PACIFIC
ENVIRONMENTAL
GROUP INC.

ENVIRONMENTAL
PROTECTION
97 OCT 23 PM 2:48

Quarterly Groundwater Monitoring Report
Second Quarter 1997

ARCO Service Station 0374
6407 Telegraph Avenue at Alcatraz Avenue
Oakland, California

Prepared for

Mr. Paul Supple
ARCO Products Company

August 15, 1997

Prepared by

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

Project 330-084.2D

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: October 20, 1997
Quarter: 2Q97

ARCO QUARTERLY GROUNDWATER MONITORING REPORT

Facility No.: 0374 Address: 6407 Telegraph Avenue at Alcatraz Avenue, Oakland
ARCO Environmental Engineer: Paul Supple
Consulting Co./Contact Person: Pacific Environmental Group, Inc./Shaw Garakani
Consultant Project No.: 330-084.2D
Primary Agency/Regulatory ID No.: Regional Water Quality Control Board - S.F. Bay Region

WORK PERFORMED THIS QUARTER (Second - 1997):

1. Submitted first quarter 1997 groundwater monitoring report.
2. Performed second quarter 1997 groundwater monitoring event.
3. Prepared second quarter 1997 groundwater monitoring report.
4. Continued intrinsic bioremediation enhancement at Well MW-3.

WORK PROPOSED FOR NEXT QUARTER (Third - 1997):

1. Submit second quarter 1997 groundwater monitoring report.
2. Perform third quarter 1997 groundwater monitoring event.
3. Prepare third quarter 1997 groundwater monitoring event.
4. Continue intrinsic bioremediation enhancement at Well MW-3.
5. Perform MtBE confirmation analysis according to EPA Method 8240 for the well containing the highest MtBE result from EPA Method 8020 analysis.

Current Phase of Project:	Monitoring	(Assmnt, Remed., etc.)
Frequency of Groundwater Sampling:	Quarterly/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:	None	(gallons)
Bulk Soil Removed This Quarter:	None	(cubic yards)
Bulk Soil Removed to Date:	None	(cubic yards)
Current Remediation Techniques:	Bioremediation enhancement	(SVE/Sparge/FP Removal, etc.)
Approximate Depth to Groundwater:	4.90 to 8.16	(Measure Feet)
Groundwater Gradient:	Southwest	(Direction)
	0.03	(Magnitude)

DISCUSSION:

- Hydrocarbon concentrations at the offsite Well MW-5 remained below detection limits.
- Intrinsic bioremediation is occurring, based on an evaluation performed during third quarter 1997.
- Bioremediation enhancement at Well MW-3 is in progress.

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

Table 1
Groundwater Sampling Schedule

ARCO Service Station 0374
6407 Telegraph Avenue at Alcatraz Avenue
Oakland, California

Well Number	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Sampling Frequency
MW-1			a		Annually
MW-2			a		Annually
MW-3	a	a	a	a	Semiannually
MW-4	a	a	a	a	Semiannually
MW-5	a	a	a	a	Quarterly
MW-6			a		Annually

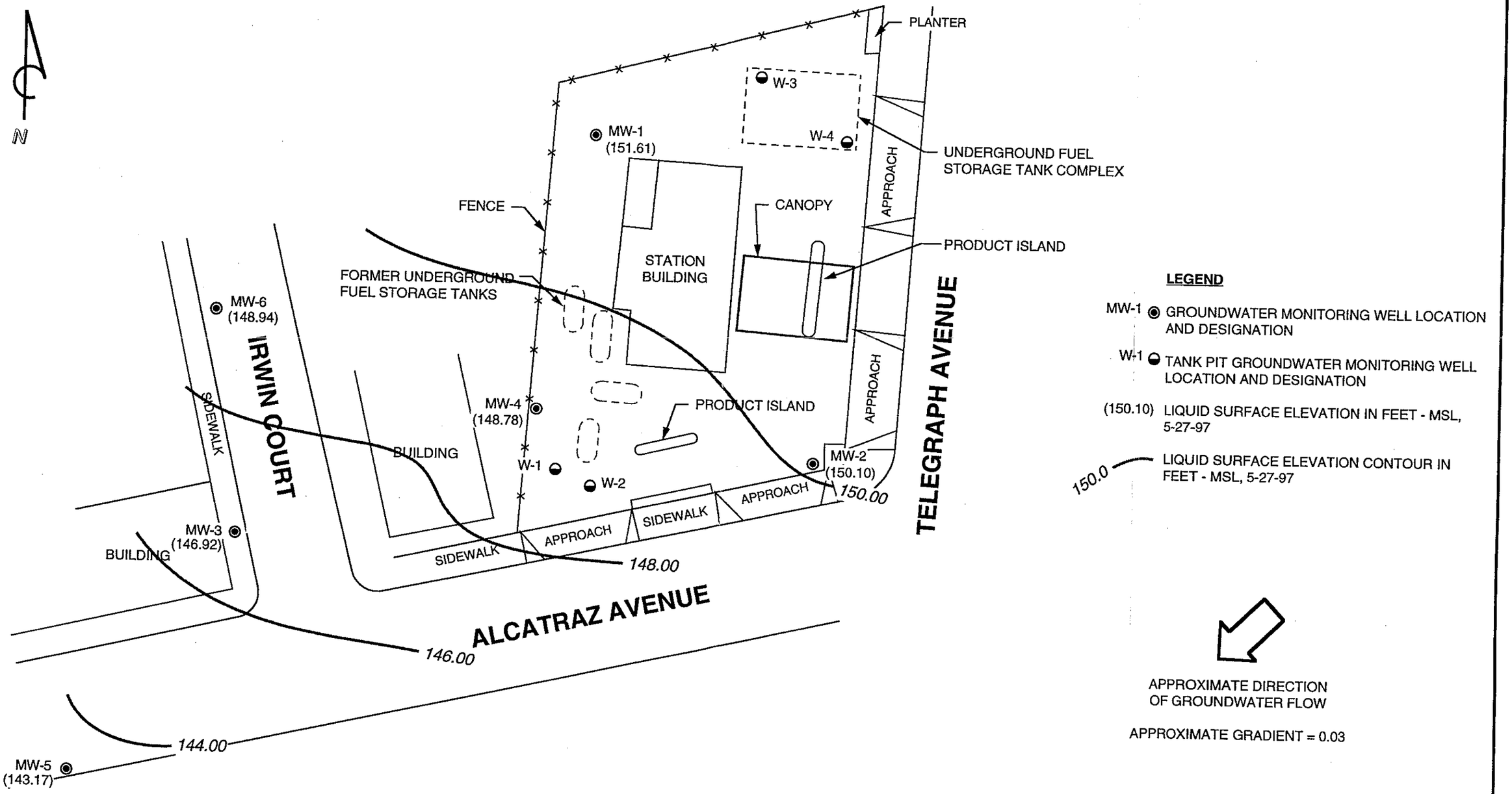
a. Samples analyzed for TPPH-g, BTEX compounds, and MtBE according to EPA Methods 8015 (modified) and 8020.

