PACIFIC
ENVIRONMENTAL
GROUP, INC.

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Quarterly Groundwater Monitoring Report and Remedial System Performance Evaluation First Quarter 1997

ARCO Service Station 4931
731 West MacArthur Boulevard at West Street
Oakland, California

Prepared for

Mr. Paul Supple
ARCO Products Company

July 25, 1997

Prepared by

Pacific Environmental Group, Inc.
2025 Gateway Place, Suite 440
San Jose, California 95110

Project 330-109.2D

Shaw Garakani
Project Engineer

Gary P. Pestana
Project Manager
RG 6451

REGISTERED GEOLOGIST
GARY P. PESTANA
No. 6451
EXP. 10/98
STATE OF CALIFORNIA

Date: July 25,1997
Quarter: 1Q97

ARCO QUARTERLY GROUNDWATER MONITORING REPORT

Facility No.: 4931 Address: 731 West Boulevard at West Street
Oakland, California
ARCO Environmental Engineer: Paul Supple
Consulting Co./Contact Person: Pacific Environmental Group, Inc./Shaw Garakani
Consultant Project No.: 330-109.2D
Primary Agency/Regulatory ID No.: Alameda County Health Care Services Agency

WORK PERFORMED THIS QUARTER (First, 1997):

1. Submitted fourth quarter 1996 groundwater monitoring report.
2. Performed first quarter 1997 groundwater monitoring event.
3. Prepared first quarter 1997 groundwater monitoring report.

WORK PROPOSED FOR NEXT QUARTER (Second - 1997):

1. Submit first quarter 1997 groundwater monitoring report.
2. Perform second quarter 1997 groundwater monitoring event.
3. Prepare second quarter 1997 groundwater monitoring report.
4. Suspend the bioremediation enhancement program.

Current Phase of Project:	Monitoring/Remediation	(Assmnt, Remed., etc.)
Frequency of Groundwater Sampling:	Quarterly, Semiannually, and Annually	(Quarterly, etc.)
Frequency of Groundwater Monitoring:	Quarterly	(Monthly, etc.)
Is Free Product (FP) Present On-Site:	No	(Yes/No)
FP Recovered this Quarter:	None	(gallons)
Cumulative FP Recovered to Date:	Unknown	(gallons)
Bulk Soil Removed This Quarter:	None	(cubic yards)
Bulk Soil Removed to Date:	Unknown	(cubic yards)
Current Remediation Techniques:	Intrinsic Bioremediation Enhancement	(SVE/Sparge/FP Removal, etc.)
Approximate Depth to Groundwater:	6.80 to 11.95	(Measure Feet)
Groundwater Gradient:	Southwest	(Direction)
	0.03	(Magnitude)
Period TPPH- g/Benzene Removed:	0.0/0.0	(gallons)
Cumulative TPPH-g/Benzene Removed:	0.45/0.06	(gallons)

DISCUSSION:

- Hydrocarbon concentrations in groundwater monitoring wells sampled were within historic levels.
- Based on Alameda County Health Care Service Agency (ACHCSA) approval, the groundwater extraction (GWE) system has been deactivated and EBMUD sewer discharge permit relinquished.
- Intrinsic bioremediation enhancement program has been suspended (Attachment C).
- Intrinsic bioremediation evaluation has indicated that biodegradation is active at the site.
- Please refer to PACIFIC's *Quarterly Groundwater Monitoring Report - Fourth Quarter 1996* for historical groundwater elevation and analytical data.

ATTACHMENTS:

- Table 1 - Groundwater Sampling Schedule
- Table 2 - Groundwater Elevation and Analytical Data
- Figure 1 - Groundwater Elevation Contour Map
- Figure 2 - TPPH-g/Benzene Concentration Map
- Attachment A - Field and Laboratory Procedures
- Attachment B - Certified Analytical Reports, Chain-of-Custody Documentation, and Field Data Sheets
- Attachment C - Remedial System Performance Evaluation

cc: Mr. Kevin Graves, Regional Water Quality Control Board - San Francisco Bay Region
Ms. Susan Hugo, Alameda County Health Care Services Agency

Table 1
Groundwater Sampling Schedule

ARCO Service Station 4931
731 West MacArthur Boulevard at West Street
Oakland, California

Well Number	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Sampling Frequency
A-1	---------- Well Destroyed ----------				
A-2	a	a	a	a	Quarterly
A-3		a		a	Semiannually
A-4	a	a	a	a	Quarterly
A-5		a		a	Semiannually
A-6	a	a	a	a	Quarterly
A-7		a			Annually
A-8		a		a	Semiannually
A-9		a		a	Semiannually
A-10	---------- Removed from Sampling Program ----------				
A-11		a		a	Semiannually
A-12		a		a	Semiannually
A-13				a	Annually
AR-1	---------- Removed from Sampling Program ----------				
AR-2	---------- Removed from Sampling Program ----------				
AR-3	---------- Removed from Sampling Program ----------				

a. Groundwater samples analyzed for the presence of TPPH-g, BTEX compounds, and MtBE according to EPA Methods 8015 (modified) and 8020.

Table 2
Groundwater Elevation and Analytical Data
Total Purgeable Petroleum Hydrocarbons
(TPPH as Gasoline, BTEX Compounds, and MtBE)

ARCO Service Station 4931
731 West MacArthur Boulevard at West Street
Oakland, California

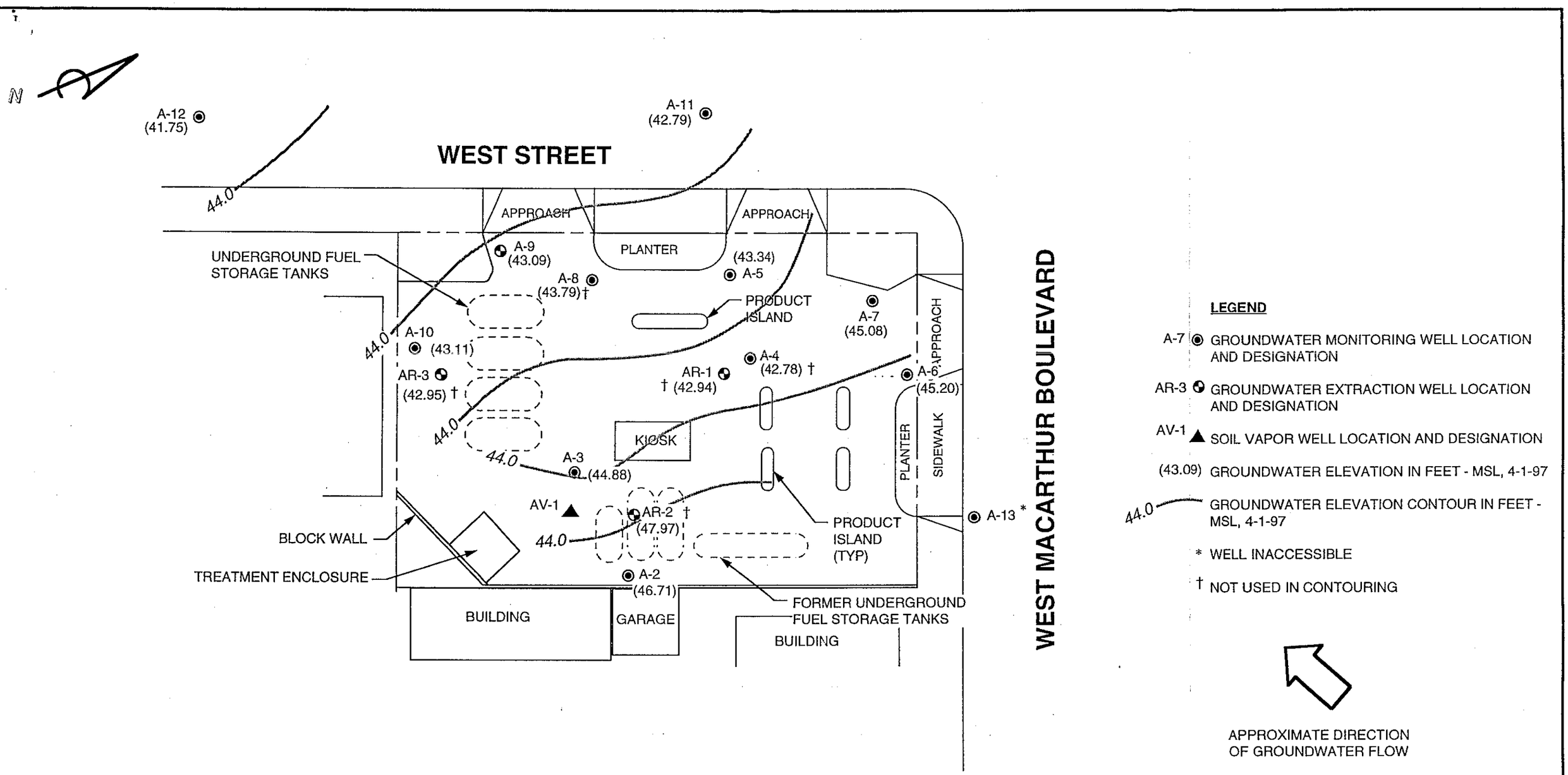
Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOB)	Groundwater Elevation (feet, MSL)	TPPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Xylenes (ppb)	MtBE (ppb)
A-2	03/26/96	55.48	5.37	50.11	<50	<0.50	<0.50	<0.50	<0.50	NA
	05/22/96		5.25	50.23	<50	<0.50	<0.50	<0.50	<0.50	NA
	08/22/96		10.45	45.03	<50	1.1	1.8	<0.50	1.3	<2.5
	12/19/96		5.53	49.95	<50	<0.50	<0.50	<0.50	<0.50	2.7
	04/01/97		8.77	46.71	<50	<0.50	<0.50	<0.50	<0.50	<2.5
A-3	03/26/96	54.66	7.20	47.46	---------- Well Sampled Semiannually ----------					
	05/22/96		7.70	46.96	<50	1.2	1.9	0.70	1.3	NA
	08/22/96		10.88	43.78	---------- Well Sampled Semiannually ----------					
	12/19/96		7.70	46.96	5,900	<25	<25	<25	<25	5,300 *
	04/01/97		9.78	44.88	---------- Well Sampled Semiannually ----------					
A-4	03/26/96	54.73	7.95	46.78	8,900	1,200	21	200	220	NA
	05/22/96		8.35	46.38	5,300	700	<10	170	130	NA
	08/22/96		11.03	43.70	3,000	480	<5.0	75	26	150
	12/19/96		8.67	46.06	<2,000	<20	<20	<20	<20	15,000 *
	04/01/97		11.95	42.78	8,900	1,700	22	310	260	6,900
A-5	03/26/96	54.17	7.93	46.24	---------- Well Sampled Semiannually ----------					
	05/22/96		8.20	45.97	<50	<0.50	<0.50	<0.50	<0.50	NA
	08/22/96		10.70	43.47	---------- Well Sampled Semiannually ----------					
	12/19/96		8.39	45.78	9,900	1,100	330	230	700	24
	04/01/97		10.83	43.34	---------- Well Sampled Semiannually ----------					
A-6	03/26/96	55.17	7.15	48.02	52	2.7	<0.50	1.1	2.0	NA
	05/22/96		7.35	47.82	<50	2.4	<0.50	0.88	1.7	NA
	08/22/96		10.12	45.05	<50	<0.50	<0.50	<0.50	<0.50	<2.5
	12/19/96		7.43	47.74	<50	1.7	<0.50	0.78	1.5	<2.5
	04/01/97		9.97	45.20	<50	4.7	<0.50	1.9	3.2	<2.5
A-7	03/26/96	54.71	6.90	47.81	---------- Well Sampled Semiannually ----------					
	05/22/96		8.27	46.44	<50	<0.50	<0.50	<0.50	<0.50	NA
	08/22/96		9.80	44.91	---------- Well Sampled Semiannually ----------					
	12/19/96		7.19	47.52	---------- Well Sampled Annually ----------					
	04/01/97		9.63	45.08	---------- Well Sampled Annually ----------					
A-8 a	03/26/96	53.77	7.10	46.67	48,000	2,600	<100	650	1,100	NA
	05/22/96		7.20	46.57	14,000	2,800	160	320	190	NA
	08/22/96		11.57	42.20	8,000	1,000	76	150	96	4,300
	12/19/96		8.04	45.73	12,000	450	110	210	230	<500
	04/01/97		9.98	43.79	---------- Well Sampled Semiannually ----------					
A-9 b	03/26/96	53.04	7.05	45.99	<50	<0.50	<0.50	<0.50	<0.50	NA
	05/22/96		7.20	45.84	<50	<0.50	<0.50	<0.50	<0.50	NA
	08/22/96		9.68	43.36	<50	<0.50	<0.50	<0.50	<0.50	8.5
	12/19/96		7.43	45.61	<50	<0.50	<0.50	<0.50	<0.50	2.6
	04/01/97		9.95	43.09	---------- Well Sampled Semiannually ----------					
A-10	03/26/96	54.26	8.28	45.98	---------- Well Removed from Sampling Program ----------					
	05/22/96		8.60	45.66	---------- Well Removed from Sampling Program ----------					
	08/22/96		10.98	43 28	---------- Well Removed from Sampling Program ----------					
	12/19/96		8.80	45.46	---------- Well Removed from Sampling Program ----------					
	04/01/97		11.15	43.11	---------- Well Removed from Sampling Program ----------					

Table 2 (continued)
Groundwater Elevation and Analytical Data
Total Purgeable Petroleum Hydrocarbons
(TPPH as Gasoline, BTEX Compounds, and MtBE)

ARCO Service Station 4931
731 West MacArthur Boulevard at West Street
Oakland, California

Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOB)	Groundwater Elevation (feet, MSL)	TPPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Xylenes (ppb)	MtBE (ppb)
A-11	03/26/96	53.74	8.10	45.64	---------- Well Sampled Semiannually ----------					
	05/22/96		8.25	45.49	<50	<0.50	<0.50	<0.50	<0.50	NA
	08/22/96		10.58	43.16	---------- Well Sampled Semiannually ----------					
	12/19/96		8.37	45.37	<50	<0.50	<0.50	<0.50	<0.50	<2.5
	04/01/97		10.95	42.79	---------- Well Sampled Semiannually ----------					
A-12	03/26/96	52.05	7.83	44.22	---------- Well Sampled Semiannually ----------					
	05/22/96		7.80	44.25	<50	<0.50	<0.50	<0.50	<0.50	NA
	08/22/96		9.97	42.08	---------- Well Sampled Semiannually ----------					
	12/19/96		8.18	43.87	85	<0.50	<0.50	<0.50	<0.50	170
	04/01/97		10.30	41.75	---------- Well Sampled Semiannually ----------					
A-13	03/26/96	55.11	---------- Well Inaccessible ----------							
	05/22/96		---------- Well Inaccessible ----------							
	08/22/96		---------- Well Sampled Annually ----------							
	12/19/96		---------- Well Inaccessible ----------							
	04/01/97		---------- Well Sampled Annually ----------							
AR-1	03/26/96	54.72	8.13	46.59	6,200	110	64	38	520	NA
	05/22/96		8.57	46.15	NS	NS	NS	NS	NS	NS
	08/22/96		10.97	43.75	5,600	100	28	29	310	960
	12/19/96		8.93	45.79	-------- Well Removed from Sampling Program --------					
	04/01/97		11.78	42.94	-------- Well Removed from Sampling Program --------					
AR-2	03/26/96	54.77	4.93	49.84	<50	<0.50	<0.50	<0.50	<0.50	NA
	05/22/96		5.65	49.12	NS	NS	NS	NS	NS	NS
	08/22/96		7.27	47 50	<50	<0.50	<0.50	<0.50	<0.50	200
	12/19/96		7.78	46.99	-------- Well Removed from Sampling Program --------					
	04/01/97		6.80	47.97	-------- Well Removed from Sampling Program --------					
AR-3	03/26/96	54.19	7.95	46.24	<50	<0.50	<0.50	<0.50	<0.50	NA
	05/22/96		8.30	45.89	NS	NS	NS	NS	NS	NS
	08/22/96		10.84	43.35	-------- Well Removed from Sampling Program --------					
	12/19/96		8.56	45.63	-------- Well Removed from Sampling Program --------					
	04/01/97		11.24	42.95	-------- Well Removed from Sampling Program --------					

MSL = Mean sea level
TOB = Top of box
ppb = Parts per billion
< = Denotes laboratory detection limit
NA = Not analyzed
NS = Not sampled
a. = Bioremediation enhancement at this well has been in progress since 05/22/96.
b. = Bioremediation enhancement at this well has been in progress since 11/17/95.
* = MtBE results confirmed by EPA Method 8260.



