the IT group

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

99 AUG 30 PM 1:47

RESPONSE 9/16/99 AG

August 27, 1999
Project 791666

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

STO 3942

Re: Quarterly Groundwater Monitoring Report, Second Quarter 1999, for former ARCO Service Station No. 6002, located at 6235 Seminary Avenue, Oakland, 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 former ARCO Products Company (ARCO) Service Station No. 6002, located at 6235 Seminary Avenue, Oakland, California. The monitoring program complies with the Alameda County Health Care Services Agency (ACHCSA) requirements regarding underground tank investigations.

LIMITATIONS

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

Please call if you have questions.

Sincerely,

Pinnacle

Glen VanderVeen
Project Manager

Dan Easter, R.G.
Project Geologist

Attachment: Quarterly Groundwater Monitoring Report, Second Quarter 1999

cc: Mr. Amir Gholami, ACHCSA

Date: August 27, 1999

ARCO QUARTERLY GROUNDWATER MONITORING REPORT

Station No.: 6002 Address:	6235 Seminary Avenue, Oakland, California
Pinnacle Project No.:	791666
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 /Amir Gholami

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.

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.

QUARTERLY MONITORING:

Current Phase of Project:	Quarterly Groundwater Monitoring
Frequency of Sampling:	Annual (1st Quarter): MW-3, MW-6 Quarterly: MW-4, MW-5, MW-7, MW-8, VW-1, VW-4
Frequency of Monitoring:	Quarterly (groundwater)
Is Floating Product (FP) Present On-site:	☐ Yes ☒ No
Bulk Soil Removed to Date :	approximately 370 cubic yards of TPH impacted soil
Bulk Soil Removed This Quarter :	None
Water Wells or Surface Waters, within 2000 ft., impacted by site:	None
Current Remediation Techniques:	Natural Attenuation
Average Depth to Groundwater:	11.2 feet
Groundwater Flow Direction and Gradient (Average):	0.07 ft/ft toward West-Northwest

ATTACHMENTS:

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

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

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

Well Number	Date Gauged	TOC Elevation (ft-MSL)	Depth to Water (feet)	Groundwater Elevation (ft-MSL)	FP Thickness (feet)	Date Sampled	TPH Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE 8020 (µg/L)	MTBE 8260 (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
MW-1	03-15-95	247.06	7.37	239.69	ND	03-15-95	13,000	1,200	44	770	1,100	--	--		
MW-1	05-30-95	247.06	8.48	238.58	ND	05-30-95	19,000	1,600	30	890	1,400	--	--		
MW-1	09-01-95	247.06	9.47	237.59	ND	09-01-95	14,000	1,300	28	480	780	24,000	--		
MW-1	11-13-95	247.06	8.78	238.29*	0.01	11-13-95	11,000	570	17	260	410	--	25,000[1]		
MW-1	02-23-96	247.06	Well was decommisioned on 2-12-96												
MW-2	03-15-95	249.30	8.25	241.05	ND	03-15-95	<50	<0.5	<0.5	<0.5	<0.5	--	--		
MW-2	05-30-95	249.30	9.93	239.37	ND	05-30-95	<50	<0.5	<0.5	<0.5	<0.5	--	--		
MW-2	09-01-95	249.30	10.69	238.61	ND	09-01-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-2	11-13-95	249.30	10.32	238.98	ND	11-13-95	<50	<0.5	<0.5	<0.5	<0.5	--	--		
MW-2	02-23-96	249.30	Well was decommisioned on 2-12-96												
MW-3	03-15-95	248.35	6.76	241.59	ND	03-15-95	<50	<0.5	<0.5	<0.5	<0.5	--	--		
MW-3	05-30-95	248.35	7.81	240.54	ND	05-30-95	<50	<0.5	<0.5	<0.5	<0.5	--	--		
MW-3	09-01-95	248.35	8.65	239.70	ND	09-01-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-3	11-13-95	248.35	8.25	240.10	ND	11-13-95	120	45	0.7	<0.5	6.2	--	--		
MW-3	02-23-96	248.35	6.64	241.71	ND	03-01-96	<50	<0.5	<0.5	0.6	1.9	<3	--		
MW-3	05-10-96	248.35	7.95	240.40	ND	05-10-96	Not sampled: well sampled annually, during the first quarter								
MW-3	08-09-96	248.35	8.06	240.29	ND	08-09-96	Not sampled: well sampled annually, during the first quarter								
MW-3	11-08-96	248.35	Not surveyed: inaccessible			11-11-96	Not sampled: inaccessible								
MW-3	03-21-97	248.35	8.21	240.14	ND	03-21-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-3	05-27-97	248.35	8.25	240.10	ND	05-27-97	Not sampled: well sampled annually, during the first quarter								
MW-3	08-05-97	248.35	8.29	240.06	ND	08-05-97	Not sampled: well sampled annually, during the first quarter								
MW-3	10-29-97	248.35	8.58	239.77	ND	10-29-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-3	02-25-98	248.35	7.69	240.66	ND	02-25-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-3	05-12-98	248.35	8.20	240.15	ND	05-12-98	Not sampled: well sampled annually, during the first quarter								
MW-3	07-28-98	248.35	8.55	239.80	ND	07-28-98	Not sampled: well sampled annually, during the first quarter								

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

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

Well Number	Date Gauged	TOC Elevation (ft-MSL)	Depth to Water (feet)	Groundwater Elevation (ft-MSL)	FP Thickness (feet)	Date Sampled	TPH Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE 8020 (µg/L)	MTBE 8260 (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
MW-3	10-27-98	248.35	8.30	240.05	ND	10-27-98	Not sampled: well sampled annually, during the first quarter								
MW-3	02-08-99	248.35	7.90	240.45	ND	02-08-99	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-3	06-01-99	248.35	8.40	239.95	ND	06-01-99	Not sampled: well sampled annually, during the first quarter								
MW-4	03-15-95	242.91	9.37	233.54	ND	03-15-95	<50	<0.5	<0.5	<0.5	<0.5	--	--		
MW-4	05-30-95	242.91	11.47	231.44	ND	05-30-95	<50	<0.5	<0.5	<0.5	<0.5	--	--		
MW-4	09-01-95	242.91	12.28	230.63	ND	09-01-95	78	<0.5	0.7	<0.5	<0.5	<3	--		
MW-4	11-13-95	242.91	11.75	231.16	ND	11-13-95	<50	<0.5	<0.5	<0.5	<0.5	--	--		
MW-4	02-23-96	242.91	8.51	234.40	ND	03-01-96	59	1.2	7.4	1.6	9.3	3	--		
MW-4	05-10-96	242.91	11.35	231.56	ND	05-10-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-4	08-09-96	242.91	9.70	233.21	ND	08-09-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-4	11-08-96	242.91	11.79	231.12	ND	11-08-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-4	03-21-97	242.91	10.94	231.97	ND	03-21-97	<50	<0.5	<0.5	<0.5	<0.5	81	--		
MW-4	05-27-97	242.91	11.51	231.40	ND	05-27-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-4	08-05-97	242.91	11.90	231.01	ND	08-05-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-4	10-29-97	242.91	12.00	230.91	ND	10-29-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-4	02-25-98	242.91	8.34	234.57	ND	02-25-98	<50	<0.5	0.9	<0.5	0.9	4	--		
MW-4	05-12-98	242.91	10.93	231.98	ND	05-12-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-4	07-28-98	242.91	12.08	230.83	ND	07-28-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-4	10-27-98	242.91	11.40	231.51	ND	10-27-98	<5,000	<50	<50	160	64	6,400	--		
MW-4	02-08-99	242.91	8.40	234.51	ND	02-08-99	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-4	06-01-99	242.91	11.93	230.98	ND	06-01-99	<50	<0.5	<0.5	<0.5	<0.5	<3	--	4.0	NP
MW-5	03-15-95	244.82	11.99	232.83	ND	03-15-95	21,000	870	22	1,600	1,900	--	--		
MW-5	05-30-95	244.82	12.97	231.85	ND	05-30-95	17,000	2,100	250	1,000	520	--	--		
MW-5	09-01-95	244.82	14.03	230.79	ND	09-01-95	19,000	1,500	25	1,600	880	8,300	--		
MW-5	11-13-95	244.82	13.65	231.17	ND	11-13-95	21,000	1,300	22	1,400	630	--	--		

