

December 21, 2001

3164 Gold Camp Drive Suite 200 Rancho Cordova, CA 95670-6021 U.S A 916/638-2085 FAX: 916/638-8385

3 My Roman Day

Mr. Amir Gholami, REHS Hazardous Materials Specialist Alameda County Health Care Services 1131 Harbor Bay Parkway, Suite 250 Alameda, CA 94502-6577

Subject: Schedule for Proposed Dual-Phase High Vacuum Pilot Test and Site Groundwater

Remediation

ARCO Station No. 2111 1156 Davis Street San Leandro, California Delta Project No. D000-306

Dear Mr. Gholami:

On behalf of ARCO, Delta Environmental Consultants, Inc. (Delta) is presenting a schedule for the proposed 5-day high vacuum dual-phase extraction (HVDPE) test previously recommended in Delta's letter dated November 1, 2001. The test was originally scheduled to commence on December 17, 2001 and run through December 21, 2001. However, due to last minute and unforeseen circumstances that the equipment vendor (Solleco) experienced, the test had to be postponed. The test has been rescheduled to commence on January 7, 2002 and run through January 11, 2002.

To increase natural attenuation of dissolved petroleum hydrocarbons in the groundwater, an oxygen release compound (ORC® by Renesis Inc.) has been scheduled for installation in MW-1 and MW-5 during the month of December 2001. Impacted groundwater in MW-2 and MW-7 will continue to be addressed by monthly liquid phase hydrocarbons checks and bailing until the new HVDPE testing has been evaluated.

Due to the close proximity of the proposed HVDPE test scheduled for early January 2002, the fourth quarter 2001 pump-out event of MW-2 and MW-7, normally scheduled to occur in December 2001, has been rescheduled for the first quarter of 2002.

If you have any questions concerning this project, please contact me at (916) 536-2613.

Sincerely,

DELTA ENVIRONMENTAL CONSULTANTS, INC.

Project Manager

SWM (CL010.306.doc)

Steven W. Meeks, P.E.

Attachments

cc: Mr. Paul Supple - ARCO

Mr. Mike Bakaldin – San Leandro Fire Department - HAZMAT Division



December 21, 2001

3164 Gold Camp Drive Suite 200 Rancho Cordova, CA 95670-6021 U.S.A. 916/638-2085 FAX: 916/638-8385

Mr. Robert Cave
Bay Area Air Quality Management District
939 Ellis Street
San Francisco, California 94109

Subject: Request for Approval of 5-Day Dual-Phase High Vacuum Pilot Test

ARCO Station No. 2111 1156 Davis Street San Leandro, California Delta Project No. D000-306

Dear Mr. Cave:

At the request of ARCO, Delta Environmental Consultants, Inc. (Delta) is requesting your approval of a 5-day dual-phase high vacuum pilot test at the subject site (Figure 1). The test is being performed to obtain pertinent design information for a potential future remediation system. The test is scheduled to start on January 7, 2002 and run continuously for 5 days through January 11, 2002.

The test will consist of connecting a mobile dual-phase high vacuum thermal oxidizer unit up to existing under ground piping that terminates to wells V-2 and MW-7. The mobile unit consists of a Solleco 20 HP oil scaled 350 CFM MTS propane fired thermal oxidizer. Electricity will be supplied with a 45 KVA diesel powered generator. Depending upon daily test results, other wells may be tested during the event. Extracted soil vapors will be treated by the thermal oxidizer prior to atmospheric discharge. Extracted ground water will be stored on-site in a 21,000 gallon closed top Baker tank for disposal by an ARCO approved hauler. At a minimum, influent and effluent vapor samples will be collected at startup and at the conclusion of the test. Daily field readings will be collected by FID or PID calibrated to either methane or hexane. Vapor samples will be collected and submitted to a California-certified analytical laboratory for analyses of BTEX and TPH as gasoline using EPA methods 8020 and 8015 modified, respectively. Vapor flow rates will be measured daily.

If you have any questions regarding the information presented in this letter please contact me at (916) 536-2613.

Sincerely,

DELTA ENVIRONMENTAL CONSULTANTS, INC.

Steven W. MedRa PE Project Manager

SWM (CL009.306)

Enclosures

cc: Mr. Paul Supple, ARCO

Mr. Mike Bakaldin – San Leandro Fire Department - HAZMAT Division Mr. Amir Gholami – Alameda County Health Care Services Agency

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



May 3, 2000 Project 800032

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

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Re: High Vacuum Extraction Pilot Test Report for ARCO Service Station No. 2111, 917 hoo

Located at 1156 Davis Street, San Leandro, California

Dear Mr. Supple:

IT Corporation (IT) has prepared this letter to present the results of the High Vacuum Extraction (HVE) Pilot Test, conducted at ARCO Service Station No. 2111, located at 1156 Davis Street, San Leandro, California (Figure 1). The HVE Pilot Test was conducted from November 15 to November 19, 1999. The objective of the Test was to assess HVE as a remedial alternative for ARCO Service Station No. 2111, and other sites with similar lithology. Additionally, the HVE Pilot Test was conducted to provide five days interim petroleum hydrocarbon mass removal. The HVE system is designed to extract both soil vapors and groundwater. Dewatering the formation to expose previously saturated sediments to a vacuum enhances soil vapor extraction. Following is a description of the test, an evaluation of the collected data, conclusions, and recommendations.

#### DESCRIPTION

EnviroSupply & Service was retained to provide the equipment and instrumentation to conduct the HVE Pilot Test. A 5-horsepower high vacuum pump was used to extract petroleum hydrocarbon-laden soil vapors and groundwater from monitoring well MW2. The extracted soil vapors were abated using a 100-cubic feet per minute (cfm) catalytic oxidizer. A 40-kilowatt diesel generator was used to power the pump and oxidizer. Five 550-gallon Baker tanks were used for storing the extracted groundwater.

As the test was designed, the highest possible vacuum, approximately 100 inches of H2O. was applied to MW2 (Figure 2). However, due to higher than anticipated water production rates from MW2 and the limitations of the knockout tank transfer pump, the applied vacuum was decreased to 62.5 inches of H2O. This vacuum was maintained for the duration of the test. After the test was completed, the vacuum was increased to extract additional groundwater to fill the remaining capacity in the Baker tanks.

Mr. Paul Supple May 3, 2000 Page 2

The oxidizer was configured to maintain a 600°F minimum operating temperature to abate the petroleum hydrocarbon vapors. Dilution air was adjusted as necessary to prevent a high temperature shutdown. The oxidizer influent and effluent air streams were periodically measured for petroleum hydrocarbon concentration to assess destruction efficiency, using a Photo-Ionization Detector (PID).

Extracted groundwater and vapor samples were collected for chemical analysis at predetermined intervals from the remediation system to assess the site and system performance. Refer to Table 1 and Table 3 for sample intervals. All samples were analyzed by Columbia Analytical Services (CAS), a state-certified laboratory, for TPHg by EPA Method 8015M, BTEX by EPA Method 8021B, and fuel oxygenates by EPA Method 8260 (groundwater only). Extracted groundwater was monitored for electrical conductivity, pH, and dissolved oxygen in the field.

Depth-to-Water (DTW) and induced vacuum were measured during the test to determine the influence of the applied vacuum. Monitoring wells MW1, V1, V2, V3, and V4 were equipped with magnehelic gauges for measuring induced vacuum. DTW measurements were collected from monitoring wells MW1, MW3, MW4, MW7, V1, V2, V3, and V4. The wellhead connection for the HVE system prevented MW2 DTW monitoring during the test; therefore, MW2 well recovery information was collected instead.

### **DATA EVALUATION**

# Liquid Phase

Six extracted groundwater samples were collected over the five-day test period. Two samples were collected on the first day, just after startup and at the end of the day. One sample was collected daily thereafter. Table 1 presents the analytical results of the extracted groundwater samples. Additionally, Table 1 shows analytical results from the MW2 fourth quarter 1999 sampling event (used as a baseline) and the MW2 first quarter 2000 sampling event (used to gauge effectiveness).

The analytical results show that concentrations of petroleum hydrocarbons exhibit a decreasing trend through the duration of the test. However, petroleum hydrocarbon concentrations increased slightly in the groundwater sample from GW6 collected during the final day of the test. This increase may be attributed to the variability of petroleum hydrocarbon concentrations in the groundwater, or may indicate the radius of influence intercepted a zone of higher petroleum hydrocarbon concentrations.

Mr. Paul Supple May 3, 2000 Page 3

Analytical results from the first quarter 2000 sampling event indicate that TPHg and BTEX concentrations remain consistent with the concentrations measured at the end of the test. However, MtBE and tBA concentrations increased above the baseline concentrations. This increase may be attributed to the affinity of both constituents for the liquid-phase (high water solubility, low retardation factor), and the mobilization of the constituents in groundwater during the HVE Pilot Test. Furthermore, a sheen of free product was observed in MW7 during the first quarter 2000 sampling event.

Mass removal was calculated using the extracted groundwater analytical data and the extracted volume of groundwater between sampling periods. Mass removed, in pounds, was calculated using the following equation:

Mass, lbs = (Concentration, ug/L)
$$(10^{-6} \text{ g/ug})(2.2 \times 10^{-3} \text{ lbs/g})(3.785 \text{ L/gal})(\text{Volume, gal})$$

Table 2 presents the mass removal data. The mass removal rate does not exhibit a similar decreasing trend as the concentration data due to the variations in the extracted water rate. The constant applied vacuum did not produce a constant groundwater extraction flow rate. The total mass removed from the liquid phase by the HVE Pilot Test system was 0.262 lbs, 0.117 lbs, 0.195 lbs, and 0.183 lbs of TPHg, BTEX, MtBE, and tBA, respectively.

On December 7, 1999, a Vac Truck was used to off-haul and dispose of the extracted groundwater stored in the Baker tanks. After emptying the Baker tanks, the Vac truck was used to extract additional groundwater from MW2 and MW7, until the truck reached its capacity. An estimated 1400-gallons of water was extracted from the two wells. Table 2 includes a mass removal calculation for this event. Analytical results from the last groundwater sample (GW6) are used for this calculation.

### Vapor Phase

Six influent vapor samples were collected over the five-day test period. Two samples were collected on the first day, just after startup and at the end of the day. One sample was collected daily thereafter. Table 3 presents the analytical results of the influent samples.

Analytical results of these vapor samples show a similar trend to the groundwater data with decreasing concentrations and a slight increase on the last day. As previously discussed, this increase may be attributed to the variability of petroleum hydrocarbon concentrations in the extracted vapor over the last days of the test, or may signify the beginning of test influence on a discrete area of contamination.

Mass removal was calculated using the extracted vapor analytical data, and the associated air flow and time between sampling periods. Mass removed, in pounds, was calculated using the following equation:

Mass, lbs = [(Flow, cfm)(Concentration, ppmv)(MW, g/mole)(Time, min)(28.3 L/cf)] / [(106)(24.45 moles/L)(453.6 g/lb)]

Table 4 presents the mass removal data. The mass removal does not reflect the same decreasing trend as the concentration data due to the variable air flow rate and time interval between samples. The air flow rate will vary with the varying rate of extracted groundwater. The total mass removed from the vapor phase by the HVE Pilot Test system was 34.6 lbs, 2.73 lbs, and 0.828 lbs of TPHg, BTEX, and MtBE, respectively.

# **Influence Monitoring**

Table 5 presents the monitoring well data. Most of the data showed negligible influence (vacuum pressure) from the applied vacuum on MW2. Monitoring wells V1 and V2 were within the closest proximity of MW2. V1 never showed any influence. V2 showed no influence until the fourth day of the test when 0.7 inches of mercury (Hg) vacuum was observed. V3 showed the only considerable influence with daily induced vacuum measurements of 0.5, 1.35, 1.6, and 1.3 inches of Hg.

No significant change of depth-to-water in the monitoring wells was observed. Additionally, rainfall during the test may have effected observable water elevation changes. No significant change of depth-to-water in MW2 during recovery was observed.

### CONCLUSIONS

### Mass Removal

The HVE system removed 34.9, 2.85, and 1.02 pounds of TPHg, BTEX, and MtBE, respectively. As suggested by Tables 2 and 4, soil vapor extraction is a more efficient means of extracting petroleum hydrocarbons than groundwater extraction. Furthermore, the cost of storing, treating, and disposing the extracted groundwater exceeds the cost of operating the catalytic oxidizer on an equivalent extracted mass basis.

# **HVE System**

As previously discussed, higher than anticipated water production from MW2 was experienced during the HVE Pilot Test. Figure 3 presents a geologic cross section (A-A') from an EMCON Soil and Water Investigation (9/16/1996). Although the formation is mostly clay, this cross section shows a sand lens at the bottom of MW2. This sand lens may be a source of groundwater recharge to MW2.

HVE systems are typically used for remediating low permeability formations with limited groundwater. The high vacuum dewaters the area, which enhances soil vapor extraction. However, if the formation does not dewater, then a HVE system becomes inefficient and not cost-effective. The high vacuum is expended dewatering the formation, limiting soil vapor extraction.

The observation well monitoring data suggests that soil vapor extraction only occurred within close proximity of the test well, which may be attributed to the additional energy required from the blower to dewater the area. With the high recharge rates at MW2, the blower is primarily utilized as a groundwater pump, at an excessive capital and energy cost relative to using a groundwater pump. Additionally, the higher groundwater production rates complicate design issues and increase costs substantially for storage, treatment, and disposal. The results of this HVE test indicate that the HVE system is neither an efficient or cost-effective remedial alternative for the site.

#### RECOMMENDATIONS

Based on the data collected during the HVE Pilot Test and the first quarter 2000 monitoring event, IT recommends continued monitoring to assess the extent of contamination and the effect of the HVE Pilot Test. Furthermore, IT recommends interim remediation by quarterly batch extraction from monitoring well MW2 and/or MW7 using a Vac truck, if the data from continued monitoring warrants.

uso well MW2 and/or with the data from continued monitoring warrants.

If you have any questions, please call Dan Lescure at (510) 740-5800.

Sincerely,

IT Corporation

Project Engineer

Stephen Lofholm, R.G.

