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

the i group

STID 744

March 14, 2000
Project 791655

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

Re: Quarterly Groundwater Monitoring Report, Fourth 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 fourth 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.

Please call if you have questions.

Sincerely,

Pinnacle

Glen VanderVeen
Project Manager

Dan Easter, R.G. 5722
Project Geologist

Attachment: Quarterly Groundwater Monitoring Report, Fourth Quarter 1999

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

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Date: March 14, 2000

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 (FOURTH - 1999):

1. Prepared and submitted quarterly groundwater monitoring report for third quarter 1999.
2. Performed quarterly groundwater monitoring and sampling for fourth quarter 1999.
3. Analyzed groundwater samples for fuel oxygenates, as requested by ACHCSA.
4. Performed monthly free product check and removal.
5. Performed high vacuum, dual phase extraction test on well MW-2.

WORK PROPOSED FOR NEXT QUARTER (FIRST - 2000):

1. Prepare and submit quarterly groundwater monitoring report for fourth quarter 1999.
2. Perform quarterly groundwater monitoring and sampling for first quarter 2000.
3. Continue to perform monthly free product check and removal until product thickness diminishes to a sheen.
4. Prepare report of high vacuum, dual phase extraction test on well MW-2.

QUARTERLY MONITORING:

Current Phase of Project:	Quarterly Groundwater Monitoring
Frequency of Sampling:	Quarterly: MW-1 through MW-7
Frequency of Monitoring:	Quarterly (groundwater)
Is Floating Product (FP) Present On-site:	☐ Yes ☒ No
FP Recovered This Quarter:	None
Cumulative FP Recovered to Date:	0.381 gallons
Bulk Soil Removed to Date :	Unknown
Bulk Soil Removed This Quarter :	None
Water Wells or Surface Waters, within 2000 ft., impacted by site:	None
Current Remediation Techniques:	Free Product Bailing, High Vacuum Test
Average Depth to Groundwater:	16.3 feet
Groundwater Flow Direction and Gradient (Average):	0.002 ft/ft toward West-Southwest

DISCUSSION:

- Free product was observed in well MW-2 on June 25, 1999. Bailing of free product began on a regular basis shortly thereafter (see Table 4)

- November 15 through November 19, 1999, Pinnacle performed a high vacuum, dual phase extraction test, utilizing a liquid ring pump and catalytic oxidizer, on well MW-2 to evaluate this remediation methodology for this site and sites with similar lithologic conditions and reduce hydrocarbon impact at well MW-2. A total of 3889 gallons of groundwater were pumped and removed from the site. The test removed an estimated 34.9 pounds of TPHg from vapor and groundwater phases. A report of findings of the test will be submitted during the first quarter 2000.

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
- Table 5 - High Vacuum Extraction Pilot Test, Extracted Groundwater Analytical Data
- Table 6 - High Vacuum Extraction Pilot Test, Mass Removal from Groundwater
- Table 7 - High Vacuum Extraction Pilot Test, Extracted Vapor Analytical Data
- Table 8 - High Vacuum Extraction Pilot Test, Mass Removal from Vapor
- 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

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

the IT group

March 14, 2000
Project 791655

Reverend Sura D. Phoenix
First Christian Church
1190 Davis Street
San Leandro, California 94577

Re: Quarterly Groundwater Monitoring Results, Fourth Quarter 1999, for First Christian Church, Located at 1190 Davis Street, San Leandro, California

Dear Reverend Phoenix:

On behalf of ARCO Products Company (ARCO), Pinnacle Environmental Solutions, a member of The IT Group (Pinnacle), is submitting the attached laboratory analytical results for the groundwater sample collected from well MW-5 during the fourth quarter of 1999. This well is located at the First Christian Church, 1190 Davis Street, San Leandro, California. The groundwater sample was collected during quarterly sampling of the ARCO Service Station No. 2111, located at 1156 Davis Street, San Leandro, California.

Please call if you have questions.

Sincerely,

Pinnacle

Ute R. Maimone
for Glen VanderVeen
Project Manager

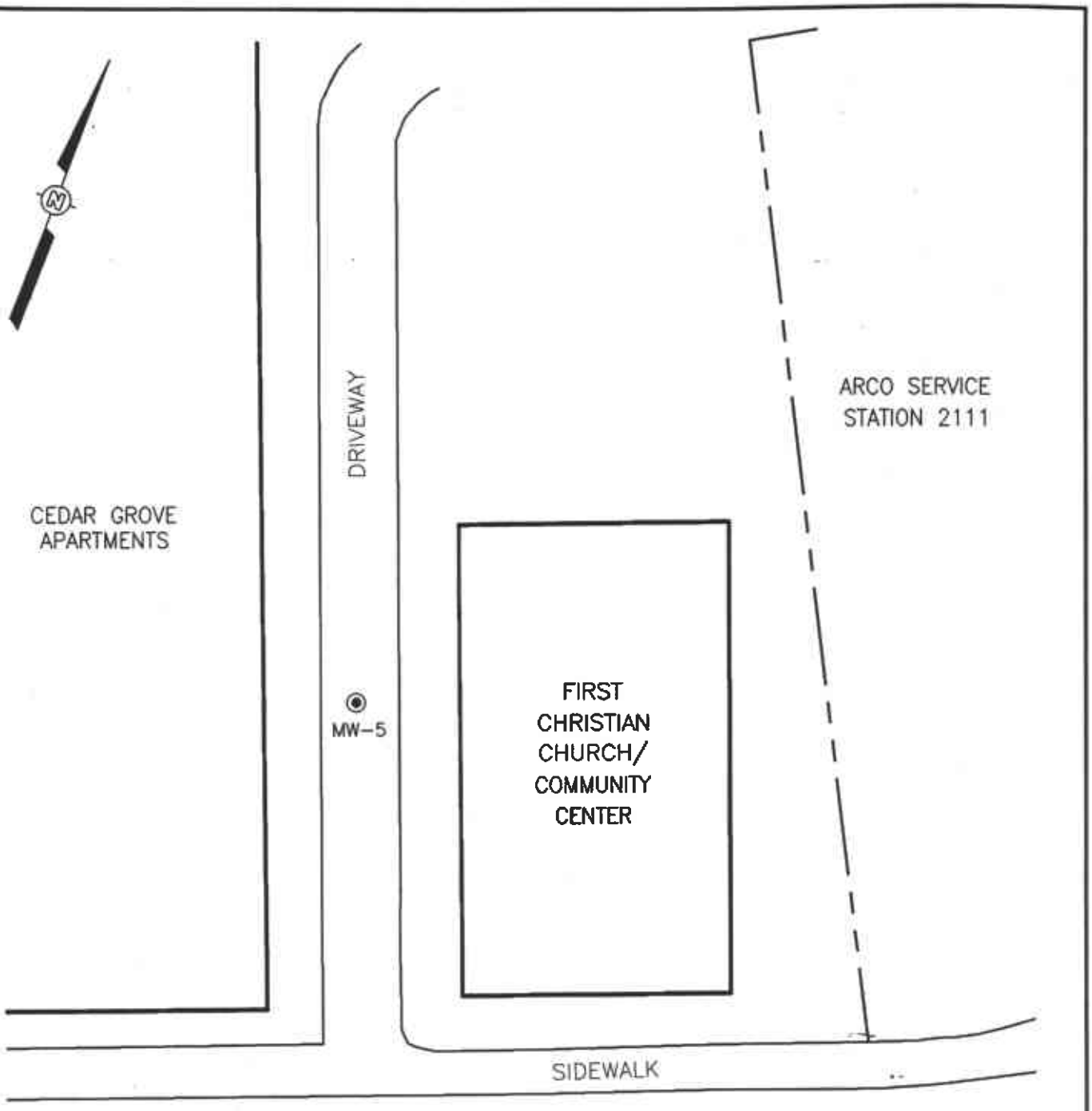
Attachments: Figure 1 - Generalized Site Plan
Appendix A - Copy of Certified Analytical Report and Chain-of-Custody Documentation

cc: Amir Gholami, ACHCSA
Paul Supple, ARCO Products Company
File

00 MAR 16 PM 4:05
ENVIRONMENTAL PROTECTION

OAK\S:\ARCO\2111\QTRLY\FCCQ499.DOC\uh:1

DRAWN BY	PROJECT NUMBER
K. Black 10-26-99	791655



EXPLANATION

◉ Groundwater monitoring well

IT CORPORATION

FIRST CHRISTIAN CHURCH

FIGURE 1
SITE PLAN

1190 DAVIS STREET
SAN LEANDRO, CALIFORNIA

SANJOSE/CADD: N:\cad\DWG\PINACL\2111\Sjchurch.dwg Tue, 26/Oct/99 01:29pm kblack

APPENDIX A

COPY OF CERTIFIED ANALYTICAL REPORT, AND CHAIN-OF-CUSTODY DOCUMENTATION

Columbia Analytical Services INC.
An Employee-Owned Company

November 23, 1999

Service Request No.: S9903532

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

RECEIVED
NOV 29 1999
BY:

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 November 11, 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 8, 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: 2352, expiration: January 31, 2001).

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

Respectfully submitted,

Columbia Analytical Services, Inc.

Bernadette Troncales
Project Chemist

Greg Jordan
Laboratory Director

COLUMBIA ANALYTICAL SERVICES, Inc.
Acronyms

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9903532
Project:	TO#24118.00 RAT#8/2111 SAN LEANDRO	**Date Collected:**	11/10/99
Sample Matrix:	Water	**Date Received:**	11/11/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-5(16)	Units:	ug/L (ppb)
Lab Code:	S9903532-001	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	11/19/99	130	
Benzene	EPA 5030	8021B	0.5	1	NA	11/19/99	2.0	
Toluene	EPA 5030	8021B	0.5	1	NA	11/19/99	7.0	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	11/19/99	1.3	
Xylenes, Total	EPA 5030	8021B	1	1	NA	11/19/99	21	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	20	NA	11/19/99	5000	

Approved By: _____ Date: 11/23/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9903532
Project:	TO#24118.00 RAT#8/2111 SAN LEANDRO	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S991119-WB1 GC 6	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	11/19/99	ND	
Benzene	EPA 5030	8021B	0.5	1	NA	11/19/99	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	11/19/99	ND	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	11/19/99	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	11/19/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	1	NA	11/19/99	ND	

Approved By: _____ Date: 11/23/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9903532
Project:	TO#24118.00 RAT#8/2111 SAN LEANDRO	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S991119-WB1 GC3	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	11/19/99	ND	
Benzene	EPA 5030	8021B	0.5	1	NA	11/19/99	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	11/19/99	ND	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	11/19/99	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	11/19/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	1	NA	11/19/99	ND	

Approved By: _____ Date: 11/23/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S9903532
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: 8021B CA/LUFT

