PACIFIC
ENVIRONMENTAL
GROUP, INC.

Quarterly Groundwater Monitoring Report and Remedial System Performance Evaluation Second Quarter 1996

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

Prepared for

ARCO Products Company

September 25, 1996

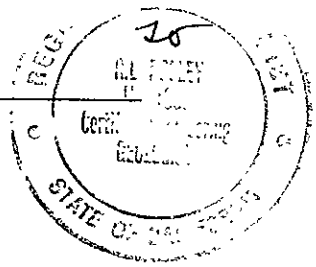
Prepared by

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

Project 330-084.2C

Shaw Garakani
Project Engineer

R. Lee Dooley
Senior Geologist
CEG 1006



Date: September 25,1996
Quarter: 2Q96

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.: 330-084.2C
Primary Agency/Regulatory ID No.: Alameda County Health Care Services Agency

WORK PERFORMED THIS QUARTER (Second - 1996):

1. Performed second quarter 1996 groundwater monitoring event.
2. Prepared second quarter 1996 groundwater monitoring report.
3. Obtained verbal authorization from ACHCSA to terminate groundwater extraction (GWE) and relinquish EBMUD discharge permit.

WORK PROPOSED FOR NEXT QUARTER (Third - 1996):

1. Perform third quarter 1996 groundwater monitoring event.
2. Prepare third quarter 1996 groundwater monitoring event.
3. Install ORCs in Well A-4 to enhance intrinsic bioremediation.
4. Submit confirmation letter to ACHCSA regarding termination of GWE.

Current Phase of Project:	Monitoring/Remediation	(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:	Natural Attenuation	(SVES/Sparge/FP Removal, etc.)
Approximate Depth to Groundwater:	4.5 to 7.8	(Measure Feet)
Groundwater Gradient:	Southwest	(Direction)
	0.04	(Magnitude)
Period TPPH-g/Benzene Removed:	0.0/0.0	(gallons)
Cumulative TPPH-g/Benzene Removed:	0.43/0.05	(gallons)

DISCUSSION:

- Hydrocarbon concentrations are within historical levels.
- Well A-5 was not sampled since there was a car parked over it.
- Increase in TPPH-g and benzene concentrations at Well A-4 appear to be due to high groundwater elevations, and will be monitored closely during future quarters. Additionally, to enhance intrinsic bioremediation at this well, at the request of ARCO, PACIFIC will install ORCs in this well during fourth quarter 1996 monitoring 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 - Historical Groundwater Elevation and Analytical Data Tables
- Attachment B - Field and Laboratory Procedures
- Attachment C - Certified Analytical Reports, Chain-of-Custody Documentation, and Field Data Sheets
- Attachment D - Remedial System Performance Evaluation

cc: [redacted]
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		Semiannually
MW-4	a		a		Semiannually
MW-5	a	a	a	a	Quarterly
MW-6			a		Annually

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

Table 2

Groundwater Elevation and Analytical Data

Total Purgeable Petroleum Hydrocarbons

(TPPH as Gasoline and BTEX Compounds)

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)	SPH Thickness (feet)	Groundwater Elevation (feet, MSL)	TPPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Xylenes (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----------				
MW-2	01/31/96	157.92	6.51	--	151.41	----------Well Sampled Annually----------				
	04/10/96		6.94	--	150.98	----------Well Sampled Annually----------				
MW-3	01/31/96	153.64	7.02	--	146.62	140	20	0.87	11	14
	04/10/96		7.82	--	145.82	84	2.4	<0.50	1.9	1.1
MW-4	01/31/96	156.53	5.64	--	150.89	230	23	2.2	3.7	32
	04/10/96		6.66	--	149.87	7,300	1,600	350	350	830
MW-5	01/31/96	151.33	8.64	--	142.69	<50	<0.50	<0.50	<0.50	<0.50
	04/10/96		N/A	--	--	----------Well Inaccessible----------				
MW-6	01/31/96	153.84	5.15	--	148.69	----------Well Sampled Annually----------				
	04/10/96		4.58	--	149.26	----------Well Sampled Annually----------				

SPH	= Separate-phase hydrocarbons
MSL	= Mean sea level
TOC	= Top of casing
ppb	= Parts per billion
<	= Denotes laboratory detection limit.
N/A	= Not available

N

PLANTER

W-3

W-4

153.0

MW-1
(153.09)

UNDERGROUND FUEL
STORAGE TANK COMPLEX

APPROACH

CANOPY

151.0

FENCE

PRODUCT ISLAND

STATION
BUILDING

FORMER UNDERGROUND
FUEL STORAGE TANKS

MW-6
(149.26)

149.0

IRWIN COURT

SIDEWALK

147.0

MW-4
(149.87)

PRODUCT ISLAND

APPROACH

TELEGRAPH AVENUE

BUILDING

W-1

W-2

MW-2
(150.98)

APPROACH

SIDEWALK

APPROACH

SIDEWALK

MW-3
(145.82)