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

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

Well Number	Date Gauged	TOC Elevation (ft-MSL)	Depth to Water (feet)	Groundwater Elevation (ft-MSL)	FP Thickness (feet)	Date Sampled	TPH Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE 8020 (µg/L)	MTBE 8260 (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
MW-6	05-12-98	252.20	15.83	236.37	ND	05-12-98	Not sampled: well sampled annually, during the first quarter								
MW-6	07-28-98	252.20	11.84	240.36	ND	07-28-98	Not sampled: well sampled annually, during the first quarter								
MW-6	10-27-98	252.20	9.73	242.47	ND	10-27-98	Not sampled: well sampled annually, during the first quarter								
MW-6	02-08-99	252.20	8.10	244.10	ND	02-08-99	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-6	06-01-99	252.20	17.84	234.36	ND	06-01-99	Not sampled: well sampled annually, during the first quarter								
MW-7	08-09-96	235.95	Not surveyed: well was dry			08-09-96	Not sampled: well was dry								
MW-7	11-08-96	235.95	Not surveyed: well was dry			11-11-96	Not sampled: well was dry								
MW-7	01-27-97	235.95	NR	NR	ND	01-27-97	2,900	29	<5	<5	580	220	--		
MW-7	03-21-97	235.95	7.13	228.82	ND	03-21-97	590	3.5	<0.5	<0.5	1.3	90	--		
MW-7	05-27-97	235.95	9.02	226.93	ND	05-27-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-7	08-05-97	235.95	12.33	223.62	ND	08-05-97	110	0.5	<0.5	<0.5	0.8	81	--		
MW-7	10-29-97	235.95	NR	NR	ND	10-29-97	Not sampled: well is dry								
MW-7	02-25-98	235.95	8.04	227.91	ND	02-25-98	<50	<0.5	0.6	<0.5	0.7	<3	--		
MW-7	05-12-98	235.95	8.88	227.07	ND	05-12-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-7	07-28-98	235.95	10.50	225.45	ND	07-28-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-7	10-27-98	235.95	8.75	227.20	ND	10-27-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-7	02-08-99	235.95	9.35	226.60	ND	02-08-99	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-7	06-01-99	235.95	9.85	226.10	ND	06-01-99	250	<0.5	0.6	<0.5	1.6	18	--	1.0	NP
MW-8	08-09-96	240.37	9.41	230.96	ND	08-09-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-8	11-08-96	240.37	9.19	231.18	ND	11-11-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-8	03-21-97	240.37	8.55	231.82	ND	03-21-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-8	05-27-97	240.37	11.06	229.31	ND	05-27-97	91	0.6	<0.5	<0.5	0.6	66	--		
MW-8	08-05-97	240.37	9.32	231.05	ND	08-05-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-8	10-29-97	240.37	9.35	231.02	ND	10-29-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-8	02-25-98	240.37	7.08	233.29	ND	02-25-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--		

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

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

Well Number	Date Gauged	TOC Elevation (ft-MSL)	Depth to Water (feet)	Groundwater Elevation (ft-MSL)	FP Thickness (feet)	Date Sampled	TPH Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE 8020 (µg/L)	MTBE 8260 (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
MW-8	05-12-98	240.37	8.61	231.76	ND	05-12-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-8	07-28-98	240.37	9.63	230.74	ND	07-28-98	<50	<0.5	<0.5	<0.5	<0.5	4	--		
MW-8	10-27-98	240.37	9.30	231.07	ND	10-27-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-8	02-08-99	240.37	5.56	234.81	ND	02-17-99	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-8	06-01-99	240.37	Not surveyed: inaccessible			06-01-99	Not sampled: well inaccessible								
AS-1	06-29-95	NR	9.20	NR	ND	06-30-95	<50	1.6	<0.5	0.9	0.9	--	--		
VW-1	02-23-96	NR	5.29	NR	ND	03-01-96	21,000	490	57	520	1,500	240	--		
VW-1	05-10-96	NR	6.80	NR	ND	05-10-96	3,700	61	<5	100	50	200	--		
VW-1	08-09-96	NR	7.03	NR	ND	08-09-96	970	2.7	<2.5	2.7	3.7	180	--		
VW-1	11-08-96	NR	Not surveyed: inaccessible			11-11-96	Not sampled: inaccessible								
VW-1	03-21-97	NR	7.51	NR	ND	03-21-97	640	<4	<1	1	3	194	--		
VW-1	05-27-97	NR	7.51	NR	ND	05-27-97	Not sampled: well sampled semi-annually, during the first and third quarters								
VW-1	08-05-97	NR	7.51	NR	ND	08-05-97	630	<1	<1	3	2	120	--		
VW-1	10-29-97	NR	7.53	NR	ND	10-29-97	600	<0.5	<0.5	<0.5	1.6	84	--		
VW-1	02-25-98	NR	6.77	NR	ND	02-25-98	230	<4	<0.7	1.2	0.5	27	--		
VW-1	05-12-98	NR	7.43	NR	ND	05-12-98	340	<0.5	0.5	2.3	0.8	29	--		
VW-1	07-28-98	NR	7.00	NR	ND	07-28-98	240	<0.5	<0.5	<0.5	1.1	54	--		
VW-1	10-27-98	NR	7.52	NR	ND	10-27-98	230	<0.5	<0.5	<0.5	<0.5	65	--		
VW-1	02-08-99	NR	7.05	NR	ND	02-08-99	<50	<0.5	<0.5	<0.5	<0.5	<3	36[12]		
VW-1	06-01-99	NR	7.55	NR	ND	06-01-99	180	<0.5	<0.5	<0.5	<0.5	23	--	1.0	NP
VW-2	02-23-96	NR	6.92	NR	ND	03-01-96	Not sampled: not part of sampling program								
VW-4	05-10-96	NR	8.58	NR	ND	05-10-96	13,000	2,500	41	420	660	43,000	--		
VW-4	08-09-96	NR	11.70	NR	ND	08-09-96	<50	<0.5	<0.5	<0.5	<0.5	6,200	--		