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

ARCO Service Station 0374
6407 Telegraph Avenue at Alcatraz Avenue
Oakland, California

Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOC)	Groundwater Elevation (feet, MSL)	TPPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Xylenes (ppb)	MtBE (ppb)
MW-1	01/31/96	158.91	6.34	152.57	---------- Well Sampled Annually ----------					
	04/10/96		5.82	153.09	---------- Well Sampled Annually ----------					
	07/16/96		7.23	151.68	<50	<0.50	<0.50	<0.50	<0.50	340
	10/14/96		8.34	150.57	---------- Well Sampled Annually ----------					
	03/27/97		6.37	152.54	---------- Well Sampled Annually ----------					
	05/27/97		7.30	151.61	---------- Well Sampled Annually ----------					
MW-2	01/31/96	157.92	6.51	151.41	---------- Well Sampled Annually ----------					
	04/10/96		6.94	150.98	---------- Well Sampled Annually ----------					
	07/16/96		7.73	150.19	<50	1.2	<0.50	<0.50	<0.50	33
	10/14/96		8.35	149.57	---------- Well Sampled Annually ----------					
	03/27/97		7.40	150.52	---------- Well Sampled Annually ----------					
	05/27/97		7.82	150.10	---------- Well Sampled Annually ----------					
MW-3	01/31/96	153.64	7.02	146 62	140	20	0.87	11	14	NA
	04/10/96		7.82	145.82	84	2.4	<0.50	1.9	1.1	NA
	07/16/96		6.80	146.84	<50	2.2	<0.50	<0.50	<0.50	<2.5
	10/14/96		7.67	145.97	<50	1.2	<0.50	<0.50	0.81	2.9
	03/27/97		7.62	146.02	<50	0.94	<0.50	0.9	0.63	<2.5
	05/27/97		6.72	146.92	---------- Well Sampled Semiannually ----------					
MW-4	01/31/96	156 53	5.64	150 89	230	23	2 2	3.7	32	NA
	04/10/96		6.66	149.87	7,300	1,600	350	350	830	NA
	07/16/96		7.73	148.80	5,600	1,100	160	240	520	150
	10/14/96		8.55	147.98	4,500	860	72	160	340	<62
	03/27/97		7.15	149.38	25,000	5,200	760	850	2,600	<250
	05/27/97 †		7.75	148.78	---------- Well Sampled Semiannually ----------					
MW-5	01/31/96	151.33	8.64	142.69	<50	<0.50	<0.50	<0.50	<0.50	NA
	04/10/96		N/A	--	<50	<0.50	<0.50	<0.50	<0.50	NA
	07/16/96		8.15	143.18	<50	0.79	1.3	<0.50	<0.50	<2.5
	10/14/96		7.92	143.41	<50	<0.50	<0.50	<0.50	<0.50	<2.5
	03/27/97		7.75	143 58	<50	<0.50	<0.50	<0.50	<0.50	<2.5
	05/27/97		8.16	143.17	<50	<0.50	<0.50	<0.50	<0.50	<2.5
MW-6	01/31/96	153.84	5.15	148.69	---------- Well Sampled Annually ----------					
	04/10/96		4.58	149.26	---------- Well Sampled Annually ----------					
	07/16/96		4.96	148.88	<50	<0.50	<0.50	<0.50	<0.50	150
	10/14/96		6.15	147.69	---------- Well Sampled Annually ----------					
	03/27/97		4.40	149.44	---------- Well Sampled Annually ----------					
	05/27/97		4.90	148.94	---------- Well Sampled Annually ----------					

MtBE	= Methyl tert-butyl ether
MSL	= Mean sea level
TOC	= Top of casing
ppb	= Parts per billion
<	= Less than laboratory detection limit stated to the right
NA	= Not analyzed
NS	= Not sampled
N/A	= Not available
†	= Well sampled without purging. Please refer to Field and Laboratory Procedures (Attachment A) for details.