Project Manager

Attachments: Table 1

Extracted Groundwater Analytical Data

Table 2 Mass Removal from Groundwater Table 3 Table 4

Extracted Vapor Analytical Data Mass Removal from Vapor Phase

Table 5 Field Data Sheet-Monitoring Well Data Figure 1 Site Location

Figure 2 Site Plan

Figure 3 EMCON Geologic Cross Section A-A'

Appendix A Certified Analytical Reports and Chain-of-Custody Documentation

Appendix B Field Data Sheets

Mr. Amir Gholami, Alameda County Health Care Services Agency cc:

Mr. Robert Cave, Bay Area Air Quality Management District

Mr. Steve Meeks, Delta Environmental

# Table 1 High Vacuum Extraction Pilot Test Extracted Groundwater Analytical Data

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

							1
Sample No. (ID#)	TPHg (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylene (ug/L)	MtBE <sup>1</sup> (ug/L)	tBA <sup>2</sup> (ug/L)
MW2 <sup>3</sup>	56000	2400	5900	1500	10000	21000	<25000
GW1	33000	1300	4500	890	4700	18000	<25000
GW2	30000 5500	14000 260	1200 620	4400 74	760 980	14000 5700	<10000 <5000
GW4	4700	200	500	38	830	3700	410
GW5 GW6	230 1500	5.2 36	18 120	2.9 28	46 160	2100 3100	340 <2500
	*	<u> </u>			21	55000	<50000
	GW1 GW2 GW3 GW4 GW5 GW6	MW2³     56000       GW1     33000       GW2     30000       GW3     5500       GW4     4700       GW5     230       GW6     1500	(ID#)         (ug/L)         (ug/L)           MW2³         56000         2400           GW1         33000         1300           GW2         30000         14000           GW3         5500         260           GW4         4700         200           GW5         230         5.2           GW6         1500         36	MW2³         56000         2400         5900           GW1         33000         1300         4500           GW2         30000         14000         1200           GW3         5500         260         620           GW4         4700         200         500           GW5         230         5.2         18           GW6         1500         36         120	MW2³         56000         2400         5900         1500           GW1         33000         1300         4500         890           GW2         30000         14000         1200         4400           GW3         5500         260         620         74           GW4         4700         200         500         38           GW5         230         5.2         18         2.9	MW2³         56000         2400         5900         1500         10000           GW1         33000         1300         4500         890         4700           GW2         30000         14000         1200         4400         760           GW3         5500         260         620         74         980           GW4         4700         200         500         38         830           GW5         230         5.2         18         2.9         46           GW6         1500         36         120         28         160	MW2³         56000         2400         5900         1500         10000         21000           GW1         33000         1300         4500         890         4700         18000           GW2         30000         14000         1200         4400         760         14000           GW3         5500         260         620         74         980         5700           GW4         4700         200         500         38         830         3700           GW5         230         5.2         18         2.9         46         2100           GW6         1500         36         120         28         160         3100

MtBE and tBA analysis by EPA Method 8260

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

11/10/99 data from 1999 4th Quarter Sampling Event (Baseline)

02/09/99 data from 2000 1st Quarter Sampling Event

# Table 2 High Vacuum Extraction Pilot Test Mass Removal from Groundwater

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

								<del></del>	
Date (mm/dd/yy)	Volume (gal)	Sample No. (ID#)	TPHg (lbs) <sup>3</sup>	Benzene (lbs)	Toluene (lbs)	hylbenze (lbs)	Xylene (lbs)	MtBE (lbs)	tBA <sup>2</sup> (lbs)
								<b>V</b>	
11/15/99	395.2	GW1	0.109	0.004	0.015	0.003	0.015	0.059	0.082
11/16/99	346.3	GW2	0.087	0.040	0.003	0.013	0.002	0.040	0.029
11/17/99	631.5	GW3	0.029	0.001	0.003	0.000	0.005	0.030	0.026
11/18/99	281.1	GW4	0.011	0.000	0.001	0.000	0.002	0.009	0.001
11/19/99	77.4	GW5	0.000	0.000	0.000	0.000	0.000	0.001	0.000
11/19/99	757.8	GW6	0.009	0.000	0.001	0.000	0.001	0.020	0.016
12/07/99	1400	GW6	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

MtBE and tBA analysis by EPA Method 8260

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

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

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

# Table 3 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)
11/15/99	V1	1900	21	58	12	44	58
11/15/99	V2	2200	24	69	14	51	61
11/16/99	V3	1400	13	48	10	37	50
11/17/99	V4	760	3.4	23	5.5	20	28
11/18/99	V5	590	7.8	22	4.8	18	31
11/19/99	V6	830	7.2	29	7.1	25	NA

Table 4
High Vacuum Extraction Pilot Test
Mass Removal from Vapor

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

Date	Air Flow	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MtBE
(mm/dd/yy)	(cfm)	(lbs) <sup>1</sup>	(lbs)	(lbs)	(lbs)	(lbs)	(lbs)
11/15/99	22	1.06	0.010	0.031	0.008	0.028	0.030
11/15/99	23.5	4.51	0.040	0.137	0.032	0.028	0.030
11/16/99	10.9	3.00	0.023	0.100	0.024	0.089	0.099
11/1 <b>7</b> /99	30	9.78	0.036	0.287	0.079	0.288	0.335
11/18/99	32	5.08	0.055	0.184	0.046	0.173	0.248
11/19/99	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

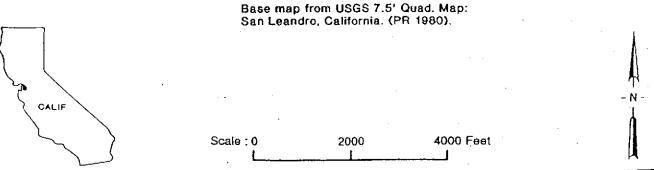
 $Mass, lbs = \{(Flow, cfm)(Concentration, ppmv)(g/mole)(Time, min)(28.3 L/cf)\} / \{(10^6)(24.45 \text{ moles/L})(453.6 \text{ g/fb})\} / \{(10^6)(24.45 \text{ moles/L})(453.6$ 

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

Table 5
High Vacuum Extraction (HVE) Pilot Test
Field Data Sheet-Monitoring Well Data

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

[	M	W1	MW3	MW4	MW7	1	/1	. 1	V2	1	V3	V4
Time	DTW	Vacuum	DTW	DTW	DTW	DTW	Vacuum	DTW	Vacuum	DTW	Vacuum	DTW
(mins)	(ft bgs)	(in. Hg)	(ft bgs)	· (ft bgs)	(ft bgs)	(ft bgs)	(in. Hg)	(ft bgs)	(in. Hg)	(ft bgs)	(in. Hg)	(ft bgs)
11/15/99				•			1			··		·
0	17.8		17.2	16	16.5	17	0	16.2	0	16	0	16.5
15						17	0	16.2	0	16	0	
30						17	0	16.2	0	15.9	0	
60						17	0	16.2	0	15.9	0 -	
120						17	0	16.2	0	15.9	] 0	
, 240						17	0	16.2	0	16	0	
480							l i				İ	
11/16/99	17.9		17.5	16.1	16.5	17	0	16.2	0	16	0.5	16.4
11/17/99	17.6		17.2	15.9	16.5	16.8		16.1		15.8	1.35	16.2
11/18/99	17.7	0	17.2	15.9	16.5	16.9		16.2	0.7	15.8	1.6	16.2
11/19/99	17.8	0	17.2	15.9	16.5	16.9	0	16.2	0.1	15.9	1,3	16.3



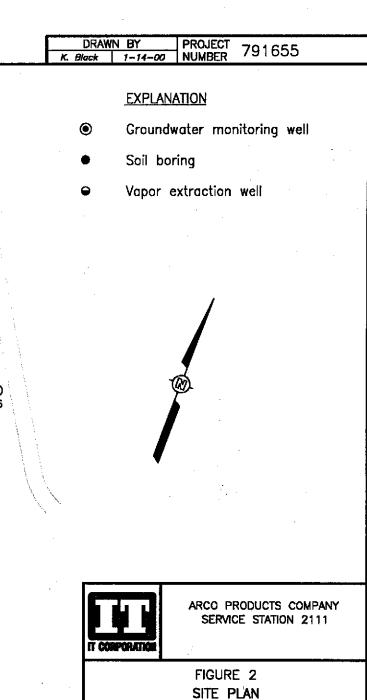


ARCO PRODUCTS COMPANY SERVICE STATION 2111, 1156 DAVIS STREET SOIL AND GROUNDWATER ASSESSMENT SAN LEANDRO, CALIFORNIA

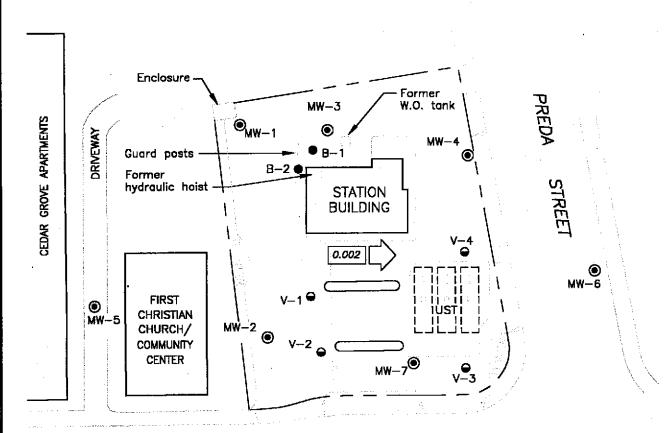
SITE LOCATION

**1** PROJECT NO. 805-127.01

FIGURE



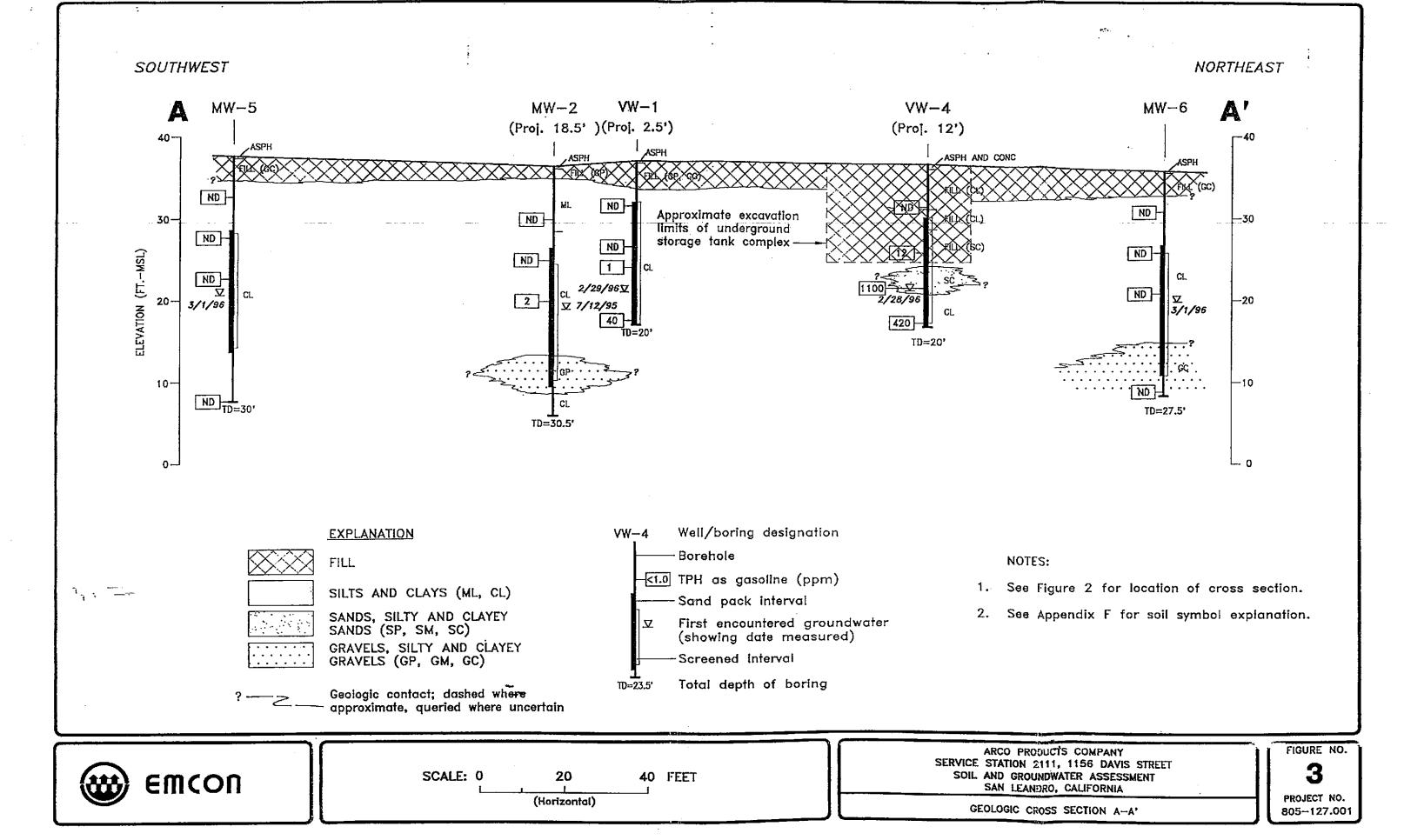
1156 DAVIS STREET SAN LEANDRO, CALIFORNIA



DAVIS STREET

SCALE

80 FEET



# **APPENDIX A**

# CERTIFIED ANALYTICAL REPORTS AND CHAIN-OF-CUSTODY DOCUMENTATION



December 8, 1999

Service Request No.: <u>S9903581</u>

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

RE:

TO#800032.00/2111 SAN LEANDRO

Dear Mr. Vanderveen:

Enclosed are the results of the sample(s) submitted to our laboratory on November 16, 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 17, 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.

rnadith Ironcales

Respectfully submitted,

Columbia Analytical Services, Inc.

Bernadette Troncales

Project Chemist

Greg Jordan

Laboratory Director

RECEIVED DEC 1 4 1999

BY:

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.

LUS 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) Page 2 ACRONLST.DOC 7/14/95

Analytical Report

Client: Project: ARCO Products Company

Service Request: S9903581 Date Collected: 11/15/99

Sample Matrix:

TO#800032.00/2111 SAN LEANDRO Water

Date Received: 11/16/99

Fuel Oxygenates

Sample Name:

GW1

Units: ug/L (ppb)

Lab Code:

S9903581-001

Basis: NA

Test Notes:

C1, O

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
tert -Butyl Alcohol	EPA 5030A	8260	50	500	NA	12/06/99	<25000	
Methyl tert -Butyl Ether	EPA 5030A	8260	0.5	500	NA	12/06/99	18000	
Diisopropyl Ether	EPA 5030A	8260	5	500	NA	12/06/99	<2500	
Ethyl tert -Butyl Ether	EPA 5030A	8260	5	500	NA	12/06/99	<2500	
tert -Amyl Methyl Ether	EPA 5030A	8260	5	500	NA	12/06/99	<2500	

C1 O

The MRL was elevated due to high analyte concentration requiring sample dilution. Sample was analyzed 6 days past the end of the recommended maximum holding time. Analyte concentration should be considered an estimate.

Approved By:	Apı	orove	ed E	By:
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1344/0413719

Analytical Report

Client: Project:

ARCO Products Company

Service Request: \$9903581

Sample Matrix:

TO#800032.00/2111 SAN LEANDRO

Date Collected: 11/15/99

Water

Date Received: 11/16/99

Fuel Oxygenates

Sample Name: Lab Code:

GW2

Units: ug/L (ppb)

Test Notes:

S9903581-002 C1, O

Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
tert -Butyl Alcohol	EPA 5030A	8260	50	200	NA	12/04/99	<10000	
Methyl tert -Butyl Ether	EPA 5030A	8260	0.5	200	NA	12/04/99	14000	
Diisopropyl Ether	EPA 5030A	8260	5	200	NA	12/04/99	<1000	
Ethyl tert -Butyl Ether	EPA 5030A	8260	5	200	NΑ	12/04/99	<1000	
tert -Amyl Methyl Ether	EPA 5030A	8260	5	200	NA	12/04/99	<1000	

C1 O

The MRL was elevated due to high analyte concentration requiring sample dilution. Sample was analyzed 4 days past the end of the recommended maximum holding time. Analyte concentration should be considered an estimate.

Approved By:

1544/0213970

### Analytical Report

Client: Project: Sample Matrix: ARCO Products Company

TO#800032.00/2111 SAN LEANDRO

Water

Service Request: S9903581

Date Collected: 11/16/99

Date Received: 11/16/99

Fuel Oxygenates

Sample Name: Lab Code:

GW3

Units: ug/L (ppb)

S9903581-003

Basis: NA

Test Notes:

C1, O

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
tert -Butyl Alcohol	EPA 5030A	8260	50	100	NA	12/06/99	<5000	
Methyl tert -Butyl Ether	EPA 5030A	8260	0.5	100	NA	12/06/99	5700	
Diisopropyl Ether	EPA 5030A	8260	5	100	NA	12/06/99	< 500	
Ethyl tert -Butyl Ether	EPA 5030A	8260	5	100	NA	12/06/99	<500	
tert - Amyl Methyl Ether	EPA 5030A	8260	5	100	NA	12/06/99	<500	

C10

The MRL was elevated due to high analyte concentration requiring sample dilution. Sample was analyzed 6 days past the end of the recommended maximum holding time. Analyte concentration should be considered an estimate.

