RESNA
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42501 Albrae Street, Suite 100
Fremont, California 94538
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TRANSMITTAL

TO: Mr. Barney Chan
ACHCSA, Dept. of Env. Health
80 Swan Way, Room 200
Oakland, California 94621

DATE: June 9, 1994
PROJECT NUMBER: 62026.05
SUBJECT: ARCO Station 2185
9800 East 14th Street, Oakland, California

94 JUN 13 PM 2:14
ALCO HAZMAT

FROM: Mary E. Rysdale
TITLE: Geologic Technician

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Mary E. Rysdale

Mary E. Rysdale, Geologic Technician

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LETTER REPORT
INSTALLATION OF COMPLIANCE WELL MW-10

ARCO Station 2185
9800 East 14th Street
Oakland, California

62026.05

#2185

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42501 Albrae Street, Suite 100
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June 6, 1994

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

Subject: Installation of Compliance Well MW-10
ARCO Station 2185
9800 East 14th Street, Oakland, California

Mr. Whelan:

At the request of ARCO Products Company (ARCO), RESNA Industries Inc. (RESNA) installed one groundwater monitoring compliance well at ARCO Station 2185, located at 9800 East 14th Street, in Oakland, California. The compliance well was installed at the request of Mr. Barney Chan of the Alameda County Health Care Services Agency (ACHCSA) in a February 28, 1994, meeting and as documented both in RESNA's work plan (RESNA, March 10, 1994) and in the letter from ACHCSA to ARCO (ACHCSA, March 18, 1994). ARCO proposes that this site be considered for Alternative Points of Compliance under the Tentative Resolution of the California Regional Water Quality Control Board's (CRWQCB) Basin and Amendment Plan (CRWQCB, November 20, 1992).

The work performed for this investigation included drilling one soil boring (B-17); collecting and describing soil samples from the boring; installing one groundwater monitoring well (MW-10); submitting selected soil samples for laboratory analyses; and preparing this letter report. The results of the proposed site investigation referenced in the work plan will be submitted in a separate report.

ARCO Station 2185 is located in a commercial and residential area on the southeastern corner of the intersection of East 14th Street and 98th Avenue in Oakland, California. The location of the site is shown on the Site Vicinity Map, Plate 1. The site is on a relatively flat, asphalt and concrete covered lot at an elevation of approximately 25 feet above mean sea level (msl). The site is currently occupied by an operating AM/PM mini-market and self-serve gasoline station with regular unleaded and supreme unleaded gasoline pumps. Pertinent site features include two service islands (located in the northern section of the

site), a station building, four newly installed USTs in the northeastern portion of the site, seven groundwater monitoring wells, and two vapor extraction wells. These site features are shown on Plate 2, Generalized Site Plan.

Field Work

A workplan prepared by RESNA (RESNA, January 20, 1994), and a subsequent letter to Mr. Chan (RESNA, March 3, 1994) outline the criteria used to determine the location of boring B-17 and subsequent monitoring well MW-10. The well permit is presented in Appendix A.

On April 6, 1994, a RESNA geologist observed Exploration GeoServices of San Jose, California, drill one soil boring (B-17) at the subject site to a total depth of 25½ feet. Exploration GeoServices then installed a groundwater monitoring well. Boring B-17 was drilled in the northwestern portion of the site, close to the property boundary (Plate 2). RESNA's field protocol is presented in Appendix B.

Ten soil samples from boring B-17 were collected for description using the Unified Soil Classification System (Plate 3), and for possible laboratory analyses. Complete descriptions of the soil encountered in the borings are presented on the Log of Boring, Plate 4. A RESNA geologist performed field monitoring of organic vapor concentrations in soil samples during drilling using an organic vapor meter (OVM).

Following completion of drilling on April 6, 1994, the RESNA geologist collected four soil samples from the soil stockpile for compositing and analyses by the laboratory. On April 29, 1994, Dillard Environmental Services of Bryon, California, transported approximately 2 yd^3 of soil for disposal to BFI Landfill in Livermore, California.

On April 13, 1994, a RESNA field technician oversaw the development of the monitoring well using surge block and bailing techniques to remove fine sediments and allow better communication between the well and the surrounding water-bearing materials. The well was sampled on April 15, 1994, by a RESNA field technician. Purged groundwater was stored onsite in DOT 17H drums.

Laboratory Methods

Soil samples collected from boring B-17 were analyzed by Sequoia Analytical Laboratories, Inc. (Sequoia), of Redwood City, California (California Hazardous Waste Testing Laboratory Certification #1210) for benzene, toluene, ethylbenzene, and total xylenes (BTEX), and total petroleum hydrocarbons as gasoline (TPHg) using Environmental Protection Agency (EPA) Methods 5030/8020/8015. The soil samples collected from the

soil stockpile were composited in the laboratory and analyzed for BTEX and TPHg using EPA Method 5030/8020/8015, for soluable lead using LUFT Method, and for reactivity, corrosivity, and ignitability using SW846, EPA 9045, and EPA 1010 methods, respectively.

Groundwater samples collected from well MW-10 were analyzed by Sequoia for TPHg and BTEX using EPA Methods 5030/8015M/8020.