LEGEND

MW-1 ◉ GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION

W-1 ◒ TANK PIT GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION

(150.10) LIQUID SURFACE ELEVATION IN FEET - MSL, 5-27-97

150.0 LIQUID SURFACE ELEVATION CONTOUR IN FEET - MSL, 5-27-97

APPROXIMATE DIRECTION OF GROUNDWATER FLOW

APPROXIMATE GRADIENT = 0.03

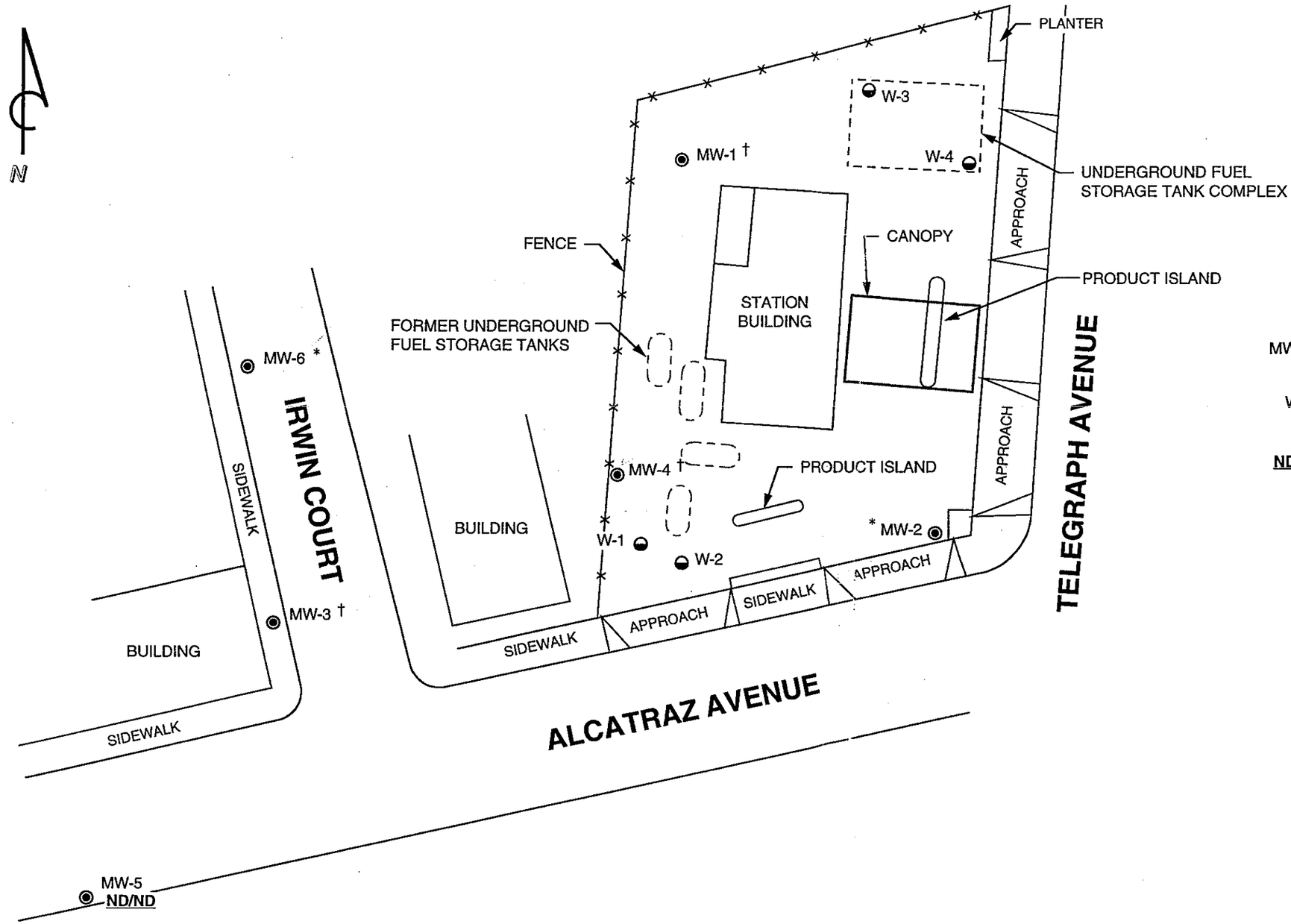
PACIFIC ENVIRONMENTAL GROUP, INC.

SCALE
0 30 60 FEET

ARCO SERVICE STATION 0374
6407 Telegraph Avenue at Alcatraz Avenue
Oakland, California

GROUNDWATER ELEVATION CONTOUR MAP

FIGURE:
1
PROJECT:
330-084.2D



LEGEND

MW-1 ◉ GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION

W-1 ◒ TANK PIT GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION

ND/ND TPPH-g/BENZENE CONCENTRATION IN GROUNDWATER, IN PARTS PER BILLION, 5-27-97

ND NOT DETECTED

* WELL SAMPLED ANNUALLY

† WELL SAMPLED SEMIANNUALLY

APPROXIMATE DIRECTION
OF GROUNDWATER FLOW

PACIFIC
ENVIRONMENTAL
GROUP, INC.

