable
<: denotes concentration not present at or above laboratory detection limit stated to the right.
*: 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
Groundwater Flow Direction and Gradient

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

Date Measured	Average Flow Direction	Average Hydraulic Gradient
03-24-95	Northwest	0.037
05-24-95	West-Northwest	0.013
08-22-95	Southwest	0.012
11-09-95	West-Southwest	0.01
02-27-96	Southwest	0.009
04-22-96	West-Southwest	0.014
08-15-96	Southwest	0.011
12-10-96	West-Southwest	0.023
03-27-97	West-Southwest	0.026
05-22-97	West-Southwest	0.024
09-04-97	West	0.019
11-03-97	Southwest	0.038
02-20-98	West	0.031
05-18-98	West	0.02
08-20-98	West	0.02
10-20-98	West	0.02
02-16-99	West	0.03
05-24-99	West-Southwest	0.03
08-24-99	**West-Southwest**	**0.01**

Table 3
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
08/17/99	13146.19	8872.83	54	0	54	0%	2079	418
09/09/99	13146.76	8873.40	23	0	23	0%	2102	418
09/21/99	13435.42	9162.06	12	12	0	100%	2114	430

Table 4
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
09/09/99	Influent	15.4	1900	90	<49	0.7	1.1	<0.1	<0.2	33
	Effluent		1200	92.1	<5	<0.1	<0.1	<0.1	<0.2	<0.8

[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 5
Soil Vapor Extraction System
Extraction Rates, Emission Rates, Destruction Efficiency, and Mass Removed
(1997 - present)

ARCO Service Station No. 2035
1001 San Pablo Avenue, Alabany, 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	0.0	0.0000	3023	250.5
09/02/98	6.1116	<0.0078	0.3057	<0.0027	95%	NC	134.9	0.0000	3157	250.5
10/19/98	0.5485	<0.0007	<0.1956	<0.0031	NC	NC	0.00	0.0000	3157	250.5
11/10/98	0.0686	<0.0007	<0.1956	<0.0031	NC	NC	0.000	0.0000	3157	250.5
06/10/99	2.4715	0.0097	<0.1375	<0.0021	94%	NC	64.45	0.2517	3222	250.8
09/09/99	<1.6149	0.0180	<0.1693	<0.0026	90%	NC	19.46	0.2171	3241	251.0

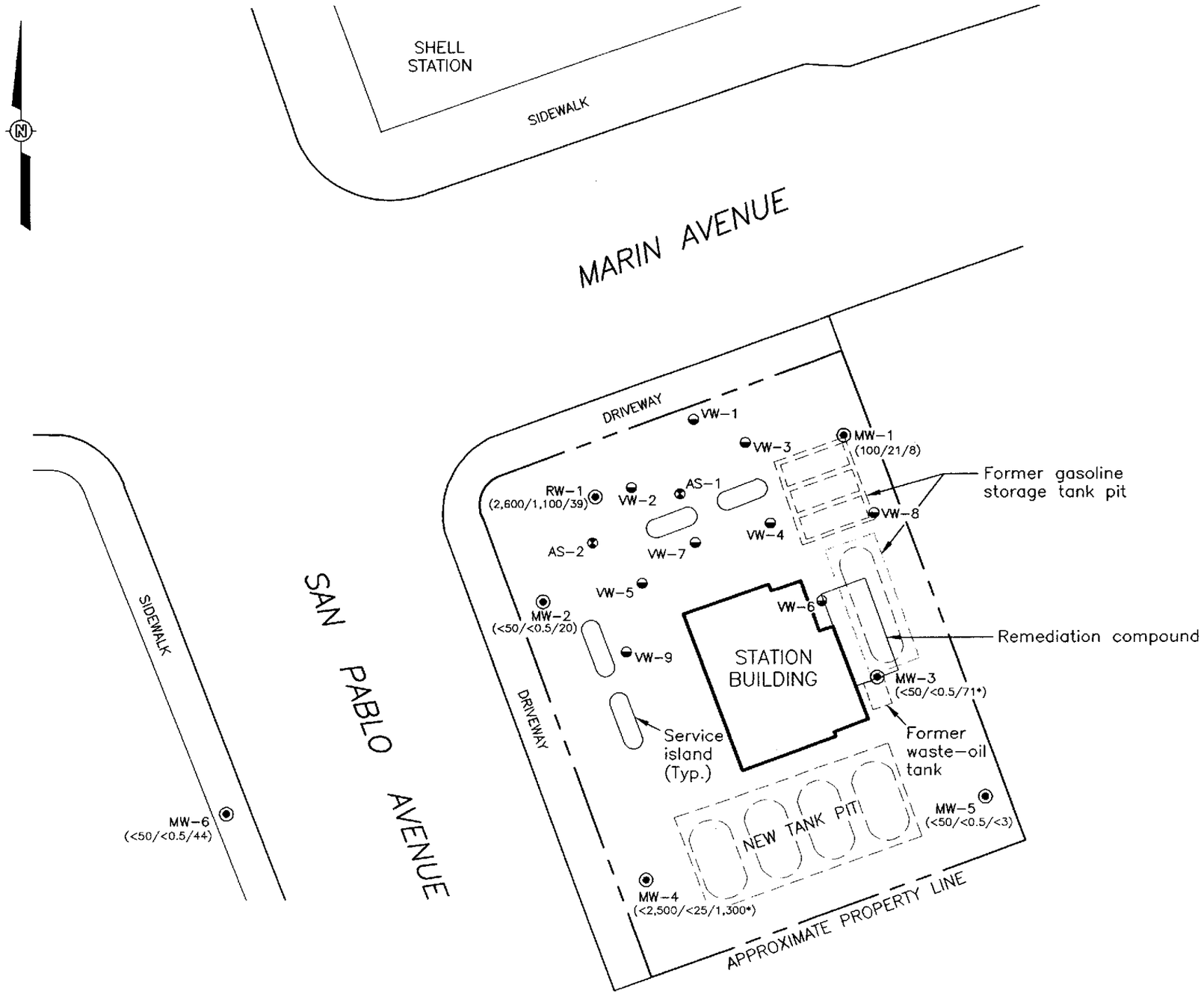
[1] Extraction Rate, lbs/day = (Influent Flow, cfm)(Influent conc., ppmv)(g/mole)(60 min/hr)(24 hr/day)(28.3 L/cf) / (10^6)(24.45 moles/L)(453.6 g/lb)
where TPHG = 100 g/mole and Benzene = 78.1 g/mole; Influent conc. = 0, if reported as non-detect

[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)

DRAWN BY	PROJECT NUMBER
K. Black 11-1-99	791643



EXPLANATION

◉	Groundwater monitoring well
◒	Vapor extraction well
⊗	Air sparge well
(100/21/8)	Concentration of total petroleum hydrocarbons as gasoline (TPHG), benzene, and MTBE in groundwater (ug/L); samples collected 8/24/99
<	Not detected at or above the indicated laboratory detection limit
*	Analyzed by EPA Method 8260