LEGEND

A-7 ◉ GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION

AR-3 ◉ GROUNDWATER EXTRACTION WELL LOCATION AND DESIGNATION

AV-1 ▲ SOIL VAPOR WELL LOCATION AND DESIGNATION

(43.09) GROUNDWATER ELEVATION IN FEET - MSL, 4-1-97

44.0 GROUNDWATER ELEVATION CONTOUR IN FEET - MSL, 4-1-97

* WELL INACCESSIBLE

† NOT USED IN CONTOURING

APPROXIMATE DIRECTION OF GROUNDWATER FLOW

APPROXIMATE GRADIENT = 0.03

SOURCE: MAP FROM GEO STRATEGIES INC. DATED 6-94

PACIFIC ENVIRONMENTAL GROUP, INC.

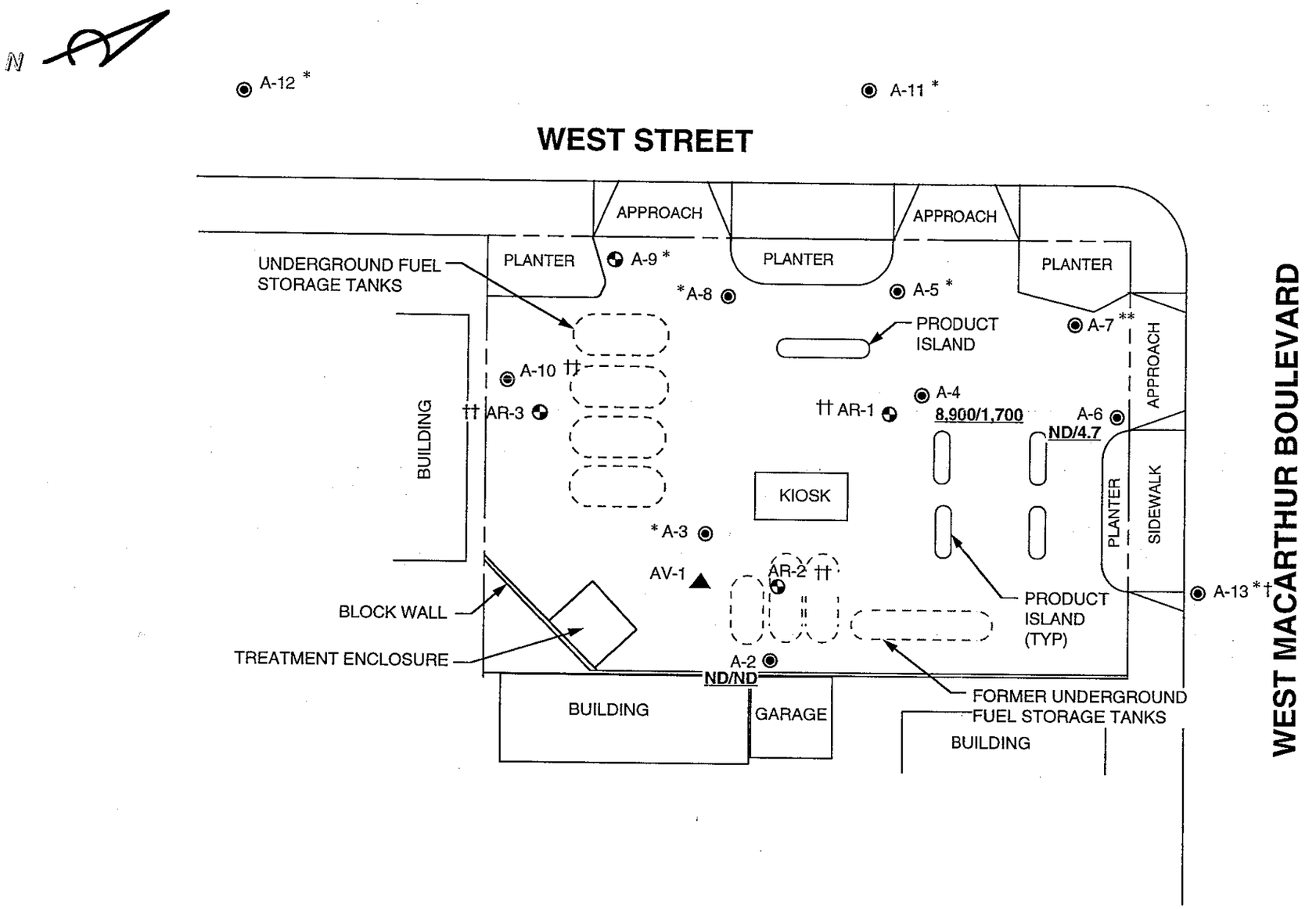
SCALE
0 30 60 FEET

ARCO SERVICE STATION 4931
731 West MacArthur Boulevard at West Street
Oakland, California

GROUNDWATER ELEVATION CONTOUR MAP

FIGURE: 1

PROJECT: 330-109.2D



LEGEND

- A-7 ◉ GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- AR-3 ◓ GROUNDWATER EXTRACTION WELL LOCATION AND DESIGNATION
- AV-1 ▲ SOIL VAPOR WELL LOCATION AND DESIGNATION
- 5,900/ND TPPH-g/BENZENE CONCENTRATION IN GROUNDWATER, IN PARTS PER BILLION, 4-1-97
- ND NOT DETECTED
- NS NOT SAMPLED
- * WELL SAMPLED SEMIANNUALLY
- * * WELL SAMPLED ANNUALLY
- †† WELL REMOVED FROM SAMPLING PROGRAM
- † WELL INACCESSIBLE

APPROXIMATE DIRECTION OF GROUNDWATER FLOW

SOURCE: MAP FROM GEO STRATEGIES INC. DATED 6-94

PACIFIC ENVIRONMENTAL GROUP, INC.

SCALE
0 30 60 FEET

ARCO SERVICE STATION 4931
731 West MacArthur Boulevard at West Street
Oakland, California

TPPH-g/BENZENE CONCENTRATION MAP

FIGURE: **2**
PROJECT: 330-109.2D

ATTACHMENT A

FIELD AND LABORATORY PROCEDURES

ATTACHMENT A
FIELD AND LABORATORY PROCEDURES

Sampling Procedures

The sampling procedure for each well consists first of measuring the water level and checking for the presence of separate-phase hydrocarbons (SPH), using either an electronic indicator and a clear Teflon® bailer or an oil-water interface probe. Wells not containing SPH are then purged of approximately four casing volumes of water (or to dryness) using a centrifugal pump, gas displacement pump, or bailer. Equipment used for the current sampling event is noted on the attached field data sheets. During purging, temperature, pH, and electrical conductivity are monitored in order to document that these parameters are stable prior to collecting samples. After purging, water levels are allowed to partially recover. Groundwater samples are collected using a Teflon® bailer, placed into appropriate EPA-approved containers, labeled, logged onto chain-of-custody documents, and transported on ice to a California State-certified laboratory.

Laboratory Procedures

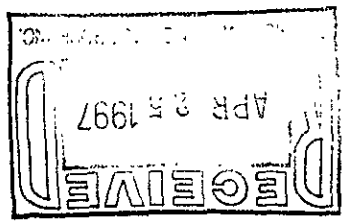
The groundwater samples were analyzed for the presence of total purgeable petroleum hydrocarbons calculated as gasoline, benzene, toluene, ethylbenzene, xylenes, and methyl tert-butyl ether. The analyses were performed according to EPA Methods 8015 (modified) and 8020 utilizing a purge-and-trap extraction technique. Final detection was by gas chromatography using flame- and photo-ionization detectors. The methods of analysis for the groundwater samples are documented in the certified analytical report. The certified analytical report, chain-of-custody documentation, and field data sheets are presented as Attachment C.

ATTACHMENT B

CERTIFIED ANALYTICAL REPORT, CHAIN-OF-CUSTODY DOCUMENTATION, AND FIELD DATA SHEETS

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (510) 988-9600, FAX (510) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100



Pacific Environmental Group
2025 Gateway Place, Suite 440
San Jose, CA 95110
Attention: Shaw Garakani

Project: 330-109.2K/4931, Oakland

Enclosed are the results from samples received at Sequoia Analytical on April 2, 1997. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE COLLECTED	TEST METHOD
9704259 -01	LIQUID, A-2	04/01/97	MTBE_W Methyl t-Butyl Ethe
9704259 -01	LIQUID, A-2	04/01/97	TPHGBW Purgeable TPH/BTEX
9704259 -02	LIQUID, A-4	04/01/97	MTBE_W Methyl t-Butyl Ethe
9704259 -02	LIQUID, A-4	04/01/97	TPHGBW Purgeable TPH/BTEX
9704259 -03	LIQUID, A-6	04/01/97	MTBE_W Methyl t-Butyl Ethe
9704259 -03	LIQUID, A-6	04/01/97	TPHGBW Purgeable TPH/BTEX
9704259 -04	LIQUID, TB-1	04/01/97	TPHGBW Purgeable TPH/BTEX

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

Project Manager

Quality Assurance Department

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (510) 988-9600, FAX (510) 988-9673
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Pacific Environmental Group
2025 Gateway Place, Suite 440
San Jose, CA 95110

Attention: Shaw Garakani

Client Proj. ID: 330-109.2K/4931, Oakland
Sample Descript: A-2
Matrix: LIQUID
Analysis Method: EPA 8020
Lab Number: 9704259-01

Sampled: 04/01/97
Received: 04/02/97

Analyzed: 04/10/97
Reported: 04/14/97

QC Batch Number: GC041097BTEX01A
Instrument ID: GCHP01

Methyl t-Butyl Ether (MTBE)

Analyte	Detection Limit ug/L	Sample Results ug/L
Methyl t-Butyl Ether	2.5	N.D.

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	111

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

SEQUOIA ANALYTICAL - ELAP #1210

Tod Granicher
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (510) 988-9600, FAX (510) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Pacific Environmental Group	Client Proj. ID: 330-109.2K/4931, Oakland	Sampled: 04/01/97
2025 Gateway Place, Suite 440	Sample Descript: A-2	Received: 04/02/97
San Jose, CA 95110	Matrix: LIQUID	
	Analysis Method: 8015Mod/8020	Analyzed: 04/10/97
Attention: Shaw Garakani	Lab Number: 9704259-01	Reported: 04/14/97

QC Batch Number: GC041097BTEX01A
Instrument ID: GCHP01

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX

Analyte	Detection Limit ug/L	Sample Results ug/L
TPPH as Gas	50	N.D.
Benzene	0.50	N.D.
Toluene	0.50	N.D.
Ethyl Benzene	0.50	N.D.
Xylenes (Total)	0.50	N.D.
Chromatogram Pattern:		

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	111

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

SEQUOIA ANALYTICAL - ELAP #1210

Tod Granicher
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (510) 988-9600, FAX (510) 988-9673
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Pacific Environmental Group
2025 Gateway Place, Suite 440
San Jose, CA 95110

Attention: Shaw Garakani

Client Proj. ID: 330-109.2K/4931, Oakland
Sample Descript: A-4
Matrix: LIQUID
Analysis Method: EPA 8020
Lab Number: 9704259-02

Sampled: 04/01/97
Received: 04/02/97

Analyzed: 04/10/97
Reported: 04/14/97

QC Batch Number: GC041097BTEX18A
Instrument ID: GCHP18

Methyl t-Butyl Ether (MTBE)

Analyte	Detection Limit ug/L	Sample Results ug/L
Methyl t-Butyl Ether	100	6900

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	131 Q

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

SEQUOIA ANALYTICAL - ELAP #1210

Tod Granicher
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (510) 988-9600, FAX (510) 988-9673
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Pacific Environmental Group
2025 Gateway Place, Suite 440
San Jose, CA 95110

Attention: Shaw Garakani

Client Proj. ID: 330-109.2K/4931, Oakland
Sample Descript: A-4
Matrix: LIQUID
Analysis Method: 8015Mod/8020
Lab Number: 9704259-02

Sampled: 04/01/97
Received: 04/02/97

Analyzed: 04/10/97
Reported: 04/14/97

QC Batch Number: GC041097BTEX18A
Instrument ID: GCHP18

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX

Analyte	Detection Limit ug/L	Sample Results ug/L
TPPH as Gas	2000	8900
Benzene	20	1700
Toluene	20	22
Ethyl Benzene	20	310
Xylenes (Total)	20	260
Chromatogram Pattern:		Gas

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	131 Q

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

SEQUOIA ANALYTICAL - ELAP #1210

Tod Granicher
Project Manager

Sequoia Analytical

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Pacific Environmental Group
2025 Gateway Place, Suite 440
San Jose, CA 95110

Attention: Shaw Garakani

Client Proj. ID: 330-109.2K/4931, Oakland
Sample Descript: A-6
Matrix: LIQUID
Analysis Method: EPA 8020
Lab Number: 9704259-03

Sampled: 04/01/97
Received: 04/02/97

Analyzed: 04/10/97
Reported: 04/14/97

QC Batch Number: GC041097BTEX01A
Instrument ID: GCHP01

Methyl t-Butyl Ether (MTBE)

Analyte	Detection Limit ug/L	Sample Results ug/L
Methyl t-Butyl Ether	2.5	N.D.

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	114

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

SEQUOIA ANALYTICAL - ELAP #1210

Tod Granicher
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (510) 988-9600, FAX (510) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Pacific Environmental Group
2025 Gateway Place, Suite 440
San Jose, CA 95110

Attention: Shaw Garakani

Client Proj. ID: 330-109.2K/4931, Oakland
Sample Descript: A-6
Matrix: LIQUID
Analysis Method: 8015Mod/8020
Lab Number: 9704259-03

Sampled: 04/01/97
Received: 04/02/97

Analyzed: 04/10/97
Reported: 04/14/97

QC Batch Number: GC041097BTEX01A
Instrument ID: GCHP01

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX

Analyte	Detection Limit ug/L	Sample Results ug/L
TPPH as Gas	50	N.D.
Benzene	**0.50**	**4.7**
Toluene	0.50	N.D.
Ethyl Benzene	**0.50**	**1.9**
Xylenes (Total)	**0.50**	**3.2**
Chromatogram Pattern:		

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	114

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

SEQUOIA ANALYTICAL - ELAP #1210

Tod Granicher
Project Manager

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Pacific Environmental Group
2025 Gateway Place, Suite 440
San Jose, CA 95110

Attention: Shaw Garakani

Client Proj. ID: 330-109.2K/4931, Oakland
Sample Descript: TB-1
Matrix: LIQUID
Analysis Method: 8015Mod/8020
Lab Number: 9704259-04

Sampled: 04/01/97
Received: 04/02/97

Analyzed: 04/10/97
Reported: 04/14/97

QC Batch Number: GC041097BTEX01A
Instrument ID: GCHP01

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX

Analyte	Detection Limit ug/L	Sample Results ug/L
TPPH as Gas	50	N.D.
Benzene	0.50	N.D.
Toluene	0.50	N.D.
Ethyl Benzene	0.50	N.D.
Xylenes (Total)	0.50	N.D.
Chromatogram Pattern:		

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	107

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

SEQUOIA ANALYTICAL - ELAP #1210

Tod Granicher
Project Manager

Sequoia Analytical

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Pacific Environmental Group
2025 Gateway Place, Suite 440
San Jose, CA 95110
Attention: Shaw Garakani

Client Project ID: 330-109.2K/4931, Oakland
Matrix: LIQUID
Work Order #: 99704259 01-09
Reported: Apr 24, 1997

QUALITY CONTROL DATA REPORT

Analyte:	Benzene	Toluene	Ethyl Benzene	Xylenes	Gas
QC Batch#:	GC041097BTEX01A	GC041097BTEX01A	GC041097BTEX01A	GC041097BTEX01A	GC041097BTEX01A
Analy. Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020	EPA 8015M
Prep. Method:	EPA 5030	EPA 5030	EPA 5030	EPA 5030	EPA 5030
Analyst:	R. Geckler	R. Geckler	R. Geckler	R. Geckler	R. Geckler
MS/MSD #:	9703G9501	9703G9501	9703G9501	9703G9501	9703G9501
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.
Prepared Date:	4/10/97	4/10/97	4/10/97	4/10/97	4/10/97
Analyzed Date:	4/10/97	4/10/97	4/10/97	4/10/97	4/10/97
Instrument I.D.#:	GCHP1	GCHP1	GCHP1	GCHP1	GCHP1
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L	60 µg/L
Result:	11	11	11	32	63
MS % Recovery:	110	110	110	107	105
Dup. Result:	12	12	12	34	67
MSD % Recov.:	120	120	120	113	112
RPD:	8.7	8.7	8.7	6.1	6.1
RPD Limit:	0-25	0-25	0-25	0-25	0-25
LCS #:	BLK041097BSA	BLK041097BSA	LK041097BSA	BLK041097BSA	BLK041097BSA
Prepared Date:	4/10/97	4/10/97	4/10/97	4/10/97	4/10/97
Analyzed Date:	4/10/97	4/10/97	4/10/97	4/10/97	4/10/97
Instrument I.D.#:	GCHP1	GCHP1	GCHP1	GCHP1	GCHP1
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L	60 µg/L
LCS Result:	11	11	11	32	62
LCS % Recov.:	110	110	110	107	103
MS/MSD Control Limits	60-140	60-140	60-140	60-140	60-140
LCS Control Limits	70-130	70-130	70-130	70-130	70-130

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

SEQUOIA ANALYTICAL

Tod Granicher
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.

