



ENVIRONMENTAL PROTECTION

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September 22, 1999
Project 791655

ST10 744

Resp. done to 10/14/99
MS

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

Re: Quarterly Groundwater Monitoring Report, Second 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 second 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

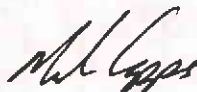
No monitoring event is thorough enough to describe all geologic and hydrogeologic conditions of interest at a given site. If conditions have not been identified during the monitoring event, results should not be construed as a guarantee of the absence of such conditions at the site, but rather as the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


Mark Capps, R.G.
Project Geologist

Attachment: Quarterly Groundwater Monitoring Report, Second Quarter 1999

cc: Amir Gholami, ACHCSA

Mike Bakaldin, San Leandro Fire Department, Hazardous Materials Program

Date: September 22, 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 (SECOND - 1999):

1. Prepared and submitted quarterly groundwater monitoring report for first quarter 1999.
2. Performed quarterly groundwater monitoring and sampling for second quarter 1999.
3. Analyzed groundwater samples for fuel oxygenates, as requested by ACHCSA.

WORK PROPOSED FOR NEXT QUARTER (THIRD - 1999):

1. Prepare and submit quarterly groundwater monitoring report for second quarter 1999.
2. Perform quarterly groundwater monitoring and sampling for third quarter 1999.
3. Install free product skimmer in well MW-2.
4. Perform monthly free product check and removal until product thickness diminishes to a sheen.

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: 0.355 gallons
Cumulative FP Recovered to Date: 0.355 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: 16.6 feet
Groundwater Flow Direction and Gradient
(Average): 0.017 ft/ft toward North-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 0.008 feet.
- MTBE was the only oxygenate detected using USEAP method 8260 to analyze samples from wells MW-2 and MW-7.

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-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	--	--	--		
MW-2	03-24-97	37.99	14.22	ND	23.77	03-24-97	790	18	<1	2	6	280	--	--	--		

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Petroleum Hydrocarbons and Their Constituents

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

B↑ in MW2

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-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-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	..	..	..
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		

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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-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-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	--	--	--		

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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-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-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	..	..	..
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		

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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-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-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	∅	230	10	460	--	--	--		
MW-7	08-07-97	38.68	17.10	ND	21.58	08-07-97	3,900	350	∅	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

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
<p>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 [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</p>																	

**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

NR: not recorded

**Table 3
Fuel Oxygenates**

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

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

Handwritten note in red:
 up to 50,000 ppb
 for MTBE
 in MW-7

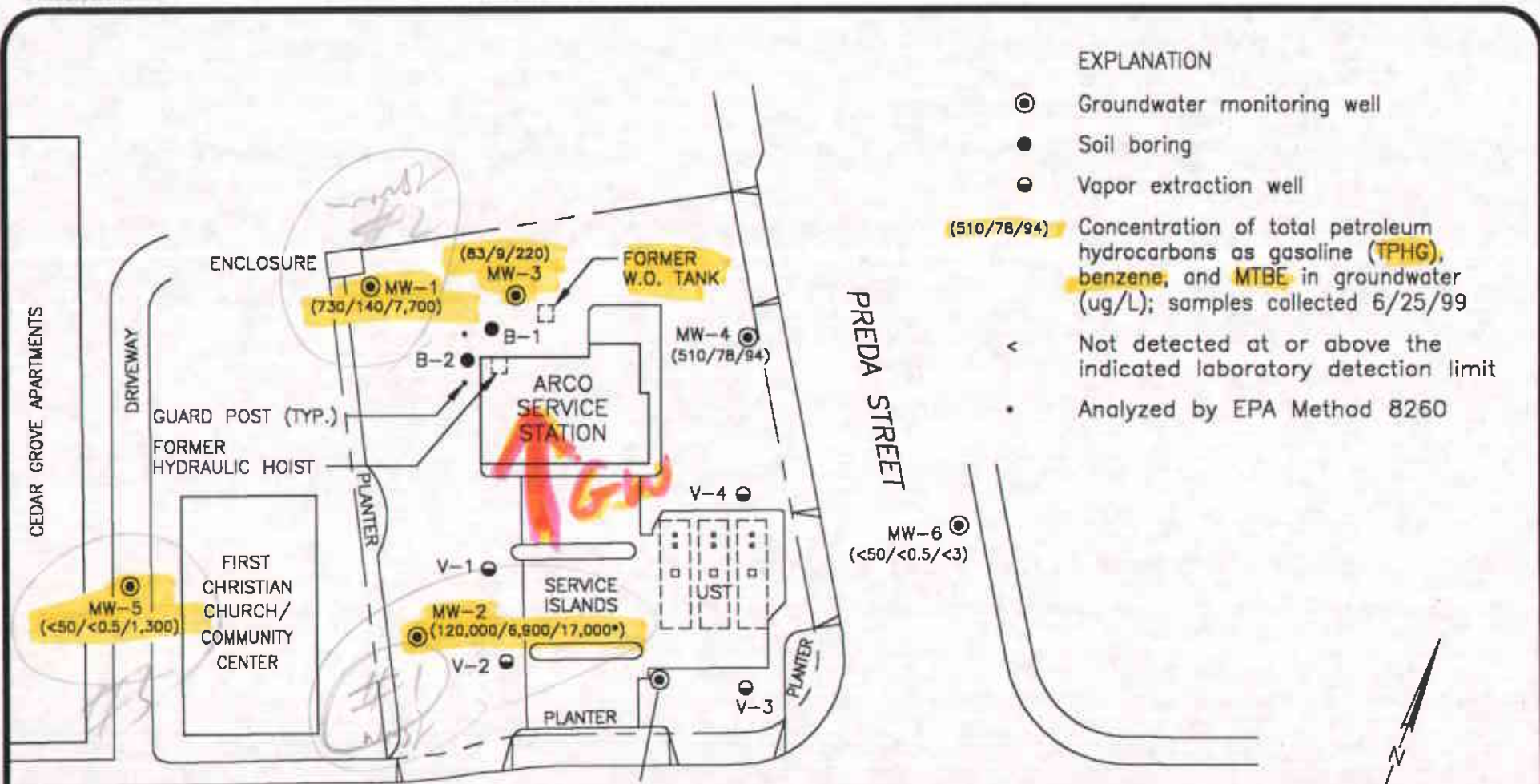
Table 4
Approximate Cumulative Floating Product Recovered

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

Well Desig- nation	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
Cumulative Floating Product recovered (gallons):			0.355

1/2"
 1" = 40'
 1/4" = 10'

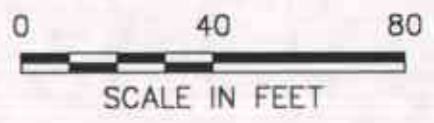
DATE: AUG. 1999
 DRAWN BY: KAB
 CHECKED BY: [unclear]
 PROJECT NO. 791655



EXPLANATION

- ⊙ Groundwater monitoring well
- Soil boring
- Vapor extraction well
- (510/78/94) Concentration of total petroleum hydrocarbons as gasoline (TPHG), benzene, and MTBE in groundwater (ug/L); samples collected 6/25/99
- < Not detected at or above the indicated laboratory detection limit
- Analyzed by EPA Method 8260

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 A MEMBER OF THE IT GROUP



AUG. 1999
 KAB
 PROJECT NO.
 791655

FIGURE 1
 ARCO PRODUCTS COMPANY
 SERVICE STATION 2111, 1156 DAVIS ST.
 SAN LEANDRO, CALIFORNIA
GROUNDWATER ANALYTICAL SUMMARY
SECOND QUARTER 1999

