(1) need UAR form
no apparent spiking around proposed new tank area.

8/8/91

ROUX
ENVIRONMENTAL CONSULTING & MANAGEMENT
1350 Arnold Drive, Suite 201
Martinez, California 94553
Tel. (510) 370-2275 • Fax (510) 370-2235

ENVIRONMENTAL CONSULTING & MANAGEMENT
ROUX ASSOCIATES

ROUX

1350 ARNOLD DRIVE
SUITE 201
MARTINEZ, CALIFORNIA 94553 510 370-2275 FAX # 510 370-2235

Transmittal/Memorandum

To: Mr. Barney Chan
Alameda County
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

From: Paul Supple

Date: November 14, 1991

Subject: Preliminary Tank Replacement Assessment
Limited Soil Performan Test
ARCO Facility No. 2185
9800 East 14th Street
Oakland, California

Job No.: A102W01

Remarks: Enclosed is one copy of the subject reports for your files.

Doc #A102W01.1.8

PRELIMINARY TANK REPLACEMENT ASSESSMENT

ARCO Facility No. 2185
9800 E. 14th Street
Oakland, California

August 8, 1991

Prepared for:

ARCO Products Company
P.O. Box 5811
San Mateo, California

Prepared by:

ROUX ASSOCIATES
1350 Arnold Drive, Suite 201
Martinez, CA 94553
(415) 370-2275

Doc #A102W01.1.8

TITLE: Preliminary Tank Replacement Assessment
ARCO Facility No. 2185,
9800 E. 15th Street
Oakland, California

DATE: August 8, 1991

PROJECT NO: A102W01

SUBMITTED BY: Roux Associates
1350 Arnold Drive, Suite 201
Martinez, California 94553

This work was done under the direction of the undersigned California Registered Geologist.

PREPARED BY:

Keith G. Kennedy
California Registered Geologist No. 4903

For Brian Thomas

Brian Thomas
Senior Hydrogeologist

CONTENTS

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FIGURES

APPENDICES

1.0 INTRODUCTION

This report describes the results of a preliminary tank replacement assessment (pre-drill) performed by Roux Associates (Roux) at ARCO Products Company (ARCO) Facility No. 2185 at 9800 E. 14th Street, Oakland, California (Site). The activities described in this report were carried out in accordance with ARCO's Retail Marketing Environmental Procedures for Preliminary Tank Replacement Assessment, San Francisco Region.

This investigation was conducted on May 14, 1991 to evaluate potential levels of petroleum hydrocarbons in soil prior to a planned replacement of underground storage tanks (USTs) at the Site. Four soil borings were drilled, sampled and logged. Undisturbed soil samples acquired during the drilling were submitted to a California State certified laboratory for analysis, and the boreholes were backfilled to grade. Two vapor extraction test wells were also installed at the Site. All work performed by Roux was conducted by Roux geologists under the direction of Mr. Keith Kennedy, California Registered Geologist No. 4903.

2.0 SITE DESCRIPTION

ARCO Facility No. 2185 is an operating self-service gasoline station and AM/PM mini-market located at the southeast corner of E. 14th Street and 98th Avenue, Oakland, California (Figure 1). The Site is a relatively flat asphalt and concrete covered lot, at an elevation of about 25 feet above mean sea level. Topography in the area is nearly flat, sloping very gently (less than 1 percent slope) toward the west (U.S.G.S., 1968). Currently,

Site features include an AM/PM mini-market building, two pump islands, and three single-wall USTs located in a common tank cavity in the western part of the Site (Figure 2). ARCO plans to remove these USTs and install new double-wall USTs in the same location.

3.0 GEOLOGY

The Site is located in the San Francisco Bay Region of California. Shallow subsurface deposits in the region generally consist of a heterogeneous mixture of moderately to poorly sorted, clay, silt, sand, and gravel (Helley et al, 1979).

Geologic data derived from the six boreholes drilled on site consisted of a heterogeneous mixture of clay and silt with lesser amounts of sand and gravel down to 20 feet below ground surface. Ground water encountered in the boreholes ranged from 13 to 17 feet. Approximately three feet of fill material consisting of silt and sand overlies the native sediments in the vicinity of the USTs.

4.0 FIELD INVESTIGATION

Roux subcontracted Gregg Drilling and Testing, Inc. of Concord, California to drill soil borings at the Site to evaluate potential levels of petroleum hydrocarbons in soil prior to a planned replacement of USTs. The field investigation involved the drilling of four soil borings and collection of undisturbed soil samples. Two vapor extraction test wells were

drilled to determine the feasibility of using vapor extraction techniques at the Site (Figure 2).

4.1 Soil Borings and Sampling

Drilling was performed by Gregg Drilling and Testing, Inc., under the direct supervision of a Roux geologist. Four soil borings (B1, B2, B3, and B4) were drilled adjacent to the existing USTs to a depth ranging from 14.5 to 20 feet below grade. Soil boring B1 was located near the fill end of the existing USTs, and borings B2, B3 and B4 were located along the other sides of the tank complex (Figure 2).

Prior to drilling, boreholes were advanced with a hand auger to a depth of at least three feet, or until it was impossible to advance the hand auger deeper. Native sediments were encountered at about three feet below ground surface. The soil boring was then drilled using six-inch outside diameter, hollow stem augers.

Soil samples for possible laboratory analysis were collected at five foot intervals from each borehole. Samples were collected using a 2.5-inch outside diameter California modified split-spoon sampler lined with three 2-inch by 6-inch clean brass sample tubes. The sampler was driven into the soil ahead of the augers with a 140-pound hammer falling 30 inches. The number of blows required to drive the sampler six inches was recorded, as was the amount of soil recovered by the sampler. The soil boring logs are in Appendix A.

Immediately after the sampler was recovered, one of the three brass sampling tubes was selected for possible laboratory analysis. The ends of this tube were covered with aluminum foil and a plastic cap and sealed with duct tape. The sample was labeled with the location, time, date, sample identification number, and sampler's initials. The sample was placed in a plastic bag and stored on ice in a closed cooler chest until delivery to the laboratory. Chain-of-custody documentation was maintained for all samples (Appendix B).

