RESNA
Working to Restore Nature

3315 Almaden Expressway, Suite 34
San Jose, CA 95118
Phone: (408) 264-7723
FAX: (408) 264-2435

INITIAL ONSITE SUBSURFACE INVESTIGATION REPORT

at

ARCO Station 6002
6235 Seminary Avenue
Oakland, California

3-31-94

for

ARCO Products Company
P.O. Box 5811
San Mateo, California 94402

RESNA Industries Inc.

Erin D. Krueger
Staff Geologist

John C. Young
Project Manager

REGISTERED GEOLOGIST
JAMES LEWIS NELSON
No. 1463
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

James L. Nelson, C.E.G. 1463
Certified Engineering Geologist

RESNA Report 130063.01
March 31, 1994

ALCO
HAZMAT

94 APR -5 PM 1:04

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San Jose, CA 95118
Phone: (408) 264-7723
FAX: (408) 264-2435

TRANSMITTAL

TO: Ms. Juliet Shin
Alameda County Health
Care Services Agency
80 Swan Way, Room 200
Oakland, California 94621

DATE: March 31, 1994
PROJECT NUMBER: 130063.01
SUBJECT: ARCO Station 6002

FROM: Erin D. Krueger

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REMARKS:
Copies: 1 to RESNA project file no. 130063.01

Erin D. Krueger, Staff Geologist

cc: Mr. Michael Whelan, ARCO

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INITIAL ONSITE SUBSURFACE INVESTIGATION
at
ARCO Station 6002
6235 Seminary Avenue
Oakland, California

For
ARCO Products Company

1.0 INTRODUCTION

As requested by ARCO Products Company (ARCO), RESNA Industries Inc. (RESNA) has prepared this initial onsite subsurface investigation report for the above-referenced site. This initial investigation was performed in response to a leak report submitted to the Alameda County Health Care Services Agency (ACHCSA) for existing gasoline underground storage tanks (USTs) at the site. The objective of this investigation was to evaluate the possibility that gasoline hydrocarbons have impacted soil and groundwater. The location of the site is shown on the Site Vicinity Map, Plate 1.

The tasks performed for this investigation included: obtaining a drilling permit from the Alameda County Flood Control and Water Conservation District, Zone 7 (ACFCWCD); drilling four onsite soil borings (B-1 through B-4); installing one 4-inch diameter groundwater monitoring well (MW-1) and two 4-inch diameter vapor extraction wells (VW-1 and VW-2); developing groundwater monitoring well MW-1; collecting groundwater samples from wells MW-1, VW-1 and VW-2; and preparing a report detailing our procedures and

the results of this investigation. Work was preformed in accordance with RESNA's Work Plan for Initial Onsite Subsurface Investigation (RESNA, November 1993), RESNA's Field Protocol (Appendix A), and RESNA's Site Safety Plan (January 1994).

2.0 BACKGROUND

2.1 General

The site is an active ARCO gasoline service station and an AM/PM mini-market located at the intersection of Seminary and Sunnymere Avenues as shown on Plate 1. The station is located in a residential area of east Oakland, immediately east of Highway 580, on a gently sloping, asphalt and concrete covered lot at an elevation of approximately 250 feet above mean sea level (msl). Four existing 10,000 gallon gasoline USTs are located on the eastern portion of the property.

2.2 Regional Geology and Hydrogeology

The site is located along the eastern margin of San Francisco Bay on the East Bay Plain, approximately ½ mile west of the Hayward Fault Zone. The subsurface soils in the vicinity of the site have been mapped as Late Pleistocene Alluvium composed of weakly consolidated slightly weathered poorly sorted, irregularly interbedded clay, silt, sand, and gravel deposited mainly in stream channels and on alluvial fans (Helley et.al., 1979). Groundwater in the area is inferred to flow to the west, toward San Francisco Bay (U.S. Geological Survey [USGS], 1980).

3.0 PREVIOUS ENVIRONMENTAL WORK

Based on information provided by ARCO, no previous environmental work has been performed at the site.

4.0 FIELD WORK

4.1 Drilling

RESNA field personnel were onsite January 13 and 14, 1994, to drill four soil borings (B-1 through B-4) and install one monitoring well (MW-1) and two vapor extraction wells (VW-1 and VW-2). Borings B-1, B-2, and B-4 were located in the topographically inferred downgradient direction of the USTs (USGS, 1980), and boring B-3 was located in the inferred upgradient direction of the existing USTs. Locations of the borings/wells are shown on Plate 2. Prior to drilling, a permit was obtained from ACFCWCD, Zone 7. A copy of the permit is included in Appendix B.

4.2 Soil Sampling and Description

Twenty-one soil samples were collected for soil description and possible laboratory analyses. Soil was described using the Unified Soil Classification System (Plate 3), and samples were collected at the depths shown on Plates 4 through 7, Logs of Borings. Sampling was conducted as described in Appendix A.

The earth materials encountered at the site consisted primarily of silty clay and sandy silt to silty sand and sandy gravel. Soil stratigraphy in boring B-1 appeared to be anomalous, consisting of probable sand fill to a depth of 14 feet. Graphic interpretations of the soil stratigraphy are shown on Geologic Cross Sections A-A' and B-B' (Plates 8 and 9). The locations of these cross sections are shown on Plate 2.

The subsurface materials consist of three units beneath the asphalt and baserock. The first unit encountered was a sandy silt to silty clay unit extending from depths of 3 to 19 feet in B-2, and to the total depths of borings in B-3 and B-4 (15½ and 16 feet, respectively). Beneath the first unit, a silty sand to sandy and silty gravel unit was encountered to a depth of about 32 feet, which was underlain by a clayey sand unit to the total depth of boring B-2 (36½ feet.) Groundwater was encountered in boring B-1 at a depth of 9 feet, B-2 at a depth of 11 feet, and in B-3 and B-4 at depths of 9½ feet. The groundwater stabilized at a depth of 7 to 9 feet below ground surface.

4.3 Well Construction and Development

Groundwater monitoring well MW-1 was constructed in boring B-2, and vapor extraction wells VW-1 and VW-2 were constructed in borings B-4 and B-3, respectively, using the methods summarized in Appendix A. Well MW-1 was constructed using 4-inch-diameter, Schedule (Sch) 40 polyvinyl chloride (PVC) casing, and screened with 4-inch-diameter machine slotted 0.020 inch casing. Wells VW-1 and VW-2 were constructed using 4-inch-diameter, Sch 40 PVC casing, and screened with 4-inch-diameter machine slotted 0.1 inch casing. For screened intervals and other specific well construction details see Plates 4, 5, and 7.

Well MW-1 was developed on January 26, 1994, to remove fine-grained sediments and allow better communication between the water-bearing zone and the groundwater monitoring well. Professional well development was performed using surge block and bailing techniques.

4.4 Groundwater Sampling

On January 31, 1994, a RESNA technician was onsite to measure depth-to-water (DTW) levels, perform subjective analyses, purge and sample groundwater monitoring well MW-1 (Appendix C), and collect grab samples from vapor wells VW-1 and VW-2 for laboratory analyses. A description of field methods used in included in Appendix A.

5.0 LABORATORY METHODS

5.1 Soil Samples

Eighteen soil samples collected from borings B-1 through B-4 were analyzed by Sequoia Analytical (Sequoia), of Redwood City, California (Hazardous Waste Testing Laboratory Certification #1210) for total petroleum hydrocarbons as gasoline (TPHg), and benzene, toluene, ethylbenzene, and total xylenes (BTEX), using Environmental Protection Agency (EPA) Methods 5030/8015/8020.

5.2 Groundwater Samples

Groundwater samples collected from wells MW-1, VW-1, and VW-2 were analyzed by Sequoia Analytical for TPHg and BTEX using EPA Methods 5030/Modified 8015/8020.

5.3 Stockpiled Soil Cuttings

Cuttings from borings B-1 through B-4 were placed on visqueen along the southeastern boundary of the station pending proper disposal. The soil stockpile was sampled on January 14, 1994, at the completion of drilling. At the request of ARCO's contracted hauler, samples were analyzed for TPHg using EPA Method Modified 8015, BTEX using Total Concentration Leaching Procedure (TCLP), lead by Soluble Threshold Limit Concentration (STLC), and reactivity, corrosivity, and ignitability (RCI).

6.0 RESULTS OF LABORATORY ANALYSES

6.1 Soil Samples

Laboratory analytical results of soil samples from borings B-1 through B-4 are summarized in Table 1, Results of Laboratory Analytical Results of Soil Samples. Laboratory Analytical Reports and Chain of Custody Records are included in Appendix D.

Laboratory analytical results indicated concentrations of TPHg and benzene ranged from not detected at the method detection limits of 1.0 part per million and 0.0050 ppm, respectively, to 420 ppm and 0.031 ppm, respectively.

6.2 Groundwater Samples

Laboratory analytical results of groundwater samples from monitoring well MW-1, and vapor wells VW-1 and VW-2 are summarized in Table 2, Results of Laboratory Analytical Results of Groundwater Samples. Laboratory Analytical Reports and Chain of Custody Records are included in Appendix C.

Laboratory analytical results of the groundwater sample from well MW-1 indicated a concentration of 18,000 parts per billion (ppb) TPHg and 1,300 ppb benzene. Laboratory analytical results of the groundwater grab samples from VW-1 and VW-2 indicated concentrations of 19,000 ppb and 11,000 ppb TPHg, respectively; and 1,100 ppb and 620 ppb benzene, respectively.

6.3 Stockpiled Soil Cuttings

Laboratory analytical results of samples from the soil stockpile are summarized in Table 1, Results of Laboratory Analytical Results of Soil Samples. Laboratory Analytical Reports and Chain of Custody Records are included in Appendix D.

Laboratory analytical results of the soil stockpile samples indicated concentrations of BTEX were not detected at the MDL, no reactivities with sulfide, cyanide or water existed, a pH of 6.7, an ignitability of greater than 100°C, TPHg at 3.1 ppm, and lead at 0.050 ppb.

7.0 CONCLUSIONS

Based on the results of this investigation, RESNA concludes:

- The greatest concentrations of gasoline hydrocarbons in soil appear to be located in central portion of the site, in the inferred downgradient direction of the USTs (B-2), at a depth of approximately 10½ feet (420 ppm).