SCALE
0 30 60 FEET

ARCO SERVICE STATION 0374
6407 Telegraph Avenue at Alcatraz Avenue
Oakland, California

TPPH-g/BENZENE CONCENTRATION MAP

FIGURE:
2
PROJECT:
330-084.2D

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 then 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 three 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.

ARCO initiated utilization of a case-by-case approach for the implementation of non-purge sampling of monitoring wells impacted by petroleum hydrocarbons, beginning first quarter 1997. The criteria for implementation of non-purge sampling include:

- The screened interval of the well casing is not fully submerged.
- The well is not located within a confined aquifer.
- The well is not being monitored for the first time.
- The site is not being monitored during the confirmation monitoring period, prior to site closure.

Based on the above criteria, prescreening of monitoring wells are performed for each site. Depth to water data obtained on the sampling date is compared to the well construction data, to decide whether the well may be sampled without purging.

ATTACHMENT B

CERTIFIED ANALYTICAL REPORTS, 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: 330-084.2K/0374 Berkeley

Enclosed are the results from samples received at Sequoia Analytical on May 28, 1997. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE COLLECTED	TEST METHOD
9705E75 -01	LIQUID, MW-5	05/27/97	MTBE_W Methyl t-Butyl Ethe
9705E75 -01	LIQUID, MW-5	05/27/97	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
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: 330-084.2K/0374 Berkeley
Sample Descript: MW-5
Matrix: LIQUID
Analysis Method: EPA 8020
Lab Number: 9705E75-01

Sampled: 05/27/97
Received: 05/28/97

Analyzed: 06/03/97
Reported:

QC Batch Number: GC060397BTEX22A
Instrument ID: GCHP22

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	75

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: 330-084.2K/0374 Berkeley
Sample Descript: MW-5
Matrix: LIQUID
Analysis Method: 8015Mod/8020
Lab Number: 9705E75-01

Sampled: 05/27/97
Received: 05/28/97

Analyzed: 06/03/97
Reported:

QC Batch Number: GC060397BTEX22A
Instrument ID: GCHP22

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	75

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: 330-084.2K / 0374, Berkely
Matrix: LIQUID
Work Order #: 9705E75 01

Reported: Jun 11, 1997

QUALITY CONTROL DATA REPORT

Analyte:	Benzene	Toluene	Ethyl Benzene	Xylenes	Gas
QC Batch#:	GC060397BTEX22A	GC060397BTEX22A	GC060397BTEX22A	GC060397BTEX22A	GC060397BTEX22A
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 #:	9705E8149	9705E8149	9705E8149	9705E8149	9705E8149
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.
Prepared Date:	6/3/97	6/3/97	6/3/97	6/3/97	6/3/97
Analyzed Date:	6/3/97	6/3/97	6/3/97	6/3/97	6/3/97
Instrument I.D.#:	GCHP22	GCHP22	GCHP22	GCHP22	GCHP22
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L	60 µg/L
Result:	11	10	10	30	59
MS % Recovery:	110	100	100	100	98
Dup. Result:	11	10	9.8	29	56
MSD % Recov.:	110	100	98	97	93
RPD:	0.0	0.0	2.0	3.4	5.2
RPD Limit:	0-25	0-25	0-25	0-25	0-25
LCS #:	BLK060397BSA	BLK060397BSA	BLK060397BSA	BLK060397BSA	
Prepared Date:	6/3/97	6/3/97	6/3/97	6/3/97	6/3/97
Analyzed Date:	6/3/97	6/3/97	6/3/97	6/3/97	6/3/97
Instrument I.D.#:	GCHP22	GCHP22	GCHP22	GCHP22	GCHP22
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L	60 µg/L
LCS Result:	10	9.6	9.6	28	51
LCS % Recov.:	100	96	96	93	85
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 Proj. ID: 330-084.2K/0374 Berkeley

Lab Proj. ID: 9705E75

Received: 05/28/97

Reported:

LABORATORY NARRATIVE

In order to properly interpret this report, it must be reproduced in its entirety. This report contains a total of 7 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

Division of Atlantic Richfield Company

Chain of Custody

Task Order No. WA 2133400

ARCO Facility no. 0374	City (Facility) Berkeley CA 6407 Telegraph Ave	Project manager (Consultant) Shaw Garakani	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 Env. Group Inc	Address (Consultant) 2025 Gateway Pl Suite 440 San Jose CA 95110		Contract number 2133400

Method of shipment: 970SE75

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 ☐		
MW-5		3		X		X	HCl	5/27/97	14:45		X											

Special detection Limit/reporting

Special QA/QC

MAY 28 12 49

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:

	Date	Time		Date	Time
Relinquished by sampler: Don Water Company	5/27/97	18:10	Received by: Russell Flesoras		
Relinquished by: Russell Flesoras	5/28/97	10:26	Received by:		
Relinquished by:	5/28/97		Received by laboratory: ZD Cardenas	5-28-97	1249

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

APPC-3292 (2-91)

ANALYTICAL SAMPLE RECEIPT LOG

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

WORKORDER: 9705E75
DATE OF LOG-IN: 5/29/97

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* → Time
10. Proper Preservatives used: Yes / No*
11. Date Rec. at Lab: 5-28-97
12. Time Rec. at Lab: 1249
13. Temp Rec. at Lab: 14°C

LAB SAMPLE #	DASH #	CLIENT IDENTIFICATION	CONTAINER DESCRIPTION	SAMPLE MATRIX	DATE SAMP.	REMARKS: CONDITION (ETC.)
1	AC	mw-5	3 VOA	liq	5-27-97	15:20