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery 4-Bromofluorobenzene	Percent Recovery a,a,a-Trifluorotoluene
MW-5(16)	S9903532-001		107	96
Lab Control Sample	S991119-LCS GC 6		95	101
Dup Lab Control Sample	S991119-DLCS GC 6		83	120
Method Blank	S991119-WB1 GC 6		93	93
Method Blank	S991119-WB1 GC3		98	96
CAS Acceptance Limits:			69-116	72-139

Approved By: _____ Date: 11/23/99

SUR2/020397p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9903532
Project:	TO#24118.00 RAT#8/2111 SAN LEANDRO	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	11/19/99

Laboratory Control Sample/Duplicate Laboratory Control Sample Summary
BTEX and TPH as Gasoline

Sample Name:	Dup Lab Control Sample	Units:	ug/L (ppb)
Lab Code:	S991119-LCS GC (S991119-DLCS GC 6	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	True Value LCS	True Value DLCS	Result LCS	Result DLCS	Percent Recovery LCS	Percent Recovery DLCS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
Benzene	EPA 5030	8021B	25	25	27	24	108	96	75-135	12	
Toluene	EPA 5030	8021B	25	25	24	24	96	96	73-136	<1	
Ethylbenzene	EPA 5030	8021B	25	25	24	24	96	96	69-142	<1	
Gasoline	EPA 5030	CA/LUFT	250	250	240	250	96	100	75-135	4	

Approved By: _____ Date: 11/23/99

DLCS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S9903532
Date Analyzed: 11/19/99

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	250	85-115	100	
Benzene	EPA 5030	8021B	25	28	85-115	112	
Toluene	EPA 5030	8021B	25	27	85-115	108	
Ethylbenzene	EPA 5030	8021B	25	28	85-115	112	
Xylenes, Total	EPA 5030	8021B	75	85	85-115	113	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	25	27	85-115	108	

Approved By: _____ Date: 11/23/99

ICV/032196

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 24118.00 S990 3532

Chain of Custody

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

Method of shipment: Sampler will deliver

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH/MTBE EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
MW-5 (96)		2	(1)	X		X	HCl	11/10/99	1240		X											

Special detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

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

Lab number

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

Condition of sample:		Temperature received:	DUE: 11/26/99 R11 D3-H
Relinquished by sampler	Date 11/11/99 Time 0830	Received by Bruce Pulla	11/11/99 10:30
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory	Date Time

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant
APC-3292 (2-91)

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 8021B* µg/L	**Toluene** EPA 8021B* µg/L	**Ethylbenzene** EPA 8021B* µg/L	**Total Xylenes** EPA 8021B* µg/L	**MTBE** EPA 8021B* µg/L	**MTBE** EPA 8260 µg/L	**TRPH** EPA 418.1 µg/L	**TPHD** LUFT Method µg/L	Dissolved Oxygen mg/L	Purged/ Not Purged P/NP
MW-1	08-01-95	39.60	17.45	ND	22.15	08-01-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--		
MW-1	12-14-95	39.60	17.09	ND	22.51	12-14-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	03-21-96	39.60	14.72	ND	24.88	03-21-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	05-24-96	39.60	15.94	ND	23.66	05-24-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	08-09-96	39.60	17.89	ND	21.71	08-09-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	11-06-96	39.60	18.66	ND	20.94	11-06-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	03-24-97	39.60	16.13	ND	23.47	03-24-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	05-27-97	39.60	17.23	ND	22.37	05-28-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	08-07-97	39.60	18.68	ND	20.92	08-07-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	11-10-97	39.60	19.19	ND	20.41	11-10-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	02-16-98	39.60	12.61	ND	26.99	02-16-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	04-15-98	39.60	14.30	ND	25.30	04-15-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	07-24-98	39.60	16.40	ND	23.20	07-24-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	10-19-98	39.60	17.90	ND	21.70	10-19-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-1	01-28-99	39.60	16.85	ND	22.75	01-28-99	<20,000	580	<200	<200	320	14,000	--	--	--		
MW-1	06-25-99	39.60	17.35	ND	22.25	06-25-99	730	140	5	3	2	7,700	--	--	--	0.79	NP
MW-1	08-25-99	39.60	18.20	ND	21.40	08-25-99	390	66	8.5	<2.5	8.6	3,700	--	--	--	1.56	NP
MW-1	11-10-99	39.60	17.77	ND	21.83	11-10-99	360	70	13	2.2	13	980	--	--	--	0.30	NP
MW-2	08-01-95	37.99	15.67	ND	22.32	08-01-95	23,000	1,300	310	500	3,500	--	--	--	--		
MW-2	12-14-95	37.99	15.36	ND	22.63	12-14-95	7,300	900	25	180	1,000	<200	--	--	--		
MW-2	03-21-96	37.99	12.84	ND	25.15	03-21-96	9,600	850	30	280	1,400	250	--	--	--		
MW-2	05-24-96	37.99	14.03	ND	23.96	05-24-96	2,300	300	<5	73	310	<25	--	--	--		
MW-2	08-09-96	37.99	16.10	ND	21.89	08-09-96	2,800	290	6	75	320	50	--	--	--		
MW-2	11-06-96	37.99	16.98	ND	21.01	11-06-96	750	76	<1	15	51	110	--	--	--		

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

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

Well Designation	Water Level Field Date	Top of Casing Elevation 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 8021B* µg/L	**Toluene** EPA 8021B* µg/L	**Ethylbenzene** EPA 8021B* µg/L	**Total Xylenes** EPA 8021B* µg/L	**MTBE** EPA 8021B* 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	03-24-97	37.99	14.22	ND	23.77	03-24-97	790	18	<1	2	6	280	--	--	--		
MW-2	05-27-97	37.99	15.42	ND	22.57	05-28-97	750	14	<1	<1	10	150	--	--	--		
MW-2	08-07-97	37.99	16.92	ND	21.07	08-07-97	360	31	<2.5	<2.5	15	260	--	--	--		
MW-2	11-10-97	37.99	17.52	ND	20.47	11-10-97	1,300	82	<5	14	49	550	--	--	--		
MW-2	02-16-98	37.99	12.04	ND	25.95	02-16-98	<2,500	<25	<25	<25	<25	4,200	--	--	--		
MW-2	04-15-98	37.99	12.34	ND	25.65	04-15-98	<10,000	<100	<100	<100	<100	7,300	--	--	--		
MW-2	07-24-98	37.99	14.45	ND	23.54	07-24-98	<2,500	<25	<25	<25	<25	1,500	--	--	--		
MW-2	10-19-98	37.99	16.08	ND	21.91	10-19-98	<1,000	18	<10	<10	<10	1,100	--	--	--		
MW-2	01-28-99	37.99	15.59	0.02	22.41 [1]	01-28-99	160,000	3,000	24,000	4,400	31,000	23,000	--	--	--		
MW-2	06-25-99	37.99	19.20	3.73[4]	21.51 [1]	06-25-99	120,000	6,900	21,000	2,600	19,000	18,000	17,000[3]	--	--	0.49	NP
MW-2	08-25-99	37.99	16.49	0.02	21.51 [1]	08-25-99	92,000	2,200	16,000	3,200	19,000	11,000	9,400[3]	--	--	0.84	NP
MW-2	11-10-99	37.99	16.08	ND	21.91	11-10-99	56,000	2,400	5,900	1,500	10,000	17,000	21,000[3]	--	--	0.41	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	--	--	--		

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 8021B* µg/L	**Toluene** EPA 8021B* µg/L	**Ethylbenzene** EPA 8021B* µg/L	**Total Xylenes** EPA 8021B* µg/L	**MTBE** EPA 8021B* 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-3	07-24-98	39.32	15.90	ND	23.42	07-24-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-3	10-19-98	39.32	17.45	ND	21.87	10-19-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-3	01-28-99	39.32	16.40	ND	22.92	01-28-99	<100	14	4	<1	6	100	--	--	--		
MW-3	06-25-99	39.32	17.92	ND	21.40	06-25-99	83	9.0	1.4	<0.5	2.5	220	--	--	--	1.11	NP
MW-3	08-25-99	39.32	17.79	ND	21.53	08-25-99	240	41	12	3.7	9.9	160	--	--	--	1.13	NP
MW-3	11-10-99	39.32	17.37	ND	21.95	11-10-99	620	100	9.7	4.1	21	150	--	--	--	0.24	NP
MW-4	08-01-95	38.10	15.65	ND	22.45	08-01-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--		
MW-4	12-14-95	38.10	15.35	ND	22.75	12-14-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	03-21-96	38.10	12.74	ND	25.36	03-21-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	05-24-96	38.10	14.03	ND	24.07	05-24-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	08-09-96	38.10	16.10	ND	22.00	08-09-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	11-06-96	38.10	17.00	ND	21.10	11-06-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	03-24-97	38.10	14.21	ND	23.89	03-24-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	05-27-97	38.10	15.38	ND	22.72	05-28-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	08-07-97	38.10	16.95	ND	21.15	08-07-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	11-10-97	38.10	17.53	ND	20.57	11-10-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	02-16-98	38.10	10.65	ND	27.45	02-16-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	04-15-98	38.10	12.20	ND	25.90	04-15-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	07-24-98	38.10	14.47	ND	23.63	07-24-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	10-19-98	38.10	16.20	ND	21.90	10-19-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-4	01-28-99	38.10	15.02	ND	23.08	01-28-99	340	52	5.5	<0.5	74	31	--	--	--		
MW-4	06-25-99	38.10	15.57	ND	22.53	06-25-99	510	78	4.1	0.5	18	94	--	--	--	0.90	NP
MW-4	08-25-99	38.10	16.43	ND	21.67	08-25-99	660	130	21	6.4	39	110	--	--	--	1.01	NP
MW-4	11-10-99	38.10	16.02	ND	22.08	11-10-99	510	98	5.1	3.1	15	69	--	--	--	0.28	NP

