2201 Broadway, Suite 101
Oakland, CA 94612-3023
Tel. 510.740.5800
Fax. 510.663.3315

the i group

Responded to 11/19/99

STID 744

November 17, 1999
Project 791655

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

Re: Quarterly Groundwater Monitoring Report, Third Quarter 1999, for ARCO Service Station No. 2111, Located at 1156 Davis Street, San Leandro, 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. 2111, located at 1156 Davis Street, San Leandro, California. The monitoring program complies with Alameda County Health Care Services Agency (ACHCSA) requirements regarding underground tank investigations.

LIMITATIONS

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

Please call if you have questions.

Sincerely,

Pinnacle

Glen VanderVeen
Project Manager

Dan Easter, R.G.
Project Geologist

Attachment: Quarterly Groundwater Monitoring Report, Third Quarter 1999

cc: Amir Gholami, ACHCSA
Mike Bakaldin, San Leandro Fire Department, Hazardous Materials Program

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Date: November 17, 1999

ARCO QUARTERLY GROUNDWATER MONITORING REPORT

Station No.: 2111 Address: 1156 Davis Street, San Leandro, California

Pinnacle Project No. 791655

ARCO Environmental Engineer/Phone No.: Paul Supple /(925) 299-8891

Pinnacle Project Manager/Phone No.: Glen VanderVeen /(510) 740-5807

Primary Agency/Regulatory ID No.: ACHCSA

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. Analyzed groundwater samples for fuel oxygenates, as requested by ACHCSA.
4. Installed free product skimmer in well MW-2.
5. Performed monthly free product check and removal.

WORK PROPOSED FOR NEXT QUARTER (FOURTH - 1999):

1. Prepare and submit quarterly groundwater monitoring report for third quarter 1999.
2. Perform quarterly groundwater monitoring and sampling for fourth quarter 1999.
3. Continue to perform monthly free product check and removal until product thickness diminishes to a sheen.
4. Perform high vacuum, dual phase extraction test on well MW-2.

QUARTERLY MONITORING:

Current Phase of Project:	Quarterly Groundwater Monitoring
Frequency of Sampling:	Quarterly: MW-1 through MW-7
Frequency of Monitoring:	Quarterly (groundwater)
Is Floating Product (FP) Present On-site:	☒ Yes ☐ No
FP Recovered This Quarter:	0.026 gallons
Cumulative FP Recovered to Date:	0.381 gallons
Bulk Soil Removed to Date :	Unknown
Bulk Soil Removed This Quarter :	None
Water Wells or Surface Waters, within 2000 ft., impacted by site:	None
Current Remediation Techniques:	None
Average Depth to Groundwater:	16.7 feet
Groundwater Flow Direction and Gradient (Average):	0.005 ft/ft toward West-Northwest

DISCUSSION:

- Free product was observed in well MW-2 on June 25, 1999. The field technician recorded 3.73 feet of product measured by an oil water interface tape, but did not verify the thickness with a visual check using a bailer. The following day, Pinnacle performed a bailer check and found only 0.45 feet of product, so that the 3.73 feet measurement is suspected to be an erroneous value caused by the interface tape. Subsequent bailing of the product (see Table 4) has reduced the product thickness to 0.01 feet.

- Pinnacle will perform a high vacuum, dual phase extraction test, utilizing a liquid ring pump and catalytic oxidizer, on well MW-2 to evaluate this remediation methodology for this site and sites with similar lithologic conditions and reduce hydrocarbon impact at well MW-2.

ATTACHMENTS:

- Table 1 - Historical Groundwater Elevation and Analytical Data, Petroleum Hydrocarbons and Their Constituents
- Table 2 - Groundwater Flow Direction and Gradient
- Table 3 - Fuel Oxygenates
- Table 4 - Approximate Cumulative Floating Product Recovered
- Figure 1 - Groundwater Analytical Summary Map
- Figure 2 - Groundwater Elevation Contour Map
- Appendix A - Sampling and Analysis Procedures
- Appendix B - Certified Analytical Reports and Chain-of-Custody Documentation
- Appendix C - Field Data Sheets

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

ARCO Service Station 2111
1156 Davis Street, San Leandro, California

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Free Product Thickness feet	Groundwater Elevation ft-MSL	Water Sample Field Date	**TPHG** LUFT Method µg/L	**Benzene** EPA 8020 µg/L	**Toluene** EPA 8020 µg/L	**Ethylbenzene** EPA 8020 µg/L	**Total Xylenes** EPA 8020 µg/L	**MTBE** EPA 8020 µg/L	**MTBE** EPA 8260 µg/L	**TRPH** EPA 418.1 µg/L	**TPHD** LUFT Method µg/L	Dissolved Oxygen mg/L	Purged/ Not Purged P/NP
MW-1	08-01-95	39.60	17.45	ND	22.15	08-01-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--		
MW-1	12-14-95	39.60	17.09	ND	22.51	12-14-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	03-21-96	39.60	14.72	ND	24.88	03-21-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	05-24-96	39.60	15.94	ND	23.66	05-24-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	08-09-96	39.60	17.89	ND	21.71	08-09-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	11-06-96	39.60	18.66	ND	20.94	11-06-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	03-24-97	39.60	16.13	ND	23.47	03-24-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	05-27-97	39.60	17.23	ND	22.37	05-28-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	08-07-97	39.60	18.68	ND	20.92	08-07-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	11-10-97	39.60	19.19	ND	20.41	11-10-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	02-16-98	39.60	12.61	ND	26.99	02-16-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	04-15-98	39.60	14.30	ND	25.30	04-15-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	07-24-98	39.60	16.40	ND	23.20	07-24-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	10-19-98	39.60	17.90	ND	21.70	10-19-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	01-28-99	39.60	16.85	ND	22.75	01-28-99	<20,000	580	<200	<200	320	14,000	--	--	--		
MW-1	06-25-99	39.60	17.35	ND	22.25	06-25-99	730	140	5	3	2	7,700	--	--	--	0.79	NP
MW-1	08-25-99	39.60	18.20	ND	21.40	08-25-99	390	66	8.5	<2.5	8.6	3,700	--	--	--	1.56	NP
MW-2	08-01-95	37.99	15.67	ND	22.32	08-01-95	23,000	1,300	310	500	3,500	--	--	--	--		
MW-2	12-14-95	37.99	15.36	ND	22.63	12-14-95	7,300	900	25	180	1,000	<200	--	--	--		
MW-2	03-21-96	37.99	12.84	ND	25.15	03-21-96	9,600	850	30	280	1,400	250	--	--	--		
MW-2	05-24-96	37.99	14.03	ND	23.96	05-24-96	2,300	300	<5	73	310	<25	--	--	--		
MW-2	08-09-96	37.99	16.10	ND	21.89	08-09-96	2,800	290	6	75	320	50	--	--	--		
MW-2	11-06-96	37.99	16.98	ND	21.01	11-06-96	750	76	<1	15	51	110	--	--	--		

