PACIFIC
ENVIRONMENTAL
GROUP, INC.

Quarterly Groundwater Monitoring Report and Remedial System Performance Summary Fourth Quarter 1997

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

Prepared for

Mr. Paul Supple
ARCO Products Company

February 10, 1998

Prepared by

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

Project 330-109.2D

Joseph Muzzio
Project Manager
CEG 1672

REGISTERED GEOLOGIST
JOSEPH J. MUZZIO
No. 1672
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

Date: February 10, 1998
Quarter: 4Q97

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./Joseph Muzzio
Consultant Project No.: 330-109.2D
Primary Agency/Regulatory ID No.: Alameda County Health Care Services Agency
Monitoring Events Performed to Date: 38

WORK PERFORMED THIS QUARTER (Fourth - 1997):

1. Submitted third quarter 1997 groundwater monitoring report.
2. Performed fourth quarter 1997 groundwater monitoring event on November 14.
3. Prepared fourth quarter 1997 groundwater monitoring report.

WORK PROPOSED FOR NEXT QUARTER (First - 1998):

1. Submit fourth quarter 1997 groundwater monitoring report.
2. Perform first quarter 1998 groundwater monitoring event.
3. Prepare first quarter 1998 groundwater monitoring report.

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:	7.74 to 10.80	(Measure Feet)
Groundwater Gradient:	Southwest	(Direction)
	0.02	(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 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.
- As proposed in PACIFIC's third quarter 1997 groundwater monitoring report, Well A-13 will be removed from the monitoring program effective during the first quarter 1998 sampling event.

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 Summary

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)	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
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
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
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
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
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 ----------						
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 ----------						

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

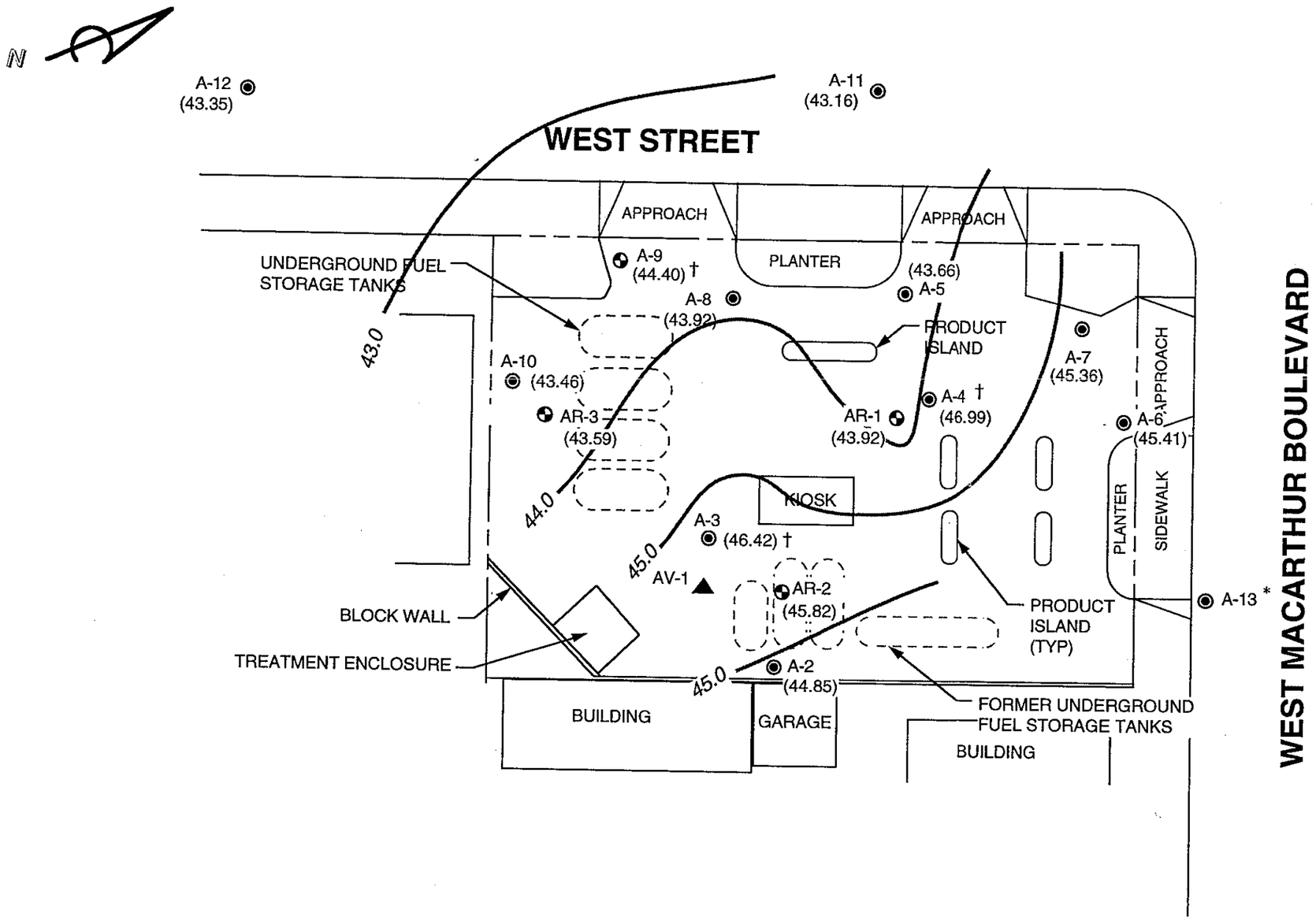
Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOB)	Groundwater Elevation (feet, MSL)	TPPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Xylenes (ppb)	MtBE (ppb)	Dissolved Oxygen (ppm)
A-8	05/27/97		11.45	42.32	11,000	1,600	100	220	210	2,300	NM
(cont.)	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
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
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 ----------						
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
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
A-13	03/26/96	55.11	---------- Well Inaccessible ----------								
	05/22/96		---------- Well Inaccessible ----------								
	08/22/96		---------- Well Inaccessible ----------								
	12/19/96		---------- Well Inaccessible ----------								
	04/01/97		---------- Well Inaccessible ----------								
	05/27/97		---------- Well Inaccessible ----------								
	08/12/97		---------- Well Inaccessible ----------								
	11/14/97		---------- Well Inaccessible ----------								
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 ----------						

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)	Dissolved Oxygen (ppm)
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
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.