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

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

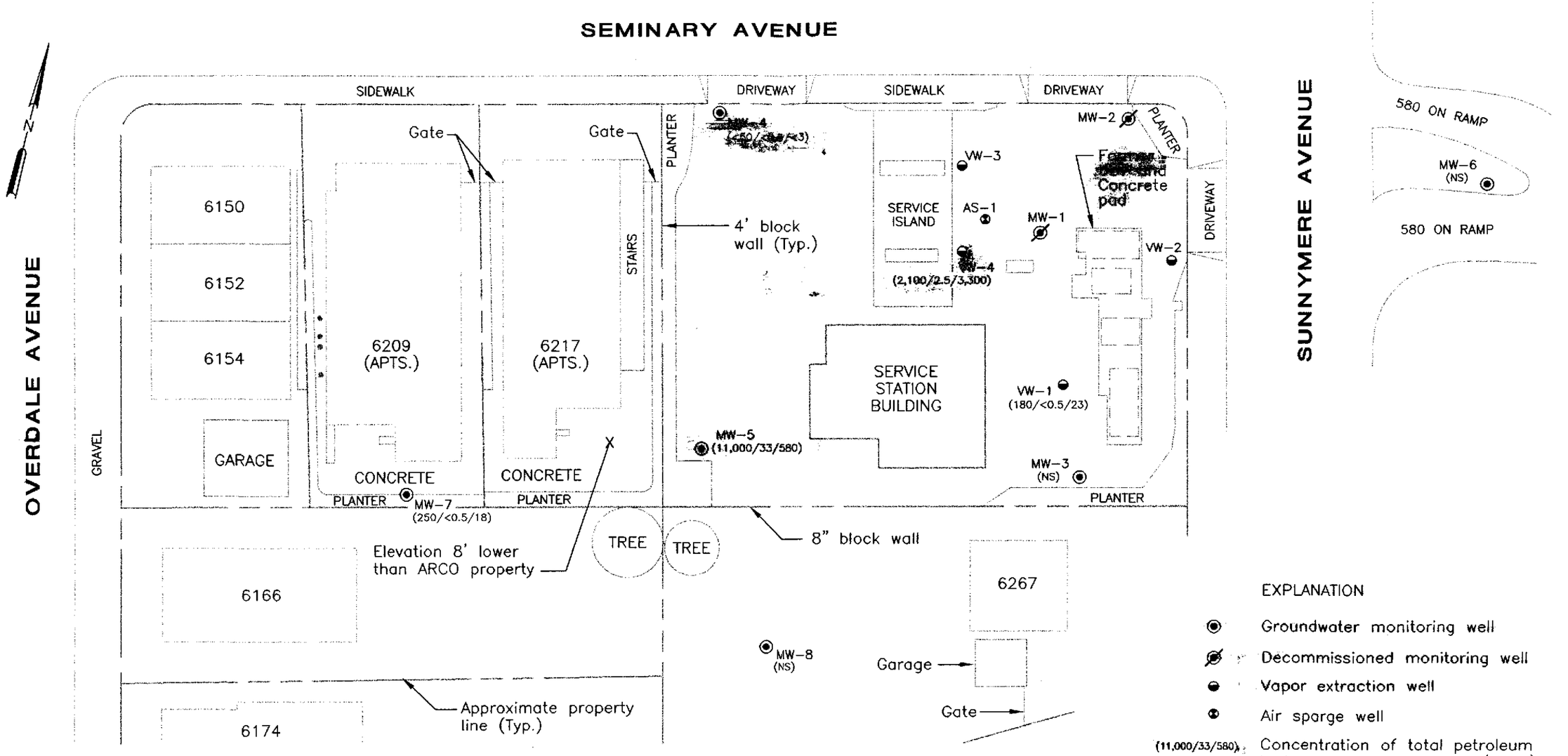
Well Number	Date Gauged	TOC Elevation (ft-MSL)	Depth to Water (feet)	Groundwater Elevation (ft-MSL)	FP Thickness (feet)	Date Sampled	TPH Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE 8020 (µg/L)	MTBE 8260 (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
VW-4	11-08-96	NR	9.38	NR	ND	11-08-96	7,800	510	7	180	370	21,000	- -		
VW-4	03-21-97	NR	9.11	NR	ND	03-21-97	10,000	290	10	270	230	8,900	- -		
VW-4	05-27-97	NR	9.34	NR	ND	05-27-97	Not sampled: well sampled semi-annually, during the first and third quarters								
VW-4	08-05-97	NR	9.47	NR	ND	08-05-97	<10,000	180	<100	<100	110	12,000	- -		
VW-4	10-29-97	NR	9.35	NR	ND	10-29-97	9,800	200	69	260	360	4,900	- -		
VW-4	02-25-98	NR	7.08	NR	ND	02-25-98	<50	2.5	<0.5	<0.5	0.7	<3	- -		
VW-4	05-12-98	NR	9.17	NR	ND	05-12-98	3,200	<20	22	29	52	2,100	- -		
VW-4	07-28-98	NR	9.55	NR	ND	07-28-98	<10,000	<100	<100	<100	<100	5,100	- -		
VW-4	10-27-98	NR	9.92	NR	ND	10-27-98	<50	<0.5	<0.5	<0.5	<0.5	<3	- -		
VW-4	02-08-99	NR	7.50	NR	ND	02-08-99	<2,500	<25	<25	28	<25	2,400	3,100[2]		
VW-4	06-01-99	NR	9.87	NR	ND	06-01-99	2,100	2.5	1.1	2.5	15	3,300	- -	2.0	NP

TPH: Total petroleum hydrocarbons by modified EPA method 8015
BTEX: Benzene, toluene, ethylbenzene, xylenes by EPA method 8020
MTBE: Methyl tert-butyl ether
TOC: Top of Casing
ft-MSL: elevation in feet, relative to mean sea level
µg/L: micrograms per liter
mg/L: milligrams per liter
ND: none detected
NR: not reported; data not available or not measurable
- -: not analyzed or not applicable
<: less than laboratory detection limit stated to the right
[1]: analyzed by EPA method 8240
[2]: also analyzed for fuel oxygenates
* [corrected elevation (Z')] = Z + (h * 0.73) where: Z: measured elevation, h: floating product thickness, 0.73: density ratio of oil to water
**: For previous historical groundwater elevation data please refer to *Fourth Quarter 1995 Groundwater Monitoring Program Results, ARCO Service Station 6002, Oakland, California,* (EMCON, February 23, 1996).