Laboratory Analytical Results

The analytical results of soil samples are summarized in Table 1, Cumulative Results of Laboratory Analyses of Soil Samples. The analytical results of groundwater samples are summarized in Table 2, Cumulative Results of Laboratory Analyses of Water Samples. Certified Laboratory Analytical Reports and Chain of Custody Records for soil and groundwater samples are included in Appendix C.

Laboratory analytical results of soil samples collected from B-17 at depths of 5.5, 8.5, 11, and 23.5 feet below grade indicated TPHg and BTEX were not detected at the laboratory method detection limits (MDL).

Laboratory analytical results of groundwater samples from MW-10 indicated concentrations of TPHg to be 4,800 parts per billion and benzene to be below the laboratory MDL.

Reporting Requirements

We recommend that copies of this report be forwarded to:

Mr. Richard Hiett
California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, California 94612

Mr. Barney Chan
Alameda County Health Care Services Agency
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94624

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If you have any questions or comments, please call us at (408) 264-7723.

Sincerely,
RESNA Industries Inc.

Mary E. Rysdale
Geologic Technician

John B. Bobbitt, R.G. 4313
Program Manager

REGISTERED GEOLOGIST
JOHN BAILEY BOBBITT
No. 4313
STATE OF CALIFORNIA

Attachments:

References

Plate 1: Site Vicinity Map
Plate 2: Generalized Site Plan
Plate 3: Unified Soil Classification System and Symbol Key
Plate 4: Log of Boring B-17

Table 1: Cumulative Results of Laboratory Analyses of Soil Samples
Table 2: Cumulative Results of Laboratory Analyses of Water Samples

Appendix A: Well Permit
Appendix B: Field Protocol
Appendix C: Certified Laboratory Analytical Reports and Chain of Custody Records

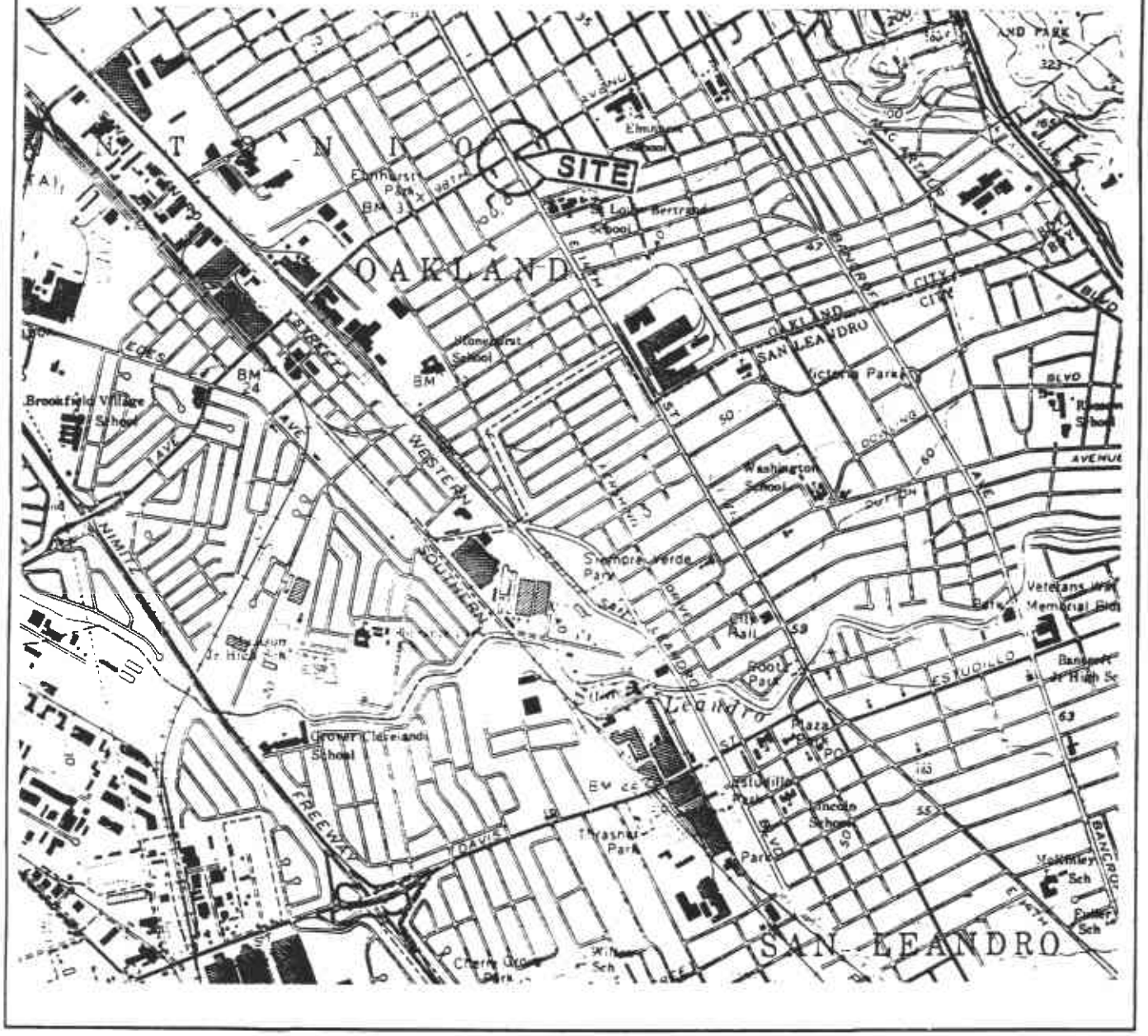
References

RESNA Industries Inc. October 12, 1993. Report of Findings, Initial Offsite and Additional Onsite Subsurface Investigation and Aquifer Pumping Test at ARCO Station 2185, 9800 East 14th Street, Oakland, California. RESNA Report 62026.02