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

(43.16) GROUNDWATER ELEVATION IN FEET - MSL, 11-14-97

45.0 GROUNDWATER ELEVATION CONTOUR IN FEET - MSL, 11-14-97

* WELL INACCESSIBLE

† NOT USED IN CONTOURING

APPROXIMATE DIRECTION OF GROUNDWATER FLOW

APPROXIMATE GRADIENT = 0.02

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

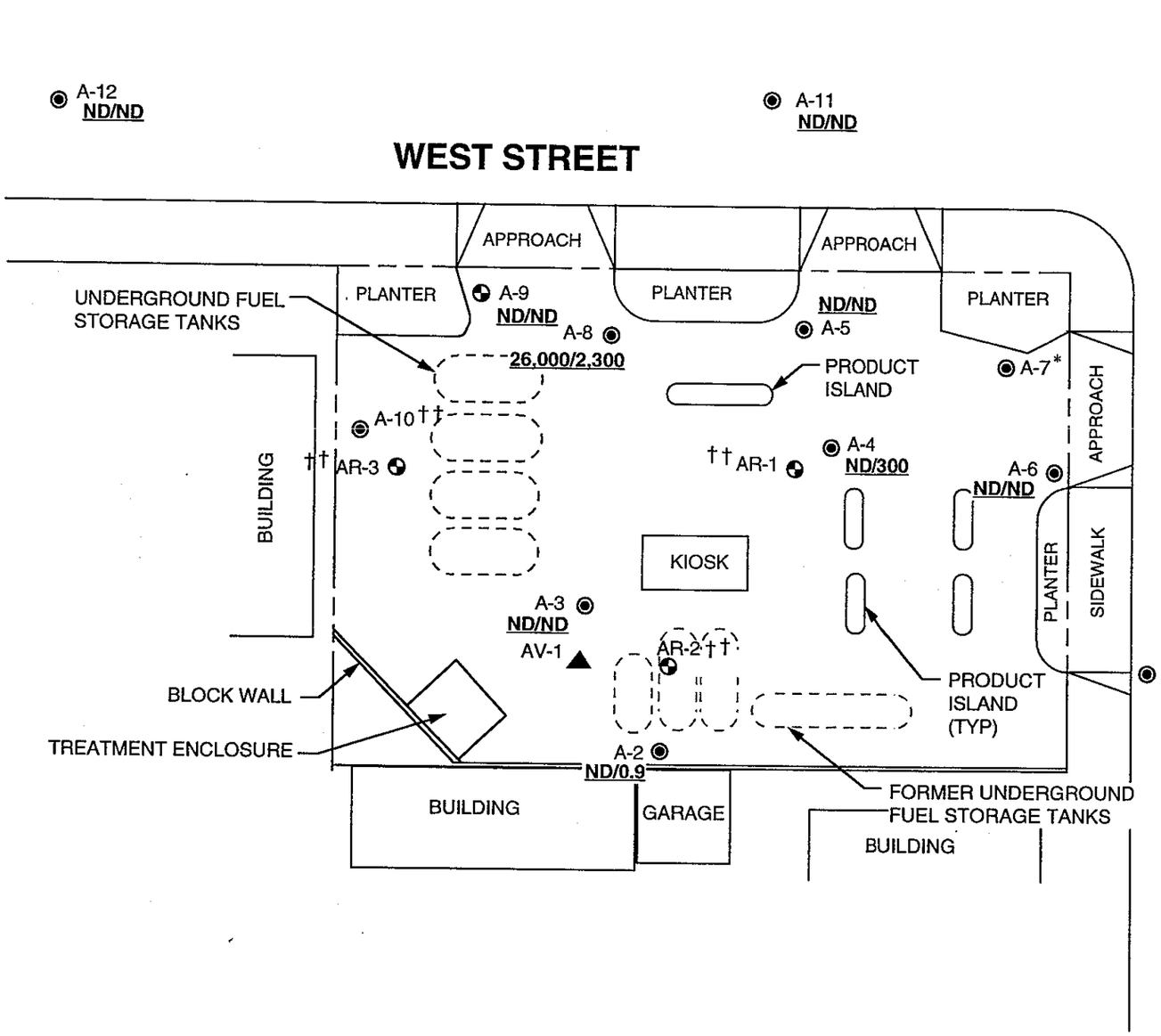
PACIFIC ENVIRONMENTAL GROUP, INC.

SCALE
0 30 60 FEET

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

GROUNDWATER ELEVATION CONTOUR MAP - FOURTH QUARTER 1997

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
- 26,000/2,300 TPPH-g/BENZENE CONCENTRATION IN GROUNDWATER, IN PARTS PER BILLION, 11-14-97
- ND NOT DETECTED
- * WELL SAMPLED ANNUALLY
- † WELL INACCESSIBLE
- †† WELL REMOVED FROM SAMPLING PROGRAM

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 - FOURTH QUARTER 19970

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

Columbia Analytical Services inc.