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

ARCO Service Station 2111
1156 Davis Street, San Leandro, California

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Free Product Thickness	Groundwater Elevation	Water Sample Field Date	**TPHG** LUFT Method	**Benzene** EPA 8020	**Toluene** EPA 8020	**Ethylbenzene** EPA 8020	**Total Xylenes** EPA 8020	**MTBE** EPA 8020	**MTBE** EPA 8260	**TRPH** EPA 418.1	**TPHD** LUFT Method	Dissolved Oxygen	Purged/ Not Purged
		ft-MSL	feet	feet	ft-MSL		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	P/NP
MW-2	03-24-97	37.99	14.22	ND	23.77	03-24-97	790	18	<1	2	6	280	--	--	--		
MW-2	05-27-97	37.99	15.42	ND	22.57	05-28-97	750	14	<1	<1	10	150	--	--	--		
MW-2	08-07-97	37.99	16.92	ND	21.07	08-07-97	360	31	<2.5	<2.5	15	260	--	--	--		
MW-2	11-10-97	37.99	17.52	ND	20.47	11-10-97	1,300	82	<5	14	49	550	--	--	--		
MW-2	02-16-98	37.99	12.04	ND	25.95	02-16-98	<2,500	<25	<25	<25	<25	4,200	--	--	--		
MW-2	04-15-98	37.99	12.34	ND	25.65	04-15-98	<10,000	<100	<100	<100	<100	7,300	--	--	--		
MW-2	07-24-98	37.99	14.45	ND	23.54	07-24-98	<2,500	<25	<25	<25	<25	1,500	--	--	--		
MW-2	10-19-98	37.99	16.08	ND	21.91	10-19-98	<1,000	18	<10	<10	<10	1,100	--	--	--		
MW-2	01-28-99	37.99	15.59	0.02	22.41 [1]	01-28-99	160,000	3,000	24,000	4,400	31,000	23,000	--	--	--		
MW-2	06-25-99	37.99	19.20	3.73[4]	21.51 [1]	06-25-99	120,000	6,900	21,000	2,600	19,000	18,000	17,000[3]	--	--	0.49	NP
MW-2	08-25-99	37.99	16.49	0.02	21.51 [1]	08-25-99	92,000	2,200	16,000	3,200	19,000	11,000	9,400[3]	--	--	0.84	NP
MW-3	08-01-95	39.32	17.00	ND	22.32	08-01-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	600	76[2]		
MW-3	12-14-95	39.32	16.70	ND	22.62	12-14-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	<500	<50		
MW-3	03-21-96	39.32	14.17	ND	25.15	03-21-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	<500	<50		
MW-3	05-24-96	39.32	15.30	ND	24.02	05-24-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	<500	<50		
MW-3	08-09-96	39.32	17.58	ND	21.74	08-09-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	<500	--		
MW-3	11-06-96	39.32	18.33	ND	20.99	11-06-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-3	03-24-97	39.32	15.44	ND	23.88	03-24-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-3	05-27-97	39.32	16.75	ND	22.57	05-28-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-3	08-07-97	39.32	18.35	ND	20.97	08-07-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-3	11-10-97	39.32	18.83	ND	20.49	11-10-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-3	02-16-98	39.32	11.99	ND	27.33	02-16-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-3	04-15-98	39.32	13.75	ND	25.57	04-15-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		

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1156 Davis Street, San Leandro, California

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Free Product Thickness	Groundwater Elevation	Water Sample Field Date	**TPHG** LUFT Method	**Benzene** EPA 8020	**Toluene** EPA 8020	**Ethylbenzene** EPA 8020	**Total Xylenes** EPA 8020	**MTBE** EPA 8020	**MTBE** EPA 8260	**TRPH** EPA 418.1	**TPHD** LUFT Method	Dissolved Oxygen	Purged/ Not Purged
		ft-MSL	feet	feet	ft-MSL		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	P/NP
MW-3	07-24-98	39.32	15.90	ND	23.42	07-24-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-3	10-19-98	39.32	17.45	ND	21.87	10-19-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-3	01-28-99	39.32	16.40	ND	22.92	01-28-99	<100	14	4	<1	6	100	--	--	--		
MW-3	06-25-99	39.32	17.92	ND	21.40	06-25-99	83	9.0	1.4	<0.5	2.5	220	--	--	--	1.11	NP
MW-3	08-25-99	39.32	17.79	ND	21.53	08-25-99	240	41	12	3.7	9.9	160	--	--	--	1.13	NP
MW-4	08-01-95	38.10	15.65	ND	22.45	08-01-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--		
MW-4	12-14-95	38.10	15.35	ND	22.75	12-14-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	03-21-96	38.10	12.74	ND	25.36	03-21-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	05-24-96	38.10	14.03	ND	24.07	05-24-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	08-09-96	38.10	16.10	ND	22.00	08-09-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	11-06-96	38.10	17.00	ND	21.10	11-06-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	03-24-97	38.10	14.21	ND	23.89	03-24-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	05-27-97	38.10	15.38	ND	22.72	05-28-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	08-07-97	38.10	16.95	ND	21.15	08-07-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	11-10-97	38.10	17.53	ND	20.57	11-10-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	02-16-98	38.10	10.65	ND	27.45	02-16-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	04-15-98	38.10	12.20	ND	25.90	04-15-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	07-24-98	38.10	14.47	ND	23.63	07-24-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	10-19-98	38.10	16.20	ND	21.90	10-19-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	01-28-99	38.10	15.02	ND	23.08	01-28-99	340	52	5.5	<0.5	74	31	--	--	--		
MW-4	06-25-99	38.10	15.57	ND	22.53	06-25-99	510	78	4.1	0.5	18	94	--	--	--	0.90	NP
MW-4	08-25-99	38.10	16.43	ND	21.67	08-25-99	660	130	21	6.4	39	110	--	--	--	1.01	NP

Table 1
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Petroleum Hydrocarbons and Their Constituents

ARCO Service Station 2111
1156 Davis Street, San Leandro, California

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Free Product Thickness	Groundwater Elevation	Water Sample Field Date	**TPHG** LUFT Method	**Benzene** EPA 8020	**Toluene** EPA 8020	**Ethylbenzene** EPA 8020	**Total Xylenes** EPA 8020	**MTBE** EPA 8020	**MTBE** EPA 8260	**TRPH** EPA 418.1	**TPHD** LUFT Method	Dissolved Oxygen	Purged/ Not Purged
		ft-MSL	feet	feet	ft-MSL		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	P/NP
MW-5	03-21-96	37.21	12.60	ND	24.61	03-22-96	<50	<0.5	<0.5	<0.5	<0.5	82	--	--	--		
MW-5	05-24-96	37.21	13.71	ND	23.50	05-24-96	<50	<0.5	<0.5	<0.5	<0.5	7	--	--	--		
MW-5	08-09-96	37.21	15.60	ND	21.61	08-09-96	<50	<0.5	<0.5	<0.5	<0.5	8	--	--	--		
MW-5	11-06-96	37.21	16.36	ND	20.85	11-06-96	<50	<0.5	<0.5	<0.5	<0.5	100	--	--	--		
MW-5	03-24-97	37.21	13.87	ND	23.34	03-24-97	<50	<0.5	<0.5	<0.5	<0.5	460	--	--	--		
MW-5	05-27-97	37.21	14.71	ND	22.50	05-28-97	<100	<1	<1	<1	<1	120	--	--	--		
MW-5	08-07-97	37.21	16.90	ND	20.31	08-07-97	<250	<2.5	<2.5	<2.5	<2.5	250	--	--	--		
MW-5	11-10-97	37.21	16.88	ND	20.33	11-10-97	<1,000	<10	<10	<10	<10	770	--	--	--		
MW-5	02-16-98	37.21	10.56	ND	26.65	02-16-98	<200	<2	<2	<2	<2	230	--	--	--		
MW-5	04-15-98	37.21	12.20	ND	25.01	04-15-98	<500	<5	<5	<5	<5	900	--	--	--		
MW-5	07-24-98	37.21	14.20	ND	23.01	07-24-98	<500	<5	<5	<5	<5	570	--	--	--		
MW-5	10-19-98	37.21	15.74	ND	21.47	10-19-98	<250	<2.5	<2.5	<2.5	<2.5	300	--	--	--		
MW-5	01-28-99	37.21	14.60	ND	22.61	01-28-99	<500	8	<5	<5	<5	290	--	--	--		
MW-5	06-25-99	37.21	15.10	ND	22.11	06-25-99	<50	<0.5	<0.5	<0.5	<0.5	1,300	--	--	--	0.76	NP
MW-5	08-25-99	37.21	15.91	ND	21.30	08-25-99	<50	<0.5	<0.5	<0.5	<0.5	6,700	--	--	--	0.98	NP
MW-6	03-21-96	37.11	11.55	ND	25.56	03-22-96	<50	<0.5	1.9	<0.5	<0.5	<3	--	--	--		
MW-6	05-24-96	37.11	12.80	ND	24.31	05-24-96	<50	<0.5	<0.5	<0.5	<0.5	6	--	--	--		
MW-6	08-09-96	37.11	Not surveyed			08-09-96	Not sampled: Car parked on well										
MW-6	11-06-96	37.11	Not surveyed			11-06-96	Not sampled: Car parked on well										
MW-6	03-24-97	37.11	13.06	ND	24.05	03-24-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-6	05-27-97	37.11	14.30	ND	22.81	05-28-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-6	08-07-97	37.11	16.40	ND	20.71	08-07-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-6	11-10-97	37.11	16.53	ND	20.58	11-10-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		