Approved By:

1944/02137/p

Analytical Report

Client:

ARCO Products Company

Project:

TO#800032.00/2111 SAN LEANDRO

Service Request: S9903581

Date Collected: NA

Sample Matrix:

Water

Date Received: NA

Fuel Oxygenates

Sample Name: Lab Code:

Method Blank (MS01)

Units: ug/L (ppb)

S991203-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	12/03/99	ND	
Methyl tert -Butyl Ether	EPA 5030A	8260	0.5	1	NA	12/03/99	ND	
Diisopropyl Ether	EPA 5030A	8260	5	1	NA	12/03/99	ND	
Ethyl tert -Butyl Ether	EPA 5030A	8260	5	1	NA	12/03/99	ND	
tert - Amyl Methyl Ether	EPA 5030A	8260	. 5	1	NA	12/03/99	ND	

Approved By:

1344/02137/P

Date: 12/08/99

Analytical Report

Client:

**ARCO Products Company** 

Service Request: S9903581

Project:

TO#800032.00/2111 SAN LEANDRO

8260

8260

Date Collected: NA

Sample Matrix:

Water

Date Received: NA

Fuel Oxygenates

Sample Name: Lab Code:

tert -Butyl Alcohol Methyl tert -Butyl Ether Diisopropyl Ether

Ethyl tert -Butyl Ether

tert - Amyl Methyl Ether

Method Blank (MS01)

Units: ug/L (ppb)

ND

ND

S991206-WB2

Basis: NA

Test Notes:

Analyte

EPA 5030A

EPA 5030A

Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
EPA 5030A	8260	50	1	NA	12/06/99	ND	
EPA 5030A	8260	0.5	1	NA	12/06/99	ND	
EPA 5030A	8260	5	1	NA	12/06/99	ND	

NA

12/06/99

12/06/99

Approved By:

Date: 12/08/99

13<del>44</del>/041397þ

QA/QC Report

Client:

ARCO Products Company

Project:

TO#800032.00/2111 SAN LEANDRO

Sample Matrix:

Water

Service Request: S9903581

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	P e r c e Dibromofluoromethane	n t R e c Toluene-D8	o v e r y 4-Bromofluorobenzene
GW1	S9903581-001		99	100	100
GW2	S9903581-002		107	104	105
GW3	S9903581-003		99	99	98
Lab Control Sample	S991203-LCS		106	104	98
Lab Control Sample	S991203-DLCS		106	103	98
Method Blank (MS01)	S991203-WB2		101	103	104
Method Blank (MS01)	S991206-WB2		100	101	100

EPA Acceptance Limits:

86-118

88-110

86-115

Approved By:

SUR3/020597p

# QA/QC Report

Client:

ARCO Products Company

Project:

TO#800032.00/2111 SAN LEANDRO

LCS Matrix:

Water

Service Request: S9903581

Date Collected: ·NA

Date Received: NA
Date Extracted: NA

Date Analyzed: 12/04/99

Laboratory Control Sample/Duplicate Laboratory Control Sample Summary
Fuel Oxygenates

Sample Name:

Lab Control Sample

Units: ug/L (ppb)

Lab Code:

S991203-LCS,

S991203-DLCS

Basis: NA

Test Notes:

Percent Recovery

			Tollow Rood, or y								
	Prep	Analysis	True	· Value	Re	sult			CAS Acceptance	Relative Percent	Result
Analyte	Method	Method	LCS	DLCS	LCS	DLCS	LCS	DLCS	Limits	Difference	Notes
1,1-Dichloroethene	EPA 5030A	8260	10	10	11	11	110	110	62-145	<1	
Benzene	EPA 5030A	8260	10	10	11	11	110	110	77-127	<1	
Trichloroethene	EPA 5030A	8260	10	10	10	11	100	110	71-119	10	
Toluene	EPA 5030A	8260	10	10	10	11	100	110	76-124	10	
Chlorobenzene	EPA 5030A	8260	10	10	10	11	100	110	75-127	10	
1,2-Dichlorobenzene	EPA 5030A	8260	10	10	11	12	110	120	74-126	9	
Naphthalene	EPA 5030A	<b>826</b> 0	10	10	8.0	12	80	120	43-157	40	,

Approved By:	M	Date	12/08/99
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DLCS/020597p

# Analytical Report

Client:

ARCO Products Company

Project:

TO#800032.00/2111 SAN LEANDRO

Sample Matrix:

Water

Service Request: S9903581

Date Collected: 11/15/99

Date Received: 11/16/99

BTEX, MTBE and TPH as Gasoline

Sample Name:

GW1

Lab Code:

S9903581-001

Units: ug/L (ppb)
Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	20	NA	11/26/99	33000	
Benzene	EPA 5030	8021B	0.5	20	ΝA	11/26/99	1300	
Toluene	EPA 5030	8021B	0.5	20	NA	11/26/99	4500	
Ethylbenzene	EPA 5030	8021B	0.5	20	NA	11/26/99	890	
Xylenes, Total	EPA 5030	8021B	1 .	20	NA	11/26/99	4700	
Methyl tert-Butyl Ether	EPA 5030	8021B	3	20	NA	11/26/99	16000	

approved By:	W	<u> </u>	Date:	121	08/9	9
	,	-	-	$\overline{}$		

# Analytical Report

Client:

ARCO Products Company

Project:

TO#800032.00/2111 SAN LEANDRO

Service Request: S9903581 Date Collected: 11/15/99

Sample Matrix:

Water

Date Received: 11/16/99

BTEX, MTBE and TPH as Gasoline

Sample Name:

GW2

Units: ug/L (ppb)

Lab Code:

S9903581-002

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	20	NA	11/26/99	30000	
Benzene	EPA 5030	8021B	0.5	20	NA	11/26/99	14000	
Toluene	EPA 5030	8021B	0.5	20	NA	11/26/99	1200	
Ethylbenzene	EPA 5030	8021B	0.5	20	NA	11/26/99	4400	
Xylenes, Total	EPA 5030	8021B	1	20	NA	11/26/99	760	
Methyl tert -Butyl Ether	EPA 5030	8021B	3	20	NA	11/26/99	4800	

Approved By: _	M Date:	12108199	

# Analytical Report

Client:

ARCO Products Company

Project:

TO#800032.00/2111 SAN LEANDRO

Sample Matrix:

Water

Service Request: S9903581

**Date Collected:** 11/16/99

Date Received: 11/16/99

BTEX, MTBE and TPH as Gasoline

Sample Name:

GW3

Lab Code:

S9903581-003

Units: ug/L (ppb)

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	11/25/99	5500	
Benzene	EPA 5030	8021B	0.5	5	NA	11/25/99	260	
Toluene	EPA 5030	8021B	0.5	5	NA	11/25/99	620	
Ethylbenzene	EPA 5030	8021B	0.5	5	NA	11/25/99	74	
Xylenes, Total	EPA 5030	8021B	1	5	NA	11/25/99	980	
Methyl tert -Butyl Ether	EPA 5030	8021B	3	5	NA	11/25/99	4600	

Approved By:	M	Date:	ואכן	8/94	
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# Analytical Report

Client:

ARCO Products Company

Project:

TO#800032.00/2111 SAN LEANDRO

Sample Matrix:

Water

Service Request: S9903581

Date Collected: NA
Date Received: NA

BTEX, MTBE and TPH as Gasoline

Sample Name:

Method Blank

Units: ug/L (ppb)

Lab Code:

S991125-WB1

Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	11/25/99	ND	
Benzene	EPA 5030 ·	8021B	0.5	1	NA	11/25/99	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	11/25/99	ND	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	11/25/99	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	11/25/99	ND	
Methyl tert -Butyl Ether	EPA 5030	8021B	3	1	NA	11/25/99	ND	

•	Ch 6	12/00/66	
Approved By:	(10)	Date: AWS1977	
-FF		 	

# Analytical Report

Client:

ARCO Products Company

Project:

TO#800032.00/2111 SAN LEANDRO

Date Collected: NA

Sample Matrix:

Water

Date Received: NA

Service Request: S9903581

BTEX, MTBE and TPH as Gasoline

Sample Name:

Method Blank

Units: ug/L (ppb)

Lab Code:

S991126-WB1

Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	11/26/99	ND	
Benzene	EPA 5030	8021B	0.5	1	NA	11/26/99	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	11/26/99	ND	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	11/26/99	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	11/26/99	ND	
Methyl tert -Butyl Ether	EPA 5030	8021B	3	1	NA	11/26/99	ND	

married Rue (MA) . Date: 1d			_	17/08/06
pproved By: Batc. 100	ed By:	•	Date:	1210012

# QA/QC Report

Client:

ARCO Products Company

Project:

TO#800032.00/2111 SAN LEANDRO

Sample Matrix:

Water

Service Request: S9903581

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

		Test	Percent Recovery					
Sample Name	Lab Code	Notes	a,a,a-Trifluorotoluene	Fluorobenzene				
GW1	S9903581-001		96	97				
GW2	S9903581-002		106	93				
GW3	S9903581-003		101	96				
Lab Control Sample	S991125-LCS		98	105				
Dup Lab Control Sample	S991125-DLCS		95	105				
Method Blank	S991125-WB1		107	90				
Method Blank	S991126-WB1		105	94				

CAS Acceptance Limits:

69-116

60-140

Approved By:	Mr	•	Date:	12/08/99

SUR2/020397p

QA/QC Report

Client:

ARCO Products Company

Project:

TO#800032.00/2111 SAN LEANDRO

LCS Matrix:

Water

Service Request: S9903581

Date Collected: NA

Date Received: NA

Date Extracted: NA

Date Analyzed: 11/25/99

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:

S991125-LCS,

S991125-DLCS

Basis: NA

Test Notes:

Percent Recovery

	Prep	Analysis	True	Value	Re	sult			CAS Acceptance	Relative Percent	Result
Analyte	Method	Method	LCS	DLCS	LCS	DLCS	LCS	DLCS	Limits	Difference	Notes
Benzene	EPA 5030	8021B	50	50	50	48	100	96	75-135	4	
Toluene	EPA 5030	8021B	50	50	50	47	100	94	73-136	6	
Ethylbenzene	EPA 5030	8021B	50	50	49	47	98	94	69-142	4	
Gasoline	EPA 5030	CA/LUFT	500	500	480	470	96	94	75-135	2	

DLCS/020597p

QA/QC Report

Client:

ARCO Products Company

Project:

TO#800032.00/2111 SAN LEANDRO

Service Request: \$9903581

Date Analyzed: 11/25/99

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

Sample Name:

ICV

Units: ug/L (ppb)

Lab Code:

ICV1

Basis: NA

Test Notes:

ICV Source:					CAS		
					Percent Recovery		
	Prep	Analysis	True		Acceptance	Percent	Result
Analyte	Method	Method	Value	Result	Limits	Recovery	Notes
TPH as Gasoline	EPA 5030	CA/LUFT	500	480	85-115	96	
Benzene	EPA 5030	8021B	50	50	85-115	100	
Toluene	EPA 5030	8021B	50	49	85-115	- 98	
Ethylbenzene	EPA 5030	8021B	50	49	85-115	98	
Xylenes, Total	EPA 5030	8021B	150	97	85-115	65	
Methyl tert -Butyl Ether	EPA 5030	8021B	50	50	85-115	100	

Approved By:	M	Date:	208/99

ICY/032196

ARCO	Produ	JCts of Atlantic	Comp	cany	<b>⇔</b>			Task O	rder No.	E	00	00	2		:	59	90	35	8-1			C	hain of Custody	<u>,</u>
ARCO Fac		2111			y acilityi <i>La</i>	AMI	MAS			(Consul	: manaç İtanti		27	JAH	NB	2:4	CEI	7					Laboratory name	
ARCO eng			SUPP			. , ,	Telephor (ARCO)	ne no.		Telepho (Consu	one no. Itaniì	5D	740	434)	157	Fax (Co	no.	115K	) bb	33	315		CAZ Contract number	
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				Matrix		Prese	rvation				3015	:≅□		36		•		Semi Jvov	00070100		32		Method of shipment PKK P C	
Sample I.D.	Lab no.	Container no.	Soil	Water	Other	ice	Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEXTPH EPA M602/8020/8015	TPH Modified 8015 Gas	Oil and Grease 413.1  413.2	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals □ vOA □	CAN Metals EPA 6 TTC 🗀 STLC	Lead Org_/DHS [ Lead EPA 7420/7421	व्याप्तकार्य		PKKPE DIKING IT	
GNI	(1)			<b>V</b>			<b>V</b>	11/19/99			<b>V</b>										<b>V</b>		Special detection Limit/reporting	
GW2	3			<b>✓</b>			<b>√</b>	11/19/99	6mo		<b>✓</b>										/		MBELVOPP	•
6N3				/				11/1499															Special QA/QC	
<u> </u>				V			V	171911	$\nu$	<b>-</b>	_													
		•																					Lab number  Turnaround time	_ _ _
Condition of	by sam	pler					Date	1	Time	Recei	ved by	ric	20: I	OS	: ]	21:	zlse	i	11 SI		3 <b>D</b>		Rush 2 Business Days  Expedited	
Relinquish		<u>.</u>					Date		Time		ved by	laborat	ory	-		[	Date			Time		:	5 Business Days	□ <b>½</b>



December 9, 1999

Service Request No.: S9903648

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

RE:

TO#800032/2111 SAN LEANDRO

Dear Mr. Vanderveen:

Enclosed are the results of the sample(s) submitted to our laboratory on November 18, 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 17, 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.

nalleth Troncales

Respectfully submitted,

Columbia Analytical Services, Inc.

Bernadette Troncales

**Project Chemist** 

Greg Jordan Laboratory Director

RECEIVED
DEC 1 4 1999

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.

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.