- The vertical extent of gasoline hydrocarbons in soil appears to have been delineated to less than 1.0 ppm at depths of 13½ feet in B-2, and 15½ feet in B-4, in the downgradient direction of the USTs. Soil in the upgradient direction of the USTs (B-3) does not appear to be impacted by gasoline hydrocarbons.

- Groundwater in the vicinity of the USTs appears to have been impacted by gasoline hydrocarbons.

8.0 DISTRIBUTION

It is recommended that a copy of this Report be forwarded to:

Ms. Juliet Shin
Alameda County Health Care Services Agency
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

9.0 LIMITATIONS

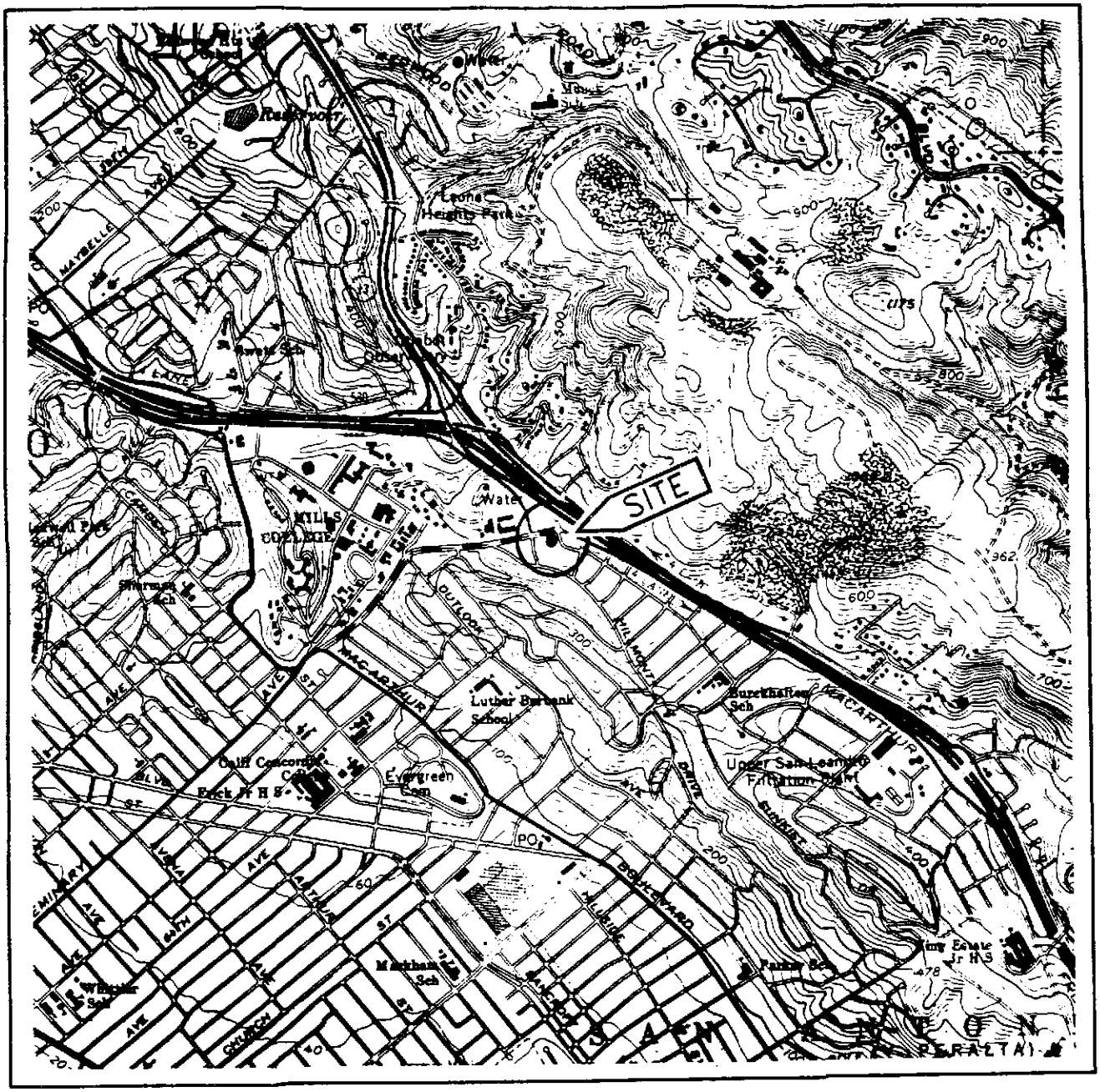
This report was prepared in accordance with generally accepted standards of environmental geological practice in California at the time this investigation was performed. This investigation was conducted solely for the purpose of evaluating environmental conditions of the soil and groundwater with respect to gasoline hydrocarbons related to the existing gasoline USTs at the site. No soil engineering or geotechnical references are implied or should be inferred. Evaluation of the geologic conditions at the site for the purpose of this assessment is made from a limited number of observation points. Subsurface conditions may vary away from the data points available.

10.0 REFERENCES

RESNA Industries Inc. November 18, 1993. Work Plan for Initial Onsite Subsurface Investigation at ARCO Station 6002, 6235 Seminary Avenue, Oakland, California. RESNA Report 130063.01

RESNA Industries Inc. January 10, 1994. Site Safety Plan for ARCO Station 6002, 6235 Seminary Avenue, Oakland, California. RESNA Report 130063.01

U.S. Geological Survey 1980. 7.5-Minute Quadrangle, Oakland East, California.



Source: U.S. Geological Survey
7.5-Minute Quadrangle
Oakland East, California
Photorevised 1980

N

Approximate Scale
2000 1000 0 2000
feet

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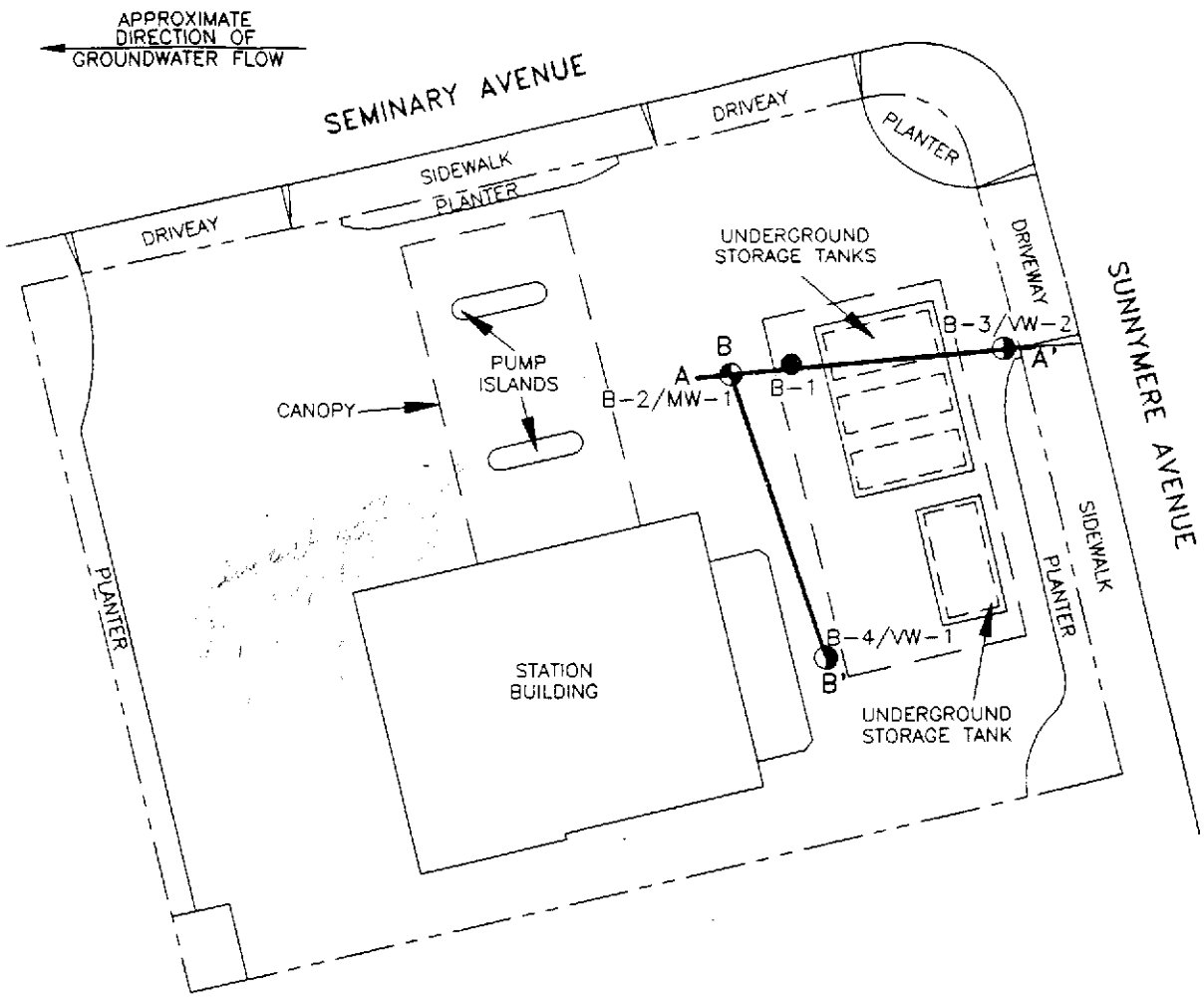
SITE VICINITY MAP
ARCO Station 6002
6235 Seminary Avenue
Oakland, California

PLATE
1

1300631G



EXPLANATION

MW-1 = Approximate location of monitoring well (RESNA, 1994)

B-4/VW-1 = Approximate location of vapor extraction well (RESNA, 1994)

B-1 = Approximate location of soil boring

B — B' = Geologic cross section

= Approximate area of apparent excavation and backfill

N

Approximate Scale

30 15 0 30

feet

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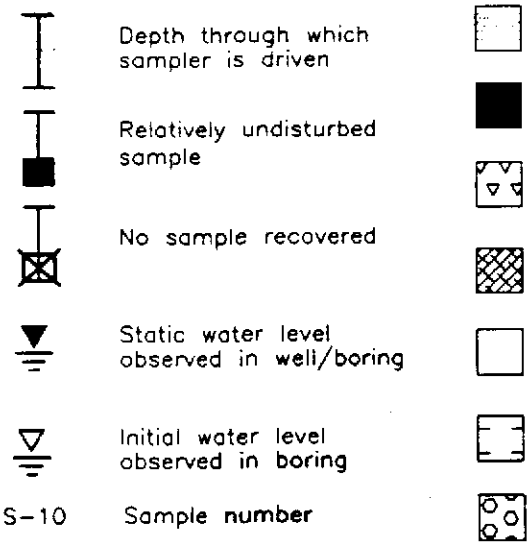
GENERALIZED SITE PLAN
ARCO Station 6002
6235 Seminary Avenue
Oakland, California