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

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

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Free Product Thickness	Groundwater Elevation	Water Sample Field Date	**TPHG** LUFT Method	**Benzene** EPA 8021B*	**Toluene** EPA 8021B*	**Ethylbenzene** EPA 8021B*	**Total Xylenes** EPA 8021B*	**MTBE** EPA 8021B*	**MTBE** EPA 8260	**TRPH** EPA 418.1	**TPHD** LUFT Method	Dissolved Oxygen	Purged/ Not Purged
		ft-MSL	feet	feet	ft-MSL		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	P/NP
MW-5	03-21-96	37.21	12.60	ND	24.61	03-22-96	<50	<0.5	<0.5	<0.5	<0.5	82	--	--	--		
MW-5	05-24-96	37.21	13.71	ND	23.50	05-24-96	<50	<0.5	<0.5	<0.5	<0.5	7	--	--	--		
MW-5	08-09-96	37.21	15.60	ND	21.61	08-09-96	<50	<0.5	<0.5	<0.5	<0.5	8	--	--	--		
MW-5	11-06-96	37.21	16.36	ND	20.85	11-06-96	<50	<0.5	<0.5	<0.5	<0.5	100	--	--	--		
MW-5	03-24-97	37.21	13.87	ND	23.34	03-24-97	<50	<0.5	<0.5	<0.5	<0.5	460	--	--	--		
MW-5	05-27-97	37.21	14.71	ND	22.50	05-28-97	<100	<1	<1	<1	<1	120	--	--	--		
MW-5	08-07-97	37.21	16.90	ND	20.31	08-07-97	<250	<2.5	<2.5	<2.5	<2.5	250	--	--	--		
MW-5	11-10-97	37.21	16.88	ND	20.33	11-10-97	<1,000	<10	<10	<10	<10	770	--	--	--		
MW-5	02-16-98	37.21	10.56	ND	26.65	02-16-98	<200	<2	<2	<2	<2	230	--	--	--		
MW-5	04-15-98	37.21	12.20	ND	25.01	04-15-98	<500	<5	<5	<5	<5	900	--	--	--		
MW-5	07-24-98	37.21	14.20	ND	23.01	07-24-98	<500	<5	<5	<5	<5	570	--	--	--		
MW-5	10-19-98	37.21	15.74	ND	21.47	10-19-98	<250	<2.5	<2.5	<2.5	<2.5	300	--	--	--		
MW-5	01-28-99	37.21	14.60	ND	22.61	01-28-99	<500	8	<5	<5	<5	290	--	--	--		
MW-5	06-25-99	37.21	15.10	ND	22.11	06-25-99	<50	<0.5	<0.5	<0.5	<0.5	1,300	--	--	--	0.76	NP
MW-5	08-25-99	37.21	15.91	ND	21.30	08-25-99	<50	<0.5	<0.5	<0.5	<0.5	6,700	--	--	--	0.98	NP
MW-5	11-10-99	37.21	15.52	ND	21.69	11-10-99	130	2.0	7.0	1.3	21	5,000	--	--	--	0.21	NP
MW-6	03-21-96	37.11	11.55	ND	25.56	03-22-96	<50	<0.5	1.9	<0.5	<0.5	<3	--	--	--		
MW-6	05-24-96	37.11	12.80	ND	24.31	05-24-96	<50	<0.5	<0.5	<0.5	<0.5	6	--	--	--		
MW-6	08-09-96	37.11	Not surveyed			08-09-96	Not sampled: Car parked on well										
MW-6	11-06-96	37.11	Not surveyed			11-06-96	Not sampled: Car parked on well										
MW-6	03-24-97	37.11	13.06	ND	24.05	03-24-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-6	05-27-97	37.11	14.30	ND	22.81	05-28-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-6	08-07-97	37.11	16.40	ND	20.71	08-07-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-6	11-10-97	37.11	16.53	ND	20.58	11-10-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		

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

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

Well Designation	Water Level Field Date	Top of Casing Elevation 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 8021B* µg/L	**Toluene** EPA 8021B* µg/L	**Ethylbenzene** EPA 8021B* µg/L	**Total Xylenes** EPA 8021B* µg/L	**MTBE** EPA 8021B* 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	02-16-98	37.11	Not surveyed			02-16-98	Not sampled: Car parked on well										
MW-6	04-15-98	37.11	10.95	ND	26.16	04-15-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-6	07-24-98	37.11	13.30	ND	23.81	07-24-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-6	10-19-98	37.11	Not surveyed			10-19-98	Not sampled: Car parked on well										
MW-6	01-28-99	37.11	13.92	ND	23.19	01-28-99	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-6	06-25-99	37.11	15.47	ND	21.64	06-25-99	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	0.74	NP
MW-6	08-25-99	37.11	15.39	ND	21.72	08-25-99	<50	<0.5	3.4	0.6	3.7	<3	--	--	--	0.92	NP
MW-6	11-10-99	37.11	14.92	ND	22.19	11-10-99	<50	<0.5	<0.5	<0.5	<1	<3	--	--	--	0.31	NP
MW-7	03-21-96	38.68	13.32	ND	25.36	03-22-96	32,000	870	450	970	4,900	280	--	--	--		
MW-7	05-24-96	38.68	14.58	ND	24.10	05-24-96	22,000	570	40	42	1,900	<200[2]	--	--	--		
MW-7	08-09-96	38.68	15.33	ND	23.35	08-09-96	14,000	390	<10	180	470	<200[2]	--	--	--		
MW-7	11-06-96	38.68	16.95	ND	21.73	11-06-96	9,500	440	<10	210	150	<100[2]	--	--	--		
MW-7	03-24-97	38.68	14.65	ND	24.03	03-24-97	6,400	420	<10	260	13	480	--	--	--		
MW-7	05-27-97	38.68	15.58	ND	23.10	05-28-97	5,000	420	<5	230	10	460	--	--	--		
MW-7	08-07-97	38.68	17.10	ND	21.58	08-07-97	3,900	350	<5	200	10	330	--	--	--		
MW-7	11-10-97	38.68	18.05	ND	20.63	11-10-97	5,600	590	10	370	43	540	--	--	--		
MW-7	02-16-98	38.68	12.03	ND	26.65	02-16-98	<5,000	390	<50	<50	61	4,300	--	--	--		
MW-7	04-15-98	38.68	13.02	ND	25.66	04-15-98	<10,000	<100	<100	<100	<100	8,900	--	--	--		
MW-7	07-24-98	38.68	14.18	ND	24.50	07-24-98	5,800	180	<50	74	<50	4,200	--	--	--		
MW-7	10-19-98	38.68	15.99	ND	22.69	10-19-98	<2,500	54	<25	72	<25	3,000	--	--	--		
MW-7	01-28-99	38.68	15.69	ND	22.99	01-28-99	4,500	560	250	<50	94	6,200	--	--	--		
MW-7	06-25-99	38.68	15.36	ND	23.32	06-25-99	3,900	520	160	46	100	45,000	63,000[3]	--	--	0.56	NP
MW-7	08-25-99	38.68	16.71	ND	21.97	08-25-99	3,400	730	77	51	110	62,000	76,000[3]	--	--	0.90	NP
MW-7	11-10-99	38.68	16.76	ND	21.92	11-10-99	15,000	340	19	13	20	55,000	91,000[3]	--	--	0.37	NP

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

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

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Free Product Thickness	Groundwater Elevation	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8021B*	Toluene EPA 8021B*	Ethylbenzene EPA 8021B*	Total Xylenes EPA 8021B*	MTBE EPA 8021B*	MTBE EPA 8260	TRPH EPA 418.1	TPHD LUFT Method	Dissolved Oxygen	Purged/ Not Purged
		ft-MSL	feet	feet	ft-MSL		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	P/NP

ft-MSL: elevation in feet, relative to mean sea level
TPHG: total petroleum hydrocarbons as gasoline, California DHS LUFT Method
MTBE: Methyl tert-butyl ether
TRPH: total recoverable petroleum hydrocarbons
TPHD: total petroleum hydrocarbons as diesel, California DHS LUFT Method
*: EPA method 8020 prior to 11/10/99
EPA: United States Environmental Protection Agency
µg/L: micrograms per liter
mg/L: milligrams per liter
ND: none detected
- -: not available or not analyzed
<: less than laboratory detection limit stated to the right
[1]: [corrected elevation (Z')] = Z + (h * 0.73) where: Z = measured elevation, h = floating product thickness, 0.73 = density ratio of oil to water
[2]: chromatogram fingerprint is not characteristic of diesel
[3]: also analyzed for fuel oxygenates
[4]: this value is suspected to be erroneous based on subsequent check by bailer (following day). See discussion

Table 2
Groundwater Flow Direction and Gradient

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

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

NR: not recorded

Table 3
Fuel Oxygenates

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

Well I.D. Number	Field Date	TBA EPA 8260 ug/L	MTBE EPA 8260 ug/L	DIPE EPA 8260 ug/L	ETBE EPA 8260 ug/L	TAME EPA 8260 ug/L
MW-2	06-25-99	<25,000	17,000	<2,500	<2,500	<2,500
MW-2	08-25-99	<10,000	9,400	<1,000	<1,000	<1,000
MW-2	11-10-99	<25,000	21,000	<2,500	<2,500	<2,500
MW-7	06-25-99	<50,000	63,000	<5,000	<5,000	<5,000
MW-7	08-25-99	<50,000	76,000	<5,000	<5,000	<5,000
MW-7	11-10-99	<50,000	91,000	<5,000	<5,000	<5,000

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

Table 4
Approximate Cumulative Floating Product Recovered

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

Well Designation	Product Recovery Field Date	Floating Product Thickness (feet)	Floating Product Recovered (gallons)
MW-2	06/28/99	0.45	0.3
MW-2	06/30/99	0.015	0.01
MW-2	07/07/99	0.06	0.04
MW-2	07/23/99	0.008	0.005
MW-2	08/25/99	0.02	0.013
MW-2	09/21/99	0.01	0.013
MW-2	11/10/99	ND	0.00
Cumulative Floating Product recoverd (gallons):			**0.381**

ND: not detected

Table 5
High Vacuum Extraction Pilot Test
Extracted Groundwater Analytical Data

ARCO Service Station No. 2111
1156 Davis Street, San Leandro, California

Date (mm/dd/yy)	Sample No. (GW#)	TPHg (ug/L)	Benzene (ug/L)	Toluene (ug/L)	thylbenzen (ug/L)	Xylene (ug/L)	MtBE[1] (ug/L)	tBA[2] (ug/L)
11/15/1999	GW1	33000	1300	4500	890	4700	18000	<25000
11/15/1999	GW2	30000	14000	1200	4400	760	14000	<10000
11/16/1999	GW3	5500	260	620	74	980	5700	<5000
11/17/1999	GW4	4700	200	500	38	830	3700	410
11/18/1999	GW5	230	5.2	18	2.9	46	2100	340
11/19/1999	GW6	1500	36	120	28	160	3100	<2500

[1] MtBE and tBA analysis by EPA Method 8260

[2] tBA MRL was elevated due to high MtBE concentration requiring sample dilution

Table 6
High Vacuum Extraction Pilot Test
Mass Removal from Groundwater

ARCO Service Station No. 2111
1156 Davis Street, San Leandro, California

Date (mm/dd/yy)	Sample No. (GW#)	Volume (gal)	TPHg (lbs)[3]	Benzene (lbs)	Toluene (lbs)	Ethylbenzene (lbs)	Xylene (lbs)	MtBE[1] (lbs)	tBA[2] (lbs)
11/15/99	GW1	395.2	0.109	0.004	0.015	0.003	0.015	0.059	0.082
11/16/99	GW2	346.3	0.087	0.040	0.003	0.013	0.002	0.040	0.029
11/17/99	GW3	631.5	0.029	0.001	0.003	0.000	0.005	0.030	0.026
11/18/99	GW4	281.1	0.011	0.000	0.001	0.000	0.002	0.009	0.001
11/19/99	GW5	77.4	0.000	0.000	0.000	0.000	0.000	0.001	0.000
11/19/99	GW6	757.8	0.009	0.000	0.001	0.000	0.001	0.020	0.016
12/07/99	GW6	1400	0.017	0.000	0.001	0.000	0.002	0.036	0.029
Total		3889	0.262	0.047	0.025	0.017	0.028	0.195	0.183