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

ARCO Service Station 2111
1156 Davis Street, San Leandro, California

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Free Product Thickness	Groundwater Elevation	Water Sample Field Date	**TPHG** LUFT Method	**Benzene** EPA 8020	**Toluene** EPA 8020	**Ethylbenzene** EPA 8020	**Total Xylenes** EPA 8020	**MTBE** EPA 8020	**MTBE** EPA 8260	**TRPH** EPA 418.1	**TPHD** LUFT Method	Dissolved Oxygen	Purged/ Not Purged
		ft-MSL	feet	feet	ft-MSL		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	P/NP
MW-6	02-16-98	37.11	Not surveyed			02-16-98	Not sampled: Car parked on well										
MW-6	04-15-98	37.11	10.95	ND	26.16	04-15-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-6	07-24-98	37.11	13.30	ND	23.81	07-24-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-6	10-19-98	37.11	Not surveyed			10-19-98	Not sampled: Car parked on well										
MW-6	01-28-99	37.11	13.92	ND	23.19	01-28-99	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-6	06-25-99	37.11	15.47	ND	21.64	06-25-99	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	0.74	NP
MW-6	08-25-99	37.11	15.39	ND	21.72	08-25-99	<50	<0.5	3.4	0.6	3.7	<3	--	--	--	0.92	NP
MW-7	03-21-96	38.68	13.32	ND	25.36	03-22-96	32,000	870	450	970	4,900	280	--	--	--		
MW-7	05-24-96	38.68	14.58	ND	24.10	05-24-96	22,000	570	40	42	1,900	<200[2]	--	--	--		
MW-7	08-09-96	38.68	15.33	ND	23.35	08-09-96	14,000	390	<10	180	470	<200[2]	--	--	--		
MW-7	11-06-96	38.68	16.95	ND	21.73	11-06-96	9,500	440	<10	210	150	<100[2]	--	--	--		
MW-7	03-24-97	38.68	14.65	ND	24.03	03-24-97	6,400	420	<10	260	13	480	--	--	--		
MW-7	05-27-97	38.68	15.58	ND	23.10	05-28-97	5,000	420	<5	230	10	460	--	--	--		
MW-7	08-07-97	38.68	17.10	ND	21.58	08-07-97	3,900	350	<5	200	10	330	--	--	--		
MW-7	11-10-97	38.68	18.05	ND	20.63	11-10-97	5,600	590	10	370	43	540	--	--	--		
MW-7	02-16-98	38.68	12.03	ND	26.65	02-16-98	<5,000	390	<50	<50	61	4,300	--	--	--		
MW-7	04-15-98	38.68	13.02	ND	25.66	04-15-98	<10,000	<100	<100	<100	<100	8,900	--	--	--		
MW-7	07-24-98	38.68	14.18	ND	24.50	07-24-98	5,800	180	<50	74	<50	4,200	--	--	--		
MW-7	10-19-98	38.68	15.99	ND	22.69	10-19-98	<2,500	54	<25	72	<25	3,000	--	--	--		
MW-7	01-28-99	38.68	15.69	ND	22.99	01-28-99	4,500	560	250	<50	94	6,200	--	--	--		
MW-7	06-25-99	38.68	15.36	ND	23.32	06-25-99	3,900	520	160	46	100	45,000	63,000[3]	--	--	0.56	NP
MW-7	08-25-99	38.68	16.71	ND	21.97	08-25-99	3,400	730	77	51	110	62,000	76,000[3]	--	--	0.90	NP

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

ARCO Service Station 2111
1156 Davis Street, San Leandro, California

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Free Product Thickness	Groundwater Elevation	Water Sample Field Date	**TPHG** LUFT Method	**Benzene** EPA 8020	**Toluene** EPA 8020	**Ethylbenzene** EPA 8020	**Total Xylenes** EPA 8020	**MTBE** EPA 8020	**MTBE** EPA 8260	**TRPH** EPA 418.1	**TPHD** LUFT Method	Dissolved Oxygen	Purged/ Not Purged
		ft-MSL	feet	feet	ft-MSL		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	P/NP

ft-MSL: elevation in feet, relative to mean sea level
TPHG: total petroleum hydrocarbons as gasoline, California DHS LUFT Method
MTBE: Methyl tert-butyl ether
TRPH: total recoverable petroleum hydrocarbons
TPHD: total petroleum hydrocarbons as diesel, California DHS LUFT Method
EPA: United States Environmental Protection Agency
µg/L: micrograms per liter
mg/L: milligrams per liter
ND: none detected
- -: not available or not analyzed
<: less than laboratory detection limit stated to the right
[1]: [corrected elevation (Z')] = Z + (h * 0.73) where: Z = measured elevation, h = floating product thickness, 0.73 = density ratio of oil to water
[2]: chromatogram fingerprint is not characteristic of diesel
[3]: also analyzed for fuel oxygenates
[4]: this value is suspected to be erroneous based on subsequent check by bailer (following day). See discussion

Table 2
Groundwater Flow Direction and Gradient

ARCO Service Station 2111
1156 Davis Street, San Leandro, California

Date Measured	Average Flow Direction	Average Hydraulic Gradient
08-01-95	NR	NR
12-14-95	West	0.002
03-21-96	West-Southwest	0.005
05-24-96	West	0.003
08-09-96	West-Northwest	0.01
11-06-96	West-Northwest	0.007
03-24-97	West	0.005
05-27-97	North-Northwest	0.006
08-07-97	West	0.009
11-10-97	West	0.002
02-16-98	South-Southwest	0.013
04-15-98	West-Southwest	0.014
07-24-98	Northwest	0.01
10-19-98	West	0.008
01-28-99	Southwest	0.01
06-25-99	North-Northwest	0.017
08-25-99	**West-Northwest**	**0.005**

NR: not recorded

Table 3
Fuel Oxygenates

ARCO Service Station 2111
1156 Davis Street, San Leandro, California

Well I.D. Number	Field Date	TBA EPA 8260 ug/L	MTBE EPA 8260 ug/L	DIPE EPA 8260 ug/L	ETBE EPA 8260 ug/L	TAME EPA 8260 ug/L
MW-2	06-25-99	<25,000	17,000	<2,500	<2,500	<2,500
MW-2	08-25-99	<10,000	9,400	<1,000	<1,000	<1,000
MW-7	06-25-99	<50,000	63,000	<5,000	<5,000	<5,000
MW-7	08-25-99	<50,000	76,000	<5,000	<5,000	<5,000

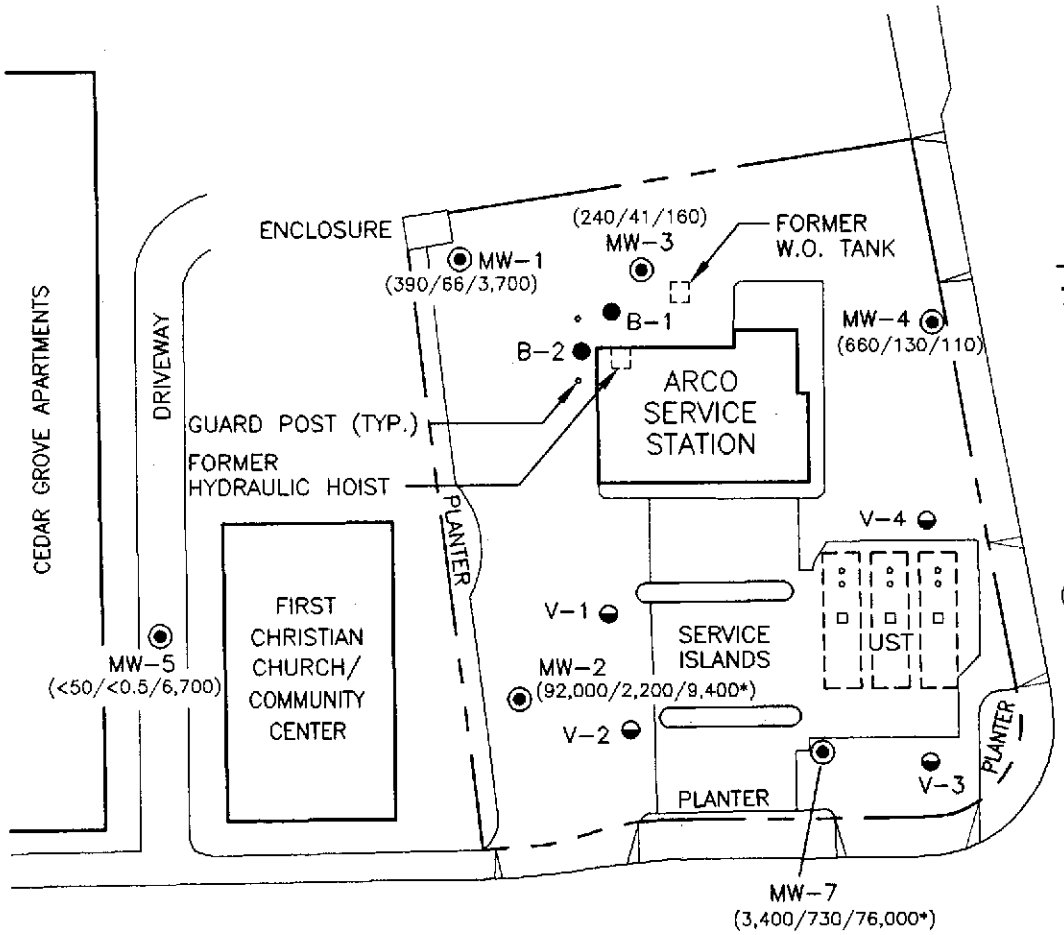
TBA = Tert-butyl alcohol
MTBE = Methyl-tert-Butyl Ether
DIPE = Di-isopropyl ether
ETBE = Ethyl tert-butyl ether
TAME = Tert-amyl methyl ether
EPA = Environmental Protection Agency
ug/L = Microgram per liter
< = less than laboratory detection limit to the right