The contents of one of the sample tubes were emptied into a plastic bag, sealed and placed in the direct sunlight to accelerate the volatilization of any hydrocarbons in the soil. An organic vapor meter (OVM) was used to measure the relative concentration of volatile organic compounds (VOCs) in the plastic bag. The OVM measurements are recorded on the soil boring logs. Field instruments such as the OVM are capable of qualitatively evaluating relative concentrations of VOCs, but cannot be used as a quantitative measure of VOC concentrations.

The contents of the remaining sample tubes were examined by the field geologist. Descriptions of the soil and classification according to the Unified Soil Classification System (USCS) are in the soil boring logs (Appendix A). All of the soil borings, except the two vapor extraction test wells, were backfilled with bentonite grout to within two feet of the surface, followed by concrete to grade.

4.2 Laboratory Analyses

Soil samples collected from the soil borings were delivered for chemical analyses to Sequoia Analytical (Sequoia) of Concord, California, a California State certified laboratory. Eight soil samples were analyzed for total petroleum hydrocarbons as gasoline (TPH-G), benzene, toluene, ethylbenzene and xylenes (BTEX) by Modified U.S. Environmental Protection Agency (USEPA) Method 8015/8020. Two soil samples for each borehole were submitted for chemical analyses. Table 1 summarizes the laboratory analytical data from the borehole soil samples. Laboratory analytical reports are in Appendix C.

4.3 Installation of Vapor Extraction Test Wells

Two vapor extraction system test wells (VW-1 and VW-2) were installed on the southeast side of the Site. These wells were installed to conduct limited soil performance testing (LSPT) to assess the feasibility of using vapor extraction techniques at the Site. This was conducted by Roux on June 6, 1991 and the findings of the LSPT were issued in a separate letter report prepared by Roux (1991).

The vapor extraction test wells were constructed of 2-inch diameter PVC pipe screened over the interval from five to ten feet below land surface. The screened zone was backfilled with a sand filter pack using Number 3 sand. One foot of bentonite pellets was placed above the sand pack. The remaining space was then filled with cement to within one foot of the surface. A surface utility box with a PVC apron was placed over the well and set in concrete. The utility box was placed slightly above the surrounding ground surface and

SOURCE:

USGS 7.5 MINUTE QUADRANGLE
SAN LEANDRO, CALIFORNIA 1968

TITLE:

LOCATION OF SITE

ARCO FACILITY NO. 2185

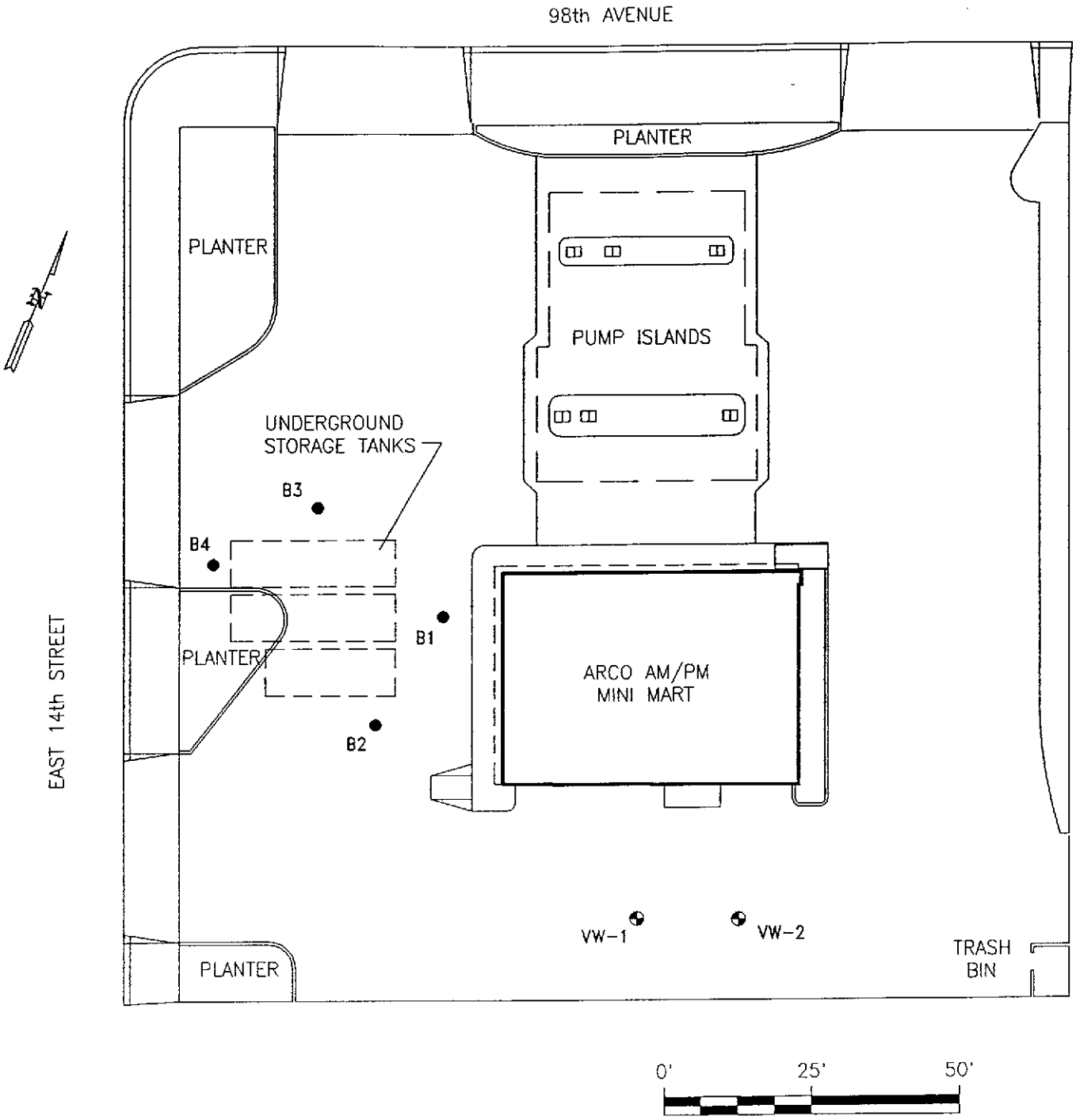
PREPARED FOR:

ARCO PRODUCTS COMPANY

ROUX ASSOCIATES, INC.
ENVIRONMENTAL CONSULTING & MANAGEMENT

COMPILED BY:	T.R.	DATE:	05/91
PREPARED BY:	R.P.	SCALE:	AS SHOWN
PROJECT MANAGER:	B.T.	REVISION:	0
PROJECT NO		A102W01	

FIGURE 1



EXPLANATION

●B3 SOIL BORING LOCATION AND DESIGNATION

⊕VW-1 VAPOR EXTRACTION WELL LOCATION AND DESIGNATION

SOURCE:

MAP MODIFIED FROM BLUEPRINT PROVIDED BY BARGHAUSEN CONSULTING ENGINEERS (1986)

TITLE:

SITE PLAN

ARCO FACILITY NO. 2185

PREPARED FOR:

ARCO PRODUCTS COMPANY

ROUX ASSOCIATES, INC.
ENVIRONMENTAL CONSULTING & MANAGEMENT

COMPILED BY:	T.R.	DATE:	05/91
PREPARED BY:	R.P.	SCALE:	AS SHOWN
PROJECT MANAGER:	B.T.	REVISION:	0
PROJECT NO.	A102W01		

FIGURE 2

TABLE 1: Summary of Soil Sample Analytical Data
ARCO Facility No. 2185, 9800 East 14th Street, Oakland, California

Sample Designation	Date	Depth (feet bgs)	TPH-G(1)	BTEX Distinction(1)			
				Benzene	Toluene	Ethylbenzene	Xylenes
B1-5	5/14/91	5	ND	0.021	ND	ND	0.012
B1-10	5/14/91	10	350	1.1	0.65	4.9	19
B2-5	5/14/91	5	ND	0.034	ND	ND	ND
B2-10	5/14/91	10	280	1.3	0.34	3.4	10
B3-5	5/14/91	5	1.6	0.015	ND	0.021	0.048
B3-10	5/14/91	10	38	ND	0.24	0.31	2
B4-5	5/14/91	5	ND	ND	ND	ND	0.017
B4-10	5/14/91	10	110	0.4	0.2	0.72	0.24

FOOTNOTES:

(1) = Concentrations reported in mg/kg (ppm)

TPH-G =Total Petroleum Fuel Hydrocarbons As Low/Medium Boiling Point Hydrocarbons (USEPA 8015)

BTEX Distinction (USEPA 8020)

ND = Not Detected (For detection limits see laboratory reports, Appendix D)

bgs = below ground surface

covered with a watertight lid. The top of each well casing was secured with a 2-inch diameter, watertight, locking well cap. Vapor extraction boring logs are in Appendix B and their well construction diagrams are in Appendix D.

5.0 SUMMARY OF FINDINGS

Below is a summary of data collected during the preliminary tank replacement assessment at ARCO Facility No. 2185 in Oakland, California:

1) The Site is underlain by alluvial material consisting of interbedded silt and silty clay layers. Ground water was encountered in the boreholes at depths ranging from 13 to 17 feet below ground surface.

2) Laboratory analyses of soil samples collected at 5 feet below ground surface from all of the soil borings indicated levels of TPH-G and BTEX. Maximum concentrations of targeted compounds were: TPH-G, 1.6 mg/kg (ppm); benzene, 0.034 mg/kg; ethylbenzene, 0.021 mg/kg, and xylenes, 0.048 mg/kg. Toluene was not detected in any of these samples.

3) Laboratory analyses of soil samples collected at 10 feet below ground surface from all of the soil borings indicated levels of TPH-G and BTEX. Concentration ranges for targeted compounds were: TPH-G, 38 mg/kg to 350 mg/kg; benzene, not detected to 1.3 mg/kg; toluene, 0.2 to 0.65 mg/kg; ethylbenzene, 0.31 to 4.9 mg/kg; and xylenes, 0.24 to 19 mg/kg. Borings B1 and B2 at the 10 foot level contained generally higher levels of hydrocarbons than borings B3 and B4.

6.0 REFERENCES

Helley, E.J., K.R. LaJoie, W.E. Spangle, and M.L. Blair, 1979, Flatland Deposits of the San Francisco Bay Region, California-their geology and engineering properties and their importance to comprehensive planning. U.S. Geological Professional Paper 943.

Roux Associates, 1991, Letter Report, Limited Soil Performance Test, ARCO Facility No. 2185, 9800 East 14th Street, Oakland, California

U.S. Geological Survey, 1968, Oakland East, California, 7.5-minute topographic quadrangle.

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions			Group Symbols	Typical Names	Field Identification Procedures (excluding particles larger than 3 inches and basing fractions on estimated weights)			Information Required for Describing Soils
1	2		3	4	5			6
Coarse-grained Soils: More than half of material is larger than No. 200 sieve size. The No. 200 sieve size is about the smallest particle visible to the naked eye.	Gravels: More than half of coarse fraction is larger than No. 4 sieve size. (For visual classification, the 1/4-in. size may be used as equivalent to the No. 4 sieve size.)	Clean Gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.	Wide range in grain sizes and substantial amounts of all intermediate particle sizes.			For undisturbed soils add information on stratification, degree of compactness, cementation, moisture conditions, and drainage characteristics.
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines.	Predominantly one size or a range of sizes with some intermediate sizes missing.			
		Gravels with Fines (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixture.	Nonplastic fines or fines with low plasticity (for identification procedures see ML below)			Give typical name: Indicate approximate percentage of sand and gravel, maximum size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information; and symbol in parentheses.
			GC	Clayey gravels, gravel-sand-clay mixtures.	Plastic fines (for identification see CL below)			
	Sands: More than half of coarse fraction is smaller than No. 4 sieve size	Clean Sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines.	Wide range in grain size and substantial amounts of all intermediate particle sizes.			
			SP	Poorly graded sands or gravelly sands, little or no fines.	Predominantly one size or a range of sizes with some intermediate sizes missing.			Example: Silty sand, gravelly; about 20% hard, angular gravel particles 1/2 in. maximum size; rounded and subangular sand grains, course to fine; about 15% nonplastic fines with low dry strength; well compacted and moist in place; alluvial sand; (SM).
		Sands with Fines (Appreciable amount of fines)	SM	Silty sands, sand-silt mistures.	Nonplastic fines or fines with low plasticity (for identification procedures see ML below)			
			SC	Clayey sands, sand-clay mixtures.	Plastic fines (for identification procedures see CL below)			
Fine-grained Soils: More than half of material is smaller than No. 200 sieve size. The No. 200 sieve size is about the smallest particle visible to the naked eye.					Identification Procedures on Fraction Smaller than No. 40 Sieve Size			
					Dry Strength (Crushing characteristics)	Dilatancy (Reaction to shaking)	Toughness (Consistency near PL)	
	Silts and Clays: Liquid limit is less than 50		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.	None to slight	Quick to slow	None	For undisturbed soils add information on structure, stratification, consistency in undisturbed and remolded states, moisture and drainage conditions.
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.	Medium to high	None to very slow	Medium	
			OL	Organic silts and organic silty clays of low plasticity.	Slight to medium	Slow	Slight	Give typical name; indicate degree and character of plasticity; amount and maximum size of coarse grains; color in wet condition; odor, if any; local or geologic name and other pertinent descriptive information; and symbol in parentheses.
	Silts and Clays: Liquid limit is greater than 50		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.	Slight to medium	Slow to none	Slight to medium	
			CH	Inorganic clays of high plasticity, fat clays.	High to very high	None	High	
			OH	Organic clays and silts of medium to high plasticity.	Medium to high	None to very slow	Slight to medium	Example: Clayey silt, brown; slighty plastic; small percentage of fine sand; numerous vertical root holes; firm and dry in place; loess; (ML).
Highly Organic Soils			Pt	Peat and other highly organic soils.	Readily identified by color, odor, spongy feel and frequently by fibrous texture.			