Table 2
Groundwater Flow Direction and Gradient

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

Date Measured	Average Flow Direction	Average Hydraulic Gradient
03-15-95	West-Southwest	0.08
05-30-95	West-Southwest	0.08
09-01-95	West-Southwest	0.09
11-13-95	West-Southwest	0.08
02-23-96	West-Southwest	0.08
05-10-96	West-Southwest	0.08
08-09-96	Southwest	0.08
11-08-96	Southwest	0.055
03-21-97	West-Southwest	0.051
05-27-97	West-Southwest	0.069
08-05-97	West	0.076
10-29-97	West-Southwest	0.036
02-25-98	West-Southwest	0.052
05-12-98	West	0.07
07-28-98	West	0.07
10-27-98	West-Southwest	0.06
02-08-99	West-Southwest	0.07
06-01-99	**West-Northwest**	**0.07**



EXPLANATION

- Groundwater monitoring well
- Decommissioned monitoring well
- Vapor extraction well
- Air sparge well
- (11,000/33/580) Concentration of total petroleum hydrocarbons as gasoline (TPHG), benzene, and MTBE in groundwater (ug/L); samples collected 6/1/99
- < Not detected at or above indicated laboratory detection limit
- NS Not sampled

Base map modified from CSI, 1994.

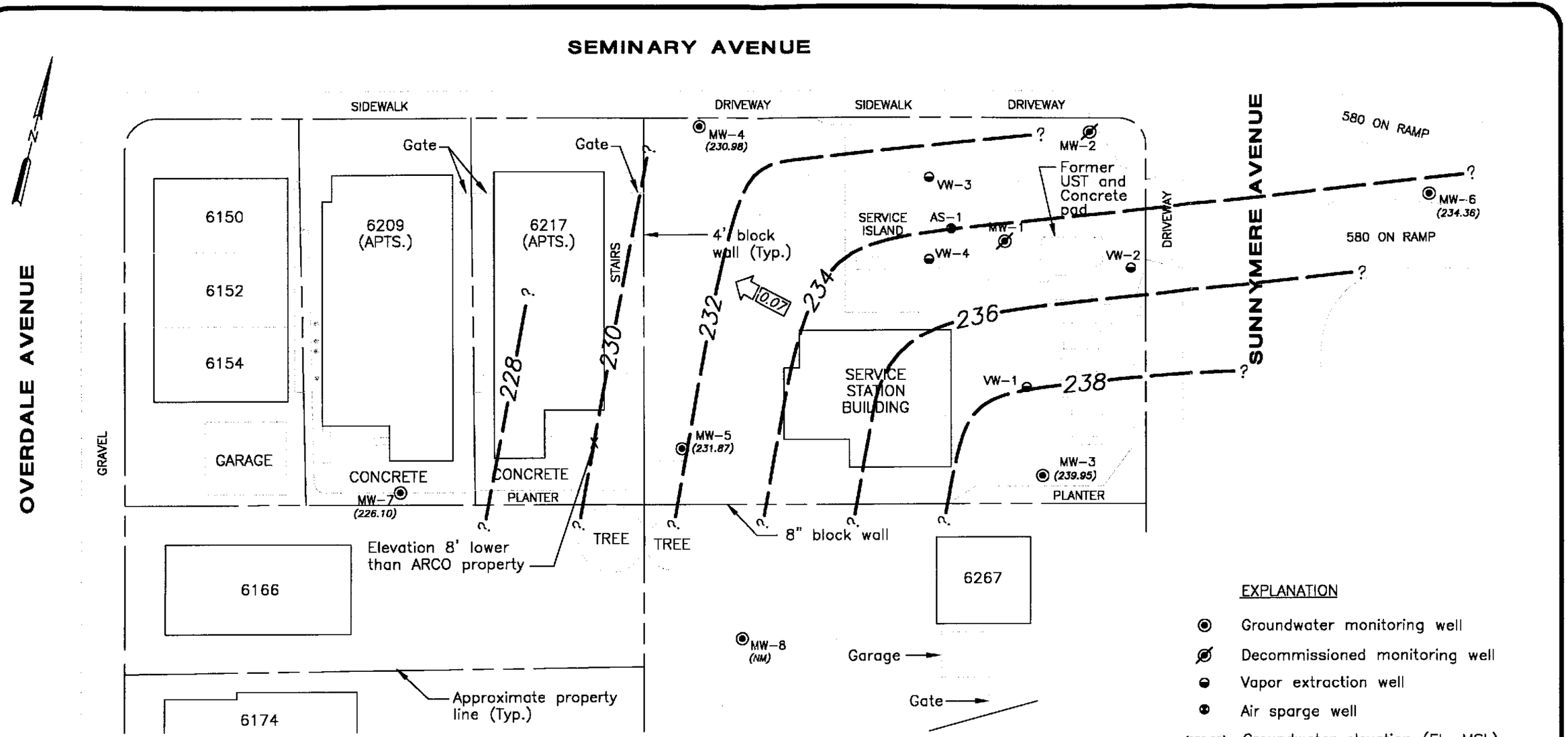
0 30 60
SCALE IN FEET

Pinnacle
ENVIRONMENTAL SOLUTIONS
A DIVISION OF EMCON

DATE JULY 1999
DWN KAB
APP
REV
PROJECT NO.
20805-131.014

FIGURE 1
ARCO PRODUCTS COMPANY
FORMER STATION 6002, 6235 SEMINARY AVE.
OAKLAND, CALIFORNIA
GROUNDWATER ANALYTICAL SUMMARY
SECOND QUARTER 1999

IMAGE Files: <No Images>
XREF Files: <No Xrefs>
Dimscale: 30 Ltscale: 30 Psltscale: 1
SANJOSE/CADD: N:\DWG\PINACL\6002\6002CHEM.DWG Tue, 27/Jul/99 12:54pm kblack
1" 1/2" 0" 1"



EXPLANATION

- Groundwater monitoring well
- Decommissioned monitoring well
- Vapor extraction well
- Air sparge well
- (239.95) Groundwater elevation (Ft.–MSL) measured 6/1/99
- ? Groundwater elevation contour (Ft.–MSL)
- Approximate direction of groundwater flow showing gradient
- NM Not measured

Base map modified from GSI, 1994.