RESNA Industries Inc. January 20, 1994. Work Plan and Response Letter to perform a Record Search and Additional Offsite Subsurface Environmental Investigation, ARCO Station 2185, 9800 East 14th Street, Oakland, California. RESNA Letter 62026/ADDINVES.WP1

RESNA Industries Inc. March 8, 1994. Letter Report, Quarterly Groundwater Monitoring, Fourth Quarter 1993, at ARCO Station 2185, 9800 East 14th Street, Oakland, California. RESNA Report 62026.04

RESNA Industries Inc. March 10, 1994. Letter to Mr. Barney Chan, Alameda County Health Care Services Agency, Department of Environmental Health. Subject: Response to letter dated February 10, 1994, ARCO Station 2185, 9800 East 14th Street, Oakland, California. RESNA Letter 62026/0303BCHA.LET



Source: U.S. Geological Survey
7.5–Minute Quadrangle
San Leandro, California
Photorevised 1980

N

Approximate Scale

2000 1000 0 2000

feet

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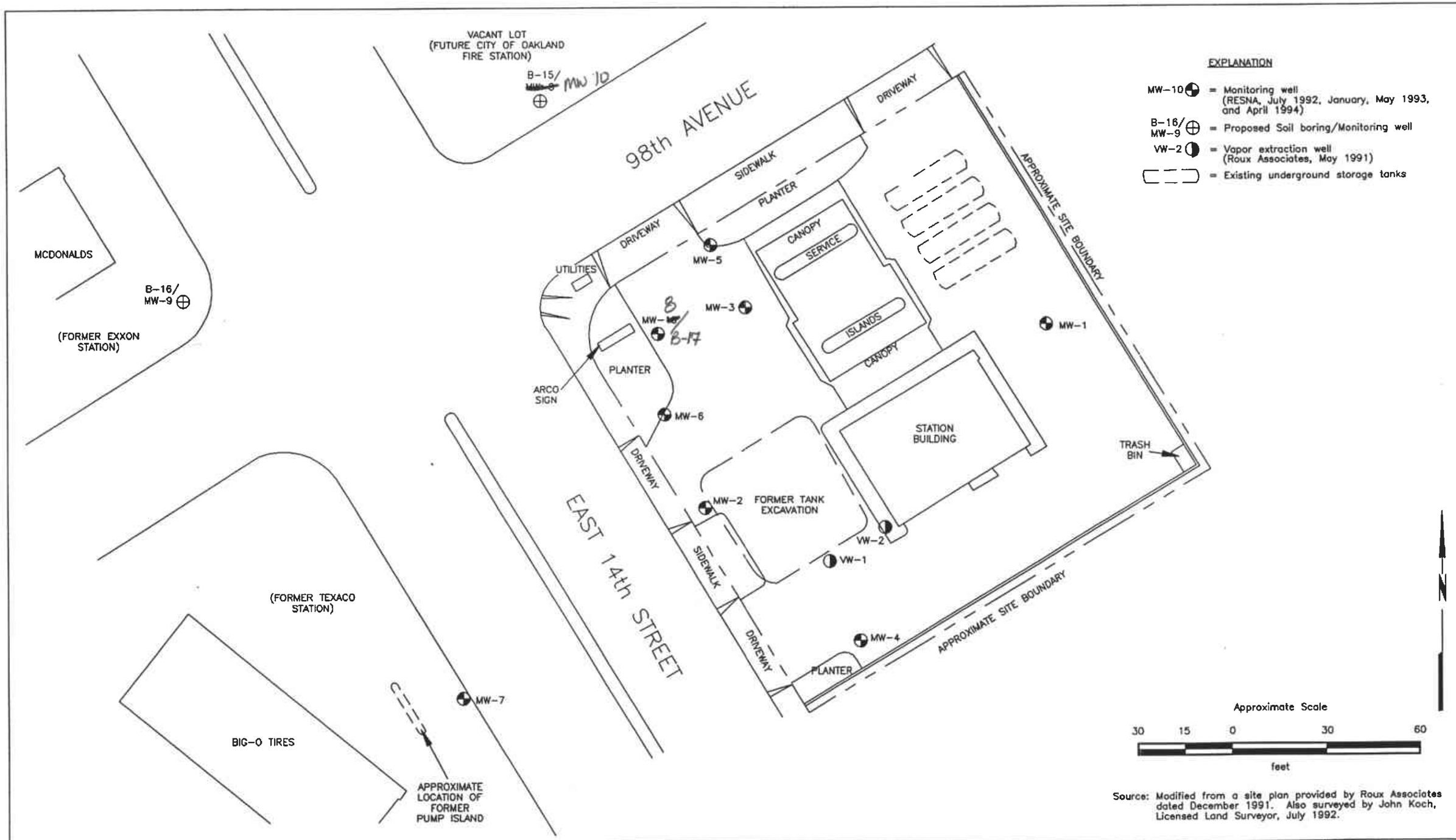
SITE VICINITY MAP
ARCO Station 2185
9800 East 14th Street
San Leandro, California

PLATE
1



Source: Modified from a site plan provided by Roux Associates dated December 1991. Also surveyed by John Koch, Licensed Land Surveyor, July 1992.