** MS = Matrix Spike, MSD = MS Duplicate, RPD = Relative % Difference

Sequoia Analytical

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Pacific Environmental Group
2025 Gateway Place, Suite 440
San Jose, CA 95110
Attention: Shaw Garakani

Client Project ID: 330-109.2K/4931, Oakland
Matrix: LIQUID
Work Order #: 9704259 01-09

Reported: Apr 24, 1997

QUALITY CONTROL DATA REPORT

Analyte:	Benzene	Toluene	Ethyl Benzene	Xylenes	Gas
QC Batch#:	GC041097BTEX18A	GC041097BTEX18A	GC041097BTEX18A	GC041097BTEX18A	GC041097BTEX01A
Analy. Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020	EPA 8015M
Prep. Method:	EPA 5030	EPA 5030	EPA 5030	EPA 5030	EPA 5030
Analyst:	A. Porter	A. Porter	A. Porter	A. Porter	A. Porter
MS/MSD #:	9703G9504	9703G9504	9703G9504	9703G9504	9703G9504
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.
Prepared Date:	4/10/97	4/10/97	4/10/97	4/10/97	4/10/97
Analyzed Date:	4/10/97	4/10/97	4/10/97	4/10/97	4/10/97
Instrument I.D.#:	GCHP18	GCHP18	GCHP18	GCHP18	GCHP18
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L	60 µg/L
Result:	10	10	9.9	29	65
MS % Recovery:	100	100	99	97	108
Dup. Result:	10	10	10	30	70
MSD % Recov.:	100	100	100	100	117
RPD:	0.0	0.0	1.0	3.4	7.4
RPD Limit:	0-25	0-25	0-25	0-25	0-25
LCS #:	BLK041097BSA	BLK041097BSA	LK041097BSA	BLK041097BSA	BLK041097BSA
Prepared Date:	4/10/97	4/10/97	4/10/97	4/10/97	4/10/97
Analyzed Date:	4/10/97	4/10/97	4/10/97	4/10/97	4/10/97
Instrument I.D.#:	GCHP18	GCHP18	GCHP18	GCHP18	GCHP18
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L	60 µg/L
LCS Result:	9.6	9.5	9.5	28	61
LCS % Recov.:	96	95	95	93	102
MS/MSD Control Limits	60-140	60-140	60-140	60-140	60-140
LCS Control Limits	70-130	70-130	70-130	70-130	70-130

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

SEQUOIA ANALYTICAL

Tod Granicher
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.

** MS = Matrix Spike, MSD = MS Duplicate, RPD = Relative % Difference

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Pacific Environmental Group
2025 Gateway Place, Suite 440
San Jose, CA 95110
Attention: Shaw Garakani

Client Proj. ID: 330-109.2K/4931, Oakland
Lab Proj. ID: 9704259

Received: 04/02/97
Reported: 04/14/97

LABORATORY NARRATIVE

In order to properly interpret this report, it must be reproduced in its entirety. This report contains a total of 13 pages including the laboratory narrative, sample results, quality control, and related documents as required (cover page, COC, raw data, etc.).

SEQUOIA ANALYTICAL

Tod Granicher
Project Manager

SEQUOIA ANALYTICAL SAMPLE RECEIPT LOG

CLIENT NAME: PEG
REC. BY (PRINT): LDC

WORKORDER: 9704259
DATE OF LOG-IN: 4-5-97

CIRCLE THE APPROPRIATE RESPONSE

1. Custody Seal(s): Present / ~~Absent~~ Intact / Broken*
2. Custody Seal #: Put in Remarks Section
3. Chain-of-Custody: ~~Present~~ / Absent*
4. Traffic Reports or Packing List: Present / ~~Absent~~
5. Airbill: Airbill / Sticker Present / ~~Absent~~
6. Airbill #:
7. Sample Tags: ~~Present~~ / Absent
   Sample Tags #s: ~~Listed~~ / Not Listed on Chain-of-Custody
8. Sample Condition: ~~Intact~~ / Broken* / Leaking*
9. Does information on custody reports, traffic reports and sample tags agree? ~~Yes~~ / No*
10. Proper Preservatives used: ~~Yes~~ / No*
11. Date Rec. at Lab: 4-2-97
12. Time Rec. at Lab: 1121
13. Temp Rec. at Lab: 7°C

LAB SAMPLE #	DASH #	CLIENT IDENTIFICATION	CONTAINER DESCRIPTION	SAMPLE MATRIX	DATE SAMP.	REMARKS: CONDITION (ETC.)
1	A-D	A-2	voa (4)	liq	4-1	
2	↓	A-4	↓	↓	↓	
3	↓	A-6	↓	↓	↓	
4	A,B	TB-1	voa (2)	↓	↓	

4-2-97

*if Circled, contact Project Manager and attach record of resolution.

Revision 9/10/96
RCPTLOG.XLS

ARCO Products Company
Division of AtlanticRichfieldCompany

330 10921K **Task Order No.** 21055-00

Chain of Custody

ARCO Facility no. 4931	City (Facility) OAKLAND	Project manager (Consultant) SHAW GARAVANI	Laboratory name SEQUOIA
ARCO engineer PAUL SUPPLE	Telephone no. (ARCO)	Telephone no. (Consultant) 408 441 7500	Fax no. (Consultant) 408 441 7539
Consultant name PACIFIC ENVIRONMENTAL	Address (Consultant) 2025 GATEWAY PL #440 SAN JOSE		Contract number 21055-00

Method of shipment: 9704259

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 ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	MTBE DISTINCTION
A-2	1	4		X		Y	HCL	4.1.97	12:05		X										Y
A-4	2	↓		↓		↓	↓	↓	12:39		↓										↓
A-6	3	↓		↓		↓	↓	↓	11:48		↓										↓
TB-1	4	2		↓		↓	↓	↓	N/A		↓										

Special detection Limit/reporting

Special QA/QC

Remarks

PR 2 11 21

Lab number

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		Date	Time
Relinquished by sampler: Paul Wienhardt	4.1.97	16:20	Received by: Julie Warren	4/1/97	1620
Relinquished by: Julie Warren	4-2-97	1015	Received by: Stu Kemp	4/2/97	1015
Relinquished by: Stu Kemp	4/2/97	11:21	Received by laboratory: LD Cardenas	4-2-97	1121

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

APPC-3292 (2-91)

FIELD SERVICES / O & M REQUEST

SITE INFORMATION FORM

Project #:330-109.2K

☐ **1st time visit**

Station #:4931

☒ **1st** ☐ **2nd** ☐ **3rd** ☐ **4th**

Date of Request: 1Q

Site Address:731 McArthur Blvd.
Oakland, California

☐ **Monthly**

Ideal Field Date:

☐ **Semi-Monthly**

County: Alameda

☐ **Weekly**

Budget Hrs._____

Project Manager: Shaw Garakani

☐ **One time Event**

Actual Hrs._____

Requestor: David Nanstad

☐ **Other.**_____

Mob de Mob_____

Purge Total_____

Client: Arco

Client P.O.C.: Paul Supple

Prefield contacts:

Field Tasks: For General Description

First Quarter 1997 groundwater sampling event: DTW/DTL from TOB/TOC; sample all wells for GAS/BTEX/MtBE. Note and repair/replace damaged J-plugs, locks ect. DO NOT PURGE WELLS WITH ORC'S.

WA# 21055 00

Comments, remarks, from Field Staff (include problems encountered

Completed by:_____ Date:_____

Checked by:_____

FIELD SERVICES / O & M REQUEST

SITE INFORMATION FORM

Project #:330-109.2K

☐ **1st time visit**

Station #:4931

☒ **1st** ☐ **2nd** ☐ **3rd** ☐ **4th**

Date of Request: 1Q

Site Address:731 McArthur Blvd.
Oakland, California

☐ **Monthly**

Ideal Field Date:

☐ **Semi-Monthly**

County: Alameda

☐ **Weekly**

Budget Hrs._____

Project Manager: Shaw Garakani

☐ **One time Event**

Actual Hrs. 4 1/2

Requestor: David Nanstad

☐ **Other.**_____

Mob de Mob_____

Purge Total 40 gal

Client: Arco

Client P.O.C.: Paul Supple

Prefield contacts:

Field Tasks: For General Description

First Quarter 1997 groundwater sampling event: DTW/DTL from TOB/TOC; sample all wells for GAS/BTEX/MtBE. Note and repair/replace damaged J-plugs, locks ect.

WA# 21055 00

Comments, remarks, from Field Staff (include problems encountered

3 sampled

3 purged

14 gauged

Completed by: Paul Wimbadt Date: 4.1.97

Checked by:_____

WELL SAMPLING REQUEST

SAMPLING PROTOCOL								
Project No.	Station #	Project Name	SEQUENCE	Project Manager	Approval	Date/s	Laboratory:	Client Engineer:
330-109.2k	4931	731 McArthur BL Oakland	1Q97	Shaw Garakani			Sequoia 21055 00	PAUL SUPPLE

Well Number	Ideal Sampling Order	Sample I.D.	Sampling Frequency	Analyses	TOB TOC	Well Depth	Casing Diameter	Top of Screen	Well goes Dry?	Comments
A-2	1		QLY	MtBE/GAS/BTEX	TOB/TOC	20	4"		yes	
A-3	10		Semiannual 2Q/4Q	DTW ONLY	TOB/TOC	17	4"		yes	
A-4	14		QLY	MtBE/GAS/BTEX	TOB/TOC	20	4"		yes	
A-5	5		Semiannual 2Q/4Q	DTW ONLY	TOB/TOC	24.5	3"		no	
A-6	12		QLY	MtBE/GAS/BTEX	TOB/TOC	25 5	3"		no	
A-7	11		Annually 2Q	DTW ONLY	TOB/TOC	23	3"		no	
A-8	15		Semiannual 2Q/4Q	DTW ONLY	TOB/TOC	18	3"		no	
A-9	9		Semiannual 2Q/4Q	DYW ONLY	TOB/TOC	19	6"	5'	no	
A-10	3		REMOVED	DTW ONLY	TOB/TOC	30'	3"	5'	?	
A-11	2		Semiannual 2Q/4Q	DTW ONLY	TOB/TOC	28	3"	5'	no	
A-12	4		Semiannual 2Q/4Q	DTW ONLY	TOB/TOC	30	3"	5'	no	
A-13	6		ANNUAL 2Q	DTW ONLY	TOB/TOC	29.5	3"	10'	no	
AR-1	13		REMOVED	DTW ONLY	TOB/TOC	31 5	6"	10'	no	
AR-2	7		REMOVED	DTW ONLY	TOB/TOC	27.5	6"	10'	no	
AR-3	8		REMOVED	DTW ONLY	TOB/TOC	27	6"	10'	no	
TB-1			QLY	MtBE/GAS/BTEX						

FIELD DATA SHEET

WATER SAMPLE FIELD DATA SHEET

PROJECT No.: 330 1092K LOCATION: 731 McAvoy OAKLAND WELL ID #: A-2

CLIENT/STATION No.: 4931 FIELD TECHNICIAN: PAUL WEINHARDT

WELL INFORMATION

Depth to Liquid: ——— TOB ——— TOC
Depth to water: 8.77 TOB 8.35 TOC
Total depth: ——— TOB 20.0 TOC
Date: 4.1.97 Time (2400): 10.40

Probe Type and I.D. #
- ☐ Oil/Water interface ———
- ☒ Electronic Indicator #2
- ☐ Other: ———

CASING DIAMETER / **GAL/LINEAR FT.**

☐	2	0.17
☐	3	0.38
☒	4	0.66
☐	4.5	0.83
☐	5	1.02
☐	6	1.5
☐	8	2.6

SAMPLE TYPE
- ☒ Groundwater
- ☐ Duplicate
- ☐ Extraction well
- ☐ Trip blank
- ☐ Field blank
- ☐ Equipment blank
- ☐ Other: ———

TD 20.0 - DTW 8.35 = 11.65 x Gal/Linear Foot .66 = 7.68 x Number of Casings ——— = Calculated Purge 23.04

DATE PURGED: 4.1.97 START: 11.15 END (2400 hr): 11.20 PURGED BY: PW

DATE SAMPLED: 4.1.97 START: ——— END (2400 hr): ——— SAMPLED BY: PW

TIME (2400 hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm @ 25°C)	TEMPERATURE (°F)	COLOR	TURBIDITY	ODOR
11:18	7.75	7.27	560	69.7	cloudy	mod	none
11:20	90	7.20	540	68.4	cloudy	mod	none
			DRY AT 90 gal				

Pumped dry (Yes) / No

Color: Cobalt 0-100, Clear, Cloudy, Yellow, Brown
Turbidity: NTU 0-200, Heavy, Moderate, Light, Trace
Odor: Strong, Moderate, Faint, None

FIELD MEASUREMENTS AT TIME OF SAMPLE, AFTER RECHARGE:

DTW	TOB/TOC		E.C.	TEMPERATURE	COLOR	TURBIDITY	ODOR
10.74	TOB (TOC)	7.02	470	65.1	Brown	Hvy	none

PURGING EQUIPMENT/I.D. #
- ☐ Bailer: ———
- ☒ Centrifugal Pump: #15
- ☐ Other: ———
- ☐ Airlift Pump: ———
- ☐ Dedicated: ———

SAMPLING EQUIPMENT/I.D. #
- ☒ Bailer: DISP
- ☐ Dedicated: ———
- ☐ Other: ———

SAMP. CNTRL #	DATE	TIME (2400)	No. of Cont.	SIZE	CONTAINER	PRESERVE	ANALYTICAL PARAMETER
A-2	4.1.97	12:05	4	40mL	VOA	HCL	GAS MTBE

REMARKS: NO SCREEN INFORMATION ON REQUEST
PURGED well

SIGNATURE: Paul Weinhardt

PACIFIC ENVIRONMENTAL GROUP INC

FIELD DATA SHEET

WATER SAMPLE FIELD DATA SHEET

PROJECT No.: 330 1092K LOCATION: 731 McArthur WELL ID #: A-4

CLIENT/STATION No.: 4931 FIELD TECHNICIAN: Paul Weinhardt

WELL INFORMATION

Depth to Liquid: — TOB — TOC
Depth to water: 11.95 TOB 10.80 TOC
Total depth: — TOB 20.0 TOC
Date: 4.1.97 Time (2400): 10.56

Probe Type and I.D. #
- ☐ Oil/Water interface
- ☒ Electronic Indicator #2
- ☐ Other:

CASING DIAMETER		GAL/ LINEAR FT.
☐	2	0.17
☐	3	0.38
☒	4	0.66
☐	4.5	0.83
☐	5	1.02
☐	6	1.5
☐	8	2.6

SAMPLE TYPE
- ☐ Groundwater
- ☐ Duplicate
- ☐ Extraction well
- ☐ Trip blank
- ☐ Field blank
- ☐ Equipment blank
- ☐ Other:

TD 20.0 - DTW 10.80 = 11.20 x Gal/Linear Foot .66 = 7.39 x Number of Casings ____ = Calculated Purge 22.17

DATE PURGED: 4.1.97 START: 11:23 END (2400 hr): 11:28 PURGED BY: PW

DATE SAMPLED: 4.1.97 START: 12:30 END (2400 hr): 12.40 SAMPLED BY: PW

TIME (2400 hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm @ 25°C)	TEMPERATURE (°F)	COLOR	TURBIDITY	ODOR
11:26	7.5	7.16	1.240	66.0	Cloudy	mod	mod
11.28	9.0	7.19	1.600	66.4	cloudy	mod	FAINT
			Dry AT 9.0gal				

Pumped dry (Yes) / No

Color: Cobalt 0-100, Clear, Cloudy, Yellow, Brown
Turbidity: NTU 0-200, Heavy, Moderate, Light, Trace
Odor: Strong, Moderate, Faint, None

FIELD MEASUREMENTS AT TIME OF SAMPLE, AFTER RECHARGE:

DTW	TOB/(TOC)						
14.10	(TOC)	7.04	1.490	64.9	Cloudy	mod	FAINT

PURGING EQUIPMENT/I.D. #
- ☐ Bailer:
- ☒ Centrifugal Pump: # 1
- ☐ Other:
- ☐ Airlift Pump:
- ☐ Dedicated:

SAMPLING EQUIPMENT/I.D. #
- ☒ Bailer: DISP
- ☐ Dedicated:
- ☐ Other:

SAMP. CNTRL #	DATE	TIME (2400)	No. of Cont.	SIZE	CONTAINER	PRESERVE	ANALYTICAL PARAMETER
A-4	4.1.97	12:37	4	40ml	VOA	HCL	GasBTEX MTBE

REMARKS: NO SCREEN INFORMATION on the REQUEST

PURGED WELL

SIGNATURE: Paul Weinhardt

PACIFIC ENVIRONMENTAL GROUP INC

FIELD DATA SHEET

WATER SAMPLE FIELD DATA SHEET

PROJECT No.: 33010926 LOCATION: 731 McArthur WELL ID #: A-6

CLIENT/STATION No.: 4931 FIELD TECHNICIAN: Paul Weinhardt

WELL INFORMATION

Depth to Liquid: — TOB — TOC
Depth to water: 9.97 TOB 9.28 TOC
Total depth: — TOB 25.5 TOC
Date: 4.1.97 Time (2400): 10:36

Probe Type and I.D. #
- ☐ Oil/Water interface
- ☒ Electronic Indicator #2
- ☐ Other:

CASING DIAMETER		GAL/ LINEAR FT.
☐	2	0.17
☒	3	0.38
☐	4	0.66
☐	4.5	0.83
☐	5	1.02
☐	6	1.5
☐	8	2.6

SAMPLE TYPE
- ☐ Groundwater
- ☐ Duplicate
- ☐ Extraction well
- ☐ Trip blank
- ☐ Field blank
- ☐ Equipment blank
- ☐ Other:

TD 25.5 - DTW 9.28 = 16.22 x Gal/Linear Foot .38 = 6.16 x Number of Casings 3 = Calculated Purge 18.47

DATE PURGED: 4.1.97 START: 11:32 END (2400 hr): 11:41 PURGED BY: PW

DATE SAMPLED: 4.1.97 START: 11:41 END (2400 hr): 11:50 SAMPLED BY: PW

TIME (2400 hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm @ 25°C)	TEMPERATURE (°F)	COLOR	TURBIDITY	ODOR
11.35	6.25	6.89	770	68.2	Cloudy	med	none
11:38	12.50	6.87	720	67.9	Brown	Hvy	none
11:41	18.75	7.04	740	68.3	Brown	Hvy	none

Pumped dry Yes (No)

Color: Cobalt 0-100, Clear, Cloudy, Yellow, Brown
Turbidity: NTU 0-200, Heavy, Moderate, Light, Trace
Odor: Strong, Moderate, Faint, None

FIELD MEASUREMENTS AT TIME OF SAMPLE, AFTER RECHARGE:

DTW: 11.27 TOB/TOC

PURGING EQUIPMENT/I.D. #
- ☐ Bailer:
- ☒ Centrifugal Pump: N/A
- ☐ Airlift Pump:
- ☐ Dedicated:
- ☐ Other:

SAMPLING EQUIPMENT/I.D. #
- ☒ Bailer: DISP
- ☐ Dedicated:
- ☐ Other:

SAMP. CNTRL #	DATE	TIME (2400)	No. of Cont.	SIZE	CONTAINER	PRESERVE	ANALYTICAL PARAMETER
A-6	4.1.97	11.48	4/8	40ml	VOA	HCL	Gas Btex MTBE

REMARKS: NO SCREEN INFORMATION on REQUEST
Purged Well

SIGNATURE: Paul Weinhardt

PACIFIC ENVIRONMENTAL GROUP, INC.

FIELD DATA SHEET

WATER SAMPLE FIELD DATA SHEET

PROJECT No.: 330 1092K LOCATION: 731 McArthur Oakland WELL ID #: TB-1

CLIENT/STATION No.: 4931 FIELD TECHNICIAN: PW

WELL INFORMATION

Depth to Liquid: _____ TOB _____ TOC
Depth to water: _____ TOB _____ TOC
Total depth: _____ TOB _____ TOC
Date: _____ Time (2400): _____

Probe Type and I.D. #
- ☐ Oil/Water interface _____
- ☐ Electronic Indicator _____
- ☐ Other: _____

CASING DIAMETER		GAL/ LINEAR FT.
☐	2	0.17
☐	3	0.38
☐	4	0.66
☐	4.5	0.83
☐	5	1.02
☐	6	1.5
☐	8	2.6

SAMPLE TYPE
- ☐ Groundwater
- ☐ Duplicate
- ☐ Extraction well
- ☒ Trip blank
- ☐ Field blank
- ☐ Equipment blank
- ☐ Other: _____

TD _____ - DTW _____ = _____ x Gal/Linear Foot _____ = _____ x Number of Casings _____ = Calculated Purge _____

DATE PURGED: _____ START: _____ END (2400 hr): _____ PURGED BY: _____

DATE SAMPLED: _____ START: _____ END (2400 hr): _____ SAMPLED BY: _____

TIME (2400 hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm @ 2 5°C)	TEMPERATURE (°F)	COLOR	TURBIDITY	ODOR
			TRIP BLANK				

Pumped dry Yes / No

Colour 0-100: Clear, Cloudy, Yellow, Brown
NTU 0-200: Heavy, Moderate, Light, Trace
Strong, Moderate, Faint, None

FIELD MEASUREMENTS AT TIME OF SAMPLE, AFTER RECHARGE:

DTW: _____ TOB/TOC

PURGING EQUIPMENT/I.D. #
- ☐ Bailer: _____
- ☐ Airlift Pump: _____
- ☐ Centrifugal Pump: _____
- ☐ Dedicated: _____
- ☐ Other: _____

SAMPLING EQUIPMENT/I.D. #
- ☐ Bailer: _____
- ☐ Dedicated: _____
- ☐ Other: _____

SAMP. CNTRL #	DATE	TIME (2400)	No. of Cont.	SIZE	CONTAINER	PRESERVE	ANALYTICAL PARAMETER
TB-1	4.1.97	N/A	2	40ml	VOA	HCL	GasBTEX MTBE

REMARKS: _____

SIGNATURE: Paul Wenhardt

PACIFIC ENVIRONMENTAL GROUP INC.

FIELD REPORT

DEPTH TO WATER/SEPARATE-PHASE HYDROCARBON SURVEY

PROJECT No.: 330 1092L LOCATION: 731 Mc Arthur Oakland DATE: 4-1-97

CLIENT/STATION NO.: 4931 FIELD TECHNICIAN: Paul Weinheimer DAY OF WEEK: Tues

PROBE TYPE/ID No.
- ☐ Oil/Water IF/ _____
- ☐ H_2O level indicator _____
- ☐ Other: _____

Dtw Order	Well ID	Time	Surface Seal	Lid Secure	Gasket	Lock	Expanding Cap	Total Depth (feet)	First Depth to Water (feet) TOB/TOC	Second Depth to Water (feet) TOB/TOC	SERARATE-PHASE HYDROCARBONS (SPH): SPH Depth (feet) TOB/TOC	SPH Thickness (feet)	COLOR: Fresh	Weathered	Gas	Oil	VISCOSITY: Lite	Medium	Heavy	LIQUID REMOVED (gallons): SPH / H_2O
	A2	10:40	X	X	X	Ø	X	20.00	8.77 / 8.35	8.77 / 8.35										/
	A3	10:52	X	X	X	Ø	X	—	9.78 / 9.04	9.78 / 9.04										/
	A4	10:56	X	X	X	Ø	X	20.00	11.95 / 10.80	11.95 / 10.80										/
	A5	10:28	X	X	X	Ø	X	—	10.83 / 10.15	10.83 / 10.15										/
	A6	10:36	X	X	X	Ø	X	25.50	9.97 / 9.28	9.97 / 9.28										/
	A7	10:32	X	X	X	Ø	X	—	9.63 / 9.10	9.63 / 9.10										/
	A8	10:22	X	X	X	X	X	—	9.98 / 9.04	9.98 / 9.04										/
	A9	10:16	X	X	X	X	X	—	9.95 / 9.05	9.95 / 9.05										/
	A10	10:10	X	X	X	Ø	Ø	—	11.15 / 10.68	11.15 / 10.68										/

Comments: _____

FIELD REPORT

DEPTH TO WATER/SEPARATE-PHASE HYDROCARBON SURVEY

PROJECT No.: 330 1092K LOCATION: 731 Mc Arthur DATE: 4-1-97

CLIENT/STATION NO.: 4931 FIELD TECHNICIAN: Paul Weinhardt DAY OF WEEK: Tues

PROBE TYPE/ID No.
- ☐ Oil/Water IF/ _____
- ☐ H_2O level indicator _____
- ☐ Other: _____

Dtw Order	Well ID	Time	Surface Seal	Lid Secure	Gasket	Lock	Expanding Cap	Total Depth (feet)	First Depth to Water (feet) TOB/TOC	Second Depth to Water (feet) TOB/TOC	SERARATE-PHASE HYDROCARBONS (SPH) SPH Depth (feet) TOB/TOC	SPH Thickness (feet)	COLOR: Fresh	COLOR: Weathered	COLOR: Gas	COLOR: Oil	VISCOSITY: Lite	VISCOSITY: Medium	VISCOSITY: Heavy	LIQUID REMOVED (gallons) SPH / H_2O
	A-11	11:10	X	X	X	X	X	—	10.95 / 10.75	10.95 / 10.75										
	A-12	11:07	X	X	X	X	X	—	10.30 / 9.60	10.30 / 9.60										
	A-13					Covered By Asphalt														
	AR-1	10:58	X	X	X	X	X	—	11.78 / 10.95	11.78 / 10.95										
	AR-2	10:43	X	X	X	X	X	—	6.80 / 5.65	6.80 / 5.65										
	AR-3	11:03	X	X	X	X	X	—	11.24 / 10.41	11.24 / 10.41										

Comments: _____

ATTACHMENT C

REMEDIAL SYSTEM PERFORMANCE EVALUATION

ATTACHMENT C
REMEDIAL SYSTEM PERFORMANCE EVALUATION

GWE System

Groundwater extraction (GWE) was conducted intermittently between November 10, 1992, and July 5, 1995. The GWE system was comprised of electric GWE pumps in Wells A-9, AR-1, AR-2, and AR-3, and three 1,500-pound granular activated carbon vessels arranged in series. The GWE system was permitted by East Bay Municipal Utility District Permit Account Number 502-62131. Based on Alameda County Health Care Services Agency authorization that GWE at the site was no longer required, the permit was relinquished during second quarter 1996. No evidence of plume migration has been observed since system deactivation. Overall, 4.6 million gallons of groundwater were extracted and less than 0.06 gallon of benzene removed.

Historical GWE system performance and analytical data are presented in Tables C-1 and C-2. Graphical presentations of total purgeable petroleum hydrocarbons calculated as gasoline (TPPH-g) and benzene mass removal and concentration data are shown on Figures C-1 and C-2, respectively.

Bioremediation Enhancement Program

At the request of ARCO Products Company, Pacific Environmental Group, Inc. (PACIFIC) initiated an in-situ bioremediation enhancement program consisting of installation of oxygen releasing compound (ORC) units in select wells beginning November 1995. ORC is a formulation of very fine, insoluble magnesium peroxide that releases oxygen at a slow, controlled rate when hydrated. ORC product literature was presented in PACIFIC's fourth quarter 1995 report. ORC units are currently installed in Wells A-8 and A-9. The in-situ bioremediation enhancement program was suspended during first quarter 1997 pending further evaluation of its usefulness at this site. Bioremediation enhancement program data are presented in Table C-3.

Intrinsic Bioremediation Evaluation

At the request of ARCO, PACIFIC monitored intrinsic bioremediation indicator parameters (bioparameters) during the fourth quarter 1996 groundwater monitoring event. Groundwater samples from Wells A-4, A-8, and A-12 were analyzed for biological oxygen demand (BOD), carbon dioxide (CO_2), chemical oxygen demand (COD), methane, nitrate, sulfate, dissolved oxygen (DO), and ferrous iron. Wells A-4 and A-8 are located within the plume; Well A-12 is located outside the plume. Although fourth quarter 1996 monitoring results indicate non-detectable concentrations of TPPH-g and BTEX compounds in Well A-4, this well was considered as an inter-plume well, based on third quarter 1996 monitoring results (TPPH-g and benzene concentrations of 3,000 and 480 parts per million [ppm], respectively). The parameters monitored and the associated values are presented in Table C-3.

In general, depleted concentrations of electron acceptors (DO, nitrate, and sulfate) and elevated concentrations of bioremediation byproducts (ferrous iron, CO_2, and methane) within the impacted plume compared to background, indicate that intrinsic bioremediation is occurring. Evaluation of collected data from Wells A-4 and A-8 demonstrates a pattern that is indicative of intrinsic bioremediation at the site. Additionally, the ratio between COD and BOD at Well A-8 appears to be within an acceptable range, indicating that bioremediation can benefit from oxygen enhancement. Bioparameters are presented in Table C-3. Graphical presentation of bioparameters vs. total BTEX compounds were presented PACIFIC's fourth quarter 1996 report.

Conclusions

The ORC units will be removed from Wells A-8 and A-9 during second quarter 1997 sampling event. The oxygen enhancement program will be suspended pending evaluation of its usefulness at this site. The GWE system will remain deactivated, based on plume stability.