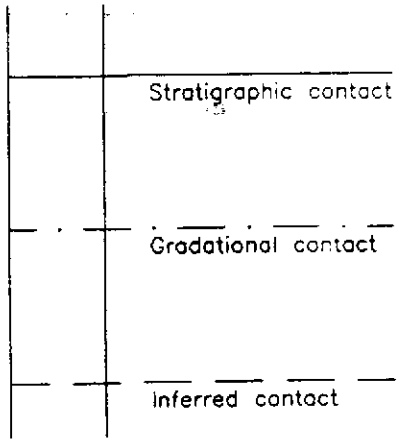
PLATE 2

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISION		LTR	DESCRIPTION
COARSE-GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW	Well-graded gravels or gravel-sand mixtures, little or no fines.
		GP	Poorly-graded gravels or gravel-sand mixtures, little or no fines.
		GM	Silty gravels, gravel-sand-silt mixtures.
		GC	Clayey gravel, gravel-sand-clay mixtures.
	SAND AND SANDY SOILS	SW	Well-graded sand or gravelly sands, little or no fines.
		SP	Poorly-graded sands or gravelly sands, little or no fines.
		SM	Silty sands, sand-silt mixtures.
		SC	Clayey sands, sand-clay mixtures.

MAJOR DIVISION		LTR	DESCRIPTION
FINE-GRAINED SOILS	SILTS AND CLAYS LL<50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity.
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		OL	Organic silts and organic silt-clays of low plasticity.
	SILTS AND CLAYS LL>50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
		CH	Inorganic clays of high plasticity, fat clays.
		OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils.





P.I.D. Photoionization detector

BLOWS REPRESENT THE NUMBER OF BLOWS OF A 140-POUND HAMMER FALLING 30 INCHES TO DRIVE THE SAMPLER THROUGH EACH 6 INCHES OF AN 18-INCH PENETRATION.

GRADATIONAL AND INFERRED CONTACT LINES SEPARATING UNITS ON THE LOG REPRESENT APPROXIMATE BOUNDARIES ONLY. ACTUAL BOUNDARIES MAY BE GRADUAL. LOGS REPRESENT SUBSURFACE CONDITIONS AT THE BORING LOCATION AT THE TIME OF DRILLING ONLY.

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UNIFIED SOIL CLASSIFICATION SYSTEM AND SYMBOL KEY
ARCO Station 6002
6235 Seminary Avenue
Oaklend, California

PLATE 3

Total depth of boring:	15-1/2 feet	Casing diameter:	NA
Diameter of boring:	12 inches	Casing material:	NA
Date drilled:	1-13-94	Slot size:	NA
Drilling Company:	Exploration Geoservices	Sand size:	NA
Driller:	Dave and Howard	Screen Interval:	NA
Drilling method:	Hollow-Stem Auger	Field Geologist:	Erin Krueger

Signature of Registered Professional:

Registration No.: CEG 1463 State: CA

P.I.D.	Sample No.	Blows	Depth	USCS Code	Description	Well Const.
			2	SP	Asphalt (2 inches). Medium-grained sand, trace cobbles, tan, damp, very dense; probably fill, trace patches silty clay, black, damp, medium plasticity, stiff. Hand dug to 5 feet, fill, no pipes or utilities encountered.	
90	S-5		4			
			6			
			8	ML	Sandy silt, gray, damp, medium plasticity, stiff; fill.	
250	S-8.5		10	SP-SM	Medium-grained sand with silt, gray, moist to wet, medium dense; probable fill, pieces of wood; fill. Wet, product odor.	
			12			
			14	CL	Silty clay, trace gravel, brown-orange, damp, medium plasticity, wet around gravel.	
108	S-14.5		16		Total Depth = 15-1/2 feet.	
			18			
			20			
			22			
			24			
			26			
			28			
			30			
			32			
			34			
			36			
			38			
			40			

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LOG OF BORING B-1

ARCO Station 6002
6235 Seminary Avenue
Oakland, California

PLATE 4

Total depth of boring:	36-1/2 feet	Casing diameter:	4 inches
Diameter of boring:	12 inches	Casing material:	Sch 40 PVC
Date drilled:	1-13-94	Slot size:	0.020-inch
Drilling Company:	Exploration Geoservices	Sand size:	No. 3 sand
Driller:	Dave and Howard	Screen Interval:	5 feet to 25 feet
Drilling method:	Hollow-Stem Auger	Field Geologist:	Erin Krueger

Signature of Registered Professional:

Registration No.: CEG 1463 State: CA

P.I.D.	Sample No.	Blows	Depth	USCS Code	Description	Well Const.
			2	GP	Asphalt (2 inches). Sandy gravel, orange, damp, very dense; baserock.	
			4	ML	Clayey silt, trace fine gravel, black, damp, medium plasticity, very stiff.	
4400	S-5.5		6	ML	Sandy silt, with gravel, gray, damp, medium plasticity, stiff.	
>9999	S-7.5		8		Visible product, black, rootholes.	
	S-8.5					
614	S-10.5		10	CL	Silty clay, with gravel, orange, damp, medium plasticity, stiff; visible product. Wet around gravel and in rootholes.	
1500	S-13.5		12			
			14		With gray mottling.	
190	S-16		16			
210	S-18		18		Roots and increasing amounts of gravel and moisture.	
770	S-20.5		20	GM	Silty gravel with sand, gray, moist to wet, dense; wet around roots and in rootholes.	
			22		Wet.	
250	S-23.5		24		Wet around gravel.	
			26	GP	Coarse sandy gravel, gray, sand red, white, and gray, damp, dense; wet around gravel.	
20	S-27		28			
			30	SM	Silty sand with gravel, gray, damp to moist, dense; wet around gravel.	
				GP	Coarse sandy gravel, orange, moist to wet, dense.	
0	S-32.5		32	SC	Clayey sand with fine gravel, orange, damp, dense; wet around gravel.	
			34			
0	S-36		36			
			38		Total Depth = 36-1/2 feet.	
			40			

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LOG OF BORING B-2/MW-1

ARCO Station 6002
6235 Seminary Avenue
Oakland, California

PLATE 5

Total depth of boring:	15-1/2 feet	Casing diameter:	4 inches
Diameter of boring:	12 inches	Casing material:	Sch 40 PVC
Date drilled:	1-14-94	Slot size:	0.1-inch
Drilling Company:	Exploration Geoservices	Sand size:	3/8" pea gravel
Driller:	Dave and Howard	Screen Interval:	6 feet to 14 feet
Drilling method:	Hollow-Stem Auger	Field Geologist:	Erin Krueger

Signature of Registered Professional:

Registration No.: CEG 1463 State: CA

P.I.D.	Sample No.	Blows	Depth	USCS Code	Description	Well Const.
				GP	Asphalt (2 inches).	
			2	ML	Sandy gravel, orange, damp, dense; baserock	
					Sandy silt with fine gravel, brown, damp, medium plasticity, stiff.	
			4		Hand dug to 4 feet, native material encountered.	
95	S-5	5 6 8	6			
			8			
78	S-10	8 10 17	10	▽	Gray, moist, wet around gravel.	
			12	ML	Sandy silt, with gravel, trace clay, orange, moist to wet, medium plasticity, stiff.	
33	S-14.5	6 7 8	14			
			16		Total Depth = 15-1/2 feet.	
			18			
			20			
			22			
			24			
			26			
			28			
			30			
			32			
			34			
			36			
			38			
			40			

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LOG OF BORING B-3/VW-2

ARCO Station 6002
6235 Seminary Avenue
Oakland, California

PLATE 6

Total depth of boring:	16 feet	Casing diameter:	4 inches
Diameter of boring:	12 inches	Casing material:	Sch 40 PVC
Date drilled:	1-14-94	Slot size:	0.1 inch
Drilling Company:	Exploration Geoservices	Sand size:	3/8" pea gravel
Driller:	Dave and Howard	Screen Interval:	6 feet to 14 feet
Drilling method:	Hollow-Stem Auger	Field Geologist:	Erin Krueger

Signature of Registered Professional:

Registration No.: CEG 1463 State: CA

P.I.D.	Sample No.	Blows	Depth	USCS Code	Description	Well Const.
			2	GP	Asphalt (2 inches). Sandy gravel, brown, damp, dense; baserock. Hand dug to 3 feet, native material encountered.	
8	S-5	5 6 6	4	ML	Sandy silt with gravel, brown, damp, medium plasticity, stiff.	
			6		Gray, moist to wet.	
			8		Brown.	
39	S-10	15 18 12	10	▽	Orange, damp, wet around gravel.	
			12			
			14			
26	S-15.5	7 11 13	16		With gray mottling in rootholes.	
					Total Depth = 16 feet.	
			18			
			20			
			22			
			24			
			26			
			28			
			30			
			32			
			34			
			36			
			38			
			40			