December 1, 1997 Service Request No.: S9702369

Shaw Garakani
PACIFIC ENVIRONMENTAL GROUP
2025 Gateway Place, Suite 440
San Jose, CA 95110

RE: 330-109.2K/WA#2105500/4931 OAKLAND

Dear Mr. Garakani:

The following pages contain analytical results for sample(s) received by the laboratory on November 14, 1997. 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 16, 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:**	S9702369
Project:	330-109.2K/WA#2105500/4931 OAKLAND	**Date Collected:**	11/14/97
Sample Matrix:	Water	**Date Received:**	11/14/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	A-2	Units:	ug/L (ppb)
Lab Code:	S9702369-001	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	11/28/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	11/28/97	0.9	
Toluene	EPA 5030	8020	0.5	1	NA	11/28/97	2.8	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	11/28/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	11/28/97	2.4	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	11/28/97	27	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702369
Project:	330-109.2K/WA#2105500/4931 OAKLAND	**Date Collected:**	11/14/97
Sample Matrix:	Water	**Date Received:**	11/14/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	A-3	Units:	ug/L (ppb)
Lab Code:	S9702369-002	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	20	NA	11/28/97	<1000	C1
Benzene	EPA 5030	8020	0.5	20	NA	11/28/97	<10	C1
Toluene	EPA 5030	8020	0.5	20	NA	11/28/97	<10	C1
Ethylbenzene	EPA 5030	8020	0.5	20	NA	11/28/97	<10	C1
Xylenes, Total	EPA 5030	8020	0.5	20	NA	11/28/97	<10	C1
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	20	NA	11/28/97	1500	

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

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702369
Project:	330-109.2K/WA#2105500/4931 OAKLAND	**Date Collected:**	11/14/97
Sample Matrix:	Water	**Date Received:**	11/14/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	A-4	Units:	ug/L (ppb)
Lab Code:	S9702369-003	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	400	NA	11/28/97	<20000	C1
Benzene	EPA 5030	8020	0.5	400	NA	11/28/97	300	
Toluene	EPA 5030	8020	0.5	400	NA	11/28/97	500	
Ethylbenzene	EPA 5030	8020	0.5	400	NA	11/28/97	<200	C1
Xylenes, Total	EPA 5030	8020	0.5	400	NA	11/28/97	<200	C1
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	400	NA	11/28/97	27000	

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

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702369
Project:	330-109.2K/WA#2105500/4931 OAKLAND	**Date Collected:**	11/14/97
Sample Matrix:	Water	**Date Received:**	11/14/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	A-5	Units:	ug/L (ppb)
Lab Code:	S9702369-004	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	11/28/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	11/28/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	11/28/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	11/28/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	11/28/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	11/28/97	41	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702369
Project:	330-109.2K/WA#2105500/4931 OAKLAND	**Date Collected:**	11/14/97
Sample Matrix:	Water	**Date Received:**	11/14/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	A-6	Units:	ug/L (ppb)
Lab Code:	S9702369-005	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	11/28/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	11/28/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	11/28/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	11/28/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	11/28/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	11/28/97	ND	

1522/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702369
Project:	330-109.2K/WA#2105500/4931 OAKLAND	**Date Collected:**	11/14/97
Sample Matrix:	Water	**Date Received:**	11/14/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	A-8	Units:	ug/L (ppb)
Lab Code:	S9702369-006	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	400	NA	11/28/97	26000	
Benzene	EPA 5030	8020	0.5	400	NA	11/28/97	2300	
Toluene	EPA 5030	8020	0.5	400	NA	11/28/97	<200	C1
Ethylbenzene	EPA 5030	8020	0.5	400	NA	11/28/97	400	
Xylenes, Total	EPA 5030	8020	0.5	400	NA	11/28/97	400	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	400	NA	11/28/97	4100	

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

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702369
Project:	330-109.2K/WA#2105500/4931 OAKLAND	**Date Collected:**	11/14/97
Sample Matrix:	Water	**Date Received:**	11/14/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	A-9	Units:	ug/L (ppb)
Lab Code:	S9702369-007	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	4	NA	11/28/97	<200	C1
Benzene	EPA 5030	8020	0.5	4	NA	11/28/97	<2	C1
Toluene	EPA 5030	8020	0.5	4	NA	11/28/97	<2	C1
Ethylbenzene	EPA 5030	8020	0.5	4	NA	11/28/97	<2	C1
Xylenes, Total	EPA 5030	8020	0.5	4	NA	11/28/97	<2	C1
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	4	NA	11/28/97	190	

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

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702369
Project:	330-109.2K/WA#2105500/4931 OAKLAND	**Date Collected:**	11/14/97
Sample Matrix:	Water	**Date Received:**	11/14/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	A-11	Units:	ug/L (ppb)
Lab Code:	S9702369-008	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	11/28/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	11/28/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	11/28/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	11/28/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	11/28/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	11/28/97	ND	

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702369
Project:	330-109.2K/WA#2105500/4931 OAKLAND	**Date Collected:**	11/14/97
Sample Matrix:	Water	**Date Received:**	11/14/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	A-12	Units:	ug/L (ppb)
Lab Code:	S9702369-009	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	11/28/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	11/28/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	11/28/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	11/28/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	11/28/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	11/28/97	75	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702369
Project:	330-109.2K/WA#2105500/4931 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:	S971128-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	11/28/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	11/28/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	11/28/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	11/28/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	11/28/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	11/28/97	ND	

1S22/020597p

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9702369
Project:	330-109.2K/WA#2105500/4931 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	Percent Recovery a,a,a-Trifluorotoluene
A-2	S9702369-001		97	101
A-3	S9702369-002		99	91
A-4	S9702369-003		101	91
A-5	S9702369-004		94	100
A-6	S9702369-005		96	100
A-8	S9702369-006		97	97
A-9	S9702369-007		100	93
A-11	S9702369-008		96	97
A-12	S9702369-009		95	99
A-12	S9702369-009MS		91	110
A-12	S9702369-009DMS		91	107
Method Blank	S971128-WB1		98	96
CAS Acceptance Limits:			69-116	69-116

SUR2/020397p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 330-109.2K/WA#2105500/4931 OAKLAND
Sample Matrix Water

Service Request: S9702369
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 11/28/97

Matrix Spike/Duplicate Matrix Spike Summary
TPH as Gasoline

Sample Name: A-12
Lab Code: S9702369-009MS, S9702369-009DMS
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
Gasoline	EPA 5030	CA/LUFT	50	250	250	27	280	270	101	97	75-135	4	