[1] MtBE and tBA analysis by EPA Method 8260

[2] tBA MRL was elevated due to high MtBE concentration requiring sample dilution

[3] Mass, lbs = (Concentration, ug/L)(10-6 g/ug)(2.2x10-3 lbs/g)(3.785 L/gal)(Volume, gal)

12/07/99: Extracted 1400-gallons from MW2 and MW7 by Vac Truck

Table 7
High Vacuum Extraction Pilot Test
Extracted Vapor Analytical Data

ARCO Service Station No. 2111
1156 Davis Street, San Leandro, California

Date (mm/dd/yy)	Sample No. (V#)	TPHg (ppmv)	Benzene (ppmv)	Toluene (ppmv)	Ethylbenzene (ppmv)	Xylene (ppmv)	MtBE (ppmv)
11/15/1999	V1	1900	21	58	12	44	58
11/15/1999	V2	2200	24	69	14	51	61
11/16/1999	V3	1400	13	48	10	37	50
11/17/1999	V4	760	3.4	23	5.5	20	28
11/18/1999	V5	590	7.8	22	4.8	18	31
11/19/1999	V6	830	7.2	29	7.1	25	NA

Analysis by EPA Method 8015M and 8020

Table 8
High Vacuum Extraction Pilot Test
Mass Removal from Vapor

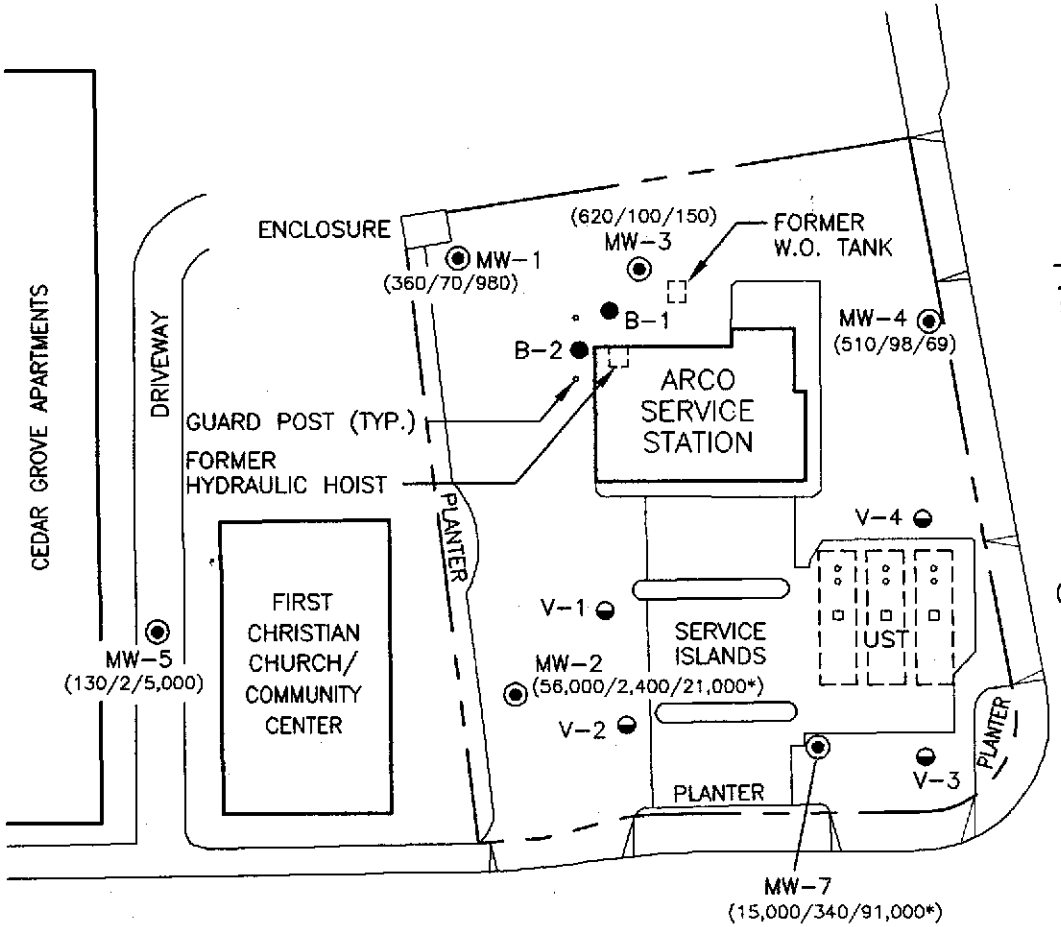
ARCO Service Station No. 2111
1156 Davis Street, San Leandro, California

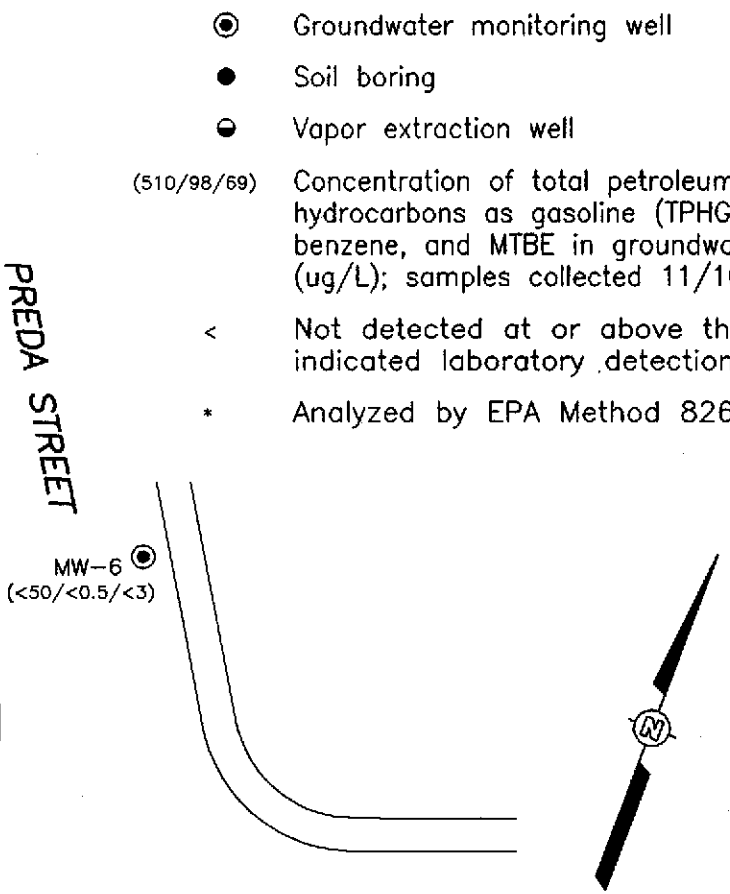
Date (mm/dd/yy)	Air Flow (cfm)	TPHg (lbs)[1]	Benzene (lbs)	Toluene (lbs)	Ethylbenzene (lbs)	Xylene (lbs)	MtBE (lbs)
11/15/1999	22	1.06	0.010	0.031	0.008	0.028	0.030
11/15/1999	23.5	4.51	0.040	0.137	0.032	0.117	0.116
11/16/1999	10.9	3.00	0.023	0.100	0.024	0.089	0.099
11/17/1999	30	9.78	0.036	0.287	0.079	0.288	0.335
11/18/1999	32	5.08	0.055	0.184	0.046	0.173	0.248
11/19/1999	32	11.2	0.080	0.379	0.107	0.377	NA
Total		34.6	0.244	1.12	0.296	1.07	0.828

[1] Mass, lbs = [(Flow, cfm)(Concentration, ppmv)(g/mole)(Time, min)(28.3 L/cf)] / [(10^6)(24.45 moles/L)(453.6 g/lb)]

where MW, g/mole: TPHg (C6-C12) = 95; Benzene = 78.1; Toluene = 92.1; Ethylbenzene = 106.2; Xylene = 106.2; MtBE = 88.2

DRAWN BY		PROJECT NUMBER
K. Black	1-14-00	791655





EXPLANATION

- ◉ Groundwater monitoring well
- ● Soil boring
- ◒ Vapor extraction well
- (510/98/69) Concentration of total petroleum hydrocarbons as gasoline (TPHG), benzene, and MTBE in groundwater (ug/L); samples collected 11/10/99
- < Not detected at or above the indicated laboratory detection limit
- * Analyzed by EPA Method 8260