Environmental Consulting & Management

Roux Associates

Soil Boring Log

Boring Number: B1

Client: ARCO Products Company

Project: A102W01

Logged by:	Jonathon Florez	Hole Diameter (in.):	6
Location:	ARCO 2185, Oakland	Hole Depth (ft.):	14.5
Surface Elevation:	25 feet (estimated)	Backfill Material:	Bentonite
Drilling Started:	14 May 1991		
Drilling Ended:	14 May 1991	Hammer weight (lbs.):	140
Driller:	Gregg Drilling & Testing	Hammer fall (in.):	30
Type of Rig:	Mobile B-61	Sampler type:	CA Modified Split-spoon

SAMPLE					Depth (feet)	Strata Change & General Description	SAMPLE DESCRIPTION
Sample Number	Sample depth (feet)	OVM (ppm)	Blows (per 6")	Recovery (inches)			
B1-5	4.5-6.0	50	8,13,15	10	5		Greenish-black clayey SILT, little fine to medium sand.
						ML	Green staining
B1-10	9.5-11.0	100	5,9,24	12	10		Green stained SILT and clay, little fine sand.
						▽	Groundwater encountered at 13 feet.
B1-15	14.5-16.0	1213	3,5,8	10	15		Mottled green and brown clayey SILT, trace fine sand, damp, moderate petroleum hydrocarbon odor.
					20		Total depth = 14.5 feet.

Environmental Consulting & Management

Roux Associates

Soil Boring Log

Boring Number: B2 | Client: ARCO Products Company

Project: A102W01 | Page 1 of 1

Logged by:	Jonathon Florez	Hole Diameter (in.):	6
Location:	ARCO 2185, Oakland	Hole Depth (ft.):	14.5
Surface Elevation:	25 feet (estimated)	Backfill Material:	Bentonite
Drilling Started:	14 May 1991		
Drilling Ended:	14 May 1991	Hammer weight (lbs.):	140
Driller:	Gregg Drilling & Testing	Hammer fall (in.):	30
Type of Rig:	Mobile B-61	Sampler type:	CA Modified Split-spoon

SAMPLE					Depth (feet)	Strata Change & General Description	SAMPLE DESCRIPTION
Sample Number	Sample depth (feet)	OVM (ppm)	Blows (per 6")	Recovery (inches)			
B2-5	5.0-6.5	42	5,7,9	18	5	ML	Mottled green and dark grey SILT, trace yellow-green gravel, strong petroleum hydrocarbon odor.
B2-10	9.5-11.0	41	3,7,8	12	10		Greyish-black to greenish grey SILT, trace coarse-medium sand, damp, strong petroleum hydrocarbon odor.
						▽	Groundwater encountered at 13 feet.
B2-15	14.5-16.0	449	5,8,11	13	15	CL	Greenish-grey CLAY with rusty brown mottles, wet, weak petroleum hydrocarbon odor. Total depth = 14.5 feet.
					20		

Environmental Consulting & Management

Roux Associates

Soil Boring Log

Boring Number: B3 | Client: ARCO Products Company

Project: A102W01 |

Logged by:	Jonathon Florez	Hole Diameter (in.):	6
Location:	ARCO 2185, Oakland	Hole Depth (ft.):	14.5
Surface Elevation:	25 feet (estimated)	Backfill Material:	Bentonite
Drilling Started:	14 May 1991		
Drilling Ended:	14 May 1991	Hammer weight (lbs.):	140
Driller:	Gregg Drilling & Testing	Hammer fall (in.):	30
Type of Rig:	Mobile B-61	Sampler type:	CA Modified Split-spoon

SAMPLE					Depth (feet)	Strata Change & General Description	SAMPLE DESCRIPTION
Sample Number	Sample depth (feet)	OVM (ppm)	Blows (per 6")	Recovery (inches)			
B3-5	5.0-6.5	54	7,9,14	12	5	CL	Greenish grey silty CLAY, trace gravel, weak petroleum hydrocarbon odor.
B3-10	9.5-11.0	32	3,6,7	10	10		As above with trace fine sand.
						▽	Groundwater encountered at 13 feet.
B3-15	14.5-16.0	--	4,6,9	N.R.	15		No recovery. Total depth = 14.5 feet.
					20		

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Soil Boring Log

Boring Number: B4 | Client: ARCO Products Company

Project: A102W01 | Page 1 of 1

Logged by:	Jonathon Florez	Hole Diameter (in.):	6
Location:	ARCO 2185, Oakland	Hole Depth (ft.):	20
Surface Elevation:	25 feet (estimated)	Backfill Material:	Bentonite
Drilling Started:	14 May 1991		
Drilling Ended:	14 May 1991	Hammer weight (lbs.):	140
Driller:	Gregg Drilling & Testing	Hammer fall (in.):	30
Type of Rig:	Mobile B-61	Sampler type:	CA Modified Split-spoon