5-28-97

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

Revision 9/10/96
RCPTLOG.XLS

FIELD SERVICES / O & M REQUEST

SITE INFORMATION FORM

Project #:330-084.2k

☐ **1st time visit**

Station #:374

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

Date of Request: 2Q

Site Address:6407 Telegraph ave
Berkeley, California

☐ **Monthly**

☐ **Semi-Monthly**

Ideal Field Date: 5/27/97

County: Alameda

☐ **Weekly**

Budget Hrs. 1

Project Manager: Shaw Garakani

☐ **One time Event**

Actual Hrs. 1.5

Requestor: David Nanstad

☐ **Other.**_____

Mob de Mob 1.5 (3)

Client: Arco

Client P.O.C.: Paul Supple

Purge Total 30 gal.

Prefield contacts: None

Field Tasks: For General Description

Second Quarter 1997 Groundwater sampling event: DTW/DTL on all wells TOB/TOC sample per attached protocol.

WA# 21334 00

Comments, remarks, from Field Staff (include problems encountered)

~~1:00 - 2:30~~ Sampled mw-5

3:00 - 4:30 + 1.5 DTW on all other wells

Completed by: Don Watenpaugh Date: 5/27/97

Checked by:_____

WELL SAMPLING REQUEST

SAMPLING PROTOCOL								
Project No.	Station #	Project Name	SEQUENCE	Project Manager	Approval	Date/s	Laboratory:	Client Engineer:
330-084.2K	374	6407 Telegraph Berkeley	2Q97	Shaw Garakani			Sequoia 21344 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
MW-1	3		ANNUAL-3Q	DTW ONLY	TOB/TOC	27	4"	7'	NO	
MW-2	4		ANNUAL-3Q	DTW ONLY	TOB/TOC	27	4"	7'	NO	
MW-3	5		SEMIANNUAL 1&3	DTW ONLY	TOB/TOC	22	4"	7'	NO	
MW-4	6		SEMIANNUAL 1&3	DTW ONLY			4"	7'		
MW-5	2		QLY	TPPH-G/BTEX/MtBE			4"	10'		
MW-6	1		ANNUAL-3Q	DTW ONLY			4"	5'		

FIELD REPORT

DEPTH TO WATER/SEPARATE-PHASE HYDROCARBON SURVEY

PROJECT No.: 330-084.2K LOCATION: 640 Telegraph Ave Berkeley, CA DATE: 5/27/97

CLIENT/STATION NO.: DRCO 374 FIELD TECHNICIAN: Don Watanabe DAY OF WEEK: Tues

PROBE TYPE/ID No.
- ☐ Oil/Water IF/ _____
- ☒ H_2O level indicator E1
- ☐ Other: _____

Casing 5.22

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	Weathered	Gas	Oil	VISCOSITY: Lite	Medium	Heavy	LIQUID REMOVED (gallons): SPH / H_2O
3	MW-1	15:30	✓	✓	✓		✓		7.55 / 7.30	7.55 / 7.30	7'										/
4	MW-2	15:33							8.10 / 7.82	8.10 / 7.82	7'										/
5	MW-3	15:45							7.12 / 6.72	7.12 / 6.72	7'										/
6	MW-4	15:37							8.60 / 7.75	8.60 / 7.75	7'										/
2	MW-5	14:45							8.53 / 8.16	8.53 / 8.16	10'										/
1	MW-6	15:47							5.35 / 4.90	5.35 / 4.90	5'										/
									/	/											/
									/	/											/
									/	/											/

Comments: _____

FIELD DATA SHEET

WATER SAMPLE FIELD DATA SHEET

PROJECT No.: 330-084.2K LOCATION: 6407 Telegraph Ave Berkeley, CA WELL ID #: MW-1

CLIENT/STATION No.: ARCO 374 FIELD TECHNICIAN: Don Whitemyer

WELL INFORMATION

Depth to Liquid: — TOB — TOC
Depth to water: 7.55 TOB 7.30 TOC
Total depth: — TOB — TOC
Date: 5/27/97 Time (2400): 1530

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 ____ - 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. (µmhos/cm @ 25°C)	TEMPERATURE (° F)	COLOR	TURBIDITY	ODOR

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: ____
- ☐ 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

REMARKS: DTW only TOB/TOC

SIGNATURE: Don Whitemyer

PACIFIC ENVIRONMENTAL GROUP, INC

FIELD DATA SHEET

WATER SAMPLE FIELD DATA SHEET

PROJECT No.: 330-084.2K LOCATION: 6407 Telegraph Ave Berkeley, CA WELL ID #: MW-2

CLIENT/STATION No.: ARCO 374 FIELD TECHNICIAN: Don Watterson

WELL INFORMATION

Depth to Liquid: _____ TOB _____ TOC
Depth to water: 8.10 TOB 7.82 TOC
Total depth: _____ TOB _____ TOC
Date: 5/27/97 Time (2400): 15:33

Probe Type and I.D. #
- ☐ Oil/Water interface _____
- ☒ Electronic indicator 51
- ☐ 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 @ 25°C)	TEMPERATURE (°F)	COLOR	TURBIDITY	ODOR

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: _____
- ☐ Dedicated: _____
- ☐ Other: _____

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

SAMP. CNTRL #	DATE	TIME (2400)	No. of Cont.	SIZE	CONTAINER	PRESERVE	ANALYTICAL PARAMETER

REMARKS: No Sample DTW only TOB/TOC

SIGNATURE: Don Watterson

PACIFIC ENVIRONMENTAL GROUP, INC.