MDLMethod Detection LimitMPNMost Probable NumberMRLMethod 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) Page 2 ACRONLST.DOC 7/14/95

# Analytical Report

Client:

ARCO Products Company

Project: Sample Matrix: TO#800032/2111 SAN LEANDRO

Water

Service Request: L9905068

Date Collected: 11/17/99

Date Received: 11/18/99

Volatile Organic Compounds

Sample Name:

GW4

Units: ug/L (ppb)

Lab Code:

L9905068-001

Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Batch Number
Methyl tert-Butyl Ether	EPA 5030	8260B	2	50	NA	12/02/99	3700	
tert-Butyl Alcohol	EPA 5030	8260B	50	5	NA	12/01/99	410	
Diisopropyl Ether	EPA 5030	8260B	2	1	NA	12/01/99	ND	
Ethyl tert-Butyl Ether	EPA 5030	8260B	2	1	NA	12/01/99	ND	
tert-Amyl methyl Ether	EPA 5030	8260B	2	1	NA	12/01/99	20	

Approved By:	M	•	Date:	12/09/99
1S22/020597p				

### Analytical Report

Client:

**ARCO Products Company** 

Project:

TO#800032/2111 SAN LEANDRO

Sample Matrix:

Water

Service Request: L9905068

Date Collected: 11/18/99

Date Received: 11/18/99

Volatile Organic Compounds

Sample Name:

GW5

Units: ug/L (ppb)

Lab Code:

L9905068-002

Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Batch Number
Methyl tert-Butyl Ether	EPA 5030	8260B	2	50	NA	12/02/99	2100	
tert-Butyl Alcohol	EPA 5030	8260B	50	· 5	NA	12/02/99	340	
Diisopropyl Ether	EPA 5030	8260B	2	1	NA	12/02/99	ND	
Ethyl tert-Butyl Ether	EPA 5030	8260B	2	1	NA	12/02/99	ND	
tert-Amyl methyl Ether	EPA 5030	8260B	2	1	NA	12/02/99	12	

Approved By:	M	•	Date:	12/09/99
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### Analytical Report

Client:

ARCO Products Company

Project:

TO#800032/2111 SAN LEANDRO

Sample Matrix:

Water

Service Request: L9905068

Date Collected: NA

Date Received: NA

Volatile Organic Compounds

Sample Name:

Method Blank

Lab Code:

L991201-MB

Units: ug/L (ppb)

Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Batch Number
Methyl tert-Butyl Ether	EPA 5030	8260B	2	1	NA	12/01/99	ND	
tert-Butyl Alcohol	EPA 5030	8260B	50	1	NA	12/01/99	ND	
Diisopropyl Ether	EPA 5030	8260B	2	1	NA	12/01/99	ND	
Ethyl tert-Butyl Ether	EPA 5030	8260B	2	1	NA	12/01/99	ND	
tert-Amyl methyl Ether	EPA 5030	8260B	2	1	NA	12/01/99	ND	

Annroved Rv	(M	Date:	12/09/90	9
Approved By:	V - 1	Date.	10-10 111	

#### Analytical Report

Client:

ARCO Products Company

Project:

TO#800032/2111 SAN LEANDRO

Sample Matrix:

Water

Service Request: L9905068

Date Collected: NA
Date Received: NA

Volatile Organic Compounds

Sample Name:

Method Blank

Units: ug/L (ppb)

Lab Code:

L991202-MB

Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Batch Number
Methyl tert-Butyl Ether	EPA 5030	8260B	2	1	NA	12/02/99	ND	
tert-Butyl Alcohol	EPA 5030	8260B	50	1	NA	12/02/99	ND	
Diisopropyl Ether	EPA 5030	8260B	2	1	NA	12/02/99	ND	
Ethyl tert-Butyl Ether	EPA 5030	8260B	2	1	NA	12/02/99	ND	
tert-Amyl methyl Ether	EPA 5030	8260B	2	1	NA	12/02/99	ND	

Approved By:	M	•	Date:	1269/99

### QA/QC Report

Client:

ARCO Products Company

Project:

TO#800032/2111 SAN LEANDRO

Sample Matrix:

Water

Service Request: L9905068

Date Collected: NA
Date Received: NA

Date Extracted: NA

Date Analyzed: NA

Surrogate Recovery Summary

Prep Method: Analysis Method: EPA 5030

8260B

Volatile Organic Compounds

Units: PERCENT

Basis: NA

Sample Name	Lab Code	Test Notes	Perce	n t R e c Toluene-D <sub>8</sub>	o v e r y 4-Bromofluorobenzene
GW4	L9905068-001		86	102	99
GW5	L9905068-002		84	102	99
Method Blank	L991201-MB		99	107	101
Method Blank	L991202-MB		92	104	97
Batch QC	L9904919-00816M		93	103	99
Batch QC	L9904919-00816D		89	101	97
Lab Control Sample	L991201-LCS		90	101	98
Lab Control Sample	L991202-LCS		90	100	98

CAS Acceptance Limits:

70-130

88-110

86-115

Approved By:	ph s	Date:	12/09/99
SUR3/020597p	<b>v</b>		

#### QA/QC Report

Client:

ARCO Products Company

Project:

TO#800032/2111 SAN LEANDRO

Sample Matrix:

Batch Number:

Date Collected: NA Date Received: NA Date Extracted: NA

Date Analyzed: 12/01/99

Service Request: L9905068

Matrix Spike/Duplicate Matrix Spike Summary Volatile Organic Compounds

Sample Name:

Batch QC

Water

Units: ug/L (ppb)

Lab Code:

L9904919-00816MS,

L9904919-00816DMS

Basis: NA

Test Notes:

Percent Recovery

	Prep	Analysis		Spike	Level	Sample	Spike	Result			CAS Acceptance	Relative Percent	RPD
Analyte	Method	Method	CRDL	MS	DMS	Result	MS	DMS	MS	DMS	Limits*	Difference	Limit
Benzene	EPA 5030	8260B	0.5	10.0	10.0	2.44	11.7	11.6	93	92	76-127	<1	25
Toluene	EPA 5030	8260B	0.5	10.0	10.0	7.85	16.9	16.5	90	86	76-125	2	25
Ethylbenzene	EPA 5030	8260B	0.5	10.0	10.0	4.21	14.2	14.1	100	99	75-130	<1	25
Methyl tert-Butyl Ether	EPA 5030	8260B	2.0	20.0	20.0	ND	19.6	15.8	98	79	50-150	24	25

	Mr		D-4	12/09/49
Approved By:	(T V )	•	_Date: _	1//~00 11
	V .			•
DMS/020597p				

### QA/QC Report

Client:

**ARCO Products Company** 

Project:

TO#800032/2111 SAN LEANDRO

LCS Matrix:

Water

Batch Number:

Service Request: L9905068

Date Collected: NA Date Received: NA

Date Extracted: NA

Date Analyzed: 12/01/99

Laboratory Control Sample Summary

Volatile Organic Compounds

Sample Name:

Lab Control Sample

Lab Code:

L991201-LCS

Units: ug/L (ppb)

Basis: NA

Test Notes:

					<b>.</b>	CAS Percent Recovery	D 14
Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	Acceptance Limits	Result Notes
Benzene	EPA 5030	8260B	10.0	9.32	93	76-127	
Toluene	EPA 5030	8260B	10.0	9.33	93	76-125	
Ethylbenzene	EPA 5030	8260B	10.0	9.87	99	75-130	
Methyl tert-Butyl Ether	EPA 5030	8260B	20.0	18.2	91	50-150	

Approved By:	M	Date: 12109199
LCS/020597p		

### QA/QC Report

Client:

ARCO Products Company

Project:

TO#800032/2111 SAN LEANDRO

LCS Matrix:

Water

**Batch Number:** 

Service Request: L9905068

Date Collected: NA

Date Received: NA
Date Extracted: NA

Date Analyzed: 12/02/99

Laboratory Control Sample Summary.

Volatile Organic Compounds

Sample Name:

Lab Control Sample

Lab Code:

L991202-LCS

Units: ug/L (ppb)

Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Benzene	EPA 5030	8260B	10.0	8.41	84	76-127	
Toluene	EPA 5030	8260B	10.0	8.40	84	76-125	
Ethylbenzene	EPA 5030	8260B	10.0	8.89	89	75-130	
Methyl tert-Butyl Ether	EPA 5030	8260B	20.0	14.5	72	50-150	

Approved By:

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Date: 12/09/99

### Analytical Report

Client:

ARCO Products Company

Project:

TO#800032/2111 SAN LEANDRO

Sample Matrix:

Water

Service Request: S9903648

**Date Collected:** 11/17/99

Date Received: 11/18/99

BTEX, MTBE and TPH as Gasoline

Sample Name:

GW4

Lab Code:

S9903648-001

Units: ug/L (ppb)

Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor		Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	5	NA	12/1/99	4700	
Benzene	EPA 5030	8021B	0.5	5	NA	12/1/99	200	
Toluene	EPA 5030	<b>8</b> 021B	0.5	5	NA	12/1/99	500	
Ethylbenzene	EPA 5030	8021B	0.5	5	NA	12/1/99	38	
Xylenes, Total	EPA 5030	8021B	1	5	NA	12/1/99	830	
Methyl tert -Butyl Ether	EPA 5030	8021B	3	5	NA .	12/1/99	6600	

Approved By:	M	_Date: _	12/09/99
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1822/020597p

### Analytical Report

Client:

ARCO Products Company

Project:

TO#800032/2111 SAN LEANDRO

Sample Matrix:

Water

Service Request: S9903648

**Date Collected:** 11/18/99

Date Received: 11/18/99

BTEX, MTBE and TPH as Gasoline

Sample Name:

GW5

Lab Code:

S9903648-002

Units: ug/L (ppb)

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	12/1/99	230	
Benzene	EPA 5030	8021B	0.5	1	NA	12/1/99	5.2	
Toluene	EPA 5030	8021B	0.5	1	NA	12/1/99	18	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	12/1/99	2.9	
Xylenes, Total	EPA 5030	8021B	1	1	NA	12/1/99	46	
Methyl tert -Butyl Ether	EPA 5030	8021B	3	20	NA	11/26/99	2000	

Approved By:	(A)	Date:	12/09/99
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### Analytical Report

Client:

ARCO Products Company

Project:

TO#800032/2111 SAN LEANDRO

Sample Matrix:

Service Request: S9903648

Date Collected: NA

Date Received: NA

BTEX, MTBE and TPH as Gasoline

Sample Name:

Method Blank

S991201-WB1

Units: ug/L (ppb) Basis: NA

Lab Code: 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	12/01/99	ND	
Benzene	EPA 5030	8021B	0.5	1	NA	12/01/99	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	12/01/99	ND	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	12/01/99	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	12/01/99	ND	
Methyl tert -Butyl Ether	EPA 5030	8021B	3	1	NA	12/01/99	ND	

pproved By:	M	Date: 12/09/99
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### Analytical Report

Client:

ARCO Products Company

Project:

TO#800032/2111 SAN LEANDRO

Sample Matrix: W

Water

Service Request: \$9903648

Date Collected: NA
Date Received: NA

BTEX, MTBE and TPH as Gasoline

Sample Name:

Method Blank

Lab Code:

S991126-WB1

Test Notes:

Units: ug/L (ppb)

Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	11/26/99	ND	
Вепzепе	EPA 5030	8021B	0.5	1	NA .	11/26/99	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	11/26/99	ND	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	11/26/99	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	11/26/99	ND	
Methyl tert-Butyl Ether	EPA 5030	8021B	3	1	NA	11/26/99	ND	

approved By:	M	Date: 12/09/99
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QA/QC Report

Client:

ARCO Products Company

Project: Sample Matrix: TO#800032/2111 SAN LEANDRO

Date Collected: NA

Service Request: S9903648

Water

Date Received: NA

Date Extracted: NA

Date Analyzed: NA

Surrogate Recovery Summary BTEX, MTBE and TPH as Gasoline

Prep Method: Analysis Method:

EPA 5030

8021B CA/LUFT

Units: PERCENT

Basis: NA

		Test	Percent R	ecovery
Sample Name	Lab Code	Notes	a,a,a-Trifluorotoluene	Fluorobenzene
GW4	S9903648-001		101	86
GW5	S9903648-002		105	85
Lab Control Sample	S991201-LCS		97	113 ·
Dup Lab Control Sample	S991201-DLCS		95	97
Method Blank	S991201-WB1		108	88
Method Blank	S991126-WB1		105	94

CAS Acceptance Limits:

69-116

60-140

Approved By:	M	•	Date:	12/09/99
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SUR2/020397p

QA/QC Report

Client:

ARCO Products Company

Project:

TO#800032/2111 SAN LEANDRO

LCS Matrix:

Water

Service Request: S9903648

Date Collected: NA

Date Received: NA

Date Extracted: NA

Date Analyzed: 12/01/99

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:

S991201-LCS,

S991201-DLCS

Basis: NA

Test Notes:

Percent Recovery

	Prep	Analysis	True	Value	Re	esult			CAS Acceptance	Relative Percent	Result
Analyte	Method	Method	LCS	DLCS	LCS	DLCS	LCS	DLCS	Limits	Difference	Notes
Benzene	EPA.5030	8021B	50	50	52	53	104	106	75-135	2	
Toluene	EPA 5030	8021B	50	50	50	51	100	102	73-136	2	
Ethylbenzene	EPA 5030	8021B	50	50	51	51	102	102	69-142	<1	
Gasoline	EPA 5030	CA/LUFT	500	500	480	480	96	96	75-135	<1	

	1	Ob ~		12/06/94
Approved By:		<i>11</i> /1	Date:	POUT
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DLCS/020597p

QA/QC Report

Client: Project: ARCO Products Company

TO#800032/2111 SAN LEANDRO

Service Request: \$9903648

Date Analyzed: 12/01/99

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

Sample Name:

ICV

Units: ug/L (ppb) Basis: NA

Lab Code:

Test Notes:

ICVI

ICV Source:					CAS		
					Percent Recovery		
	Prep	Analysis	True		Acceptance	Percent	Result
Analyte	Method	Method	Value	Result	Limits	Recovery	Notes
TPH as Gasoline	EPA 5030	CA/LUFT	500	450	85-115	90	
Benzene	EPA 5030	8021B	50	52	85-115	104	
Toluene	EPA 5030	8021B	50	50	85-115	100	
Ethylbenzene	EPA 5030	8021B	50	50	85-115	100	
Xylenes, Total	EPA 5030	8021B	150	150	85-115	100	
Methyl tert-Butyl Ether	EPA 5030	8021B	50	50	85-115	100	

Approved By:	M	Date: 12/09/91
- thbro.ee - ).		

ICV/032196

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				Matrix		Prese	rvation				<b>%</b> ≅	vo;□	Π.	W				Semi VOA	010/7000		<i>.</i> \$		Method of shipment
Sample 1.D.	Lab no.	Container no.	Soil	Water	Other	ice	Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEXTPH TTEE EPA M802/8020/8015	TPH Modified 8015 Gas Diesel	Oil and Grease 413.1	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Semi	CAM Metals EPA 6	Lead Org./DHS C Lead EPA 7420/7421 C	55K10		Special detection
GN4	(i)			<b>/</b>			$\checkmark$	11/11/199	300		<b>\</b>		~ 0 a		, 11	2					<b>/</b>		Limit/reporting
GW5	(2)			1			/	11/18/99	1000		1	7	299	03	e40	,					<b>\</b>		
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																							Turnaround time
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Relinquishe	d by sap	pler					Date W/45	19	izyy Time	Rece	iver by	Ua	Eu	Ü	7	,	111	18/9	٠	10	214	6	2 Business Days 🔲
Retinquishe	d by		-				Date		Time	Rece	ived by		<u> </u>	<u>`</u>	·			= -				,	Expedited 5 Business Days
Relinquishe	d by						Date	e e	Time	Rece	ived by	laborat	ory				Date	··· ·· ·		Time	· · · · · · · · ·		Standard GW 10 Business Days X

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Sample 1.D.	Lab no.	Container no.	Soll	Waler	Other	Ice	Acid	Sampling date	Sampling time	BTEK 602/EPA 8020	EPA MEGZIELES	TPH Modded 8015	Ol and Gresse 413.1 C 413.2 C	TPH EPA 418.1/SMS03E	EPA 601/8010	EPA 6248240	EPA ezsazm	TCLP Semi	CAN Heath EPA enjoyed	Lead Org./DHS	五名/0		
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Sample 1.D.	Lab no.	Container no.	Solt	Water	Other	lce	Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEXTPH TT CE EPA MGCZ/BOZO/8015	TPH Modified 80 Gas Diesel	Oil and Gresse 413.1 🗀 413.2 🗆	TPH EPA 418.1/5M50	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Semi	CAM Metals EPA (	Lead Org./DHS   Lead EPA 7420/7421	MEC/087"		Special detection
GNH	(1)			✓			<b>V</b>				1										<b>V</b>		Special detection Limit/reporting
6N5	(3)			1			/	11/18/99	1000		/										<b>√</b>		
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Relinquishe	d by						Date		Time	Recei	ved by								-			13	Expedited 5 Business Days
Relinquishe	d by		2				Date	7	Time	Recei	ved by	laborat	ory			D	ate			Time			Standard 6VV 10 Business Days



December 10, 1999

Service Request No.: S9903673

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

RE:

TO#800032/RAT#8/2111 SAN LEANDRO

Dear Mr. Vanderveen:

Enclosed are the results of the sample(s) submitted to our laboratory on November 19, 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 12, 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

DEC 1 4 1999

BY:

**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.

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.