SAMPLE					Depth (feet)	Strata Change & General Description	SAMPLE DESCRIPTION
Sample Number	Sample depth (feet)	OVM (ppm)	Blows (per 6")	Recovery (inches)			
						Fill	Olive-grey SILT with trace fine gravel fill.
B4-5	5.0-6.5	2	8,17,14	10	5	ML	Brownish-black clayey SILT, trace gravel, no odor.
						CL	Medium greyish-green silty CLAY, weak petroleum hydrocarbon odor.
B4-10	10.0-11.5	673	5,7,9	10	10	ML	Greyish-green to olive-green clayey SILT, trace fine sand, moist, strong petroleum hydrocarbon odor.
B4-15	15.0-16.5	--	5,7,9	6.5	15	CL	Mottled medium greyish-green and rusty orange silty CLAY, trace fine sand, moist, strong petroleum hydrocarbon odor.
						▽	Groundwater encountered at 17 feet.
B4-20	20.0-21.5	10	3,6,6	12	20		As above, wet, weak hydrocarbon odor. Total depth = 20 feet.

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Soil Boring Log

Boring Number: VW-1

Client: ARCO Products Company

Project: A102W01

Logged by:	Jonathon Florez	Hole Diameter (in.):	8
Location:	ARCO 2185, Oakland	Hole Depth (ft.):	10
Surface Elevation:	25 feet (estimated)	Backfill Material:	Bentonite
Drilling Started:	14 May 1991		
Drilling Ended:	14 May 1991	Hammer weight (lbs.):	n/a
Driller:	Gregg Drilling & Testing	Hammer fall (in.):	n/a
Type of Rig:	Mobile B-61	Sampler type:	n/a

SAMPLE					Depth (feet)	Strata Change & General Description	SAMPLE DESCRIPTION
Sample Number	Sample depth (feet)	OVM (ppm)	Blows (per 6")	Recovery (inches)			
						Fill	Mottled olive-black silty CLAY and gravel fill.
					5	CL	Black silty CLAY, trace coarse sand.
						ML	Medium brown clayey SILT, trace fine sand, no odor.
					10		Total depth = 10 feet.
					15		
					20		

Environmental Consulting & Management

Roux Associates

Soil Boring Log

Boring Number: VW-2

Client: ARCO Products Company

Project: A102W01

Logged by:	Jonathon Florez	Hole Diameter (in.):	8
Location:	ARCO 2185, Oakland	Hole Depth (ft.):	10
Surface Elevation:	25 feet (estimated)	Backfill Material:	Bentonite
Drilling Started:	14 May 1991		
Drilling Ended:	14 May 1991	Hammer weight (lbs.):	n/a
Driller:	Gregg Drilling & Testing	Hammer fall (in.):	n/a
Type of Rig:	Mobile B-61	Sampler type:	n/a

SAMPLE					Depth (feet)	Strata Change & General Description	SAMPLE DESCRIPTION
Sample Number	Sample depth (feet)	OVM (ppm)	Blows (per 6")	Recovery (inches)			
						Fill	Coarse sand, little gravel fill.
							Black silty CLAY, trace fine sand.
					5	CL	
							Light brown to black silty CLAY, trace fine sand, no odor.
					10		Total depth = 10 feet.
					15		
					20		

ARCO Products Company — Division of AtlanticRichfieldCompany

Task Order No. 2185-91-1

Chain of Custody

ARCO Facility no. 2185	City (Facility) OAKLAND	Project manager (Consultant) BRIAN THOMAS	Laboratory name SEQUOIA
ARCO engineer KYLE CHRISTIE	Telephone no. (ARCO)	Telephone no. (Consultant) 370-2275	Fax no. (Consultant) 370-2235
Consultant name Roux Associates	Address (Consultant) 1350 ARNOLD DR. SUITE 201, MARTINEZ, CA		Contract number

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☒ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☒ Lead EPA 7420/7421 ☐		
B1-5			X			X		5/14/91	0925		X											
B1-10			X			X			0930		X											
B1-15			X			X			0945												HOLD	
B2-5			X			X			1045		X											
B2-10			X			X			1052		X											
B2-15			X			X			1100												HOLD	
B3-5			X			X			1225		X											
B3-10			X			X			1230		X											
B4-5			X			X			1520		X										*	
B4-10			X			X			1542		X											
B4-15			X			X			1547												HOLD	
B4-20			X			X			1600												HOLD	
DC-1 (A-B)			X (COMPOSITE)			Y			1735		X									X		

Special detection Limit/reporting

Special QA/QC

Remarks

Lab number

Method of shipment: HAND

Turnaround time

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

Condition of sample: GOOD		Temperature received: COLD
Relinquished by sampler	Date 5/15/91 Time 10:45	Received by
Relinquished by	Date Time	Received by
Relinquished by	Date Time	Received by laboratory → Date 5/15 Time 10:45

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

APPC-3292 (2-91)

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 2185-91-1

Chain of Custody

ARCO Facility no. 2185	City (Facility) OAKLAND	Project manager (Consultant) R. THOMAS	Laboratory name SEQUOIA
ARCO engineer C. CARMEL	Telephone no. (ARCO)	Telephone no. (Consultant) 370-7275	Fax no. (Consultant) 370-7235
Consultant name ROUX ASSOCIATES	Address (Consultant) 1350 ARNOLD DRIVE SUITE 201, MARTINEZ, CA 94553		Contract number

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☒ Lead EPA 7420/7421 ☐		
DX-2A		1						1510	7/29/91													
DX-2B		1	X			X		1510	7/29/91		X									X		
DX-2C		1						1510	7/29/91													
DX-2D		1						1510	7/29/91													

Special detection Limit/reporting

Special QA/QC

Remarks
COMPOSITE INTO ONE SAMPLE

Lab number

Method of shipment HAND

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

Condition of sample:		Temperature received:
Relinquished by sampler: Todd W Lamb	Date 7/29/91 Time 1705	Received by: Karen Graham
Relinquished by	Date Time	Received by
Relinquished by	Date Time	Received by laboratory / Date / Time