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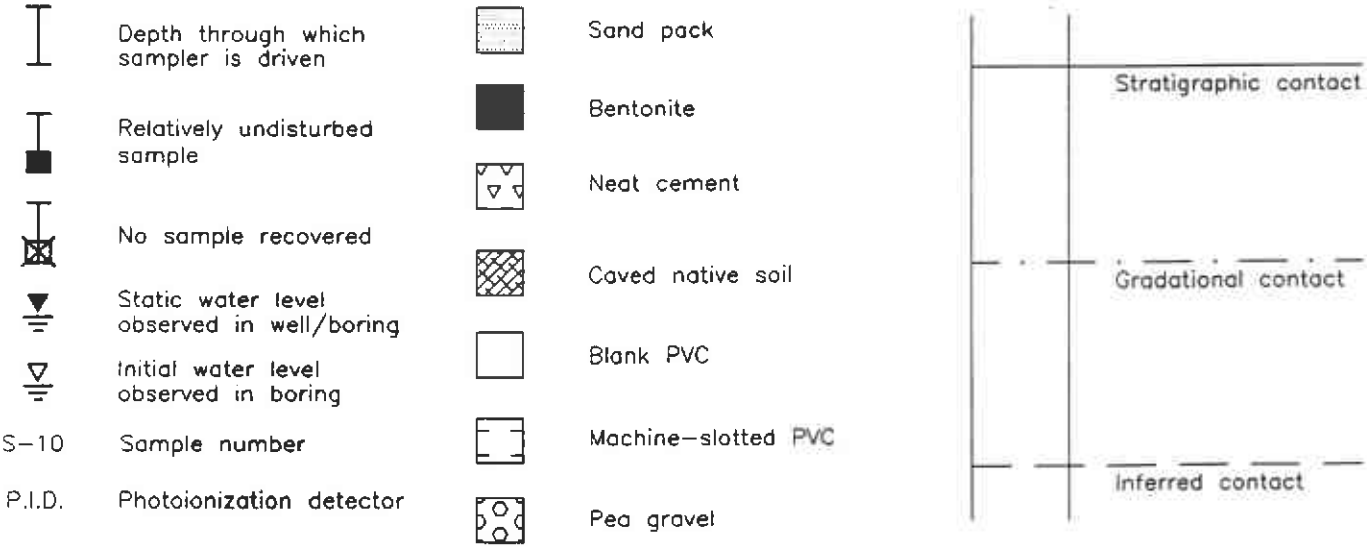
PROJECT 62026.05 62026-5G

GENERALIZED SITE PLAN
ARCO Station 2185
9800 East 14th Street
Oakland, California

PLATE
2

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISION		LTR	DESCRIPTION	MAJOR DIVISION		LTR	DESCRIPTION
COARSE-GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW	Well-graded gravels or gravel-sand mixtures, little or no fines.	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.
		GP	Poorly-graded gravels or gravel-sand mixtures, little or no fines.			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		GM	Silty gravels, gravel-sand-silt mixtures.			OL	Organic silts and organic silt-clays of low plasticity.
		GC	Clayey gravel, gravel-sand-clay mixtures.		SILTS AND CLAYS LL>50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
	SAND AND SANDY SOILS	SW	Well-graded sand or gravelly sands, little or no fines.			CH	Inorganic clays of high plasticity, fat clays.
		SP	Poorly-graded sands or gravelly sands, little or no fines.			OH	Organic clays of medium to high plasticity, organic silts.
		SM	Silty sands, sand-silt mixtures.				
		SC	Clayey sands, sand-clay mixtures.	HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils.



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 2185
9800 East 14th Street
Oakland, California

PLATE 3

Total depth of boring:	25-1/2 feet	Casing diameter:	4 inches
Diameter of boring:	12 inches	Casing material:	Sch 40 PVC
Date drilled:	4-6-94	Slot size:	0.020-inch
Drilling Company:	Exploration Geoservices	Sand size:	No. 3 Sand
Driller:	Dave	Screen Interval:	8 feet to 23 feet
Drilling method:	Hollow-Stem Auger	Field Geologist:	Erin Krueger

Signature of Registered Professional:

Registration No.: RG 4313 State: CA

P.I.D.	Sample No.	Blows	Depth	USCS Code	Description	Well Const.
					Asphalt (4-6 inches).	
			2	GP	Sandy gravel, brown, damp, dense; baserock.	
				CL	Silty clay, black, damp, medium plasticity, stiff.	
			4			
		6 8		ML	Clayey silt, trace sand and fine gravel, black, damp, medium plasticity, very stiff; rootholes.	
0	S-5.5	10 15	6			
0	S-7	21 28			With fine gravel, brown, rootholes with orange oxidation.	
		8 10	8	ML	Clayey silt with sand, gray to olive, damp, medium plasticity, very stiff; rootholes.	
0	S-8.5	11 5		SM		
0	S-10	8 11	10		Fine-grained silty sand, gray to olive, damp, medium dense.	
0	S-11	4 5		ML	Clayey silt, trace sand, gray, damp to moist, medium plasticity, stiff; abundant rootholes with orange oxidation, water in rootholes and along blocky fractures.	
		9 3	12			
		5 7				
		4 6	14			
0	S-14.5	10 7				
0	S-16	7 11	16			
		3 7				
0	S-17.5	8 4	18	SM	Fine-grained silty sand, brown with black and orange mottling, wet, medium dense.	
		6 8				
		5 7	20	ML	Clayey silt, brown and gray with black mottling, damp to wet along blocky fractures, medium plasticity, stiff.	
		8 5				
0	S-22	7 8	22		Brown with orange and black mottling, damp to moist; fewer rootholes.	
		5 8				
0	S-23.5	8 9	24	SP	Fine-grained sand, tan with orange mottling, wet, dense.	
		10 12				
		14				
			26		Total Depth = 25-1/2 feet.	
			28			
			30			
			32			
			34			
			36			
			38			
			40			

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PROJECT: 62026.05

LOG OF BORING B-17/MW-10

ARCO Station 2185
9800 East 14th Street
Oakland, California

PLATE 4

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TABLE 1
CUMULATIVE RESULTS OF LABORATORY
ANALYSES OF SOIL SAMPLES
ARCO Station 2185
Oakland, California
(Page 1 of 3)

Sample ID	Depth	TPHg	B	T	E	X
Borings, May 1991						
B1-5	5	<1.0	0.021	<0.0050	<0.0050	<0.0050
B1-10	10	350	1.1	0.65	4.9	19
B2-5	5	<1.0	0.034	<0.0050	<0.0050	<0.0050
B2-10	10	280	1.3	0.34	3.4	10
B3-5	5	1.6	0.015	<0.0050	0.021	0.048
B3-10	10	38	<0.050	0.24	.031	2.0
B4-5	5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
B4-10	10	110	0.40	0.20	0.72	0.24
Borings, September 1991						
BS-5	5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
BS-11	11	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
BS-13	13	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
B6-5	5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
B6-10	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
B7-5	5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
B7-11	11	1.7	0.04	0.013	0.0079	0.078
B7-13	13	1.7	0.27	0.0083	0.04	0.028
B8-5	5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
B8-11	11	1.7	0.054	0.0094	0.012	0.019
B8-13	13	1.3	0.013	0.0073	0.0053	0.0069
Tank Excavation, November 1991						
SW-1	14	810	3.4	1.0	13	50
SW-2	6	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
SW-3	14	370	1.6	17	8.8	53
SW-4	14	220	0.73	1.2	2.8	15
SW-5	6	1.1	0.014	0.0069	0.012	0.034
SW-6	14	230	0.84	2.3	2.4	15
SW-7	14	1100	5.9	28	15	90
SW-8	6	1.3	0.11	0.0054	<0.0050	0.016
SW-9	14	500	3.7	0.92	7.1	32
SW-10	14	750	5.9	5.3	10	61
SW-11	6	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
SW-12	14	210	1.6	0.26	3.2	5.0
Product Lines, November 1991						
L-1	3	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
L-2	3	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
L-3	5	1,400	0.51	87	55	350
L-4	11	450	2.6	24	8.7	56

See notes on page 3 of 3.

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TABLE 1
CUMULATIVE RESULTS OF LABORATORY
ANALYSES OF SOIL SAMPLES
ARCO Station 2185
Oakland, California
(Page 2 of 3)

Sample ID	Depth	TPHg	B	T	E	X
Product Lines, November 1991 cont.						
L-5	8	18	<0.0050	0.029	0.042	0.38
L-6	8	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
L-7	8	5.1	0.032	0.047	0.058	0.13
L-8	8	240	0.17	2.8	2.8	15
L-9	9.5	5,400	22	330	120	640
L-10	8	2,600	5	130	53	29
L-11	3	1.4	<0.0050	0.014	0.012	0.1
L-12	3	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
L-13	3	13	<0.0050	0.026	0.05	0.7
L-14	3	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
Borings, July 1992						
S-10.5-B9	10.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
S-13-B9	13	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
S-23.5-B9	23.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
S-9.5-B10	9.5	9.3	0.034	0.023	0.014	0.059
S-12-B10	12	220	1.1	0.75	5.1	6.3
S-23-B10	23	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
S-10.5-B11	10.5	<1.0	0.0060	<0.0050	<0.0050	<0.0050
S-29-B11	29	<1.0	<0.0050	0.015	0.015	0.078
S-10-B12	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
S-13-B12	13	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
S-23.5-B12	23.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
Composited Stockpile Sample, July 1992						
SPA-SPD	NA	<1.0	<0.0050	<0.0050	0.010	0.012
Borings, January 1993						
S-6-B13	6	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
S-11-B13	11	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
S-6-B14	6	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
S-11.5-B14	11.5	43	0.12	0.062	0.48	0.58
Composited Stockpile Sample, January 1993						
0121-SPA-D	NA	14	0.021	0.022	0.10	0.13
	Additional analyses: nondetectable STLC metals, except 0.15 ppm barium, pH of 7.4, flashpoint of 100° C, nondetectable reactivity with sulfide and cyanide, negative reaction with water.					
Boring, May 1993						
S-5-B15	5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
S-10.5-B15	10.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050