DMS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9702369
Project:	330-109.2K/WA#2105500/4931 OAKLAND	**Date Analyzed:**	11/28/97

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

Sample Name:	ICV	Units:	ug/L (ppb)
Lab Code:	ICV1	Basis:	NA
Test Notes:			

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	270	90-110	108	
Benzene	EPA 5030	8020	25	26	85-115	104	
Toluene	EPA 5030	8020	25	26	85-115	104	
Ethylbenzene	EPA 5030	8020	25	25	85-115	100	
Xylenes, Total	EPA 5030	8020	75	77	85-115	103	
Methyl *tert*-Butyl Ether	EPA 5030	8020	25	28	85-115	112	

ICV032196

TPH VOA F S9702369

ARCO Products Company
Division of AtlanticRichfieldCompany

330-1092K **Task Order No.**

Chain of Custody

ARCO Facility no. 4931 | City (Facility) 731 McArthur Blvd Oakland | Project manager (Consultant) Shaw Garakani | Laboratory name Columbia

ARCO engineer Paul Supple | Telephone no. (ARCO) | Telephone no. (Consultant) 408 441 7500 | Fax no. (Consultant) 408 441 7539

Consultant name Pacific Env. Group Inc. | Address (Consultant) 2025 Gateway Pl. Suite 440 San Jose CA. 95110 | Contract number VA 2105500

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/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 ☐		
A-2	1	3		X		X	HCl	11/14/97	11:20		X											
A-3	2								11:35													
A-4	3								13:55													
A-5	4								10:44													
A-6	5								11:15													
A-8	6								10:20													
A-9	7								12:35													
A-11	8								13:40													
A-12	9								13:10													

Method of shipment

Special detection Limit/reporting

Special QA/QC

Remarks

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]	11/14/97		[signature]
Relinquished by	**Date**	**Time**	**Received by**
[signature]	11/14/97	430pm	[signature]
Relinquished by	**Date**	**Time**	**Received by laboratory** / Date / Time
			[signature] 11-14-97 4:15pm

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

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	4Q97	Shaw Garakani		Columbia	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 goe Dry?	Comments
A-2	1		QLY	GAS/BTEX/MtBE	TOB/TOC	20	4"		yes	Slow recharge
A-3	11		Semiannual 2Q/4	GAS/BTEX/MtBE	TOB/TOC	17	4"		yes	
A-4	16		QLY	GAS/BTEX/MtBE	TOB/TOC	20	4"		yes	
A-5	2		Semiannual 2Q/4	GAS/BTEX/MtBE	TOB/TOC	24.5	3"		no	
A-6	14		QLY	GAS/BTEX/MtBE	TOB/TOC	25.5	3"		no	
A-7	13		Annually 2Q	DTW	TOB/TOC	23	3"		no	
A-8	17		QLY	GAS/BTEX/MtBE	TOB/TOC	18	3"		no	ORC in well
A-9	12		QLY	GAS/BTEX/MtBE	TOB/TOC	19	6"	5'	no	ORC in well
A-10	3		REMOVED	DTW ONLY	TOB/TOC	?	?	5'	?	
A-11	6		Semiannual 2Q/4	GAS/BTEX/MtBE	TOB/TOC	28	3"	5'	no	
A-12	7		Semiannual 2Q/4	GAS/BTEX/MtBE	TOB/TOC	30	3"	5'	no	
A-13	8		ANNUAL 2Q	DTW ONLY	TOB/TOC	29 5	3"	10'	no	Try to locate!!!
AR-1	15		REMOVED	DTW ONLY	TOB/TOC	31.5	6"	10'	no	
AR-2	9		REMOVED	DTW ONLY	TOB/TOC	27.5	6"	10'	no	
AR-3	10		REMOVED	DTW ONLY	TOB/TOC	27	6"	10'	no	

FIELD REPORT

DEPTH TO WATER/SEPARATE-PHASE HYDROCARBON SURVEY

PROJECT No.: 330-109.2K LOCATION: 731 McArthur Blvd OAKLAND DATE: 11/14/97

CLIENT/STATION NO.: ARCO 4931 FIELD TECHNICIAN: Don Watenpaugh DAY OF WEEK: Fri

PROBE TYPE/ID No.
- ☐ Oil/Water IF/ _____
- ☒ H_2O level indicator 31
- ☐ 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	SEPARATE-PHASE HYDROCARBONS (SPH) Screen 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
1	A-2	7:30	✓	✓	✓	✓		20'	10.60 / 10.30	10.63 / 10.30										/
11	A-3	9:48	✓	✓	✓	✓	✓	17'	8.24 / 7.37	8.24 / 7.37										/
16	A-4	8:04	✓	✓	✓	✓		20'	7.74 / 7.0	7.74 / 7.0										/
2	A-5	7:36	✓	✓	✓	✓		24.5'	10.51 / 9.82	10.51 / 9.82										/
14	A-6	7:56	✓	✓	✓	✓		25.5	9.76 / 9.12	9.76 / 9.12										/
13	A-7	7:54	✓	✓	✓	✓		23'	9.35 / 8.85	9.35 / 8.85										/
17	A-8	7:51	✓	✓	✓	✓		18'	9.85 / 9.48	9.85 / 9.48										/
12	A-9	~~8:07~~ 7:51	✓	✓	✓		✓	19'	~~9.85 8.64~~ 7.73 / ~~9.48~~	~~9.85 8.64~~ 7.73 / ~~9.48~~	5									/
3	A-10	7:39	✓	✓	✓	✓		30'	10.80 / 10.35	10.80 / 10.35	5									/

Comments: A-5 lid broken (GS type)