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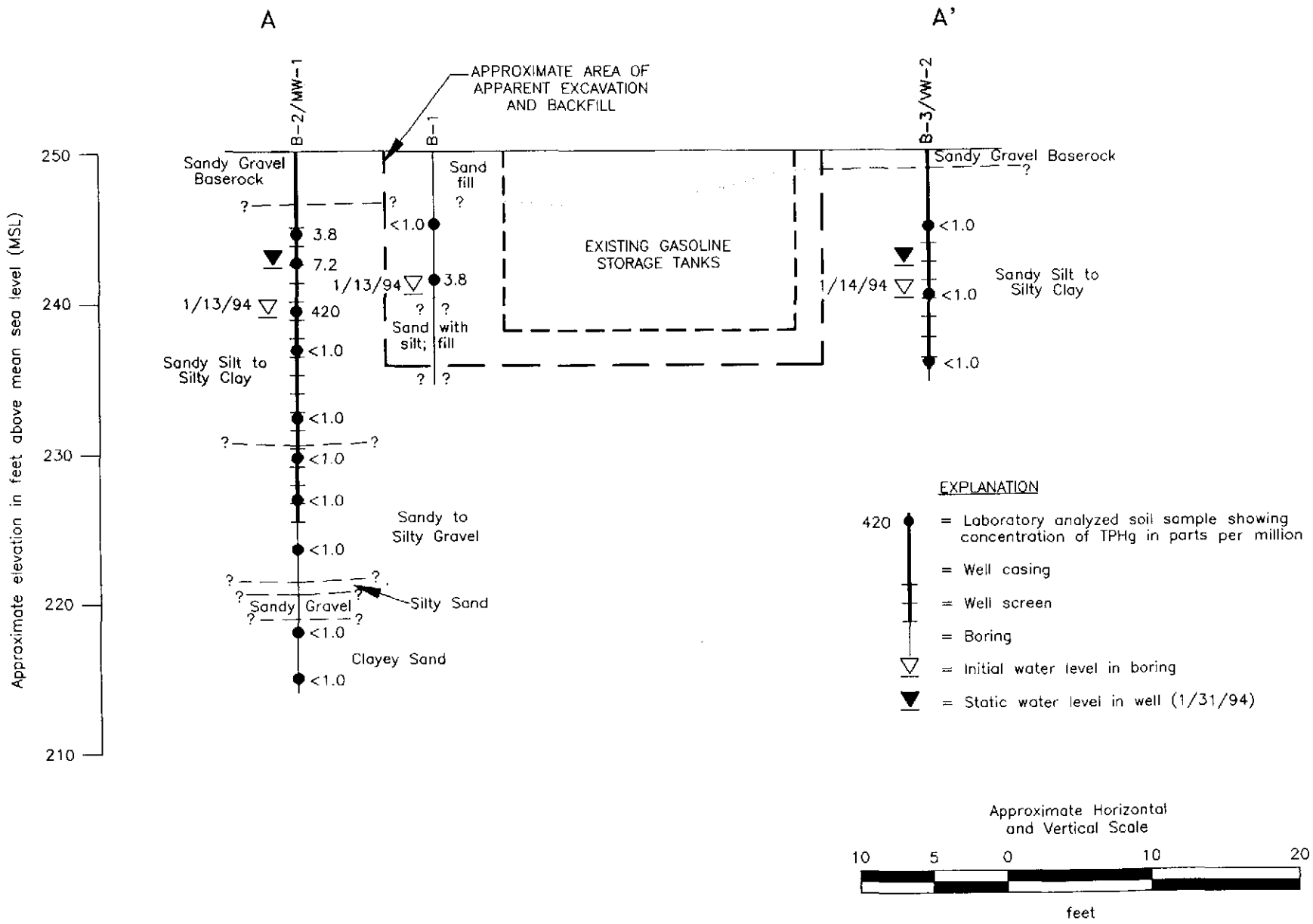
LOG OF BORING B-4/VW-1

ARCO Station 6002
6235 Seminary Avenue
Oakland, California

PLATE 7



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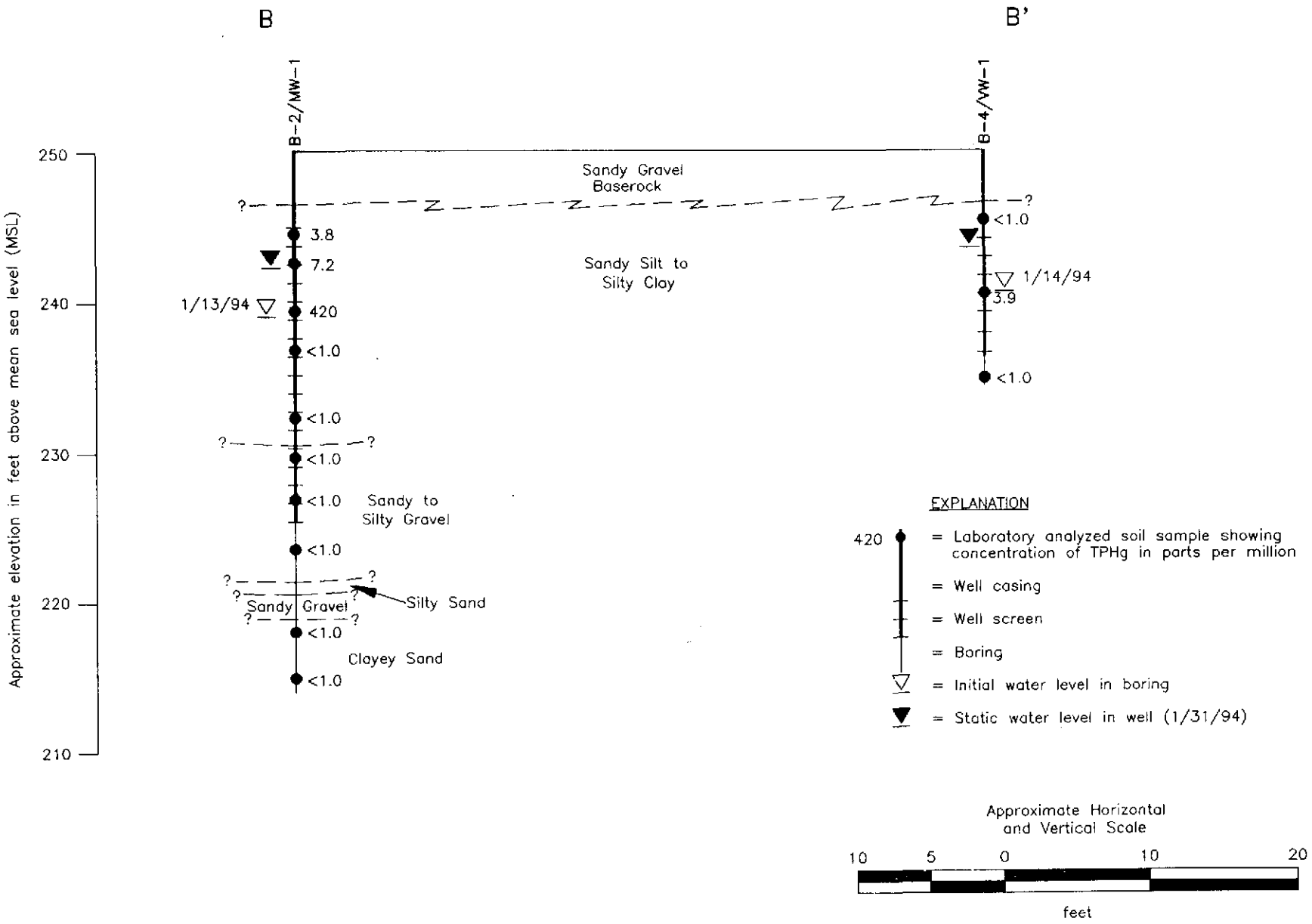
GEOLOGIC CROSS SECTION A-A'
ARCO Station 6002
6235 Seminary Avenue
Oakland, California

PLATE
8



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GEOLOGIC CROSS SECTION B-B'
ARCO Station 6002
6235 Seminary Avenue
Oakland, California

PLATE
9

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TABLE 1
RESULTS OF LABORATORY ANALYSES OF SOIL SAMPLES
ARCO Station 6002
Oakland, California

Date Sample	TPHg	Benzene	Toluene	Ethyl benzene	Total xylenes
January 1994					
S-5-B1	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
S-8.5-B1	3.8*	<0.0050	<0.0050	<0.0050	<0.0050
S-5.5-B2	3.8	0.031	0.022	0.013	0.060
S-7.5-B2	7.2	0.030	0.042	0.027	0.16
S-10.5-B2	420**	<0.0050	<0.0050	5.5	14
S-13.5-B2	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
S-18-B2	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
S-20.5-B2	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
S-23.5-B2	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
S-27-B2	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
S-32.5-B2	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
S-36-B2	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
S-5-B3	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
S-10-B3	<1.0	0.014	0.013	0.0060	0.026
S-14.5-B3	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
S-5-B4	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
S-10-B4	3.9	0.014	<0.0050	<0.0050	0.041
S-15.5-B4	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
Soil Stockpile					
0114-SP-(A-D)	3.1	<0.0050	<0.0050	<0.0050	<0.0050
Additional Analyses:	pH = 6.7, ignitability = >100°C, reactivity with sulfide = none, reactivity with cyanide = none, reactivity with water = negative, lead = 0.050 ppm				

DTW = 7.8' bgs
Converted into MW-1.

Results in parts per million (ppm)
TPHg = total petroleum hydrocarbons as gasoline using EPA Method 8015
BTEX = benzene, toluene, ethylbenzene, and total xylenes using EPA Method 8020
< = less than the detection limit
* = Laboratory reported the Chromatogram Pattern to indicate a "non-gas mix > C8."
** = Laboratory reported the Chromatogram Pattern to indicate "weathered gas."
Sample ID

S-15½-B4
- S-15½ — Soil
- 15½ — Depth of Sample
- B4 — Boring Number

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TABLE 2
RESULTS OF LABORATORY ANALYSES OF GROUNDWATER SAMPLES
ARCO Station 6002
Oakland, California

Date Sample	TPHg	Benzene	Toluene	Ethyl benzene	Total xylenes
January 31, 1994					
MW-1 W-14-MW-1	18,000	1,300	1,600	250	1,900
VW-1* W-6-VW-1	19,000	1,100	180	720	2,800
VW-2* W-8-VW-2	11,000	620	1,500	330	1,400
MCL	NA	1.0	NA	680	1,750
DWAL	NA	NA	100	NA	NA

Results in parts per billion (ppb)
TPHg = total petroleum hydrocarbons as gasoline using EPA Method 8015
BTEX = benzene, toluene, ethylbenzene, and total xylenes using EPA Method 8020
< = less than the detection limit
* = Grab samples collected from vapor wells VW-1 and VW-2 as a one-time sampling event only.

Sample ID

W-14-MW-1

- Well Number
- Depth of Sample
- Water

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APPENDIX A

FIELD PROTOCOL

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FIELD PROTOCOL

The following presents RESNA's protocol for a typical site investigation involving gasoline hydrocarbon-impacted soil and/or groundwater.