Table 4
Approximate Cumulative Floating Product Recovered

ARCO Service Station 2111
1156 Davis Street, San Leandro, California

Well Designation	Product Recovery Field Date	Floating Product Thickness (feet)	Floating Product Recovered (gallons)
MW-2	06/28/99	0.45	0.3
MW-2	06/30/99	0.015	0.01
MW-2	07/07/99	0.06	0.04
MW-2	07/23/99	0.008	0.005
MW-2	08/25/99	0.02	0.013
MW-2	09/21/99	0.01	0.013
Cumulative Floating Product recoverd (gallons):			**0.381**

DRAWN BY		PROJECT NUMBER
K. Black	10-20-99	791655



EXPLANATION

- ◉ Groundwater monitoring well
- ● Soil boring
- ◒ Vapor extraction well
- (240/41/160) Concentration of total petroleum hydrocarbons as gasoline (TPHG), benzene, and MTBE in groundwater (ug/L); samples collected 8/25/99
- < Not detected at or above the indicated laboratory detection limit
- * Analyzed by EPA Method 8260

SCALE

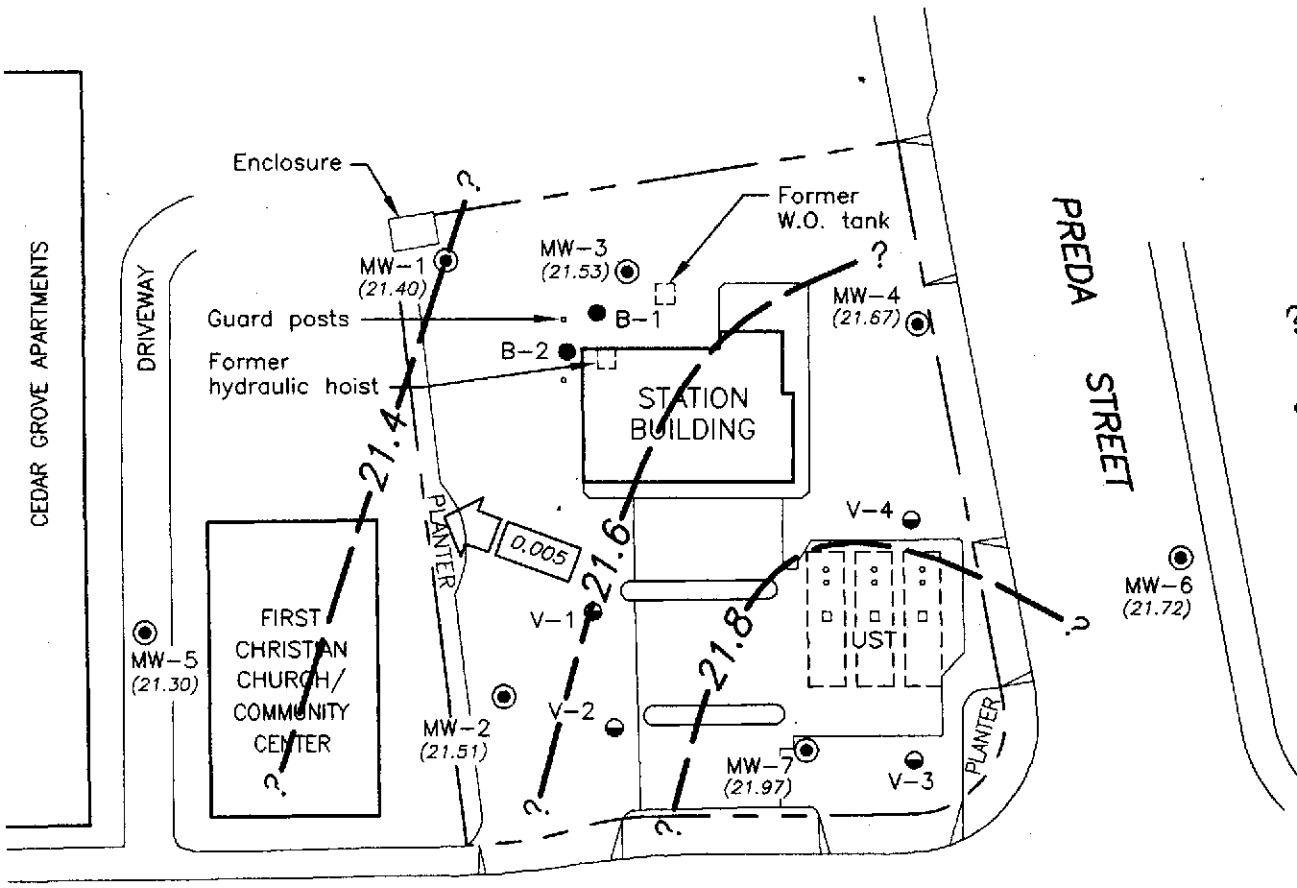
0 40 80 FEET

IT CORPORATION

ARCO PRODUCTS COMPANY
SERVICE STATION 2111

FIGURE 1
GROUNDWATER ANALYTICAL SUMMARY
THIRD QUARTER 1999
1156 DAVIS STREET
SAN LEANDRO, CALIFORNIA

DRAWN BY		PROJECT NUMBER
K. Black	10-20-99	791655



EXPLANATION

- Groundwater monitoring well
- Soil boring
- Vapor extraction well
- (21.67) Groundwater elevation (Ft.–MSL); measured 8/25/99
- ? — — Groundwater elevation contour (Ft.–MSL)
- Approx. direction of groundwater flow showing gradient