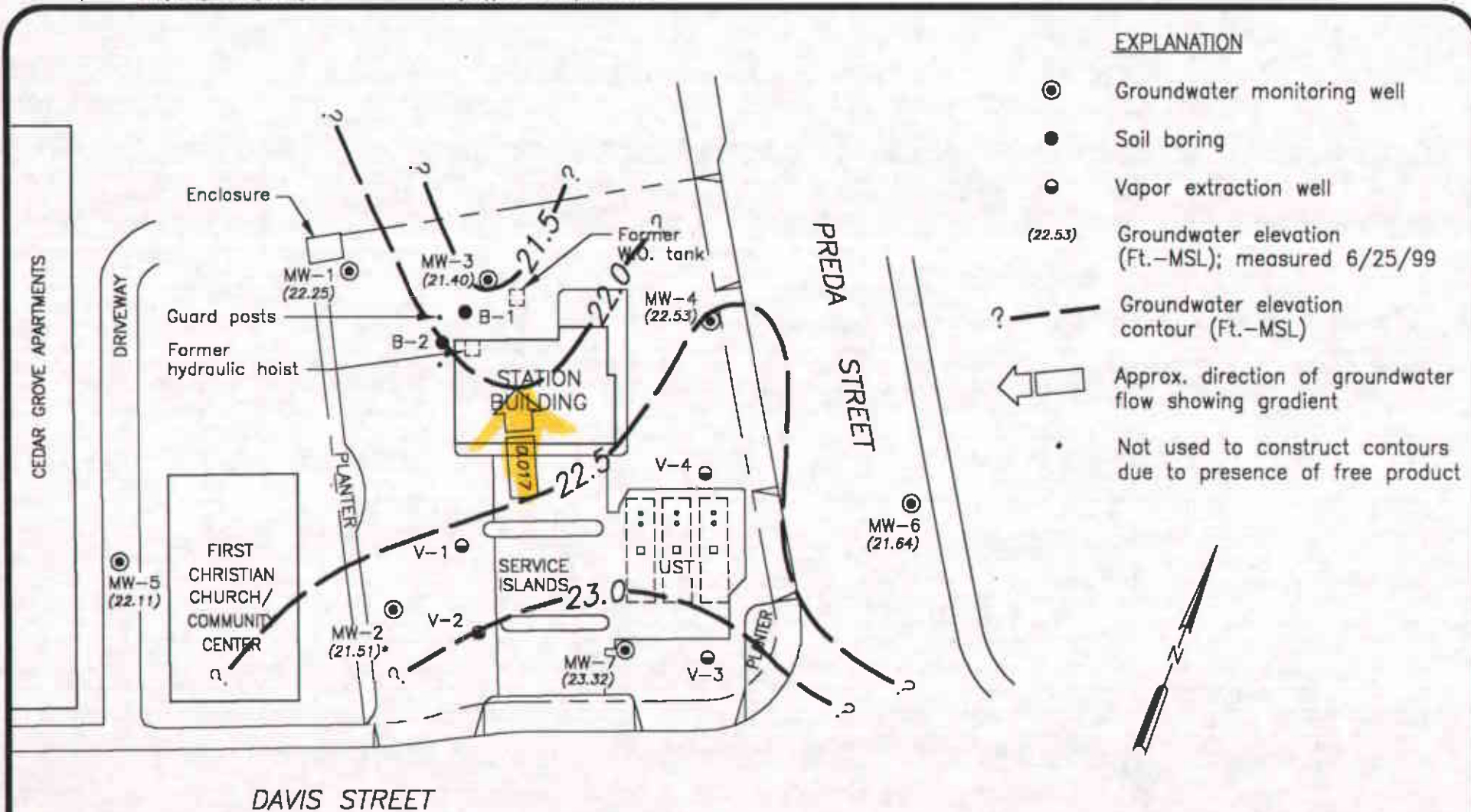


IMAGE Files: <No Images>

Dlmscale: 40 Ltscale: 40 Plotscale: 0

XREF Files: <No Xrefs>

SANJOSE/CADD: N:\DWG\PINACL\2111\2111GWC.DWG Wed, 08/Sep/99 01:33pm kblack

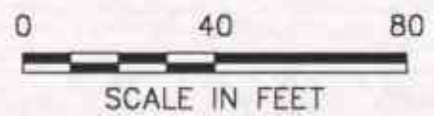


EXPLANATION

- ⊙ Groundwater monitoring well
- Soil boring
- Vapor extraction well
- (22.53) Groundwater elevation (Ft.-MSL); measured 6/25/99
- ? - - - Groundwater elevation contour (Ft.-MSL)
- ← Approx. direction of groundwater flow showing gradient
- Not used to construct contours due to presence of free product



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DATE AUG. 1999
 DWN KAB
 APP _____
 REV _____
 PROJECT NO. 791655

FIGURE 2
 ARCO PRODUCTS COMPANY
 SERVICE STATION 2111, 1156 DAVIS ST.
 SAN LEANDRO, CALIFORNIA
GROUNDWATER ELEVATION CONTOURS
SECOND QUARTER 1999

APPENDIX A
SAMPLING AND ANALYSIS PROCEDURES

APPENDIX A

SAMPLING AND ANALYSIS PROCEDURES

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

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

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

Sample Collection

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

Equipment Cleaning

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

Water Level, Floating Hydrocarbon, and Total Well Depth Measurements

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

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

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

Well Purging

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

Groundwater purged from the monitoring wells was transported in a 500-gallon water trailer, 55-gallon drum, or a 325-gallon truck-mounted tank to 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)



OWT

MONITORING WELL PURGING PROTOCOL

MEASURE AND RECORD DEPTH TO WATER AND WELL TOTAL DEPTH

CHECK FOR FLOATING PRODUCT

YES

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

NO

CALCULATE PURGE VOLUME BY USING THE FOLLOWING EQUATION:

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

where:

P = calculated purge volume (gallons)

$\pi = 3.14$

r = radius of well casing in feet

h = height of water column in feet

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

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

NO

YES

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

- pH = ± 0.1 pH units
- COND. = ± 10 %
- TEMP. = ± 1.0 °F

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

YES

NO

YES

NO

WELL PURGING CRITERIA MET; PROCEED TO WELL SAMPLING.

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

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

RECORD WELL AS DRY FOR PURPOSES OF SAMPLING.



EMCON

MONITORING WELL PURGING PROTOCOL

FIGURE

A-1

WATER SAMPLE FIELD DATA SHEET

Rev. 5/96



OWT

PROJECT NO : _____
 PURGED BY : _____
 SAMPLED BY : _____

SAMPLE ID : _____
 CLIENT NAME : _____
 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. (umhos/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				SAMPLING EQUIPMENT			
_____ 2" Bladder Pump	_____ Bailer (Teflon)	_____ 2" Bladder Pump	_____ Bailer (Teflon)	_____ Bomb Sampler	_____ Bailer (Stainless Steel)	_____ Dipper	_____ Submersible Pump
_____ Centrifugal Pump	_____ Bailer (PVC)	_____ Well Wizard™	_____ Dedicated	_____ Well Wizard™	_____ Dedicated	Other: _____	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



OWT

**EMCON - SACRAMENTO
GROUNDWATER SAMPLING AND ANALYSIS REQUEST FORM**

PROJECT NAME :

SCHEDULED DATE :

SPECIAL INSTRUCTIONS / CONSIDERATIONS :

[Empty box for special instructions]

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

Well Lock Number (s)

CHECK BOX TO AUTHORIZE DATA ENTRY

Site Contact: _____
Name Phone #

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

Laboratory and Lab QC Istructions:



EMCON

SAMPLING AND ANALYSIS REQUEST FORM

FIGURE

A-3

APPENDIX B

**CERTIFIED ANALYTICAL REPORTS,
AND CHAIN-OF-CUSTODY DOCUMENTATION**



September 22, 1999

Service Request No.: S9901960

Mr. Glen Vanderveen
EMCON-Pinnacle
2201 Broadway, Suite 101
Oakland, CA 94612

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

Dear Mr. Vanderveen:

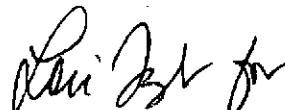
Enclosed are the results of the sample(s) submitted to our laboratory on June 29, 1999. All analyses were performed in accordance with our laboratory's quality assurance program. Results are intended to be considered in their entirety and apply to the sample(s) analyzed. Columbia Analytical Services 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 question, 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

AZLA	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)