SCALE

0 40 80 FEET

IT CORPORATION

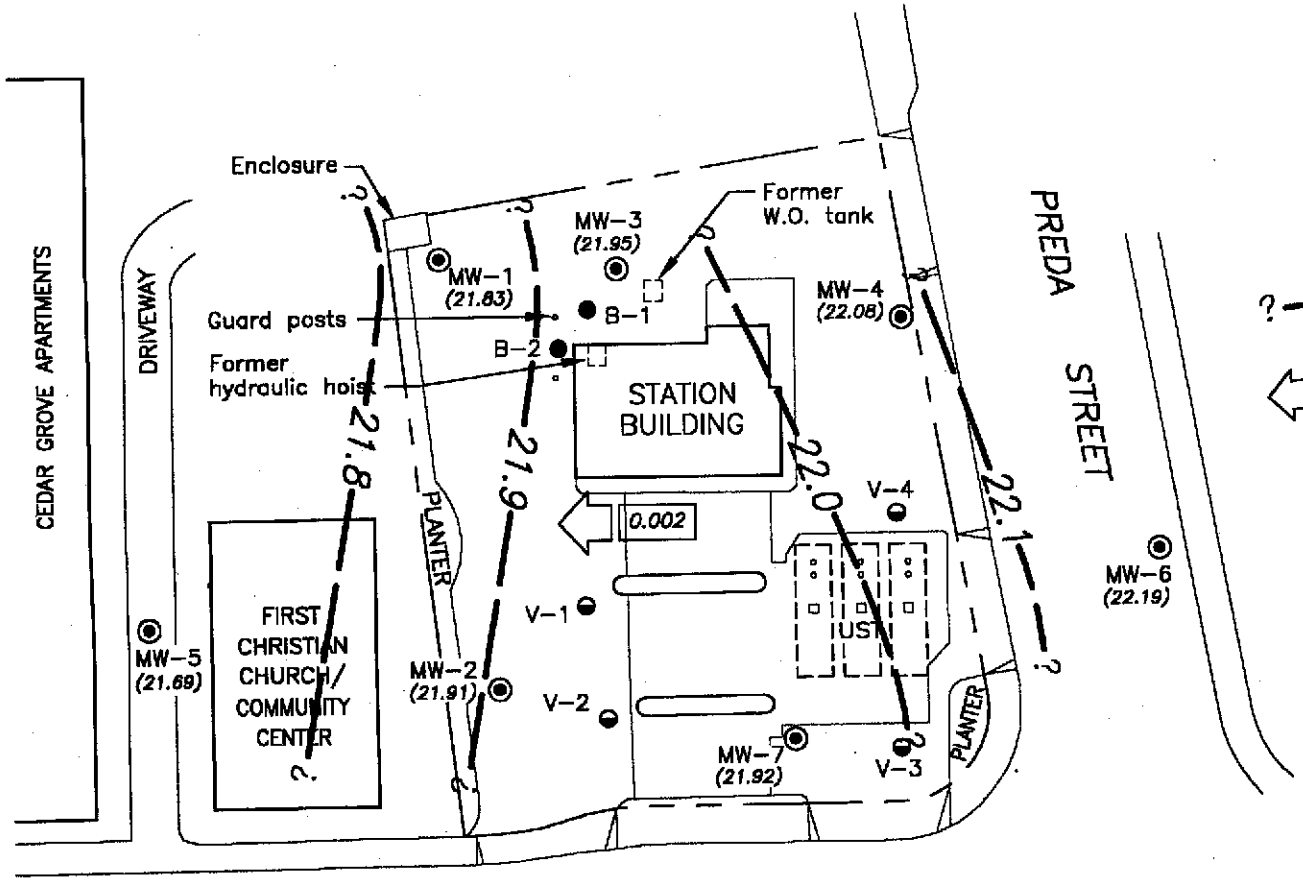
ARCO PRODUCTS COMPANY
SERVICE STATION 2111

FIGURE 1

GROUNDWATER ANALYTICAL SUMMARY
FOURTH QUARTER 1999

1156 DAVIS STREET
SAN LEANDRO, CALIFORNIA

DRAWN BY		PROJECT NUMBER
K. Black	1-14-00	791655



EXPLANATION

- Groundwater monitoring well
- Soil boring
- Vapor extraction well
- (22.19) Groundwater elevation (Ft.-MSL); measured 11/10/99
- ? Groundwater elevation contour (Ft.-MSL)
- Approx. direction of groundwater flow showing gradient

SCALE

0 40 80 FEET

IT CORPORATION

ARCO PRODUCTS COMPANY
SERVICE STATION 2111

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

SANJOSE/CADD: N:\cad\DWG\PINACL\2111\2111gwc.dwg Fri, 14/Jan/00 01:07pm kblack

APPENDIX A

SAMPLING AND ANALYSIS PROCEDURES

APPENDIX A

SAMPLING AND ANALYSIS PROCEDURES

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

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

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

Sample Collection

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

Equipment Cleaning

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

Water Level, Floating Hydrocarbon, and Total Well Depth Measurements

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

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

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

Well Purging

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

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

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

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

Well Sampling

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

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

Sample Preservation and Handling

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

Sample Containers and Preservation

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

Sample Handling

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

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

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

Sample Documentation

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

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

Field Logbook

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

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

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

Labels

Sample labels contained the following information:

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

Sampling and Analysis Chain-of-Custody Record

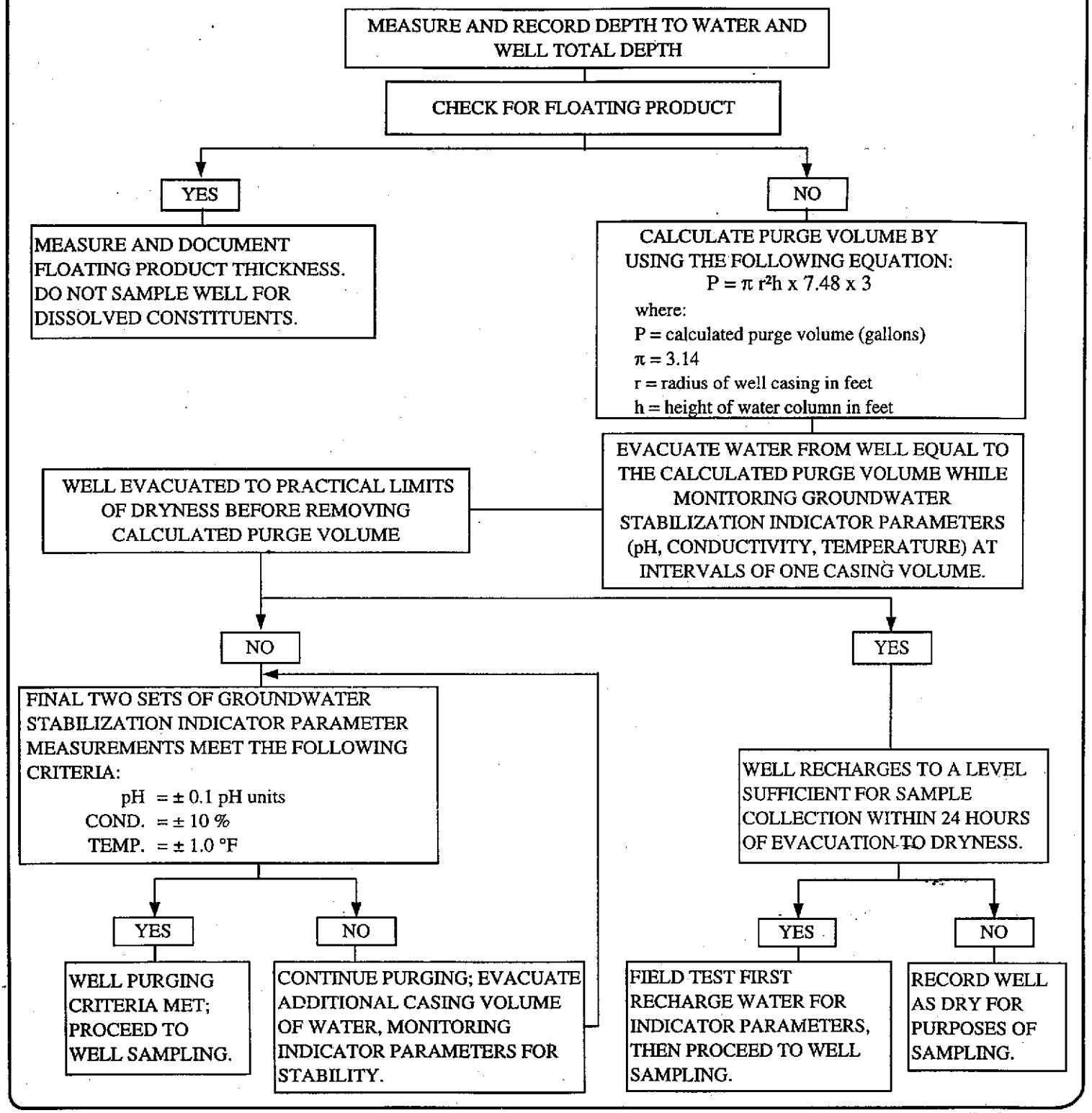
The ARCO chain-of-custody record initiated at the time of sampling contained, at a minimum, the sample designation (including the depth at which the sample was collected), sample type, analytical request, date of sampling, and the name of the sampler. The record sheet was signed, timed, and dated by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

Groundwater Sampling and Analysis Request Form

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

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

MONITORING WELL PURGING PROTOCOL



MONITORING WELL PURGING PROTOCOL

FIGURE

A-1

WATER SAMPLE FIELD DATA SHEET

PROJECT NO : _____ SAMPLE ID : _____

PURGED BY : _____ CLIENT NAME : _____

SAMPLED BY : _____ LOCATION : _____

TYPE: Groundwater _____ Surface Water _____ Leachate _____ Other _____

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

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

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

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

DATE PURGED : _____ END PURGE : _____

DATE SAMPLED : _____ SAMPLING TIME : _____

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

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

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

PURGING EQUIPMENT

_____ 2" Bladder Pump _____ Bailer (Teflon)

_____ Centrifugal Pump _____ Bailer (PVC)

_____ Submersible Pump _____ Bailer (Stainless Steel)

_____ Well Wizard™ _____ Dedicated

Other: _____

SAMPLING EQUIPMENT

_____ 2" Bladder Pump _____ Bailer (Teflon)

_____ Bomb Sampler _____ Bailer (Stainless Steel)

_____ Dipper _____ Submersible Pump

_____ Well Wizard™ _____ Dedicated

Other: _____

WELL INTEGRITY: _____ LOCK: _____

REMARKS: _____

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

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

Temperature °F _____

SIGNATURE: _____ REVIEWED BY: _____ PAGE _____ OF _____

WATER SAMPLE FIELD DATA SHEET

FIGURE A-2

IT - SACRAMENTO
GROUNDWATER SAMPLING AND ANALYSIS REQUEST FORM

PROJECT NAME :

SCHEDULED DATE :

SPECIAL INSTRUCTIONS / CONSIDERATIONS :

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

Well Lock Number (s)

☐ CHECK BOX TO AUTHORIZE DATA ENTRY

Site Contact: _____
Name Phone #

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

Laboratory and Lab QC Istructions:

SAMPLING AND ANALYSIS REQUEST FORM

FIGURE
A-3

APPENDIX B

CERTIFIED ANALYTICAL REPORTS, AND CHAIN-OF-CUSTODY DOCUMENTATION

Columbia Analytical Services INC.
An Employee-Owned Company

November 30, 1999

Service Request No.: S9903531

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

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

Dear Mr. Vanderveen:

Enclosed are the results of the sample(s) submitted to our laboratory on November 11, 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: 2352, expiration: January 31, 2001).

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

Respectfully submitted,

Columbia Analytical Services, Inc.

Bernadette Troncales
Project Chemist

Greg Jordan
Laboratory Director

RECEIVED
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BY:

COLUMBIA ANALYTICAL SERVICES, Inc.

