ENVIRONMENTAL CONSULTING & MANAGEMENT
ROUX ASSOCIATES

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Transmittal/Memorandum

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

From: Paul Supple PS

Date: November 22, 1991

Subject: Limited Subsurface Soil Investigation
ARCO Facility No. 285
9800 East 14th Street
Oakland, California

Job No.: A102W03

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

---

cc: Mr. Charles Carmel, ARCO Products Company
Mr. Chris Winsor, ARCO Products Company
Mr. Richard Hiett, Regional Water Quality Control Board

Doc #A102W03.1.2

LIMITED SUBSURFACE SOIL INVESTIGATION

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

November 22, 1991

Prepared for:

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

Prepared by:

ROUX ASSOCIATES
1350 Arnold Drive, Suite 201
Martinez, California 94553
(510) 370-2275

Doc #A102W03.1.1

TITLE: Limited Subsurface Soil Investigation
ARCO Facility No. 2185
9800 E. 14th Street
Oakland, California

DATE: November 22, 1991

PROJECT NO: A102W03

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:

Dean A. Richesin
Certified Engineering Geologist No. 1055

Paul Supple
Senior Hydrogeologist

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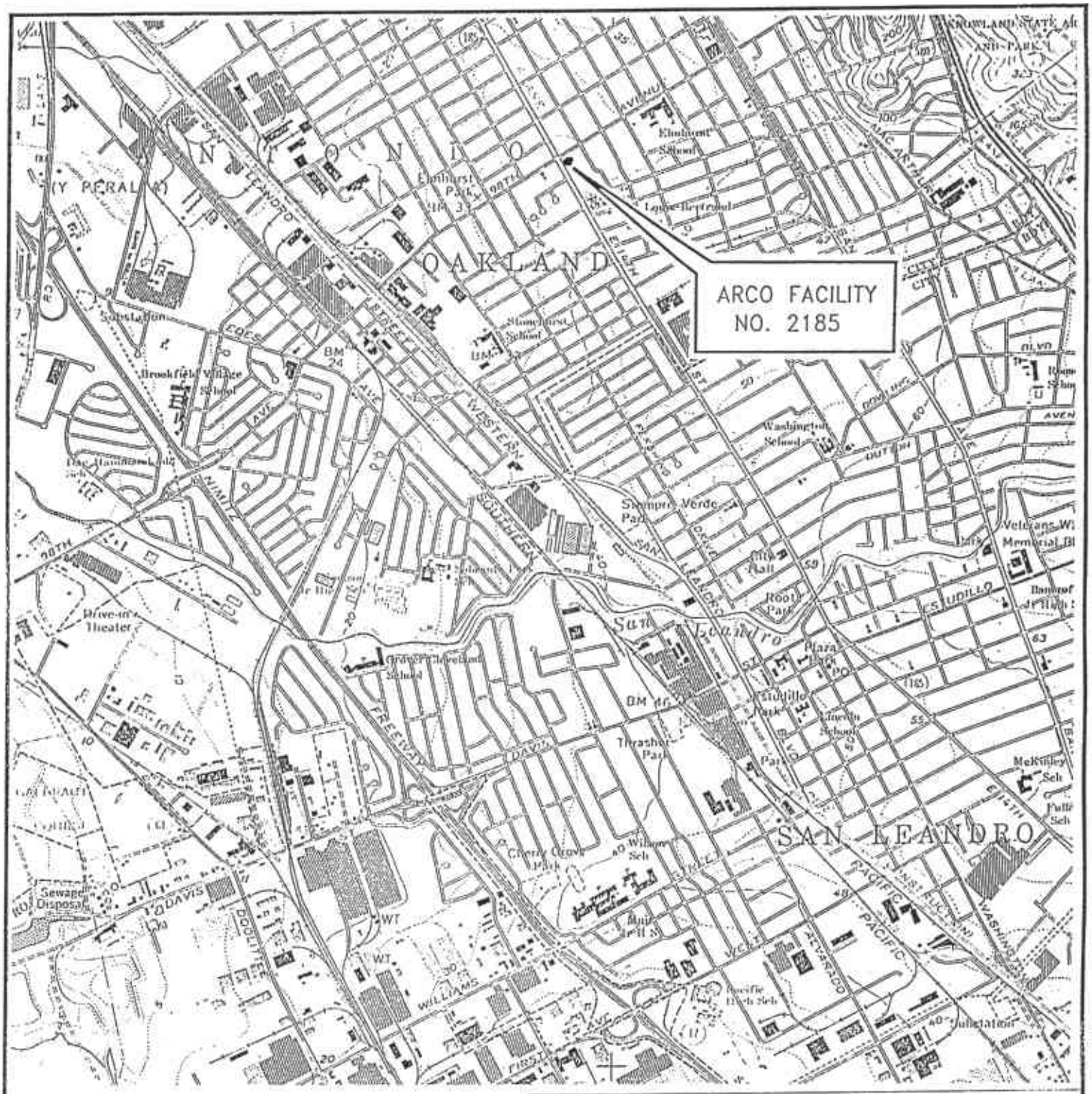
1.0 INTRODUCTION