MDLMethod Detection LimitMPNMost Probable NumberMRLMethod 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) Page 2 ACRONLST.DOC 7/14/95

Analytical Report

Client: Project: ARCO Products Company

TO#800032/RAT#8/2111 SAN LEANDRO

**Service Request:** S9903673 **Date Collected:** 11/19/99

Sample Matrix:

Water

Date Received: 11/19/99

Fuel Oxygenates

Sample Name: Lab Code: GW6

Units: ug/L (ppb)

Test Notes:

S9903673-001

Basis: NA

C1

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
tert -Butyl Alcohol	EPA 5030A	8260	50	50	NA	12/03/99	<2500	
Methyl tert -Butyl Ether	EPA 5030A	8260	0.5	50	NA	12/03/99	3100	
Diisopropyl Ether	EPA 5030A	8260	5	50	NA	12/03/99	<250	
Ethyl tert -Butyl Ether	EPA 5030A	8260	5	50	NA	12/03/99	<250	
tert -Amyl Methyl Ether	EPA 5030A	8260	5	50	NA	12/03/99	<250	

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

Approved By:

M

\_\_\_\_\_\_\_Date: 12/10/99

F2444071321b

C1

Analytical Report

Client:

ARCO Products Company

Service Request: \$9903673 Date Collected: NA

Project:

TO#800032/RAT#8/2111 SAN LEANDRO

Sample Matrix: Water Date Received: NA

Fuel Oxygenates

Sample Name: Lab Code:

Method Blank (MS01)

Units: ug/L (ppb)

Test Notes:

S991203-WB1

Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
tert -Butyl Alcohol	EPA 5030A	8260	50	1	NA	12/03/99	ND	
Methyl tert -Butyl Ether	EPA 5030A	8260	0.5	1	NA	12/03/99	ND	
Diisopropyl Ether	EPA 5030A	8260	5	1	NA	12/03/99	ND	
Ethyl tert -Butyl Ether	EPA 5030A	8260	5	1	NA	12/03/99	ND	
tert - Amyl Methyl Ether	EPA 5030A	8260	5	1	NA	12/03/99	ND	

Approved By:

Analytical Report

Client:

Service Request: \$9903673 Date Collected: NA

Project:

ARCO Products Company TO#800032/RAT#8/2111 SAN LEANDRO

Date Received: NA

Sample Matrix:

Water

Fuel Oxygenates

Sample Name: Lab Code:

Method Blank (MS01)

Units: ug/L (ppb)

Test Notes:

S991203-WB2 Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
tert -Butyl Alcohol	EPA 5030A	8260	50	1	NA	12/03/99	ND	
Methyl tert -Butyl Ether	EPA 5030A	8260	0.5	1	NA	12/03/99	ND	
Diisopropyl Ether	EPA 5030A	8260	5	1	NA	12/03/99	ND	
Ethyl tert -Butyl Ether	EPA 5030A	8260	5	1	NA	12/03/99	ND	
tert - Amyl Methyl Ether	EPA 5030A	8260	5	1	NA	12/03/99	ND	

Approved By:

1544/021397p

Date: 12/10/99

#### QA/QC Report

Client:

ARCO Products Company

Project: Sample Matrix:

Water

TO#800032/RAT#8/2111 SAN LEANDRO

Service Request: S9903673 Date Collected: NA

Date Received: NA Date Extracted: NA

Date Analyzed: NA

Surrogate Recovery Summary

Fuel Oxygenates

Prep Method: Analysis Method: EPA 5030A

8260

Units: PERCENT

Basis: NA

		Test	Perce	nt Rec	o v e r y
Sample Name	Lab Code	Notes	Dibromofluoromethane	Toluene-D8	4-Bromofluorobenzene
GW6	S9903673-001		98	102	105
Lab Control Sample	S991203-LCS		106	104	98
Lab Control Sample	S991203-DLCS		106	103	98
Method Blank (MS01)	S991203-WB1		101	100	102
Method Blank (MS01)	S991203-WB2		101	103	104

EPA Acceptance Limits:

86-118

88-110

86-115

Approved By:	M	4	Date:	12/10/9	9
			. '		

SUR3/020597p

#### QA/QC Report

Client:

ARCO Products Company

Project:

TO#800032/RAT#8/2111 SAN LEANDRO

LCS Matrix:

Water

Service Request: S9903673

Date Collected: NA
Date Received: NA

Date Extracted: NA

Date Analyzed: 12/04/99

Laboratory Control Sample/Duplicate Laboratory Control Sample Summary
Fuel Oxygenates

Sample Name:

Lab Control Sample

Units: ug/L (ppb)

Lab Code:

S991203-LCS,

S991203-DLCS

Basis: NA

Test Notes:

Percent Recovery

			rereent Recovery								
Analyte	Prep Method	Analysis Method	-	Value DLCS	Re LCS	sult DLCS	LCS	DLCS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
1,1-Dichloroethene	EPA 5030A	8260	10	10	11	11	110	110	62-145	<1	
Benzene	EPA 5030A	8260	10	10	11	11	110	110	77-127	<1	
Trichloroethene	EPA 5030A	8260	10	10	10	11	100	110	71-119	10	
Toluene	EPA 5030A	8260	10	10	10	11	100	110	76-124	10	
Chlorobenzene	EPA 5030A	8260	10	10	10	11	100	110	75-127	10	
1,2-Dichlorobenzene	EPA 5030A	8260	10	10	11	12	110	120	74-126	9	
Naphthalene	EPA 5030A	8260	10	10	8.0	12	80	120	43-157	40	

Approved By:L	(f • ( Date:	1~110177	

DLCS/020597p

### Analytical Report

Client:

**ARCO Products Company** 

Project:

TO#800032/RAT#8/2111 SAN LEANDRO

Sample Matrix:

Water

Service Request: 59903673

Date Collected: 11/19/99

Date Received: 11/19/99

BTEX and TPH as Gasoline

Sample Name:

GW6

Units: ug/L (ppb)

Lab Code:

S9903673-001

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	5	NA	11/26/99	1500	
Benzene	EPA 5030	8021B	0.5	5	NA	11/26/99	36	
Toluene	EPA 5030	8021B	0.5	5	NA	11/26/99	120	
Ethylbenzene	EPA 5030	8021B	0.5	5	NA	11/26/99	28	
Xylenes, Total	EPA 5030	8021B	1	5	NA	11/26/99	160	

Approved By:	ht	Date:	12/10/99	
-FF	<del></del>	 -		

### Analytical Report

Client:

ARCO Products Company

Project:

TO#800032/RAT#8/2111 SAN LEANDRO

Date Collected: NA

Service Request: \$9903673

Sample Matrix:

Water

Date Received: NA

BTEX and TPH as Gasoline

Sample Name:

Method Blank

Units: ug/L (ppb)

Lab Code:

S991125-WB2

Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	11/25/99	ND	
Benzene	EPA 5030	8021B	0.5	Ī	NA	11/25/99	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	11/25/99	ND	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	11/25/99	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	11/25/99	ND	

Approved By:	M	•	Date: 12/10/99

### QA/QC Report

Client:

ARCO Products Company

Project:

TO#800032/RAT#8/2111 SAN LEANDRO

Sample Matrix:

Water

Service Request: S9903673

Date Collected: NA

Date Received: NA

Date Extracted: NA
Date Analyzed: NA

Surrogate Recovery Summary

BTEX and TPH as Gasoline

Prep Method:

EPA 5030

Analysis Method: 8021B

CA/LUFT

Units: PERCENT

Basis: NA

		Test	Percent R	ecovery
Sample Name	Lab Code	Notes	a,a,a-Trifluorotoluene	Fluorobenzene
GW6	S9903673-001		103	93
Lab Control Sample	S991125-LCS		98	105
Dup Lab Control Sample	S991125-DLCS		95	105
Method Blank	S991125-WB2		104	92

CAS Acceptance Limits:

69-116

60-140

Approved By: _	(	h	•	Date: 12/10/99
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SUR2/020397p

QA/QC Report

Client:

ARCO Products Company

Project:

TO#800032/RAT#8/2111 SAN LEANDRO

LCS Matrix:

Water

Service Request: S9903673

Date Collected: NA

Date Received: NA

Date Extracted: NA
Date Analyzed: 11/25/99

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:

S991125-LCS,

S991125-DLCS

Basis: NA

Test Notes:

Percent Recovery

	Prep	Analysis	True	Value	Re	sult			CAS Acceptance	Relative Percent	Result
Analyte	Method	Method	LCS	DLCS	LCS	DLCS	LCS	DLCS	Limits	Difference	Notes
Benzene	EPA 5030	8021B	50	50	50	48	100	96	75-135	4	
Toluene	EPA 5030	8021B	50	50	50	47	100	94	73-136	6	
Ethylbenzene	EPA 5030	8021B	50	50	49	47	98	94	69-142	4	
Gasoline	EPA 5030	CA/LUFT	500	500	480	<b>47</b> 0	96	94	75-135	2	

Approved By:	W	•	Date:	12/10/99
11 /	<del>,                                    </del>	•		•

DLCS/020597p

QA/QC Report

Client: Project: ARCO Products Company

TO#800032/RAT#8/2111 SAN LEANDRO

Service Request: \$9903673

Date Analyzed: 11/25/99

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

Sample Name:

ICV

Units: ug/L (ppb)

Lab Code:

ICV1

Basis: NA

Test Notes:

ICV Source:

					CAS		
	Prep	Analysis	True		Percent Recovery	Percent	Result
Analyte	Method	Method	Value	Result	Acceptance Limits	Recovery	Notes
TPH as Gasoline	EPA 5030	CA/LUFT	500	480	85-115	<b>9</b> 6	
Benzene	EPA 5030	8021B	50	50	85-115	100	
Toluene	EPA 5030	8021B	50	49	85-115	98	
Ethylbenzene	EPA 5030	8021B	50	49	85-115	98	
Xylenes, Total	EPA 5030	8021B	150	150	85-115	100	

Approved By:	M	Date:	12/10/99
	J <del>T. 1</del>		

1CV/032196

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Sample I.D	<b>Lab</b> 70.	Container	Soil	Water	Other	Ice	Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEXTPH EPA M602/8020/8015	TPH Modified B015 Gas   Diesel	Oil and Great	PH FPA 418.1/SI	EPA 601/8010	EPA 624/824	EPA 625/827	TCLP Semi	AM Metake	eed Crg./Di	THE LOW.			
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Sample I.D.	Lab no.	Container no.	Soil	Water	Olher	lce	Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas Oiesel	Oil and Grease 413.1 T 413.2	TPH EPA 418.1/SMS/	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Semi Metals □ VOA □ VOA □	CAM Metals EPA TTLC TTLC STEC	Lead Org./DHS Lead EPA 7420/7421	mas low.	,	Constitution of the section	
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November 18, 1999

Service Request No.: S9903580

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

RE:

TO#800032.00/2111 SAN LEANDRO

Dear Mr. Vanderveen:

Enclosed are the results of the sample(s) submitted to our laboratory on November 16, 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 15, 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

Cros susuan

Laboratory Director

10V 2 2 1999

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.

MDLMethod Detection LimitMPNMost Probable NumberMRLMethod 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)
Page 2
ACRONLST.DOC 7/14/95

#### Analytical Report

Client:

ARCO Products Company

Project: Sample Matrix: TO#800032.00/2111 SAN LEANDRO

Air

Service Request: S9903580

Date Collected: 11/15/99

Date Received: 11/16/99

BTEX and Total Volatile Hydrocarbons

Sample Name:

V1

Lab Code:

\$9903580-001

Units: mg/m3 Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	NONE	8021B	0.4	20	NA	11/17/99	68	
Toluene	NONE	8021B	0.4	20	NA	11/17/99	220	
Ethylbenzene	NONE	8021B	0.5	20	NA	11/17/99	51	
Xylenes, Total	NONE	8021B	0.9	20	NA	11/17/99	190	
Total Volatile Hydrocarbons:								
C1 - C5	NONE	8015M	12	20	NA	11/17/99	6400	
C6 - C12	NONE	8015M	20	20	NA	11/17/99	7600	
TPH as Gasoline*	NONE	8015M	20	20	NA	11/17/99	7600	
Methyl tert-Butyl Ether	NONE	8021B	3	20	ŇΑ	11/17/99	210	

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

Approved By:	M	4	Date: 1//	18/99
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### Analytical Report

Client:

ARCO Products Company

**Project:** 

TO#800032.00/2111 SAN LEANDRO

Sample Matrix:

Air

Service Request: S9903580

Date Collected: 11/15/99

Date Received: 11/16/99

### BTEX and Total Volatile Hydrocarbons

Sample Name:

V1

Lab Code:

S9903580-001

Units: ppmV Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	NONE	8021B	0.1	20	NA	11/17/99	21	
Toluene	NONE	8021B	0.1	20	NA	11/17/99	58	
Ethylbenzene	NONE	8021B	0.1	20	NA	11/17/99	12	
Xylenes, Total	NONE	8021B	0.2	20	NA	11/17/99	44	
Total Volatile Hydrocarbons:								
C1 - C5	NONE	8015M	. 5	20	NA	11/17/99	2700	
C6 - C12	NONE	8015M	5	20	NA	11/17/99	1900	
TPH as Gasoline*	NONE	8015M	5	20	NA	11/17/99	1900	
Methyl tert-Butyl Ether	NONE	8021B	0.8	20	NA	11/17/99	58	

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

Approved By:	M	•	Date:	1819	39
FF	V			1-4	

#### Analytical Report

Client:

ARCO Products Company

Project:

TO#800032.00/2111 SAN LEANDRO

Sample Matrix:

Air

Service Request: S9903580

Date Collected: 11/15/99

Date Received: 11/16/99

BTEX and Total Volatile Hydrocarbons

Sample Name:

V2

Units: mg/m3 Basis: NA

Lab Code:

S9903580-002

Test Notes:

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	NONE	8021B	0.4	20	NA	11/17/99	78	
Toluene	NONE	8021B	0.4	20	NA	11/17/99	260	
Ethylbenzene	NONE	8021B	0.5	20	NA	11/17/99	61	
Xylenes, Total	NONE	8021B	0.9	20	NA	11/17/99	220	
Total Volatile Hydrocarbons:								
C1 - C5	NONE	8015M	12	20	NA	11/17/99	6900	
C6 - C12	NONE	8015M	20	2.0	NA	11/17/99	9100	
	*							
TPH as Gasoline*	NONE	8015M	20	20	NA	11/17/99	9100	
Methyl tert-Butyl Ether	NONE	8021B	3	20	NA	11/17/99	220	

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

Approved By:	M	•	Date: 11/18/99	_

#### Analytical Report

Client:

ARCO Products Company

Project:

TO#800032.00/2111 SAN LEANDRO

Sample Matrix:

Service Request: S9903580

Date Collected: 11/15/99 Date Received: 11/16/99

# BTEX and Total Volatile Hydrocarbons

Sample Name:

V2

Lab Code:

S9903580-002

Units: ppmV

Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	NONE	8021B	0.1	1	NA	11/17/99	24	
Toluene	NONE	8021B	0.1	1	NA	11/17/99	69	
Ethylbenzene	NONE	8021B	0.1	1	NA	11/17/99	14	
Xylenes, Total	NONE	8021B	0.2	1	NA	11/17/99	51	
Total Volatile Hydrocarbons:								
C1 - C5	NONE	8015M	5	1	NA	11/17/99	2900	
C6 - C12	NONE	8015M	5	1	NA	11/17/99	2200	
TPH as Gasoline*	NONE	8015M	5	1	NA	11/17/99	2200	
Methyl tert-Butyl Ether	NONE	8021B	0.8	1	NA	11/17/99	61	