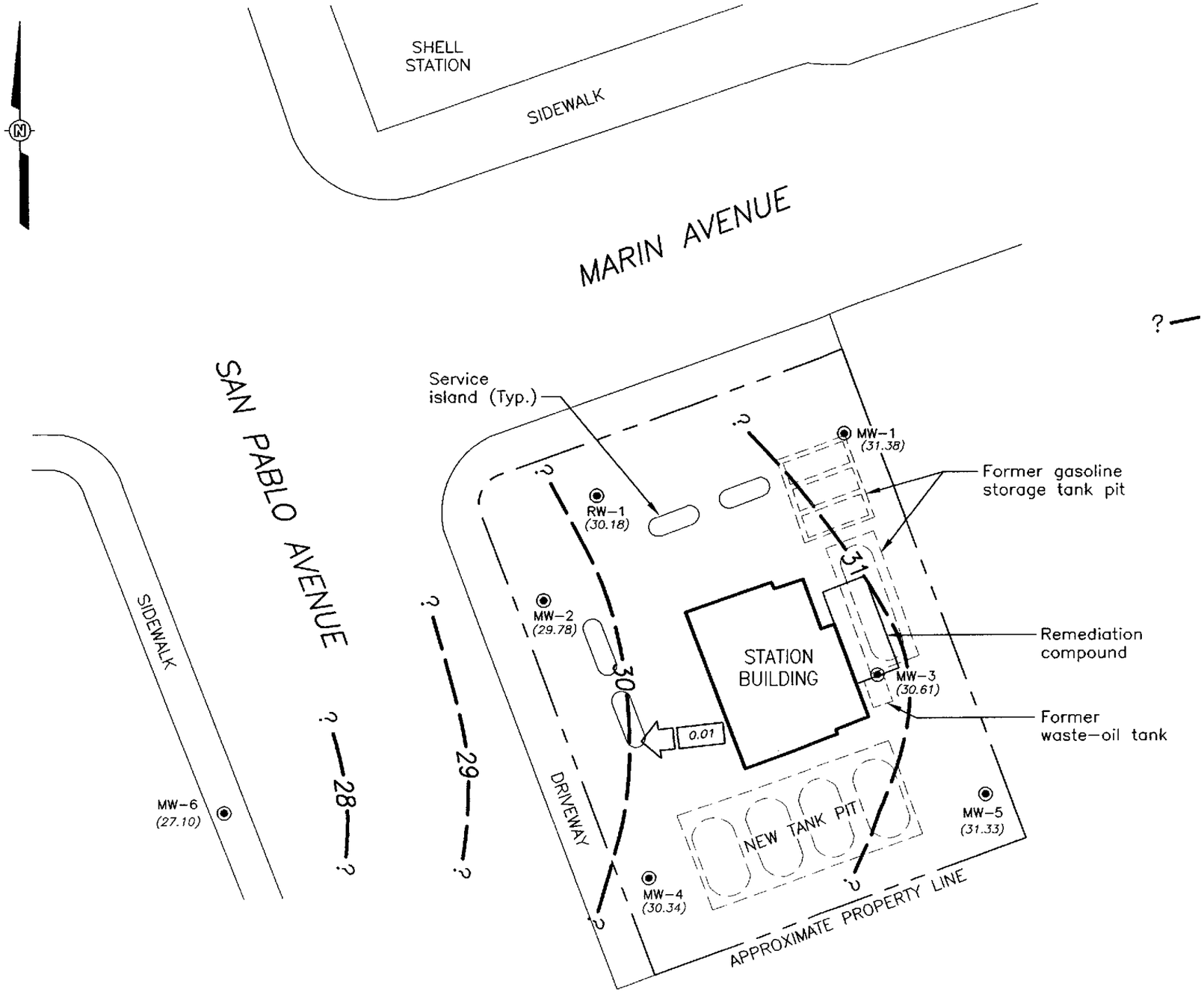
IT CORPORATION

ARCO PRODUCTS COMPANY
SERVICE STATION 2035

FIGURE 1
GROUNDWATER ANALYTICAL SUMMARY
THIRD QUARTER 1999
1001 SAN PABLO AVENUE
ALBANY, CALIFORNIA

SAN10SF/CADD: N:\rmd\DWG\PINACL\2035\2035chem.dwg Sun 31/Oct/99 04:36pm kblack

DRAWN BY	PROJECT NUMBER
K. Black 11-16-99	791643



EXPLANATION

- ⊙ Groundwater monitoring well
- (30.61) Groundwater elevation (Ft.–MSL); measured 8/24/99
- ? – – – Groundwater elevation contour (Ft.–MSL)
- ⇦ Approximate direction of groundwater flow showing gradient

SCALE
0 30 60 FEET

IT CORPORATION

ARCO PRODUCTS COMPANY
SERVICE STATION 2035

FIGURE 2
GROUNDWATER ELEVATION CONTOURS
THIRD QUARTER 1999
1001 SAN PABLO AVENUE
ALBANY, CALIFORNIA

SANJOSE/CADD- N:\cad\DWG\PINACL\2035\2035qwc.dwg Mon, 01/Nov/99 11:38pm kblack

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 IT's San Jose or Sacramento office location for temporary storage. IT 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 IT 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 IT to an ARCO-approved laboratory by courier or taken directly to the laboratory by the environmental sampler. Sample shipments from IT 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

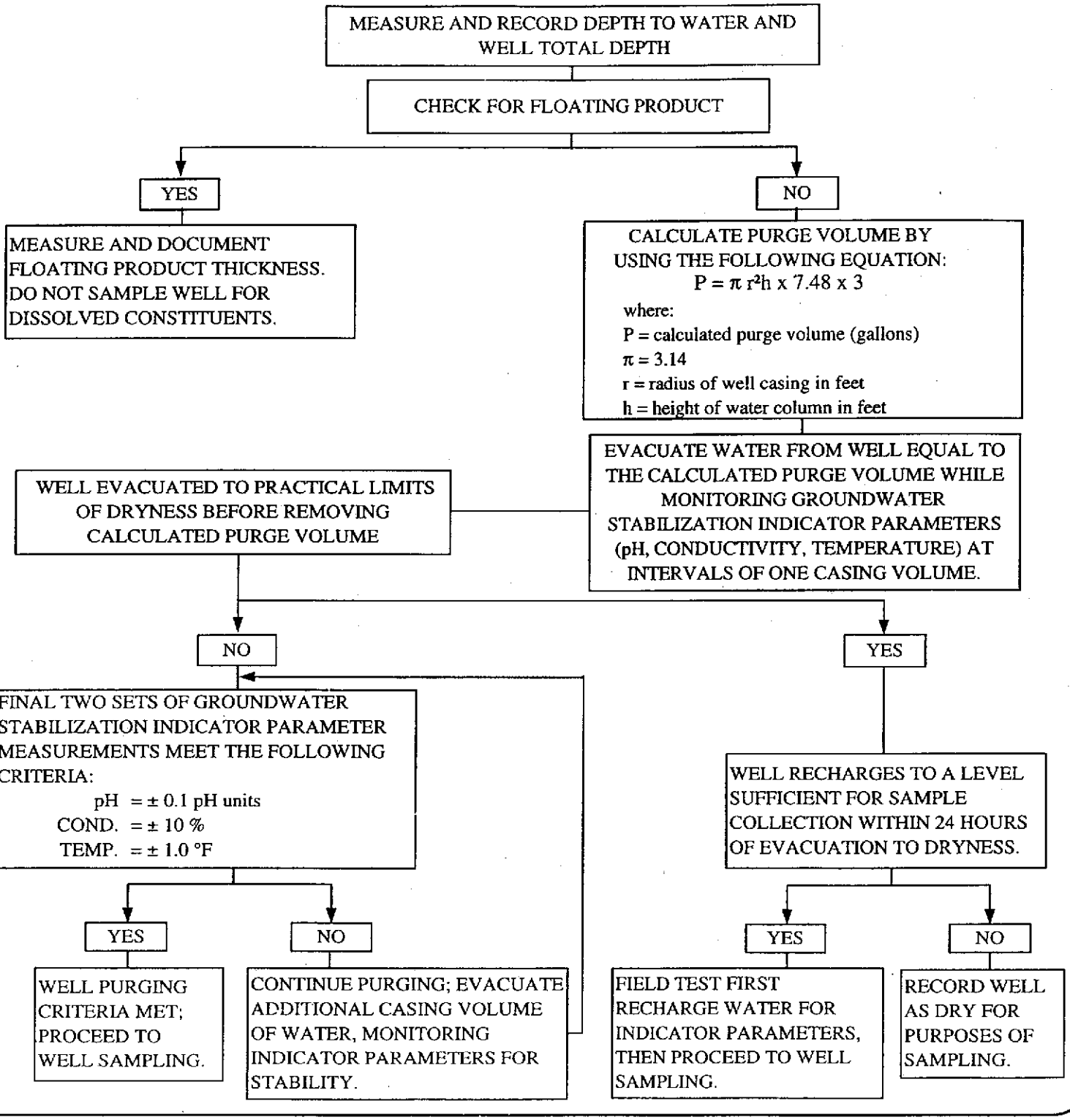
The ARCO chain-of-custody record initiated at the time of sampling contained, at a minimum, the sample designation (including the depth at which the sample was collected), sample type, analytical request, date of sampling, and the name of the sampler. The record sheet was signed, timed, and dated by 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 IT 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