SCALE

0 40 80 FEET

IT CORPORATION

ARCO PRODUCTS COMPANY
SERVICE STATION 2111

FIGURE 2
GROUNDWATER ELEVATION CONTOURS
THIRD QUARTER 1999
1156 DAVIS STREET
SAN LEANDRO, CALIFORNIA

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

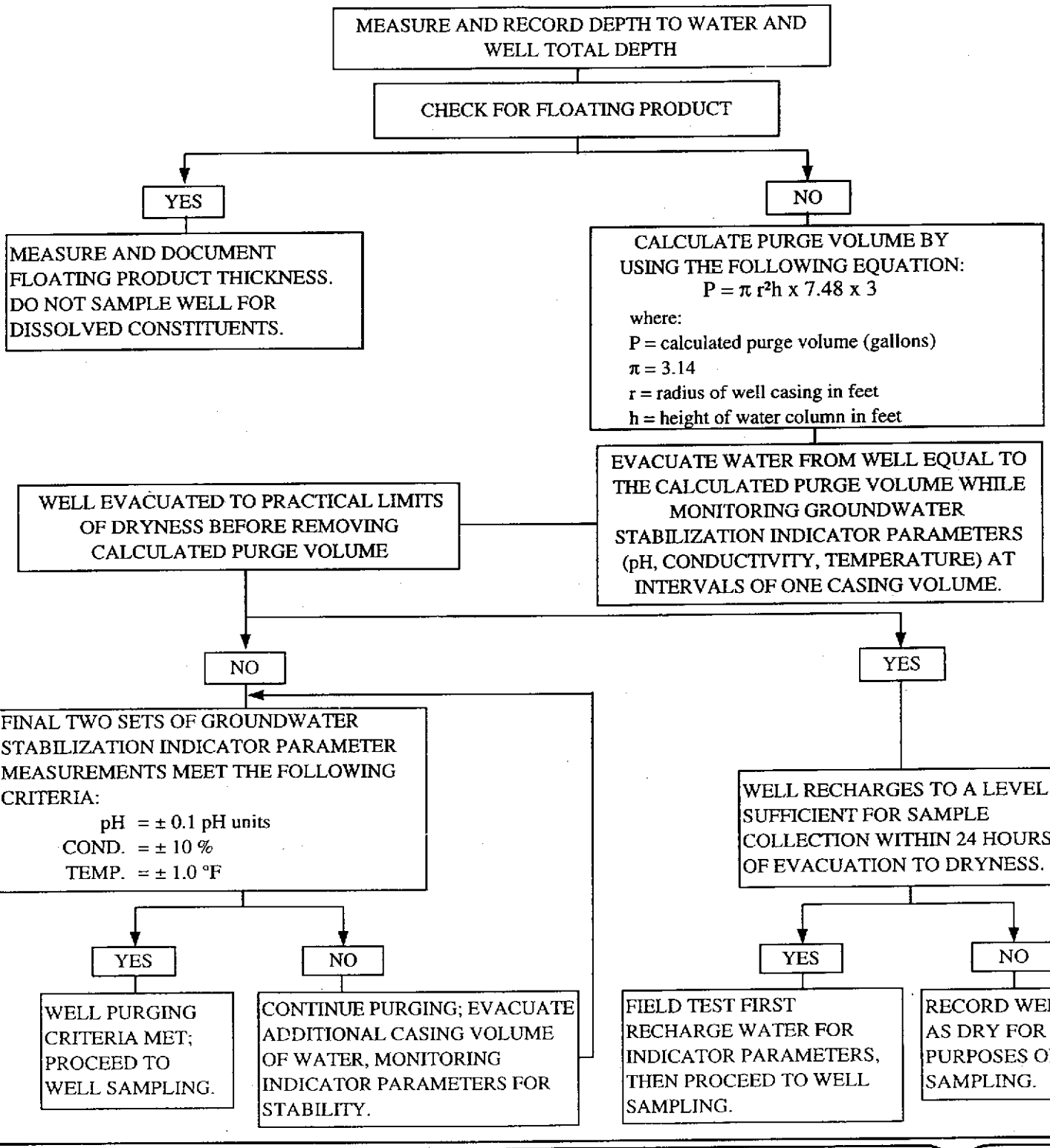
The ARCO chain-of-custody record initiated at the time of sampling contained, at a minimum, the sample designation (including the depth at which the sample was collected), sample type, analytical request, date of sampling, and the name of the sampler. The record sheet was signed, timed, and dated by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

WATER SAMPLE FIELD DATA SHEET

FIGURE A-2

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.: S9902607

RECEIVED
SEP 2 0 1999
BY:

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

RE: TO#24118.00/RAT#8/2111 SAN LEANDRO

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 20, 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:**	S9902607
Project:	TO#24118.00/RAT#8/2111 SAN LEANDRO	**Date Collected:**	8/25/99
Sample Matrix:	Water	**Date Received:**	8/25/99

Fuel Oxygenates

Sample Name:	MW-2(25)	Units:	ug/L (ppb)
Lab Code:	S9902607-005	Basis:	NA
Test Notes:	C1		

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
tert-Butyl Alcohol	EPA 5030A	8260	50	200	NA	9/7/99	<10000	
Methyl *tert*-Butyl Ether	EPA 5030A	8260	0.5	200	NA	9/7/99	9400	
Diisopropyl Ether	EPA 5030A	8260	5	200	NA	9/7/99	<1000	
Ethyl *tert*-Butyl Ether	EPA 5030A	8260	5	200	NA	9/7/99	<1000	
tert-Amyl Methyl Ether	EPA 5030A	8260	5	200	NA	9/7/99	<1000	

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

Approved By: _____ Date: 09/10/99

1S9902607.xls

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902607
Project:	TO#24118.00/RAT#8/2111 SAN LEANDRO	**Date Collected:**	8/25/99
Sample Matrix:	Water	**Date Received:**	8/25/99

Fuel Oxygenates

Sample Name:	MW-7(26)	Units:	ug/L (ppb)
Lab Code:	S9902607-006	Basis:	NA
Test Notes:	C1		

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
tert-Butyl Alcohol	EPA 5030A	8260	50	1000	NA	9/8/99	<50000	
Methyl *tert*-Butyl Ether	EPA 5030A	8260	0.5	1000	NA	9/8/99	76000	
Diisopropyl Ether	EPA 5030A	8260	5	1000	NA	9/8/99	<5000	
Ethyl *tert*-Butyl Ether	EPA 5030A	8260	5	1000	NA	9/8/99	<5000	
tert-Amyl Methyl Ether	EPA 5030A	8260	5	1000	NA	9/8/99	<5000	

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

Approved By: _____ Date: 09/10/99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902607
Project:	TO#24118.00/RAT#8/2111 SAN LEANDRO	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Fuel Oxygenates

Sample Name:	Method Blank (MSD1)	Units:	ug/L (ppb)
Lab Code:	S990907-WB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
tert-Butyl Alcohol	EPA 5030A	8260	50	1	NA	9/7/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030A	8260	0.5	1	NA	9/7/99	ND	
Diisopropyl Ether	EPA 5030A	8260	5	1	NA	9/7/99	ND	
Ethyl *tert*-Butyl Ether	EPA 5030A	8260	5	1	NA	9/7/99	ND	
tert-Amyl Methyl Ether	EPA 5030A	8260	5	1	NA	9/7/99	ND	

Approved By: _____ Date: 09/10/99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902607
Project:	TO#24118.00/RAT#8/2111 SAN LEANDRO	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Fuel Oxygenates

Sample Name:	Method Blank (MSD1)	Units:	ug/L (ppb)
Lab Code:	S990908-WB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
tert-Butyl Alcohol	EPA 5030A	8260	50	1	NA	9/8/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030A	8260	0.5	1	NA	9/8/99	ND	
Diisopropyl Ether	EPA 5030A	8260	5	1	NA	9/8/99	ND	
Ethyl *tert*-Butyl Ether	EPA 5030A	8260	5	1	NA	9/8/99	ND	
tert-Amyl Methyl Ether	EPA 5030A	8260	5	1	NA	9/8/99	ND	

Approved By: _____ Date: 09/10/99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902607
Project:	TO#24118.00/RAT#8/2111 SAN LEANDRO	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Fuel Oxygenates

Sample Name:	Method Blank (MSD1)	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
tert-Butyl Alcohol	EPA 5030A	8260	50	1	NA	9/8/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030A	8260	0.5	1	NA	9/8/99	ND	
Diisopropyl Ether	EPA 5030A	8260	5	1	NA	9/8/99	ND	
Ethyl *tert*-Butyl Ether	EPA 5030A	8260	5	1	NA	9/8/99	ND	
tert-Amyl Methyl Ether	EPA 5030A	8260	5	1	NA	9/8/99	ND	

Approved By: _____ Date: 09/10/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: TO#24118.00/RAT#8/2111 SAN LEANDRO
Sample Matrix: Water

Service Request: S9902607
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: NA

Surrogate Recovery Summary
Fuel Oxygenates

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-2(25)	S9902607-005		106	99	111
MW-7(26)	S9902607-006		104	99	110
BATCH QC	S9902581-027MS		109	102	106
BATCH QC	S9902581-027DMS		109	102	105
Method Blank (MSD1)	S990907-WB1		103	100	104
Method Blank (MSD1)	S990908-WB1		103	99	110
Method Blank (MSD1)	S990908-WB2		105	99	110
EPA Acceptance Limits:			86-118	88-110	86-115

Approved By: RT Date: 09/10/99

SUR3/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: TO#24118.00/RAT#8/2111 SAN LEANDRO
Sample Matrix: Water

Service Request: S9902607
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 9/9/99