This report describes the results of a limited subsurface soil investigation performed by Roux Associates (Roux) at ARCO Products Company (ARCO) Facility No. 2185 at 9800 E. 14th Street, Oakland, California (Site). This investigation was conducted on September 10, 1991 to evaluate soil conditions with respect to hydrocarbon contamination in the area of the proposed new underground storage tank (UST) field prior to ARCO's planned UST replacement 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. All work performed by Roux was conducted by Roux geologists under the direction of Mr. Dean A. Richesin, Certified Engineering Geologist No. 1055.

2.0 SITE DESCRIPTION

ARCO Facility No. 2185 is an operating self-service gasoline station and ARCO 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 ARCO 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).



SOURCE:

USGS 7.5 MINUTE QUADRANGLE
SAN LEANDRO, CALIFORNIA 1968

TITLE:

LOCATION OF SITE

ARCO FACILITY NO. 2185

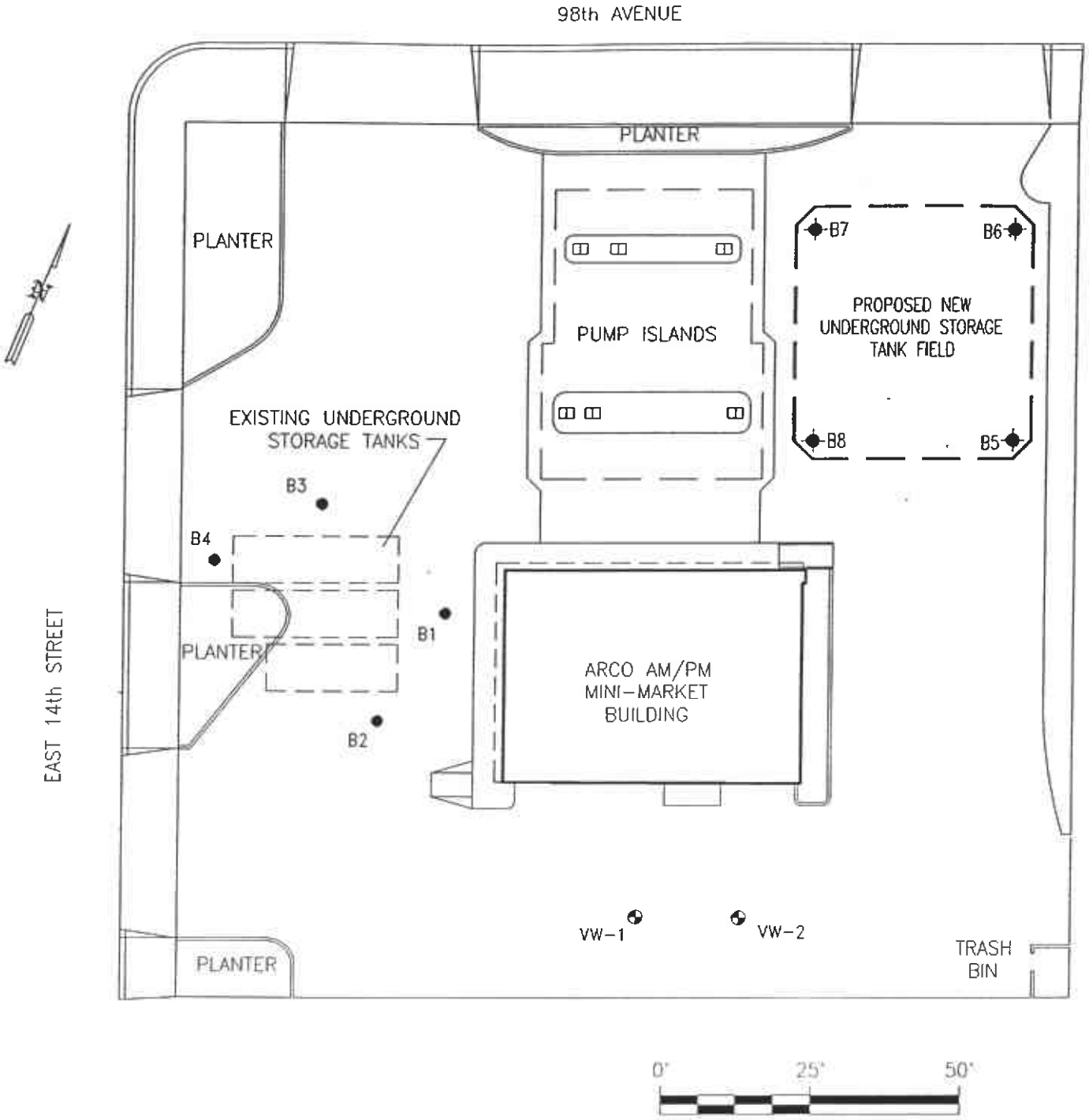
PREPARED FOR:

ARCO PRODUCTS COMPANY

ROUX
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

- ● B1 — SOIL BORING LOCATION AND DESIGNATION (MAY, 1991)
- ⊕ B5 — SOIL BORING LOCATION AND DESIGNATION (SEPTEMBER, 1991)
- ⊕ 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
ENVIRONMENTAL CONSULTING & MANAGEMENT

COMPILED BY:	T.R.	DATE:	09/91
PREPARED BY:	E.P.	SCALE:	AS SHOWN
PROJECT MANAGER:	P.S.	REVISION:	0
PROJECT NO:	A102W03	FILE #:	AR2185XX

FIGURE 2

ARCO plans to remove these USTs and install four new double-wall USTs in a new tank cavity east of the pump islands.

3.0 PREVIOUS INVESTIGATIONS

In May 1991, Roux conducted a preliminary tank replacement assessment at the Site (Roux, 1991a). The purpose of the assessment was to evaluate soil conditions with respect to hydrocarbon contamination in the area of the existing USTs prior to planned removal of the tanks. The investigation consisted of drilling and sampling six soil borings and installation of two vapor extraction test wells into two of the borings (Figure 2).

The boreholes, drilled in May 1991, encountered unconsolidated alluvial sediments consisting of interbedded silts and silty clays to a depth of 20 feet below ground surface (bgs). Ground water was encountered in the boreholes at a depth of about 13 feet bgs. Laboratory analyses of soil samples collected from the boreholes drilled adjacent to the existing tanks indicated elevated concentrations of petroleum hydrocarbons. Table 1 summarizes the laboratory analytical data collected in May 1991.

On June 6, 1991, Roux conducted a limited soil performance test to determine whether subsurface soil conditions at the Site would be amenable to soil venting/vacuum extraction remediation techniques (Roux, 1991b). A vacuum was applied to one of the vapor extraction test wells and the second well was monitored for a pressure change. The results

TABLE 1: Summary of Soil Sample Analyses: Soil Borings B1-B4 (Roux, 1991a)
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

bgs = below ground surface

indicated the subsurface conditions at the Site are not amenable to soil venting/vacuum extraction remediation techniques.

4.0 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 alluvial and near-shore deposits of moderately to poorly sorted, clay, silt, sand, and gravel (Helley et al, 1979).

Geologic data derived from the ten boreholes drilled on site indicate the native sediments consist of a heterogeneous mixture of clay and silt with lesser amounts of sand and gravel to a depth of 20 feet bgs. Approximately one to three feet of loose artificial fill material consisting of silt and sand or roadbase overlies the native clay and silt sediments at the Site. Ground water was encountered in the boreholes drilled in May and September 1991 at depths of about 13 and 14 feet bgs, respectively.