MONITORING WELL PURGING PROTOCOL

FIGURE
A-1

WATER SAMPLE FIELD DATA SHEET

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 _____

FIGURE A-2

WATER SAMPLE FIELD DATA SHEET

IT - 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:

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

September 10, 1999

Service Request No.: S9902611

Mr. Glen Vanderveen
IT/EMCON
2201 Broadway, Suite 101
Oakland, CA 94612

RE: TO#24118.00/RAT8/2035 ALBANY

Dear Mr. Vanderveen:

Enclosed are the results of the sample(s) submitted to our laboratory on August 25, 1999. All analyses were performed in accordance with our laboratory's quality assurance program. Results are intended to be considered in their entirety and apply to the sample(s) analyzed. Columbia Analytical Services is not responsible for use of less than the complete report. Signature of this CAS Analytical Report confirms that pages 2 through 23, following, have been thoroughly reviewed and approved for release.

Columbia Analytical Services is certified for environmental analyses by the California Department of Health Services (certificate number: 1496, expiration: January 31, 2001).

If you have any questions, please call me at (408) 748-9700.

Respectfully submitted,

Columbia Analytical Services, Inc.

Bernadette Troncales
Project Chemist

Greg Jordan
Laboratory Director

SEP 20 1999

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902611
Project:	TO#24118.00/RAT8/2035 Albany	**Date Collected:**	8/24/99
Sample Matrix:	Water	**Date Received:**	8/25/99

NARRATIVE

All analyses were performed in accordance with our laboratory's quality assurance program. This report contains analytical results for sample(s) designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Matrix Spike (MS) and Duplicate Matrix Spike (DMS).

All EPA recommended holding times have been met for analyses in this sample delivery group.

The following difficulties were experienced during the analysis of MW-4(24):

A total of four vials were supplied by the client for the analyses of TPH Gas, BTEX/MTBE by EPA 8020 and MTBE confirmation by EPA 8260. Columbia Analytical Services (CAS) designated two vials for TPH Gas, BTEX/MTBE analysis (vials #1 and #2) and the other two vials for MTBE by 8260 (vials #3 and #4).

Initial analysis of the sample for TPH Gas, BTEX/MTBE was done within hold time; however, upon review of the report by the project chemist, it was noticed that the result for MTBE by 8020 (vial #1) did not match the value obtained by EPA 8260 (vial #3), 50 ppb and 1300 ppb, respectively. CAS re-analyzed the same vial (#1), used for TPH Gas, by EPA 8260 on 9/11/99 and yielded 60 ppb which agreed with the value for MTBE by 8020. Another vial (#2) was then analyzed for both TPH Gas/BTEX/MTBE and EPA 8260: the results for MTBE by 8020 yielded 1200 ppb and MTBE by 8260 yielded 1100 ppb. Based on these findings, it is suspected that the results for vial #1 was the anomaly and can be attributed to incorrect sample I.D. on the bottle label.

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:**	S9902611
Project:	TO#24118.00/RAT8/2035 ALBANY	**Date Collected:**	8/24/99
Sample Matrix:	Water	**Date Received:**	8/25/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-5(24)	Units:	ug/L (ppb)
Lab Code:	S9902611-001	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	1	NA	9/5/99	ND	
Benzene	EPA 5030	8020	0.5	1	NA	9/5/99	ND	
Toluene	EPA 5030	8020	0.5	1	NA	9/5/99	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	9/5/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	9/5/99	ND	
Methyl *tert* -Butyl Ether	EPA 5030	8020	3	1	NA	9/5/99	ND	

Approved By: _____ Date: 09/10/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

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

Service Request: S9902611
Date Collected: 8/24/99
Date Received: 8/25/99

BTEX, MTBE and TPH as Gasoline

Sample Name: MW-4(24)
Lab Code: S9902611-002
Test Notes: X

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	50	NA	9/14/99	<2500	C1
Benzene	EPA 5030	8020	0.5	50	NA	9/14/99	<25	C1
Toluene	EPA 5030	8020	0.5	50	NA	9/14/99	<25	C1
Ethylbenzene	EPA 5030	8020	0.5	50	NA	9/14/99	<25	C1
Xylenes, Total	EPA 5030	8020	0.5	50	NA	9/14/99	<25	C1
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	50	NA	9/14/99	1200	

X Sample was analyzed 7 days past hold time for this analyte. Refer to case narrative.
C1 The MRL was elevated due to high analyte concentration requiring sample dilution.

Approved By: _____ Date: 09/10/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902611
Project:	TO#24118.00/RAT8/2035 ALBANY	**Date Collected:**	8/24/99
Sample Matrix:	Water	**Date Received:**	8/25/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-1(28)	Units:	ug/L (ppb)
Lab Code:	S9902611-003	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	9/5/99	100	
Benzene	EPA 5030	8020	0.5	1	NA	9/5/99	21	
Toluene	EPA 5030	8020	0.5	1	NA	9/5/99	1.3	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	9/5/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	9/5/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	9/5/99	8	

Approved By: _____ Date: 09/10/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902611
Project:	TO#24118.00/RAT8/2035 ALBANY	**Date Collected:**	8/24/99
Sample Matrix:	Water	**Date Received:**	8/25/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-2(27)	Units:	ug/L (ppb)
Lab Code:	S9902611-004	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	1	NA	9/5/99	ND	
Benzene	EPA 5030	8020	0.5	1	NA	9/5/99	ND	
Toluene	EPA 5030	8020	0.5	1	NA	9/5/99	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	9/5/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	9/5/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	9/5/99	20	

Approved By: _____ Date: 09/10/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902611
Project:	TO#24118.00/RAT8/2035 ALBANY	**Date Collected:**	8/24/99
Sample Matrix:	Water	**Date Received:**	8/25/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-6(23)	Units:	ug/L (ppb)
Lab Code:	S9902611-005	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	1	NA	9/5/99	ND	
Benzene	EPA 5030	8020	0.5	1	NA	9/5/99	ND	
Toluene	EPA 5030	8020	0.5	1	NA	9/5/99	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	9/5/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	9/5/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	9/5/99	44	

Approved By: _____ Date: 09/10/99

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902611
Project:	TO#24118.00/RAT8/2035 ALBANY	**Date Collected:**	8/24/99
Sample Matrix:	Water	**Date Received:**	8/25/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-3(32)	Units:	ug/L (ppb)
Lab Code:	S9902611-006	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	1	NA	9/5/99	ND	
Benzene	EPA 5030	8020	0.5	1	NA	9/5/99	ND	
Toluene	EPA 5030	8020	0.5	1	NA	9/5/99	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	9/5/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	9/5/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	9/5/99	54	

Approved By: _____ Date: 09/10/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902611
Project:	TO#24118.00/RAT8/2035 ALBANY	**Date Collected:**	8/24/99
Sample Matrix:	Water	**Date Received:**	8/25/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	RW-1(24)	Units:	ug/L (ppb)
Lab Code:	S9902611-007	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	5	NA	9/9/99	2600	
Benzene	EPA 5030	8020	0.5	5	NA	9/9/99	1100	
Toluene	EPA 5030	8020	0.5	1	NA	9/5/99	6.3	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	9/5/99	2.3	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	9/5/99	17	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	9/5/99	39	