Attachments:
- Table C-1 - Historical Groundwater Extraction System Performance Data
- Table C-2 - Historical Groundwater Extraction System Analytical Data
- Table C-3 - Bioremediation Enhancement Program Data
- Figure C-1 - Historical Groundwater Extraction System Mass Removal Trend
- Figure C-2 - Historical Groundwater Extraction System Hydrocarbon Concentrations

Table C-1
Historical Groundwater Extraction System Performance Data

ARCO Service Station 4931
731 West MacArthur Boulevard at West Street
Oakland, California

Sample I.D.	Date Sampled	Totalizer Reading (gallons)	Net Volume (gallons)	Average Flow Rate (gpm)	TPPH as Gasoline: Influent Concentration (µg/L)	TPPH as Gasoline: Net Removed (lbs)	TPPH as Gasoline: Removed to Date (lbs)	Benzene: Influent Concentration (µg/L)	Benzene: Net Removed (lbs)	Benzene: Removed to Date (lbs)	Primary Carbon Loading (percent)
INFL	06/28/94 a	4,120,050	N/A	0.9	740	0.000	1.61	38	0.000	0.38	2.0
INFL	07/15/94	4,143,150	23,100	0.9	ND	0.071	1.68	ND	0.004	0.38	2.1
INFL	08/18/94	4,175,310	32,160	0.7	NS	0.099	1.78	NS	0.005	0.39	2.2
INFL	09/30/94	4,243,295 b	67,985	1.1	NS	0.210	1.99	NS	0.011	0.40	2.5
INFL	10/31/94 c	4,311,280	67,985	1.5	ND	0.000	1.99	ND	0.000	0.40	2.5
INFL	11/04/94	4,330,500	19,220	3.3	56	0.004	2.00	ND	0.000	0.40	2.5
INFL	12/16/94	4,352,780	22,280	0.4	NS d	0.005	2.00	NS d	0.000	0.40	2.5
INFL	01/05/95	4,382,610	29,830	1.0	1,000	0.131	2.13	87	0.011	0.41	2.7
INFL	02/07/95	4,430,130 e	47,520	1.0 e	NS d	0.209	2.34	NS d	0.017	0.43	2.9
INFL	03/03/95	4,464,690 e	34,560	1.0 e	NS d	0.152	2.49	NS d	0.013	0.44	3.1
INFL	04/13/95	23 f	59,040	1.0 e	ND	0.246	2.74	ND	0.021	0.46	3.4
INFL	05/01/95	12,138	12,115	0.5	ND	0.000	2.74	ND	0.000	0.46	3.4
INFL	06/09/95	36,412	24,274	0.4	ND	0.000	2.74	ND	0.000	0.46	3.4
INFL	07/05/95 g	121,199	84,787	2.3	ND	0.000	2.74	0.59	0.000	0.46	3.4
REPORTING PERIOD: 01/01/97 - 03/31/97 (g)											
TOTAL POUNDS REMOVED:							**2.74**			**0.46**	
TOTAL GALLONS REMOVED:							**0.45**			**0.06**	
PERIOD POUNDS REMOVED:						**0.00**			**0.00**		
PERIOD GALLONS REMOVED:						**0.00**			**0.00**		
TOTAL GALLONS EXTRACTED:					**4,643,696 (e)**						
PERIOD GALLONS EXTRACTED:					**N/A**						
PERIOD AVERAGE FLOW RATE (gpm):					**N/A**						
PRIMARY BED CAPACITY REMAINING (%):					**98.6**						

TPPH = Total purgeable petroleum hydrocarbons
gpm = Gallons per minute
µg/L = Micrograms per liter
lbs = Pounds
N/A = Not available
ND = Not detected
NS = Not sampled

a. Data prior to October 1, 1994 provided by prior consultant.
b. No operational or analytical data available; totalizer reading, flow rate, and sample estimated from prior event July 15, 1994.
c. Pacific Environmental Group, Inc. became consultant for the site as of October 1, 1994.
d. Sampled quarterly; concentrations assumed from prior sampling event.
e. Totalizer broken; volume estimated using 1.0 gpm based on prior sampling event.
f. Totalizer replaced and recalibrated on April 13, 1995.
g. System shut down on 07/05/95 for review, due to low concentrations and removal rates.

Carbon loading assumes an 8% isotherm.
Mass removed is an approximation calculated using averaged concentrations.
Pounds of hydrocarbons removed to date provided by prior consultant.
Prior to June 1995, TPPH as gasoline was reported as TPH calculated as gasoline.
See certified analytical reports for detection limits.

Table C-2
Historical Groundwater Extraction System Analytical Data

ARCO Service Station 4931
731 West MacArthur Boulevard at West Street
Oakland, California

Sample I.D.	Date Sampled	TPPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylenes (µg/L)
INFL	10/31/94	ND	ND	ND	ND	ND
	11/09/94	56	ND	ND	ND	2.7
	01/05/95	1,000	87	9	ND	160
	04/13/95	ND	ND	ND	ND	ND
	05/01/95	ND	ND	ND	ND	ND
	06/09/95	ND	ND	ND	ND	ND
	07/05/95	ND	0.59	ND	ND	ND
MID-1	11/09/94	ND	ND	ND	ND	ND
	01/05/95	ND	ND	ND	ND	ND
	04/13/95	ND	ND	ND	ND	ND
	05/01/95	ND	ND	ND	ND	ND
MID-2	11/09/94	ND	ND	ND	ND	ND
	01/05/95	ND	ND	ND	ND	ND
	04/13/95	ND	ND	ND	ND	ND
	05/01/95	ND	ND	ND	ND	ND
	06/09/95	ND	ND	ND	ND	ND
	07/05/95	ND	ND	ND	ND	ND
EFFL	10/31/94	ND	ND	ND	ND	ND
	11/09/94	ND	ND	ND	ND	ND
	01/05/95	ND	ND	ND	ND	ND
	04/13/95	ND	ND	ND	ND	ND
	05/01/95	ND	ND	ND	ND	ND
	06/09/95	ND	ND	ND	ND	ND
	07/05/95	ND	ND	ND	ND	ND

TPPH = Total purgeable petroleum hydrocarbons
µg/L = Micrograms per liter
ND = Not detected above detection limits
Pacific Environmental Group, Inc. became consultant to site 10/01/94.
Prior to June 1995, TPPH as gasoline was reported as TPH calculated as gasoline.
GWE system was deactivated on 07/05/95.
See certified analytical reports for detection limits.

Table C-3
Bioremediation Enhancement Program Data

ARCO Service Station 4931
731 West MacArthur Boulevard at West Street
Oakland, California

Well	Date Sampled	Field Analyses: Groundwater Temperature (deg F)	pH (units)	Conductivity (µmhos)	DO (mg/L)	Ferrous Iron (mg/L)	Laboratory Analyses: Nitrite as Nitrite (mg/L)	Nitrate as Nitrate (mg/L)	Carbon Dioxide (%)	Methane (%)	Sulfate (mg/L)	B.O.D. (mg/L)	C.O.D. (mg/L)	TPPH as Gasoline (µg/L)	Benzene (µg/L)	Total BTEX (µg/L)
A-4	12/19/96	60.3	6.63	740	0 4	7.0	NS	<1.0	6.7	0.50	<1.0	NS	NS	<2,000	<20	<80
A-8	05/22/96 a	71.1	6.46	1,045	0.3	0.3	0.17	18	NS	NS	NS	NS	NS	14,000	2,800	3,470
	12/19/96 a	62.1	6.95	760	0.20	10	NS	26	3.7	0.35	43	30	350	12,000	450	1,000
A-9	11/17/95 b	69.3	6.39	560	0.7	0.7	<1.0	22	NS	NS	NS	NS	NS	NS	NS	NS
	05/22/96 c	76.0	6.69	720	3.8	3.8	<1.0	41	NS	NS	NS	NS	NS	ND	<0 50	ND
	12/19/96 b	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
A-12	12/19/96	68.4	7.18	510	3 06	0.0	NS	33	1.6	<0.020	54	NS	NS	85	<0.50	<2.0

deg F = Degrees Fahrenheit
µmhos = Microhmos
DO = Dissolved oxygen measured prior to renewal of ORC units
B.O.D. = Biochemical oxygen demand
C.O.D. = Chemical oxygen demand
TPPH = Total purgeable petroleum hydrocarbons
BTEX = Benzene, toluene, ethylbenzene, and xylenes
mg/L = Milligrams per liter

µg/L = Micrograms per liter
ND = Not detected above the method detection limit
NS = Not sampled
NA = Not analyzed
a. Thirteen 2-inch diameter ORC units installed in Well A-8.
b. Eight 2-inch diameter ORC units installed in Well A-9.
c. ORC units replaced with the same number originally installed.

All data collected before original or any subsequent ORC installation, following standard purging protocol.

Figure C-1
Historical Groundwater Extraction System Mass Removal Trend

ARCO Service Station 4931
731 West MacArthur Boulevard at West Street
Oakland, California

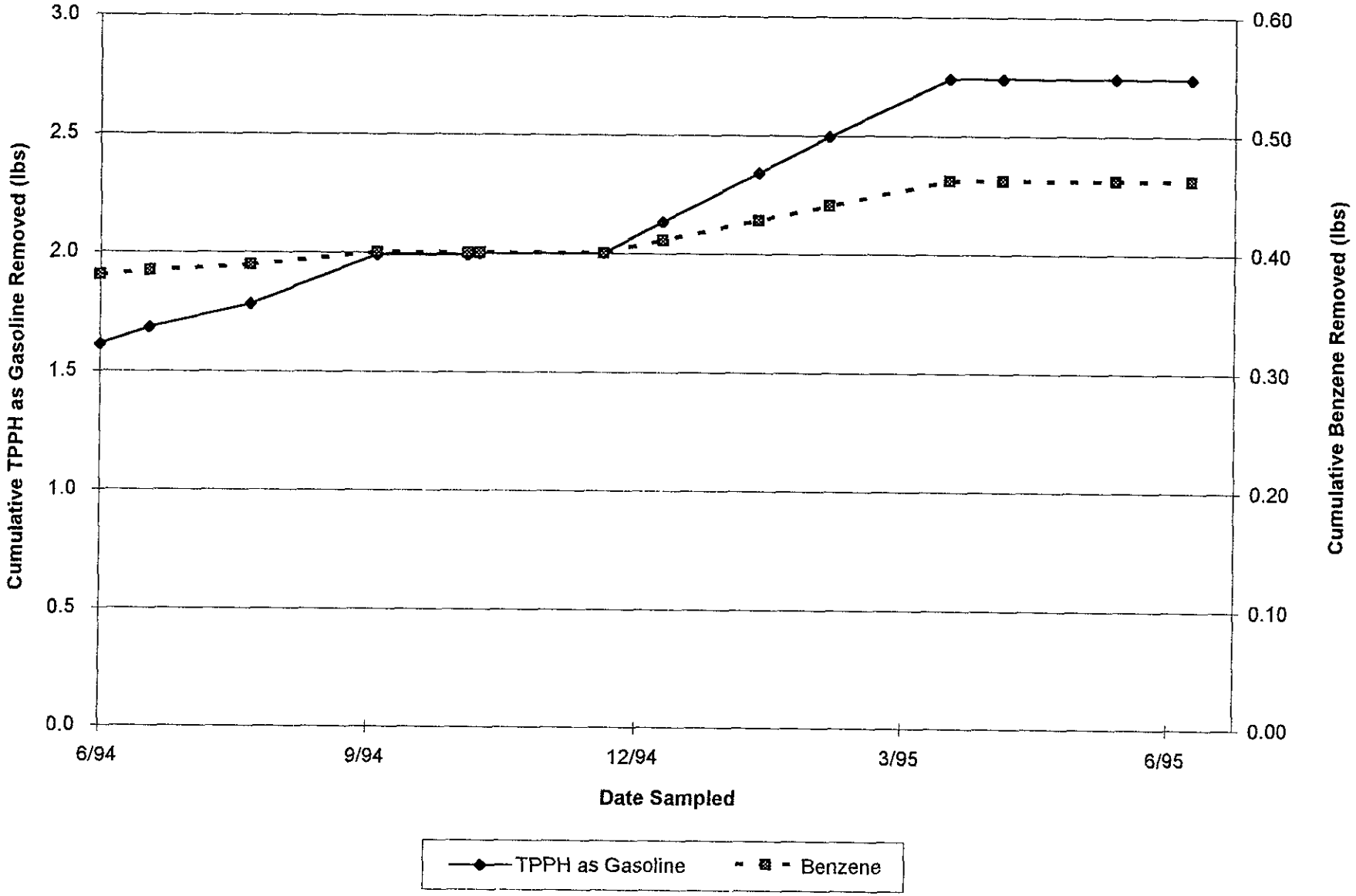
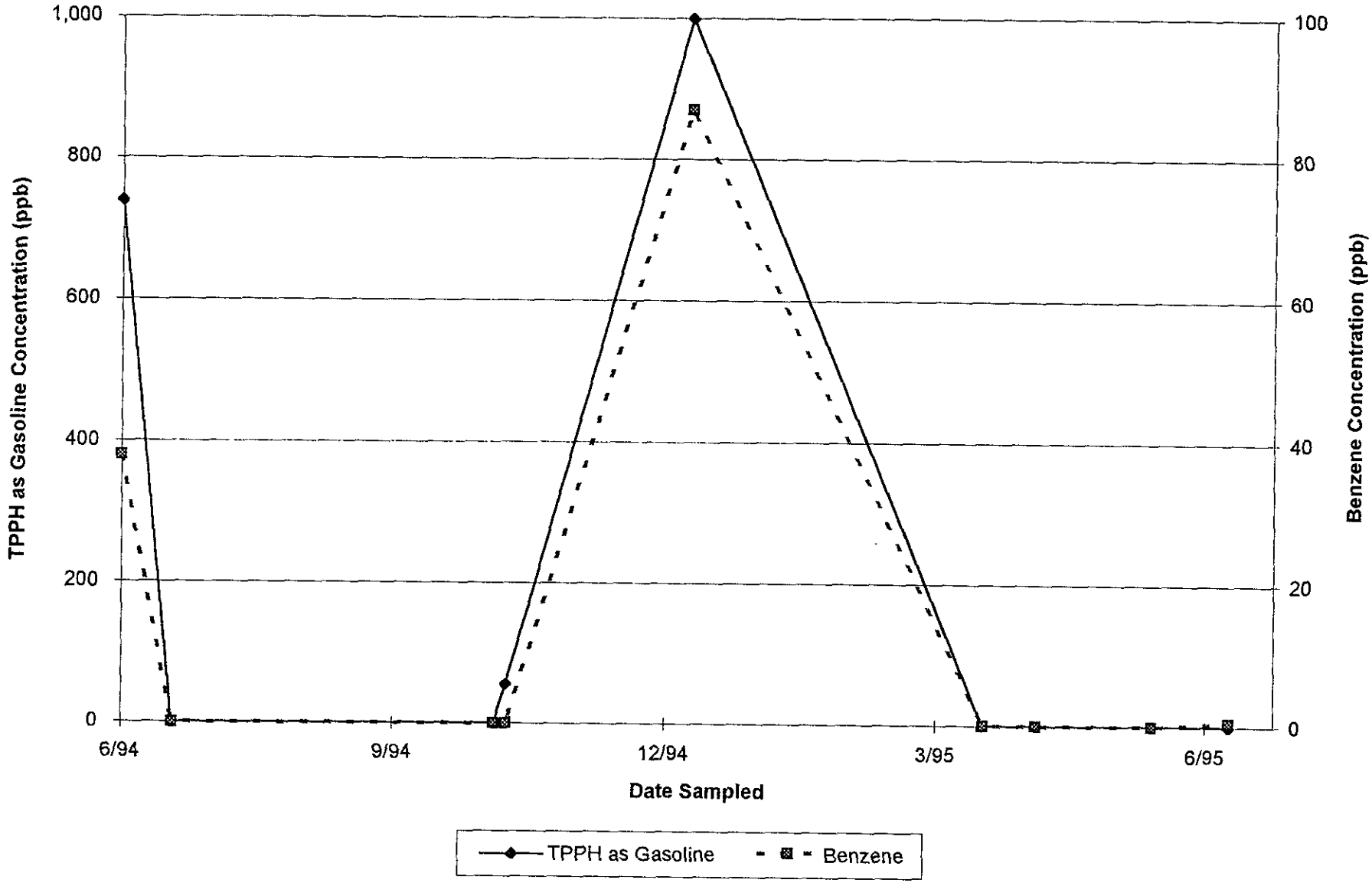


Figure C-2
Historical Groundwater Extraction System Hydrocarbon Concentrations

ARCO Service Station 4931
731 West MacArthur Boulevard at West Street
Oakland, California



ATTACHMENT A

FIELD AND LABORATORY PROCEDURES

ATTACHMENT A
FIELD AND LABORATORY PROCEDURES

Sampling Procedures

The sampling procedure for each well consists first of measuring the water level and checking for the presence of separate-phase hydrocarbons (SPH), using either an electronic indicator and a clear Teflon® bailer or an oil-water interface probe. Wells not containing SPH are then purged of approximately four casing volumes of water (or to dryness) using a centrifugal pump, gas displacement pump, or bailer. Equipment used for the current sampling event is noted on the attached field data sheets. During purging, temperature, pH, and electrical conductivity are monitored in order to document that these parameters are stable prior to collecting samples. After purging, water levels are allowed to partially recover. Groundwater samples are collected using a Teflon® bailer, placed into appropriate EPA-approved containers, labeled, logged onto chain-of-custody documents, and transported on ice to a California State-certified laboratory.