Pinnacle
ENVIRONMENTAL SOLUTIONS
A DIVISION OF EMCON

0 30 60
SCALE IN FEET

DATE JULY 1999
DWN KAB
APP
REV
PROJECT NO.
20805–131.014

FIGURE 2
ARCO PRODUCTS COMPANY
FORMER STATION 6002, 6235 SEMINARY AVE.
OAKLAND, CALIFORNIA
GROUNDWATER ELEVATION CONTOURS
SECOND QUARTER 1999

APPENDIX A

SAMPLING AND ANALYSIS PROCEDURES

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

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

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

Sample Collection

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

Equipment Cleaning

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

Water Level, Floating Hydrocarbon, and Total Well Depth Measurements

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

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

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

Well Purging

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

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

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

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

Well Sampling

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

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

Sample Preservation and Handling

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

Sample Containers and Preservation

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

Sample Handling

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

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

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

Sample Documentation

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

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

Field Logbook

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

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

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

Labels

Sample labels contained the following information:

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

Sampling and Analysis Chain-of-Custody Record

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

Groundwater Sampling and Analysis Request Form

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

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

MONITORING WELL PURGING PROTOCOL

OWT

MEASURE AND RECORD DEPTH TO WATER AND WELL TOTAL DEPTH

CHECK FOR FLOATING PRODUCT

YES

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

NO

CALCULATE PURGE VOLUME BY USING THE FOLLOWING EQUATION:

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

where:

P = calculated purge volume (gallons)

$\pi = 3.14$

r = radius of well casing in feet

h = height of water column in feet

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

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

NO

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

pH = ± 0.1 pH units

COND. = ± 10 %

TEMP. = ± 1.0 °F

YES

WELL PURGING CRITERIA MET; PROCEED TO WELL SAMPLING.

NO

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

YES

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

YES

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

NO

RECORD WELL AS DRY FOR PURPOSES OF SAMPLING.

EMCON

MONITORING WELL PURGING PROTOCOL

FIGURE

A-1

WATER SAMPLE FIELD DATA SHEET

Rev. 5/96

OWT

PROJECT NO : _____ SAMPLE ID : _____

PURGED BY : _____ CLIENT NAME : _____

SAMPLED BY : _____ LOCATION : _____

TYPE: Groundwater _____ Surface Water _____ Leachate _____ Other _____

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

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

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

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

DATE PURGED : _____ END PURGE : _____

DATE SAMPLED : _____ SAMPLING TIME : _____

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	TURBIDITY (visual/NTU)	TIME (2400 HR)
					(COBALT 0-100)	(NTU 0-200)

OTHER: _____ ODOR: _____

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

PURGING EQUIPMENT

_____ 2" Bladder Pump _____ Bailer (Teflon)

_____ Centrifugal Pump _____ Bailer (PVC)

_____ Submersible Pump _____ Bailer (Stainless Steel)

_____ Well Wizard™ _____ Dedicated

Other: _____

SAMPLING EQUIPMENT

_____ 2" Bladder Pump _____ Bailer (Teflon)

_____ Bomb Sampler _____ Bailer (Stainless Steel)

_____ Dipper _____ Submersible Pump

_____ Well Wizard™ _____ Dedicated

Other: _____

WELL INTEGRITY: _____ LOCK: _____

REMARKS: _____

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

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

Temperature °F _____

SIGNATURE: _____ REVIEWED BY: _____ PAGE _____ OF _____

EMCON

WATER SAMPLE FIELD DATA SHEET

FIGURE A-2

OWT

EMCON - SACRAMENTO
GROUNDWATER SAMPLING AND ANALYSIS REQUEST FORM

PROJECT NAME :

SCHEDULED DATE :

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

SPECIAL INSTRUCTIONS / CONSIDERATIONS :

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

Columbia Analytical Services INC.
An Employee-Owned Company

June 15, 1999

Service Request No.: S9901671

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

RE: TO#24118.00/RAT#8/6002 OAKLAND

Dear Mr. Vanderveen:

Enclosed are the results of the sample (s) submitted to our laboratory on June 1, 1999. All analyses were performed in accordance with our laboratory's quality assurance program. Results are intended to be considered in their entirety and apply to the sample (s) analyzed. Columbia Analytical Services is not responsible for use of less than the complete report. Signature of this CAS Analytical Report confirms that pages 2 through 13, following, have been thoroughly reviewed and approved for release.

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

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

Respectfully submitted,

Columbia Analytical Services, Inc.

Bernadette Troncales
Project Chemist

Greg Jordan
Laboratory Director

RECEIVED
JUN 17 1999
BY:

COLUMBIA ANALYTICAL SERVICES, Inc.
Acronyms

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9901671
Project:	TO#24118.00/RAT#8/6002 OAKLAND	**Date Collected:**	6/1/99
Sample Matrix:	Water	**Date Received:**	6/1/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-4(23)	Units:	ug/L (ppb)
Lab Code:	S9901671-001	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	6/12/99	ND	
Benzene	EPA 5030	8020	0.5	1	NA	6/12/99	ND	
Toluene	EPA 5030	8020	0.5	1	NA	6/12/99	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	6/12/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	6/12/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	6/12/99	ND	

Approved By: _____ Date: 06/18/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9901671
Project:	TO#24118.00/RAT#8/6002 OAKLAND	**Date Collected:**	6/1/99
Sample Matrix:	Water	**Date Received:**	6/1/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-7(13)	Units:	ug/L (ppb)
Lab Code:	S9901671-002	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	6/14/99	250	G2
Benzene	EPA 5030	8020	0.5	1	NA	6/14/99	ND	
Toluene	EPA 5030	8020	0.5	1	NA	6/14/99	0.6	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	6/14/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	6/14/99	1.6	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	6/14/99	18	

G2 The sample contains components eluting in the gasoline range, and quantitated as gasoline. The chromatogram does not match the typical gasoline fingerprint.

Approved By: _____ Date: 06/15/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9901671
Project:	TO#24118.00/RAT#8/6002 OAKLAND	**Date Collected:**	6/1/99
Sample Matrix:	Water	**Date Received:**	6/1/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	VW-1(13)	Units:	ug/L (ppb)
Lab Code:	S9901671-003	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	6/12/99	180	G2
Benzene	EPA 5030	8020	0.5	1	NA	6/12/99	ND	
Toluene	EPA 5030	8020	0.5	1	NA	6/12/99	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	6/12/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	6/12/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	6/12/99	23	

G2 The sample contains components eluting in the gasoline range, and quantitated as gasoline. The chromatogram does not match the typical gasoline fingerprint.

Approved By: _____ Date: 06/15/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9901671
Project:	TO#24118.00/RAT#8/6002 OAKLAND	**Date Collected:**	6/1/99
Sample Matrix:	Water	**Date Received:**	6/1/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-5(24)	Units:	ug/L (ppb)
Lab Code:	S9901671-004	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	20	NA	6/13/99	11000	G2
Benzene	EPA 5030	8020	0.5	20	NA	6/13/99	33	
Toluene	EPA 5030	8020	0.5	1	NA	6/13/99	3.3	
Ethylbenzene	EPA 5030	8020	0.5	20	NA	6/13/99	340	
Xylenes, Total	EPA 5030	8020	0.5	20	NA	6/13/99	180	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	20	NA	6/13/99	580	

G2 The sample contains components eluting in the gasoline range, and quantitated as gasoline. The chromatogram does not match the typical gasoline fingerprint.