See notes on page 3 of 3.

TABLE 1
CUMULATIVE RESULTS OF LABORATORY
ANALYSES OF SOIL SAMPLES
ARCO Station 2185
Oakland, California

Sample ID	Depth	TPHg	B	T	E	X
Composited Stockpile Sample, May 1993						
0504-SP(A-D)	NA	<1.0	<0.5	<0.5	<0.5	<0.5
	Additional analyses: 0.18 ppm STLC lead, pH of 7.4, flashpoint of greater than 100°C, not reactive with sulfide and cyanide, negative reaction with water.					
Boring, April 1994						
S-5.5-B17	5.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
S-8.5-B17	8.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
S-11-B17	11	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
S-23.5-B17	23.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
Composited Stockpile Sample, April 1994						
0406-SP(A-D)	NA	<1.0	<0.0050	<0.0050	<0.0050	<0.0050
	Additional analyses: 0.27 ppm STLC lead, pH of 7.8, flashpoint of greater than 100°C, not reactive with sulfide and cyanide, negative reaction with water.					

Notes:

Results in parts per million (ppm).
Depth in feet below ground surface.
TPHg = Total petroleum hydrocarbons as gasoline using EPA Method 5030/8020/8015
BTEX = B: benzene, T: toluene, E: ethylbenzene, X: total xylenes (EPA Method 8020/8015)
Additional Analyses = Reactive Cyanides using EPA Interim; Ignitability (Flash-Point) using EPA 1010; Corrosivity (pH) using EPA 9040; STLC/Organic Lead using LUFT Method;
< = Below indicated laboratory reporting limits.
NA = Not applicable

Sample Identification:

S-10-B12
- Boring number
- Sample depth in feet below ground surface
- Soil sample

SW-1
- Sample number
- Former tank cavity sample

B1-5
- Sample depth in feet below ground surface
- Boring number

SPA-SPD
- Composite sample
- Soil pile

Line-1
- Sample number
- Product line sample

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TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF
GROUNDWATER SAMPLES
ARCO Station 2185
Oakland, California
(Page 1 of 2)

Well	TPHg	B	T	E	X
MW-1					
07-24-92	<50	<0.5	<0.5	<0.5	<0.5
10-19-92	<50	<0.5	<0.5	<0.5	<0.5
01-14-93	<50	<0.5	<0.5	<0.5	<0.5
04-09-93	<50	<0.5	<0.5	<0.5	<0.5
08-23-93	<50	<0.5	<0.5	<0.5	<0.5
10-11-93	<50	<0.5	<0.5	<0.5	<0.5
MW-2					
07-24-92	5,900	510	<10*	370	430
10-19-92	4,100	110	<10*	100	62
01-14-93	12,000	700	10	720	680
04-09-93	8,400	220	<10*	480	320
08-23-93	3,700	89	<5*	230	150
10-11-93	2,700	50	<2.5*	<140	68
MW-3					
07-24-92		Not sampled – sheen			
10-19-92	42,000	740	1,100	1,500	5,700
01-14-93	44,000	1,100	840	2,200	9,600
04-09-93	21,000	33	69	350	1,600
08-23-93	13,000	63	21	530	1,300
10-11-93	11,000	56	13	530	1,200
MW-4					
07-24-92	<50	<0.5	<0.5	<0.5	<0.5
10-19-92	<50	<0.5	<0.5	<0.5	<0.5
01-14-93	<50	<0.5	<0.5	<0.5	<0.5
04-09-93	<50	<0.5	<0.5	<0.5	<0.5
08-23-93	<50	<0.5	<0.5	<0.5	<0.5
10-11-93	<50	<0.5	<0.5	<0.5	<0.5
MW-5					
02-11-93	9,300	620	<50*	890	2,200
04-09-93	960	29	<1*	100	96
08-23-93	2,700	50	<2.5*	260	250
10-11-93	840	9	<1*	87	41

See notes on page 2 of 2.