FIELD REPORT

DEPTH TO WATER/SEPARATE-PHASE HYDROCARBON SURVEY

PROJECT No.: 330-109.2K LOCATION: 731 McArthur Blvd OAKLAND DATE: 11/14/97

CLIENT/STATION NO.: ARCO 4931 FIELD TECHNICIAN: Don Watonpaugh DAY OF WEEK: Fri

PROBE TYPE/ID No.
- ☐ Oil/Water IF/ _____
- ☒ H_2O level indicator 31
- ☐ 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	SEPARATE-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
6	A-11	13:20	✓	✓	✓	✓		~~28~~	10.58 / 10.32	10.58 / 10.32	28	5								/
7	A-12	12:47	✓	✓	✓	✓		30	9.70 / 9.13	9.70 / 9.13	30	5								/
8	~~A-13~~										~~29.5~~									/
15	AR-1	8:00	✓	✓	✓			10.80 / 10.10	10.80 / 10.10		~~29~~ 31.5	10								/
9	AR-2	7:41	✓	✓	✓		✓	8.95 / 7.80	8.95 / 7.80		27.5	10								/
10	AR-3	7:44	✓	✓	✓			10.60 / 9.86	10.60 / 9.86		27	10								/
																				/
																				/
																				/

Comments: _____

FIELD DATA SHEET

WATER SAMPLE FIELD DATA SHEET

PROJECT No.: 330.109.2K LOCATION: 731 McArthur Blvd Oakland WELL ID #: A-2

CLIENT/STATION No.: ARCO 4931 FIELD TECHNICIAN: Don Waterpaugh

WELL INFORMATION

Depth to Liquid:	TOB ___	TOC ___
Depth to water:	10.63 TOB	10.30 TOC
Total depth:	20 TOB	___ TOC
Date:	11/14/97 Time (2400):	7:30

Probe Type and I.D. #
- ☐ Oil/Water interface ___
- ☒ Electronic indicator 31
- ☐ 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 bla.
- ☐ Other; ___

TD 20 - DTW 10.63 = 9.37 x Gal/Linear Foot .66 = 6.18 x Number of Casings 3 = Calculated Purge 18.54

DATE PURGED: 11/14/97 START: 9:10 END (2400 hr): 9:18 PURGED BY: Dw

DATE SAMPLED: 11/14/97 START: 11:20 END (2400 hr): 11:20 SAMPLED BY: Dw

TIME (2400 hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25°C)	TEMPERATURE (°F)	COLOR	TURBIDITY	ODOR
9:14	6	8.0 ~~8.23~~	~~640~~ 540	67.7	Cloudy	light	none
9:18	8	8.31	500	69.3	Cloudy	light	none

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

Pumped dry (Yes) / No Dry @ 8 gallons

FIELD MEASUREMENTS AT TIME OF SAMPLE, AFTER RECHARGE:

DTW: 14.87 TOB/TOC 8.11 460 67.1 Brown mod none

PURGING EQUIPMENT/I.D. #
- ☐ Bailer: ___
- ☒ Centrifugal Pump: 31
- ☐ Airlift Pump: ___
- ☐ Dedicated: ___
- ☐ Other: ___

SAMPLING EQUIPMENT/I.D. #
- ☒ Bailer: 31-B
- ☐ Dedicated: ___
- ☐ Other: ___

SAMP. CNTRL #	DATE	TIME (2400)	No. of Cont.	SIZE	CONTAINER	PRESERVE	ANALYTICAL PARAMETE
A-2	11/14/97	11:20	3	40ml	VOA	HCl	Gas/BTEX/mtBE

REMARKS: DO_2 - 2.6

SIGNATURE: Don Waterpaugh

PACIFIC ENVIRONMENTAL GROUP INC.

FIELD DATA SHEET

WATER SAMPLE FIELD DATA SHEET

PROJECT No.: 330.109.2K LOCATION: 731 McArthur Blvd Oakland WELL ID #: A-3

CLIENT/STATION No.: ARCO 4931 FIELD TECHNICIAN: Don Wälenpaug

WELL INFORMATION

Depth to Liquid: — TOB — TOC
Depth to water: 8.24 TOB 7.37 TOC
Total depth: 17 TOB — TOC
Date: 11/14/97 Time (2400): 7:48

Probe Type and I.D. #
- ☐ Oil/Water interface
- ☒ Electronic indicator 31
- ☐ 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 blar
- ☐ Other:

TD 17 - DTW 8.24 = 8.76 x Gal/Linear Foot .66 = 5.78 x Number of Casings 3 = Calculated Purge 17.34

DATE PURGED: 11/14/97 START: 9:40 END (2400 hr): 9:46 PURGED BY: DW
DATE SAMPLED: 11/14/97 START: 11:35 END (2400 hr): 11:35 SAMPLED BY: DW

TIME (2400 hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25°C)	TEMPERATURE (°F)	COLOR	TURBIDITY	ODOR
9:44	~~6~~ 6	8.01	320	64.6	Cloudy	light	none
9:46	12	8.62	330	69.0	Cloudy	light	none
	18						

Color: Colorless, Clear, Cloudy, Yellow, Brown
Turbidity: Heavy, Moderate, Light, Trace
Odor: Strong, Moderate, Faint, None

Pumped dry (Yes) No Dry at 7 gallons

FIELD MEASUREMENTS AT TIME OF SAMPLE, AFTER RECHARGE:

DTW: 14.85 (TOB) TOC 8.33 490 67.2 Cloudy light none

PURGING EQUIPMENT/I.D. #
- ☐ Bailer:
- ☒ Centrifugal Pump: 31
- ☐ Other:
- ☐ Airlift Pump:
- ☐ Dedicated:

SAMPLING EQUIPMENT/I.D. #
- ☒ Bailer: 31-S
- ☐ Dedicated:
- ☐ Other:

SAMP. CNTRL #	DATE	TIME (2400)	No. of Cont.	SIZE	CONTAINER	PRESERVE	ANALYTICAL PARAMETER
A-3	11/14/97	11:35	3	40ml	VOA	HCl	GAS/BTEX/mtBE

REMARKS: DO_2 - 3.8 ppm

SIGNATURE: Don Wattenpaugh

PACIFIC ENVIRONMENTAL GROUP, INC.