Matrix Spike/Duplicate Matrix Spike Summary
Fuel Oxygenates

Sample Name: BATCH QC
Lab Code: S9902581-027MS, S9902581-027DMS
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	9.4	10	94	100	62-145	6	
Benzene	NONE	8260	0.5	10	10	ND	10	10	100	100	77-127	<1	
Trichloroethene	NONE	8260	0.5	10	10	ND	9.4	9.6	94	96	71-119	2	
Toluene	NONE	8260	0.5	10	10	ND	9.6	9.9	96	99	76-124	3	
Chlorobenzene	NONE	8260	0.5	10	10	ND	9.4	9.9	94	99	75-127	5	
1,2-Dichlorobenzene	NONE	8260	0.5	10	10	ND	9.0	9.4	90	94	74-126	4	
Naphthalene	NONE	8260	2	10	10	ND	5.6	7.0	56	70	43-157	22	

Approved By: _____ Date: 09/10/99

DMS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: TO#24118.00/RAT#8/2111 SAN LEANDRO
Sample Matrix: Water

Service Request: S9902607
Date Collected: 8/25/99
Date Received: 8/25/99

BTEX, MTBE and TPH as Gasoline

Sample Name: MW-1(26)
Lab Code: S9902607-001
Test Notes:

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	5	NA	9/5/99	390	
Benzene	EPA 5030	8020	0.5	5	NA	9/5/99	66	
Toluene	EPA 5030	8020	0.5	5	NA	9/5/99	8.5	
Ethylbenzene	EPA 5030	8020	0.5	5	NA	9/5/99	<2.5	C1
Xylenes, Total	EPA 5030	8020	0.5	5	NA	9/5/99	8.6	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	5	NA	9/5/99	3700	

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

Approved By: _____ Date: 09/10/99

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902607
Project:	TO#24118.00/RAT#8/2111 SAN LEANDRO	**Date Collected:**	8/25/99
Sample Matrix:	Water	**Date Received:**	8/25/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-4(23)	Units:	ug/L (ppb)
Lab Code:	S9902607-002	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	9/5/99	660	
Benzene	EPA 5030	8020	0.5	1	NA	9/5/99	130	
Toluene	EPA 5030	8020	0.5	1	NA	9/5/99	21	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	9/5/99	6.4	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	9/5/99	39	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	9/5/99	110	

Approved By: _____ Date: 09/10/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902607
Project:	TO#24118.00/RAT#8/2111 SAN LEANDRO	**Date Collected:**	8/25/99
Sample Matrix:	Water	**Date Received:**	8/25/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-3(25)	Units:	ug/L (ppb)
Lab Code:	S9902607-003	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	240	
Benzene	EPA 5030	8020	0.5	1	NA	9/5/99	41	
Toluene	EPA 5030	8020	0.5	1	NA	9/5/99	12	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	9/5/99	3.7	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	9/5/99	9.9	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	9/5/99	160	

Approved By: RT Date: 09/10/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: TO#24118.00/RAT#8/2111 SAN LEANDRO
Sample Matrix: Water

Service Request: S9902607
Date Collected: 8/25/99
Date Received: 8/25/99

BTEX, MTBE and TPH as Gasoline

Sample Name: MW-6(24)
Lab Code: S9902607-004
Test Notes:

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	1	NA	9/5/99	ND	
Benzene	EPA 5030	8020	0.5	1	NA	9/5/99	0.5	
Toluene	EPA 5030	8020	0.5	1	NA	9/5/99	3.4	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	9/5/99	0.6	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	9/5/99	3.7	
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:**	S9902607
Project:	TO#24118.00/RAT#8/2111 SAN LEANDRO	**Date Collected:**	8/25/99
Sample Matrix:	Water	**Date Received:**	8/25/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-2(25)	Units:	ug/L (ppb)
Lab Code:	S9902607-005	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	250	NA	9/5/99	92000	
Benzene	EPA 5030	8020	0.5	250	NA	9/5/99	2200	
Toluene	EPA 5030	8020	0.5	250	NA	9/5/99	16000	
Ethylbenzene	EPA 5030	8020	0.5	250	NA	9/5/99	3200	
Xylenes, Total	EPA 5030	8020	0.5	250	NA	9/5/99	19000	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	250	NA	9/5/99	11000	

Approved By: _____ Date: 09/10/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902607
Project:	TO#24118.00/RAT#8/2111 SAN LEANDRO	**Date Collected:**	8/25/99
Sample Matrix:	Water	**Date Received:**	8/25/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-7(26)	Units:	ug/L (ppb)
Lab Code:	S9902607-006	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	10	NA	9/5/99	3400	
Benzene	EPA 5030	8020	0.5	10	NA	9/5/99	730	
Toluene	EPA 5030	8020	0.5	10	NA	9/5/99	77	
Ethylbenzene	EPA 5030	8020	0.5	10	NA	9/5/99	51	
Xylenes, Total	EPA 5030	8020	0.5	10	NA	9/5/99	110	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	250	NA	9/5/99	62000	

Approved By: _____ Date: 09/10/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902607
Project:	TO#24118.00/RAT#8/2111 SAN LEANDRO	**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:	S990905-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

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: TO#24118.00/RAT#8/2111 SAN LEANDRO
Sample Matrix: Water

Service Request: S9902607
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-1(26)	S9902607-001		94	113
MW-4(23)	S9902607-002		84	100
MW-3(25)	S9902607-003		89	91
MW-6(24)	S9902607-004		94	86
MW-2(25)	S9902607-005		102	106
MW-7(26)	S9902607-006		98	112
Laboratory Control Sample	S9900905-LCS		109	98
Laboratory Control Sample	S9900905-DLCS		101	100
Laboratory Control Sample	S9900905-LCS		93	109
Laboratory Control Sample	S9900905-DLCS		89	117
Method Blank	S990905-WB1		96	103

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	**Service Request:**	S9902607
Project:	TO#24118.00/RAT#8/2111 SAN LEANDRO	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	9/5/99

Laboratory Control /Duplicate Laboratory Control Sample Summary
BTE

Sample Name:	Laboratory Control Sample	Units:	ug/L (ppb)
Lab Code:	S9900905-LCS, S9900905-DLCS	Basis:	NA
Test Notes:			

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: 9/10/99

DMS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: TO#24118.00/RAT#8/2111 SAN LEANDRO
Sample Matrix Water

Service Request: S9902607
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 9/5/99

Laboratory Control /Duplicate Laboratory Control Sample Summary
TPH as Gasoline

Sample Name: Laboratory Control Sample
Lab Code: S9900905-LCS, S9900905-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	242	235	97	94	75-135	3	

Approved By: _____ Date: 09/10/99

DMS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: TO#24118.00/RAT#8/2111 SAN LEANDRO

Service Request: S9902607
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	229	85-115	92	
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	26	85-115	104	

Approved By: _____ Date: 09/10/99

ICV032196

ARCO Products Company
Division of Atlantic/Richfield Company

S9902607 Task Order No. 24118.00

Chain of Custody

ARCO Facility no. 2111	City (Facility) San Leandro	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

Special Detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

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 incld. MTBE 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 ☐	Chlorinated EPA 8260		
MW-1	(26')	2	①	X		X	HCL	8/25/99	1253		X												
MW-4	(23')	2	②	X		X	HCL		1302		X												
MW-3	(25')	2	③	X		X	HCL		1311		X												
MW-6	(24')	2	④	X		X	HCL		1319		X												
MW-2	(25')	4	⑤	X		X	HCL		1338		X											X	
MW-7	(26')	4	⑥	X		X	HCL	↓	1351		X											X	

Remarks: RAT 6
2-40ml HCL VOAs
MW-2 & 7 add 2-40ml HCL VOAs
#791655

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

Relinquished by sampler	Date 8/25/99	Time 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

Columbia Analytical Services INC.
An Employee-Owned Company

September 7, 1999

Service Request No.: S9902608

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

RE: TO#24118.00/RAT#8/2111 SAN LEANDRO

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 9, 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

RECEIVED
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BY:

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:**	S9902608
Project:	TO#24118.00/RAT#8/2111 SAN LEANDRO	**Date Collected:**	8/25/99
Sample Matrix:	Water	**Date Received:**	8/25/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-5(23)	Units:	ug/L (ppb)
Lab Code:	S9902608-001	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	9/2/99	ND	
Benzene	EPA 5030	8020	0.5	1	NA	9/2/99	ND	
Toluene	EPA 5030	8020	0.5	1	NA	9/2/99	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	9/2/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	9/2/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	20	NA	9/2/99	6700	