5.0 FIELD INVESTIGATION

In September 1991, Roux subcontracted Gregg Drilling and Testing, Inc. (Gregg) of Concord, California to drill soil borings at the Site to evaluate soil conditions with respect to hydrocarbon contamination in the area of the proposed new tank field. The field investigation involved the drilling of four soil borings and collection of undisturbed soil samples.

5.1 Drilling and Soil Sampling Procedures

Drilling was performed by Gregg under the direct supervision of a Roux geologist. Four soil borings (B5, B6, B7, and B8) were drilled in the proposed new UST field to depths ranging from 16.5 to 19.5 feet bgs. The soil borings were located at the four corners of the proposed new UST field (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 one foot bgs. The soil boring was then drilled using 6.5-inch outside diameter, hollow stem augers.

Soil samples for possible laboratory analysis were collected 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 contained 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, 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 field 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 are in the soil boring logs (Appendix A). All of the soil borings were backfilled with bentonite chips to within two feet of the surface and followed by concrete to grade.

5.2 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. Eleven soil samples were analyzed for total petroleum fuel hydrocarbons as low/medium boiling point hydrocarbons (TPH-G), benzene, toluene, ethylbenzene and xylenes (BTEX) by Modified U.S. Environmental Protection Agency (USEPA) Method 8015/8020. Two to

three soil samples from each borehole were submitted for chemical analyses. Table 2 summarizes the laboratory analytical data from the borehole soil samples. Laboratory analytical reports are presented in Appendix C.

TABLE 2: Summary of Soil Sample Analyses: Soil Borings B5-B8
ARCO Facility No. 2185, 9800 East 14th Street, Oakland, California

Sample		Depth		BTEX Distinction(1)			
Designation	Date	(feet bgs)	TPH-G(1)	Benzene	Toluene	Ethylbenzene	Xylenes
B5-5	9/10/91	5	ND	ND	ND	ND	ND
B5-11	9/10/91	11	ND	ND	ND	ND	ND
B5-13	9/10/91	13	ND	ND	ND	ND	ND
B6-5	9/10/91	5	ND	ND	ND	ND	ND
B6-10	9/10/91	10	ND	ND	ND	ND	ND
B7-5	9/10/91	5	ND	ND	ND	ND	ND
B7-11	9/10/91	11	1.7	0.04	0.013	0.0079	0.078
B7-13	9/10/91	13	1.7	0.27	0.0083	0.04	0.028
B8-5	9/10/91	5	ND	ND	ND	ND	ND
B8-11	9/10/91	11	1.7	0.054	0.0094	0.012	0.019
B8-13	9/10/91	13	1.3	0.013	0.0073	0.0053	0.0069

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 C)

bgs = below ground surface

6.0 SUMMARY OF FINDINGS

Below is a summary of data collected from the four soil borings drilled in the area of the proposed new UST field at ARCO Facility No. 2185 in Oakland, California:

1) The Site is underlain by alluvial material consisting of a heterogeneous mixture of clay and silt with lesser amounts of sand and gavel to a depth of 20 feet bgs. Ground water beneath the Site is encountered at a depth of about 13 to 14 feet bgs.

2) Laboratory analyses of soil samples collected from soil borings B5 and B6 indicated that TPH-G and BTEX were not present above the limits of detection (Table 2). Soil borings B5 and B6 are located at the northeast and southeast corners of the proposed new UST field (Figure 2).

3) Laboratory analyses of soil samples collected from soil borings B7 and B8 indicated detectable concentrations of TPH-G and BTEX at 11 and 13 feet bgs. TPH-G concentrations were less than 2 mg/kg and BTEX concentrations were no higher than 0.27 mg/kg. Laboratory analyses of soil samples collected at 5 feet bgs indicated that TPH-G and BTEX were not present above the limits of detection. Soil borings B7 and B8 are located at the northwest and southwest corners of the proposed new UST field.

7.0 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. 1991a. Preliminary Tank Replacement Assessment, ARCO Facility No. 2185, 9800 East 14th Street, Oakland, California, August 8, 1991.

Roux Associates. 1991b. Letter Report, Limited Soil Performance Test, ARCO Facility No. 2185, 9800 East 14th Street, Oakland, California, August 28, 1991.