Acronyms

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9903531
Project:	TO#24118.00 RAT#8/2111 SAN LEANDRO	**Date Collected:**	11/10/99
Sample Matrix:	Water	**Date Received:**	11/11/99

Fuel Oxygenates

Sample Name:	MW-2(17)	Units:	ug/L (ppb)
Lab Code:	S9903531-005	Basis:	NA
Test Notes:	C1		

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
tert-Butyl Alcohol	EPA 5030A	8260	50	500	NA	11/23/99	<25000	
Methyl *tert*-Butyl Ether	EPA 5030A	8260	0.5	500	NA	11/23/99	21000	
Diisopropyl Ether	EPA 5030A	8260	5	500	NA	11/23/99	<2500	
Ethyl *tert*-Butyl Ether	EPA 5030A	8260	5	500	NA	11/23/99	<2500	
tert-Amyl Methyl Ether	EPA 5030A	8260	5	500	NA	11/23/99	<2500	

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

Approved By: _____ Date: 11/30/99

1544/021397/p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9903531
Project:	TO#24118.00 RAT#8/2111 SAN LEANDRO	**Date Collected:**	11/10/99
Sample Matrix:	Water	**Date Received:**	11/11/99

Fuel Oxygenates

Sample Name:	MW-7(17)	Units:	ug/L (ppb)
Lab Code:	S9903531-006	Basis:	NA
Test Notes:	C1		

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
tert-Butyl Alcohol	EPA 5030A	8260	50	1000	NA	11/23/99	<50000	
Methyl *tert*-Butyl Ether	EPA 5030A	8260	0.5	1000	NA	11/23/99	91000	
Diisopropyl Ether	EPA 5030A	8260	5	1000	NA	11/23/99	<5000	
Ethyl *tert*-Butyl Ether	EPA 5030A	8260	5	1000	NA	11/23/99	<5000	
tert-Amyl Methyl Ether	EPA 5030A	8260	5	1000	NA	11/23/99	<5000	

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

Approved By: _____ Date: 11/30/99

1344\02139\p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9903531
Project:	TO#24118.00 RAT#8/2111 SAN LEANDRO	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Fuel Oxygenates

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S991123-WB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
tert-Butyl Alcohol	EPA 5030A	8260	50	1	NA	11/23/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030A	8260	0.5	1	NA	11/23/99	ND	
Diisopropyl Ether	EPA 5030A	8260	5	1	NA	11/23/99	ND	
Ethyl *tert*-Butyl Ether	EPA 5030A	8260	5	1	NA	11/23/99	ND	
tert-Amyl Methyl Ether	EPA 5030A	8260	5	1	NA	11/23/99	ND	

Approved By: _____ Date: 11/30/99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9903531
Project:	TO#24118.00 RAT#8/2111 SAN LEANDRO	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Fuel Oxygenates

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S991123-WB2	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
tert-Butyl Alcohol	EPA 5030A	8260	50	1	NA	11/23/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030A	8260	0.5	1	NA	11/23/99	ND	
Diisopropyl Ether	EPA 5030A	8260	5	1	NA	11/23/99	ND	
Ethyl *tert*-Butyl Ether	EPA 5030A	8260	5	1	NA	11/23/99	ND	
tert-Amyl Methyl Ether	EPA 5030A	8260	5	1	NA	11/23/99	ND	

Approved By: _____ Date: 11/30/99

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: S9903531
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(17)	S9903531-005		101	101	104
MW-7(17)	S9903531-006		102	100	99
Lab Control Sample	S991123-LCS		103	100	94
Lab Control Sample	S991123-DLCS		103	101	94
Method Blank	S991123-WB1		100	100	95
Method Blank	S991123-WB2		103	101	99
EPA Acceptance Limits:			86-118	88-110	86-115

Approved By: _____ Date: 11/30/99

SUR3/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S9903531
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 11/23/99

Laboratory Control Sample/Duplicate Laboratory Control Sample Summary
Fuel Oxygenates

Sample Name: Lab Control Sample
Lab Code: S991123-LCS, S991123-DLCS
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	True Value LCS	True Value DLCS	Result LCS	Result DLCS	Percent Recovery LCS	Percent Recovery DLCS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
1,1-Dichloroethene	EPA 5030A	8260	10	10	12	12	120	120	62-145	<1	
Benzene	EPA 5030A	8260	10	10	11	12	110	120	77-127	9	
Trichloroethene	EPA 5030A	8260	10	10	11	11	110	110	71-119	<1	
Toluene	EPA 5030A	8260	10	10	11	11	110	110	76-124	<1	
Chlorobenzene	EPA 5030A	8260	10	10	10	10	100	100	75-127	<1	
1,2-Dichlorobenzene	EPA 5030A	8260	10	10	9.8	10	98	100	74-126	2	
Naphthalene	EPA 5030A	8260	10	10	6.6	8.4	66	84	43-157	24	

Approved By: _____ Date: 11/30/99

DLCS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9903531
Project:	TO#24118.00 RAT#8/2111 SAN LEANDRO	**Date Collected:**	11/10/99
Sample Matrix:	Water	**Date Received:**	11/11/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-1(18)	Units:	ug/L (ppb)
Lab Code:	S9903531-001	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	2	NA	11/19/99	360	
Benzene	EPA 5030	8021B	0.5	2	NA	11/19/99	70	
Toluene	EPA 5030	8021B	0.5	2	NA	11/19/99	13	
Ethylbenzene	EPA 5030	8021B	0.5	2	NA	11/19/99	2.2	
Xylenes, Total	EPA 5030	8021B	1	2	NA	11/19/99	13	
Methyl *tert* -Butyl Ether	EPA 5030	8021B	3	2	NA	11/19/99	980	

Approved By: _____ Date: 11/13/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9903531
Project:	TO#24118.00 RAT#8/2111 SAN LEANDRO	**Date Collected:**	11/10/99
Sample Matrix:	Water	**Date Received:**	11/11/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-4(17)	Units:	ug/L (ppb)
Lab Code:	S9903531-002	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	11/19/99	510	
Benzene	EPA 5030	8021B	0.5	1	NA	11/19/99	98	
Toluene	EPA 5030	8021B	0.5	1	NA	11/19/99	5.1	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	11/19/99	3.1	
Xylenes, Total	EPA 5030	8021B	1	1	NA	11/19/99	15	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	1	NA	11/19/99	69	

Approved By: _____ Date: 11/30/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9903531
Project:	TO#24118.00 RAT#8/2111 SAN LEANDRO	**Date Collected:**	11/10/99
Sample Matrix:	Water	**Date Received:**	11/11/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-3(18)	Units:	ug/L (ppb)
Lab Code:	S9903531-003	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	11/19/99	620	
Benzene	EPA 5030	8021B	0.5	1	NA	11/19/99	100	
Toluene	EPA 5030	8021B	0.5	1	NA	11/19/99	9.7	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	11/19/99	4.1	
Xylenes, Total	EPA 5030	8021B	1	1	NA	11/19/99	21	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	1	NA	11/19/99	150	

Approved By: _____ Date: 11/30/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9903531
Project:	TO#24118.00 RAT#8/2111 SAN LEANDRO	**Date Collected:**	11/10/99
Sample Matrix:	Water	**Date Received:**	11/11/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-6(15)	Units:	ug/L (ppb)
Lab Code:	S9903531-004	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	11/19/99	ND	
Benzene	EPA 5030	8021B	0.5	1	NA	11/19/99	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	11/19/99	ND	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	11/19/99	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	11/19/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	1	NA	11/19/99	ND	

Approved By: _____ Date: 11/30/99

tS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9903531
Project:	TO#24118.00 RAT#8/2111 SAN LEANDRO	**Date Collected:**	11/10/99
Sample Matrix:	Water	**Date Received:**	11/11/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-2(17)	Units:	ug/L (ppb)
Lab Code:	S9903531-005	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	100	NA	11/19/99	56000	
Benzene	EPA 5030	8021B	0.5	100	NA	11/19/99	2400	
Toluene	EPA 5030	8021B	0.5	100	NA	11/19/99	5900	
Ethylbenzene	EPA 5030	8021B	0.5	100	NA	11/19/99	1500	
Xylenes, Total	EPA 5030	8021B	1	100	NA	11/19/99	10000	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	100	NA	11/19/99	17000	

Approved By: _____ Date: 11/30/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9903531
Project:	TO#24118.00 RAT#8/2111 SAN LEANDRO	**Date Collected:**	11/10/99
Sample Matrix:	Water	**Date Received:**	11/11/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-7(17)	Units:	ug/L (ppb)
Lab Code:	S9903531-006	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	5	NA	11/19/99	1500	
Benzene	EPA 5030	8021B	0.5	5	NA	11/19/99	340	
Toluene	EPA 5030	8021B	0.5	5	NA	11/19/99	19	
Ethylbenzene	EPA 5030	8021B	0.5	5	NA	11/19/99	13	
Xylenes, Total	EPA 5030	8021B	1	5	NA	11/19/99	20	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	200	NA	11/20/99	55000	

Approved By: _____ Date: 11/30/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9903531
Project:	TO#24118.00 RAT#8/2111 SAN LEANDRO	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S991118-WB1 GC 3	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	11/18/99	ND	
Benzene	EPA 5030	8021B	0.5	1	NA	11/18/99	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	11/18/99	ND	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	11/18/99	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	11/18/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	1	NA	11/18/99	ND	

Approved By: _____ Date: 11/30/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9903531
Project:	TO#24118.00 RAT#8/2111 SAN LEANDRO	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S991119-WB1 GC 6	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	11/19/99	ND	
Benzene	EPA 5030	8021B	0.5	1	NA	11/19/99	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	11/19/99	ND	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	11/19/99	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	11/19/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	1	NA	11/19/99	ND	

Approved By: _____ Date: 11/30/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9903531
Project:	TO#24118.00 RAT#8/2111 SAN LEANDRO	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S991120-WB1 GC 6	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	11/20/99	ND	
Benzene	EPA 5030	8021B	0.5	1	NA	11/20/99	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	11/20/99	ND	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	11/20/99	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	11/20/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	1	NA	11/20/99	ND	

Approved By: _____ Date: 11/30/99

tS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S9903531
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: 8021B CA/LUFT

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery a,a,a-Trifluorotoluene	Percent Recovery Fluorobenzene
MW-1(18)	S9903531-001		102	106
MW-4(17)	S9903531-002		100	105
MW-3(18)	S9903531-003		114	103
MW-6(15)	S9903531-004		106	96
MW-2(17)	S9903531-005		93	92
MW-7(17)	S9903531-006		103	102
Lab Control Sample	S991118-LCS GC 3		103	108
Dup Lab Control Sample	S991118-DLCS GC 3		102	111
Method Blank	S991118-WB1 GC 3		103	99
Method Blank	S991119-WB1 GC 6		93	93
Method Blank	S991120-WB1 GC 6		91	104

CAS Acceptance Limits: 69-116 60-140

Approved By: _____ Date: 11/30/99

SUR2/020397p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9903531
Project:	TO#24118.00 RAT#8/2111 SAN LEANDRO	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	11/18/99

Laboratory Control Sample/Duplicate Laboratory Control Sample Summary
BTEX and TPH as Gasoline