Laboratory Procedures

The groundwater samples were analyzed for the presence of total purgeable petroleum hydrocarbons calculated as gasoline, benzene, toluene, ethylbenzene, xylenes, and methyl tert-butyl ether. The analyses were performed according to EPA Methods 8015 (modified) and 8020 utilizing a purge-and-trap extraction technique. Final detection was by gas chromatography using flame- and photo-ionization detectors. The methods of analysis for the groundwater samples are documented in the certified analytical report. The certified analytical report, chain-of-custody documentation, and field data sheets are presented as Attachment C.

ATTACHMENT B

CERTIFIED ANALYTICAL REPORTS, CHAIN-OF-CUSTODY DOCUMENTATION, AND FIELD DATA SHEETS

Columbia Analytical Services inc.

April 1, 1998 Service Request No.: S9800639

Glen Vanderveen
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

RE: 21775-302.003/TO#22312.00/4931 OAKLAND

Dear Mr. Vanderveen:

The following pages contain analytical results for sample(s) received by the laboratory on March 19, 1998. Results of sample analyses are followed by Appendix A which contains sample custody documentation and quality assurance deliverables requested for this project. The work requested has been assigned the Service Request No. listed above. To help expedite our service, please refer to this number when contacting the laboratory.

Analytical results were produced by procedures consistent with Columbia Analytical Services' (CAS) Quality Assurance Manual (with any deviations noted). Signature of this CAS Analytical Report below confirms that pages 2 through 11, following, have been thoroughly reviewed and approved for release in accord with CAS Standard Operating Procedure ADM-DatRev3.

Please feel welcome to contact me should you have questions or further needs.

Sincerely,

Steven L. Green
Project Chemist

Bernadette T. Cox for
Greg Anderson
Regional QA Coordinator

COLUMBIA ANALYTICAL SERVICES, Inc.

Acronyms

A2LA	American Association for Laboratory Accreditation
ASTM	American Society for Testing and Materials
BOD	Biochemical Oxygen Demand
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CAM	California Assessment Metals
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
COD	Chemical Oxygen Demand
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DLCS	Duplicate Laboratory Control Sample
DMS	Duplicate Matrix Spike
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
IC	Ion Chromatography
ICB	Initial Calibration Blank sample
ICP	Inductively Coupled Plasma atomic emission spectrometry
ICV	Initial Calibration Verification sample
J	Estimated concentration. The value is less than the MRL, but greater than or equal to the MDL. If the value is equal to the MRL, the result is actually <MRL before rounding.
LCS	Laboratory Control Sample
LUFT	Leaking Underground Fuel Tank
M	Modified
MBAS	Methylene Blue Active Substances
MCL	Maximum Contaminant Level. The highest permissible concentration of a substance allowed in drinking water as established by the U. S. EPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
MS	Matrix Spike
MTBE	Methyl tert-Butyl Ether
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the paper industry for Air and Stream Improvement
ND	Not Detected at or above the method reporting/detection limit (MRL/MDL)
NIOSH	National Institute for Occupational Safety and Health
NTU	Nephelometric Turbidity Units
ppb	Parts Per Billion
ppm	Parts Per Million
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
SIM	Selected Ion Monitoring
SM	Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992
STLC	Solubility Threshold Limit Concentration
SW	Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Ed., 1986 and as amended by Updates I, II, IIA, and IIB.
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
tr	Trace level. The concentration of an analyte that is less than the PQL but greater than or equal to the MDL. If the value is equal to the PQL, the result is actually <PQL before rounding.
TRPH	Total Recoverable Petroleum Hydrocarbons
TSS	Total Suspended Solids
TTLC	Total Threshold Limit Concentration
VOA	Volatile Organic Analyte(s)

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800639
Project:	21775-302.003/TO#22312.00/4931 OAKLAND	**Date Collected:**	3/18/98
Sample Matrix:	Water	**Date Received:**	3/19/98

BTEX, MTBE and TPH as Gasoline

Sample Name:	A-2(10)	Units:	ug/L (ppb)
Lab Code:	S9800639-001	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	3/22/98	ND	
Benzene	EPA 5030	8020	0.5	1	NA	3/22/98	ND	
Toluene	EPA 5030	8020	0.5	1	NA	3/22/98	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	3/22/98	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	3/22/98	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	3/22/98	ND	

1322/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800639
Project:	21775-302.003/TO#22312.00/4931 OAKLAND	**Date Collected:**	3/18/98
Sample Matrix:	Water	**Date Received:**	3/19/98

BTEX, MTBE and TPH as Gasoline

Sample Name:	A-4(20)	Units:	ug/L (ppb)
Lab Code:	S9800639-002	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	40	NA	3/30/98	4700	
Benzene	EPA 5030	8020	0.5	40	NA	3/30/98	600	
Toluene	EPA 5030	8020	0.5	40	NA	3/30/98	<20	C1
Ethylbenzene	EPA 5030	8020	0.5	40	NA	3/30/98	99	
Xylenes, Total	EPA 5030	8020	0.5	40	NA	3/30/98	94	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	40	NA	3/30/98	1200	

C1 The MRL was elevated due to high analyte concentration requiring sample dilution.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800639
Project:	21775-302.003/TO#22312.00/4931 OAKLAND	**Date Collected:**	3/18/98
Sample Matrix:	Water	**Date Received:**	3/19/98

BTEX, MTBE and TPH as Gasoline

Sample Name:	A-6(15)	Units:	ug/L (ppb)
Lab Code:	S9800639-003	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	3/22/98	ND	
Benzene	EPA 5030	8020	0.5	1	NA	3/22/98	6.2	
Toluene	EPA 5030	8020	0.5	1	NA	3/22/98	0.5	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	3/22/98	2.3	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	3/22/98	2.6	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	3/22/98	ND	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800639
Project:	21775-302.003/TO#22312.00/4931 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S980320-WB2	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	3/20/98	ND	
Benzene	EPA 5030	8020	0.5	1	NA	3/20/98	ND	
Toluene	EPA 5030	8020	0.5	1	NA	3/20/98	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	3/20/98	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	3/20/98	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	3/20/98	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800639
Project:	21775-302.003/TO#22312.00/4931 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S980329-WB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	3/29/98	ND	
Benzene	EPA 5030	8020	0.5	1	NA	3/29/98	ND	
Toluene	EPA 5030	8020	0.5	1	NA	3/29/98	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	3/29/98	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	3/29/98	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	3/29/98	ND	

1S22/020597p

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9800639
Project:	21775-302.003/TO#22312.00/4931 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	NA

Surrogate Recovery Summary
BTEX, MTBE and TPH as Gasoline

Prep Method:	EPA 5030	**Units:**	PERCENT
Analysis Method:	8020 CA/LUFT	**Basis:**	NA

Sample Name	Lab Code	Test Notes	Percent Recovery	
			4-Bromofluorobenzene	a,a,a-Trifluorotoluene
A-2(10)	S9800639-001		93	83
A-4(20)	S9800639-002		95	88
A-6(15)	S9800639-003		96	80
BATCH QC	S9800701-001MS		93	104
BATCH QC	S9800701-001DMS		92	104
Method Blank	S980320-WB2		97	86
Method Blank	S980329-WB1		91	91
CAS Acceptance Limits:			69-116	69-116

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9800639
Project:	21775-302.003/TO#22312.00/4931 OAKLAND	**Date Collected:**	NA
Sample Matrix	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	3/29/98

Matrix Spike/Duplicate Matrix Spike Summary
TPH as Gasoline

Sample Name:	BATCH QC	**Units:**	ug/L (ppb)
Lab Code:	S9800701-001MS, S9800701-001DMS	**Basis:**	NA
Test Notes:			

									Percent Recovery				
	Prep	Analysis		Spike Level		Sample	Spike Result				CAS Acceptance	Relative Percent	Result
Analyte	**Method**	**Method**	**MRL**	MS	DMS	**Result**	MS	DMS	MS	DMS	Limits	**Difference**	**Notes**
Gasoline	EPA 5030	CA/LUFT	50	250	250	ND	240	250	96	100	75-135	4	

DMS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 21775-302.003/TO#22312.00/4931 OAKLAND

Service Request: 89800639
Date Analyzed: 3/20/98

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

Sample Name: ICV
Lab Code: ICV1
Test Notes:

Units: ug/L (ppb)
Basis: NA

ICV Source:

Analyte	Prep Method	Analysis Method	True Value	Result	CAS Percent Recovery Acceptance Limits	Percent Recovery	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	250	230	90-110	92	
Benzene	EPA 5030	8020	25	27	85-115	108	
Toluene	EPA 5030	8020	25	27	85-115	108	
Ethylbenzene	EPA 5030	8020	25	26	85-115	104	
Xylenes, Total	EPA 5030	8020	75	77	85-115	103	
Methyl *tert*-Butyl Ether	EPA 5030	8020	25	25	85-115	100	

TPHMOA PC F

ARCO Products Company
Division of Atlantic/Richfield Company

Task Order No. 22312.00

Chain of Custody

ARCO Facility no. 4931	City (Facility) Oakland	Project manager (Consultant) Glen Vandervveen	Laboratory Name CAS
ARCO engineer Paul Supple	Telephone no. (ARCO)	Telephone no. (Consultant) (408) 453-7300	Fax no. (Consultant) (408) 437-9526
Consultant name EMCON	Address (Consultant) 1921 Ringwood Ave. San Jose, CA 95131		Contract Number

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH mc, MTBE EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM 503E	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 ☐
A-7(0)	2			X		X	HCL	3/18/98	10:30		X									
A-4(2')	2			X		X	HCL	3/18/98	11:15		X									
A-6(5')	2			X		X	HCL	3/18/98	11:46		X									

Method of shipment: Sampler will deliver

Special Detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: RAT 8
2-40ml HCL VOAs

#2775-302.003

Lab Number: 59800639

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	Date 3/19/98 Time 12:08	Received by	
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory CAS	Date 3/19/98 Time 1515

Distribution: White Copy – Laboratory: Canary Copy – ARCO Environmental Engineering: Pink Copy – Consultant

8/11/03

EMCON - Groundwater Sampling and Analysis Request Form

PROJECT NAME : **ARCO STATION 4931**
731 W. MacArthur Blvd. Oakland, CA

Sampling Project # : **21775.302.003**
Reporting Project #: **?**
OWT Project #: **71048**

DATE REQUESTED : **18-Mar-98**

Project Manager: **Glen Vanderveen**

Groundwater Monitoring Instructions	Treatment System Instructions
Quarterly Monitoring - Third Month of the Quarter Perform a water level survey prior to sampling (see ARCO SOP) **Well survey points are top of well boxes.** **Purge three (3) casing volumes.** **All lids are extremely difficult to open, bring a crowbar and a large screwdriver.** AR-1, 2, & 3 have 1 inch PVC casings in box for water level measurement. Sample ID's on the C-O-C and the sample bottles must include the depth at which the sample was collected [i.e. MW-1 (30)]	**Lisle Rath Pager # (408) 798-2928**

Site Contact: **?** Site Phone: **?** Well Locks: **?**

Well ID or Source	Casing Diameter (inches)	Casing Length (feet)	Top of Screen (feet)	Analyses Requested
A-3	**4.0**	**19.3**		**Depth to Water**
A-5	**3.0**	**24.0**		
A-6	**3.0**	**25.0**		**Depth to Floating Product**
A-7	**3.0**	**22.6**		
A-8	**4.0**	**20.0**		**Floating Product Thickness**
A-9	**6.0**	**38.0**		
Above wells in any order				**Total Depth**
A-2	**4.0**	**19.0**		
A-4	**4.0**	**19.6**		**Well Integrity**
A-11				
A-12				* Asphalted over
A-13				
Above wells in indicated order				
A-2				**Add: Dissolved Oxygen** (Field Measurement)
A-4	**(See Above)**			**TPHG/ BTEX/ MTBE by (EPA 8020)** (Fill 2- 40ml HCL VOAs)
A-6				***If depth to water is below the top of the screen take a grab sample. If the water level is above the top of the screen purge as normal.***
Above wells in indicated order				

Laboratory Instructions:
Provide lowest detection limits possible.
Please use the EMCON Reporting Project Number (**?**) on the CAR.

ND = None Detected IP = Intermitent Product

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 21775-302.003 STATION ADDRESS : 731 W. MacArthur Blvd. Oakland, CA DATE : 3/18/98

ARCO STATION # : 4931 FIELD TECHNICIAN : Chris Chaco/ Keith Matthews DAY : Wednesday

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket Present	Lock Number	Type Of Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	A-3	OK	G-5	NO	2357	LWC	5.05	5.05	NA	NA	17.20	
2	A-5	OK	G-5	NO	2357	LWC	8.10	8.10			25.50	
3	A-6	OK	G-5	NO	2357	LWC	7.00	7.00			25.30	
4	A-7	OK	G-5	NO	2357	LWC	6.75	6.75			22.80	
5	A-8	OK	Vault	NA	None	Slip	7.80	7.80			22.00	
6	A-9	OK	Vault	NA	None	Slip	6.45	6.45	5.8		38.00	
7	A-2	OK	G-5	NO	2357	LWC	~~7.80~~	~~7.80~~			~~22.00~~	
8	A-4	OK	G-5	NO	2357	LWC	6.80	6.80			20.20	
9	A-11	OK	G-5	NA	?	LWC	8.14	8.14			30.0	
10	A-12	OK	G-5	NA	?	LWC	8.15	8.15			30.40	Hvy sulfur odor
11	A-13	OK	G-5	Well	Asphalted over, unable to Locate.							

SURVEY POINTS ARE TOP OF WELL BOXES

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21795-302.003 SAMPLE ID: A-2 (10')

PURGED BY: Chris / Mathews CLIENT NAME: ARCO 4921

SAMPLED BY: ↓ LOCATION: Oakland

TYPE: Ground Water ✓ Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 ✓ 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL):	-	VOLUME IN CASING (gal.):	10.59
DEPTH TO WATER (feet):	3.58	CALCULATED PURGE (gal.):	31.79
DEPTH OF WELL (feet):	19.8	ACTUAL PURGE VOL. (gal.):	32.0

DATE PURGED: 3-18-58 Start (2400 Hr) 10:20 End (2400 Hr) 10:30

DATE SAMPLED: 3-18-58 Start (2400 Hr) 10:36 End (2400 Hr) -

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
10:24	10	5.96	294.6	62.5	BRN	Hvy
10:27	21	6.20	309.7	62.2	"	"
10:30	32	6.26	330.1	6.30	"	"

D. O. (ppm): 1-2 ODOR: NONE

(COBALT 0 - 500) (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	✓ Bailer (Teflon®)
___ Centrifugal Pump	✓ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: Good LOCK #: ARCO NONE

REMARKS: ___

Meter Calibration: Date: 3-18-58 Time: 10:10 Meter Serial #: ___ Temperature °F: 65.2

(EC 1000 997 / 1000) (DI ___) (pH 7 694 / 700) (pH 10 1004 / 1000) (pH 4 399 / ___)

Location of previous calibration: ___

Signature: [signature] Reviewed By: [signature] Page 1 of 3

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-302.003 SAMPLE ID: A-4(20)

PURGED BY: Chaco / Mathews CLIENT NAME: ARCO 4831

SAMPLED BY: " LOCATION: Oakland

TYPE: Ground Water ✓ Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 ✓ 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL): — VOLUME IN CASING (gal.): 8.75

DEPTH TO WATER (feet): 6.80 CALCULATED PURGE (gal.): 26.26

DEPTH OF WELL (feet): 20.20 ACTUAL PURGE VOL. (gal.): 13.0

DATE PURGED: 3-18-98 Start (2400 Hr) 11:00 End (2400 Hr) 11:09

DATE SAMPLED: " Start (2400 Hr) — End (2400 Hr) 11215

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
11:05	9	6.70	962.8	65.3	Gray	Hvy
	~~18~~	well	dried	at 13	sur	
11:15	~~27~~	6.71	1140	66.4	"	Hvy

D. O. (ppm): 0-1 ODOR: Strong

(COBALT 0 - 500) (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

PURGING EQUIPMENT

___ 2" Bladder Pump ___ Bailer (Teflon®)
___ Centrifugal Pump ✓ Bailer (PVC)
___ Submersible Pump ___ Bailer (Stainless Steel)
___ Well Wizard™ ___ Dedicated
Other: ___