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

ROUX

SYMBOL KEY

LITHOLOGIC SYMBOL KEY
(Unified Soil Classification System)

		*Fill*
	*SW*	*Well Graded Sand*
	*SP*	*Poorly Graded Sand*
	*SM*	*Silty Sand*
	*SC*	*Clayey Sand*
	*PT*	*Peat*
	*OL*	*Low Plasticity Organic Silt*
	*OH*	*High Plasticity Organic Silt*
	*ML*	*Low Plasticity Silt*
	*MH*	*High Plasticity Silt*
	*GW*	*Well Graded Gravel*
	*GP*	*Poorly Graded Gravel*
	*GM*	*Silty Gravel*
	*GC*	*Clayey Gravel*
	*CL*	*Low Plasticity Clay*
	*CH*	*High Plasticity Clay*

SAMPLER SYMBOL KEY

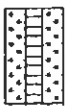

Continuous Core Barrel

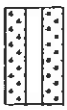

Standard Penetration Test


Modified California Sampler

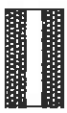

Shelby Sampler

WELL CONSTRUCTION SYMBOL KEY


Sand Pack w/Slotted Casing


Sand Pack


Concrete Grout/Fill


Bentonite Grout/Seal


Cement/Bentonite Grout


Water Level at Time of Drilling.


Stabilized Water Level.

ROUX

Project: **ARCO 2185** **9800 East 14th Street, Oakland**		Log of Soil Boring No. **B5**	
Logged By: **J. Florez**	Checked By: **P. Supple**	Date Started: **9/10/91**	Date Completed: **9/10/91**
Drilling Co: **Gregg Drilling Company**		Drill Bit Diameter: **6.5**	Total Depth: **18.0 ft**
Driller: **Mike Braman**		Backfill Material: **Bentonite Chips**	from **2.0 ft** to **18.0 ft**
Drilling Method: **Hollow Stem Auger**		Sampler: **Modified California**	
Drilling Equipment: **Mobile B-53**		Depth to Water at Time of Drilling:	**Not Apparent**

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Sample	Blow Counts	OVM (ppm)	Recovery (%)	REMARKS
	Asphalt and baserock.						
	SILT, dark brown with brown mottling; damp.	ML					
5	**SILT**, dark brown; medium stiff; damp; some brown flecks of soft silt; trace fine gravel.			6 9 22	69.9	78	
	SILT, brown with orange-brown mottling; soft; damp; trace coarse gravel.			6 10 16	9.9	100	
10	**SAND**, fine to medium, brown with iron oxide staining; and fine gravel; well graded.	SW		10 11 12	--	39	Insufficient recovery from sampler for OVM
	Clayey SILT, light brown with orange mottling; soft; damp; rootlets and rootlet voids present.	MH					
	SILT, brown with orange mottling; very stiff; damp.	ML		6 10 20	9.9	67	
15	**Clayey SILT**, brown with dark brown mottling; medium stiff; damp to moist; trace fine sand.	MH		6 15 15	9.9	56	
	Clayey SILT, brown with orange mottling; stiff; damp to moist.			10 15 20	29.9	56	
	Depth of Borehole = 18 feet.						
20							

ROUX

Project: ARCO 2185 9800 East 14th Street, Oakland		Log of Soil Boring No. **B6**	
Logged By: **J. Florez**	Checked By: **P. Supple**	Date Started: **9/10/91**	Date Completed: **9/10/91**
Drilling Co: **Gregg Drilling Company**		Drill Bit Diameter: **6.5**	Total Depth: **16.5 ft**
Driller: **Mike Braman**		Backfill Material: **Bentonite Chips**	from **2.0 ft** to **16.5 ft**
Drilling Method: **Hollow Stem Auger**		Sampler: **Modified California**	
Drilling Equipment: **Mobile B-53**		Depth to Water at Time of Drilling: **14.0 ft**	

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Sample	Blow Counts	OVM (ppm)	Recovery (%)	REMARKS
	Asphalt and baserock.						
	SILT, black; soft; damp.	ML					
5	**SILT**, brown with red-brown mottling; soft; dry; some fine white gravel.			6 16 20	9.9	67	
10	**SILT**, brown with red-brown mottling; soft; moist. Shoe of sampler contained poorly graded fine sand.			5 8 10	9.9	67	
15	**SILT**, brown with red-brown mottling; soft; moist to damp; little fine sand.			6 8 15	29.9	67	Outside of sampler saturated with water
	Depth of Borehole = 16.5 feet.						
20							