Sample Name:	Dup Lab Control Sample	Units:	ug/L (ppb)
Lab Code:	S991118-LCS GC 3 S991118-DLCS GC 3	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	True Value LCS	True Value DLCS	Result LCS	Result DLCS	Percent Recovery LCS	Percent Recovery DLCS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
Benzene	EPA 5030	8021B	50	50	46	46	92	92	75-135	<1	
Toluene	EPA 5030	8021B	50	50	45	44	90	88	73-136	2	
Ethylbenzene	EPA 5030	8021B	50	50	47	46	94	92	69-142	2	
Gasoline	EPA 5030	CA/LUFT	500	500	480	470	96	94	75-135	2	

Approved By: _____ Date: 11/30/99

DLCS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S9903531
Date Analyzed: 11/18/99

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	500	450	85-115	90	
Benzene	EPA 5030	8021B	50	47	85-115	94	
Toluene	EPA 5030	8021B	50	45	85-115	90	
Ethylbenzene	EPA 5030	8021B	50	47	85-115	94	
Xylenes, Total	EPA 5030	8021B	150	140	85-115	93	
Methyl *tert* -Butyl Ether	EPA 5030	8021B	50	51	85-115	102	

Approved By: _____ Date: 11/30/99

ICV/032196

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 24118.00 S990 3531

Chain of Custody

ARCO Facility no. 2111	City (Facility) San Leandro	Project manager (Consultant) Glen Vanderveen	Laboratory name CAS
ARCO engineer Paul Supple	Telephone no. (ARCO)	Telephone no. (Consultant) 408-453-7300	Fax no. (Consultant)
Consultant name Emcon	Address (Consultant) 2201 Broadway # 101 Oakland, CA 94612		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 (gas/BTEX only) EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	EPA 8260
mw-1 (18')	2	1		X		X	HCL	11-10-99	1220		X										
mw-4 (17')	2	2		X		X	HCL		1135		X										
mw-3 (18')	2	3		X		X	HCL		1205		X										
mw-6 (15')	2	4		X		X	HCL		1150		X										
mw-2 (17')	4	5		X		X	HCL		1300		X										X
mw-7 (17')	4	6		X		X	HCL		1320		X										X

Method of shipment: Sampler will deliver.

Special detection Limit/reporting: Lowest Possible.

Special QA/QC: AS Normal

Remarks: RAT 8
2-40mL HCL VOAS
#791655

Lab number

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

Condition of sample: R11 D2

Temperature received: DUE: 11/29/99 R11 D3 H

	Date	Time		Date	Time
Relinquished by sampler	11/11/99		Received by Brian Fuller	11/11/99	10:30
Relinquished by			Received by		
Relinquished by			Received by laboratory		

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant
APC-3292 (2-91)

Columbia Analytical Services INC.
An Employee-Owned Company

November 23, 1999

Service Request No.: S9903532

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

RECEIVED
NOV 29 1999
BY:

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 November 11, 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 8, 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: 2352, expiration: January 31, 2001).

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

Respectfully submitted,

Columbia Analytical Services, Inc.

Bernadette Troncales
Project Chemist

Greg Jordan
Laboratory Director

COLUMBIA ANALYTICAL SERVICES, Inc.

Acronyms

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9903532
Project:	TO#24118.00 RAT#8/2111 SAN LEANDRO	**Date Collected:**	11/10/99
Sample Matrix:	Water	**Date Received:**	11/11/99

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-5(16)	Units:	ug/L (ppb)
Lab Code:	S9903532-001	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	11/19/99	130	
Benzene	EPA 5030	8021B	0.5	1	NA	11/19/99	2.0	
Toluene	EPA 5030	8021B	0.5	1	NA	11/19/99	7.0	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	11/19/99	1.3	
Xylenes, Total	EPA 5030	8021B	1	1	NA	11/19/99	21	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	20	NA	11/19/99	5000	

Approved By: _____ Date: 11/23/99

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9903532
Project:	TO#24118.00 RAT#8/2111 SAN LEANDRO	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S991119-WB1 GC 6	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	11/19/99	ND	
Benzene	EPA 5030	8021B	0.5	1	NA	11/19/99	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	11/19/99	ND	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	11/19/99	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	11/19/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	1	NA	11/19/99	ND	

Approved By: _____ Date: 11/23/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9903532
Project:	TO#24118.00 RAT#8/2111 SAN LEANDRO	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S991119-WB1 GC3	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	11/19/99	ND	
Benzene	EPA 5030	8021B	0.5	1	NA	11/19/99	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	11/19/99	ND	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	11/19/99	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	11/19/99	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	1	NA	11/19/99	ND	

Approved By: _____ Date: 11/23/99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S9903532
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: 8021B CA/LUFT

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery 4-Bromofluorobenzene	Percent Recovery a,a,a-Trifluorotoluene
MW-5(16)	S9903532-001		107	96
Lab Control Sample	S991119-LCS GC 6		95	101
Dup Lab Control Sample	S991119-DLCS GC 6		83	120
Method Blank	S991119-WB1 GC 6		93	93
Method Blank	S991119-WB1 GC3		98	96

CAS Acceptance Limits: 69-116 72-139

Approved By: _____ Date: 11/23/99

SUR2/020397p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S9903532
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 11/19/99

Laboratory Control Sample/Duplicate Laboratory Control Sample Summary
BTEX and TPH as Gasoline

Sample Name: Dup Lab Control Sample
Lab Code: S991119-LCS GC (S991119-DLCS GC 6
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	True Value LCS	True Value DLCS	Result LCS	Result DLCS	Percent Recovery LCS	Percent Recovery DLCS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
Benzene	EPA 5030	8021B	25	25	27	24	108	96	75-135	12	
Toluene	EPA 5030	8021B	25	25	24	24	96	96	73-136	<1	
Ethylbenzene	EPA 5030	8021B	25	25	24	24	96	96	69-142	<1	
Gasoline	EPA 5030	CA/LUFT	250	250	240	250	96	100	75-135	4	

Approved By: _____ Date: 11/23/99

DLCS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S9903532
Date Analyzed: 11/19/99

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	250	85-115	100	
Benzene	EPA 5030	8021B	25	28	85-115	112	
Toluene	EPA 5030	8021B	25	27	85-115	108	
Ethylbenzene	EPA 5030	8021B	25	28	85-115	112	
Xylenes, Total	EPA 5030	8021B	75	85	85-115	113	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	25	27	85-115	108	

Approved By: _____ Date: 11/23/99

ICV/032196

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 74118.00 S990 3532

Chain of Custody

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

Method of shipment: Sampler will deliver

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH(gas) EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐
MW-5(16')		2	(1)	X		X	HCl	11/10/99	1240		X									

Special detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: RAT 8
2-40ml HCl
VOAs
#79655

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: 11/25/99	R11 D3-H
Relinquished by sampler	Date 11/11/99 Time 0830	Received by Bruce Pulla	11/11/99 10:30
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory	Date Time

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant

APC-3292 (2-91)

APPENDIX C

FIELD DATA SHEETS

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : **792219** STATION ADDRESS : **1156 Davis Street, San Leandro** DATE : **11/10/99**

ARCO STATION # : **2111** FIELD TECHNICIAN : **Manuel Gallegos** DAY : **Wednesday**

DTW Order	WELL ID	Well Box Seal Condition	Type Of Well Lid	Gasket Present	Lock Number	Type Of Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-1	BAD	3/4"	YES	3490	LWC	17.77	17.77	ND	NR	26.0	Put lock 3600/LWC Needs new LID
2	MW-4	BAD	3/4"	YES	3490	LWC	16.02	16.02			21.6	Needs new LID
3	MW-3	BAD	3/4"	YES	3490	LWC	17.37	17.37			26.5	needs new LID
4	MW-6	ok	9/16"	YES	3490	LWC	14.92	14.92			24.8	
5	MW-5	ok	9/16"	YES	3616	LWC	15.52	15.52			23.6	
6	MW-2	BAD	3/4"	YES	3490	LWC	16.08	16.08			26.3	Needs new LID
7	MW-7	ok	9/16"	YES	Dolphin	LWC	16.76	16.76	↓	↓	26.9	

SURVEY POINTS ARE TOP OF WELL CASINGS

RECEIVED
JAN 12 2000
BY:

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

EMCON

PROJECT NO : 792219 | SAMPLE ID : MW-1 (18)

PURGED BY : Manuel Gallegos | CLIENT NAME : ARCO #2111

SAMPLED BY : Manuel Gallegos | LOCATION : San Leandro, California

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

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

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

DEPTH OF WELL (feet) : 26.0 | CALCULATED PURGE (gal.) : ____

DEPTH OF WATER (feet) : 17.77 | ACTUAL PURGE VOL. (gal.) : ✓

DATE PURGED : 11/10/99 | END PURGE : —

DATE SAMPLED : 11/10/99 | SAMPLING TIME : 1220

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1220	GRAB	6.41	752	69.2	clear	clear

OTHER: Dissolved Oxygen= 0.30 | ODOR: slight | N/A (COBALT 0-100) | N/A (NTU 0-200)

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

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)

____ Centrifugal Pump ____ Bailer (PVC)

____ Submersible Pump ____ Bailer (Stainless Steel)

____ Well WizardÔ ____ Dedicated

Other: ____

SAMPLING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)

____ Bomb Sampler ____ Bailer (Stainless Steel)

____ Dipper ____ Submersible Pump

____ Well WizardÔ ____ Dedicated

Other: Disposable Teflon Bailer

WELL INTEGRITY: OK | LOCK: 3500

REMARKS: all samples taken

pH, E.C., Temp. Meter Calibration: Date: 11/10/99 | Time: ____ | Meter Serial No.: 87m

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

Temperature °F ____

SIGNATURE: [signature] | REVIEWED BY: MS | PAGE 1 OF 7

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

EMCON

PROJECT NO : 792219 | SAMPLE ID : MW-2 (7')

PURGED BY : Manuel Gallegos | CLIENT NAME : ARCO #2111

SAMPLED BY : Manuel Gallegos | LOCATION : San Leandro, California

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

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

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

DEPTH OF WELL (feet) : 26.3 | CALCULATED PURGE (gal.) : ____

DEPTH OF WATER (feet) : 16.08 | ACTUAL PURGE VOL. (gal.) : ____

DATE PURGED : 11/10/99 | END PURGE : ____

DATE SAMPLED : 11/10/99 | SAMPLING TIME : (1200) 1300

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1300	GRAB	6.52	755	70.4	Clear	Light

OTHER: Dissolved Oxygen= 0.41 | ODOR: Strong | N/A (COBALT 0-100) | N/A (NTU 0-200)

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

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

WELL INTEGRITY: OK | LOCK: Envirocap

REMARKS: all samples taken

pH, E.C., Temp. Meter Calibration: Date: 11/10/99 | Time: ____ | Meter Serial No.: 8700

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

Temperature °F ____

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

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

EMCON

PROJECT NO : 792219 | SAMPLE ID : MW-3 (18)