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

Approved By:	ans I	Date: 11/18/99
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#### Analytical Report

Client:

ARCO Products Company

Project:

TO#800032.00/2111 SAN LEANDRO

Service Request: \$9903580 Date Collected: 11/16/99

Sample Matrix:

Air

Date Received: 11/16/99

#### BTEX and Total Volatile Hydrocarbons

Sample Name:

V3

Units: mg/m3

Lab Code:

S9903580-003

Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	NONE	8021B	0.4	10	NA	11/1 <b>7/9</b> 9	42	
Toluene	NONE	8021B	0.4	10	NA	11/1 <i>7/</i> 99	180	
Ethylbenzene	NONE	· 8021B	0.5	10	NA	11/17/99	44	
Xylenes, Total	NONE	8021B	0.9	10	NA	11/1 <b>7</b> /99	160	
Total Volatile Hydrocarbons:								
C1 - C5	NONE	8015M	12	10	NA	11/1 <i>7/</i> 99	4600	
C6 - C12	NONE	8015M	20	10	NA	11/17/99	5900	
TPH as Gasoline*	NONE	8015M	20	10	NA	11/17/99	5900	
Methyl tert-Butyl Ether	NONE	8021B	3	10	NA	11/17/99	180	

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

Approved By:	1	W	· .	 Date: _	11	L	81	40	9	
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#### Analytical Report

Client:

ARCO Products Company

Project:

Sample Matrix:

TO#800032.00/2111 SAN LEANDRO

Air

Service Request: S9903580

Date Collected: 11/16/99

Date Received: 11/16/99

BTEX and Total Volatile Hydrocarbons

Sample Name:

V3

Lab Code: Test Notes: S9903580-003

Units: ppmV

Basis: NA

Analyte	Prep Method	Analysis Method	MRL .	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	NONE	8021B	0.1	10	NA	11/17/99	13	
Toluene	NONE	8021B	0.1	10	NA	11/17/99	48	
Ethylbenzene	NONE	8021B	.0.1	10	NA	11/17/99	10	
Xylenes, Total	NONE	8021B	0.2	10	ŇA	11/17/99	37	
Total Volatile Hydrocarbons:								
C1 - C5	NONE	8015M	5	10	NA	11/17/99	1900	
C6 - C12	NONE	8015M	5	10	NA	11/17/99	1400	
TPH as Gasoline*	NONE	8015M	5	10	NA	11/17/99	1400	
Methyl tert-Butyl Ether	NONE	8021B	0.8	10	NA	11/17/99	50	

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

Approved By:	(M)	. Date:	18/99
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#### Analytical Report

Client:

ARCO Products Company

Project:

TO#800032.00/2111 SAN LEANDRO

Sample Matrix:

Air

Service Request: S9903580

Date Collected: NA
Date Received: NA

#### BTEX and Total Volatile Hydrocarbons

Sample Name:

Method Blank

Lab Code:

S991117-VB1

Units: mg/m3 Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	NONE	8021B	0.4	1	NA	11/17/99	ND	
Toluene	NONE	8021B	0.4	1	NA	11/17/99	ND	
Ethylbenzene	NONE	8021B	0.5	1	NA	11/17/99	ND	
Xylenes, Total	NONE	8021B	0.9	1	NA	11/17/99	ND	
Total Volatile Hydrocarbons:								
C1 - C5	NONE	8015M	12	1	NA	11/17/99	ND	
C6 - C12	NONE	8015M	20	I	NA	11/17/99	ND	
TPH as Gasoline*	NONE	8015M	20	1	NA	11/17/99	ND	
Methyl tert-Butyl Ether	NONE	8021B	3	1	NA	11/17/99	ND	

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

Approved By:	JU _	. Date: 11/18/99	
	V		

#### Analytical Report

Client:

ARCO Products Company

Project:

TO#800032.00/2111 SAN LEANDRO

Sample Matrix:

Air

Service Request: S9903580

Date Collected: NA
Date Received: NA

#### BTEX and Total Volatile Hydrocarbons

Sample Name:

Method Blank

Lab Code:

S991117-VB1

Units: ppmV Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	NONE	8021B	0.1	1	NA	11/17/99	ND	
Toluene	NONE	8021B	0.1	1	NA	11/17/99	ND	
Ethylbenzene	NONE	8021B	0.1	1	NA	11/17/99	ND	
Xylenes, Total	NONE	8021B	0.2	1	NA	11/17/99	ND	
Total Volatile Hydrocarbons:								
C1 - C5	NONE	8015M	5	1	NA	11/1 <b>7/9</b> 9	ND	
C6 - C12	NONE	8015M	5	1	NA	11/17/99	ND	
TPH as Gasoline*	NONE	8015M	5	ı	NA	11/17/99	ND	
Methyl tert-Butyl Ether	NONE	8021B	1.4	1	NA	11/17/99	ND	

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

Approved By:	MT	•	Date:
	V /		

# QA/QC Report

Client:

ARCO Products Company

Project:

TO#800032.00/2111 SAN LEANDRO

Sample Matrix: Air

Service Request: \$9903580 Date Collected: 11/15/99 Date Received: 11/16/99 Date Extracted: NA

Date Analyzed: 11/17/99

**Duplicate Summary** BTEX and Total Volatile Hydrocarbons

Sample Name:

Lab Code:

s9903580-001DUP

Test Notes:

Units: mg/m3 Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Benzene	NONE	8021B	0.4	68	73	71	7	
Toluene	NONE	8021B	0.4	220	230	230	4	
Ethylbenzene	NONE	8021B	0.5	51	54	53	6	
Xylenes, Total	NONE	8021B	0.9	190	200	200	5	
Total Volatile Hydrocarbons								
C1 - C5	NONE	8015M	12	6400	6600	6500	3	
C6 - C12	NONE	8015M	20	7600	8100	7900	6	
TPH as Gasoline*	NONE	8015M	20	7600	8100	7900	6	
Methyl tert-Butyl Ether	NONE	8021B	3	210	230	220	9	

Approved By:	M	•	Date:	11/18/99
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DUP/020597p

# QA/QC Report

Client:

ARCO Products Company

Project:

TO#800032.00/2111 SAN LEANDRO

Sample Matrix: Air

Service Request: S9903580 Date Collected: 11/15/99 Date Received: 11/16/99

Date Extracted: NA Date Analyzed: 11/17/99

**Duplicate Summary** BTEX and Total Volatile Hydrocarbons

Sample Name:

V1

Lab Code:

s9903580-001DUP

Units: ppmV Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Benzene	NONE	8021B	0.1	21.3	22.9	22.1	7	
Toluene	NONE	8021B	0.1	58.5	61.1	59.8	4	
Ethylbenzene	NONE	8021B	0.1	11.8	12.5	12.2	6	
Xylenes, Total	NONE	8021B	0.2	43.8	46.1	45	5	
Total Volatile Hydrocarbons								
C1 - C5	NONE	8015M	5	2700	2780	2,740	3	
C6 - C12	NONE	8015M	. 5	1860	1980	1,920	6	
TPH as Gasoline*	NONE	8015M	5	1860	1980	1,920	6	
Methyl tert-Butyl Ether	NONE	8021B	0.8	58.3	63.9	61.1	9 -	

Approved By:	M	•	Date: )///	8/99

DUP/020597p

QA/QC Report

Client:

ARCO Products Company

Project:

TO#800032.00/2111 SAN LEANDRO

LCS Matrix:

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Service Request: S9903580

Date Collected: NA

Date Received: NA
Date Extracted: NA

Date Analyzed: 11/17/99

Laboratory Control Sample Summary,

BTEX and TPH as Gasoline

Sample Name: Lab Code: Lab Control Sample

S991117-LCS

Units: mg/m3

Basis: NA

Test Notes:

CAS Percent Recovery Result Analysis True Percent Acceptance Prep Limits Notes Analyte Method Method Value Result Recovery 8021B 24 20 83 60-140 Benzene NONE 60-140 Toluene NONE 8021B 24 19 79 60-140 20 83 Ethylbenzene NONE 8021B 24 60-140 200 95 Gasoline NONE 8015M 210

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Approved By:	(V)		Date:	1//	1181	77
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QA/QC Report

Client:

ARCO Products Company

Project:

TO#800032.00/2111 SAN LEANDRO

LCS Matrix:

Service Request: \$9903580

Date Collected: NA Date Received: NA Date Extracted: NA

Date Analyzed: 11/17/99

Laboratory Control Sample Summary.

BTEX and TPH as Gasoline

Sample Name:

Lab Control Sample

Lab Code:

S991117-LCS

Units: ppmV Basis: NA

Test Notes:

						CAS Percent Recovery	
Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	Acceptance Limits	Result Notes
Benzene	NONE	8021B	7.5	6.3	84	60-140	
Toluene	NONE	8021B	6.4	5.1	80	60-140	
Ethylbenzene	NONE	8021B	5.5	4.6	84	60-140	
Gasoline	NONE	8015M	51	48.9	96	60-140	

Approved By:	MI	•	Date: 11/18/95
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QA/QC Report

Client:

**ARCO Products Company** 

Project:

TO#800032.00/2111 SAN LEANDRO

Service Request: S9903580

Date Analyzed: 11/17/99

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

Sample Name:

ICV

Units: mg/m3

Lab Code:

ICV1

Basis: NA

Test Notes:

ICV Source:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	Result Notes
Benzene	NONE	8021B	25	25	100	
Toluene	NONE	8021B	25	24	96	
Ethylbenzene	NONE	8021B	25	25	100	
Xylenes, Total	NONE	8021B	75	74	99	
Gasoline	NONE	8015M	250	250	100	
Methyl tert-Butyl Ether	NONE	8021B	25	23	92	

approved By:	(10)	Date:	11/18/	99
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ICV/032196

ARCO	Produ	ucts of Atlantic	Comp	any	<b>\$</b>			Task Or	der No.	Z	00	ロカ	2		<	399	0	358	0			C	Chain of Custody
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ARCO engi	neer )	PANI	- 2	SPPI	2		Telephor (ARCO)	ne na.		Telepho (Consu	one no. Itant)	50	740	68	07	Fax (Co	no. nsultar	から	5 10°C	و م	323,5	>	Contract number
Consultant	name (	V W	RP					Address (Consulta	nt) 220				-						<i>&gt; 6</i>	A C	ት <mark>ት</mark> የ	12	
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Sample I.D.	Lab no.	Container no.	Soll	Water	Other	Ice	Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 80 Gas ☐ Diesel [	Oil and Grease 413.1	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals 🗆 VOA 🗀	CAM Metals EPA (	Lead Org./DHS Clead EPA Lead EPA 7420/7421 Cl	2200 N	-	Consist detection
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Relinquishe	d by	<i>-</i>	· · · · ·	<u> </u>			Date	<b>\</b>	Time		ved by	1 d	uur	M.	1							•	Expedited 5 Business Days
Relinquishe	d by						Date		Time	Recel	ved by	laborat	ory				Date	\		Time			Standard 10 Business Days



November 22, 1999

Service Request No.: S9903649

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

RE:

TO#800032/2111 SAN LEANDRO

Dear Mr. Vanderveen:

Enclosed are the results of the sample(s) submitted to our laboratory on November 18, 1999. All analyses were performed in accordance with our laboratory's quality assurance program. Results are intended to be considered in their entirety and apply to the sample(s) analyzed. Columbia Analytical Services is not responsible for use of less than the complete report. Signature of this CAS Analytical Report confirms that pages 2 through 13, following, have been thoroughly reviewed and approved for release.

Columbia Analytical Services is certified for environmental analyses by the California Department of Health Services (certificate number: 2352, expiration: January 31, 2001).

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

madette Troncale

Respectfully submitted,

Columbia Analytical Services, Inc.

Bernadette Troncales Project Chemist

Laboratory Director

VOV 2 4 1999

3334 Victor Court Santa Clara, CA 95054

Telephone (408) 748-9700 ■

Fax (408) 748-9860

**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.

LUFT 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.

MDLMethod Detection LimitMPNMost Probable NumberMRLMethod 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) Page 2 ACRONLST.DOC 7/14/95

#### Analytical Report

Client:

ARCO Products Company

Project:

TO#800032/2111 SAN LEANDRO

Sample Matrix:

Air

Service Request: \$9903649

Date Collected: 11/17/99

Date Received: 11/18/99

BTEX and Total Volatile Hydrocarbons

Sample Name:

V4

Units: mg/m3 Basis: NA

Lab Code:

S9903649-001

Test Notes:

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	NONE	8021B	0.4	10	NA	11/19/99	11	
Toluene	NONE	8021B	0.4	10	NA	11/19/99	86	
Ethylbenzene	NONE	8021B	0.5	10	NA	11/19/99	24	
Xylenes, Total	NONE	8021B	0.9	10	NA.	11/19/99	87	
Total Volatile Hydrocarbons:								
C1 - C5	NONE	8015M	12	10	NA	11/19/99	2300	
C6 - C12	NONE	8015M	20	10	NA	11/19/99	3100	
TPH as Gasoline*	NONE	8015M	20	10	NA	11/19/99	3100	
Methyl tert-Butyl Ether	NONE	8021B	3	10	NA	11/19/99	89	

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

Approved By:	(h)	 Date: 11/22/99
1S22/020597p		

# Analytical Report

Client:

ARCO Products Company

Project:

TO#800032/2111 SAN LEANDRO

Service Request: S9903649 Date Collected: 11/17/99

Date Received: 11/18/99

Sample Matrix:

Air

#### BTEX and Total Volatile Hydrocarbons

Sample Name:

V4

Lab Code:

S9903649-001

Units: ppmV Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	NONE	8021B	0.1	10	NA	11/19/99	3.4	
Toluene	NONE	8021B	0.1	10	NA	11/19/99	23	
Ethylbenzene	NONE	8021B	0.1	10	NA	11/19/99	5.5	
Xylenes, Total	NONE	8021B	0.2	10	NA	11/19/99	20	•
Total Volatile Hydrocarbons:								
C1 - C5	NONE	8015M	5	10	NA	11/19/99	970	
C6 - C12	NONE	8015M	5	10	NA	11/19/99	760	
TPH as Gasoline*	NONE	8015M	5	10	NA	11/19/99	760	
Methyl tert-Butyl Ether	NONE	8021B	0.8	10	NA	11/19/99	28	

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

Approved By:	an The Control of the	•	Date: 11/22/99
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#### Analytical Report

Client:

ARCO Products Company

Project:

TO#800032/2111 SAN LEANDRO

Sample Matrix:

Air

Service Request: S9903649

Date Collected: 11/18/99

Date Received: 11/18/99

# BTEX and Total Volatile Hydrocarbons

Sample Name:

V5

Lab Code:

S9903649-002

Units: mg/m3 Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	NONE	8021B	0.4	20	NA	11/19/99	25	
Toluene	NONE	8021B	0.4	20	NA	11/19/99	82	
Ethylbenzene	NONE	8021B	0.5	20	NA	11/19/99	21	
Xylenes, Total	NONE	8021B	0.9	20	NA	11/19/99	78	
Total Volatile Hydrocarbons:								
C1 - C5	NONE	8015M	12	20	NA	11/19/99	2000	
C6 - C12	NONE	8015M	20	20	NA	11/19/99	2400	
TPH as Gasoline*	NONE	8015M	20	20	NA	11/19/99	2400	
Methyl tert-Butyl Ether	NONE	8021B	3	20	NA	11/19/99	100	