BUILDING

ALCATRAZ AVENUE

* MW-5

LEGEND

MW-1 GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION

W-1 TANK PIT GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION

(153.09) LIQUID SURFACE ELEVATION IN FEET - MSL, 4-10-96

150.0 LIQUID SURFACE ELEVATION CONTOUR IN FEET - MSL, 4-10-96

* WELL INACCESSIBLE

APPROXIMATE DIRECTION
OF GROUNDWATER FLOW

APPROXIMATE GRADIENT = 0.04

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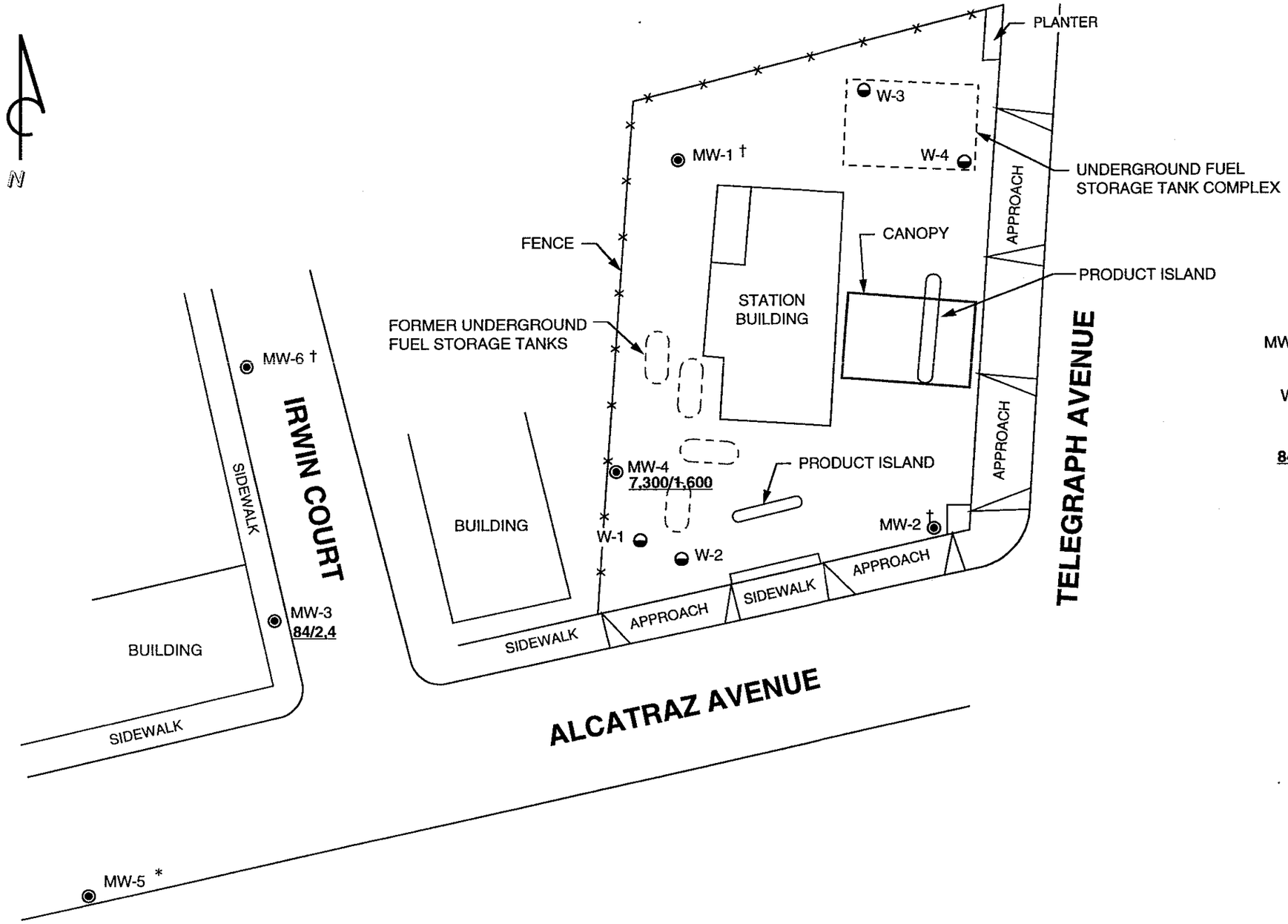
.RONMENTAL
)UP, INC.