Approved By: _____ Date: 06/15/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9901671
Project:	TO#24118.00/RAT#8/6002 OAKLAND	**Date Collected:**	6/1/99
Sample Matrix:	Water	**Date Received:**	6/1/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	VW-4(14)	Units:	ug/L (ppb)
Lab Code:	S9901671-005	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	20	NA	6/13/99	2100	G2
Benzene	EPA 5030	8020	0.5	1	NA	6/13/99	2.5	
Toluene	EPA 5030	8020	0.5	1	NA	6/13/99	1.1	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	6/13/99	2.5	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	6/13/99	15	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	100	NA	6/14/99	3300	

G2 The sample contains components eluting in the gasoline range, and quantitated as gasoline. The chromatogram does not match the typical gasoline fingerprint.

Approved By: _____ Date: 06/15/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9901671
Project:	TO#24118.00/RAT#8/6002 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S990612-WB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	6/12/99	ND	
Benzene	EPA 5030	8020	0.5	1	NA	6/12/99	ND	
Toluene	EPA 5030	8020	0.5	1	NA	6/12/99	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	6/12/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	6/12/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	6/12/99	ND	

Approved By: _____ Date: 06/15/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: TO#24118.00/RAT#8/6002 OAKLAND
Sample Matrix: Water

Service Request: S9901671
Date Collected: NA
Date Received: NA

BTEX, MTBE and TPH as Gasoline

Sample Name: Method Blank
Lab Code: S990613-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	6/13/99	ND	
Benzene	EPA 5030	8020	0.5	1	NA	6/13/99	ND	
Toluene	EPA 5030	8020	0.5	1	NA	6/13/99	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	6/13/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	6/13/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	6/13/99	ND	

Approved By: _____ Date: 06/15/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9901671
Project:	TO#24118.00/RAT#8/6002 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S990614-WB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	6/14/99	ND	
Benzene	EPA 5030	8020	0.5	1	NA	6/14/99	ND	
Toluene	EPA 5030	8020	0.5	1	NA	6/14/99	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	6/14/99	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	6/14/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	6/14/99	ND	

Approved By: _____ Date: 06/15/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: TO#24118.00/RAT#8/6002 OAKLAND
Sample Matrix: Water

Service Request: S9901671
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: NA

Surrogate Recovery Summary
BTEX, MTBE and TPH as Gasoline

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

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery 4-Bromofluorobenzene	Percent Recovery a,a,a-Trifluorotoluene
MW-4(23)	S9901671-001		100	97
MW-7(13)	S9901671-002		99	104
VW-1(13)	S9901671-003		101	109
MW-5(24)	S9901671-004		104	97
VW-4(14)	S9901671-005		87	100
MW-4(23)	S9901671-001MS		96	101
MW-4(23)	S9901671-001DMS		100	104
Method Blank	S990612-WB1		100	106
Method Blank	S990613-WB1		108	98
Method Blank	S990614-WB1		102	104
CAS Acceptance Limits:			69-116	69-116

Approved By: _____ Date: 06/15/96

SUR2/020397p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: TO#24118.00/RAT#8/6002 OAKLAND
Sample Matrix Water

Service Request: S9901671
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 6/13/99

Matrix Spike/Duplicate Matrix Spike Summary
TPH as Gasoline

Sample Name: MW-4(23)
Lab Code: S9901671-001MS, S9901671-001DMS
Test Notes:

Units: ug/L (ppb)
Basis: NA

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

Approved By: _____ Date: 06/15/99

DMS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: TO#24118.00/RAT#8/6002 OAKLAND

Service Request: S9901671
Date Analyzed: 6/12/99

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

Sample Name: ICV
Lab Code: ICV1
Test Notes:

Units: ug/L (ppb)
Basis: NA

ICV Source:

Analyte	Prep Method	Analysis Method	True Value	Result	CAS Percent Recovery Acceptance Limits	Percent Recovery	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	250	260	90-110	104	
Benzene	EPA 5030	8020	25	24	85-115	96	
Toluene	EPA 5030	8020	25	24	85-115	96	
Ethylbenzene	EPA 5030	8020	25	24	85-115	96	
Xylenes, Total	EPA 5030	8020	75	69	85-115	92	
Methyl *tert*-Butyl Ether	EPA 5030	8020	25	26	85-115	104	

Approved By: _____ Date: 06/15/99

ICV/032196

ARCO Products Company
Division of Atlantic/Richfield Company

Task Order No. 74118.00 S9901671

Chain of Custody

ARCO Facility no. 6002	City (Facility) Oakland	Project manager (Consultant) Glen VanderVeen	Laboratory Name CAS
ARCO engineer Paul Supple	Telephone no. (ARCO)	Telephone no. (Consultant) (408)453-7300	Fax no. (Consultant) (415)437-9526
Consultant name EMCON		Address (Consultant) 7701 Broadway #101 Oakland, CA	Contract Number

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH incl. MTBE EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM 503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Semi Metals ☐ VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org/DHS ☐ Lead EPA 7420/7421 ☐
MW-4 (23)	2	1		X		X	HCl	6-1-99	1155		X									
MW-7 (13)	2	2		X		X	HCL		1205		X									
VW-1 (13)	2	3		X		X	HCL		1220		X									
MW-5 (24)	2	4		X		X	HCL		1238		X									
VW-2 (14)	2	5		X		X	HCL	↓	1253		X									

* per Glen Vanderveen on 06/07/99, run samples undiluted + diluted.
BT 06/07/99

Method of shipment: Sampler will deliver

Special Detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: RAT 8
2-40ml HCl VOAs
#20805-131,003

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: 6/15/99 R11|D3

	Date	Time		Date	Time
Relinquished by sampler: Bonnie Pedue	6-1-99	1423	Received by: CAS	6/01/99	1423
Relinquished by:	Date	Time	Received by		
Relinquished by	Date	Time	Received by laboratory	Date	Time

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

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : **21775-241.004** STATION ADDRESS : **6235 Seminary Avenue, Oakland** DATE : **6/1/99**

ARCO STATION # : **6002** FIELD TECHNICIAN : **Ronnie Perdue** DAY : **Tuesday**

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-3	OK	15/16"	NO		LWC	8.4	8.4	ND	ND	24.5	
2	MW-6	OK	6"	NO		LWC	17.84	17.84			31.4	
3	MW-8		9/16"	NO	DOLPHIN	LWC	NO	answer	at	DOOR		
4	MW-4	OK	15/16"	YES	ARCO	LWC	11.93	11.93			23.9	
5	MW-7	OK	9/16"	NO	3616	LWC	9.85	9.85			13.5	
6	VW-1	OK	15/16"	NO		LWC	7.55	7.55			13.6	
7	MW-5	OK	15/16"	NO	ARCO	LWC	12.95	12.95			24.3	
8	VW-4	OK	15/16"	YES	3616	LWC	9.87	9.87	↓	↓	15.0	