ROUX

Project: ARCO 2185 9800 East 14th Street, Oakland	Log of Soil Boring No. B7
Logged By: J. Florez — Checked By: P. Supple	Date Started: 9/10/91 — Date Completed: 9/10/91
Drilling Co: Gregg Drilling Company	Drill Bit Diameter: 6.5 — Total Depth: 16.5 ft
Driller: Mike Braman	Backfill Material: Bentonite Chips from 2.0 ft to 14.0 ft
Drilling Method: Hollow Stem Auger	Sampler: Modified California
Drilling Equipment: Mobile B-53	Depth to Water at Time of Drilling: 14.0 ft

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Sample	Blow Counts	OVM (ppm)	Recovery (%)	REMARKS
	Asphalt and baserock.						
	SILT, black; damp.	ML					
5	**SILT**, dark brown; soft; dry; little fine sand; little fine gravel.			5 12 17	29.9	56	
	SILT, grey-green; soft; moist to damp.			10 12 15	--	33	Insufficient recovery from sampler for OVM
10	**SAND**, fine to medium, grey-green; very loose; damp; and fine gravel.	SW		10 10 10	--	33	Insufficient recovery from sampler for OVM
	SILT, brown with red-orange mottling; stiff; damp; trace fine gravel.	ML		6 8 14	189.9	67	
15	**SAND**, fine poorly graded, brown with orange-brown mottling; very loose; wet to moist; some silt.	SP		4 8 12	9.9	67	
	Depth of Borehole = 16.5 feet.						
20							

ROUX

Project: ARCO 2185 9800 East 14th Street, Oakland		Log of Soil Boring No. **B8**	
Logged By: **J. Florez**	Checked By: **P. Supple**	Date Started: **9/10/91**	Date Completed: **9/10/91**
Drilling Co: **Gregg Drilling Company**		Drill Bit Diameter: **6.5**	Total Depth: **19.5 ft**
Driller: **Mike Braman**		Backfill Material: **Bentonite Chips**	from **2.0 ft** to **19.5 ft**
Drilling Method: **Hollow Stem Auger**		Sampler: **Modified California**	
Drilling Equipment: **Mobile B-53**		Depth to Water at Time of Drilling:	**Not Apparent**

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Sample	Blow Counts	OVM (ppm)	Recovery (%)	REMARKS
	Asphalt and baserock.						
	SILT, black; soft; damp.	ML					
5	SILT, brown with orange mottling; very stiff; damp, some fine white gravel.			7 12 25	29.9	83	
	SILT, grey-green with orange mottling; medium stiff; damp.			10 15 25	29.9	56	
10	SILT, grey-green with orange mottling; medium stiff; damp to moist; slight hydrocarbon odor .			10 12 16	69.9	72	
	SILT, brown with orange and dark brown mottling; soft; moist.			7 9 9	9.9	50	
15	SILT, brown with orange-brown mottling; stiff; moist; trace fine gravel.			8 10 14	9.9	50	
	SILT, grey-brown with orange mottling; stiff; moist; trace fine gravel-sized charcoal present.			10 10 13	9.9	100	1.5 ft. of ground water in bottom of borehole prior to backfilling
20	Depth of Borehole = 19.5 feet.						

ARCO Products Company Division of AtlanticRichfieldCompany — **Task Order No.** [redacted]

ARCO Facility no. 2185	City (Facility) Oakland	Project manager (Consultant) Paul Supple	Laboratory name Sequoia
ARCO engineer Chuck Carmel	Telephone no. (ARCO) 571-2434	Telephone no. (Consultant) 370-2275	Fax no. (Consultant) 370-2235
Consultant name Roux Associates	Address (Consultant) 1350 Arnold Drive, #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 ☐		
[redacted]			X			X		9/10/91	0900		X											
[redacted]			X			X		9/10/91	0915		X											
[redacted]			X			X		9/10/91	0926		X											
[redacted]			X			X		9/10/91	1027		X											
[redacted]			X			X		9/10/91	1035		X											
[redacted]			X			X		9/10/91	1123		X											
[redacted]			X			X		9/10/91	1135		X											
[redacted]			X			X		9/10/91	1142		X											
[redacted]			X			X		9/10/91	1300		X											
[redacted]			X			X		9/10/91	1312		X											
[redacted]			X			X		9/10/91	1317		X											