ACRONLST.DOC 7/14/95

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:
Project:
Sample Matrix:

ARCO Products Company
TO#24118.00/RAT#8/2111 SAN LEANDRO
Water

Service Request: S9901960
Date Collected: 6/25/99
Date Received: 6/29/99

Fuel Oxygenates

Sample Name:
Lab Code:
Test Notes:

MW-2(25)
S9901960-005
C1

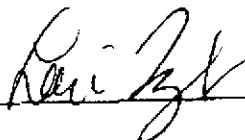
Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
tert-Butyl Alcohol	EPA 5030A	8260	50	500	NA	7/8/99	<25000	
Methyl tert-Butyl Ether	EPA 5030A	8260	0.5	500	NA	7/8/99	17,000	
Diisopropyl Ether	EPA 5030A	8260	5	500	NA	7/8/99	<2500	
Ethyl tert-Butyl Ether	EPA 5030A	8260	5	500	NA	7/8/99	<2500	
tert-Amyl Methyl Ether	EPA 5030A	8260	5	500	NA	7/8/99	<2500	

C1

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

Approved By: _____



Date: _____

9-22-99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Service Request: S9901960
 Date Collected: 6/25/99
 Date Received: 6/29/99

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

Fuel Oxygenates

Sample Name: MW-7(24)
 Lab Code: S9901960-006
 Test Notes: C1

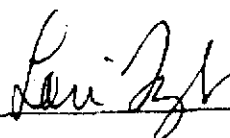
Units: ug/L (ppb)
 Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
tert-Butyl Alcohol	EPA 5030A	8260	50	1000	NA	7/8/99	<50000	
Methyl tert-Butyl Ether	EPA 5030A	8260	0.5	1000	NA	7/8/99	63,000	
Diisopropyl Ether	EPA 5030A	8260	5	1000	NA	7/8/99	<5000	
Ethyl tert-Butyl Ether	EPA 5030A	8260	5	1000	NA	7/8/99	<5000	
tert-Amyl Methyl Ether	EPA 5030A	8260	5	1000	NA	7/8/99	<5000	

C1

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

Approved By: _____



Date: 9-22-99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:
Project:
Sample Matrix:

ARCO Products Company
TO#24118.00/RAT#8/2111 SAN LEANDRO
Water

Service Request: S9901960
Date Collected: NA
Date Received: NA

Fuel Oxygenates

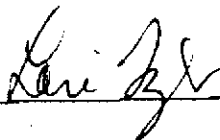
Sample Name:
Lab Code:
Test Notes:

Method Blank
S990707-WB2

Units: ug/L (ppb)
Basis: NA

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

Approved By:



Date:

9-22-99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:
Project:
Sample Matrix:

ARCO Products Company
TO#24118.00/RAT#8/2111 SAN LEANDRO
Water

Service Request: S9901960
Date Collected: NA
Date Received: NA

Fuel Oxygenates

Sample Name:
Lab Code:
Test Notes:

Method Blank
S990708-WB2

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
<i>tert</i> -Butyl Alcohol	EPA 5030A	8260	50	1	NA	7/8/99	ND	
Methyl <i>tert</i> -Butyl Ether	EPA 5030A	8260	0.5	1	NA	7/8/99	ND	
Diisopropyl Ether	EPA 5030A	8260	5	1	NA	7/8/99	ND	
Ethyl <i>tert</i> -Butyl Ether	EPA 5030A	8260	5	1	NA	7/8/99	ND	
<i>tert</i> -Amyl Methyl Ether	EPA 5030A	8260	5	1	NA	7/8/99	ND	

Approved By: _____

Date: _____

9-22-99

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: S9901960
 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)	S9901960-005		98	100	102
MW-7(24)	S9901960-006		99	101	101
BATCH QC	S9902010-002MS		100	104	94
BATCH QC	S9902010-002DMS		100	104	95
Method Blank	S990707-WB2		102	105	99
Method Blank	S990708-WB1		100	103	95

EPA Acceptance Limits: 86-118 88-110 86-115

Approved By: _____

Leri J. J.

Date: _____

9-22-99

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: S9901960
 Date Collected: NA
 Date Received: NA
 Date Extracted: NA
 Date Analyzed: 7/9/99

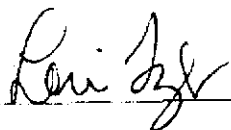
Matrix Spike/Duplicate Matrix Spike Summary
 Fuel Oxygenates

Sample Name: BATCH QC
 Lab Code: S9902010-002MS. S9902010-002DMS
 Test Notes:

Units: ug/L (ppb)
 Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Spike Level		Sample Result	Spike Result		Percent Recovery		CAS Acceptance Limits	Relative Percent Difference	Result Notes
				MS	DMS		MS	DMS	MS	DMS			
1,1-Dichloroethene	NONE	8260	0.5	10	10	ND	8.7	8.6	87	86	62-145	1	
Benzene	NONE	8260	0.5	10	10	ND	9.7	9.7	97	97	77-127	<1	
Trichloroethene	NONE	8260	0.5	10	10	ND	9.0	9.1	90	91	71-119	1	
Toluene	NONE	8260	0.5	10	10	ND	9.4	9.3	94	93	76-124	1	
Chlorobenzene	NONE	8260	0.5	10	10	ND	9.6	9.42	96	94	75-127	2	
1,2-Dichlorobenzene	NONE	8260	0.5	10	10	ND	8.9	8.8	89	88	74-126	1	
Naphthalene	NONE	8260	2	10	10	ND	4.7	6.6	47	66	43-157	34	

Approved By:



Date:

9-22-99

DMS-926397p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

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

Service Request: S9901960
 Date Collected: 6/25/99
 Date Received: 6/29/99

BTEX, MTBE and TPH as Gasoline

Sample Name: MW-1(24)
 Lab Code: S9901960-001
 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	4	NA	7/8/99	730	
Benzene	EPA 5030	8020	0.5	4	NA	7/8/99	140	
Toluene	EPA 5030	8020	0.5	4	NA	7/8/99	5	
Ethylbenzene	EPA 5030	8020	0.5	4	NA	7/8/99	3	
Xylenes, Total	EPA 5030	8020	0.5	4	NA	7/8/99	2	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	400	NA	7/7/99	7700	

Approved By: _____

Date: 9-22-99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

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

Service Request: S9901960
 Date Collected: 6/25/99
 Date Received: 6/29/99

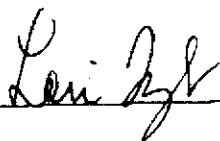
BTEX, MTBE and TPH as Gasoline

Sample Name: MW-4(20)
 Lab Code: S9901960-002
 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	7/7/99	510	
Benzene	EPA 5030	8020	0.5	4	NA	7/8/99	78	
Toluene	EPA 5030	8020	0.5	1	NA	7/7/99	4.1	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	7/7/99	0.5	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	7/7/99	18	
Methyl tert-Butyl Ether	EPA 5030	8020	3	4	NA	7/8/99	94	

Approved By: _____



Date: _____

9-22-99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

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

Service Request: S9901960
 Date Collected: 6/25/99
 Date Received: 6/29/99

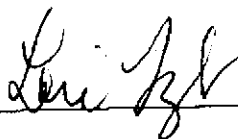
BTEX, MTBE and TPH as Gasoline

Sample Name: MW-3(24)
 Lab Code: S9901960-003
 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	7/8/99	83	
Benzene	EPA 5030	8020	0.5	1	NA	7/8/99	9.0	
Toluene	EPA 5030	8020	0.5	1	NA	7/8/99	1.4	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	7/8/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	7/8/99	2.5	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	4	NA	7/8/99	220	

Approved By: _____



Date: _____

9-22-99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

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

Service Request: S9901960
 Date Collected: 6/25/99
 Date Received: 6/29/99

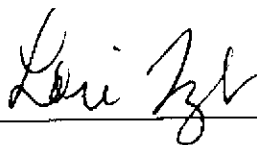
BTEX, MTBE and TPH as Gasoline

Sample Name: MW-6(23)
 Lab Code: S9901960-004
 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	7/8/99	ND	
Benzene	EPA 5030	8020	0.5	1	NA	7/8/99	ND	
Toluene	EPA 5030	8020	0.5	1	NA	7/8/99	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	7/8/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	7/8/99	ND	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	1	NA	7/8/99	ND	