Site Safety Plan

The Site Safety Plan describes the safety requirements for the evaluation of gasoline hydrocarbons in soil, groundwater, and the vadose-zone at the site. The Site Safety Plan is applicable to personnel of RESNA and its subcontractors. RESNA personnel and subcontractors of RESNA scheduled to perform the work at the site are to be briefed on the contents of the Site Safety Plan before work begins. A copy of the Site Safety Plan is available for reference by appropriate parties during the work. A site Safety Officer is assigned to the project.

Sampling of Stockpiled Soil

One composite soil sample is collected for each 50 cubic yards of stockpiled soil, and for each individual stockpile composed of less than 50 cubic yards. Composite soil samples are obtained by first evaluating relatively high, average, and low areas of hydrocarbon concentration by digging approximately one to two feet into the stockpile and placing the intake probe of a field calibrated OVM against the surface of the soil; and then collecting one sample from the "high" reading area, and three samples from the "average" areas. Samples are collected by removing the top one to two feet of soil, then driving laboratory-cleaned brass sleeves into the soil. The samples are sealed in the sleeves using aluminum foil, plastic caps, and aluminized duct tape; labeled; and promptly placed in iced storage for transport to the laboratory, where compositing will be performed.

Soil Borings

Prior to the drilling of borings and construction of monitoring wells, permits are acquired from the appropriate regulatory agency. In addition to the above-mentioned permits, encroachment permits from the City or State are acquired if drilling of borings offsite in the City or State streets is necessary. Copies of the permits are included in the appendix of the project report. Prior to drilling, Underground Services Alert is notified of our intent to drill, and known underground utility lines and structures are approximately marked.

The borings are drilled by a truck-mounted drill rig equipped with 8- or 12-inch-diameter, hollow-stem augers. The augers are steam-cleaned prior to drilling each boring to minimize the possibility of cross-contamination. After drilling the borings, monitoring wells are

constructed in the borings, or neat-cement grout with bentonite is used to backfill the borings to the ground surface.

Borings for groundwater monitoring wells are drilled to a depth of no more than 20 feet below the depth at which a saturated zone is first encountered, or a short distance into a stratum beneath the saturated zone which is of sufficient moisture and consistency to be judged as a perching layer by the field geologist, whichever is shallower. Drilling into a deeper aquifer below the shallowest aquifer can begin only after a conductor casing is properly installed and allowed to set, to seal the shallow aquifer.

Drill Cuttings

Drill cuttings subjectively evaluated as having hydrocarbon contamination at levels greater than 100 parts per million (ppm) are separated from those subjectively evaluated as having hydrocarbon contamination levels less than 100 ppm. Evaluation is based either on subjective evidence of soil discoloration, or on measurements made using a field calibrated OVM. Readings are taken by placing a soil sample into a ziplock type plastic bag and allowing volatilization to occur. The intake probe of the OVM is then inserted into the headspace created in the plastic bag immediately after opening it. The drill cuttings from the borings are placed in labeled 55-gallon drums approved by the Department of Transportation; or on plastic at the site, and covered with plastic. The cuttings remain the responsibility of the client.

Soil Sampling in Borings

Soil samples are collected at no greater than 5-foot intervals from the ground surface to the total depth of the borings. The soil samples are collected by advancing the boring to a point immediately above the sampling depth, and then driving a California-modified, split-spoon sampler containing brass sleeves through the hollow center of the auger into the soil. The sampler and brass sleeves are laboratory-cleaned, steam-cleaned, or washed thoroughly with Alconox® and water, prior to each use. The sampler is driven with a standard 140-pound hammer repeatedly dropped 30 inches. The number of blows to drive the sampler each successive six inches are counted and recorded to evaluate the relative consistency of the soil.

The samples selected for laboratory analyses are removed from the sampler and quickly sealed in their brass sleeves with aluminum foil, plastic caps, and aluminized duct tape. The samples are then be labeled, promptly placed in iced storage, and delivered to a laboratory certified by the State of California to perform the analyses requested.

One of the samples in brass sleeves not selected for laboratory analyses at each sampling interval is tested in the field using an OVM that is field calibrated at the beginning of each day it is used. This testing is performed by inserting the intake probe of the OVM into the headspace created in the plastic bag containing the soil sample as described in the Drill Cuttings section above. The OVM readings are presented in Logs of Borings included in the project report.

Logging of Borings

A geologist is present to log the soil cuttings and samples using the Unified Soil Classification System. Samples not selected for chemical analyses, and the soil in the sampler shoe, are extruded in the field for inspection. Logs include texture, color, moisture, plasticity, consistency, blow counts, and any other characteristics noted. Logs also include subjective evidence for the presence of hydrocarbons, such as soil staining, noticeable or obvious product odor, and OVM readings.

Monitoring Well Construction

Monitoring wells are constructed in selected borings using clean 2- or 4-inch-diameter, thread-jointed, Schedule 40 polyvinyl chloride (PVC) casing. No chemical cements, glues, or solvents are used in well construction. Each casing bottom is sealed with a threaded end-plug, and each casing top with a locking plug. The screened portions of the wells are constructed of machine-slotted PVC casing with 0.020-inch-wide (typical) slots for initial site wells. Slot size for subsequent wells may be based on sieve analyses and/or well development data. The screened sections in groundwater monitoring wells are placed to allow monitoring during seasonal fluctuations of groundwater levels.

The annular space of each well is backfilled with No. 2 by 12 sand, or similar sorted sand, to approximately two feet above the top of the screened casing for initial site wells. The sand pack grain size for subsequent wells may be based on sieve analyses and/or well development data. A 1- to 2-foot-thick bentonite plug is placed above the sand as a seal against cement entering the filter pack. The remaining annulus is then backfilled with a slurry of water, neat cement, and bentonite to approximately one foot below the ground surface.

An aluminum utility box with a PVC apron is placed over each wellhead and set in concrete placed flush with the surrounding ground surface. Each wellhead cover has a seal to protect the monitoring well against surface-water infiltration and requires a special wrench to open. The design discourages vandalism and reduces the possibility of accidental disturbance of the well.

Groundwater Monitoring Well Development

The monitoring wells are developed by bailing or over-pumping and surge-block techniques. The wells are either bailed or pumped, allowed to recharge, and bailed or pumped again until the water removed from the wells is determined to be clear. Turbidity measurements (in NTUs) are recorded during well development and are used in evaluating well development. The development method used, initial turbidity measurement, volume of water removed, final turbidity measurement, and other pertinent field data and observations are included in reports. The wells are allowed to equilibrate for at least 48 hours after development prior to sampling. Water generated by well development will be stored in 17E Department of Transportation (DOT) 55-gallon drums on site and will remain the responsibility of the client.

Groundwater Sampling

The static water level in each well is measured to the nearest 0.01-foot using a Solinst® electric water-level sounder or oil/water interface probe (if the wells contain floating product) cleaned with Alconox® and water before use in each well. The liquid in the onsite wells is examined for visual evidence of hydrocarbons by gently lowering approximately half the length of a Teflon® bailer (cleaned with Alconox® and water) past the air/water interface. The sample is then retrieved and inspected for floating product, sheen, emulsion, color, and clarity. The thickness of floating product detected is recorded to the nearest 1/8-inch.

Wells which do not contain floating product are purged using a submersible pump. The pump, cables, and hoses are cleaned with Alconox® and water prior to use in each well. The wells are purged until withdrawal is of sufficient duration to result in stabilized Ph, temperature, and electrical conductivity of the water, as measured using portable meters calibrated to a standard buffer and conductivity standard. If the well becomes dewatered, the water level is allowed to recover to at least 80 percent of the initial water level. If the sample to be collected is a grab sample, the well is not purged before the sample is collected. Prior to the collection of each groundwater sample, the Teflon® bailer is cleaned with Alconox® and rinsed with tap water and deionized water, and the latex gloves worn by the sampler changed. Hydrochloric acid is added to the sample vials as a preservative (when applicable). A sample method blank is collected by pouring distilled water into the bailer and then into sample vials. A sample of the formation water is then collected from the surface of the water in each of the wells using the Teflon® bailer. The water samples are then gently poured into laboratory-cleaned, 40-milliliter (ml) glass vials, 500 ml plastic bottles or 1-liter glass bottles (as required for specific laboratory analysis) and sealed with Teflon®-lined caps, and inspected for air bubbles to check for headspace, which would allow volatilization to occur. The samples are then labeled and promptly placed in iced storage. A field log of well evacuation procedures and parameter monitoring is maintained. Water

generated by the purging of wells is stored in 17E DOT 55-gallon drums onsite and remains the responsibility of the client.

Sample Labeling and Handling

Sample containers are labeled in the field with the job number, sample location and depth, and date, and promptly placed in iced storage for transport to the laboratory. A Chain of Custody Record is initiated by the field geologist and updated throughout handling of the samples, and accompanies the samples to a laboratory certified by the State of California for the analyses requested. Samples are transported to the laboratory promptly to help ensure that recommended sample holding times are not exceeded. Samples are properly disposed of after their useful life has expired.

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APPENDIX B

DRILLING PERMIT

ZONE 7 WATER AGENCY

5997 PARKSIDE DRIVE PLEASANTON, CALIFORNIA 94588 VOICE (510) 484-2600
FAX (510) 462-3914

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT ARCO 6002
6235 Seminary Avenue
Oakland, CA

CLIENT
Name ARCO Products Company
Address P.O. Box 5811 Phone (415) 571-2849
City San Mateo CA Zip 94402

APPLICANT
Name RESNA INDUSTRIES INC
Erin Kallinger
Address 3315 Almaden Expy, Suite 34 Phone (408) 264-7723
City San Jose, CA Zip 95118

TYPE OF PROJECT

Well Construction		Geotechnical Investigation	
Cathodic Protection	___	General	___
Water Supply	___	Contamination	___
Monitoring	✓	Well Destruction	___

PROPOSED WATER SUPPLY WELL USE

Domestic ___ Industrial ___ Other ___
Municipal ___ Irrigation ___

DRILLING METHOD:

Mud Rotary ___ Air Rotary ___ Auger Hollow Stem
Cable ___ Other ___

DRILLER'S LICENSE NO. 484288

WELL PROJECTS

Drill Hole Diameter 12 in. Maximum
Casing Diameter 4 in. Depth 70 ft.
Surface Seal Depth 5 ft. Number 3

GEOTECHNICAL PROJECTS

Number of Borings ___ Maximum
Hole Diameter ___ in. Depth ___ ft.