Approved By: _____ Date: 09/10/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902611
Project:	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	Units:	ug/L (ppb)
Lab Code:	S990904-WB1	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	9/5/99	ND	
Benzene	EPA 5030	8020	0.5	1	NA	9/5/99	ND	
Toluene	EPA 5030	8020	0.5	1	NA	9/5/99	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	9/5/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	9/5/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	9/5/99	ND	

Approved By: _____ Date: 09/10/99

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902611
Project:	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	Units:	ug/L (ppb)
Lab Code:	S990908-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	9/9/99	ND	
Benzene	EPA 5030	8020	0.5	1	NA	9/9/99	ND	
Toluene	EPA 5030	8020	0.5	1	NA	9/9/99	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	9/9/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	9/9/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	9/9/99	ND	

Approved By: _____ Date: 09/10/99

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S9902611
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	Percent Recovery a,a,a-Trifluorotoluene
MW-5(24)	S9902611-001		92	89
MW-4(24)	S9902611-002		99	94
MW-1(28)	S9902611-003		98	93
MW-2(27)	S9902611-004		99	105
MW-6(23)	S9902611-005		100	104
MW-3(32)	S9902611-006		92	108
RW-1(24)	S9902611-007		88	113
Lab Control Sample	S990905-LCS		98	99
Lab Control Sample	S990905-DLCS		103	100
Lab Control Sample	S990905-LCS		86	109
Lab Control Sample	S990905-DLCS		87	110
Method Blank	S990904-WB1		96	107
Method Blank	S990908-WB2		92	104
Lab Control Sample	S990908-LCS		96	103
Lab Control Sample	S990908-DLCS		97	98
Lab Control Sample	S990908-LCS		87	109
Lab Control Sample	S990908-DLCS		86	112

CAS Acceptance Limits: 69-116 72-139

Approved By: _____ Date: 09/10/99

SUR2/020397p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S9902611
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 9/5/99

Lab Control/Duplicate Lab Control Sample Summary
BTE

Sample Name: Lab Control Sample
Lab Code: S990905-LCS, S990905-DLCS
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
Benzene	EPA 5030	8020	0.5	25	25	ND	27	27	108	108	75-135	<1
Toluene	EPA 5030	8020	0.5	25	25	ND	25	24	100	96	73-136	4
Ethylbenzene	EPA 5030	8020	0.5	25	25	ND	27	26	108	104	69-142	4

Approved By: _____ Date: 09/10/99

DMS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S9902611
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 9/8/99

Lab Control/Duplicate Lab Control Sample Summary
BTE

Sample Name: Lab Control Sample
Lab Code: S990908-LCS S990908-DLCS
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
Benzene	EPA 5030	8020	0.5	25	25	ND	25	28	100	112	75-135	11
Toluene	EPA 5030	8020	0.5	25	25	ND	23	28	92	112	73-136	20
Ethylbenzene	EPA 5030	8020	0.5	25	25	ND	25	27	100	108	69-142	8

Approved By: _____ Date: 09/10/99

DMS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S9902611
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 9/5/99

Lab Control/Duplicate Lab Control Sample Summary
TPH as Gasoline

Sample Name: Lab Control Sample
Lab Code: S990905-LCS, S990905-DLCS
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	253	229	101	92	75-135	10	

Approved By: _____ Date: 09/10/99

DMS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S9902611
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 9/8/99

Lab Control/Duplicate Lab Control Sample Summary
TPH as Gasoline

Sample Name: Lab Control Sample
Lab Code: S990908-LCS S990908-DLCS
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	247	213	99	85	75-135	15	

Approved By: _____ Date: 09/10/99

DMS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S9902611
Date Analyzed: 9/8/99

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	253	85-115	101	
Benzene	EPA 5030	8020	25	27	85-115	108	
Toluene	EPA 5030	8020	25	24	85-115	96	
Ethylbenzene	EPA 5030	8020	25	26	85-115	104	
Xylenes, Total	EPA 5030	8020	75	76	85-115	101	
Methyl *tert*-Butyl Ether	EPA 5030	8020	25	27	85-115	108	

Approved By: _____ Date: 09/10/99

ICV/032196

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S9902611
Date Analyzed: 9/5/99

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	273	85-115	109	
Benzene	EPA 5030	8020	25	27	85-115	108	
Toluene	EPA 5030	8020	25	27	85-115	108	
Ethylbenzene	EPA 5030	8020	25	26	85-115	104	
Xylenes, Total	EPA 5030	8020	75	79	85-115	105	
Methyl *tert*-Butyl Ether	EPA 5030	8020	25	23	85-115	92	

Approved By: _____ Date: 09/10/99

ICV/032196

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902611
Project:	TO#24118.00/RAT8/2035 ALBANY	**Date Collected:**	8/24/99
Sample Matrix:	Water	**Date Received:**	8/25/99

EPA Method 8260
Volatile Organic Compounds

Sample Name:	MW-4(24)	Units:	ug/L (ppb)
Lab Code:	S9902611-002	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Methyl *tert*-Butyl Ether	EPA 5030A	8260	0.5	20	NA	9/3/99	1300	

Approved By: _____ Date: 09/10/99

1S44/021397p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902611
Project:	TO#24118.00/RAT8/2035 ALBANY	**Date Collected:**	8/24/99
Sample Matrix:	Water	**Date Received:**	8/25/99

EPA Method 8260
Volatile Organic Compounds

Sample Name:	MW-3(32)	Units:	ug/L (ppb)
Lab Code:	S9902611-006	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Methyl *tert*-Butyl Ether	EPA 5030A	8260	0.5	1	NA	9/3/99	71	

Approved By: _____ Date: 09/10/99

1344/02139/p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

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

Service Request: S9902611
Date Collected: NA
Date Received: NA

EPA Method 8260
Volatile Organic Compounds

Sample Name: Method Blank (MSD1)
Lab Code: S990903-WB2
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Methyl *tert*-Butyl Ether	EPA 5030A	8260	0.5	1	NA	9/3/99	ND	

Approved By: _____ Date: 09/10/99

t344v02139rp

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S9902611
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: NA

Surrogate Recovery Summary
Volatile Organic Compounds

Prep Method: EPA 5030A
Analysis Method: 8260

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery		
			Dibromofluoromethane	Toluene-D8	4-Bromofluorobenzene
MW-4(24)	S9902611-002		108	101	106
MW-3(32)	S9902611-006		108	101	106
BATCH QC	S9902581-001MS		109	102	106
BATCH QC	S9902581-001DMS		109	102	106
Method Blank (MSD1)	S990903-WB2		106	101	106
EPA Acceptance Limits:			86-118	88-110	86-115

Approved By: _____ Date: 09/10/99

SUR3/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S9902611
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 9/4/99

Matrix Spike/Duplicate Matrix Spike Summary
Volatile Organic Compounds

Sample Name: BATCH QC
Lab Code: S9902581-001MS, S9902581-001DMS
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
1,1-Dichloroethene	NONE	8260	0.5	10	10	ND	8.2	8.1	82	81	62-145	1	
Benzene	NONE	8260	0.5	10	10	ND	9.4	9.2	94	92	77-127	2	
Trichloroethene	NONE	8260	0.5	10	10	ND	8.9	8.7	89	87	71-119	2	
Toluene	NONE	8260	0.5	10	10	ND	9.1	8.9	91	89	76-124	2	
Chlorobenzene	NONE	8260	0.5	10	10	ND	9.6	9.4	96	94	75-127	2	
1,2-Dichlorobenzene	NONE	8260	0.5	10	10	ND	9.1	9.2	91	92	74-126	1	
Naphthalene	NONE	8260	2	10	10	ND	4.8	6.1	48	61	43-157	24	