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TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF
GROUNDWATER SAMPLES
ARCO Station 2185
Oakland, California
(Page 2 of 2)

Well	TPHg	B	T	E	X
MW-6					
02-11-93	4,800	630	<10*	490	460
04-09-93	13,000	880	<10*	1,000	1,000
08-23-93	6,300	390	<20*	450	390
10-11-93	2,900	150	3.4	190	140
MW-7					
05-14-93	350	0.83	<0.50	<0.50	<0.50
08-23-93	630**	7.3	<1*	<1*	<1*
10-11-93	620**	3.5	<0.50	<0.50	<0.50
MW-10					
04/15/94	4,800	<0.50	<0.50	290	<0.50
MCL	—	1.0	—	680	1,750
DWAL	—	—	100	—	—

Notes:

Results in parts per billion (ppb).
TPHg = Total petroleum hydrocarbons as gasoline using EPA Method 5030/8020/DHS LUFT.
BTEX = B: benzene, T: toluene, E: ethylbenzene, X: total xylenes using EPA Method 5030/8020/DHS LUFT
< = Below indicated laboratory detection limits.
* = Laboratory raised Method Reporting Limit (MRL) due to high analyte concentration requiring sample dilution.
** = According to the laboratory, the sample contains components eluting in the gasoline range that were quantitated as gasoline. The chromatogram does not match the typical gasoline fingerprint.
MCL = State Maximum Contaminant Level (California Department of Health Services, October 1990).
DWAL = State Recommended Drinking Water Action Level (California Department of Health Services, October 1990).

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APPENDIX A

WELL PERMIT

ZONE 7 WATER AGENCY

5997 PARKSIDE DRIVE PLEASANTON, CALIFORNIA 94588 VOICE (510) 484-2600
FAX (510) 482-3914

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT ARCO STATION 2185
9800 EAST 14TH STREET
OAKLAND CA

CLIENT
Name ARCO PRODUCTS COMPANY
Address P.O. Box 5811 Voice (415) 571-2449
City SAN MATEO Zip 94402

APPLICANT
Name RESNA INDUSTRIES INC.
ERIN KRUEGER Fax (408) 264-2435
Address 3315 ALMADEN EXPY Voice (408) 264-7723
City SAN JOSE Zip 95118

TYPE OF PROJECT
Well Construction
Cathodic Protection ___
Water Supply ___
Monitoring X
Geotechnical Investigation
General ___
Contamination ___
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 30 ft.
Surface Seal Depth 5 ft. Number 1

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

ESTIMATED STARTING DATE 4/4/94
ESTIMATED COMPLETION DATE 4/8/94

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

APPLICANT'S SIGNATURE Erin D. Krueger Date 3/24/94

FOR OFFICE USE

PERMIT NUMBER 94204
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 1 Apr 94
Wyman Hong

91992

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APPENDIX B

FIELD PROTOCOL

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FIELD PROTOCOL

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

Site Safety Plan

The Site Safety Plan describes the safety requirements for the evaluation of hydrocarbons in soil, groundwater, and the vadose-zone at the site. The site Safety Plan is applicable to personnel of RESNA Industries and its subcontractors. RESNA Industries personnel and subcontractors of RESNA Industries scheduled to perform the work at the site are 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. Field instruments such as the OVM are useful for measuring relative concentrations of vapor content, but cannot be used to measure levels of hydrocarbons with the accuracy of laboratory analysis. 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 plastic zip-lock bags or aluminized duct tape; labeled; and promptly placed in iced storage for transport to the laboratory, where compositing is 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 on City or State property is necessary. Copies of the permits are included in the appendix of the project report. Prior to drilling, Underground Service Alert (USA) 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 10-inch-diameter, solid-stem or hollow-stem augers. Other methods such as rotary or casing hammer may be used if special conditions are encountered. The augers, sampling equipment and other equipment that comes into contact with the soil are steam-cleaned prior to drilling each boring to minimize the possibility of cross-contamination. Sampling equipment is cleaned with a trisodium phosphate solution and rinsed with clean water between samples. 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 texture, 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 is begun only after a conductor casing is properly installed and allowed to set, to seal the shallow aquifer.

Drill Cuttings

Drill cuttings subjectively evaluated as containing hydrocarbons at levels greater than 100 parts per million (ppm) are separated from those subjectively evaluated as containing hydrocarbons at 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. (A standard penetrometer, which does not contain liners, may be used to collect samples when laboratory analysis for volatile components is not an issue. 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. When necessary, the sampler

may be pushed by the drill rig hydraulics. In this case, the pressure exerted (in pounds per square inch) is recorded.

The samples selected for laboratory analysis are removed from the sampler and quickly sealed in their brass sleeves with aluminum foil, plastic caps, and plastic zip-lock bags or aluminized duct tape. The samples are then 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 analysis 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 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 analysis, 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 analysis 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 (groundwater monitoring wells), or pea gravel (vapor extraction wells) 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 analysis 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 evaluated 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 recorded. The wells are allowed to equilibrate for at least 48 hours after development prior to sampling. Water generated by well development is stored in 17E Department of Transportation (DOT) 55-gallon drums on site, and remains 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 depth of each well is also measured. The liquid in the 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, sediment, and clarity. Obvious product odor is recorded if noted. If floating product is present in the well, the thickness of floating product is measured using an oil/water interface probe and is recorded to the nearest 0.01 foot. Floating product is removed from wells on site visits.