Approved By: _____



Date: _____

9-12-99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

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

Service Request: S9901960
 Date Collected: 6/25/99
 Date Received: 6/29/99

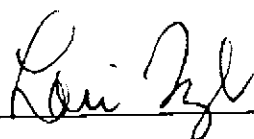
BTEX, MTBE and TPH as Gasoline

Sample Name: MW-2(25)
 Lab Code: S9901960-005
 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	CALUFT	50	500	NA	7/8/99	120000	
Benzene	EPA 5030	8020	0.5	500	NA	7/8/99	6900	
Toluene	EPA 5030	8020	0.5	500	NA	7/8/99	21000	
Ethylbenzene	EPA 5030	8020	0.5	500	NA	7/8/99	2600	
Xylenes, Total	EPA 5030	8020	0.5	500	NA	7/8/99	19000	
Methyl tert -Butyl Ether	EPA 5030	8020	3	500	NA	7/8/99	18000	

Approved By: _____



Date: _____

9-22-98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

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

Service Request: S9901960
 Date Collected: 6/25/99
 Date Received: 6/29/99

BTEX, MTBE and TPH as Gasoline

Sample Name: MW-7(24)
 Lab Code: S9901960-006
 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	10	NA	7/8/99	3900	
Benzene	EPA 5030	8020	0.5	10	NA	7/8/99	520	
Toluene	EPA 5030	8020	0.5	10	NA	7/8/99	160	
Ethylbenzene	EPA 5030	8020	0.5	10	NA	7/8/99	46	
Xylenes, Total	EPA 5030	8020	0.5	10	NA	7/8/99	100	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	1000	NA	7/9/99	45000	

Approved By: _____

Date: _____

9-22-99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

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

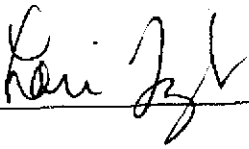
Service Request: S9901960
Date Collected: NA
Date Received: NA

BTEX, MTBE and TPH as Gasoline

Units: ug/L (ppb)
 Basis: NA

Sample Name: Method Blank
Lab Code: S990707-WB1
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	7/7/99	ND	
Benzene	EPA 5030	8020	0.5	1	NA	7/7/99	ND	
Toluene	EPA 5030	8020	0.5	1	NA	7/7/99	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	7/7/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	7/7/99	ND	
Methyl tert-Butyl Ether	EPA 5030	8020	3	1	NA	7/7/99	ND	

Approved By:  Date: 9-22-99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

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

Service Request: S9901960
 Date Collected: NA
 Date Received: NA

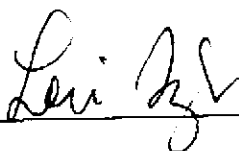
BTEX, MTBE and TPH as Gasoline

Sample Name: Method Blank
 Lab Code: S990708-WB1
 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	7/8/99	ND	
Benzene	EPA 5030	8020	0.5	1	NA	7/8/99	ND	
Toluene	EPA 5030	8020	0.5	1	NA	7/8/99	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	7/8/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	7/8/99	ND	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	1	NA	7/8/99	ND	

Approved By: _____



Date: _____

9-22-99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
 Project: T0#24118.00/RAT#8/2111 SAN LEANDRO
 Sample Matrix: Water

Service Request: S9901960
 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 CALUFT

Units: PERCENT
 Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery	
			4-Bromofluorobenzene	m,m'-Trifluorotoluene
MW-1(24)	S9901960-001		96	109
MW-4(20)	S9901960-002		93	116
MW-3(24)	S9901960-003		101	109
MW-6(23)	S9901960-004		102	92
MW-2(25)	S9901960-005		95	96
MW-7(24)	S9901960-006		90	108
BATCH QC	S9901958-001MS		98	111
BATCH QC	S9901958-001DMS		99	107
BATCH QC	S9901958-003MS		102	101
BATCH QC	S9901958-003DMS		99	111
Method Blank	S990707-WB1		99	102
Method Blank	S990708-WB1		100	101

CAS Acceptance Limits:

69-116

69-116

Approved By: _____

Date: _____

9-22-95

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: S9901960
 Date Collected: NA
 Date Received: NA
 Date Extracted: NA
 Date Analyzed: 7/7/99

Matrix Spike/Duplicate Matrix Spike Summary
 BTE

Sample Name: BATCH QC
 Lab Code: S9901958-001MS, S9901958-001DMS
 Test Notes:

Units: ug/L (ppb)
 Basis: NA

Percent Recovery

Analyte	Prep Method	Analysis Method	Spike Level			Sample Result	Spike Result		Percent Recovery		CAS Acceptance Limits	Relative Percent Difference
			MRL	MS	DMS		MS	DMS	MS	DMS		
Benzene	EPA 5030	8020	0.5	25	25	ND	24	23	96	92	75-135	4
Toluene	EPA 5030	8020	0.5	25	25	ND	25	25	100	100	73-136	<1
Ethylbenzene	EPA 5030	8020	0.5	25	25	ND	25	23	100	92	69-142	8

Approved By: _____

Lawry Zyl

Date: _____

9-22-99

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: S9901960
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 7/7/99

Matrix Spike/Duplicate Matrix Spike Summary
 TPH as Gasoline

Sample Name: BATCH QC
Lab Code: S9901958-001MS, S9901958-001DMS
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	Spike Level		Sample Result	Percent Recovery				CAS Acceptance Limits	Relative Percent Difference	Result Notes
			MRL	DMS		MS	DMS	MS	DMS			
Gasoline	EPA 5030	CA/LUFT	50	250	ND	250	270	100	108	75-135	8	

Approved By: _____

Lori Ryl

Date: _____

9-22-99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S9901960
 Date Analyzed: 7/8/99

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

Sample Name: ICV
 Lab Code: ICV
 Test Notes:

Units: ug/L (ppb)
 Basis: NA

ICV Source:

Analyte	Prep Method	Analysis Method	True Value	Result	CAS		Result Notes
					Percent Recovery Acceptance Limits	Percent Recovery	
TPH as Gasoline	EPA 5030	CA/T.UFT	250	250	90-110	100	
Benzene	EPA 5030	8020	25	23	85-115	92	
Toluene	EPA 5030	8020	25	25	85-115	100	
Ethylbenzene	EPA 5030	8020	25	23	85-115	92	
Xylenes, Total	EPA 5030	8020	75	68	85-115	91	
Methyl tert-Butyl Ether	EPA 5030	8020	25	28	85-115	112	

Approved By: _____

Lou Zyl

Date: _____

9-22-99

ICV032196

ARCO Products Company

Division of Atlantic/Richfield Company

Task Order No. **24118.00**

S9901960

Chain of Custody

ARCO Facility no. 2111	City (Facility) San Leandro	Project manager (Consultant) Glen Vander Veen		Laboratory Name CAS
ARCO engineer Paul Supple	Telephone no. (ARCO)	Telephone no. (Consultant) (408)453-7300	Fax no. (Consultant) (408)437-9526	Contract Number
Consultant name EMCON		Address (Consultant) 2701 Broadway #101 Oakland, CA 94612		