ESTIMATED STARTING DATE 1/12/94
ESTIMATED COMPLETION DATE 1/21/94

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE Erin Kallinger Date 1/10/94

FOR OFFICE USE

PERMIT NUMBER 94013
LOCATION NUMBER ___

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well Projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

(B.) WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

E. WELL DESTRUCTION. See attached.

Approved Wyman Hong Date 11 Jan 94
Wyman Hong

11902

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APPENDIX C

WELL PURGE DATA SHEET, LABORATORY ANALYTICAL REPORTS AND CHAIN OF CUSTODY RECORDS FOR GROUNDWATER SAMPLES

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WELL PURGE DATA SHEET

Project Name: ARCO 6002 — Job No. 130063.01

Date: January 31, 1994 — Page 1 of 1

Well No. MW-1 — Time Started 12:00

TIME (hr)	GALLONS (cum.)	TEMP. (F)	pH	CONDUCT. (micromho)	TURBIDITY (NTU)
12:00	Start purging MW-1				
12:00	0	60.9	6.94	7.77	5.1
12:05	5	59.9	7.02	7.67	>200
12:10	10	60.1	7.11	7.85	>200
12:14	13	60.9	7.14	8.23	>200
12:18	16	60.9	7.23	8.18	>200
12:23	19	61.0	7.26	8.21	>200
	Stop purging MW-1				

Notes: Hand bailed

Well Diameter (inches) :	4
Depth to Bottom (feet) :	24.41
Depth to Water - initial (feet) :	7.82
Depth to Water - final (feet) :	14.37
% recovery :	61%
Time Sampled :	14:00
Gallons per Well Casing Volume :	10.83
Gallons Purged :	19
Well Casing Volume Purged :	1.8
Approximate Pumping Rate (gpm) :	NA

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Project: ARCO 6002, Oakland

Enclosed are the results from 1 water sample received at Sequoia Analytical on February 3,1994. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
4B26601	Water, W-14-MW1	1/31/94	EPA 5030/8015 Mod./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

Vickie Tague
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

RESNA	Client Project ID:	ARCO 6002, Oakland	Sampled:	Jan 31, 1994
3315 Almaden Expwy., Suite 34	Sample Matrix:	Water	Received:	Feb 3, 1994
San Jose, CA 95118	Analysis Method:	EPA 5030/8015 Mod./8020	Reported:	Feb 16, 1994
Attention: John Young	First Sample #:	4B26601		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 4B26601 W-14-MW1
Purgeable Hydrocarbons	50	18,000
Benzene	0.50	1,300
Toluene	0.50	1,600
Ethyl Benzene	0.50	250
Total Xylenes	0.50	1,900
Chromatogram Pattern:		Gas

Quality Control Data

Report Limit Multiplication Factor:	50
Date Analyzed:	2/8/94
Instrument Identification:	GCHP-2
Surrogate Recovery, %: (QC Limits = 70-130%)	90

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Client Project ID: ARCO 6002, Oakland
Matrix: Liquid

QC Sample Group: 4B26601

Reported: Feb 16, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel
MS/MSD Batch#:	4B15506	4B15506	4B15506	4B15506
Date Prepared:	-	-	-	-
Date Analyzed:	2/8/94	2/8/94	2/8/94	2/8/94
Instrument I.D.#:	GCHP-2	GCHP-2	GCHP-2	GCHP-2
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	100	100	100	103
Matrix Spike Duplicate % Recovery:	100	100	100	107
Relative % Difference:	0.0	0.0	0.0	3.8
LCS Batch#:	-	-	-	-
Date Prepared:	-	-	-	-
Date Analyzed:	-	-	-	-
Instrument I.D.#:	-	-	-	-
LCS % Recovery:	-	-	-	-
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 6002-95-2

Chain of Custody

ARCO Facility no. 6002	City (Facility) OAKLAND	Project manager (Consultant) John Young	Laboratory name Sequoia
ARCO engineer Mike Whelan	Telephone no. (ARCO) (415)571-2449	Telephone no. (Consultant) 408 264 7723	Fax no. (Consultant) 264-2435
Consultant name RESNA Industries	Address (Consultant) 3315 Almaden Expy, Suite 34, San Jose CA 95118		Contract number 07-073

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 ☐	HOLD
BB1@1		2		✓		✓	✓	1/31/94													
BB1@4		3		✓		✓	✓	"	2:00		✓										-01

Special detection Limit/reporting

Special QA/QC

Remarks

Lab number 9402266

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: Chuck D. Krueger	Date 2/3/94	Time 3:07	Received by: G. Thune #758 PRIME
Relinquished by: G. Thune	Date 2/3/94	Time 354	Received by:
Relinquished by:	Date	Time	Received by laboratory: KG

Date: 020394 Time: 1554

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

APPC-3292 (2-91)

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Project: ARCO 6002, Oakland

Enclosed are the results from 2 water samples received at Sequoia Analytical on February 3,1994. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
4B26801	Water, W-8-VW-2	1/31/94	EPA 5030/8015 Mod./8020
4B26802	Water, W-6-VW-1	1/31/94	EPA 5030/8015 Mod./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

Vickie Tague
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

RESNA	Client Project ID:	ARCO 6002, Oakland	Sampled:	Jan 31, 1994
3315 Almaden Expwy., Suite 34	Sample Matrix:	Water	Received:	Feb 3, 1994
San Jose, CA 95118	Analysis Method:	EPA 5030/8015 Mod./8020	Reported:	Feb 16, 1994
Attention: John Young	First Sample #:	4B26801		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 4B26801 W-8-VW-2	Sample I.D. 4B26802 W-6-VW-1
Purgeable Hydrocarbons	50	11,000	19,000
Benzene	0.50	520	1,100
Toluene	0.50	1,500	180
Ethyl Benzene	0.50	330	720
Total Xylenes	0.50	1,400	2,800
Chromatogram Pattern:		Gas	Gas

Quality Control Data

Report Limit Multiplication Factor:	50	20
Date Analyzed:	2/8/94	2/7/94
Instrument Identification:	GCHP-3	GCHP-3
Surrogate Recovery, %: (QC Limits = 70-130%)	98	85

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Client Project ID: ARCO 6002, Oakland
Matrix: Liquid

QC Sample Group: 4B26801

Reported: Feb 16, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel
MS/MSD Batch#:	4B15505	4B15505	4B15505	4B15505
Date Prepared:	-	-	-	-
Date Analyzed:	2/8/94	2/8/94	2/8/94	2/8/94
Instrument I.D.#:	GCHP-3	GCHP-3	GCHP-3	GCHP-3
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	110	110	110	110
Matrix Spike Duplicate % Recovery:	110	110	110	110
Relative % Difference:	0.0	0.0	0.0	0.0
LCS Batch#:	-	-	-	-
Date Prepared:	-	-	-	-
Date Analyzed:	-	-	-	-
Instrument I.D.#:	-	-	-	-
LCS % Recovery:	-	-	-	-
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Client Project ID: ARCO 6002, Oakland
Matrix: Liquid

QC Sample Group: 4B26802

Reported: Feb 16, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel
MS/MSD Batch#:	4B25901	4B25901	4B25901	4B25901
Date Prepared:	-	-	-	-
Date Analyzed:	2/7/94	2/7/94	2/7/94	2/7/94
Instrument I.D.#:	GCHP-3	GCHP-3	GCHP-3	GCHP-3
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	98	99	99	100
Matrix Spike Duplicate % Recovery:	93	93	94	93
Relative % Difference:	5.2	6.2	5.2	7.3
LCS Batch#:	-	-	-	-
Date Prepared:	-	-	-	-
Date Analyzed:	-	-	-	-
Instrument I.D.#:	-	-	-	-
LCS % Recovery:	-	-	-	-
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

ARCO Products Company
Division of AtlanticRichfieldCompany

Chain of Custody

Task Order No. 6002-93-2

ARCO Facility no. 6002	City (Facility) Oakland	Project manager (Consultant) John Young	Laboratory name Sequoia
ARCO engineer Mike Whelan	Telephone no. (ARCO) (415)571-2449	Telephone no. (Consultant) (408)264-7723	Fax no. (Consultant) 264-2435	Contract number 07-073
Consultant name RESNA Industries	Address (Consultant) 3315 Almaden Expressway suite 34 SJ 95118			Method of shipment

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 ☐	HOLD
Rinsate		2		✓		✓	✓	1/31/94		~~✓~~											✓
BBV4-2		2		✓		✓	✓	1/31/94			~~✓~~										✓
W-8-W02		3		✓		✓	✓	"	1:15		✓									-01	
BBV4-1		2		✓		✓	✓	"													✓
W-6-W01		3		✓		✓	✓	"	1:40		✓									-02	
~~BB~~																					

Special detection Limit/reporting

Special QA/QC

Remarks

Lab number 9402268

Turnaround time

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

Condition of sample:

Temperature received:

	Date	Time
Relinquished by sampler: Jim D. Krueger	2/3/94	3:07
Received by: G Adam #158 Prime	2/3/94	307 PM
Relinquished by: G Adam	2/3/94	354
Received by:		
Relinquished by:		
Received by laboratory: KB	02/03/94	1554

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

APPC 3292 (2-91)

RESNA
Working to Restore Nature

APPENDIX D

LABORATORY ANALYTICAL REPORTS AND CHAIN OF CUSTODY RECORDS FOR SOIL SAMPLES

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Project: ARCO, 6002 Oakland

Enclosed are the results from 12 soil samples received at Sequoia Analytical on January 18,1994. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
4AA0101	Soil, S-5-B1	1/13/94	EPA 5030/8015 Mod./8020
4AA0102	Soil, S-8.5-B1	1/13/94	EPA 5030/8015 Mod./8020
4AA0103	Soil, S-5.5-B2	1/13/94	EPA 5030/8015 Mod./8020
4AA0104	Soil, S-7.5-B2	1/13/94	EPA 5030/8015 Mod./8020
4AA0105	Soil, S-10.5-B2	1/13/94	EPA 5030/8015 Mod./8020
4AA0106	Soil, S-13.5-B2	1/13/94	EPA 5030/8015 Mod./8020
4AA0107	Soil, S-18-B2	1/13/94	EPA 5030/8015 Mod./8020
4AA0108	Soil, S-20.5-B2	1/13/94	EPA 5030/8015 Mod./8020
4AA0109	Soil, S-23.5-B2	1/13/94	EPA 5030/8015 Mod./8020
4AA0110	Soil, S-27-B2	1/13/94	EPA 5030/8015 Mod./8020
4AA0111	Soil, S-32.5-B2	1/13/94	EPA 5030/8015 Mod./8020
4AA0112	Soil, S-36-B2	1/13/94	EPA 5030/8015 Mod./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