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

Approved By:	Ax	•	Date: 1/2	22/91
- tpp://www.pp.	V: 1			

#### Analytical Report

Client:

ARCO Products Company

Project:

Sample Matrix:

TO#800032/2111 SAN LEANDRO

Date Collected: 11/18/99

Service Request: S9903649

Date Received: 11/18/99

#### BTEX and Total Volatile Hydrocarbons

Sample Name:

V5

Units: ppmV

Lab Code:

S9903649-002

Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	NONE	8021B	0.1	20	NA	11/19/99	7.8	
Toluene	NONE	8021B	0.1	20	NA	11/19/99	22	
Ethylbenzene	NONE	8021B	0.1	20	NA	11/19/99	4.8	
Xylenes, Total	NONE	8021B	0.2	20	NA	11/19/99	18	
Total Volatile Hydrocarbons:								
C1 - C5	NONE	8015M	5	20	NA	11/19/99	840	
C6 - C12	NONE	8015M	5	20	NA	11/19/99	590	•
TPH as Gasoline*	NONE	8015M	5	20	NA	11/19/99	590	
Methyl tert-Butyl Ether	NONE	8021B	0.8	. 20	NA	11/19/99	31	

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

Approved By:	M	•	Date:	11/22/99

#### Analytical Report

Client:

ARCO Products Company

Project:

TO#800032/2111 SAN LEANDRO

Sample Matrix:

Air

Service Request: S9903649

Date Collected: NA Date Received: NA

BTEX and Total Volatile Hydrocarbons

Sample Name:

Method Blank

Lab Code:

S991119-VB1

Units: mg/m3 Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	NONE	8021B	0.4	1	NA	11/19/99	ND	
Toluene	NONE	8021B	0.4	1	NA	11/19/99	ND	
Ethylbenzene	NONE	8021B	0.5	. 1	NA	11/19/99	ND	•
Xylenes, Total	NONE	8021B	0.9	1	NA	11/19/99	ND	
Total Volatile Hydrocarbons:								
C1 - C5	NONE	8015M	12	1	NA	11/19/99	ND	
C6 - C12	NONE	8015M	20	1	NA	11/19/99	ND	
TPH as Gasoline*	NONE	8015M	20	1	NA	11/19/99	ND	
Methyl tert-Butyl Ether	NONE	8021B	3	1	NA	11/19/99	ND	

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

Approved By:	M	-	_ Date:	11/22/99	
	V				

#### Analytical Report

Client:

ARCO Products Company

Project:

TO#800032/2111 SAN LEANDRO

Sample Matrix:

Air

Service Request: S9903649

Date Collected: NA
Date Received: NA

# BTEX and Total Volatile Hydrocarbons

Sample Name:

Method Blank

Lab Code:

S991119-VB1

Units: ppmV Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	NONE	8021B	0.1	• 1	NA	11/19/99	ND	
Toluene	NONE	8021B	0.1	1	NA	11/19/99	ND	
Ethylbenzene	NONE	8021B	0.1	1	NA	11/19/99	ND	
Xylenes, Total	NONE	8021B	0.2	1	NA	11/19/99	ND	
Total Volatile Hydrocarbons:								
CI - C5	NONE	8015M	5	1	NA	11/19/99	ND	
C6 - C12	NONE	8015M	5	1	NA	11/19/99	ND	
TPH as Gasoline*	NONE	8015M	5	1	NA	11/19/99	ND	
Methyl tert-Butyl Ether	NONE	8021B	1.4	. 1	NA	11/19/99	ND	

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

Approved By:	M	. Date: 11/21/99	
1522/020597p		, ,	

# QA/QC Report

Client:

ARCO Products Company

Project:

TO#800032/2111 SAN LEANDRO

Sample Matrix: Air

Service Request: \$9903649

Date Collected: 11/17/99

Date Received: 11/18/99

Date Extracted: NA

Date Analyzed: 11/19/99

Duplicate Summary BTEX and Total Volatile Hydrocarbons

Sample Name:

V4

Lab Code:

S9903649-001DUP

Test Notes:

Units: mg/m3 Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Benzene	NONE	8021B	0.4	11	11	11	<1	
Toluene	NONE	8021B	0.4	86	87	86.5	1	
Ethylbenzene	NONE	8021B	0.5	24	24	24	<1	
Xylenes, Total	NONE	8021B	0.9	87	84	85.5	3	
Total Volatile Hydrocarbons								
C1 - C5	NONE	8015M	12	2300	2200	2250	4	
C6 - C12	NONE	8015M	20	3100	2800	2950	10	
TPH as Gasoline*	NONE	8015M	20	3100	2800	2950	10	
Methyl tert-Butyl Ether	NONE	8021B	3	89	88	88.5	1	

approved By:	hr	•	Date: []	22/99

DUP/020597p

# QA/QC Report

Client:

ARCO Products Company

Project:

TO#800032/2111 SAN LEANDRO

Sample Matrix: Air

Service Request: S9903649
Date Collected: 11/17/99
Date Received: 11/18/99
Date Extracted: NA
Date Analyzed: 11/19/99

Duplicate Summary BTEX and Total Volatile Hydrocarbons

Sample Name:

V4

Lab Code:

S9903649-001DUP

Test Notes:

Units: ppmV Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Benzene	NONE	8021B	0.1	3.4	3.4	3.4	<1	
Toluene	NONE	8021B	0.1	23	23	23	<1	
Ethylbenzene	NONE	8021B	0.1	5.5	5.5	5.5	<1	
Xylenes, Total	NONE	8021B	0.2	20	19	19.5	5	
Total Volatile Hydrocarbons								
C1 - C5	NONE	8015M	5	970	930	950	4	
C6 - C12	NONE	8015M	5	760	680	720	11	
TPH as Gasoline*	NONE	8015M	5	760	680	720	11	
Methyl tert-Butyl Ether	NONE	8021B	0.8	28	22	25	24	

	Ch-	•	Waster	
Approved By:	$y\nu$		Date: 11/22199	

DUP/020597p

QA/QC Report

Client:

ARCO Products Company

Project:

TO#800032/2111 SAN LEANDRO

LCS Matrix:

A :--

Service Request: S9903649

Date Collected: NA
Date Received: NA

Date Extracted: NA
Date Analyzed: 11/19/99

Laboratory Control Sample Summary

BTEX and TPH as Gasoline

Sample Name: Lab Code: Lab Control Sample

S991119-LCS

Units: mg/m3

Basis: NA

Test Notes:

CAS Percent Recovery Acceptance Result Percent Analysis True Prep Notes Limits Recovery Analyte Method Method Value Result 60-140 NONE 8021B 24 17 71 Benzene 60-140 16 67 Toluene NONE 8021B 24 60-140 24 16 67 Ethylbenzene NONE 8021B 200 95 60-140 NONE 8015M 210 Gasoline

Approved By:	M	•	Date: _	11/22/0	99
	•				

QA/QC Report

Client:

ARCO Products Company

Project:

TO#800032/2111 SAN LEANDRO

LCS Matrix:

Δir

Service Request: S9903649

Date Collected: NA
Date Received: NA
Date Extracted: NA

Date Analyzed: 11/19/99

Laboratory Control Sample Summary

BTEX and TPH as Gasoline

Sample Name:

Lab Control Sample

Lab Code:

S991119-LCS

JILA and IIII as Gasonik

Units: ppmV

Basis: NA

Test Notes:

						CAS Percent	
	Prep	Analysis	True		Percent	Recovery Acceptance	Result
Analyte	Method	Method	Value	Result	Recovery	Limits	Notes
Benzene	NONE	8021B	7.5	5.3	71	60-140	
Toluene	NONE	8021B	6.4	4.2	66	60-140	
Ethylbenzene	NONE	8021B	5.5	3.7	67	60-140	
Gasoline	NONE	8015M	51	49	96	60-140	

Americad Bur	MI	•	Date:	nlast.	49
Approved By:			Daw.		<del></del>

QA/QC Report

Client:

ARCO Products Company

Project:

TO#800032/2111 SAN LEANDRO

Service Request: S9903649

Date Analyzed: 11/19/99

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

Sample Name:

ICV

ICV1

Units: mg/m3

Basis: NA

Lab Code: Test Notes:

ICV Source:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	Result Notes
Benzene	NONE	8021B	25	28	112	
Toluene	NONE	8021B	25	27	108	
Ethylbenzene	NONE	8021B	25	28	112	
Xylenes, Total	NONE	8021B	75	85	113	
Gasoline	NONE	8015M	250	250	100	
Methyl tert-Butyl Ether	NONE	8021B	25	27	108	

Approved By:	Date: _	11/21/99
	•	,

ICV/032196

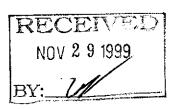
ARCO enginese P Supplies Transported to the property of the pr	ARCO	Prod	ucts (	Comp	Dany	<b>\$</b>			Task O	rder No.	¥.	000	037	2_		59	90	36	49	·			(	Chain of Custody
Considered family    Address   Addre							AN	IZA		,	Project (Consu	mena( itant)	ger <i>E</i>	<del>1</del> -	100	1/2	EN	42.	<b>€</b> 1~				<u> </u>	Laboratory name
Considered name    Considered name   Considered	ARCO engl	neer	P. S.	198	12			Telephor	ne no.		Teleph (Consu	one no. Itant)	54	07	to:	550	7 Fax	no. nsultar	051	06	63	33	<u> </u>	Contract number
Matrix Preservation  Soll Water Other Roe Acid	Consultant	name 1	TU	OCP					Address (Consults	int) 120	1 (	2/0	Aa	W	**(	01	0	<u> برا</u>	A	10	$\mathcal{A}$	94	11/2	
VI DE O MIL WINA 370 / Special CAIOC  VS D D MIL WINA 570 / Special CAIOC  Remerks  Remerks  Lab number  Turnscound time  Pricrity Rush All  Business Day  Received by  Time  Received by  Received							Prese	rvation				%≅	, C		ı,				<b>₩</b>	2007/0		1		Method of shipment
Temperature received: Duce: 14 19 99  Facility disagrature  Time  Facility disagrature  Time  Facility disagrature  Time  Facility disagrature  Facility d	ا ا				<u> </u>				date	time	§	Fogg	ed 801	6859 413.2 [	/SM503	910	240	270	ă Ş	STIC		00		·
Temperature received: Duce: 14 19 99  Facility disagrature  Time  Facility disagrature  Time  Facility disagrature  Time  Facility disagrature  Facility d	ng e	5	ntainer	Soll	١ ١	l i	lce	Acid	mpling	mpling	EPA 8	EXTPH A M602	± 50 €	200 E	# ¥ 418.1	A 601/B	A 62418	74 625/R		25 25 25 26 26 26 26 26 26 26 26 26 26 26 26 26	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	見る		
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NIMA 270 V Special CA/OC  VE Q 2 M/L 11/18/19 W <sup>PD</sup> V Special CA/OC  Remarks  Remarks  Remarks  Lab number  Turnacound time Priority Rush A/L 18 special CA/OC  Remarks									1.40	-01D														, ,
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Reinvised by appler    Date   Time   Received by   Receive					<u></u>	-			NITIMA	1000	-	\ <u>\</u>	ļ									<u> </u>		Special QA/QC
Condition of sample:  Relinquished by sampler  Date  Time  Date  Time  Date  Time  Date  Time  Date  Time  Received by  Date  Time  Beceived by  Date  Date  Time  Beceived by  Date   V5_	10				MIL			MISH	W	-	<u> </u>	<u> </u>		<del> </del>						<u> </u>	<u> </u>	ļ		
Condition of sample:  Relinquished by sampler  Date  Time  Date  Time  Date  Time  Date  Time  Date  Time  Received by  Date  Time  Beceived by  Date  Date  Time  Beceived by  Date   <b> </b>	<u> </u>		<u> </u>		ļ			<u> </u>		}			<u> </u>								-			
Condition of sample:  Temperature received: Due: 11 1999  Relinquished by sampler  Date  Time  Received by  Time  Turnaround time  Priority Rush And  1 Business Day  Rush  2 Business Days  Expedited  5 Business Days	<u> </u> -	-	<del>                                     </del>		<u> </u>	<u> </u>			<u> </u>		-		ļ										<u> </u>	Remarks
Condition of sample:  Temperature received: Due: 11 1999  Relinquished by sampler  Date  Time  Received by  Time  Turnaround time  Priority Rush And  1 Business Day  Rush  2 Business Days  Expedited  5 Business Days		<del> </del>	ļ			<u> </u>						ļ <u> </u>										<del> </del>		
Condition of sample:  Temperature received: Due: 11 1999  Relinquished by sampler  Date  Time  Received by  Time  Turnaround time  Priority Rush And  1 Business Day  Rush  2 Business Days  Expedited  5 Business Days	· 	ļ. <u></u>	-			ļ—	<u> </u>	<u> </u>			-	ļ <u> </u>		ļ	ļ					<u> </u>			<u> </u>	
Condition of sample:  Temperature received: Due: 11 1999  Relinquished by sampler  Date  Time  Received by  Time  Turnaround time  Priority Rush And  1 Business Day  Rush  2 Business Days  Expedited  5 Business Days			-			<u> </u>		<u> </u>	-		-	· · · · · · · · · · · · · · · · · · ·		<u> </u>										
Condition of sample:  Temperature received: Due: 11 1999  Relinquished by sampler  Date  Time  Received by  Time  Turnaround time  Priority Rush And  1 Business Day  Rush  2 Business Days  Expedited  5 Business Days		ļ	ļ			ļ		<u> </u>			-	<u> </u>	-	ļ							-	-	<u> </u>	
Condition of sample:  Temperature received: Due: 11 1999  Relinquished by sampler  Date  Time  Received by  Time  Turnaround time  Priority Rush And  1 Business Day  Rush  2 Business Days  Expedited  5 Business Days		ļ	ļ			ļ			ļ		_					_						-	-	-
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Condition of sample:  Temperature received: Dree: 16 19 99  Residualished by sampler  Time Received by		'			<b> </b>	ļ			,		ļ		<del> </del>	<u> </u>		ļ						-	<del> </del>	
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	Relinquish	ed by						Dafté	· <del>•</del>	Time	Rece	ived by	•											5 Business Days
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November 22, 1999

Service Request No.: <u>S9903672</u>

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



RE:

TO#800032/RAT#8/2111 SAN LEANDRO

Dear Mr. Vanderveen:

Enclosed are the results of the sample(s) submitted to our laboratory on November 19, 1999. All analyses were performed in accordance with our laboratory's quality assurance program. Results are intended to be considered in their entirety and apply to the sample(s) analyzed. Columbia Analytical Services is not responsible for use of less than the complete report. Signature of this CAS Analytical Report confirms that pages 2 through 13, following, have been thoroughly reviewed and approved for release.

Columbia Analytical Services is certified for environmental analyses by the California Department of Health Services (certificate number: 2352, expiration: January 31, 2001).

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

adette Troncales

Respectfully submitted,

Columbia Analytical Services, Inc.

Bernadette Troncales Project Chemist

Laboratory Director

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.