FIELD DATA SHEET

WATER SAMPLE FIELD DATA SHEET

PROJECT No.: 330.109.2K LOCATION: 731 McArthur Blvd Oakland WELL ID #: A-4

CLIENT/STATION No.: ARCO 4931 FIELD TECHNICIAN: Don Watenpaugh

WELL INFORMATION

Depth to Liquid: — TOB — TOC
Depth to water: 7.74 TOB 7.00 TOC
Total depth: 20 TOB — TOC
Date: 11/14/97 Time (2400): 8:04

Probe Type and I.D. #
- ☐ Oil/Water interface
- ☒ Electronic indicator 31
- ☐ 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 - DTW 7.74 = 12.26 x Gal/Linear Foot .66 = 8.09 x Number of Casings 3 = Calculated Purge 24.27

DATE PURGED: 11/14/97 START: 11:45 END (2400 hr): 11:56 PURGED BY: DW
DATE SAMPLED: 11/14/97 START: 13:55 END (2400 hr): 13:55 SAMPLED BY: DW

TIME (2400 hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm @ 25°C)	TEMPERATURE (°F)	COLOR	TURBIDITY	ODOR
11:50	8	8.52	340	65.6	cloudy	mod	faint
11:56	16	8.31	390	67.6	cloudy	mod	faint
	24			68			

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

Pumped dry (Yes) / No Dry @ ≈16 gallons

FIELD MEASUREMENTS AT TIME OF SAMPLE, AFTER RECHARGE:
DTW: 16.33 TOB/TOC 8.04 580 66.6 cloudy mod faint

PURGING EQUIPMENT/I.D. #
- ☐ Bailer:
- ☐ Airlift Pump:
- ☒ Centrifugal Pump: 31
- ☐ Dedicated:
- ☐ Other:

SAMPLING EQUIPMENT/I.D. #
- ☒ Bailer: 31-13
- ☐ Dedicated:
- ☐ Other:

SAMP. CNTRL #	DATE	TIME (2400)	No. of Cont.	SIZE	CONTAINER	PRESERVE	ANALYTICAL PARAMETE
A-4	11/14/97	13:55	3	40ml	VOA	HCl	GAS/BTEX/mtBE

REMARKS: DO = 7.2 ppm

SIGNATURE: Don Watenpaugh

PACIFIC ENVIRONMENTAL GROUP, INC.

FIELD DATA SHEET

WATER SAMPLE FIELD DATA SHEET

PROJECT No.: 330.109.2K LOCATION: 731 McArthur Blvd Oakland WELL ID #: A-5

CLIENT/STATION No.: ARCO 4931 FIELD TECHNICIAN: Don Watenpaugh

WELL INFORMATION

Depth to Liquid: — TOB — TOC
Depth to water: 10.51 TOB 9.82 TOC
Total depth: 24.5 TOB — TOC
Date: 11/14/97 Time (2400): 7:36

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 blan
☐ Other:

Probe Type and I.D. #
☐ Oil/Water interface
☒ Electronic indicator 37
☐ Other:

TD 24.5 - DTW 10.51 = 13.99 x Gal/Linear Foot .38 = 5.32 x Number of Casings 3 = Calculated Purge 15-96

DATE PURGED: 11/14/97 START: 10:30 END (2400 hr): 10:39 PURGED BY: Don
DATE SAMPLED: 11/14/97 START: 10:44 END (2400 hr): 10:44 SAMPLED BY: Don

TIME (2400 hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25°C)	TEMPERATURE (°F)	COLOR	TURBIDITY	ODOR
10:34	5	8.16	740	64.6	Brown	mod	none
10:37	11	8.11	620	67.5	Brown	mod	none
10:39	16	8.05	640	67.7	Brown	mod	none
					Cobalt 0-100 Clear Cloudy Yellow Brown	NTU 0-200 Heavy Moderate Light Trace	Strong Moderate Faint None

Pumped dry Yes / (No)

FIELD MEASUREMENTS AT TIME OF SAMPLE, AFTER RECHARGE:

DTW: ______ TOB/TOC

PURGING EQUIPMENT/I.D. #
☐ Bailer:
☒ Centrifugal Pump: 37
☐ Other:
☐ Airlift Pump:
☐ Dedicated:

SAMPLING EQUIPMENT/I.D. #
☒ Bailer: 31-10
☐ Dedicated:
☐ Other:

SAMP. CNTRL #	DATE	TIME (2400)	No. of Cont.	SIZE	CONTAINER	PRESERVE	ANALYTICAL PARAMETE
A-5	11/14/97	10:44	3	40ml	VOA	HCl	GAS/BTEX/MtBE

REMARKS: DO_2 - 4.8 ppm

SIGNATURE: Don Watenpaugh

PACIFIC ENVIRONMENTAL GROUP, INC.

FIELD DATA SHEET

WATER SAMPLE FIELD DATA SHEET

PROJECT No.: 330.109.2K LOCATION: 731 McArthur Blvd Oakland WELL ID #: A-6

CLIENT/STATION No.: ARCO 4931 FIELD TECHNICIAN: Don Watenpaugh

WELL INFORMATION

Depth to Liquid:	—	TOB —	TOC
Depth to water:	~~25.5~~ 9.76	TOB 9.12	TOC
Total depth:	~~25.5~~ 25.5	TOB —	TOC
Date: 11/14/97	Time (2400): 7:56		

Probe Type and I.D. #
- ☐ Oil/Water interface
- ☒ Electronic indicator 31
- ☐ 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 9.76 = 15.74 x Gal/Linear Foot .38 = 5.98 x Number of Casings 3 = Calculated Purge 17.84

DATE PURGED: 11/14/97 START: 11:00 END (2400 hr): 11:12 PURGED BY: Don

DATE SAMPLED: 11/14/97 START: 11:15 END (2400 hr): 11:15 SAMPLED BY: Don

TIME (2400 hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm @ 25°C)	TEMPERATURE (°F)	COLOR	TURBIDITY	ODOR
11:05	6	8.27	460	65.8	Brown	mod	none
11:08	12	8.10	490	67.7	Brown	mod	none
11:12	18	8.06	530	69.2	Brown	mod	none