FIELD DATA SHEET

WATER SAMPLE FIELD DATA SHEET

PROJECT No.: 330-084.2K LOCATION: 6407 Telegraph Ave Berkeley, CA WELL ID #: MW-3

CLIENT/STATION No.: ARCO 374 FIELD TECHNICIAN: Don Whitemyer

WELL INFORMATION

Depth to Liquid: _____ TOB _____ TOC
Depth to water: 7.12 TOB 6.72 TOC
Total depth: _____ TOB _____ TOC
Date: 5/27/97 Time (2400): 15:45

Probe Type and I.D. #
- ☐ Oil/Water interface _____
- ☒ Electronic indicator 81
- ☐ 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. (µmhos/cm @ 25°C)	TEMPERATURE (° F)	COLOR	TURBIDITY	ODOR

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: _____
- ☐ 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

REMARKS: No Sample DTW only TOB/TOC

SIGNATURE: Don Whitemyer

PACIFIC ENVIRONMENTAL GROUP, INC

FIELD DATA SHEET

WATER SAMPLE FIELD DATA SHEET

PROJECT No.: 330-084.2K LOCATION: 6401 Telegraph Ave Berkeley, CA WELL ID #: MW-4

CLIENT/STATION No.: ARCO 374 FIELD TECHNICIAN: Don Watenpaugh

WELL INFORMATION

Depth to Liquid: _____ TOB _____ TOC
Depth to water: 8.60 TOB 7.75 TOC
Total depth: _____ TOB _____ TOC
Date: 5/27/92 Time (2400): 15:37

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 _____ - 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. (µmhos/cm @ 25°C)	TEMPERATURE (° F)	COLOR	TURBIDITY	ODOR

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 _____

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

REMARKS: NO Sample
DTW TOB/TOC only

SIGNATURE: Don Watenpaugh

PACIFIC ENVIRONMENTAL GROUP, INC.

FIELD DATA SHEET

WATER SAMPLE FIELD DATA SHEET

PROJECT No.: 330-084.2K LOCATION: 6401 Telegraph Ave Berkeley, CA. WELL ID #: MW-5

CLIENT/STATION No.: ARCO 374 FIELD TECHNICIAN: Don Waterpaugh

WELL INFORMATION

Depth to Liquid:	TOB	TOC
Depth to water:	8.53 TOB	8.16 TOC
Total depth:	23.4 TOB	23.0 TOC
Date: 5/27/97	Time (2400):	14:45

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 23 - DTW ~~23~~ 8.16 = 14.84 x Gal/Linear Foot .66 = 9.79 x Number of Casings 3 = Calculated Purge 29

DATE PURGED: 5/27/97 START: 14:50 END (2400 hr): 15:18 PURGED BY: DMW

DATE SAMPLED: 5/27/97 START: 15:20 END (2400 hr): 15:20 SAMPLED BY: DMW

TIME (2400 hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25°C)	TEMPERATURE (° F)	COLOR	TURBIDITY	ODOR
15:02	10	7.03	580	82.2	clear	trace	None
15:06	20	6.94	650	79.4	clear	trace	None
15:18	30	6.92	600	84.8	clear	trace	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: ~~Disp~~ DMW
- ☒ Centrifugal Pump: #31
- ☐ 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
MW-5	5/27/97	15:20	3	40mL	VOA	HCl	TPHG/BTEX/MTBE

REMARKS:

SIGNATURE: Don Waterpaugh

PACIFIC ENVIRONMENTAL GROUP, INC.

FIELD DATA SHEET

WATER SAMPLE FIELD DATA SHEET

PROJECT No.: 330-084.2K LOCATION: 6407 Telegraph Ave Berkeley, CA WELL ID #: MW-6

CLIENT/STATION No.: ARCO 374 FIELD TECHNICIAN: Don Watenpaugh

WELL INFORMATION

Depth to Liquid: — TOB — TOC
Depth to water: 5.35 TOB 4.90 TOC
Total depth: — TOB — TOC
Date: 5/27/97 Time (2400): 15:47

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 _____ - 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 @ 25°C)	TEMPERATURE (° F)	COLOR	TURBIDITY	ODOR

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: _____
- ☐ Dedicated: _____
- ☐ Other: _____

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

SAMP. CNTRL #	DATE	TIME (2400)	No. of Cont.	SIZE	CONTAINER	PRESERVE	ANALYTICAL PARAMETER

REMARKS: No Sample DTW TOB/TOC Only

SIGNATURE: Don Watenpaugh

PACIFIC ENVIRONMENTAL GROUP, INC.