MDLMethod Detection LimitMPNMost Probable NumberMRLMethod 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) Page 2 ACRONLST.DOC 7/14/95

#### Analytical Report

Client:

ARCO Products Company

Project:

TO#800032/RAT#8/2111 SAN LEANDRO

Sample Matrix:

Air

Service Request: S9903672

Date Collected: 11/19/99

Date Received: 11/19/99

BTEX and Total Volatile Hydrocarbons

Sample Name:

V6

S9903672-001

Units: mg/m3 Basis: NA

Lab Code: Test Notes:

tS22/020597p

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	5030	8021B	0.4	10	NA	11/19/99	23	
Toluene	5030	8021B	0.4	10	NA	11/19/99	110	
Ethylbenzene	5030	8021B	0.5	10	NA	11/19/99	31	
Xylenes, Total	5030	8021B	0.9	. 10	NA	11/19/99	110	
Total Volatile Hydrocarbons:						-		
C1 - C5	5030	8015M	12	10	NA	11/19/99	2800	
C6 - C12	5030	8015M	20	10	NA	11/19/99	3400	
TPH as Gasoline*	5030	8015M	20	10	NA	11/19/99	3400	

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

Approved By:	(hr	Date:	11/22/04

#### Analytical Report

Client:

ARCO Products Company

Project:

TO#800032/RAT#8/2111 SAN LEANDRO

Service Request: S9903672

Sample Matrix:

Air

Date Collected: 11/19/99 Date Received: 11/19/99

#### BTEX and Total Volatile Hydrocarbons

Sample Name:

V6

Units: ppmV

Lab Code:

S9903672-001

Basis: NA

Test Notes:

LS22/020597p

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	5030	8021B	0.1	10	NA	11/19/99	7.2	
Toluene	5030	8021B	0.1	10	NA	11/19/99	29	
Ethylbenzene	5030	8021B	0.1	10	NA	11/19/99	7.1	
Xylenes, Total	5030	8021B	0.2	10	NA	11/19/99	25	
Total Volatile Hydrocarbons:								
C1 - C5	5030	8015M	5	10	NA.	11/19/99	1200	
C6 - C12	5030	8015M	5	10	NA	11/19/99	830	
TPH as Gasoline*	5030	8015M	5	10	NA	11/19/99	830	

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

Approved By:	M		Date:	11/22/99
••	· · · · · · · · · · · · · · · · · · ·	-		•

#### Analytical Report

Client:

ARCO Products Company

Project:

TO#800032/RAT#8/2111 SAN LEANDRO

Sample Matrix:

Air

Date Collected: NA
Date Received: NA

Service Request: S9903672

#### BTEX and Total Volatile Hydrocarbons

Sample Name:

Method Blank

Lab Code:

S991119-VB1

Test Notes:

Units: mg/m3 Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	5030	8021B	0.4	1	NA	11/19/99	ND	
Toluene	5030	8021B	0.4	1	NA	11/19/99	ND	
Ethylbenzene	5030	8021B	0.5	1	NA	11/19/99	ND	
Xylenes, Total	5030	8021B	0.9	1	NA	11/19/99	ND	
Total Volatile Hydrocarbons:								
C1 - C5	5030	8015M	12	1	NA	11/19/99	ND -	
C6 - C12	5030	8015M	20	1	NA	11/19/99	ND	
TPH as Gasoline*	5030	8015M	20	1	NA	11/19/99	ND	

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

Approved By:	M		Date: 11/22/99
		•	

#### Analytical Report

Client:

ARCO Products Company

Project:

TO#800032/RAT#8/2111 SAN LEANDRO

Sample Matrix:

Air

Service Request: \$9903672

Date Collected: NA
Date Received: NA

BTEX and Total Volatile Hydrocarbons

Sample Name:

Method Blank

Lab Code:

S991119-VB1

Test Notes:

Units: ppmV Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	5030	8021B	0.1	1	NA	11/19/99	ND	
Toluene	5030	8021B	0.1	1	NA	11/19/99	ND.	
Ethylbenzene	5030	8021B	0.1	1	NA	11/19/99	ND	
Xylenes, Total	5030	8021B	0.2	1	NA	11/19/99	ND	
Total Volatile Hydrocarbons:								
C1 - C5	5030	8015M	5	1	NA	11/19/99	ND	
C6 - C12	5030	8015M	5	1	NA	11/19/99	ND	
TPH as Gasoline*	5030	8015M	5	1	NA	11/19/99	ND	

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

Approved By:	M		Date: 11/22/99	
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QA/QC Report

Client:

ARCO Products Company

Project:

Sample Matrix: Air

TO#800032/RAT#8/2111 SAN LEANDRO

Date Collected: NA Date Received: NA Date Extracted: NA Date Analyzed: 11/19/99

Service Request: S9903672

**Duplicate Summary** BTEX and Total Volatile Hydrocarbons

Sample Name:

BATCH QC

Lab Code:

Test Notes:

S9903649-001DUP

Units: mg/m3 Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Вепzепе	<b>503</b> 0	8021B	0.4	11	11	11.0	<1	
Toluene	5030	8021B	0.4	86	87	86.5	1	
Ethylbenzene	5030	8021B	0.5	24	24	24.0	<1	
Xylenes, Total	5030	8021B	0.9	87	84	85.5	3	
Total Volatile Hydrocarbons								
C1 - C5	5030	8015M	12	2300	2200	2250	4	
C6 - C12	5030	8015M	20	3100	2800	2950	10	
TPH as Gasoline*	5030	8015M	20 、	3100	2800	2950	10	

Approved By:	AT	•	Date:	11/22/99
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DUP/020597p

QA/QC Report

Client:

ARCO Products Company

Project:

TO#800032/RAT#8/2111 SAN LEANDRO

Sample Matrix: Air

Service Request: S9903672

Date Collected: NA
Date Received: NA

Date Extracted: NA

Date Analyzed: 11/19/99

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Sample Name:

BATCH QC

Lab Code:

S9903649-001DUP

Test Notes:

Units: ppmV

Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Benzene	5030	8021B	0.1	3.4	3.4	3.4	<1	
Toluene	5030	8021B	0.1	23	23	23.0	<1	
Ethylbenzene	5030	8021B	0.1	5.5	5.5	5.5	<1	
Xylenes, Total	5030	8021B	0.2	20	19	19.5	5	
Total Volatile Hydrocarbons								
C1 - C5	5030	8015M	5	970	930	950	4	
C6 - C12	5030	8015M	5	760	680	720	11	
TPH as Gasoline*	5030	8015M	5	760	680	720	11	

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DUP/020597p

QA/QC Report

Client:

ARCO Products Company

Project:

TO#800032/RAT#8/2111 SAN LEANDRO

LCS Matrix:

Service Request: S9903672

Date Collected: NA Date Received: NA Date Extracted: NA

Date Analyzed: 11/19/99

Laboratory Control Sample Summary.

BTE

Sample Name:

Lab Control Sample

Lab Code:

S991119-LCS

Units: mg/m3

Basis: NA

Test Notes:

CAS Percent Recovery Acceptance Result Analysis True Percent Prep Limits Notes Method Value Recovery Analyte Method Result 5030 8021B 24 17 71 60-140 Benzene 60-140 16 67 5030 8021B 24 Toluene 60-140 67 24 16 Ethylbenzene 5030 8021B

Approved By:	M	Date: 11/2/1999
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QA/QC Report

Client:

ARCO Products Company

Project: LCS Matrix: TO#800032/RAT#8/2111 SAN LEANDRO

Service Request: S9903672

Date Collected: NA
Date Received: NA

Date Extracted: NA

Date Analyzed: 11/19/99

Laboratory Control Sample Summary.

BTE

Sample Name:

Lab Control Sample

Units: ppmV

Lab Code:

S991119-LCS

Basis: NA

Test Notes:

CAS Percent Recovery Result Percent Acceptance Analysis True Prep Limits Notes Method Value Result Recovery Analyte Method 7.5 5.3 71 60-140 8021B 5030 Benzene 60-140 4.2 66 5030 8021B 6.4 Toluene 60-140 5030 8021B 5.5 3.7 67 Ethylbenzene

Approved By:	h	·	Date:	][	22/99
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QA/QC Report

Client:

ARCO Products Company

Project:

TO#800032/RAT#8/2111 SAN LEANDRO

LCS Matrix:

Service Request: S9903672

Date Collected: NA Date Received: NA

Date Extracted: NA Date Analyzed: 11/19/99

Laboratory Control Sample Summary.

TPH as Gasoline

Sample Name:

Lab Control Sample

Lab Code:

S991119-LCS

Units: mg/m3

Basis: NA

Test Notes:

CAS Percent Recovery Result Percent Acceptance Analysis True Prep Limits Notes Recovery Method Method Value Result Analyte 60-140 100 Gasoline 5030 8015M 200 200

Approved By:

QA/QC Report

Client:

ARCO Products Company

Project: LCS Matrix: TO#800032/RAT#8/2111 SAN LEANDRO

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Service Request: S9903672

Date Collected: NA
Date Received: NA

Date Extracted: NA

Date Analyzed: 11/19/99

Laboratory Control Sample Summary.

TPH as Gasoline

Sample Name:

Lab Control Sample

Lab Code:

S991119-LCS

Units: ppmV

Basis: NA

Test Notes:

CAS
Percent
Recovery

Result Percent Acceptance Prep Analysis True Notes Method Value Result Recovery Limits Method Analyte 60-140 100 Gasoline 5030 8015M 49 49

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Approved By:		 Date: _	11100197

QA/QC Report

Client:

**ARCO Products Company** 

Project:

TO#800032/RAT#8/2111 SAN LEANDRO

Service Request: S9903672

Date Analyzed: 11/19/99

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

Sample Name:

ICV

Lab Code:

ICV1

Units: mg/m3

Basis: NA

Test Notes:

ICV Source:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Acceptance Limits
Benzene	5030	8021B	25	28	112	80-120
Toluene	5030	8021B	25	27	108	80-120
Ethylbenzene	5030	8021B	25	28	112	80-120
Xylenes, Total	5030	8021B	75	85	113	80-120
Gasoline	5030	8015M	250	250	100	80-120

Approved By: \_\_\_\_\_\_\_ Date: 11 22/99

ICV/032196

RCO	Produ	UCTS of Atlanti	Comp	Dany Company	<b>�</b>			Task O	rder No.	E	000	つかね	2_			Sq	190	36	72			(	Chain of Custody
RCO Faci	lity no	2111	<u></u>			261	LEA	runc		Project	manac	aer 🗸				2.		I					Laboratory name
RCO engi	neer F	. SJ	PPI	٤			Telepho (ARCO)	ne no.		Teleph (Consu	one no. Itani)	510	<u>140</u>	198	507	Fau (Co	k no. Insultar	11)51	04	# blo	33	315	CAS Contract number
onsultant	name (	16	OPP				.,		int) 2201		)AO	M	#1	01	120	4/4	^	VO	CA	41	161	2	
		,		Matrix		Prese	ervation			1	8015	₩.		GE				Semi JVOA	00077000		lors)		Method of shipment
Sample I.D.	Lab no.	Container no.	Soil	Waler	Other	lce	Acid	Sampling date	Sampling time	BTEX SOZIEPA 8020	BTEXTPH EPA M602/8020/	TPH Modified 80 Gas Diesel	Oil and Gresse 413.1  413.2	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals   voA	CAN Metals EPA	Lead Org./DHS Lead EPA 7420/7421	Jana /	<i>158</i>	Special detection
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# APPENDIX B FIELD DATA SHEETS

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

# High Vacuum Extraction (HVE) Pilot Test Field Data Sheet-Groundwater(MW2)

Date	Time	Σ(Time)	MW2 DTW	E.C.	pН	D.O.	T1 DTW	T2 DTW	T3 DTW	T4 DTW	T5 DTW	Volume	Flow	Σ(Flow)	Sample
	(min)	(min)	(ft. bgs)	(umhos/cm)	(units)	(mg/L)	(in. btt)	(gal)	(gpm)	(gpm)	Name				
		<u></u>													
11/15/1999												.			
10:45:00	0	0	16.1	·NM	NM	NM	67.5	67.5	67.5	67.5	67.5	0.0	0.0	0.0	~
12:30:00	105	105	NM	0.699	6.33	9	45	67.5	67.5	67.5	67.5	183.3	1.75	1.75	GW1
14:30:00	120	225	NM	NM	NM	NM	29	67.5	67.5	67.5	67.5	313.7	1.09	1.39	
18:30:00	240	465	NM	0.658	6.57	7.4	19	67.5	67.5	67.5	67.5	395.2	0.34	0.85	GW2
11/16/1999												l ·			
8:00:00	810	1275	NM	0.644	6.51	6.02	16	28	67.5	67.5	67.5	741.5	0.43	0.58	GW3
11/17/1999														1	
15:30:00	1170	2445	NM	0.702	6.61	4.18	9	10	15	67.5	67.5	1373.0	0.54	0.56	GW4
11/18/1999															
10:00:00	1110	3555	NM	0.648	6.82	4.35	9	10	14	34	67.5	1654.1	0.25	0.47	GW5
11/19/1999			•												
9:30:00	1740	5295	· NM	0.693	6.95	4.82	9	10	14	32	60	1731.5	0.04	0.33	GW6
15;00:00	330	5625	15.6	NM	NM	NM	0	0	8	10	14	2489.3	2.30	0.44	
15:01:00	1	5626	15.7	ļ											
15:03:00	2	5628	15.7	1											
15:06:00	3	5631	15.7				·								
15:10:00	4	5635	15.7												·
15;15:00	5	5640	15.7												
15:25:00	10	5650	15.6												
15:40:00	15	5665	15.7			1		·							
16:10:00	30	5695	15.7					1							
17:10:00	60	5755	15.6			İ	1	1							

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

# High Vacuum Extraction (HVE) Pilot Test Field Data Sheet-Vapor Extraction (MW2)

Date	Time	Σ(Time)	Influent PID	Vacuum	Flow	Effluent PID	Sample
	(min)	(min)	(ppmv)	(in.H2O)	(cfm)	(ppmv)	Name
<u> </u>							
11/15/1999							
10:45:00	0	0	>2500	100	·		
11:00:00	15	15	>2500	100			
11:30:00	30	45	>2500	100			
12:30:00	60	105	>2500	62.5	13.5		.V1
14:30:00	120	225	>2500	62.5	22		
18;30:00	240	465	>2500	62.5	23.5		V2
11/16/1999							
8;00;00	810	1275	680	62.5	10.9	<100	V3
11/17/1999						:	,
-15:30:00	1170	2445	260 & >2500	62.5	30	<10	V4
11/18/1999		- Committee of the Comm					
10:00:00	1110	3555	1470	62.5	32	0	V5
11/19/1999							
9:30:00	1740	5295	>2500	62.5	32	0	V6

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

# High Vacuum Extraction (HVE) Pilot Test Field Data Sheet-Monitoring Wells

Time (mins)	MW1		MW3	MW4	MW7	V1		V2		V3 .		V4
	DTW (ft bgs)	Vacuum (in. Hg)	DTW (ft bgs)	DTW (ft bgs)	DTW (ft bgs)	DTW (ft bgs)	Vacuum (in. Hg)	DTW (ft bgs)	Vacuum (in. Hg)	DTW (ft bgs)	Vacuum (in. Hg)	DTW (ft bgs)
11/15/1999		<u> </u>				<u> </u>	ī		1			
О	17.8		17.2	16	16.5	17	0	16.2	0	16	0	16.5
15						17	0	16.2	0	16	0	
30						17	0	16.2	0	15.9	0	
60						17	0 1	16.2	0	15.9	0	
120						17	0	16.2	0	15.9	0	
240						17	0	16.2	0	16	0	
480												
11/16/1999	17.9		17.5	16.1	16.5	17	0	16.2	0	16	0.5	16.4
11/17/1999	17.6		17.2	15.9	16.5	16.8		16.1		15.8	1.35	16.2
11/18/1999	17.7	0	17.2	15.9	16.5	16.9		16.2	0.7	15.8	1.6	16.2
11/19/1999	17.8	0.	17.2	15.9	16.5	16.9	0	16.2	0.1	15.9	1.3	16.3