Approved By: _____ Date: 09/10/99

DMS/020597p

ARCO Products Company — Chain of Custody

Division of Atlantic/Richfield Company

S9902611 Task Order No. 24118.00

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) 2201 Broadway #101 Oakland, CA 94612		Contract Number

Method of shipment: Sampler will deliver

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 (Gas) 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 Semi Metals ☐ VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org/DHS ☐ Lead EPA 7420/7421 ☐	MTBE EPA 8260		
MW-5 (24')		2	1	X			HCL	8/24/99	1108		X										X		
MW-4 (21')		4	2	X			HCL		1120		X										X		
MW-1 (28')		2	3	X			HCL		1140		X												
MW-2 (27')		2	4	X			HCL		1206		X												
MW-6 (23')		2	5	X			HCL		1220		X												
MW-3 (32')		4	6	X			HCl		1308		X										X		
RW-1 (24')		2	7	X			HCL	↓	1330		X												

Special Detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: RAT 8
2-40ml HCL VOAs
MW-3+4 add 2 additional 40ml HCL VOAs 791643

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: 9/9/99 R11/D2 R11/D3

	Date	Time			
Relinquished by sampler	8/25/99	1445	Received by Joseph Machado CAS	8/25/99	1450
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 # : 792211 STATION ADDRESS : 101 San Pablo Avenue, Albany DATE : 8/24/99

ARCO STATION # : 2035 FIELD TECHNICIAN : D Wofford 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	15/16"	—	ARCO	LWC	10.51	10.51	N.D.	—	24.4	0.79 mg/L 17.7°C
2	MW-4	Ok	15/16"	—	ARCO	LWC	9.99	9.99	N.D.	—	25.1	0.84 mg/L 19.6°C
✱ Δ 3	MW-1	Ok	15/16"	—		LWC	10.03	10.03	N.D.	—	29.7	0.55 mg/L 19.2°C
Δ 4	MW-2	Ok	15/16"	—	ARCO	LWC	10.60	10.60	N.D.	—	28.8	0.88 mg/L 19.8°C
5	MW-6	Ok	15/16"	—	ARCO	LWC	13.03	13.03	N.D.	—	24.3	0.46 mg/L 18.9°C
6	MW-3	Ok	15/16"	—	ARCO	LWC	10.83	10.83	N.D.	—	33.0	0.41 mg/L 18.1°C
7	RW-1	Ok	3/4"	—	None	LWC	10.15	10.15	N.D.	—	25.4	0.52 mg/L 20.2°C

SURVEY POINTS ARE TOP OF WELL CASINGS

✱ NEW 4" CAP

RECEIVED
SEP 07 1999
BY:

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

EMCON

PROJECT NO : 792211 | SAMPLE ID : MW-1 (28')

PURGED BY : Dwallace | CLIENT NAME : ARCO #2035

SAMPLED BY : ✓ | LOCATION : Albany, California

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

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

CASING ELEVATION (feet/MSL) : N/A | VOLUME IN CASING (gal.) : 130

DEPTH OF WELL (feet) : 29.7 | CALCULATED PURGE (gal.) : 390

DEPTH OF WATER (feet) : 10.03 | ACTUAL PURGE VOL. (gal.) : 39.0

DATE PURGED : 8/24/99 | END PURGE : 1138

DATE SAMPLED : ✓ | SAMPLING TIME : 1140

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1132	13.0	7.23	671.0	68.4	Gray	moderate
1134	26.0	7.24	704.0	67.2	"	"
1138	39.0	7.23	741.0	66.7	"	"

OTHER: Dissolved Oxygen= | ODOR: Mild | N/A (COBALT 0-100) | N/A (NTU 0-200)

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

PURGING EQUIPMENT

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

SAMPLING EQUIPMENT

____ 2" Bladder Pump
____ Bomb Sampler
____ Dipper
____ Well WizardÔ
____ Bailer (Teflon)
____ Bailer (Stainless Steel)
____ Submersible Pump
____ Dedicated
Other: Disposable Teflon Bailer

WELL INTEGRITY: Good - New Cap | LOCK: OK

REMARKS: ____

pH, E.C., Temp. Meter Calibration: Date: ____ | Time: ____ | Meter Serial No.: 5

E.C. 1000 ____ / | pH 7 ____ / SE | pH 10 ____ / MW | pH 4 ____ /

Temperature °F ____

SIGNATURE: ____ | REVIEWED BY: ____ | PAGE 1 OF 7

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

EMCON

PROJECT NO : 792211 | SAMPLE ID : MW-2 (27)

PURGED BY : DWO'Flaherty | CLIENT NAME : ARCO #2035

SAMPLED BY : | LOCATION : Albany, California

TYPE: Groundwater X | Surface Water | Leachate | Other

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

CASING ELEVATION (feet/MSL) : N/A | VOLUME IN CASING (gal.) : 120

DEPTH OF WELL (feet) : 28.8 | CALCULATED PURGE (gal.) : 360

DEPTH OF WATER (feet) : 10.00 | ACTUAL PURGE VOL. (gal.) : 36.0

DATE PURGED : 8/4/99 | END PURGE : 1202

DATE SAMPLED : " | SAMPLING TIME : 1206

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1154	12.0	7.27	7580	67.3	Clear	Low
1159	24.0	7.26	761.0	67.4	"	"
1202	36.0	7.30	762.0	67.4	"	"

OTHER: Dissolved Oxygen= | ODOR: None | N/A (COBALT 0-100) | N/A (NTU 0-200)

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

PURGING EQUIPMENT

- ___ 2" Bladder Pump
- ___ Centrifugal Pump
- ✓ Submersible Pump
- ___ Well WizardÔ
- ___ Bailer (Teflon)
- ___ Bailer (PVC)
- ___ Bailer (Stainless Steel)
- ___ Dedicated
- Other: ___

SAMPLING EQUIPMENT

- ___ 2" Bladder Pump
- ___ Bomb Sampler
- ___ Dipper
- ✓ Well WizardÔ
- ___ Bailer (Teflon)
- ___ Bailer (Stainless Steel)
- ___ Submersible Pump
- ___ Dedicated
- Other: Disposable Teflon Bailer

WELL INTEGRITY: Good | LOCK: O/K

REMARKS:

pH, E.C., Temp. Meter Calibration: Date: | Time: 555 | Meter Serial No.: 5

E.C. 1000 ___ / ___ | pH 7 ___ / 5 | pH 10 ___ / ___ | pH 4 ___ / ___

Temperature °F ___

SIGNATURE: [signature] | REVIEWED BY: [signature] | PAGE 2 OF 7

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

EMCON

PROJECT NO : 792211
PURGED BY : Dwyer
SAMPLED BY : ↓

SAMPLE ID : MW-3 (32')
CLIENT NAME : ARCO #2035
LOCATION : Albany, California

TYPE: Groundwater X Surface Water ___ Leachate ___ Other ___

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

CASING ELEVATION (feet/MSL) : N/A
DEPTH OF WELL (feet) : 32.0
DEPTH OF WATER (feet) : 10.83

VOLUME IN CASING (gal.) : 14.5
CALCULATED PURGE (gal.) : 43.5
ACTUAL PURGE VOL. (gal.) : ~~30.0~~ ~~45.0~~ 45.0

DATE PURGED : 8/4/99
DATE SAMPLED : ↓

END PURGE : ~~1255~~ 1300
SAMPLING TIME : 1308

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
~~[illegible]~~ 1246	15.0	7.23	696.0	65.8	Brown	Lt H
1255	30.0	7.71	664.0	65.4	LT Brown	~~[illegible]~~ modest
1300	45.0	7.22	620.0	65.4	Brown	Lt H

OTHER: Dissolved Oxygen= ___ ODOR: MILD ___ N/A (COBALT 0-100) N/A (NTU 0-200)