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

APPENDIX C

Laboratory Analytical Reports

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

Roux Associates
340 Arnold Drive, Suite 231
Martinez, CA 94553
Attention: Brian Thomas

Project: ARCO #2185/#2185-91-2

Enclosed are the results from 9 soil samples received at Sequoia Analytical on May 15,1991. The requested analyses are listed below:

1050556	Soil, B1-5	5/14/91	EPA 5030/8015/8020
1050557	Soil, B1-10	5/14/91	EPA 5030/8015/8020
1050559	Soil, B2-10	5/14/91	EPA 5030/8015/8020
105-0558	Soil, B2-5	5/14/91	EPA 5030/8015/8020
105-0560	Soil, B3-5	5/14/91	EPA 5030/8015/8020
105-0561	Soil, B3-10	5/14/91	EPA 5030/8015/8020
105-0562	Soil, B4-5	5/14/91	EPA 5030/8015/8020
105-0563	Soil, B4-10	5/14/91	EPA 5030/8015/8020

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Julia R. Malerstein
Project Manager

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

oux Associates	Client Project ID:	ARCO #2185/#2185-91-2	Sampled:	May 14, 1991
1340 Arnold Drive, Suite 231	Matrix Descript:	Soil	Received:	May 15, 1991
Martinez, CA 94553	Analysis Method:	EPA 5030/8015/8020	Analyzed:	May 23, 1991
ttention: Brian Thomas	First Sample #:	105-0556	Reported:	May 30, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
105-0556	B1-5	N.D.	0.021	N.D.	N.D.	0.012
105-0558	B2-5	N.D.	0.034	N.D.	N.D.	N.D.
105-0560	B3-5	1.6	0.015	N.D.	0.021	0.048
105-0562	B4-5	N.D.	N.D.	N.D.	N.D.	0.017
Detection Limits:		**1.0**	**0.0050**	**0.0050**	**0.0050**	**0.0050**

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
alytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

J R Malerstein

lia R. Malerstein
oject Manager

1050556.RRR <1>

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

Roux Associates
340 Arnold Drive, Suite 231
Martinez, CA 94553
Attention: Brian Thomas

Project: ARCO #2185/#2185-91-2

Enclosed are the results from 9 soil samples received at Sequoia Analytical on May 15,1991. The requested analyses are listed below:

1050556	Soil, B1-5	5/14/91	EPA 5030/8015/8020
1050557	Soil, B1-10	5/14/91	EPA 5030/8015/8020
1050559	Soil, B2-10	5/14/91	EPA 5030/8015/8020
105-0558	Soil, B2-5	5/14/91	EPA 5030/8015/8020
105-0560	Soil, B3-5	5/14/91	EPA 5030/8015/8020
105-0561	Soil, B3-10	5/14/91	EPA 5030/8015/8020
105-0562	Soil, B4-5	5/14/91	EPA 5030/8015/8020
105-0563	Soil, B4-10	5/14/91	EPA 5030/8015/8020
105-0564 A-D	Soil, DC-1(A-D)	5/14/91	California LUFT Manual, 12/87 EPA 5030/8015/8020

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Julia R. Malerstein
Project Manager

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

oux Associates	Client Project ID:	ARCO #2185/#2185-91-2	Sampled:	May 14, 1991
1340 Arnold Drive, Suite 231	Matrix Descript:	Soil	Received:	May 15, 1991
artinez, CA 94553	Analysis Method:	EPA 5030/8015/8020	Analyzed:	May 23, 1991
ttention: Brian Thomas	First Sample #:	105-0556	Reported:	May 30, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
105-0556	B1-5	N.D.	0.021	N.D.	N.D.	0.012
105-0558	B2-5	N.D.	0.034	N.D.	N.D.	N.D.
105-0560	B3-5	1.6	0.015	N.D.	0.021	0.048
105-0562	B4-5	N.D.	N.D.	N.D.	N.D.	0.017
105-0564 A-D	DC-1(A-D)	110	0.11	0.35	0.39	2.0
etection Limits:		**1.0**	**0.0050**	**0.0050**	**0.0050**	**0.0050**

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Julia R. Malerstein
Project Manager

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

ɒux Associates
1340 Arnold Drive, Suite 231
Martinez, CA 94553
ttention: Brian Thomas

Client Project ID: ARCO #2185/#2185-91-2

QC Sample Group: 1050556-64

Reported: May 30, 1991

QUALITY CONTROL DATA REPORT

NALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA8015/8020	EPA8015/8020	EPA8015/8020	EPA8015/8020
Analyst:	J. Fontecha	J. Fontecha	J. Fontecha	J. Fontecha
Reporting Units:	ppm	ppm	ppm	ppm
Date Analyzed:	May 23, 1991	May 23, 1991	May 23, 1991	May 23, 1991
QC Sample #:	Matrix Blank	Matrix Blank	Matrix Blank	Matrix Blank
ample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	0.40	0.40	0.40	1.2
Conc. Matrix Spike:	0.40	0.40	0.40	1.2
Matrix Spike % Recovery:	110	100	100	100
Conc. Matrix Spike Dup.:	0.42	0.41	0.42	1.2
Matrix Spike Duplicate % Recovery:	110	100	110	100
Relative % Difference:	4.9	2.5	4.9	0

uality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

ula R. Malerstein
oject Manager

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

Roux Associates	Client Project ID:	ARCO #2185/#2185-91-2	Sampled:	May 14, 1991
1340 Arnold Drive, Suite 231	Sample Descript:	Soil	Received:	May 15, 1991
Martinez, CA 94553	Analysis Method:	California LUFT Manual, 12/87	Extracted:	May 29, 1991
Attention: Brian Thomas	First Sample #:	105-0564 A-D	Analyzed:	May 30, 1991
			Reported:	May 30, 1991

ORGANIC LEAD

Sample Number	Sample Description	Sample Results mg/kg (ppm)
105-0564 A-D	DC-1(A_D)	N.D.