SURVEY POINTS ARE TOP OF WELL CASINGS

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

OWT

PROJECT NO: 21775-241.004 SAMPLE ID: MW-4 (23)

PURGED BY: R Perdue CLIENT NAME: ARCO 6002

SAMPLED BY: ↓ LOCATION: Oakland

TYPE: Groundwater ✓ Surface Water ____ Leachate ____ Other ____

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

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

DEPTH OF WELL (feet): 23.9 CALCULATED PURGE (gal.): ↓

DEPTH OF WATER (feet): 11.53 ACTUAL PURGE VOL. (gal.): ____

DATE PURGED: 6-1-99 END PURGE: ____

DATE SAMPLED: ↓ SAMPLING TIME: 1155

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1155	Grab	6.26	350	18.6	Clear	Clear

OTHER: DO: 4 / ORP 113 ODOR: None NR (COBALT 0-100) NR (NTU 0-200)

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

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)

✓ Centrifugal Pump ____ Bailer (PVC)

____ Submersible Pump ____ Bailer (Stainless Steel)

____ Well WizardÔ ____ Dedicated

Other: ____

SAMPLING EQUIPMENT

____ 2" Bladder Pump ✓ Bailer (Teflon)

____ Bomb Sampler ____ Bailer (Stainless Steel)

____ Dipper ____ Submersible Pump

____ Well WizardÔ ____ Dedicated

Other: ____

WELL INTEGRITY: OK LOCK: ARCO

REMARKS: all samples

pH, E.C., Temp. Meter Calibration: Date: 6-1-99 Time: ____ Meter Serial No.: ____

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

Temperature °F ____

SIGNATURE: ____ REVIEWED BY: ____ PAGE 1 OF 6

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

OWT

PROJECT NO: 21775-241.004 SAMPLE ID: MW-5 (24)

PURGED BY: R Perdue CLIENT NAME: ARCO 6002

SAMPLED BY: ↓ LOCATION: Oakland

TYPE: Groundwater ✓ Surface Water ____ Leachate ____ Other ____

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

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

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

DEPTH OF WATER (feet): 12.95 ACTUAL PURGE VOL. (gal.): ____

DATE PURGED: 6-1-99 END PURGE: —

DATE SAMPLED: ↓ SAMPLING TIME: 1238

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1238	Grab	6.49	570	17.4	Clear	Clear

OTHER: DO: 1 / ORP -55 ODOR: Strong NR (COBALT 0-100) NR (NTU 0-200)

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

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)

✓ Centrifugal Pump ____ Bailer (PVC)

____ Submersible Pump ____ Bailer (Stainless Steel)

____ Well WizardÔ ____ Dedicated

Other: ____

SAMPLING EQUIPMENT

____ 2" Bladder Pump ✓ Bailer (Teflon)

____ Bomb Sampler ____ Bailer (Stainless Steel)

____ Dipper ____ Submersible Pump

____ Well WizardÔ ____ Dedicated

Other: ____

WELL INTEGRITY: Ok LOCK: Arco

REMARKS: all Samples

pH, E.C., Temp. Meter Calibration: Date: 6-1-99 Time: ____ Meter Serial No.: ____

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

Temperature °F ____

SIGNATURE: [signature] REVIEWED BY: ↓ PAGE 2 OF 6

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

OWT

PROJECT NO: 21775-24.001 SAMPLE ID: MW-7 (13)

PURGED BY: R Redline CLIENT NAME: ARCO 6002

SAMPLED BY: ↓ LOCATION: Oakland

TYPE: Groundwater Y Surface Water ____ Leachate ____ Other ____

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

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

DEPTH OF WELL (feet): 13.5 CALCULATED PURGE (gal.): ↓

DEPTH OF WATER (feet): 9.85 ACTUAL PURGE VOL. (gal.): ↓

DATE PURGED: 6-1-99 END PURGE: ____

DATE SAMPLED: ↓ SAMPLING TIME: 1205

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1205	Grab	6.43	439	16.9	clear	clear

OTHER: DO: 1 / ORP -11 ODOR: none NR (COBALT 0-100) NR (NTU 0-200)

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

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)

Y Centrifugal Pump ____ Bailer (PVC)

____ Submersible Pump ____ Bailer (Stainless Steel)

____ Well WizardÔ ____ Dedicated

Other: ____

SAMPLING EQUIPMENT

____ 2" Bladder Pump Y Bailer (Teflon)

____ Bomb Sampler ____ Bailer (Stainless Steel)

____ Dipper ____ Submersible Pump

____ Well WizardÔ ____ Dedicated

Other: ____

WELL INTEGRITY: OK LOCK: ARCO

REMARKS: all samples

pH, E.C., Temp. Meter Calibration: Date: 6-1-99 Time: ____ Meter Serial No.: ____

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

Temperature °F ____

SIGNATURE: [signature] REVIEWED BY: GA PAGE 3 OF 6

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

OWT

PROJECT NO: 21775-24.1001 SAMPLE ID: MW-5

PURGED BY: R Peedue CLIENT NAME: ARCO 6002

SAMPLED BY: ↓ LOCATION: Oakland

TYPE: Groundwater Y Surface Water ____ Leachate ____ Other ____

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

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

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

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

DATE PURGED: 6-1-99 END PURGE: ____

DATE SAMPLED: ↓ SAMPLING TIME: ____

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
	Could not get to well no one home					
	Checked back 6h + 6h					

OTHER: DO: /ORP ODOR: ____ NR (COBALT 0-100) NR (NTU 0-200)

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

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)

Y Centrifugal Pump ____ Bailer (PVC)

____ Submersible Pump ____ Bailer (Stainless Steel)

____ Well WizardÔ ____ Dedicated

Other: ____

SAMPLING EQUIPMENT

____ 2" Bladder Pump Y Bailer (Teflon)

____ Bomb Sampler ____ Bailer (Stainless Steel)

____ Dipper ____ Submersible Pump

____ Well WizardÔ ____ Dedicated

Other: ____

WELL INTEGRITY: ____ LOCK: ____

REMARKS: ~~all samples~~

pH, E.C., Temp. Meter Calibration: Date: 6-1-99 Time: ____ Meter Serial No.: ____

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

Temperature °F ____

SIGNATURE: ____ REVIEWED BY: ____ PAGE 4 OF 6

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

OWT

PROJECT NO: 21775-24.004 SAMPLE ID: MW-1 (13)