VM Tague

Vickie Tague
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

RESNA	Client Project ID:	ARCO, 6002 Oakland	Sampled:	Jan 13, 1994
3315 Almaden Expwy., Suite 34	Sample Matrix:	Soil	Received:	Jan 18, 1994
San Jose, CA 95118	Analysis Method:	EPA 5030/8015 Mod./8020	Reported:	Feb 1, 1994
Attention: John Young	First Sample #:	4AA0101		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 4AA0101 S-5-B1	Sample I.D. 4AA0102 S-8.5-B1	Sample I.D. 4AA0103 S-5.5-B2	Sample I.D. 4AA0104 S-7.5-B2	Sample I.D. 4AA0105 S-10.5-B2	Sample I.D. 4AA0106 S-13.5-B2
Purgeable Hydrocarbons	1.0	N.D.	3.8	3.8	7.2	420	N.D.
Benzene	0.0050	N.D.	N.D.	0.031	0.030	N.D.	N.D.
Toluene	0.0050	N.D.	N.D.	0.022	0.042	N.D.	N.D.
Ethyl Benzene	0.0050	N.D.	N.D.	0.013	0.027	5.5	N.D.
Total Xylenes	0.0050	N.D.	N.D.	0.060	0.16	14	N.D.
Chromatogram Pattern:		--	Non-Gas Mix > C8	Gas	Gas	Weathered Gas	--

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Date Analyzed:	1/21/94	1/21/94	1/25/94	1/21/94	1/21/94	1/21/94
Instrument Identification:	GCHP-6	GCHP-7	GCHP-7	GCHP-7	GCHP-6	GCHP-6
Surrogate Recovery, %: (QC Limits = 70-130%)	81	94	97	74	111	79

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

RESNA	Client Project ID:	ARCO, 6002 Oakland	Sampled:	Jan 13, 1994
3315 Almaden Expwy., Suite 34	Sample Matrix:	Soil	Received:	Jan 18, 1994
San Jose, CA 95118	Analysis Method:	EPA 5030/8015 Mod./8020	Reported:	Feb 1, 1994
Attention: John Young	First Sample #:	4AA0107		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 4AA0107 S-18-B2	Sample I.D. 4AA0108 S-20.5-B2	Sample I.D. 4AA0109 S-23.5-B2	Sample I.D. 4AA0110 S-27-B2	Sample I.D. 4AA0111 S-32.5-B2	Sample I.D. 4AA0112 S-36-B2
Purgeable Hydrocarbons	1.0	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Benzene	0.0050	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Toluene	0.0050	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Ethyl Benzene	0.0050	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Total Xylenes	0.0050	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Chromatogram Pattern:		--	--	--	--	--	--

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Date Analyzed:	1/21/94	1/21/94	1/21/94	1/21/94	1/21/94	1/21/94
Instrument Identification:	GCHP-6	GCHP-6	GCHP-6	GCHP-6	GCHP-6	GCHP-6
Surrogate Recovery, %: (QC Limits = 70-130%)	82	85	86	90	92	89

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Client Project ID: ARCO, 6002 Oakland
Matrix: Soil

QC Sample Group: 4AA0101-12

Reported: Feb 1, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	E. Cunanan	E. Cunanan	E. Cunanan	E. Cunanan
MS/MSD Batch#:	4A77202	4A77202	4A77202	4A77202
Date Prepared:	1/21/94	1/21/94	1/21/94	1/21/94
Date Analyzed:	1/21/94	1/21/94	1/21/94	1/21/94
Instrument I.D.#:	GCHP-18	GCHP-18	GCHP-18	GCHP-18
Conc. Spiked:	0.20 mg/kg	0.20 mg/kg	0.20 mg/kg	0.60 mg/kg
Matrix Spike % Recovery:	95	75	95	95
Matrix Spike Duplicate % Recovery:	95	75	100	98
Relative % Difference:	0.0	0.0	5.1	3.1
LCS Batch#:	-	-	-	-
Date Prepared:	-	-	-	-
Date Analyzed:	-	-	-	-
Instrument I.D.#:	-	-	-	-
LCS % Recovery:	-	-	-	-
% Recovery Control Limits:	55-145	47-149	47-155	56-140

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

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

ARCO Products Company

Division of AtlanticRichfieldCompany

Chain of Custody

Task Order No. 6002-93-2

ARCO Facility no. 6002	City (Facility) Oakland	Project manager (Consultant) John C. Young	Laboratory name Sequoia
ARCO engineer Mike Whelan	Telephone no. (ARCO) (415) 521-2449	Telephone no. (Consultant)	Fax no. (Consultant)	Contract number 87-073
Consultant name RESNA Industries, Inc.	Address (Consultant) 3315 Almaden Expy Suite 34 San Jose CA 95118		Method of shipment

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Water	Other	Preservation: Ice	Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH Gas EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Semi Metals ☐ VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	HOLD	
S-5-B1			✓			✓		1/13/94	9:16		✓											01
S-5-B1			✓			✓		1/13/94	9:26		✓											02
S-5-B1			✓			✓		1/13/94	9:47												✓	
S-5.5-B3			✓			✓		1/13/94	11:00		✓											03
S-7.5-B2			✓			✓		1/13/94	11:05		✓											04
S-8.5-B2			✓			✓		1/13/94	11:07												✓	
S-10.5-B2			✓			✓		1/13/94	11:12		✓											05
S-13.5-B2			✓			✓		1/13/94	11:21		✓											06
S-16-B2			✓			✓		1/13/94	11:34												✓	
S-18-B2			✓			✓		1/13/94	11:37		✓											07
S-20.5-B2			✓			✓		1/13/94	11:46		✓											08
S-23.5-B2			✓			✓		1/13/94	12:02		✓											09
S-27-B2			✓			✓		1/13/94	12:41		✓											10
S-32.5-B2			✓			✓		1/13/94	13:07		✓											11
S-36-B2			✓			✓		1/13/94	13:15		✓											12

Special detection Limit/reporting

Special QA/QC

Remarks

Lab number 9401A01

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: Steven W. Krueger	Date 1/18/94	Time 1100	Received by SPO 1/18/94 1101
Relinquished by: SPO	Date 1/18/94	Time 1155	Received by
Relinquished by	Date	Time	Received by laboratory: KC Date 01/18/94 Time 1155

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

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Project: ARCO, 6002 Oakland

Enclosed are the results from 6 soil samples received at Sequoia Analytical on January 18,1994. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
4AA0301	Soil, S-5-B3	1/14/94	EPA 5030/8015 Mod./8020
4AA0302	Soil, S-10-B3	1/14/94	EPA 5030/8015 Mod./8020
4AA0303	Soil, S-14.5-B3	1/14/94	EPA 5030/8015 Mod./8020
4AA0304	Soil, S-5-B4	1/14/94	EPA 5030/8015 Mod./8020
4AA0305	Soil, S-10-B4	1/14/94	EPA 5030/8015 Mod./8020
4AA0306	Soil, S-15.5-B4	1/14/94	EPA 5030/8015 Mod./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

Vickie Tague
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

RESNA	Client Project ID:	ARCO, 6002 Oakland	Sampled:	Jan 14, 1994
3315 Almaden Expwy., Suite 34	Sample Matrix:	Soil	Received:	Jan 18, 1994
San Jose, CA 95118	Analysis Method:	EPA 5030/8015 Mod./8020	Reported:	Jan 27, 1994
Attention: John Young	First Sample #:	4AA0301		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 4AA0301 S-5-B3	Sample I.D. 4AA0302 S-10-B3	Sample I.D. 4AA0303 S-14.5-B3	Sample I.D. 4AA0304 S-5-B4	Sample I.D. 4AA0305 S-10-B4	Sample I.D. 4AA0306 S-15.5-B4
Purgeable Hydrocarbons	1.0	N.D.	N.D.	N.D.	N.D.	3.9	N.D.
Benzene	0.0050	N.D.	0.014	N.D.	N.D.	0.014	N.D.
Toluene	0.0050	N.D.	0.013	N.D.	N.D.	N.D.	N.D.
Ethyl Benzene	0.0050	N.D.	0.0060	N.D.	N.D.	N.D.	N.D.
Total Xylenes	0.0050	N.D.	0.026	N.D.	N.D.	0.041	N.D.
Chromatogram Pattern:		--	Gas	--	--	Gas	--

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Date Analyzed:	1/24/94	1/21/94	1/21/94	1/21/94	1/21/94	1/21/94
Instrument Identification:	GCHP-7	GCHP-7	GCHP-7	GCHP-7	GCHP-7	GCHP-7
Surrogate Recovery, %: (QC Limits = 70-130%)	85	87	84	87	85	86

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as *N.D.* were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Vickie Tagué
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Client Project ID: ARCO, 6002 Oakland
Matrix: Soil

QC Sample Group: 4AA0301-6

Reported: Jan 27, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	R. Geckler	R. Geckler	R. Geckler	R. Geckler
MS/MSD Batch#:	4A77201	4A77201	4A77201	4A77201
Date Prepared:	1/21/94	1/21/94	1/21/94	1/21/94
Date Analyzed:	1/21/94	1/21/94	1/21/94	1/21/94
Instrument I.D.#:	GCHP-6	GCHP-6	GCHP-6	GCHP-6
Conc. Spiked:	0.20 mg/kg	0.20 mg/kg	0.20 mg/kg	0.60 mg/kg
Matrix Spike % Recovery:	85	90	90	90
Matrix Spike Duplicate % Recovery:	95	100	100	98
Relative % Difference:	11	11	11	8.5
LCS Batch#:	-	-	-	-
Date Prepared:	-	-	-	-
Date Analyzed:	-	-	-	-
Instrument I.D.#:	-	-	-	-
LCS % Recovery:	-	-	-	-
% Recovery Control Limits:	55-145	47-149	47-155	56-140

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

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

ARCO Products Company
Division of AtlanticRichfieldCompany

Chain of Custody

Task Order No. 6002-93-2

ARCO Facility no. 6002	City (Facility) Oakland	Project manager (Consultant) John Young	Laboratory name Sequoia
ARCO engineer Mike Whelan	Telephone no. (ARCO) (415) 271-2449	Telephone no. (Consultant) (408) 264-7723	Fax no. (Consultant) (408) 264-2435
Consultant name RESNA Industries, Inc.	Address (Consultant) 3315 Almaden Expwy, Suite 34, San Jose, CA 95118		Contract number 07-073