Sample I.D.	Lab no.	Container no.	Matrix			Preservation		Sampling date	Sampling time	BTEX EPA 801/802	BTEX/TPH in oil EPA 801/802/806/807	TPH Modified 8015 Gas <input type="checkbox"/> Diesel <input type="checkbox"/>	Oil and Grease 413.1 <input type="checkbox"/> 413.2 <input type="checkbox"/>	TPH EPA 418.1/SM 503E	EPA 601/6010	EPA 624/6240	EPA 625/6270	TCLP Metals <input type="checkbox"/> VOAD <input type="checkbox"/>	Semi Metals <input type="checkbox"/> VOAD <input type="checkbox"/>	CAM Metals EPA 6010/7000 TLC <input type="checkbox"/> STLC <input type="checkbox"/>	Lead Org/DHS <input type="checkbox"/>	Lead EPA 7420/7421 <input type="checkbox"/>	Oxygenates EPA 521/522	Method of shipment					
			Soil	Water	Other	Ice	Acid																						
MW-1 (34)		2	①	X		X	HCL	6/25/99	0915		X														Sampler will deliver				
MW-4 (30)		7	②	X		X	HCL		1000		X															Special Detection Limit/reporting Lowest Possible			
MW-3 (34)		7	③	X		X	HCL		1015		X																Special QA/QC As Normal		
MW-6 (33)		7	④	X		X	HCL		1030		X																	Remarks RAT 8	
MW-7 (35)		4	⑤	X		X	HCL		1200		X												X						#20805-127.006 Lab Number
MW-7 (34)		4	⑥	X		X	HCL		1233		X												X							Turnaround Time: Priority Rush 1 Business Day ☐ Rush 2 Business Days ☐ Expedited 5 Business Days ☐ Standard 10 Business Days ☒

Condition of sample: Received samples in cooler to cooler		Temperature received: R11 P3 DUE: 7/14/99 R11 D2	
Relinquished by sampler Lumberly Melle	Date 6/29/99	Time 2:00pm	Received by Bruce Felder
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory
	Date	Time	



September 22, 1999

Service Request No.: S9901960

Mr. Glen Vanderveen
EMCON-Pinnacle
2201 Broadway, Suite 101
Oakland, CA 94612

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

Dear Mr. Vanderveen:

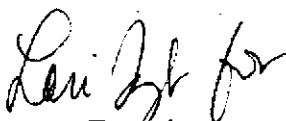
Enclosed are the results of the sample(s) submitted to our laboratory on June 29, 1999. All analyses were performed in accordance with our laboratory's quality assurance program. Results are intended to be considered in their entirety and apply to the sample(s) analyzed. Columbia Analytical Services 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 question, please call me at (408) 748-9700.

Respectfully submitted,

Columbia Analytical Services, Inc.


Bernadette Tromcales
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)

ACRONLST.DOC 7/14/95

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

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

Service Request: S9901960
 Date Collected: 6/25/99
 Date Received: 6/29/99

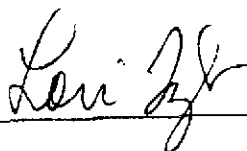
BTEX, MTBE and TPH as Gasoline

Sample Name: MW-5(21)
 Lab Code: S9901960-007
 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	7/8/99	ND	
Benzene	EPA 5030	8020	0.5	1	NA	7/8/99	ND	
Toluene	EPA 5030	8020	0.5	1	NA	7/8/99	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	7/8/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	7/8/99	ND	
Methyl tert-Butyl Ether	EPA 5030	8020	3	20	NA	7/8/99	1300	

Approved By: _____



Date: _____

9-22-99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

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

Service Request: S9901960
 Date Collected: NA
 Date Received: NA

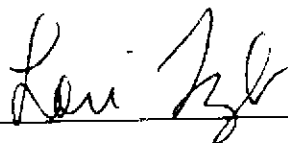
BTEX, MTBE and TPH as Gasoline

Sample Name: Method Blank
 Lab Code: S990707-WB1
 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	CALUFT	50	1	NA	7/7/99	ND	
Benzene	EPA 5030	8020	0.5	1	NA	7/7/99	ND	
Toluene	EPA 5030	8020	0.5	1	NA	7/7/99	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	7/7/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	7/7/99	ND	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	1	NA	7/7/99	ND	

Approved By: _____



Date: _____

9-22-99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

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

Service Request: S9901960
 Date Collected: NA
 Date Received: NA

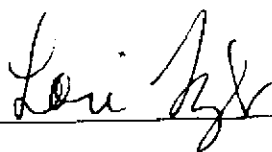
BTEX, MTBE and TPH as Gasoline

Sample Name: Method Blank
 Lab Code: S990708-WB1
 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	7/8/99	ND	
Benzene	EPA 5030	8020	0.5	1	NA	7/8/99	ND	
Toluene	EPA 5030	8020	0.5	1	NA	7/8/99	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	7/8/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	7/8/99	ND	
Methyl tert-Butyl Ether	EPA 5030	8020	3	1	NA	7/8/99	ND	

Approved By: _____



Date: _____

9-22-99

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: S9901960
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 CALUFT

Units: PERCENT
Basis: NA

Table with columns: Sample Name, Lab Code, Test Notes, Percent Recovery (4-Bromofluorobenzene, a,a,a-Trifluorotoluene). Rows include MW-5(21), BATCH QC, Method Blank, etc.

CAS Acceptance Limits: 69-116 69-116

Approved By: [Signature] Date: 9-22-99

SUR2020397p

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: S9901960
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 7/7/99

Matrix Spike/Duplicate Matrix Spike Summary
 BTE

Sample Name: BATCH QC
Lab Code: S9901958-001MS. S9901958-001DMS
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	Spike Level		Sample Result	Spike Result		Percent Recovery				Relative Percent Difference	
			MRL	MS		DMS	MS	DMS	MS	DMS	CAS		Acceptance
										Limits			
Benzene	EPA 5030	8020	0.5	25	25	ND	24	23	96	92	75-135	4	
Toluene	EPA 5030	8020	0.5	25	25	ND	25	25	100	100	73-136	<1	
Ethylbenzene	EPA 5030	8020	0.5	25	25	ND	25	23	100	92	69-142	8	

Approved By: *Lori Byle* Date: 9-22-99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

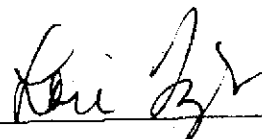
Service Request: S9901960
 Date Collected: NA
 Date Received: NA
 Date Extracted: NA
 Date Analyzed: 7/7/99

Matrix Spike/Duplicate Matrix Spike Summary
 TPH as Gasoline

Sample Name: BATCH QC
 Lab Code: S9901958-001MS, S9901958-001DMS
 Test Notes:

Units: ug/L (ppb)
 Basis: NA

Analyte	Prep Method	Analysis Method	Spike Level		Sample Result	Percent Recovery				CAS Acceptance Limits	Relative Percent Difference	Result Notes
			MRL	MS DMS		MS	DMS	MS	DMS			
Gasoline	EPA 5030	CA/LUFT	50	250 250	ND	250	270	100	108	75-135	8	

Approved By:  Date: 9-22-99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: 59901960
 Date Analyzed: 7/8/99

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

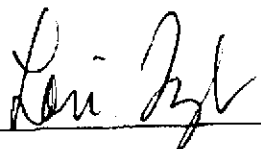
Sample Name: ICV
 Lab Code: ICV1
 Test Notes:

Units: ug/L (ppb)
 Basis: NA

ICV Source:

Analyte	Prep Method	Analysis Method	True Value	Result	CAS Percent Recovery		Result Notes
					Acceptance Limits	Percent Recovery	
TPH as Gasoline	EPA 5030	CA/LUFT	250	250	90-110	100	
Benzene	EPA 5030	8020	25	23	85-115	92	
Toluene	EPA 5030	8020	25	25	85-115	100	
Ethylbenzene	EPA 5030	8020	25	23	85-115	92	
Xylenes, Total	EPA 5030	8020	75	68	85-115	91	
Methyl tert-Butyl Ethol	EPA 5030	8020	25	28	85-115	112	

Approved By: _____



Date: _____

9-22-99

ICV02196

ARCO Products Company

Division of Atlantic/Richfield Company

Task Order No. 74118.00

S9901960 Chain of Custody

ARCO Facility no. 2111 City (Facility) San Leandro Project manager (Consultant) Glen Vanderveen
 ARCO engineer Paul Supple Telephone no. (ARCO) _____ Telephone no. (Consultant) (408) 453-7300 Fax no. (Consultant) (408) 437-9526
 Consultant name EMCGN Address (Consultant) 2201 Broadway #101 Oakland, CA 94612