ARCO Products Company
Division of AtlanticRichfieldCompany

Berkeley CA Task Order No. WA 2133400

Chain of Custody

ARCO Facility no. 0374	City (Facility) 6407 Telegraph Ave	Project manager (Consultant) Shaw Garakani	Laboratory name Sequoia
ARCO engineer Paul Supple	Telephone no. (ARCO)	Telephone no. (Consultant) (408)4417500	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 2133400

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
MW5		3		X		X	HCl	5/27/97	14:45		X											

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 Don Wadsworth	Date 5/27/97 Time 18:10	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

ARPC 3292 (2-91)

ATTACHMENT C

REMEDIAL SYSTEM PERFORMANCE EVALUATION

ATTACHMENT C
REMEDIAL SYSTEM PERFORMANCE EVALUATION

GWE System

Groundwater extraction (GWE) was conducted between December 21, 1993, and October 13, 1995. No evidence of plume migration has been observed since system deactivation. The GWE system was comprised of a pneumatic pump in Well W-2 and three 200-pound granular activated carbon vessels arranged in series to treat the extracted groundwater. Extracted and treated groundwater was discharged into the East Bay Municipal Utility District (EBMUD) Permit Account Number 502-85611. Based on verbal approval from the ACHCSA, indicating that GWE would no longer be required at the site, the EBMUD permit was relinquished on June 14 1996. Overall, approximately 0.1 million gallons of groundwater were extracted and less than 0.05 gallon of benzene was removed.

Historical GWE system performance and analytical data are presented in Tables C-1 and C-2. Graphical presentations of TPPH-g and benzene mass removal and concentration data are shown on Figures C-1 and C-2, respectively.

Intrinsic Bioremediation Evaluation

At the request of ARCO, PACIFIC monitored intrinsic bioremediation indicator parameters (bioparameters) during the third quarter 1996 groundwater monitoring event. Groundwater samples from Wells MW-3, MW-4, and MW-5 were analyzed for total alkalinity, dissolved oxygen (DO), ferrous iron, nitrate, sulfate, methane, biological oxygen demand (BOD), chemical oxygen demand (COD), and carbon dioxide (CO_2). Intrinsic bioremediation evaluation data are presented in Table C-3.

In general, depleted concentrations of electron acceptors (DO, nitrate, and sulfate), and elevated concentrations of bioremediation byproducts (CO_2, methane, and ferrous iron) within the hydrocarbon-impacted plume compared to background levels indicate that intrinsic bioremediation is occurring. As indicated by Table C-3, collected data follow the trend that indicates the occurrence of intrinsic bioremedation.

Bioremediation Enhancement Program

At the request of ARCO, PACIFIC initiated an in-situ bioremediation enhancement program at off-site Well MW-3 on November 14, 1995. The in-situ bioremediation enhancement program utilizes oxygen releasing compound (ORC) manufactured by Regenesis Bioremediation Products, Inc. Twelve 2-inch-diameter ORC socks were installed below the groundwater surface in Well MW-3. 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 replaced with new units when dissolved oxygen data indicate that they have been depleted.

Conclusions

As indicated above, GWE at the site has been terminated with verbal approval from ACHCSA. Bioremediation enhancement program will continue during third quarter 1997.

Attachments:

Table C-1 -	Historical Groundwater Extraction System Performance Data
Table C-2 -	Historical Groundwater Extraction System Analytical Data - Total Purgeable Petroleum Hydrocarbons (TPPH as Gasoline and BTEX Compounds)
Table C-3 -	Groundwater Biodegradation Study Field and Laboratory Data
Figure C-1-	Groundwater Extraction System Mass Removal Trend
Figure C-2	Groundwater Extraction System Hydrocarbon Concentrations

Table C-1
Historical Groundwater Extraction System Performance Data

ARCO Service Station 0374
6407 Telegraph Avenue at Alcatraz Avenue
Oakland, California

Sample I.D.	Date Sampled		Totalizer Reading (gallons)	Net Volume (gallons)	Average Flow Rate (gpm)	TPPH Influent Concentration (µg/L)	TPPH Net Removed (lbs)	TPPH Removed to Date (lbs)	Benzene Influent Concentration (µg/L)	Benzene Net Removed (lbs)	Benzene Removed to Date (lbs)	Primary Carbon Loading (percent)
INFL	12/21/93	a	22	22	0.21	NS	0.000	0.00	NS	0.000	0.00	0.0
INFL	12/23/93	a	4,855	4,833	1.6	9,300	0.380	0.38	1,200	0.024	0.02	0.5
INFL	12/27/93	a	6,871	2,016	0.36	5,700	0 130	0.51	820	0.017	0.04	0.6
INFL	12/29/93	a	7,192	321	0.13	5,800	0.016	0.53	950	0.002	0.04	0.7
INFL	01/03/94	a	7,925	733	0.10	6,500	0.010	0.54	860	0.006	0.05	0.7
INFL	01/05/94	a	8,162	237	0.08	5,200	0.010	0.55	970	0.002	0.05	0.7
INFL	01/11/94	a	8,907	745	0.08	6,300	0.030	0.58	900	0.006	0.06	0.7
INFL	01/13/94	a	9,175	268	0.09	8,600	0.019	0.60	950	0.002	0.06	0.7
INFL	01/24/94	a	9,306	131	0.08	NS	0.007	0.60	NS	0.001	0.06	0.8
INFL	02/24/94	a	14,555	5,249	0.21	4,200	0.280	0.88	520	0.011	0.07	1.1
INFL	03/24/94	a	23,723	9,168	0.24	6,200	0.400	1.40	1,100	0.062	0.13	1.8
INFL	04/26/94	b	29,543	5,820	0.12	6,400	0.150	1.55	1,400	0.061	0.19	1.9
INFL	05/24/94	c	35,082	5,539	0.14	NS	0.196	1.75	NS	0.043	0.24	2.2
INFL	11/17/94	d,e	35,507	425	N/A	2,100	0.004	1.75	460	0.001	0.24	2.2
INFL	01/10/95	f	36,493	986	0.01	1,100	0.013	1.76	180	0.003	0.24	2.2
INFL	02/07/95	g	41,399	4,906	0.12	3,500	0.094	1.86	370	0.011	0.25	2.3
INFL	03/03/95	h	53,290	11,891	0.34	NS	0.220	2.08	NS	0.035	0.29	2.6
INFL	04/03/95		62,582	9,292	0.21	5,000	0.194	2.27	1,000	0.039	0.32	2.8
INFL	05/01/95		69,809	7,227	0.18	580	0.168	2.44	40	0.031	0.36	3.0
INFL	06/09/95		75,254	5,445	0 10	1,400	0.045	2.48	420	0.010	0.37	3.1
INFL	07/05/95		81,540	6,286	0.17	750	0.056	2.54	41	0.012	0.38	3.2
INFL	08/10/95		86,868	5,328	0.10	610	0.030	2.57	29	0.002	0.38	3.2
INFL	09/18/95		91,532	4,664	0.08	600	0.024	2.59	10	0.001	0.38	3.2
INFL	10/02/95		92,918	1,386	0.07	790	0.008	2.60	52	0.000	0.38	3.3
INFL	10/13/95	i,h	93,989	1,071	0.07	NS	0.006	2.61	NS	0.000	0.38	3.3