PURGED BY: R Perdue CLIENT NAME: ARCO 6002

SAMPLED BY: ↓ LOCATION: Oakland

TYPE: Groundwater Y Surface Water ____ Leachate ____ Other ____

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

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

DEPTH OF WELL (feet): 13.6 CALCULATED PURGE (gal.): ↓

DEPTH OF WATER (feet): 7.55 ACTUAL PURGE VOL. (gal.): ____

DATE PURGED: 6-1-99 END PURGE: —

DATE SAMPLED: ↓ SAMPLING TIME: 1220

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1220	Grab	6.36	816	17.5	clear	clear

OTHER: DO: 1 / ORP -40 ODOR: none NR (COBALT 0-100) NR (NTU 0-200)

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

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)

Y Centrifugal Pump ____ Bailer (PVC)

____ Submersible Pump ____ Bailer (Stainless Steel)

____ Well WizardÔ ____ Dedicated

Other: ____

SAMPLING EQUIPMENT

____ 2" Bladder Pump Y Bailer (Teflon)

____ Bomb Sampler ____ Bailer (Stainless Steel)

____ Dipper ____ Submersible Pump

____ Well WizardÔ ____ Dedicated

Other: ____

WELL INTEGRITY: [redacted] LOCK: none

REMARKS: all samples & Lid Broke as well as lock Cap.

pH, E.C., Temp. Meter Calibration: Date: 6-1-99 Time: ____ Meter Serial No.: ____

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

Temperature °F ____

SIGNATURE: [redacted] REVIEWED BY: [redacted] PAGE 5 OF 6

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

OWT

PROJECT NO: 21775-241.004 SAMPLE ID: VW-4 (14)

PURGED BY: R Perdue CLIENT NAME: ARCO 6002

SAMPLED BY: ↓ LOCATION: Oakland

TYPE: Groundwater Y Surface Water ____ Leachate ____ Other ____

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

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

DEPTH OF WELL (feet): 15.0 CALCULATED PURGE (gal.): ↓

DEPTH OF WATER (feet): 9.87 ACTUAL PURGE VOL. (gal.): ____

DATE PURGED: 6-1-99 END PURGE: —

DATE SAMPLED: ↓ SAMPLING TIME: 1253

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1253	Grab	6.69	638	16.9	Clear	Clear

OTHER: DO: 2 / ORP -50 ODOR: None NR (COBALT 0-100) NR (NTU 0-200)

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

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)

Y Centrifugal Pump ____ Bailer (PVC)

____ Submersible Pump ____ Bailer (Stainless Steel)

____ Well WizardÔ ____ Dedicated

Other: ____

SAMPLING EQUIPMENT

____ 2" Bladder Pump Y Bailer (Teflon)

____ Bomb Sampler ____ Bailer (Stainless Steel)

____ Dipper ____ Submersible Pump

____ Well WizardÔ ____ Dedicated

Other: ____

WELL INTEGRITY: OK LOCK: 3616

REMARKS: all samples

pH, E.C., Temp. Meter Calibration Date: 6-1-99 Time: ____ Meter Serial No.: ____

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

Temperature °F ____

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

EMCON Associates - Field Services

1921 Ringwood Avenue

San Jose, California

1999

Historical Monitoring Well Data

ARCO 6002

21775-241.004

Well ID	Quarter	Date	Purge Volume (gallons)	Did well dry	Well Contained Product	Gallons
						First 0.00
						Second 0.00
						Third 0.00
						Fourth 0.00
MW-3	First	02/08/99	0.00	GRAB	NO	
	Second	06/01/99			NO	
	Third	07/28/98	0.00	NA	NO	
	Fourth	10/27/98	0.00	NA	NO	
MW-4	First	02/08/99	0.00	GRAB	NO	
	Second	06/01/99	0.00	GRAB	NO	
	Third	07/28/98	0.00	GRAB	NO	
	Fourth	10/27/98	0.00	GRAB	NO	
MW-5	First	02/08/99	0.00	GRAB	NO	
	Second	06/01/99	0.00	GRAB	NO	
	Third	07/28/98	0.00	GRAB	NO	
	Fourth	10/27/98	0.00	GRAB	NO	
MW-6	First	02/08/99	0.00	GRAB	NO	
	Second	06/01/99	0.00	NA	NO	
	Third	07/28/98	0.00	NA	NO	
	Fourth	10/27/98	0.00	NA	NO	
MW-7	First	02/08/99	0.00	GRAB	NO	
	Second	06/01/99	0.00	GRAB	NO	
	Third	07/28/98	0.00	GRAB	NO	
	Fourth	10/27/98	0.00	GRAB	NO	
MW-8	First	02/08/99	0.00	GRAB	NO	
	Second	06/01/99	0.00	IW	IW	
	Third	07/28/98	0.00	GRAB	NO	
	Fourth	10/27/98	0.00	GRAB	NO	
VW-1	First	02/08/99	0.00	GRAB	NO	
	Second	06/01/99	0.00	GRAB	NO	
	Third	07/28/98	0.00	GRAB	NO	
	Fourth	10/27/98	0.00	GRAB	NO	
VW-4	First	02/08/99	0.00	GRAB	NO	
	Second	06/01/99	0.00	GRAB	NO	
	Third	07/28/98	0.00	GRAB	NO	
	Fourth	10/27/98	0.00	GRAB	NO	
						Steam water (gal) _____

ARCO Products Company
Division of Atlantic/Richfield Company

Task Order No. 24119.00

Chain of Custody

ARCO Facility no.	[illegible]
City (Facility)	Oakland
Project manager (Consultant)	Glen VanderVeen
Laboratory Name	CAS
ARCO engineer	Paul Supple
Telephone no. (ARCO)	
Telephone no. (Consultant)	(408)467-7100
Fax no. (Consultant)	(408)467-9026
Contract Number	
Consultant name	EMCON
Address (Consultant)	2201 Broadway #101 Oakland, CA

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH *new MTBE* EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM 503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals☐ VOA☐ Semi VOA☐	CAM Metals EPA 6010/7000 TTLC☐ STLC☐	Lead Org/DHS☐ Lead EPA 7420/7421☐			
MW-4	[illegible]	2		X		X	HCL	[illegible]	[illegible]		X												
MW-7	[illegible]	2		X		X	HCL	↓	[illegible]		X												
MW-1	[illegible]	2		X		X	HCL	↓	[illegible]		X												
MW-5	[illegible]	[illegible]		X		X	HCL	↓	[illegible]		X												
MW-1	[illegible]	2		X		X	HCL	↓	[illegible]		X												

Method of shipment: Samplers will deliver

Special Detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: RAT 7 2-40ml HCl VOAs [illegible]

Lab Number:

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

Condition of sample:

Temperature received:

Relinquished by sampler	Date	Time	Received by		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Relinquished by	**Date**	**Time**	**Received by**		
[illegible]					
Relinquished by	**Date**	**Time**	**Received by laboratory**	**Date**	**Time**

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