Special detection Limit/reporting

Special QA/QC

Remarks

Lab number

Method of shipment: Hand Delivery

Turnaround time

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

Condition of sample: Forwarded on ICE		Temperature received:	
Relinquished by sampler [signature]	Date 9-11-91	Time 0925	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory [signature] Date 9/11/91 Time 0925

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

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(510) 686-9066 • FAX (510) 686-9689

Roux Associates	Client Project ID:	Arco#2185-91-1A/Oakland	Sampled:	Sep 10, 1991
1350 Arnold Drive, Suite 201	Matrix Descript:	Soil	Received:	Sep 11, 1991
Martinez, CA 94553	Analysis Method:	EPA 3550/8015/8020	Analyzed:	Sep 17, 1991
Attention: Paul Supple	First Sample #:	109-0813	Reported:	Sep 25, 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)
109-0813	B5-5	N.D.	N.D.	N.D.	N.D.	N.D.
109-0814	B5-11	N.D.	N.D.	N.D.	N.D.	N.D.
109-0815	B5-13	N.D.	N.D.	N.D.	N.D.	N.D.
109-0816	B6-5	N.D.	N.D.	N.D.	N.D.	N.D.
109-0817	B6-10	N.D.	N.D.	N.D.	N.D.	N.D.
109-0818	B7-5	N.D.	N.D.	N.D.	N.D.	N.D.
109-0819	B7-11	1.7	0.040	0.013	0.0079	0.078
109-0820	B7-13	1.7	0.27	0.0083	0.040	0.028
109-0821	B8-5	N.D.	N.D.	N.D.	N.D.	N.D.
109-0822	B8-11	1.7	0.054	0.0094	0.012	0.019
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.

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Project Manager

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Roux Associates	Client Project ID:	Arco#2185-91-1A/Oakland	Sampled:	Sep 10, 1991
1350 Arnold Drive, Suite 201	Matrix Descript:	Soil	Received:	Sep 11, 1991
Martinez, CA 94553	Analysis Method:	EPA 3550/8015/8020	Analyzed:	Sep 17, 1991
Attention: Paul Supple	First Sample #:	109-0823	Reported:	Sep 25, 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)
109-0823	B8-13	1.3	0.013	0.0073	0.0053	0.0069
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.

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Roux Associates
1350 Arnold Drive, Suite 201
Martinez, CA 94553
Attention: Paul Supple

Client Project ID: Arco#2185-91-1A/Oakland

QC Sample Group: 1090813-823

Reported: Sep 25, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020
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:	Sep 18, 1991	Sep 18, 1991	Sep 18, 1991	Sep 18, 1991
QC Sample #:	108-0876	108-0876	108-0876	108-0876
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	0.40	0.40	0.40	1.2
Conc. Matrix Spike:	0.43	0.40	0.42	1.4
Matrix Spike % Recovery:	110	100	110	120
Conc. Matrix Spike Dup.:	0.49	0.45	0.46	1.5
Matrix Spike Duplicate % Recovery:	120	110	120	130
Relative % Difference:	6.5	12	9.1	6.9

Laboratory blank contained the following analytes: None Detected

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Project 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

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Martinez, CA 94553
Attention: Paul Supple

Project: Arco#2185-91-1A/Oakland

Enclosed are the results from 11 soil samples received at Sequoia Analytical on September 11,1991. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
1090813	Soil, B5-5	9/10/91	EPA 3550/8015/8020
1090814	Soil, B5-11	9/10/91	EPA 3550/8015/8020
1090815	Soil, B5-13	9/10/91	EPA 3550/8015/8020
1090816	Soil, B6-5	9/10/91	EPA 3550/8015/8020
1090817	Soil, B6-10	9/10/91	EPA 3550/8015/8020
1090818	Soil, B7-5	9/10/91	EPA 3550/8015/8020
1090819	Soil, B7-11	9/10/91	EPA 3550/8015/8020
1090820	Soil, B7-13	9/10/91	EPA 3550/8015/8020
1090821	Soil, B8-5	9/10/91	EPA 3550/8015/8020
1090822	Soil, B8-11	9/10/91	EPA 3550/8015/8020
1090823	Soil, B8-13	9/10/91	EPA 3550/8015/8020

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