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

PURGING EQUIPMENT

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

SAMPLING EQUIPMENT

___ 2" Bladder Pump
___ Bomb Sampler
___ Dipper
___ Well WizardÔ
___ Bailer (Teflon)
___ Bailer (Stainless Steel)
___ Submersible Pump
___ Dedicated
Other: Disposable Teflon Bailer

WELL INTEGRITY: GOOD LOCK: OK

REMARKS: ~~Well Dewatered at 30 Gals purged~~
(Slow Recharge)

pH, E.C., Temp. Meter Calibration: Date: ___ See Time Miles Meter Serial No : ___

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

Temperature °F ___

SIGNATURE: [signature] REVIEWED BY: [signature] PAGE 3 OF 7

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

EMCON

PROJECT NO: 792211 | SAMPLE ID: MW-4 (W)

PURGED BY: Dwatkins | CLIENT NAME: ARCO #2035

SAMPLED BY: | LOCATION: Albany, California

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

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

CASING ELEVATION (feet/MSL): N/A | VOLUME IN CASING (gal.): 100

DEPTH OF WELL (feet): 25.1 | CALCULATED PURGE (gal.): 300

DEPTH OF WATER (feet): 9.99 | ACTUAL PURGE VOL. (gal.): ____

DATE PURGED: — | END PURGE: —

DATE SAMPLED: 8/24/99 | SAMPLING TIME: 1120

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1120	—	7.14	477.0	68.1	LT Brown	Moderate

OTHER: Dissolved Oxygen= | ODOR: None | N/A (COBALT 0-100) | N/A (NTU 0-200)

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

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: Disposable Teflon Bailer

WELL INTEGRITY: Good | LOCK: OK

REMARKS: SEE MW-3

pH, E.C., Temp. Meter Calibration: Date: ____ Time: SEE MW-3 Meter Serial No.: ____

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

Temperature °F ____

SIGNATURE: [signature] REVIEWED BY: [signature] PAGE: 4 OF 7

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

EMCON

PROJECT NO : 792211 | SAMPLE ID : MW-5 (24')

PURGED BY : D Wofford | CLIENT NAME : ARCO #2035

SAMPLED BY : | LOCATION : Albany, California

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

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

CASING ELEVATION (feet/MSL) : N/A | VOLUME IN CASING (gal.) : 7.0

DEPTH OF WELL (feet) : 24 | CALCULATED PURGE (gal.) : 27.0

DEPTH OF WATER (feet) : 10.51 | ACTUAL PURGE VOL. (gal.) : ____

DATE PURGED : — | END PURGE : —

DATE SAMPLED : 8/4/99 | SAMPLING TIME : 1108

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1108	—	6.74	577.0	69.9	Gray	moderate

OTHER: Dissolved Oxygen= | ODOR: NONE | N/A (COBALT 0-100) | N/A (NTU 0-200)

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

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)

____ Centrifugal Pump ____ Bailer (PVC)

____ Submersible Pump ____ Bailer (Stainless Steel)

____ Well WizardÔ ____ Dedicated

Other: ____

SAMPLING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)

____ Bomb Sampler ____ Bailer (Stainless Steel)

____ Dipper ____ Submersible Pump

____ Well WizardÔ ____ Dedicated

Other: Disposable Teflon Bailer

WELL INTEGRITY: GOOD | LOCK: OK

REMARKS: DTW is Below Top of Screen

Taking Grab Sample

pH, E.C., Temp. Meter Calibration: Date: 8/4/99 | Time: 1054 | Meter Serial No.: 232

E.C. 1000 1413 / 1418 | pH 7 6.93 / 7.00 | pH 10 9.55 / 10.00 | pH 4 4.08 / —

Temperature °F 69.1

SIGNATURE: [signature] 8/4 | REVIEWED BY: [signature] | PAGE 5 OF 7

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

EMCON

PROJECT NO : 792211 | SAMPLE ID : MW-6 (23')

PURGED BY : Dwayne | CLIENT NAME : ARCO #2035

SAMPLED BY : [illegible] | LOCATION : Albany, California

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

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

CASING ELEVATION (feet/MSL) : N/A | VOLUME IN CASING (gal.) : 20

DEPTH OF WELL (feet) : 24.3 | CALCULATED PURGE (gal.) : 60

DEPTH OF WATER (feet) : 13.03 | ACTUAL PURGE VOL. (gal.) : ____

DATE PURGED : — | END PURGE : —

DATE SAMPLED : 8/24/99 | SAMPLING TIME : 1220

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1220	—	7.43	2120	65.9	Brown	Hi

OTHER: Dissolved Oxygen= | ODOR: None | N/A (COBALT 0-100) | N/A (NTU 0-200)

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

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)

____ Centrifugal Pump ____ Bailer (PVC)

____ Submersible Pump ____ Bailer (Stainless Steel)

____ Well WizardÔ ____ Dedicated

Other: ____

SAMPLING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)

____ Bomb Sampler ____ Bailer (Stainless Steel)

____ Dipper ____ Submersible Pump

____ Well WizardÔ ____ Dedicated

Other: Disposable Teflon Bailer

WELL INTEGRITY: Good | LOCK: OK

REMARKS: See Notes

pH, E.C., Temp. Meter Calibration: Date: ____ | Time: See Notes | Meter Serial No.: See Notes

E.C. 1000 ____ / ____ | pH 7 ____ / ____ | pH 10 ____ / ____ | pH 4 ____ / ____

Temperature °F ____

SIGNATURE: [signature] | REVIEWED BY: [illegible] | PAGE 6 OF 7

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

EMCON

PROJECT NO : 792211 | SAMPLE ID : RW-1 (4')

PURGED BY : Dwolfe | CLIENT NAME : ARCO #2035

SAMPLED BY : | LOCATION : Albany, California

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

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

CASING ELEVATION (feet/MSL) : N/A | VOLUME IN CASING (gal.) : 16.0

DEPTH OF WELL (feet) : 25.4 | CALCULATED PURGE (gal.) : 48.0

DEPTH OF WATER (feet) : 10.15 | ACTUAL PURGE VOL. (gal.) : —

DATE PURGED : — | END PURGE : —

DATE SAMPLED : 8/24/99 | SAMPLING TIME : 1330

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1330	—	7.84	2980	67.8	Clear	Low

OTHER: Dissolved Oxygen= | ODOR: Slight | N/A (COBALT 0-100) | N/A (NTU 0-200)

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

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)

____ Centrifugal Pump ____ Bailer (PVC)

____ Submersible Pump ____ Bailer (Stainless Steel)

____ Well WizardÔ ____ Dedicated

Other: ____

SAMPLING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)

____ Bomb Sampler ____ Bailer (Stainless Steel)

____ Dipper ____ Submersible Pump

____ Well WizardÔ ____ Dedicated

Other: Disposable Teflon Bailer

WELL INTEGRITY: Good | LOCK: None

REMARKS: See Notes

pH, E.C., Temp. Meter Calibration: Date: ____ | Time: See Notes | Meter Serial No: ____