Approved By: _____ Date: 09/07/99

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902608
Project:	TO#24118.00/RAT#8/2111 SAN LEANDRO	**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:	S990902-WB1 GC 03	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	9/2/99	ND	
Benzene	EPA 5030	8020	0.5	1	NA	9/2/99	ND	
Toluene	EPA 5030	8020	0.5	1	NA	9/2/99	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	9/2/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	9/2/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	9/2/99	ND	

Approved By: _____ Date: 09/07/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9902608
Project:	TO#24118.00/RAT#8/2111 SAN LEANDRO	**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:	S990901-WB1 (GC 06)	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	9/1/99	ND	
Benzene	EPA 5030	8020	0.5	1	NA	9/1/99	ND	
Toluene	EPA 5030	8020	0.5	1	NA	9/1/99	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	9/1/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	9/1/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	9/1/99	ND	

Approved By: _____ Date: 09/07/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: TO#24118.00/RAT#8/2111 SAN LEANDRO
Sample Matrix: Water

Service Request: S9902608
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(23)	S9902608-001		95	92
BATCH QC	S9902628-003MS		104	92
BATCH QC	S9902628-003DMS		106	89
BATCH QC	S9902628-003MS		106	85
BATCH QC	S9902628-003DMS		102	93
Method Blank	S990901-WB1		102	89
Method Blank	S990902-WB1		93	115

CAS Acceptance Limits: 69-116 72-139

Approved By: _____ Date: 09/07/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9902608
Project:	TO#24118.00/RAT#8/2111 SAN LEANDRO	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	9/1-2/99

Matrix Spike/Duplicate Matrix Spike Summary
BTE

Sample Name:	BATCH QC	Units:	ug/L (ppb)
Lab Code:	S9902628-003MS, S9902628-003DMS	Basis:	NA
Test Notes:			

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	26	26	104	104	75-135	<1
Toluene	EPA 5030	8020	0.5	25	25	ND	27	27	108	108	73-136	<1
Ethylbenzene	EPA 5030	8020	0.5	25	25	ND	27	26	108	104	69-142	100

Approved By: _____ Date: 09/07/99

DMS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: TO#24118.00/RAT#8/2111 SAN LEANDRO
Sample Matrix: Water

Service Request: S9902608
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 9/2/99

Matrix Spike/Duplicate Matrix Spike Summary
TPH as Gasoline

Sample Name: BATCH QC
Lab Code: S9902628-003MS, S9902628-003DMS
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	254	268	102	107	75-135	5	

Approved By: _____ Date: 09/07/99

DMS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: TO#24118.00/RAT#8/2111 SAN LEANDRO

Service Request: S9902608
Date Analyzed: 9/1/99

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	280	85-115	112	
Benzene	EPA 5030	8020	25	26	85-115	104	
Toluene	EPA 5030	8020	25	26	85-115	104	
Ethylbenzene	EPA 5030	8020	25	26	85-115	104	
Xylenes, Total	EPA 5030	8020	75	75	85-115	100	
Methyl *tert*-Butyl Ether	EPA 5030	8020	25	25	85-115		

Approved By: PT Date: 09/07/99

ICV/032196

1 OF 7

600341

4.00 / 4.00

CK: ARCO

Sample

n Bailer

edicated

ubmersible Pump

iler (Stainless Steel)

iler (Teflon)

N/A

(NTU 0-200) N/A

TURBIDITY (visual) Low

, California

Rev. 1/97

Sam	Lab	Cor						Samp	Samp	BTEX 602/E	BTEX EPA	TPH	Gas	Oil ar 413.1	TPH EPA	EPA	EPA	EPA	TCLP Metal	CAM TTLC	Lead	Leac			
MW-5(23)		2	(1)	X		X	HCL	8/25/99	1329		X														

Special Detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: RAT 8 2-40ml HCL VOAs #791655

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/D3	
Relinquished by sampler [signature]	Date 8/25/99 Time 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 # : 792219 STATION ADDRESS : 1156 Davis Street, San Leandro DATE : 8/25/99

ARCO STATION # : 2111 FIELD TECHNICIAN : B. Hendricks DAY : Wednesday

DTW Order	WELL ID	Well Box Seal Condition	Type Of Well Lid	Gasket Present	Lock Number	Type Of Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS DO = mg/L - °C
1	MW-1	ok	3/4"	YES	3490	LWC	18.20	18.20	ND	—	27.0	1.56 / 20.0 °C Broken lid
2	MW-4	ok	3/4"	YES	3490	LWC	16.43	16.43			24.8	1.01 / 19.9 °C
3	MW-3	ok	3/4"	YES	3490	LWC	17.79	17.79			26.8	1.13 / 19.8 °C
4	MW-6	ok	9/16"	YES	3490	LWC	15.39	15.39			25.0	0.42 / 20.8 °C
5	MW-5	ok	9/16"	YES	3616	LWC	15.91	15.91			24.8	0.46 / 20.1 °C
6	MW-2	ok	3/4"	YES	3490	LWC	16.49	16.49			26.8	0.84 / 19.7 °C
7	MW-7	ok	9/16"	YES	Dolphin	LWC	16.71	16.71			27.0	0.90 / 20.1 °C
									0.02	per	sample	sheet

SURVEY POINTS ARE TOP OF WELL CASINGS

RECEIVED
SEP 07 1999
BY:

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

EMCON

PROJECT NO: 792219 | SAMPLE ID: MW-1 (20')

PURGED BY: B. Hawkins | CLIENT NAME: ARCO #2111

SAMPLED BY: " | LOCATION: San Leandro, 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.): 5.7

DEPTH OF WELL (feet): 27.0 | CALCULATED PURGE (gal.): 17.3

DEPTH OF WATER (feet): 18.20 | ACTUAL PURGE VOL. (gal.): 0

DATE PURGED: 8/25/99 | END PURGE: No Purge

DATE SAMPLED: " | SAMPLING TIME: 1253

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1252	—	7.37	711	72.1	clear	low

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 Wizard©
____ Bailer (Teflon)
____ Bailer (PVC)
____ Bailer (Stainless Steel)
____ Dedicated
Other: ____

SAMPLING EQUIPMENT

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

WELL INTEGRITY: Good | LOCK: Arco

REMARKS: DTW Below top of screen, grab sample

pH, E.C., Temp. Meter Calibration: Date: 8/25/99 | Time: 1243 | Meter Serial No.: 60034/

E.C. ~~1000~~ 1413 / 1409 / 1413 | pH 7 7.04 / 7.00 | pH 10 9.93 / 10.00 | pH 4 4.00 / 4.00

Temperature °F 73.9

SIGNATURE: BH | REVIEWED BY: [illegible] | PAGE 1 OF 7

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

EMCON

PROJECT NO : 792219 | SAMPLE ID : MW-2 (S)

PURGED BY : B. Hawkins | CLIENT NAME : ARCO #2111

SAMPLED BY : " | LOCATION : San Leandro, 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.) : 6.7

DEPTH OF WELL (feet) : 26.8 | CALCULATED PURGE (gal.) : 20.2

DEPTH OF WATER (feet) : 16.49 | ACTUAL PURGE VOL. (gal.) : 6

DATE PURGED : 8/25/99 | END PURGE : No purge

DATE SAMPLED : " | SAMPLING TIME : 1338

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1337	—	7.65	719	71.3	Brown	Med

OTHER: Dissolved Oxygen= | ODOR: Strong | 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: plug

REMARKS: Skimmer installed in well
emptied skimmer, removed 1.0 gallons H_2O + ~50 mL product
product layer in DTSPO bailer measured 0.02'
DTW below top of screen, grab sample

pH, E.C., Temp. Meter Calibration: Date: see MW-1 | Time: ____ | Meter Serial No.: ____

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

Temperature °F: ____

SIGNATURE: BH | REVIEWED BY: [illegible] | PAGE 2 OF 7

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

EMCON

PROJECT NO : 792219 | SAMPLE ID : MW-3 (25)

PURGED BY : B. Hendricks | CLIENT NAME : ARCO #2111

SAMPLED BY : I | LOCATION : San Leandro, 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.) : 5.8

DEPTH OF WELL (feet) : 26.8 | CALCULATED PURGE (gal.) : 17.7

DEPTH OF WATER (feet) : 17.79 | ACTUAL PURGE VOL. (gal.) : 0

DATE PURGED : 8/25/99 | END PURGE : no purge

DATE SAMPLED : I | SAMPLING TIME : 1311

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1310	—	7.66	705	70.8	clear	low