Detection Limits:	0.050

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Julia R. Malerstein
Project Manager

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

ux Associates
1340 Arnold Drive, Suite 231
artinez, CA 94553
ttention: Brian Thomas

Client Project ID: ARCO #2185/#2185-91-2

QC Sample Group: 1050556-64

Reported: May 30, 1991

QUALITY CONTROL DATA REPORT

NALYTE	Organic Lead
Method:	HML Draft
Analyst:	N. Herrera
Reporting Units:	mg/L
Date Analyzed:	May 30, 1991
QC Sample #:	105-0897
ample Conc.:	N.D.
Spike Conc. Added:	0.020
Conc. Matrix Spike:	0.016
Matrix Spike % Recovery:	80
Conc. Matrix Spike Dup.:	0.016
Matrix Spike Duplicate % Recovery:	80
Relative % Difference:	0

SEQUOIA ANALYTICAL

ula R. Malerstein
oject Manager

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

oux Associates	Client Project ID:	ARCO #2185/#2185-91-2	Sampled:	May 14, 1991
340 Arnold Drive, Suite 231	Matrix Descript:	Soil	Received:	May 15, 1991
Martinez, CA 94553	Analysis Method:	EPA 5030/8015/8020	Analyzed:	May 23, 1991
ttention: Brian Thomas	First Sample #:	105-0557	Reported:	May 30, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
105-0557	B1-10	350	1.1	0.65	4.9	19
Detection Limits:		**20**	**0.10**	**0.10**	**0.10**	**0.10**

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

SEQUOIA ANALYTICAL

Julia R. Malerstein
Project Manager

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

Roux Associates	Client Project ID:	ARCO #2185/#2185-91-2	Sampled:	May 14, 1991
3340 Arnold Drive, Suite 231	Matrix Descript:	Soil	Received:	May 15, 1991
Martinez, CA 94553	Analysis Method:	EPA 5030/8015/8020	Analyzed:	May 23, 1991
Attention: Brian Thomas	First Sample #:	105-0559	Reported:	May 30, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
105-0559	B2-10	280	1.3	0.34	3.4	10
105-0561	B3-10	38	N.D.	0.24	0.31	2.0
105-0563	B4-10	110	0.40	0.20	0.72	0.24
Detection Limits:		**10**	**0.050**	**0.050**	**0.050**	**0.050**

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

SEQUOIA ANALYTICAL

Julia R. Malerstein
Project Manager

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

oux Associates	Client Project ID:	ARCO #2185/#2185-91-2	Sampled:	May 14, 1991
340 Arnold Drive, Suite 231	Matrix Descript:	Soil	Received:	May 15, 1991
Martinez, CA 94553	Analysis Method:	EPA 5030/8015/8020	Analyzed:	May 23, 1991
Attention: Brian Thomas	First Sample #:	105-0564 A-D	Reported:	May 30, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
105-0564 A-D	DC-1(A-D)	110	0.11	0.35	0.39	2.0
Detection Limits:		**1.0**	**0.0050**	**0.0050**	**0.0050**	**0.0050**

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Julia R. Malerstein
Project Manager

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

RECEIVED JUL 1 2 1991

Roux Associates
1340 Arnold Drive, Suite 231
Martinez, CA 94553
Attention: Brian Thomas

Project: ARCO #2185/#2185-91-2

Enclosed are the results from 1 soil sample received at Sequoia Analytical on May 15,1991. The requested analyses are listed below:

05-0564 A-D	Soil, DC-1(A-D)	5/14/91	California LUFT Manual, 12/87 EPA 5030/8015/8020

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Julia R. Malerstein
Project Manager

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

Roux Associates
[illegible]50 Arnold Drive, Suite 201
[illegible]artinez, CA 94553
Attention: B. Thomas

[illegible]roject: 2185-91-1 / ARCO #2185 Oakland

Enclosed is the result from 1 soil sample received at Sequoia Analytical on July 29,1991. The requested [illegible]nalyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
[illegible]070808 A-D	Soil, DC-2A - DC-2D	7/29/91	HML Draft EPA 5030/8015/8020

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you [illegible]n this project.

Very truly yours,

[illegible]EQUOIA ANALYTICAL

[illegible]lia R. Malerstein
Project Manager

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

oux Associates	Client Project ID:	2185-91-1 / ARCO #2185 Oakland	Sampled:	Jul 29, 1991
1340 Arnold Drive, Suite 231	Sample Descript.:	Soil, DC-2A - DC-2D	Relogged:	Aug 6, 1991
Martinez, CA 94553	Analysis Method:	EPA 5030/8015/8020	Analyzed:	Aug 6, 1991
ttention: B. Thomas	Lab Number:	107-0808 A-D	Reported:	Aug 7, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS WITH BTEX DISTINCTION (EPA 8015/8020)

Analyte	Detection Limit mg/kg (ppm)	Sample Results mg/kg (ppm)
ow to Medium Boiling Point Hydrocarbons	1.0	3.4
Benzene	0.0050	0.0054
oluene	0.0050	0.018
hyl Benzene	0.0050	0.012
Xylenes	0.0050	0.065

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Julia R. Malerstein
Project Manager

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

oux Associates
340 Arnold Drive, Suite 231
Martinez, CA 94553
ttention: B. Thomas

Client Project ID: 2185-91-1 / ARCO #2185 Oakland

QC Sample Group: 107-0808

Reported: Aug 7, 1991

QUALITY CONTROL DATA REPORT

NALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA8015/8020	EPA8015/8020	EPA8015/8020	EPA8015/8020
Analyst:	R.H./J.F.	R.H./J.F.	R.H./J.F.	R.H./J.F.
Reporting Units:	mg/kg	mg/kg	mg/kg	mg/kg
Date Analyzed:	Aug 5, 1991	Aug 5, 1991	Aug 5, 1991	Aug 5, 1991
QC Sample #:	107-0808	107-0808	107-0808	107-0808
ample Conc.:	0.0054	0.018	0.012	0.065
Spike Conc. Added:	0.40	0.40	0.40	1.2
Conc. Matrix Spike:	0.43	0.42	0.46	1.3
Matrix Spike % Recovery:	110	110	120	110
Conc. Matrix Spike Dup.:	0.42	0.41	0.44	1.3
Matrix Spike Duplicate % Recovery:	110	100	110	110
Relative % Difference:	2.4	2.4	4.4	0

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Julia R. Malerstein
roject Manager