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

Pumped dry Yes (No)

FIELD MEASUREMENTS AT TIME OF SAMPLE, AFTER RECHARGE:

DTW: ____ TOB/TOC ____

PURGING EQUIPMENT/I.D. #
- ☐ Bailer:
- ☒ Centrifugal Pump: 37
- ☐ Other:
- ☐ Airlift Pump:
- ☐ Dedicated:

SAMPLING EQUIPMENT/I.D. #
- ☒ Bailer: 31-11
- ☐ Dedicated:
- ☐ Other:

SAMP. CNTRL #	DATE	TIME (2400)	No. of Cont.	SIZE	CONTAINER	PRESERVE	ANALYTICAL PARAME
A-6	11/14/97	11:15	3	40ml	VOA	HCl	BAS/BTEX/MtOE

REMARKS: DO2 - 2.1 ppm

SIGNATURE: Don Watenpaugh

PACIFIC ENVIRONMENT GROUP, INC

FIELD DATA SHEET

WATER SAMPLE FIELD DATA SHEET

PROJECT No.: 330.109.2K LOCATION: 731 McArthur Blvd Oakland WELL ID #: A-8

CLIENT/STATION No.: ARCO 4931 FIELD TECHNICIAN: Don Walenpaug

WELL INFORMATION

Depth to Liquid:	—	TOB —	TOC
Depth to water:	9.85	TOB 9.48	TOC
Total depth:	18	TOB —	TOC
Date:	11/14/97	Time (2400):	7:51

Probe Type and I.D. #: ☐ Oil/Water interface ☒ Electronic indicator 31 ☐ 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 blan ☐ Other:

TD 18 - DTW 9.85 = 8.15 x Gal/Linear Foot .38 = 3.10 x Number of Casings 3 = Calculated Purge 9.3

DATE PURGED: 11/14/97 START: 10:07 END (2400 hr): 10:17 PURGED BY: Dw

DATE SAMPLED: 11/14/97 START: 10:20 END (2400 hr): 10:20 SAMPLED BY: Dw

TIME (2400 hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25°C)	TEMPERATURE (° F)	COLOR	TURBIDITY	ODOR
10:11	3	7.95	930	64.7	Brown	mod	Strong
10:14	6	7.88	1010	68.0	Brown	mod	Strong
10:17	9	7.90	830	69.0	Brown	mod	Strong

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

Pumped dry Yes / (No)

FIELD MEASUREMENTS AT TIME OF SAMPLE, AFTER RECHARGE:

DTW: ____ TOB/TOC ____

PURGING EQUIPMENT/I.D. #

☐ Bailer: ☐ Airlift Pump: ☒ Centrifugal Pump: 37 ☐ Dedicated: ☐ Other:

SAMPLING EQUIPMENT/I.D. #

☒ Bailer: 31-12 ☐ Dedicated: ☐ Other:

SAMP. CNTRL #	DATE	TIME (2400)	No. of Cont.	SIZE	CONTAINER	PRESERVE	ANALYTICAL PARAMET
A-8	11/14/97	10:20	3	40ml	VOA	HCl	624/BTEX/MtBE

REMARKS: DO_2 - 2.2 ppm

SIGNATURE: Don Walenpaug

PACIFIC ENVIRONMENTAL GROUP, INC

FIELD DATA SHEET

WATER SAMPLE FIELD DATA SHEET

PROJECT No.: 330.109.2K LOCATION: 731 McArthur Blvd Oakland WELL ID #: A-9

CLIENT/STATION No.: ARCO 4931 FIELD TECHNICIAN: Don Watenpaugh

WELL INFORMATION

Depth to Liquid:	—	TOB —	TOC
Depth to water:	8.64	TOB 7.73	TOC
Total depth:	19	TOB —	TOC
Date:	11/14/97	Time (2400):	8:07

Probe Type and I.D. #
- ☐ Oil/Water interface
- ☒ Electronic indicator 31
- ☐ 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 blan
- ☐ Other;

TD 19 - DTW 8.64 = 10.36 x Gal/Linear Foot 1.5 = 15.54 x Number of Casings 3 = Calculated Purge 46.62

DATE PURGED: 11/14/97 START: 12:15 END (2400 hr): 12:33 PURGED BY: DM

DATE SAMPLED: 11/14/97 START: 12:35 END (2400 hr): 12:35 SAMPLED BY: DM

TIME (2400 hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25°C)	TEMPERATURE (° F)	COLOR	TURBIDITY	ODOR
12:22	15.5	8.51	530	64.2	cloudy	light	none
12:27	31	8.28	540	65.9	clear	trace	none
12:33	46	8.00	540	65.0	clear	trace	none

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

Pumped dry Yes / No

FIELD MEASUREMENTS AT TIME OF SAMPLE, AFTER RECHARGE:

DTW: ____ TOB/TOC ____

PURGING EQUIPMENT/I.D. #
- ☐ Bailer:
- ☒ Centrifugal Pump: 31
- ☐ Other:
- ☐ Airlift Pump:
- ☐ Dedicated:

SAMPLING EQUIPMENT/I.D. #
- ☒ Bailer: 31-14
- ☐ Dedicated:
- ☐ Other:

SAMP. CNTRL #	DATE	TIME (2400)	No. of Cont.	SIZE	CONTAINER	PRESERVE	ANALYTICAL PARAMETE
A-9	11/14/97	12:35	3	40ml	VOA	HCl	BAS/BTEX/MtBE

REMARKS: DO_2 - 9.6 ppm

SIGNATURE: Don Watenpaugh

PACIFIC ENVIRONMENT GROUP, INC.