E.C. 1000 ____ / ____ | pH 7 ____ / ____ | pH 10 ____ / ____ | pH 4 ____ / ____

Temperature °F ____

SIGNATURE: [signature] | REVIEWED BY: [signature] | PAGE 7 OF 7

EMCON Associates - Field Services

1921 Ringwood Avenue

San Jose, California

1999

Historical Monitoring Well Data

ARCO 2035

792211

	Gallons
First	208.50
Second	98.50
Third	0.00
Fourth	73.00

Well ID	Quarter	Date	Purge Volume (gallons)	Did well dry	Well Contained Product
MW-1	First	02/16/99	42.00	NO	NO
	Second	05/24/99	39.00	NO	NO
	Third	08/24/99	39.00	NO	NO
	Fourth				
MW-2	First	02/16/99	38.50	NO	NO
	Second	05/24/99	36.50	NO	NO
	Third	08/24/99	36.00	NO	NO
	Fourth				
MW-3	First	02/16/99	47.50	NO	NO
	Second	05/24/99	23.00	YES	NO
	Third	08/24/99	45.00	NO	NO
	Fourth				
MW-4	First	02/16/99	0.00	GRAB	NO
	Second	05/24/99	0.00	GRAB	NO
	Third	08/24/99	0.00	GRAB	NO
	Fourth				
MW-5	First	02/16/99	0.00	NA	NO
	Second	05/24/99	0.00	GRAB	NO
	Third	08/24/99	0.00	GRAB	NO
	Fourth				
MW-6	First	02/16/99	0.00	GRAB	NO
	Second	05/24/99	0.00	GRAB	NO
	Third	08/24/99	0.00	GRAB	NO
	Fourth				
RW-1	First	02/16/99	80.50	NO	NO
	Second	05/24/99	0.00	GRAB	NO
	Third	08/24/99	0.00	GRAB	NO
	Fourth				

Steam water (gal) _____

ARCO Products Company

Division of Atlantic/Richfield Company

Task Order No. [illegible]

Chain of Custody

ARCO Facility no.	City (Facility) [illegible]	Project manager (Consultant) [illegible]	Laboratory Name
ARCO engineer [illegible]	Telephone no. (ARCO)	Telephone no. (Consultant) [illegible]	Fax no. (Consultant) [illegible]
Consultant name	Address (Consultant) [illegible]		Contract Number

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/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 ☐			
	[illegible]			X			HCl	[illegible]	[illegible]		X												
		[illegible]		X			HCl	[illegible]	[illegible]		X												
				X			HCl	[illegible]	[illegible]		X												
				X			HCl	[illegible]	[illegible]		X												
				X			HCl	[illegible]	[illegible]		X												
				X			HCl	[illegible]	[illegible]		X												
				X			HCl	[illegible]			X												

Method of shipment

Special Detection Limit/reporting

Special QA/QC

Remarks

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 [illegible] Time	Received by	
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 D

CERTIFIED ANALYTICAL REPORTS, AND CHAIN-OF-CUSTODY DOCUMENTATION FOR SOIL-VAPOR EXTRACTION SYSTEM

Columbia Analytical Services INC.
An Employee-Owned Company

September 15, 1999

Service Request No.: S9902773

Mr. Glen Vanderveen
IT/EMCON
2201 Broadway, Suite 101
Oakland, CA 94612

RECEIVED
SEP 2 0 1999
BY:

RE: **TO#24057.00/RAT8/2035 OAKLAND**

Dear Mr. Vanderveen:

Enclosed are the results of the sample(s) submitted to our laboratory on September 9, 1999. All analyses were performed in accordance with our laboratory's quality assurance program. Results are intended to be considered in their entirety and apply to the sample(s) analyzed. Columbia Analytical Services is not responsible for use of less than the complete report. Signature of this CAS Analytical Report confirms that pages 2 through 13, following, have been thoroughly reviewed and approved for release.

Columbia Analytical Services is certified for environmental analyses by the California Department of Health Services (certificate number: 1496, expiration: January 31, 2001).

If you have any questions, please call me at (408) 748-9700.

Respectfully submitted,

Columbia Analytical Services, Inc.

Bernadette Troncales
Project Chemist

Greg Jordan
Laboratory Director

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:**	S9902773
Project:	TO#24057.00/RAT8/2035 OAKLAND	**Date Collected:**	9/9/99
Sample Matrix:	Air	**Date Received:**	9/9/99

BTEX and Total Volatile Hydrocarbons

Sample Name:	I-1	Units:	mg/m3
Lab Code:	S9902773-001	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	NONE	8020	0.4	1	NA	9/11/99	2.2	
Toluene	NONE	8020	0.4	1	NA	9/11/99	4.0	
Ethylbenzene	NONE	8020	0.5	1	NA	9/11/99	ND	
Xylenes, Total	NONE	8020	0.9	1	NA	9/11/99	ND	
Total Volatile Hydrocarbons:								
C1 - C5	NONE	8015M	12	10	NA	9/11/99	1400	
C6 - C12	NONE	8015M	20	10	NA	9/11/99	<200	C1
TPH as Gasoline*	NONE	8015M	20	10	NA	9/11/99	<200	C1
Methyl tert-Butyl Ether	NONE	8020	3	10	NA	9/11/99	120	

* TPH as gasoline is defined as C6 (benzene) through C12 (dodecane) and uses a molecular weight of 100 to calculate the ppmv.

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

Approved By: _____ Date: 09/15/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902773
Project:	TO#24057.00/RAT8/2035 OAKLAND	**Date Collected:**	9/9/99
Sample Matrix:	Air	**Date Received:**	9/9/99

BTEX and Total Volatile Hydrocarbons

Sample Name:	I-1	Units:	ppmV
Lab Code:	S9902773-001	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	NONE	8020	0.1	1	NA	9/11/99	0.7	
Toluene	NONE	8020	0.1	1	NA	9/11/99	1.1	
Ethylbenzene	NONE	8020	0.1	1	NA	9/11/99	ND	
Xylenes, Total	NONE	8020	0.2	1	NA	9/11/99	ND	
Total Volatile Hydrocarbons:								
C1 - C5	NONE	8015M	5	10	NA	9/11/99	590	
C6 - C12	NONE	8015M	5	10	NA	9/11/99	<49	C1
TPH as Gasoline*	NONE	8015M	5	10	NA	9/11/99	<49	C1
Methyl tert-Butyl Ether	NONE	8020	0.8	10	NA	9/11/99	33	

* TPH as gasoline is defined as C6 (benzene) through C12 (dodecane) and uses a molecular weight of 100 to calculate the ppmv.

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

Approved By: _____ Date: 09/15/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902773
Project:	TO#24057.00/RAT8/2035 OAKLAND	**Date Collected:**	9/9/99
Sample Matrix:	Air	**Date Received:**	9/9/99

BTEX and Total Volatile Hydrocarbons

Sample Name:	E-1	Units:	mg/m3
Lab Code:	S9902773-002	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	NONE	8020	0.4	1	NA	9/11/99	ND	
Toluene	NONE	8020	0.4	1	NA	9/11/99	ND	
Ethylbenzene	NONE	8020	0.5	1	NA	9/11/99	ND	
Xylenes, Total	NONE	8020	0.9	1	NA	9/11/99	ND	
Total Volatile Hydrocarbons:								
C1 - C5	NONE	8015M	12	1	NA	9/11/99	ND	
C6 - C12	NONE	8015M	20	1	NA	9/11/99	ND	
TPH as Gasoline*	NONE	8015M	20	1	NA	9/11/99	ND	
Methyl tert-Butyl Ether	NONE	8020	3	1	NA	9/11/99	ND	

* TPH as gasoline is defined as C6 (benzene) through C12 (dodecane) and uses a molecular weight of 100 to calculate the ppmv.

Approved By: _____ Date: 09/15/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902773
Project:	TO#24057.00/RAT8/2035 OAKLAND	**Date Collected:**	9/9/99
Sample Matrix:	Air	**Date Received:**	9/9/99

BTEX and Total Volatile Hydrocarbons

Sample Name:	E-1	Units:	ppmV
Lab Code:	S9902773-002	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	NONE	8020	0.1	1	NA	9/11/99	ND	
Toluene	NONE	8020	0.1	1	NA	9/11/99	ND	
Ethylbenzene	NONE	8020	0.1	1	NA	9/11/99	ND	
Xylenes, Total	NONE	8020	0.2	1	NA	9/11/99	ND	
Total Volatile Hydrocarbons:								
C1 - C5	NONE	8015M	5	1	NA	9/11/99	ND	
C6 - C12	NONE	8015M	5	1	NA	9/11/99	ND	
TPH as Gasoline*	NONE	8015M	5	1	NA	9/11/99	ND	
Methyl tert-Butyl Ether	NONE	8020	0.8	1	NA	9/11/99	ND	

* TPH as gasoline is defined as C6 (benzene) through C12 (dodecane) and uses a molecular weight of 100 to calculate the ppmv.