Laboratory Name
CAS
Contract Number

Sample I.D.	Lab no.	Container no.	Matrix			Preservation		Sampling date	Sampling time	BTEX 602EPA 8020	BTEX/TPH incal, MIBT EPA Method 8015 EPA Method 8210/8015	TPH Modified 8015 Gas <input type="checkbox"/> Diesel <input type="checkbox"/>	Oil and Grease 413.1 <input type="checkbox"/> 413.2 <input type="checkbox"/>	TPH EPA 418.1/SM 503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCUP Semi Metals VOAD VOAQ	CWM Metals EPA 6010/7000 TTLCC <input type="checkbox"/> STLCC <input type="checkbox"/>	Lead Org/DHSC Lead EPA 7420/7421 <input type="checkbox"/>			
			Soil	Water	Other	Ice	Acid																
<u>MW-500</u>	<u>2</u>	<u>(7)</u>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<u>HCl</u>	<u>6/25/99 11:13</u>		<input checked="" type="checkbox"/>													

Method of shipment
Sampler will deliver

Special Detection Limit/reporting
Lowest Possible

Special QA/QC
As Normal

Remarks
RAT 8
2-40ml HCl
VOAs
#20905-127.006
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 7/14/99 RII D3
 Relinquished by sampler [Signature] Date 6/29/99 Time 2:00 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 C
FIELD DATA SHEETS

**FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY**

PROJECT # : 21775-226.004 STATION ADDRESS : 1156 Davis Street, San Leandro DATE : 6/25/99

ARCO STATION # : 2111 FIELD TECHNICIAN : Kimberly Miller DAY : Friday

DTW Order	WELL ID	Well Box Seal	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
1	MW-1		3/4"	YES	3490	LWC	17.35	17.35	ND	NA	26.3	DC Temp 0.79 / 19.2
2	MW-4		3/4"	YES	3490	LWC	15.57	15.57	ND	NA	21.7	0.90 / 19.2
3	MW-3		3/4"	YES	3490	LWC	17.92	17.92	ND	NA	26.7	1.11 / 19.2
4	MW-6		9/16"	YES	3490	LWC	15.47	15.47	ND	NA	25.0	0.74 / 19.6
5	MW-5		9/16"	YES	3616	LWC	15.10	15.10	ND	NA	23.9	0.76 / 19.6
6	MW-2		3/4"	YES	3490	LWC	19.2	19.2	15.57	3.73	26.7	0.49 / 19.5
7	MW-7		9/16"	YES	Dolphin	LWC	15.30	15.30	ND	NA	26.2	0.50 / 19.2

SURVEY POINTS ARE TOP OF WELL CASINGS

RECEIVED
JUL 21 1999
BY: _____

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97



OWT

PROJECT NO: ALT 226.004
 PURGED BY: _____
 SAMPLED BY: K Miller

SAMPLE ID: MW 1
 CLIENT NAME: Arco 211
 LOCATION: San Leandro

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): 26.3 CALCULATED PURGE (gal.): _____
 DEPTH TO WATER (feet): 17.35 ACTUAL PURGE VOL. (gal.): _____

DATE PURGED: _____ END PURGE: _____
 DATE SAMPLED: 10/25/99 SAMPLING TIME: 0915

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>0913</u>	<u>0.2 AB</u>	<u>6.62</u>	<u>743.1</u>	<u>66.5</u>	<u>cloudy</u>	<u>Slight</u>

OTHER: DD-0.79/19.2 ODOR: None NR NR
(COBALT 0-100) (NTU 0-200)

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

PURGING EQUIPMENT	SAMPLING EQUIPMENT
<input type="checkbox"/> 2" Bladder Pump <input type="checkbox"/> Centrifugal Pump <input type="checkbox"/> Submersible Pump <input type="checkbox"/> Well Wizard [®] Other: _____	<input type="checkbox"/> 2" Bladder Pump <input checked="" type="checkbox"/> Bailer (Teflon) Des pos. <input type="checkbox"/> Bailer (PVC) <input type="checkbox"/> Bailer (Stainless Steel) <input type="checkbox"/> Bomb Sampler <input type="checkbox"/> Dipper <input type="checkbox"/> Submersible Pump <input type="checkbox"/> Well Wizard [®] <input type="checkbox"/> Dedicated Other: _____

WELL INTEGRITY: OK LOCK: OK

REMARKS: Lid broken in half

pH, E.C., Temp. Meter Calibration: Date: 10/25/99 Time: 0830 Meter Serial No.: L000035
 E.C. 1000 105.000 pH 7 6.89 7.00 pH 10 10.05 10.00 pH 4 4.0
 Temperature °F 69.2
 SIGNATURE: K Miller REVIEWED BY: [Signature] PAGE 1 OF 7

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97



OWT

PROJECT NO: 21775-226.004

SAMPLE ID: MW-2

PURGED BY: _____

CLIENT NAME: ARO 2111

SAMPLED BY: K Miller

LOCATION: San Leandro

TYPE: Groundwater Surface Water _____ Leachate _____ Other _____
 CASING DIAMETER (inches): 2 _____ 3 _____ 4 4.5 _____ 6 _____ Other _____

CASING ELEVATION (feet/MSL): 117 VOLUME IN CASING (gal.): _____
 DEPTH OF WELL (feet): 80.7 CALCULATED PURGE (gal.): _____
 DEPTH TO WATER (feet): 19.2 ACTUAL PURGE VOL. (gal.): _____

DATE PURGED: _____ END PURGE: _____
 DATE SAMPLED: 6/25/99 SAMPLING TIME: 1200

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1200</u>	<u>GRAB</u>	<u>8.52</u>	<u>744.5</u>	<u>71.3</u>	<u>yellow</u>	<u>slight</u>

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

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

PURGING EQUIPMENT	SAMPLING EQUIPMENT
_____ 2" Bladder Pump _____ Centrifugal Pump _____ Submersible Pump _____ Well Wizard [®] Other: _____	_____ Bailer (Teflon) _____ Bailer (PVC) _____ Bailer (Stainless Steel) _____ Dedicated _____ 2" Bladder Pump <input checked="" type="checkbox"/> _____ Bomb Sampler _____ Dipper _____ Well Wizard [®] Other: _____

WELL INTEGRITY: OK LOCK: 3490

REMARKS: _____

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: [Signature] REVIEWED BY: [Signature] PAGE 7 OF 7

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97



PROJECT NO: 21775-226.004
 PURGED BY: _____
 SAMPLED BY: B. Miller

SAMPLE ID: MW-3
 CLIENT NAME: ARO 2171
 LOCATION: San Leandro

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): 26.7 CALCULATED PURGE (gal.): _____
 DEPTH TO WATER (feet): 17.92 ACTUAL PURGE VOL. (gal.): _____

DATE PURGED: _____ END PURGE: _____
 DATE SAMPLED: 6/25/99 SAMPLING TIME: 10:15

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25°C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>10:15</u>	<u>GPAB</u>	<u>6.67</u>	<u>702.6</u>	<u>64.0</u>	<u>clear</u>	<u>none</u>

OTHER: DO-19.2/1.11 ODOR: none MR ND
(COBALT 0-100) (NTU 0-200)

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

<u>PURGING EQUIPMENT</u>		<u>SAMPLING EQUIPMENT</u>	
<input type="checkbox"/> 2" Bladder Pump	<input type="checkbox"/> Bailer (Teflon)	<input type="checkbox"/> 2" Bladder Pump	<input checked="" type="checkbox"/> Bailer (Teflon)
<input type="checkbox"/> Centrifugal Pump	<input type="checkbox"/> Bailer (PVC)	<input type="checkbox"/> Bomb Sampler	<input type="checkbox"/> Bailer (Stainless Steel)
<input type="checkbox"/> Submersible Pump	<input type="checkbox"/> Bailer (Stainless Steel)	<input type="checkbox"/> Dipper	<input type="checkbox"/> Submersible Pump
<input type="checkbox"/> Well Wizard [®]	<input type="checkbox"/> Dedicated	<input type="checkbox"/> Well Wizard [®]	<input type="checkbox"/> Dedicated
Other: _____		Other: _____	