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: Arco

REMARKS: DTW below top of screen, grab sample

pH, E.C., Temp. Meter Calibration: Date: See MW-1 | Time: ____ | Meter Serial No.: ____

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

Temperature °F ____

SIGNATURE: BH | REVIEWED BY: MA | PAGE 3 OF 7

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

EMCON

PROJECT NO: 792219 | SAMPLE ID: MW-4(23)

PURGED BY: B. Hendricks | CLIENT NAME: ARCO #2111

SAMPLED BY: L | LOCATION: San Leandro, 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.): 5.4

DEPTH OF WELL (feet): 24.8 | CALCULATED PURGE (gal.): 16.4

DEPTH OF WATER (feet): 16.43 | ACTUAL PURGE VOL. (gal.): 8

DATE PURGED: 8/25/99 | END PURGE: No purge

DATE SAMPLED: L | SAMPLING TIME: 1302

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1301	—	7.38	754	72.6	lt. Brown	low

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 Wizard©
- ____ Bailer (Teflon)
- ____ Bailer (PVC)
- ____ Bailer (Stainless Steel)
- ____ Dedicated

Other: ____

SAMPLING EQUIPMENT

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

Other: Disposable Teflon Bailer

WELL INTEGRITY: Good | LOCK: ARCO

REMARKS: DTW below top of screen, grab sample

pH, E.C., Temp. Meter Calibration: Date: See MW-1 | Time: ____ | Meter Serial No.: ____

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

Temperature °F ____

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WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

EMCON

PROJECT NO: 792219 | SAMPLE ID: MW-5 (23')

PURGED BY: B. Hendricks | CLIENT NAME: ARCO #2111

SAMPLED BY: " | LOCATION: San Leandro, 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.): 1.3

DEPTH OF WELL (feet): 24.0 | CALCULATED PURGE (gal.): 4.0

DEPTH OF WATER (feet): 15.91 | ACTUAL PURGE VOL. (gal.): 0

DATE PURGED: 8/25/99 | END PURGE: No Purge

DATE SAMPLED: " | SAMPLING TIME: 1329

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1328	—	7.41	714	70.9	lt. Brown	low

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 Wizard©
- X Bailer (Teflon)
- ____ Bailer (PVC)
- ____ Bailer (Stainless Steel)
- ____ Dedicated

Other: ____

SAMPLING EQUIPMENT

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

Other: Disposable Teflon Bailer

WELL INTEGRITY: Good | LOCK: Arco

REMARKS: DTW below top of screen, grab sample.

pH, E.C., Temp. Meter Calibration: Date: See MW-1 | Time: ____ | Meter Serial No.: ____

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

Temperature °F ____

SIGNATURE: BH | REVIEWED BY: [signature] | PAGE 5 OF 7

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

EMCON

PROJECT NO: 792219 | SAMPLE ID: MW-6 (24)

PURGED BY: B. Hawkins | CLIENT NAME: ARCO #2111

SAMPLED BY: ↓ | LOCATION: San Leandro, 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.): 1.5

DEPTH OF WELL (feet): 25.0 | CALCULATED PURGE (gal.): 4.7

DEPTH OF WATER (feet): 15.39 | ACTUAL PURGE VOL. (gal.): 0

DATE PURGED: 8/25/99 | END PURGE: NO PURGE

DATE SAMPLED: ↓ | SAMPLING TIME: 1319

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1315	—	7.41	695	72.1	H. Brown	low

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: Arco

REMARKS: DTW below top of screen, grab sample

pH, E.C., Temp. Meter Calibration: Date: See MW-1 | Time: ____ | Meter Serial No.: ____

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

Temperature °F ____

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WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

EMCON

PROJECT NO: 792219 | SAMPLE ID: MW-7 (26')
PURGED BY: B. Hc. Jacobs | CLIENT NAME: ARCO #2111
SAMPLED BY: I | LOCATION: San Leandro, 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.): 6.7
DEPTH OF WELL (feet): 27.0 | CALCULATED PURGE (gal.): 20.2
DEPTH OF WATER (feet): 16.71 | ACTUAL PURGE VOL. (gal.): 6

DATE PURGED: 6/25/99 | END PURGE: No purge
DATE SAMPLED: I | SAMPLING TIME: 1351

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1350	~	7.33	897	70.7	Clear	Low

OTHER: Dissolved Oxygen= | ODOR: Strong | 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: ARCO

REMARKS: DTW Below top of Screen, grab Sample

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

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

Temperature °F ____

SIGNATURE: BA | REVIEWED BY: [illegible] | PAGE 7 OF 7

EMCON Associates - Field Services

1921 Ringwood Avenue

San Jose, California

1999

Historical Monitoring Well Data

ARCO 2111

#792219

						Gallons
						First 0.00
						Second 0.00
						Third 0.00
						Fourth 0.00
Well ID	Quarter	Date	Purge Volume (gallons)	Did well dry	Well Contained Product	
MW-1	First	01/28/99	0.00	GRAB	NO	
	Second	06/25/99	0.00	GRAB	NO	
	Third	08/25/99	0.00	GRAB	NO	
	Fourth					
MW-2	First	01/28/99	0.00	GRAB	NO	
	Second	06/25/99	0.00	GRAB	NO	
	Third	08/25/99	0.00	GRAB	NO	
	Fourth					
MW-3	First	01/28/99	0.00	GRAB	NO	
	Second	06/25/99	0.00	GRAB	NO	
	Third	08/25/99	0.00	GRAB	NO	
	Fourth					
MW-4	First	01/28/99	0.00	GPAB	NO	
	Second	06/25/99	0.00	GRAB	NO	
	Third	08/25/99	0.00	GRAB	NO	
	Fourth					
MW-5	First	01/28/99	0.00	GRAB	NO	
	Second	06/25/99	0.00	GRAB	NO	
	Third	08/25/99	0.00	GRAB	NO	
	Fourth					
MW-6	First	01/28/99	0.00	GRAB	NO	
	Second	06/25/99	0.00	GRAB	NO	
	Third	08/25/99	0.00	GRAB	NO	
	Fourth					
MW-7	First	01/28/99	0.00	GRAB	NO	
	Second	06/25/99	0.00	GRAB	NO	
	Third	08/25/99	0.00	GRAB	NO	
	Fourth					
						Steam water (gal) _____

ARCO Products Company

Division of Atlantic/Richfield Company

Chain of Custody

Task Order No.

ARCO Facility no.	City (Facility)	Project manager (Consultant)	Laboratory Name
ARCO engineer	Telephone no. (ARCO)	Telephone no. (Consultant)	Fax no. (Consultant)	Contract Number
Consultant name	Address (Consultant)		Method of shipment

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 Semi Metals ☐ VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org/DHS ☐ Lead EPA 7420/7421 ☐			
				X		X					X												
				X		X					X												
				X		X					X												
				X							X												
				X							X												
				X		X					X												

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 / 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

ARCO Products Company

Division of Atlantic/Richfield Company

Task Order No.

Chain of Custody

ARCO Facility no.	City (Facility)
ARCO engineer	Telephone no. (ARCO)
Consultant name	Address (Consultant)
Project manager (Consultant)	
Telephone no. (Consultant)	Fax no. (Consultant)

Sample I.D.	Lab no.	Container no.	Matrix			Preservation		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 ☐			
			Soil	Water	Other	Ice	Acid																

Laboratory Name

Contract Number

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	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

FIELD REPORT

Project Number: ______

Client Name: ARCO 2111

Location: San Leandro

Date: 9-21-99

Name: L. RATH

WORK PERFORMED: Arrive on Site at 0858 HRS Per Glen Vanderveen. Product Drum Found under ARCO Station equipment.

MW-2 DTW = 16.72 DTP = ~~16.~~ 16.71 Approx ~~~~ 0.01 Product in well, Skimer in well Approx 50ml product emptied into over pac Drum on site

MW-7 DTW = 17.19 No Product Found

V-1 DTW = 16.90 No Product Food

North TO well Found Filled with gravel
South TO well DTW 10.61' water is Black with NO GAS ODOR

Product Drum Approx 1GAL upon Arrival
Product Drum Approx 2GAL upon departure

SIGNATURE: L Rath