SAMPLING EQUIPMENT

___ 2" Bladder Pump ✓ Bailer (Teflon®)
___ DDL Sampler ___ Bailer (Stainless Steel)
___ Dipper ___ Submersible Pump
___ Well Wizard™ ___ Dedicated
Other: ___

WELL INTEGRITY: Good LOCK #: None

REMARKS: Well dry @ 13.0 Gallons ; Visible Sheen

Meter Calibration: Date: ___ Time: ___ Meter Serial #: ___ Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: ___

Signature: [signature] Reviewed By: SA Page 2 of 3

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-302.003 SAMPLE ID: A-6 (15)

PURGED BY: Chaco / Mathews CLIENT NAME: ARCO 4931

SAMPLED BY: ↓ LOCATION: Oakland

TYPE: Ground Water ✓ Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ✓ 4 ___ 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL):	NR	VOLUME IN CASING (gal.):	6.71
DEPTH TO WATER (feet):	7.00	CALCULATED PURGE (gal.):	20.13
DEPTH OF WELL (feet):	25.3	ACTUAL PURGE VOL. (gal.):	21.0

DATE PURGED: 3-18-98 Start (2400 Hr) 11:35 End (2400 Hr) 11:44

DATE SAMPLED: ↓ Start (2400 Hr) ___ End (2400 Hr) 11:46

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
11:39	7	6.93	636.4	65.1	Brown	Hvy
11:41	14	6.85	639.2	66.2	"	"
11:44	21	6.83	644.9	67.2	"	"

D. O. (ppm): 2-3 ODOR: None

(COBALT 0 - 500) (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: ___

Parameters field filtered at this well: ___

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	✓ Bailer (Teflon®)
___ Centrifugal Pump	✓ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: Good LOCK #: Arco

REMARKS: ___

Meter Calibration: Date: ___ Time: ___ Meter Serial #: ___ Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: ___

Signature: [signature] Reviewed By: SA Page 3 of 3

EMCON Associates - Field Services | Historical Monitoring Well Data

1921 Ringwood Avenue | **1998** | ARCO 4931

San Jose, California | 21775-302.003

	Gallons
First	**65.00**
Second	**0.00**
Third	**0.00**
Fourth	**0.00**

Well ID	Quarter	Date	Purge Volume (gallons)	Did well dry	Well Contained Product	
A-2	First Second Third Fourth	03/18/98	32.00	NO	NO	
A-3	First Second Third Fourth	03/18/98	0.00	NA	NO	
A-4	First Second Third Fourth	03/18/98	13.00	NO	NO	
A-5	First Second Third Fourth	03/18/98	0.00	NA	NO	
A-6	First Second Third Fourth	03/18/98	20.00	NO	NO	
A-7	First Second Third Fourth	03/18/98	0.00	NA	NO	
A-8	First Second Third Fourth	03/18/98	0.00	NA	NO	
A-9	First Second Third Fourth	03/18/98	0.00	NA	NO	
A-11	First Second Third Fourth	03/18/98	0.00	NA	NO	
A-12	First Second Third Fourth	03/18/98	0.00	NA	NO	

EMCON Associates - Field Services | Historical Monitoring Well Data

1921 Ringwood Avenue | 1998 | ARCO 4931

San Jose, California | 21775-302.003

Well ID	Quarter	Date	Purge Volume (gallons)	Did well dry	Well Contained Product	
						Gallons
						First 65.00
						Second 0.00
						Third 0.00
						Fourth 0.00
A-13	First Second Third Fourth	03/18/98	0.00	NA	NO	
	First Second Third Fourth	03/18/98	0.00	NA	NO	Steam water (gal)

ARCO Products Company
Division of Atlantic/Richfield Company

Task Order No. 77312.OG

Chain of Custody

ARCO Facility no. 4931 | City (Facility) Oakland | Project manager (Consultant) Glen Vandeveen

ARCO engineer Paul Supple | Telephone no. (ARCO) | Telephone no. (Consultant) (408) 453-7300 | Fax no. (Consultant) (408) 437-9526

Consultant name EMCON | Address (Consultant) 1921 Ringwood Ave. San Jose, CA 95131

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 MTBE EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM 503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ VOA ☐ Semi	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org/DHS ☐ Lead EPA 7420/7421 ☐			
A-7(10)		2		X		X	HCl	3/18/98	10:50		X												
A-4(22)		2		X		X	HCl	3/18/98	11:15		X												
A-6(15)		2		X		X	HCl	3/18/98	11:46		X												

Laboratory name: [illegible]

Contract number: [illegible]

Method of shipment: Sampler will deliver [partly illegible]

Special detection limit/reporting: Lowest possible [partly illegible]

Special QA/QC: As normal [partly illegible]

Remarks: 2 - 40 ml HCl VOAs [partly illegible]

#2 9803-307 [partly illegible]

Lab Number

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	Date	Time	Received by
[signature]	3/18/98	17:0?	

Relinquished by	Date	Time	Received by

Relinquished by	Date	Time	Received by laboratory	Date	Time
			[signature] CAS	3/19/98	1515

Distribution: White Copy – Laboratory; Canary Copy – ARCO Environmental Engineering; Pink Copy – Consultant

ATTACHMENT C

REMEDIAL SYSTEM PERFORMANCE SUMMARY

ATTACHMENT C
REMEDIAL SYSTEM PERFORMANCE SUMMARY

GWE System

Groundwater extraction (GWE) was conducted intermittently between November 10, 1992, and July 5, 1995. The GWE system was comprised of electric GWE pumps in Wells A-9, AR-1, AR-2, and AR-3, and three 1,500-pound granular activated carbon vessels arranged in series. The GWE system was permitted by East Bay Municipal Utility District Permit Account Number 502-62131. Based on Alameda County Health Care Services Agency authorization that GWE at the site was no longer required, the permit was relinquished during the second quarter 1996. Overall, 4.6 million gallons of groundwater were extracted and less than 0.06 gallon of benzene removed. Please refer to the Second Quarter 1997 Groundwater Monitoring Report for historical GWE system performance and analytical data.

Intrinsic Bioremediation Evaluation

At the request of ARCO, intrinsic bioremediation indicator parameters (bioparameters) were monitored during the fourth quarter 1996 groundwater monitoring event. Groundwater samples from Wells A-4, A-8, and A-12 were analyzed for biological oxygen demand (BOD), carbon dioxide (CO_2), chemical oxygen demand (COD), methane, nitrate, sulfate, dissolved oxygen (DO), and ferrous iron. Wells A-4 and A-8 are located within the plume; Well A-12 is located outside the plume. Based on analysis of the collected data, intrinsic bioremediation was active at the site. Please refer to the First Quarter 1997 Groundwater Monitoring Report for details.

Pinnacle
ENVIRONMENTAL SOLUTIONS

a division of EMCON

August 5, 1998
Project 20805-213.001

Mr. Paul Supple
ARCO Products Company
P.O. Box 6549
Moraga, California 94570

Re: Quarterly Groundwater Monitoring Report, First Quarter 1998, for ARCO Service Station No. 4931, located at 731 West Boulevard, Oakland, California

Dear Mr. Supple:

Pinnacle Environmental Solutions, a division of EMCON (Pinnacle), is submitting the attached report which presents the results of the first quarter 1998 groundwater monitoring program at ARCO Products Company (ARCO) Service Station No. 4931, located at 731 West Boulevard, Oakland, California (see Figure 1). Pertinent site features, including existing monitoring and groundwater extraction wells, are shown in Figure 2. The monitoring program complies with the Alameda County Health Care Services Agency requirements regarding underground tank investigations.

LIMITATIONS

No monitoring event is thorough enough to describe all geologic and hydrogeologic conditions of interest at a given site. If conditions have not been identified during the monitoring event, results should not be construed as a guarantee of the absence of such conditions at the site, but rather as the product of the scope and limitations of work performed during the monitoring event.

Please call if you have questions.

Sincerely,

Pinnacle

Glen VanderVeen
Project Manager

Jay R. Johnson, R.G.
Senior Project Supervisor

Attachment: Quarterly Groundwater Monitoring Report, First Quarter 1998

cc: Mr. John Kaiser, Regional Water Quality Control Board - San Francisco Bay Region
Ms. Susan Hugo, Alameda County Health Care Services Agency

Date: August 5, 1998

ARCO QUARTERLY GROUNDWATER MONITORING REPORT

Facility No.: 4931 Address:	731 West MacArthur Boulevard, Oakland, California
ARCO Environmental Engineer:	Paul Supple
Consulting Co./Contact Person:	Pinnacle Environmental Solutions/ Glen VanderVeen
Consultant Project No.:	20805-213.001
Primary Agency/Regulatory ID No.:	Alameda County Health Care Services Agency

WORK PERFORMED THIS QUARTER (First - 1998)

1. Prepared and submitted quarterly groundwater monitoring report for fourth quarter 1997.
2. Performed quarterly groundwater monitoring and sampling for first quarter 1998.

WORK PROPOSED FOR NEXT QUARTER (Second - 1998):

1. Prepare and submit quarterly groundwater monitoring report for first quarter 1998.
2. Perform quarterly groundwater monitoring and sampling for second quarter 1998.

QUARTERLY MONITORING:

Current Phase of Project:	Monitoring/Remediation
Frequency of Groundwater Sampling:	Annual (2nd Quarter): A-7, A-13 Semi-Annual (2nd/4th Quarter): A-3, A-5, A-8, A-9, A-11, A-12 Quarterly: A-2, A-4, A-6
Frequency of Groundwater Monitoring:	Quarterly
Is Free Product (FP) Present On-Site:	No
FP Recovered this Quarter:	None
Cumulative FP Recovered to Date:	Unknown
Bulk Soil Removed This Quarter:	None
Bulk Soil Removed to Date:	Unknown
Current Remediation Techniques:	Intrinsic Bioremediation Enhancement
Approximate Depth to Groundwater:	6.8 feet
Groundwater Gradient (Average):	0.03 ft/ft toward West
Period TPPH- g/Benzene Removed:	0.0/0.0
Cumulative TPPH-g/Benzene Removed:	0.45/0.06

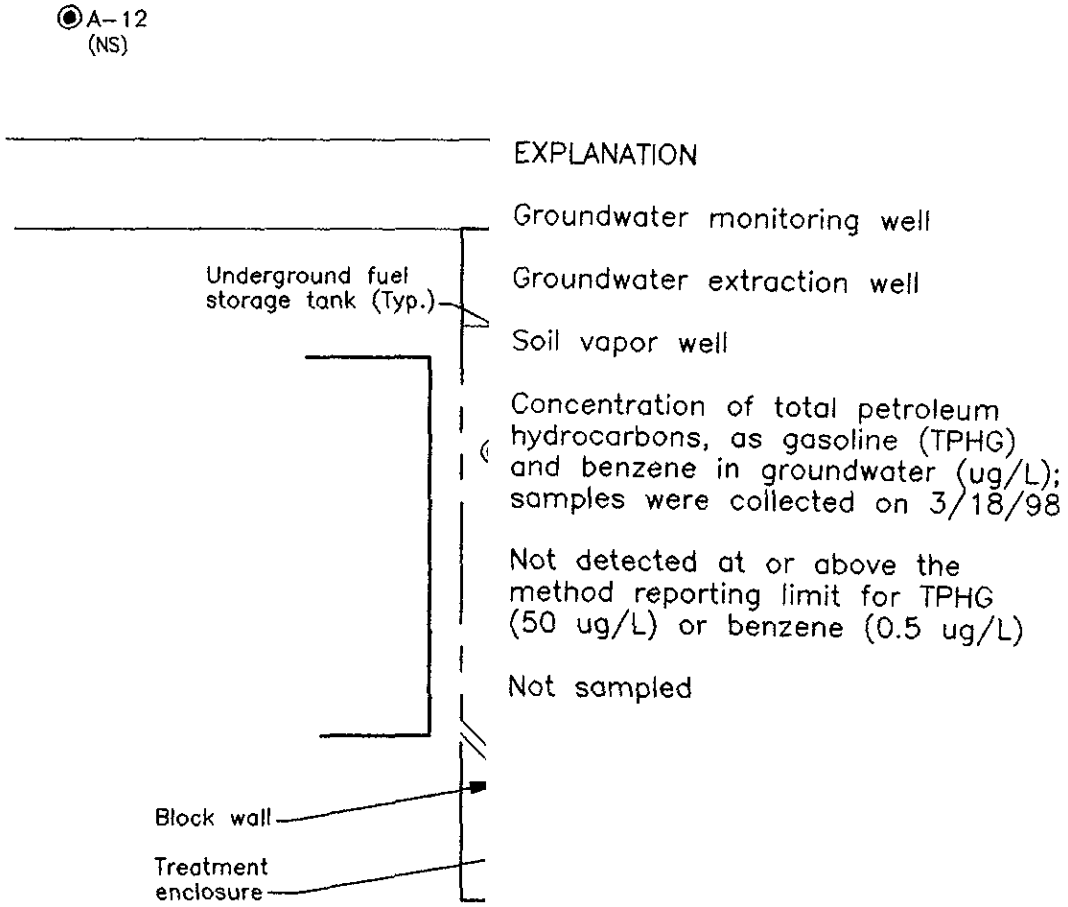
DISCUSSION:

- Hydrocarbon concentrations in wells sampled were within historic levels.
- Based on Alameda County Health Care Service Agency (ACHCSA) approval, the groundwater extraction (GWE) system has been deactivated and EBMUD sewer discharge permit relinquished. Monitoring data indicate that the petroleum hydrocarbon plume appears stable.

- Bioremediation enhancement using oxygen release compound socks (ORC) in wells A-8 and A-9 is ongoing.

ATTACHMENTS:

- Figure 1 - Groundwater Analytical Summary Map
- Figure 2 - Groundwater Elevation Contour Map
- Table 1 - Groundwater Elevation and Analytical Data
- Attachment A - Field and Laboratory Procedures
- Attachment B - Certified Analytical Reports, Chain-of-Custody Documentation, and Field Data Sheets
- Attachment C - Remedial System Performance Summary



Base map from Pacific Environmental Group, Inc.

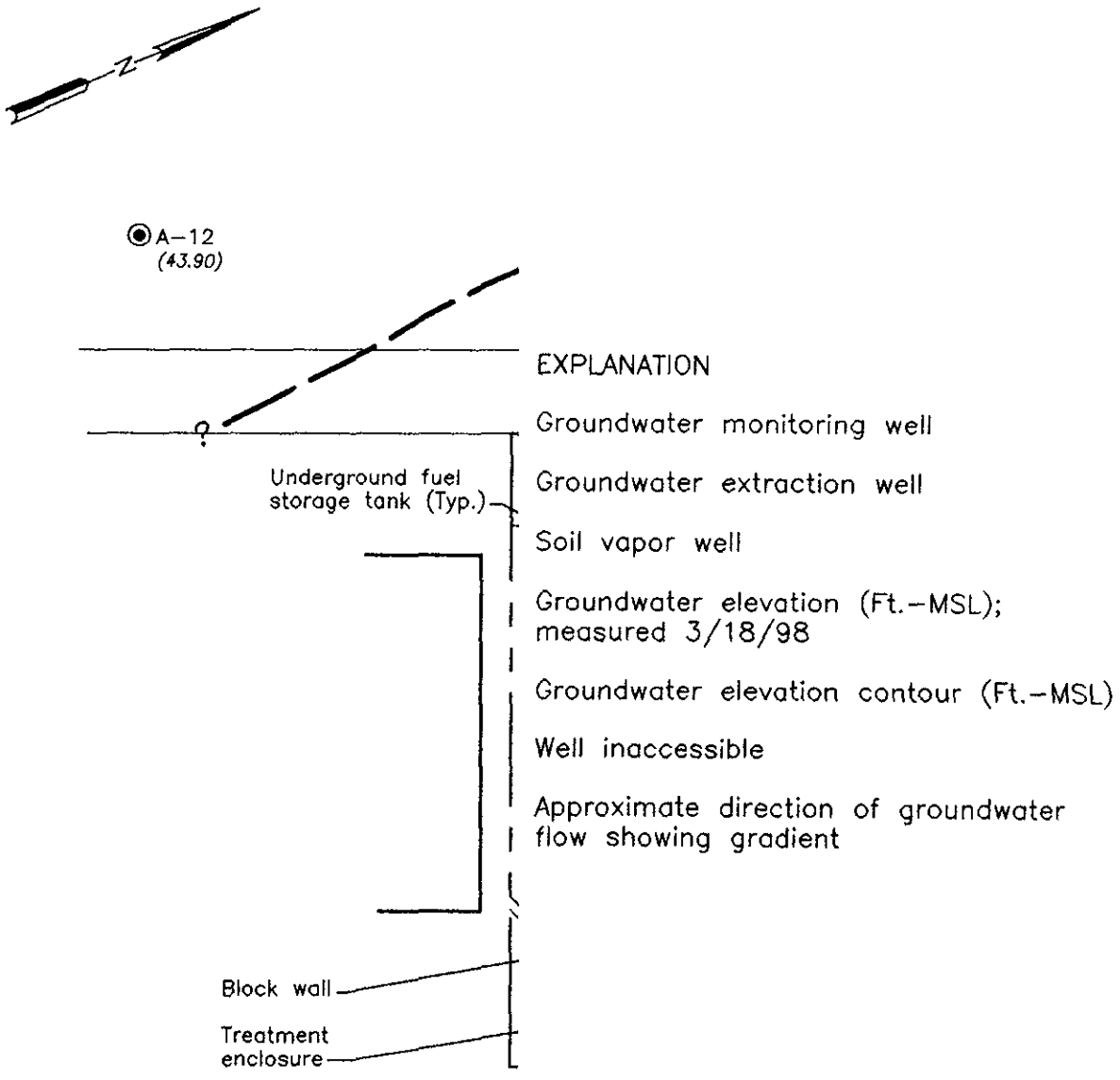
Pinnacle

ENVIRONMENTAL SOLUTIONS
A DIVISION OF EMCON

FIGURE 1
ARCO PRODUCTS COMPANY
SERVICE STATION 4931, 731 W. MACARTHUR BLVD.
OAKLAND, CALIFORNIA
GROUNDWATER ANALYTICAL SUMMARY
1ST QUARTER 1998

EA-SANJOSE-CAD/DRAWINGS: J:\PINACL\4931CHEM.dwg Xrefs: <NONE>
Scale: 1 = 30.00 DimScale: 1 = 30.00 Date: 7/1/98 Time: 9:21 AM Operator: KJOHNSON

1" 1/2" 0" 1"



Base map from Pacific Environmental Group, Inc.