TOTAL POUNDS REMOVED:			**2.61**		**0.38**
TOTAL GALLONS REMOVED:			**0.43**		**0.05**
PERIOD POUNDS REMOVED:		**0.000**		**0.00**	
PERIOD GALLONS REMOVED:		**0.000**		**0.00**	
TOTAL GALLONS EXTRACTED:	**93,989**				
PERIOD GALLONS EXTRACTED:	**0**				
PERIOD AVERAGE FLOW RATE (gpm):	**N/A**				
PRIMARY BED CAPACITY REMAINING:	**96.7%**				

TPPH = Total purgeable petroleum hydrocarbons
gpm = Gallons per minute
µg/L = Micrograms per liter
lbs = Pounds
NS = Not sampled (prior concentrations assumed)
N/A = Not available or not applicable

a. All data prior to 9/1/94 provided by prior consultant.
b. Samples taken 4/21/94; totalizer reading from 4/26/94.
c. Last site visit by RESNA on 5/24/94.
d. Pacific Environmental Group, Inc. became consultant for the site 9/1/94.
e. System operated for two days in 4th quarter 1994; system down due to extensive repairs required for system and compound.
f. System started on January 10, 1995.
g. System auto shutdown 2/14/95; shut down 3/3/95 for repairs.
h. TPPH/benzene pounds removed estimated from previous data.
i. GWE system temporarily shut down 10/13/95.

System operation began December 21, 1993, under RESNA Industries, Inc., system shut down 4/27/94 - 11/17/94.
Pounds of hydrocarbons removed to date through March 24, 1994 provided by prior consultant.
Benzene mass removal from 12/21/93 through 4/27/94 estimated from data provided by prior consultant.
Prior to June 1995, TPPH was reported as "TPH calculated as Gasoline".
Mass removed is an approximation calculated using averaged concentrations.
Carbon loading assumes an 8 percent isotherm. See certified analytical reports for detection limits.

Table C-3
Groundwater Biodegradation Study Field and Laboratory Data

ARCO Service Station 0374
6407 Telegraph Avenue at Alcatraz Avenue
Oakland, California

		Field Analyses					Laboratory Analyses									
Well	Date Sampled	Groundwater Temperature (deg F)	pH (units)	Conductivity (µmhos)	D.O. (mg/L)	Ferrous Iron (mg/L)	Total Alkalinity (mg CaCO3/L	B.O.D. (mg/L)	Carbon Dioxide (mg/L)	C.O.D. (mg/L)	Methane (%)	Nitrate as Nitrate (mg/L)	Nitrite as Nitrite (mg/L)	Sulfate (mg/L)	TPPH as Gasoline (µg/L)	Total BTEX (µg/L)
MW-3	11/14/95 **	65.5*	6.76*	508*	7.17	N/A	NS	NS	NS	NS	NS	6.6	<1.0	NS	140	46
	06/06/96 **	66.2	7.38	700	12.28	N/A	NS	NS	NS	NS	NS	NS	NS	NS	84†	5.4†
	07/16/96	67.8	7.08	1,010	8.73	0.0	280	1.8	270	44	<0.020	<1.0	NS	78	<50	2.2
	01/21/97 **	59	N/A	N/A	11.15	0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MW-4	07/16/96	69.5	6.72	1,370	3.20	4.20	420	NS	470	NS	0.11	<1.0	NS	18	5,600	2,020
MW-5	07/16/96	70.4	6.85	690	6.80	0.0	170	NS	180	NS	<0.020	<1.0	NS	35	<50	1.1
MW-6	06/06/96	N/A	N/A	N/A	3.47	N/A	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

D.O. = Dissolved oxygen
B.O.D = Biochemical oxygen demand
C.O.D = Chemical oxygen demand
TPPH = Total purgeable petroleum hydrocarbons
BTEX = Benzene, toluene, ethylbenzene, and xylenes
deg F = Degrees Fahrenheit
µmhos = Micromhos
mg/L = Milligrams per liter
µg/L = Micrograms per liter
NS = Not sampled
N/A = Not available
* Field measurements collected on November 2, 1995.
** ORC installed following data collection.
† From April 10, 1996 groundwater monitoring event.