PURGED BY : Manuel Gallegos | CLIENT NAME : ARCO #2111

SAMPLED BY : Manuel Gallegos | LOCATION : San Leandro, California

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

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

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

DEPTH OF WELL (feet) : 26.5 | CALCULATED PURGE (gal.) : ↓

DEPTH OF WATER (feet) : 17.37 | ACTUAL PURGE VOL. (gal.) : ↓

DATE PURGED : 11/10/99 | END PURGE : ____

DATE SAMPLED : 11/10/99 | SAMPLING TIME : 1205

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1205	GRAB	6.50	753	69.3	clear	clear

OTHER: Dissolved Oxygen= 0.24 | ODOR: none | N/A (COBALT 0-100) | N/A (NTU 0-200)

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

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)

____ Centrifugal Pump ____ Bailer (PVC)

____ Submersible Pump ____ Bailer (Stainless Steel)

____ Well WizardÔ ____ Dedicated

Other: ____

SAMPLING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)

____ Bomb Sampler ____ Bailer (Stainless Steel)

____ Dipper ____ Submersible Pump

____ Well WizardÔ ____ Dedicated

Other: Disposable Teflon Bailer

WELL INTEGRITY: OK | LOCK: 3490

REMARKS: all samples taken

pH, E.C., Temp. Meter Calibration: Date: 11/10/99 | Time: ____ | Meter Serial No.: 873

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

Temperature °F ____

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

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

EMCON

PROJECT NO : 792219 | SAMPLE ID : MW-4 (17')

PURGED BY : Manuel Gallegos | CLIENT NAME : ARCO #2111

SAMPLED BY : Manuel Gallegos | LOCATION : San Leandro, California

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

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

CASING ELEVATION (feet/MSL) : N/A | VOLUME IN CASING (gal.) : 4.1

DEPTH OF WELL (feet) : 21.6 | CALCULATED PURGE (gal.) : ↓

DEPTH OF WATER (feet) : 16.02 | ACTUAL PURGE VOL. (gal.) : ↓

DATE PURGED : 11/10/99 | END PURGE : ——

DATE SAMPLED : 11/10/99 | SAMPLING TIME : 1135

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1135	4.1	6.09	813	67.4	clear	clear

OTHER: Dissolved Oxygen= 0.28 | ODOR: slight | N/A (COBALT 0-100) | N/A (NTU 0-200)

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

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

WELL INTEGRITY: OK | LOCK: 3490

REMARKS: all Samples taken

pH, E.C., Temp. Meter Calibration: Date: 11/10/99 | Time: 1125 | Meter Serial No.: 87M

E.C. 1000 1051 / 1053 | pH 7 656 / 703 | pH 10 1006 / 1003 | pH 4 396 / 403

Temperature °F 64.7

SIGNATURE [signature] | REVIEWED BY MJ | PAGE 4 OF 7

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

EMCON

PROJECT NO : 792219 | SAMPLE ID : MW-5 (6')

PURGED BY : Manuel Gallegos | CLIENT NAME : ARCO #2111

SAMPLED BY : Manuel Gallegos | LOCATION : San Leandro, California

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

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

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

DEPTH OF WELL (feet) : 22.6 | CALCULATED PURGE (gal.) : ____

DEPTH OF WATER (feet) : 15.52 | ACTUAL PURGE VOL. (gal.) : ____

DATE PURGED : 11/10/99 | END PURGE : ____

DATE SAMPLED : 11/10/99 | SAMPLING TIME : 1240

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1240	GRAB	6.51	755	69.3	Clear	Clear

OTHER: Dissolved Oxygen= 0.21 | ODOR: none | N/A (COBALT 0-100) | N/A (NTU 0-200)

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

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)

____ Centrifugal Pump ____ Bailer (PVC)

____ Submersible Pump ____ Bailer (Stainless Steel)

____ Well WizardÔ ____ Dedicated

Other: ____

SAMPLING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)

____ Bomb Sampler ____ Bailer (Stainless Steel)

____ Dipper ____ Submersible Pump

____ Well WizardÔ ____ Dedicated

Other: Disposable Teflon Bailer

WELL INTEGRITY: OK | LOCK: 3616

REMARKS: all samples taken

pH, E.C., Temp. Meter Calibration: Date: 11/10/99 | Time: ____ | Meter Serial No.: 87M

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

Temperature °F ____

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

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

EMCON

PROJECT NO : 792219 | SAMPLE ID : MW-6 (15)'

PURGED BY : Manuel Gallegos | CLIENT NAME : ARCO #2111

SAMPLED BY : Manuel Gallegos | LOCATION : San Leandro, California

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

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

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

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

DEPTH OF WATER (feet) : 14.92 | ACTUAL PURGE VOL. (gal.) : ✓

DATE PURGED : 11/10/99 | END PURGE : ____

DATE SAMPLED : 11/10/99 | SAMPLING TIME : 1150

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1150	6 2/3	6.49	802	69.1	Clear	Clear

OTHER: Dissolved Oxygen= 0.31 | ODOR: None | N/A (COBALT 0-100) | N/A (NTU 0-200)

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

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

WELL INTEGRITY: OK | LOCK: 3490

REMARKS: all Samples taken

pH, E.C., Temp. Meter Calibration: Date: 11/10/99 | 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

EMCON

PROJECT NO : 792219 | SAMPLE ID : MW-7 (17'

PURGED BY : Manuel Gallegos | CLIENT NAME : ARCO #2111

SAMPLED BY : Manuel Gallegos | LOCATION : San Leandro, California

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

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

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

DEPTH OF WELL (feet) : 26.9 | CALCULATED PURGE (gal.) : ____

DEPTH OF WATER (feet) : 16.76 | ACTUAL PURGE VOL. (gal.) : ____

DATE PURGED : 11/10/99 | END PURGE : ____

DATE SAMPLED : 11/10/99 | SAMPLING TIME : 1320

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1320	GRAB	6.52	949	71.2	cloudy	clear

OTHER: Dissolved Oxygen= 0.37 | ODOR: moderate | N/A (COBALT 0-100) | N/A (NTU 0-200)

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

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)

____ Centrifugal Pump ____ Bailer (PVC)

____ Submersible Pump ____ Bailer (Stainless Steel)

____ Well WizardÔ ____ Dedicated

Other: ____

SAMPLING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)

____ Bomb Sampler ____ Bailer (Stainless Steel)

____ Dipper ____ Submersible Pump

____ Well WizardÔ ____ Dedicated

Other: Disposable Teflon Bailer

WELL INTEGRITY: OK | LOCK: Dolphin

REMARKS: all samples taken

pH, E.C., Temp. Meter Calibration: Date: 11/10/99 | Time: ____ | Meter Serial No.: ____

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

Temperature °F ____

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

EMCON Associates - Field Services | Historical Monitoring Well Data

1921 Ringwood Avenue | 1999 | ARCO 2111

San Jose, California | #792219

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-1	First	01/28/99	0.00	GRAB	NO	
	Second	06/25/99	0.00	GRAB	NO	
	Third	08/25/99	0.00	GRAB	NO	
	Fourth	11/10/99	0.00	GRAB	NO	
MW-2	First	01/28/99	0.00	GRAB	NO	
	Second	06/25/99	0.00	GRAB	NO	
	Third	08/25/99	0.00	GRAB	NO	
	Fourth	11/10/99				
MW-3	First	01/28/99	0.00	GRAB	NO	
	Second	06/25/99	0.00	GRAB	NO	
	Third	08/25/99	0.00	GRAB	NO	
	Fourth	11/10/99				
MW-4	First	01/28/99	0.00	GRAB	NO	
	Second	06/25/99	0.00	GRAB	NO	
	Third	08/25/99	0.00	GRAB	NO	
	Fourth	11/10/99				
MW-5	First	01/28/99	0.00	GRAB	NO	
	Second	06/25/99	0.00	GRAB	NO	
	Third	08/25/99	0.00	GRAB	NO	
	Fourth	11/10/99				
MW-6	First	01/28/99	0.00	GRAB	NO	
	Second	06/25/99	0.00	GRAB	NO	
	Third	08/25/99	0.00	GRAB	NO	
	Fourth	11/10/99				
MW-7	First	01/28/99	0.00	GRAB	NO	
	Second	06/25/99	0.00	GRAB	NO	
	Third	08/25/99	0.00	GRAB	NO	
	Fourth	11/10/99				
						Steam water (gal)

FLOATING PRODUCT RECOVERY CHART

EMCON
1921 Ringwood Avenue
San Jose, California 95131
(408) 453-7300

PROJECT:

LOCATION :

DATE: 11-10-99

CLIENT :

SAMPLER: Manny Gallegos

DAY OF WEEK: Wednesday

WELL ID	DTW (FT)	DTFP (FT)	FP THICK	TIME	AMOUNT OF PRODUCT RECOVERED (gal)	COMMENTS
MW-2	16.08	ND	ND	11:10	N/A	

Signature

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 24118.00

Chain of Custody

ARCO Facility no. 2111	City (Facility) San Leandro	Project manager (Consultant) Glen Vanderveen	Laboratory name CAS
ARCO engineer Paul Supple	Telephone no. (ARCO)	Telephone no. (Consultant) 408-453-7300	Fax no. (Consultant)	Contract number
Consultant name Emcon	Address (Consultant) 2201 Broadway # 101 Oakland, CA 94612		Method of shipment Sampler will deliver.

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH gasoline EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	OXYGENATES EPA - 8260
mw-1(18')		2		X		X	HCL	11-10-99	1220		X										
mw-4(17')		2		X		X	HCL		1135		X										
mw-3(18')		2		X		X	HCL		1205		X										
mw-6(15')		2		X		X	HCL		1150		X										
mw-2(17')		4		X		X	HCL		1300		X										X
mw-7(17')		4		X		X	HCL	↓	1320		X										X

Special detection Limit/reporting: Lowest Possible.

Special QA/QC: As Normal

Remarks: RAT 8
2.40mL HCL
VOAS

#791655

Lab number

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

Condition of sample:		Temperature received:	
Relinquished by sampler	Date 11/11/99 Time	Received by Brian Fuller 11/11/99 10:30	
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

ARC-3292 (2-91)

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 24119.00

Chain of Custody

ARCO Facility no. 2111	City (Facility) San Leandro	Project manager (Consultant) Glen Vonderveen	Laboratory name CAS
ARCO engineer Paul Supple	Telephone no. (ARCO)	Telephone no. (Consultant) (408) 453-7300	Fax no. (Consultant) (408) 437-9526
Consultant name EMCON	Address (Consultant) 2201 Broadway #101 Oakland, CA 94612		Contract number

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 #(GC/MS) EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
MW-5 (16)		2		X		X	HCL	11/10/99	1240		X											

Method of shipment: Sampler will deliver

Special detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: RAT 8
2 - 40ml HCL
VOAs
79655

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 11/11/99 Time 0830	Received by Bruce Fulk	11/11/99 10:30
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

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