Groundwater samples from the wells are collected in approximate order of increasing product concentration, as best known or estimated. Wells which do not contain floating product are purged using a submersible pump. Equipment which comes in contact with the interior of the well or the groundwater is cleaned with Alconox® and deionized or distilled 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. These parameters are measured to the nearest 0.1 pH unit, 0.1 degree F, and 10 umhos/cm,

respectively, using portable meters calibrated daily to a buffer and conductivity standard, according to the manufacturer's specifications. A minimum of four well volumes is purged from each well. If the well becomes dewatered, the water level is allowed to recover to at least 80 percent of the initial water level. When recovery of the water level has not reached at least 80 percent of the static water level after two hours, a groundwater sample will be collected when sufficient volume is available to fill the sample container. 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). Sample containers remain sealed until usage at the site. A sample method blank is collected by pouring distilled water into the bailer and then into sample vials. Method blanks are analyzed periodically to verify effective cleaning procedures. 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), sealed with Teflon®-lined caps, and inspected for air bubbles to check for headspace, which would allow volatilization to occur. If a bubble is evident, the cap is removed, more sample is added, and the bottle resealed. The samples are then labeled and promptly placed in iced storage, and the wellhead is secured. A field log documenting sampling procedures and parameter monitoring is maintained. Water generated by the purging of wells is stored in 17E DOT 55-gallon drums, and floating product bailed from the wells is stored in double containment onsite; this water and product remains the responsibility of the client.

Sample Labeling and Handling

Sample containers are labeled in the field with the job number, unique sample location, 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.

Quality Assurance/Quality Control

The sampling and analysis procedures employed by RESNA for groundwater sampling and monitoring follow regulatory guidance for quality assurance/quality control (QA/QC). Quality control is maintained by site-specific field protocols and quality control checks performed by the laboratory. Laboratory and field handling of samples may be monitored by including QC samples for analysis. QC samples may include any combination of the

following. The number and types of QC samples are selected and analyzed on a project-specific basis.

Trip blanks - Trip blanks are sent to the project site, and travel with project site samples. They are not opened, and are returned from a project site with the samples for analysis.

Field blank - Prepared in the field using organic-free water. Field blanks accompany project site samples to the laboratory and are analyzed periodically for specific chemical compounds present at the project site where they were prepared.

Duplicates - Duplicate samples are collected from a selected well and project site. They are analyzed at two different laboratories, or at the same laboratory under different labels.

Equipment blank - Periodic QC samples are collected from field equipment rinsate to verify adequate cleaning procedures.

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APPENDIX C

CERTIFIED LABORATORY ANALYTICAL REPORTS AND CHAIN OF CUSTODY RECORDS

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

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

Project: Arco, 2185 Oakland

Enclosed are the results from 1 water sample received at Sequoia Analytical on April 19,1994. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
4DA7301	Water, W-11-MW10	4/15/94	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

VMTClark

Vickie Tague Clark
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

RESNA	Client Project ID:	Arco, 2185 Oakland	Sampled:	Apr 15, 1994
3315 Almaden Expwy., Suite 34	Sample Matrix:	Water	Received:	Apr 19, 1994
San Jose, CA 95118	Analysis Method:	EPA 5030/8015 Mod./8020	Reported:	May 5, 1994
Attention: John Young	First Sample #:	4DA7301		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 4DA7301 W-11-MW10
Purgeable Hydrocarbons	50	4,800
Benzene	0.50	N.D.
Toluene	0.50	N.D.
Ethyl Benzene	0.50	290
Total Xylenes	0.50	N.D.
Chromatogram Pattern:		Weathered Gas

Quality Control Data

Report Limit Multiplication Factor:	20
Date Analyzed:	4/26/94
Instrument Identification:	GCHP-18
Surrogate Recovery, %: (QC Limits = 70-130%)	93

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 Clark
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

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

Client Project ID: Arco, 2185 Oakland
Matrix: Liquid
QC Sample Group: 4DA7301

Reported: May 5, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	A. Miraftab	A. Miraftab	A. Miraftab	A. Miraftab
MS/MSD Batch#:	4DB6607	4DB6607	4DB6607	4DB6607
Date Prepared:	-	-	-	-
Date Analyzed:	4/26/94	4/26/94	4/26/94	4/26/94
Instrument I.D.#:	GCHP-18	GCHP-18	GCHP-18	GCHP-18
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	94	95	96	97
Matrix Spike Duplicate % Recovery:	93	95	95	93
Relative % Difference:	1.1	0.0	1.2	4.2
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.

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 Clark
Project Manager

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 2185-94-2

Chain of Custody

ARCO Facility no. 2185	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 SJ 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
W-11-MW10				X		X	X	4/15/94	1550		3				9404		A73		-01		
MW10R				X		X	X	"	1550										-02		1
SB				X		X	X	"	1550										-03		1

Special detection Limit/reporting

Special QA/QC

12

Remarks

Lab number

Turnaround time

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

Method of shipment

Condition of sample:

Temperature received:

Relinquished by sampler: Matt Ripdale	Date 4/19/94	Time 9AM	Received by: [signature] 4-19-94
Relinquished by: [signature]	Date 4-19-94	Time 12:25	Received by:
Relinquished by:	Date	Time	Received by laboratory: Elaine Colorg — Date 4/19/94 — Time 1225

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

ARPC 3292 (2-91)