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

Roux Associates	Client Project ID:	2162-91-1 / ARCO #2162 San Leandro	Sampled:	Jul 29, 1991
340 Arnold Drive, Suite 231	Sample Descript:	Soil, DC-2A - DC-2D	Relogged:	Aug 6, 1991
Martinez, CA 94553			Extracted:	Aug 6, 1991
Attention: B. Thomas	Lab Number:	107-0809 A-D	Analyzed:	Aug 7, 1991
			Reported:	Aug 7, 1991

LABORATORY ANALYSIS

Analyte	Detection Limit mg/kg	Sample Results mg/kg
Organic Lead	0.0010	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Julia R. Malerstein
Project Manager

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

oux Associates
1340 Arnold Drive, Suite 231
Martinez, CA 94553
ttention: B. Thomas

Client Project ID: 2185-91-1 / ARCO #2185 Oakland

QC Sample Group: 107-0808

Reported: Aug 7, 1991

QUALITY CONTROL DATA REPORT

NALYTE
Lead (Organic)

Method:	HML Draft
Analyst:	N. Herrera
Reporting Units:	mg/kg
Date Analyzed:	Aug 7, 1991
QC Sample #:	107-0808

Sample Conc.:	N.D.
Spike Conc. Added:	0.0020
Conc. Matrix Spike:	0.0020
Matrix Spike % Recovery:	100
Conc. Matrix Spike Dup.:	0.0025
Matrix Spike Duplicate % Recovery:	130
Relative % Difference:	22

uality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Julia R. Malerstein
oject Manager

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

APPENDIX D

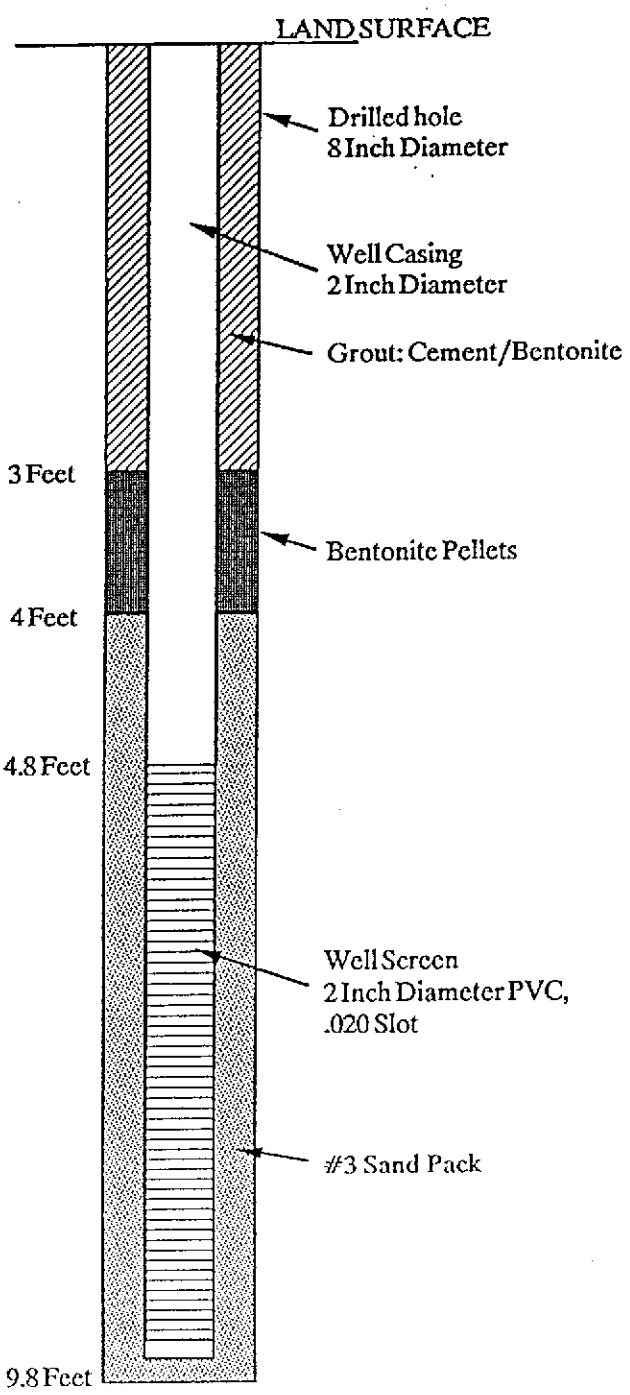
Vapor Extraction Well Logs

Environmental Consulting & Management

Roux Associates — Vapor Extraction Well Construction Log

Well Number: VW-1
Project: A102W01

Client: ARCO Products Company



Well Purpose:	Vapor Extraction Well
Project Name:	ARCO 2185
Address:	9800 East 14th Street
City:	Oakland
County:	Alameda
State:	California

Land Surface Elevation 25 Feet (Estimated)

Installation Date:	May 14, 1991
Drilling Method:	Hollow Stem Auger
Drilling Contractor:	Gregg Drilling
Drilling Fluid:	None

Remarks: Well was finished flush to ground surface. Groundwater was not encountered. Depth measurements are in feet below ground surface.

Environmental Consulting & Management

Roux Associates

Soil Boring Log

Boring Number: VW-2

Client: ARCO Products Company

Project: A102W01

Logged by:	Jonathon Florez	Hole Diameter (in.):	8
Location:	ARCO 2185, Oakland	Hole Depth (ft.):	10
Surface Elevation:	25 feet (estimated)	Backfill Material:	Bentonite
Drilling Started:	14 May 1991	Hammer weight (lbs.):	n/a
Drilling Ended:	14 May 1991	Hammer fall (in.):	n/a
Driller:	Gregg Drilling & Testing	Sampler type:	n/a
Type of Rig:	Mobile B-61		

SAMPLE					Depth (feet)	Strata Change & General Description	SAMPLE DESCRIPTION
Sample Number	Sample depth (feet)	OVM (ppm)	Blows (per 6")	Recovery (inches)			
						Fill	Coarse sand, little gravel fill.
							Black silty CLAY, trace fine sand.
					5	CL	
							Light brown to black silty CLAY, trace fine sand, no odor.
					10		Total depth = 10 feet.
					15		
					20		

APPENDIX B

Chain-of-Custody Documentation