WELL INTEGRITY: ac LOCK: 3490

REMARKS: _____

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: B.M. REVIEWED BY: [Signature] PAGE 3 OF 7

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97



PROJECT NO: 21715-226004
 PURGED BY: _____
 SAMPLED BY: K Miller

SAMPLE ID: MW-4
 CLIENT NAME: Arco 2111
 LOCATION: San Leandro

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): 21.7 CALCULATED PURGE (gal.): _____
 DEPTH TO WATER (feet): 15.57 ACTUAL PURGE VOL. (gal.): _____

DATE PURGED: _____ END PURGE: _____
 DATE SAMPLED: 6/25/99 SAMPLING TIME: 1000

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>0959</u>	<u>GRAB</u>	<u>6.58</u>	<u>168.3</u>	<u>67.9</u>	<u>Cloudy</u>	<u>Slight</u>

OTHER: DO - 0.90 / 19.2 ODOR: None NR NR
(COBALT 0-100) (NTU 0-200)
 FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

PURGING EQUIPMENT	SAMPLING EQUIPMENT
_____ 2" Bladder Pump _____ Centrifugal Pump _____ Submersible Pump _____ Well Wizard [®] Other: _____	_____ Bailer (Teflon) _____ Bailer (PVC) _____ Bailer (Stainless Steel) _____ Dedicated _____ 2" Bladder Pump <input checked="" type="checkbox"/> _____ Bomb Sampler _____ Dipper _____ Well Wizard [®] Other: _____

WELL INTEGRITY: OK LOCK: 3490

REMARKS: _____

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: K Miller REVIEWED BY: [Signature] PAGE 4 OF 7

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97



OWT

PROJECT NO: 21775-226.004
 PURGED BY: _____
 SAMPLED BY: B. Miller

SAMPLE ID: MW-5
 CLIENT NAME: Arco 211
 LOCATION: San Antonio

TYPE: Groundwater Surface Water _____ Leachate _____ Other _____
 CASING DIAMETER (inches): 2 3 _____ 4 _____ 4.5 _____ 6 _____ Other _____

CASING ELEVATION (feet/MSL): NA VOLUME IN CASING (gal.): _____
 DEPTH OF WELL (feet): 23.9 CALCULATED PURGE (gal.): _____
 DEPTH TO WATER (feet): 15.10 ACTUAL PURGE VOL. (gal.): _____

DATE PURGED: _____ END PURGE: _____
 DATE SAMPLED: 6/25/99 SAMPLING TIME: 1113

TIME (2400 HR)	VOLUME (gal)	pH (units)	E.C. (µmhos/cm@25°C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1110</u>	<u>GRAB</u>	<u>6.62</u>	<u>738.3</u>	<u>69.5</u>	<u>Foggy</u>	<u>Slight</u>

OTHER: DO - 0.76 / 19.20 ODOR: None _____ M NA
(COBALT 0-100) (NTU 0-200)

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

PURGING EQUIPMENT

SAMPLING EQUIPMENT

2" Bladder Pump _____ Bailer (Teflon)
 Centrifugal Pump _____ Bailer (PVC)
 Submersible Pump _____ Bailer (Stainless Steel)
 Well Wizard[®] _____ Dedicated
 Other: _____

2" Bladder Pump Bailer (Teflon)
 Bomb Sampler _____ Bailer (Stainless Steel)
 Dipper _____ Submersible Pump
 Well Wizard[®] _____ Dedicated
 Other: _____

WELL INTEGRITY: OK LOCK: 3616

REMARKS: _____

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: [Signature] REVIEWED BY: [Signature] PAGE 5 OF 7



WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

OWT

PROJECT NO: 21775-226.004

SAMPLE ID: MW-6

PURGED BY: _____

CLIENT NAME: Arco 21118

SAMPLED BY: K Miller

LOCATION: San Leandro

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): 25.0 CALCULATED PURGE (gal.): _____

DEPTH TO WATER (feet): 15.47 ACTUAL PURGE VOL. (gal.): _____

DATE PURGED: _____ END PURGE: _____

DATE SAMPLED: 6/25/99 SAMPLING TIME: 1031e

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25°C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1034</u>	<u>22AB</u>	<u>6.4</u>	<u>700.5</u>	<u>69.5</u>	<u>brownish</u>	<u>slight</u>
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

OTHER: DB - 0.74/19.6 ODOR: none M NR

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

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

<u>PURGING EQUIPMENT</u>		<u>SAMPLING EQUIPMENT</u>	
<input type="checkbox"/> 2" Bladder Pump	<input type="checkbox"/> Bailer (Teflon)	<input type="checkbox"/> 2" Bladder Pump	<input checked="" type="checkbox"/> Bailer (Teflon)
<input type="checkbox"/> Centrifugal Pump	<input type="checkbox"/> Bailer (PVC)	<input type="checkbox"/> Bomb Sampler	<input type="checkbox"/> Bailer (Stainless Steel)
<input type="checkbox"/> Submersible Pump	<input type="checkbox"/> Bailer (Stainless Steel)	<input type="checkbox"/> Dipper	<input type="checkbox"/> Submersible Pump
<input type="checkbox"/> Well Wizard [®]	<input type="checkbox"/> Dedicated	<input type="checkbox"/> Well Wizard [®]	<input type="checkbox"/> Dedicated
Other: _____		Other: _____	

WELL INTEGRITY: OK LOCK: 3490

REMARKS: _____

pH, E.C., Temp. Meter Calibration: Date: 5/26/99 Time: _____ Meter Serial No.: _____

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

Temperature °F _____

SIGNATURE: [Signature] REVIEWED BY: [Signature] PAGE 6 OF 7

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97



OWT

PROJECT NO: 21775-224.004
 PURGED BY: _____
 SAMPLED BY: K Miller

SAMPLE ID: MW-7
 CLIENT NAME: Arco 2111
 LOCATION: San Leandro

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): 210.2 CALCULATED PURGE (gal.): _____
 DEPTH TO WATER (feet): 15.30 ACTUAL PURGE VOL. (gal.): _____

DATE PURGED: _____ END PURGE: _____
 DATE SAMPLED: 10/25/99 SAMPLING TIME: 1233

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1231</u>	<u>0.2 AB</u>	<u>6.52</u>	<u>951.2</u>	<u>73.3</u>	<u>Clear</u>	<u>none</u>

OTHER: DO - 0.51 / 19.2 ODOR: hint of gas _____
(COBALT 0-100) (NTU 0-200)

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

PURGING EQUIPMENT			SAMPLING EQUIPMENT		
<input checked="" type="checkbox"/> 2" Bladder Pump	<input type="checkbox"/> Bailer (Teflon)	<input type="checkbox"/> 2" Bladder Pump	<input checked="" type="checkbox"/> Bailer (Teflon)	<input type="checkbox"/> Bomb Sampler	<input type="checkbox"/> Bailer (Stainless Steel)
<input type="checkbox"/> Centrifugal Pump	<input type="checkbox"/> Bailer (PVC)	<input type="checkbox"/> Dipper	<input type="checkbox"/> Submersible Pump	<input type="checkbox"/> Well Wizard [®]	<input type="checkbox"/> Dedicated
<input type="checkbox"/> Submersible Pump	<input type="checkbox"/> Bailer (Stainless Steel)	Other: _____	Other: _____		
<input type="checkbox"/> Well Wizard [®]	<input type="checkbox"/> Dedicated				

WELL INTEGRITY: ac LOCK: Reddick

REMARKS: _____

pH, E.C., Temp. Meter Calibration: Date: SEP MW-1 Time: _____ Meter Serial No.: _____
 E.C. 1000 _____ / pH 7 _____ / pH 10 _____ / pH 4 _____
 Temperature °F _____
 SIGNATURE: [Signature] REVIEWED BY: [Signature] PAGE 1 OF 1



EMCON ASSOCIATES

FIELD SERVICES FIELD SUPPORT REQUEST

PROJECT NAME ARCO # 2111 PROJECT NO. 20805-127.00A
 DATE: SUBMITTED June 24, 1999 TASK CODE N/A
 REQUESTED June 25, 1999 REQUESTED BY G. VanderVee

SPECIAL INSTRUCTIONS / CONSIDERATIONS Please check listed vapor wells for floating product. If detected, measure thickness with Reck Meter and verify thickness with disposable bailer, and bail until product is gone or just reduced to a sheen.