FIELD DATA SHEET

WATER SAMPLE FIELD DATA SHEET

PROJECT No.: 330.109.2K LOCATION: 731 McArthur Blvd Oakland WELL ID #: A-11

CLIENT/STATION No.: ARCO 4931 FIELD TECHNICIAN: Don Watenpaugh

WELL INFORMATION

Depth to Liquid: — TOB — TOC
Depth to water: 10.58 TOB 10.32 TOC
Total depth: 28 TOB — TOC
Date: 11/14/97 Time (2400): 13:20

Probe Type and I.D. #
- ☐ Oil/Water interface
- ☒ Electronic indicator 31
- ☐ 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 28 - DTW 10.58 = 17.42 x Gal/Linear Foot .66 = 11.5 x Number of Casings 3 = Calculated Purge 34.5

DATE PURGED: 11/14/97 START: 13:23 END (2400 hr): 13:34 PURGED BY: Don
DATE SAMPLED: 11/14/97 START: 13:40 END (2400 hr): 13:40 SAMPLED BY: Don

TIME (2400 hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25°C)	TEMPERATURE (°F)	COLOR	TURBIDITY	ODOR
13:27	11.5	7.84	590	69.5	clear	trace	none
13:30	23	7.84	600	71.3	clear	trace	none
13:34	34.5	7.70	600	71.6	clear	trace	none

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

Pumped dry Yes / (No)

FIELD MEASUREMENTS AT TIME OF SAMPLE, AFTER RECHARGE:

DTW: ____ TOB/TOC ____

PURGING EQUIPMENT/I.D. #
- ☐ Bailer:
- ☒ Centrifugal Pump: 31
- ☐ Airlift Pump:
- ☐ Dedicated:
- ☐ Other:

SAMPLING EQUIPMENT/I.D. #
- ☒ Bailer: 31-16
- ☐ Dedicated:
- ☐ Other:

SAMP. CNTRL #	DATE	TIME (2400)	No. of Cont.	SIZE	CONTAINER	PRESERVE	ANALYTICAL PARAMETER
A-11	11/14/97	13:40	3	40ml	VOA	HCl	Gas/BTEX/mtBE

REMARKS: DO_2 - 1.6 ppm

SIGNATURE: Don Watenpaugh

PACIFIC ENVIRONMENTAL GROUP, INC.

FIELD DATA SHEET

WATER SAMPLE FIELD DATA SHEET

PROJECT No.: 330.109.2K LOCATION: 731 McArthur Blvd Oakland WELL ID #: A-12

CLIENT/STATION No.: ARCO 4931 FIELD TECHNICIAN: Don Watenpaugh

WELL INFORMATION

Depth to Liquid:	— TOB	— TOC
Depth to water:	9.70 TOB	9.15 TOC
Total depth:	30 TOB	— TOC
Date:	11/14/97 Time (2400):	12:47

Probe Type and I.D. #
- ☐ Oil/Water interface
- ☒ Electronic indicator 31
- ☐ 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 30 - DTW 9.70 = 20.3 x Gal/Linear Foot .66 = 13.40 x Number of Casings 3 = Calculated Purge 40

DATE PURGED: 11/14/97 START: 12:51 END (2400 hr): 13:08 PURGED BY: DMW

DATE SAMPLED: 11/14/97 START: 13:10 END (2400 hr): 13:10 SAMPLED BY: DMW

TIME (2400 hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm @ 25°C)	TEMPERATURE (° F)	COLOR	TURBIDITY	ODOR
12.57	13.4	8.11	380	65.5	cloudy	light	none
13:02	26.8	7.84	520	66.2	clear	light	none
13:08	40	7.71	530	68.0	clear	trace	none

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

Pumped dry Yes (No)

FIELD MEASUREMENTS AT TIME OF SAMPLE, AFTER RECHARGE:

DTW: ____ TOB/TOC ____

PURGING EQUIPMENT/I.D. #
- ☐ Bailer:
- ☐ Airlift Pump:
- ☒ Centrifugal Pump: 31
- ☐ Dedicated:
- ☐ Other:

SAMPLING EQUIPMENT/I.D. #
- ☒ Bailer: 31-15
- ☐ Dedicated:
- ☐ Other:

SAMP. CNTRL #	DATE	TIME (2400)	No. of Cont.	SIZE	CONTAINER	PRESERVE	ANALYTICAL PARAMETER
A-12	11/14/97	13:10	3	40ml	VOA	HCl	GAS/BTEX/MtBE

REMARKS: DO_2 ~ 7 ppm

SIGNATURE: Don Watenpaugh

PACIFIC ENVIRONMENTAL GROUP, INC.

ARCO Products Company ◆ Division of AtlanticRichfieldCompany

330-1092K **Task Order No.**

Chain of Custody

ARCO Facility no. 4931	City (Facility) 731 McArthur Blvd Oakland	Project manager (Consultant) Shaw Garakani	Laboratory name Columbia
ARCO engineer Paul Supple	Telephone no. (ARCO)	Telephone no. (Consultant) 408 441 7500	Fax no. (Consultant) 4084417539
Consultant name Pacific Env. Group Inc.	Address (Consultant) 2025 Gateway Pl. Suite 440 San Jose CA. 95110		Contract number VA 2105500

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/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
A-2		3		X		X	HCl	11/14/97	11:20		X											
A-3		↓		↓		↓	↓	↓	11:35		↓											
A-4									13:55													
A-5									10:44													
A-6									11:15													
A-8									10:20													
A-9									12:35													
A-11									13:40													
A-12		↓		↓		↓	↓	↓	13:10		↓											

Method of shipment

Special detection Limit/reporting

Special QA/QC

Remarks

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 11/14/97 Time	Received by	
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory	Date Time

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

APPC-3292 (2-91)

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 PACIFIC's *Quarterly Groundwater Monitoring Report - Second Quarter 1997,* for historical GWE system performance and analytical data.

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. Based on analysis of the collected data, PACIFIC concluded that intrinsic bioremediation was active at the site. Please refer to PACIFIC's *Quarterly Groundwater Monitoring Report - First Quarter 1997,* for details.