Approved By: _____ Date: 09/15/99

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902773
Project:	TO#24057.00/RAT8/2035 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Air	**Date Received:**	NA

BTEX and Total Volatile Hydrocarbons

Sample Name:	Method Blank	Units:	mg/m3
Lab Code:	S990911-VB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	NONE	8020	0.4	1	NA	9/11/99	ND	
Toluene	NONE	8020	0.4	1	NA	9/11/99	ND	
Ethylbenzene	NONE	8020	0.5	1	NA	9/11/99	ND	
Xylenes, Total	NONE	8020	0.9	1	NA	9/11/99	ND	
Total Volatile Hydrocarbons:								
C1 - C5	NONE	8015M	12	1	NA	9/11/99	ND	
C6 - C12	NONE	8015M	20	1	NA	9/11/99	ND	
TPH as Gasoline*	NONE	8015M	20	1	NA	9/11/99	ND	
Methyl tert-Butyl Ether	NONE	8020	3	1	NA	9/11/99	ND	

* TPH as gasoline is defined as C6 (benzene) through C12 (dodecane) and uses a molecular weight of 100 to calculate the ppmv.

Approved By: _____ Date: 09/15/99

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902773
Project:	TO#24057.00/RAT8/2035 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Air	**Date Received:**	NA

BTEX and Total Volatile Hydrocarbons

Sample Name:	Method Blank	Units:	ppmV
Lab Code:	S990911-VB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	NONE	8020	0.1	1	NA	9/11/99	ND	
Toluene	NONE	8020	0.1	1	NA	9/11/99	ND	
Ethylbenzene	NONE	8020	0.1	1	NA	9/11/99	ND	
Xylenes, Total	NONE	8020	0.2	1	NA	9/11/99	ND	
Total Volatile Hydrocarbons:								
C1 - C5	NONE	8015M	5	1	NA	9/11/99	ND	
C6 - C12	NONE	8015M	5	1	NA	9/11/99	ND	
TPH as Gasoline*	NONE	8015M	5	1	NA	9/11/99	ND	
Methyl tert-Butyl Ether	NONE	8020	1.4	1	NA	9/11/99	ND	

* TPH as gasoline is defined as C6 (benzene) through C12 (dodecane) and uses a molecular weight of 100 to calculate the ppmv.

Approved By: _____ Date: 09/15/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: TO#24057.00/RAT8/2035 OAKLAND
Sample Matrix: Air

Service Request: S9902773
Date Collected: 9/9/99
Date Received: 9/9/99
Date Extracted: NA
Date Analyzed: 9/11/99

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Sample Name: BATCH QC
Lab Code: S9902787-001DUP
Test Notes:

Units: mg/m3
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Benzene	NONE	8020	0.4	74	83	79	11	
Toluene	NONE	8020	0.4	33	34	34	3	
Ethylbenzene	NONE	8020	0.5	13	13	13	<1	
Xylenes, Total	NONE	8020	0.9	32	35	34	3	
Total Volatile Hydrocarbons								
C1 - C5	NONE	8015M	12	7700	8100	7900	5	
C6 - C12	NONE	8015M	20	3100	3300	3200	6	
TPH as Gasoline*	NONE	8015M	20	3100	3300	3200	6	
Methyl tert-Butyl Ether	NONE	8020	3	260	270	270	4	

Approved By: _____ Date: 09/15/99

DUP/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: TO#24057.00/RAT8/2035 OAKLAND
Sample Matrix: Air

Service Request: S9902773
Date Collected: 9/9/99
Date Received: 9/9/99
Date Extracted: NA
Date Analyzed: 9/11/99

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Sample Name: BATCH QC
Lab Code: S9902787-001DUP
Test Notes:

Units: ppmV
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Benzene	NONE	8020	0.1	23	26	25	12	
Toluene	NONE	8020	0.1	8.8	9.0	9	2	
Ethylbenzene	NONE	8020	0.1	3.0	3.0	3.0	<1	
Xylenes, Total	NONE	8020	0.2	7.4	8.1	8	9	
Total Volatile Hydrocarbons								
C1 - C5	NONE	8015M	5	3240	3410	3,320	5	
C6 - C12	NONE	8015M	5	758	806	782	6	
TPH as Gasoline*	NONE	8015M	5	758	806	782	6	
Methyl tert-Butyl Ether	NONE	8020	0.8	72	75	74	4	

Approved By: _____ Date: 09/15/99

DUP/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: TO#24057.00/RAT8/2035 OAKLAND
LCS Matrix: Air

Service Request: S9902773
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 9/11/99

Laboratory Control Sample Summary
BTEX and TPH as Gasoline

Sample Name: Lab Control Sample
Lab Code: S990911-LCS
Test Notes:

Units: mg/m3
Basis: NA

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Benzene	NONE	8020	24	22	92	60-140	
Toluene	NONE	8020	24	21	88	60-140	
Ethylbenzene	NONE	8020	24	22	92	60-140	
Gasoline	NONE	8015M	210	220	105	60-140	

Approved By: MS Date: 09/16/99

LCS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: TO#24057.00/RAT8/2035 OAKLAND
LCS Matrix: Air

Service Request: S9902773
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 9/11/99

Laboratory Control Sample Summary
BTEX and TPH as Gasoline

Sample Name: Lab Control Sample
Lab Code: S990911-LCS
Test Notes:

Units: ppmV
Basis: NA

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Benzene	NONE	8020	7.5	6.9	92	60-140	
Toluene	NONE	8020	6.4	5.6	88	60-140	
Ethylbenzene	NONE	8020	5.5	5.1	93	60-140	
Gasoline	NONE	8015M	51	54	106	60-140	

Approved By: _____ Date: 09/15/99

LCS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9902773
Project:	TO#24057.00/RAT8/2035 OAKLAND	**Date Analyzed:**	9/11/99

Initial Calibration Verification (ICV) Summary
BTEX and Total Volatile Hydrocarbons

Sample Name:	ICV	Units:	mg/m3
Lab Code:	ICV1	Basis:	NA

Test Notes:

ICV Source:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	Result Notes
Benzene	NONE	8020	25	21	84	
Toluene	NONE	8020	25	24	96	
Ethylbenzene	NONE	8020	25	23	92	
Xylenes, Total	NONE	8020	75	63	84	
Gasoline	NONE	8015M	250	250	100	
Methyl tert-Butyl Ether	NONE	8020	25	20	80	

Approved By: _____ Date: 09/15/99

ICV/032196

ARCO Products Company
Division of AtlanticRichfieldCompany

S9902773 **Task Order No.** 24057.00

Chain of Custody

ARCO Facility no. 2035	City (Facility) Oakland	Project manager (Consultant) Glen Vanderveen	
ARCO engineer Paul Supple	Telephone no. (ARCO)	Telephone no. (Consultant)	Fax no. (Consultant)
Consultant name Emcon IT		Address (Consultant)	

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 MTBE EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
I-1	(1)	1			AIR			9-9-99			X											
E-1	(2)	1			AIR			9-9-99			X											

Laboratory name: CAS

Contract number:

Method of shipment: Tech

Special detection Limit/reporting: ppmv

Special QA/QC:

Remarks: 20805 123 006

Rat 8

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: J. Dee: 9/10/99

Relinquished by sampler	Date	Time	Received by
[signature]	9-9-99	1345	Joseph Machado CAS 9/9/99 1350
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
APC-3292 (2-91)