Method of shipment: 9401 A03

Special detection Limit/reporting:

Special QA/QC:

Remarks:

Lab number: 9401103

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 ☐
S-5-B3			✓			✓		1/14/94			✓					-01				
S-10-B3			✓			✓		1/14/94			✓					-02				
S-14.5-B3			✓			✓		1/14/94			✓					-03				
S-5-B4			✓			✓		1/14/94			✓					-04				
S-10-B4			✓			✓		1/14/94			✓					-05				
S-15.5-B4			✓			✓		1/14/94			✓					-06				
~~B1H-S-5~~																				
~~B1H-S-?~~																				
~~QA~~																				

Condition of sample:

Temperature received:

Relinquished by sampler: Chris Kruger	Date 1/18/94	Time 11:00	Received by SFO 1/18/94 11:01
Relinquished by: SFO	Date 1/18/94	Time 11:55	Received by
Relinquished by	Date	Time	Received by laboratory VG Date 01-18-94 Time 1156

Turnaround time

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

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APPC-3292 (2-91)

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Project: Arco, 6002 Oakland

Enclosed are the results from 1 soil sample received at Sequoia Analytical on January 18,1994. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
4A80401	Soil, 0114-SP-(A-D)	1/14/94	Corrosivity Ignitability Reactivity EPA 5030/8015/8020 TCLP BTEX STLC Lead

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

Vickie Tague
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

RESNA	Client Project ID:	Arco, 6002 Oakland	Sampled:	Jan 14, 1994
3315 Almaden Expwy., Suite 34	Sample Descript:	Soil, 0114-SP-(A-D)	Received:	Jan 18, 1994
San Jose, CA 95118			Analyzed:	Jan 18-19, 1994
Attention: John Young	Lab Number:	4A80401	Reported:	Jan 24, 1994

CORROSIVITY, IGNITABILITY, AND REACTIVITY

Analyte	Detection Limit	Sample Results
Corrosivity:		
pH	N.A.	6.7
Ignitability:		
Flashpoint (Pensky-Martens), °C	25	> 100 °C
Reactivity:		
Sulfide, mg/kg	13	N.D.
Cyanide, mg/kg	0.50	N.D.
Reaction with water	N.A.	Negative

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

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

4A80401.RES

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

RESNA	Client Project ID:	Arco, 6002 Oakland	Sampled:	Jan 14, 1994
3315 Almaden Expwy., Suite 34	Sample Descript:	STLC Extract of Soil	Received:	Jan 18, 1994
San Jose, CA 95118	Analysis for:	STLC Lead		
Attention: John Young	First Sample #:	4A80401	Analyzed:	Jan 21, 1994
			Reported:	Jan 24, 1994

LABORATORY ANALYSIS FOR: STLC Lead

Sample Number	Sample Description	Detection Limit mg/L	Sample Result mg/L
4A80401	0114-SP-(A-D)	0.025	0.050

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

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

RESNA	Client Project ID:	Arco, 6002 Oakland	Sampled:	Jan 14, 1994
3315 Almaden Expwy., Suite 34	Sample Matrix:	Soil	Received:	Jan 18, 1994
San Jose, CA 95118	Analysis Method:	EPA 5030/8015/8020	Reported:	Jan 24, 1994
Attention: John Young	First Sample #:	4A80401		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 4A80401 0114-SP-(A-D)
Purgeable Hydrocarbons	1.0	3.1
Benzene	0.0050	N.D.
Toluene	0.0050	N.D.
Ethyl Benzene	0.0050	N.D.
Total Xylenes	0.0050	0.042
Chromatogram Pattern:		Gas + Non-Gas Mix C6 - C12

Quality Control Data

Report Limit Multiplication Factor:	1.0
Date Analyzed:	1/20/94
Instrument Identification:	GCHP-6
Surrogate Recovery, %: (QC Limits = 70-130%)	87

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

RESNA	Client Project ID:	Arco, 6002 Oakland	Sampled:	Jan 14, 1994
3315 Almaden Expwy., Suite 34	Sample Matrix:	TCLP Extract of Soil	Received:	Jan 18, 1994
San Jose, CA 95118	Analysis Method:	EPA 5030/8020	Reported:	Jan 24, 1994
Attention: John Young	First Sample #:	4A80401		

BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 4A80401 0114-SP-(A-D)
Benzene	0.0050	N.D.
Toluene	0.0050	N.D.
Ethyl Benzene	0.0050	N.D.
Total Xylenes	0.0050	N.D.

Quality Control Data

Report Limit Multiplication Factor:	20
Date Analyzed:	1/20/94
Instrument Identification:	GCHP-3
Surrogate Recovery, %: (QC Limits = 70-130%)	107

Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Client Project ID: Arco, 6002 Oakland
Matrix: Soil

QC Sample Group: 4A80401

Reported: Jan 24, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	pH	Flashpoint	Reactive Sulfide	Reactive Cyanide
Method:	EPA 9045	EPA 1010	SW-846	SW-846
Analyst:	Y. Arteaga	K. Newberry	K. Newberry	M. Nguyen
Date Analyzed:	1/18/94	1/12/94	1/13/94	1/14/94
Sample #:	4A79901	4A37101	4A52901	4A52901
Sample Concentration:	6.4	>100°C	N.D.	N.D.
Sample Duplicate Concentration:	6.2	>100°C	N.D.	N.D.
% RPD:	3.2	0.0	0.0	0.0
% RPD: Control Limits:	0-30	±5.0°C	80-120	80-120

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Vickie Tague
Project Manager

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RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Client Project ID: Arco, 6002 Oakland
Matrix: Liquid

QC Sample Group: 4A80401

Reported: Jan 24, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Lead
Method:	EPA 239.2
Analyst:	J. Martinez
MS/MSD Batch#:	4AA2601
Date Prepared:	1/21/94
Date Analyzed:	1/21/94
Instrument I.D.#:	MV-1
Conc. Spiked:	0.050 mg/L
Matrix Spike % Recovery:	85
Matrix Spike Duplicate % Recovery:	95
Relative % Difference:	11
LCS Batch#:	BLK012194
Date Prepared:	1/21/94
Date Analyzed:	1/21/94
Instrument I.D.#:	MV-1
LCS % Recovery:	105
% Recovery Control Limits:	75-125

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

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL

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(415) 364-9600 • FAX (415) 364-9233

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Client Project ID: Arco, 6002 Oakland
Matrix: Solid

QC Sample Group: 4A80401

Reported: Jan 24, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	R. Geckler	R. Geckler	R. Geckler	R. Geckler
MS/MSD Batch#:	4A70706	4A70706	4A70706	4A70706
Date Prepared:	1/19/94	1/19/94	1/19/94	1/19/94
Date Analyzed:	1/19/94	1/19/94	1/19/94	1/19/94
Instrument I.D.#:	GCHP-6	GCHP-6	GCHP-6	GCHP-6
Conc. Spiked:	0.20 mg/kg	0.20 mg/kg	0.20 mg/kg	0.60 mg/kg
Matrix Spike % Recovery:	85	90	85	92
Matrix Spike Duplicate % Recovery:	90	95	95	97
Relative % Difference:	5.7	5.4	11	5.3
LCS Batch#:	-	-	-	-
Date Prepared:	-	-	-	-
Date Analyzed:	-	-	-	-
Instrument I.D.#:	-	-	-	-
LCS % Recovery:	-	-	-	-
% Recovery Control Limits:	55-145	47-149	47-155	56-140

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

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

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SEQUOIA ANALYTICAL

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RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: John Young

Client Project ID: Arco, 6002 Oakland
Matrix: Solid

QC Sample Group: 4A80401

Reported: Jan 24, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	M. Nipp	M. Nipp	M. Nipp	M. Nipp
MS/MSD Batch#:	4A75401	4A70706	4A70706	4A70706
Date Prepared:	-	-	-	-
Date Analyzed:	1/20/94	1/20/94	1/20/94	1/20/94
Instrument I.D.#:	GCHP-3	GCHP-3	GCHP-3	GCHP-3
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	95	94	94	93
Matrix Spike Duplicate % Recovery:	100	100	99	100
Relative % Difference:	5.1	6.2	5.2	7.3
LCS Batch#:	-	-	-	-
Date Prepared:	-	-	-	-
Date Analyzed:	-	-	-	-
Instrument I.D.#:	-	-	-	-
LCS % Recovery:	-	-	-	-
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

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ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 600293-2

Chain of Custody

ARCO Facility no. 6002	City (Facility) Oakland	Project manager (Consultant) John Young	Laboratory name Sequoia
ARCO engineer Mike Whelan	Telephone no. (ARCO) (415) 571-2449	Telephone no. (Consultant) (408) 264-7723	Fax no. (Consultant) (408) 264-2435
Consultant name RESNA Industries Inc	Address (Consultant) 3315 Almaden Expy, Suite 34, San Jose 95118		Contract number 94-073

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX TCLP 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas X Diese	Oil and Grease 413.1 413.2	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals VOA Semi VOA	CAM Metals EPA 6010/7000 TTLC STLC	Lead Org./DHS Lead EPA 7420/7421	RQ 1	STLC LEAD
0114-SP-A	01A		✓			✓		1/14/94	13:57	✓		✓									✓	✓
0114-SP-B	01B		✓			✓		1/14/94	13:57													
0114-SP-C	01C		✓			✓		1/14/94	13:57													
0114-SP-D	01D		✓			✓		1/14/94	13:57													

Method of shipment

Special detection Limit/reporting

Special QA/QC

Remarks
Composite. 1 1
4 40 1

Lab number
9401804

Turnaround time
- Priority Rush 1 Business Day [ ]
- Rush 2 Business Days [X]
- Expedited 5 Business Days [ ]
- Standard 10 Business Days [ ]

Condition of sample:

Temperature received:

Relinquished by sampler: Steven D. Krueger	Date 1/18/94	Time 11:00	Received by SPO 1/19/94 11:01
Relinquished by: SPO	Date 1/19/94	Time 1115	Received by
Relinquished by	Date	Time	Received by laboratory: [illegible] Date 01/18 Time 1157

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