EQUIPMENT NEEDED Oil Water Interface Probe LOCK NUMBER(S) _____
Disposable Bailer _____

LOCATION NUMBER OR SOURCE	WELL CASING DIAMETER (If Applicable)	SERVICES REQUESTED AT EACH LOCATION OR SOURCE
V-1	?	Depth to Floating Product
V-2	?	Floating Product Thickness
V-3	?	Floating Product Removal
V-4	?	
V-1	6/25/99 WTR/VL 1303 13.84	4in, no product
V-2	lock rusted sheet	
V-3	6/25/99 WTR/VL 1240 15.45	no lock, 4in, no product
V-4	6/25/99 WTR/VL 1245 15.88	no lock, 4in, no product

NOTE: Please include a billable materials form, a map showing driving directions to the site, and a site work map with this request.

1921 Ringwood Avenue
San Jose, California

1999

ARCO 2111
21775-226.004

Well ID	Quarter	Date	Purge Volume (gallons)	Did well dry	Well Contained Product	Gallons			
						First	Second	Third	Fourth
MW-1	First	01/28/99	0.00	GRAB	NO	0.00	0.00	0.00	0.00
	Second	06/25/99	0.00	GRAB	NO				
	Third	07/24/98	0.00	GRAB	NO				
	Fourth	10/19/98	0.00	GRAB	NO				
MW-2	First	01/28/99	0.00	GRAB	NO				
	Second	06/25/99	0.00	GRAB	NO				
	Third	07/24/98	0.00	GRAB	NO				
	Fourth	10/19/98	0.00	GRAB	NO				
MW-3	First	01/28/99	0.00	GRAB	NO				
	Second	06/25/99	0.00	GRAB	NO				
	Third	07/24/98	0.00	GRAB	NO				
	Fourth	10/19/98	0.00	GRAB	NO				
MW-4	First	01/28/99	0.00	GRAB	NO				
	Second	06/25/99	0.00	GRAB	NO				
	Third	07/24/98	0.00	GRAB	NO				
	Fourth	10/19/98	0.00	GRAB	NO				
MW-5	First	01/28/99	0.00	GRAB	NO				
	Second	06/25/99	0.00	GRAB	NO				
	Third	07/24/98	0.00	GRAB	NO				
	Fourth	10/19/98	0.00	GRAB	NO				
MW-6	First	01/28/99	0.00	GRAB	NO				
	Second	06/25/99	0.00	GRAB	NO				
	Third	07/24/98	0.00	GRAB	NO				
	Fourth	10/19/98	0.00	GRAB	NO				
MW-7	First	01/28/99	0.00	GRAB	NO				
	Second	06/25/99	0.00	GRAB	NO				
	Third	07/24/98	0.00	GRAB	NO				
	Fourth	10/19/98	0.00	GRAB	NO				
									Steam water (gal) _____

ARCO Products Company

Division of Atlantic/Richfield Company

Task Order No. 24118.00

Chain of Custody

ARCO Facility no. <u>2111</u>	City (Facility) <u>San Leandro</u>	Project manager (Consultant) <u>Glen Vander Veen</u>	Laboratory Name <u>CAS</u>
ARCO engineer <u>Paul Supple</u>	Telephone no. (ARCO)	Telephone no. (Consultant) <u>(408) 452-7200</u>	Contract Number
Consultant name <u>EMCOA</u>	Address (Consultant) <u>7701 Broadway #101 Oakland, CA 94617</u>		

Sample I.D.	Lab no.	Container no.	Matrix			Preservation		Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH in total EPA 1631/200/8015	TPH Modified 8015 Gas <input type="checkbox"/> Diesel <input type="checkbox"/>	Oil and Grease 413.1 <input type="checkbox"/> 413.2 <input type="checkbox"/>	TPH EPA 418.1/SM 503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals <input type="checkbox"/> VOAD <input type="checkbox"/> VOMD <input type="checkbox"/>	CAM Metals EPA 601/7000 TLC <input type="checkbox"/> STLC <input type="checkbox"/>	Lead Org/DHSC <input type="checkbox"/>	Lead EPA 7420/7421 <input type="checkbox"/>	CIVIL/NOTES EPA 8760	Method of shipment
			Soil	Water	Other	Ice	Acid																
<u>MW-1 (4)</u>		<u>2</u>		<u>X</u>		<u>X</u>	<u>HCL</u>	<u>6/27/98</u>	<u>0915</u>		<u>X</u>												<u>Sampler will deliver</u>
<u>MW-4 (8)</u>		<u>2</u>		<u>X</u>		<u>X</u>	<u>HCL</u>		<u>1000</u>		<u>X</u>												<u>Lowest possible</u>
<u>MW-3 (2)</u>		<u>2</u>		<u>X</u>		<u>X</u>	<u>HCL</u>		<u>1015</u>		<u>X</u>												<u>Special QA/QC As Normal</u>
<u>MW-6 (3)</u>		<u>2</u>		<u>X</u>		<u>X</u>	<u>HCL</u>		<u>1030</u>		<u>X</u>												<u>As Normal</u>
<u>MW-7 (2)</u>		<u>4</u>		<u>X</u>		<u>X</u>	<u>HCL</u>		<u>1200</u>		<u>X</u>											<u>X</u>	<u>Remarks RA79</u>
<u>MW-7 (4)</u>		<u>4</u>		<u>X</u>		<u>X</u>	<u>HCL</u>		<u>1235</u>		<u>X</u>											<u>X</u>	<u>#20805-177.00</u>

Condition of sample:		Temperature received:		Turnaround Time: Priority Rush 1 Business Day <input type="checkbox"/> Rush 2 Business Days <input type="checkbox"/> Expedited 5 Business Days <input type="checkbox"/> Standard 10 Business Days <input checked="" type="checkbox"/>
Relinquished by sampler	Date	Time	Received by	
Relinquished by	Date	Time	Received by	
Relinquished by	Date	Time	Received by laboratory	

ARCO Products Company

Division of Atlantic/Richfield Company

Task Order No. **74118.00**

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	Contract Number
Consultant name EMCON		Address (Consultant) 2201 Broadway, #101 Oakland, CA 94612	

Sample I.D.	Lab no.	Container no.	Matrix			Preservation		Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH injection EPA 1631/200/8015	TPH Modified 8015 Gas <input type="checkbox"/> Diesel <input type="checkbox"/>	Oil and Grease 413.1 <input type="checkbox"/> 413.2 <input type="checkbox"/>	TPH EPA 418.1/SM 503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals <input type="checkbox"/> VOC <input type="checkbox"/> VOAD <input type="checkbox"/>	CAM Metals EPA 6010/7000 TLC <input type="checkbox"/> STLC <input type="checkbox"/>	Lead Org/DHSC <input type="checkbox"/>	Lead EPA 7420/7421 <input type="checkbox"/>	Method of shipment Sampler will deliver	
			Soil	Water	Other	Ice	Acid																
MW-50A		2		X																			Special Detection Limit/reporting Lowest possible
																							Special QA/QC As Normal
																							Remarks RA7 E 2 - 40ml HCL VOCs #70905-127.006
																							Lab Number
																							Turnaround Time: Priority Rush 1 Business Day <input type="checkbox"/>
																							Rush 2 Business Days <input type="checkbox"/>
																							Expedited 5 Business Days <input type="checkbox"/>
																							Standard 10 Business Days <input checked="" type="checkbox"/>

Condition of sample:				Temperature received:			
Relinquished by sampler <i>Kenneth Miller</i>	Date	Time	Received by				
Relinquished by	Date	Time	Received by				
Relinquished by	Date	Time	Received by laboratory	Date	Time		