Pinnacle

ENVIRONMENTAL SOLUTIONS
A DIVISION OF EMCON

FIGURE 2
ARCO PRODUCTS COMPANY
SERVICE STATION 4931, 731 W. MACARTHUR BLVD.
OAKLAND, CALIFORNIA
GROUNDWATER ELEVATION CONTOURS
1ST QUARTER 1998

EA-SANJOSE-CAD/DRAWINGS: J:\PINACL\4931GWC.dwg Xrefs: <NONE>
Scale: 1 = 30.00 DimScale: 1 = 30.00 Date: 7/1/98 Time: 9:22 AM Operator: KJOHNSON

1" 1/2" 0" 1"

Table 1
Groundwater Elevation and Analytical Data
Total Purgeable Petroleum Hydrocarbons
(TPPH as Gasoline, BTEX Compounds, and MtBE)

ARCO Service Station 4931
731 West MacArthur Boulevard at West Street
Oakland, California

Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOB)	Groundwater Elevation (feet, MSL)	TPPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Xylenes (ppb)	MtBE (ppb)	Dissolved Oxygen (ppm)
A-2	03/26/96	55.48	5.37	50.11	<50	<0.50	<0.50	<0.50	<0.50	NA	NM
	05/22/96		5.25	50.23	<50	<0.50	<0.50	<0.50	<0.50	NA	NM
	08/22/96		10.45	45.03	<50	1.1	1.8	<0.50	1.3	<2.5	NM
	12/19/96		5.53	49.95	<50	<0.50	<0.50	<0.50	<0.50	2.7	NM
	04/01/97		8.77	46.71	<50	<0.50	<0.50	<0.50	<0.50	<2.5	NM
	05/27/97		9.87	45.61	<50	<0.50	<0.50	<0.50	<0.50	4.6	NM
	08/12/97		11.11	44.37	<50	<0.50	<0.50	<0.50	<0.50	5.6	NM
	11/14/97		10.63	44.85	<50	0.9	2.8	<0.50	2.4	27	2.6
	03/18/98		3.58	51.90	<50	<0.50	<0.50	<0.50	<0.50	<3.0	NM
A-3	03/26/96	54.66	7.20	47.46	---------- Well Sampled Semiannually ----------						
	05/22/96		7.70	46.96	<50	1.2	1.9	0.7	1.3	NA	NM
	08/22/96		10.88	43.78	---------- Well Sampled Semiannually ----------						
	12/19/96		7.70	46.96	5,900	<25	<25	<25	<25	5,300 *	NM
	04/01/97		9.78	44.88	---------- Well Sampled Semiannually ----------						
	05/27/97		10.55	44.11	2,300	<20	<20	<20	<20	3,800	NM
	08/12/97		11.12	43.54	---------- Well Sampled Semiannually ----------						
	11/14/97		8.24	46.42	<1,000	<10	<10	<10	<10	1,500	3.8
	03/18/98		5.05	49.61	---------- Well Sampled Semiannually ----------						
A-4	03/26/96	54.73	7.95	46.78	8,900	1,200	21	200	220	NA	NM
	05/22/96		8.35	46.38	5,300	700	<10	170	130	NA	NM
	08/22/96		11.03	43.70	3,000	480	<5.0	75	26	150	NM
	12/19/96		8.67	46.06	<2,000	<20	<20	<20	<20	15,000 *	NM
	04/01/97		11.95	42.78	8,900	1,700	22	310	260	6,900	NM
	05/27/97		10.80	43.93	7,100	960	<20	150	74	7,900	NM
	08/12/97		11.38	43.35	4,300	670	12	51	27	2,800	NM
	11/14/97		7.74	46.99	<20,000	300	500	<200	<200	27,000	2.2
	03/18/98		6.80	47.93	4,700	600	<20^	99	94	1,200	1.0
A-5	03/26/96	54.17	7.93	46.24	---------- Well Sampled Semiannually ----------						
	05/22/96		8.20	45.97	<50	<0.50	<0.50	<0.50	<0.50	NA	NM
	08/22/96		10.70	43.47	---------- Well Sampled Semiannually ----------						
	12/19/96		8.39	45.78	9,900	1,100	330	230	700	24	NM
	04/01/97		10.83	43.34	---------- Well Sampled Semiannually ----------						
	05/27/97		10.65	43.52	100	<0.50	<0.50	<0.50	<0.50	120	NM
	08/12/97		11.05	43.12	---------- Well Sampled Semiannually ----------						
	11/14/97		10.51	43.66	<50	<0.50	<0.50	<0.50	<0.50	41	4.8
	03/18/98		8.10	46.07	---------- Well Sampled Semiannually ----------						
A-6	03/26/96	55.17	7.15	48.02	52	2.7	<0.50	1.1	2.0	NA	NM
	05/22/96		7.35	47.82	<50	2.4	<0.50	0.88	1.7	NA	NM
	08/22/96		10.12	45.05	<50	<0.50	<0.50	<0.50	<0.50	<2.5	NM
	12/19/96		7.43	47.74	<50	1.7	<0.50	0.78	1.5	<2.5	NM
	04/01/97		9.97	45.20	<50	4.7	<0.50	1.9	3.2	<2.5	NM
	05/27/97		9.66	45.51	<50	0.69	<0.50	<0.50	<0.50	<2.5	NM
	08/12/97		10.43	44.74	<50	<0.50	<0.50	<0.50	<0.50	<2.5	NM
	11/14/97		9.76	45.41	<50	<0.50	<0.50	<0.50	<0.50	<3.0	<1.0
	03/18/98		7.00	48.17	<50	6.2	0.5	2.3	2.6	<3.0	3.0
A-7	03/26/96	54.71	6.90	47.81	---------- Well Sampled Semiannually ----------						
	05/22/96		8.27	46.44	<50	<0.50	<0.50	<0.50	<0.50	NA	NM
	08/22/96		9.80	44.91	---------- Well Sampled Semiannually ----------						
	12/19/96		7.19	47.52	---------- Well Sampled Annually ----------						
	04/01/97		9.63	45.08	---------- Well Sampled Annually ----------						
	05/27/97		9.34	45.37	<50	<0.50	<0.50	<0.50	<0.50	<2.5	NM
	08/12/97		10.10	44.61	---------- Well Sampled Annually ----------						
	11/14/97		9.35	45.36	---------- Well Sampled Annually ----------						
	03/18/98		6.75	47.96	---------- Well Sampled Annually ----------						

Table 1
Groundwater Elevation and Analytical Data
Total Purgeable Petroleum Hydrocarbons
(TPPH as Gasoline, BTEX Compounds, and MtBE)

ARCO Service Station 4931
731 West MacArthur Boulevard at West Street
Oakland, California

Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOB)	Groundwater Elevation (feet, MSL)	TPPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Xylenes (ppb)	MtBE (ppb)	Dissolved Oxygen (ppm)
A-8 a	03/26/96	53 77	7.10	46.67	48,000	2,600	<100	650	1,100	NA	NM
	05/22/96		7.20	46.57	14,000	2,800	160	320	190	NA	NM
	08/22/96		11.57	42.20	8,000	1,000	76	150	96	4,300	NM
	12/19/96		8.04	45.73	12,000	450	110	210	230	<500	NM
	04/01/97		9.98	43.79	Well Sampled Semiannually						
	05/27/97		11.45	42 32	11,000	1,600	100	220	210	2,300	NM
	08/12/97		11.59	42.18	Well Sampled Semiannually						
	11/14/97		9.85	43 92	26,000	2,300	<200	400	400	4,100	2 2
	03/18/98		7.80	45.97	Well Sampled Semiannually						
A-9 b	03/26/96	53.04	7.05	45.99	<50	<0 50	<0.50	<0.50	<0.50	NA	NM
	05/22/96		7.20	45.84	<50	<0.50	<0.50	<0.50	<0.50	NA	NM
	08/22/96		9.68	43.36	<50	<0.50	<0.50	<0 50	<0.50	8.5	NM
	12/19/96		7.43	45.61	<50	<0.50	<0.50	<0.50	<0.50	2 6	NM
	04/01/97		9.95	43 09	Well Sampled Semiannually						
	05/27/97		9.56	43.48	<50	2.3	<0.50	<0.50	<0.50	45	NM
	08/12/97		10.15	42.89	Well Sampled Semiannually						
	11/14/97		8.64	44.40	<200	<2 0	<2.0	<2.0	<2.0	190	9.6
	03/18/98		6.45	46.59	Well Sampled Semiannually						
A-10	03/26/96	54.26	8.28	45.98	Well Removed from Sampling Program						
	05/22/96		8.60	45.66	Well Removed from Sampling Program						
	08/22/96		10.98	43 28	Well Removed from Sampling Program						
	12/19/96		8.80	45.46	Well Removed from Sampling Program						
	04/01/97		11.15	43.11	Well Removed from Sampling Program						
	05/27/97		10.90	43.36	Well Removed from Sampling Program						
	08/12/97		11.30	42.96	Well Removed from Sampling Program						
	11/14/97		10.80	43.46	Well Removed from Sampling Program						
	03/18/98		--	--	Well Removed from Sampling Program						
A-11	03/26/96	53.74	8.10	45.64	Well Sampled Semiannually						
	05/22/96		8.25	45.49	<50	<0.50	<0.50	<0.50	<0.50	NA	NM
	08/22/96		10.58	43.16	Well Sampled Semiannually						
	12/19/96		8.37	45.37	<50	<0.50	<0.50	<0.50	<0.50	<2 5	NM
	04/01/97		10.95	42 79	Well Sampled Semiannually						
	05/27/97		10.60	43.14	<50	<0.50	<0.50	<0.50	<0 50	3.1	NM
	08/12/97		11.07	42 67	Well Sampled Semiannually						
	11/14/97		10.58	43.16	<50	<0.50	<0.50	<0.50	<0.50	<3.0	1 6
	03/18/98		8.14	45.60	Well Sampled Semiannually						
A-12	03/26/96	52.05	7.83	44.22	Well Sampled Semiannually						
	05/22/96		7.80	44.25	<50	<0.50	<0.50	<0.50	<0.50	NA	NM
	08/22/96		9.97	42.08	Well Sampled Semiannually						
	12/19/96		8.18	43.87	85	<0.50	<0.50	<0.50	<0.50	170	NM
	04/01/97		10.30	41.75	Well Sampled Semiannually						
	05/27/97		10.05	42.00	50	12	<0.50	<0.50	<0 50	96	NM
	08/12/97		10.46	41 59	Well Sampled Semiannually						
	11/14/97		9.70	42.35	<50	<0.50	<0 50	<0.50	<0.50	75	7.0
	03/18/98		8.15	43.90	Well Sampled Semiannually						
A-13	03/26/96	55.11	Well Inaccessible								
	05/22/96		Well Inaccessible								
	08/22/96		Well Inaccessible								
	04/01/97		Well Inaccessible								
	05/27/97		Well Inaccessible								
	08/12/97		Well Inaccessible								
	11/14/97		Well Inaccessible								
	03/18/98		Well Inaccessible								

Table 1
Groundwater Elevation and Analytical Data
Total Purgeable Petroleum Hydrocarbons
(TPPH as Gasoline, BTEX Compounds, and MtBE)

ARCO Service Station 4931
731 West MacArthur Boulevard at West Street
Oakland, California

Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOB)	Groundwater Elevation (feet, MSL)	TPPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Xylenes (ppb)	MtBE (ppb)	Dissolved Oxygen (ppm)
AR-1	03/26/96	54.72	8.13	46.59	6,200	110	64	38	520	NA	NM
	05/22/96		8.57	46.15	NS	NS	NS	NS	NS	NS	NM
	08/22/96		10.97	43.75	5,600	100	28	29	310	960	NM
	12/19/96		8.93	45.79	---------- Well Removed from Sampling Program ----------						
	04/01/97		11.78	42.94	---------- Well Removed from Sampling Program ----------						
	05/27/97		10.76	43.96	---------- Well Removed from Sampling Program ----------						
	08/12/97		11.40	43.32	---------- Well Removed from Sampling Program ----------						
	11/14/97		10.80	43.92	---------- Well Removed from Sampling Program ----------						
AR-2	03/26/96	54.77	4.93	49.84	<50	<0.50	<0 50	<0.50	<0.50	NA	NM
	05/22/96		5.65	49.12	NS	NS	NS	NS	NS	NS	NM
	08/22/96		7.27	47.50	<50	<0.50	<0.50	<0.50	<0.50	200	NM
	12/19/96		7.78	46 99	---------- Well Removed from Sampling Program ----------						
	04/01/97		6.80	47.97	---------- Well Removed from Sampling Program ----------						
	05/27/97		6.32	48.45	---------- Well Removed from Sampling Program ----------						
	08/12/97		7.43	47.34	---------- Well Removed from Sampling Program ----------						
	11/14/97		8.95	45.82	---------- Well Removed from Sampling Program ----------						
AR-3	03/26/96	54.19	7.95	46.24	<50	<0.50	<0.50	<0.50	<0.50	NA	NM
	05/22/96		8.30	45.89	NS	NS	NS	NS	NS	NS	NM
	08/22/96		10.84	43.35	---------- Well Removed from Sampling Program ----------						
	12/19/96		8.56	45.63	---------- Well Removed from Sampling Program ----------						
	04/01/97		11.24	42.95	---------- Well Removed from Sampling Program ----------						
	05/27/97		10.67	43.52	---------- Well Removed from Sampling Program ----------						
	08/12/97		11.10	43.09	---------- Well Removed from Sampling Program ----------						
	11/14/97		10.60	43.59	---------- Well Removed from Sampling Program ----------						

MSL = Mean sea level
TOB = Top of box
ppb = Parts per billion
ppm = Parts per million
< = Denotes laboratory detection limit
^ = The MRL was elevated due to high analyte concentration requiring sample dilution.
NA = Not analyzed
NM = Not measured
NS = Not sampled
a. = Bioremediation enhancement at this well has been in progress since 05/22/96.
b. = Bioremediation enhancement at this well has been in progress since 11/17/95.
• = MtBE results confirmed by EPA Method 8260.