SCALE
0 30 60 FEET

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

GROUNDWATER ELEVATION CONTOUR MAP

FIGURE:
1
PROJECT:
330-084.2C



LEGEND

MW-1 ◉ GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION

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

84/2.4 TPPH-g/BENZENE CONCENTRATION IN GROUNDWATER, IN PARTS PER BILLION, 4-10-96

ND NOT DETECTED

* WELL INACCESSIBLE

† WELL SAMPLED ANNUALLY

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:
330-084.2C

ATTACHMENT A

HISTORICAL GROUNDWATER ELEVATION AND ANALYTICAL DATA TABLES

Table A-1
Historical Liquid Surface Elevation Data

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

Well Number	Date Gauged	Well Elevation (feet, MSL)	Depth to Liquid (feet, TOC)	SPH Thickness (feet)	Liquid Surface Elevation (feet, MSL)
MW-1	07/20/89	159.44	8.04	--	151.40
	08/30/89		8.47	--	150.97
	10/04/89		8.50	--	150.94
	01/10/90		6.74	--	152.70
	08/07/90		6.87	--	152.57
	12/06/90		7.35	--	152.09
	12/19/90		7.22	--	152.22
	01/29/91		8.28	--	151.16
	02/20/91		7.98	--	151.46
	04/25/91		6.89	--	152.55
	05/31/91		7.64	--	151.80
	07/08/91		8.17	--	151.27
	08/09/91		8.58	--	150.86
	09/25/91		8.82	--	150.62
	10/17/91		8.96	--	150.48
	11/20/91		8.60	--	150.84
	12/27/91		8.71	--	150.73
	01/19/92		7.83	--	151.61
	02/19/92		6.68	--	152.76
	03/09/92		4.47	--	154.97
	04/15/92	158.91	6.44	--	152.47
	05/12/92		7.31	--	151.60
	06/16/92		7.97	--	150.94
	07/14/92		8.22	--	150.69
	08/07/92		8.46	--	150.45
	09/22/92		6.76	--	152.15
	10/12/92		7.13	--	151.78
	11/23/92		7.24	--	151.67
	12/16/92		6.44	--	152.47
	01/21/93		5.03	--	153.88
	02/22/93		4.93	--	153.98
	03/25/93		5.13	--	153.78
	04/27/93		5.68	--	153.23
	08/04/93		7.91	--	151.00
	10/13/93		8.81	--	150.10
	02/03/94		7.51	--	151.40
	04/29/94		7.20	--	151.71
	08/02/94		8.02	--	150.89
	11/12/94		6.70	--	152.21
	02/23/95		7.77	--	151.14
	05/09/95		7.82	--	151.09
	08/07/95		7.45	--	151.46
	11/02/95		8.26	--	150.65
MW-2	07/20/89	158.46	8.15	--	150.31
	08/30/89		8.42	--	150.04
	10/04/89		8.40	--	150.06
	01/10/90		6.12	--	152.34
	08/07/90		6.35	--	152.11
	12/06/90		7.15	--	151.31
	12/19/90		7.38	--	151.08
	01/29/91		8.41	--	150.05
	02/20/91		8.26	--	150.20
	04/25/91		7.70	--	150.76
	05/31/91		8.10	--	150.36
	07/08/91		8.34	--	150.12

Table A-1 (continued)
Historical Liquid Surface Elevation Data

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

Well Number	Date Gauged	Well Elevation (feet, MSL)	Depth to Liquid (feet, TOC)	SPH Thickness (feet)	Liquid Surface Elevation (feet, MSL)
MW-2	08/09/91		8.51	--	149.95
(cont.)	09/25/91		8.66	--	149.80
	10/17/91		8.80	--	149.66
	11/20/91		8.66	--	149.80
	12/27/91		8.57	Sheen	149.89
	01/19/92		8.25	--	150.21
	02/19/92		7.50	--	150.96
	03/09/92		7.40	--	151.06
	04/15/92	157.92	7.72	--	150.20
	05/12/92		8.01	--	149.91
	06/16/92		8.25	--	149.67
	07/14/92		8 33	--	149.59
	08/07/92		8 42	--	149.50
	09/22/92		6.13	--	151.79
	10/12/92		6 80	--	151.12
	11/23/92		7.15	--	150.77
	12/16/92		6.66	--	151.26
	01/21/93		5.93	--	151.99
	02/22/93		6.01	--	151.91
	03/25/93		5.91	--	152.01
	04/27/93		6.63	--	151.29
	08/04/93		8.02	--	149.90
	10/13/93		8.64	--	149.28
	02/03/94		8.08	--	149.84
	04/29/94		8.14	--	149.78
	08/02/94		8.31	--	149.61
	11/12/94		7.74	--	150.18
	02/23/95		7.53	--	150.39
	05/09/95		7.57	--	150.35
	08/07/95		8.15	--	149.77
	11/02/95		8.50	--	149.42
MW-3	07/20/89	154.18	7.58	--	146.60
	08/30/89		8.00	--	146.18
	10/04/89		7.73	Emulsion	146.45
	01/10/90		7.78	--	146.40
	08/07/90		7.66	--	146.52
	12/06/90		7.75	--	146.43
	12/19/90		7.58	--	146.60
	01/29/91		7.60	--	146.58
	02/20/91		7.51	--	146.67
	04/25/91		6.37	--	147.81
	05/31/91		7.19	--	146.99
	07/08/91		7.60	--	146.58
	08/09/91		7.94	--	146.24
	09/25/91		8.23	--	145.95
	10/17/91		8.44	--	145.74
	11/20/91		8.78	--	145.40
	12/27/91		8.05	Sheen	146.13
	01/19/92		7.65	--	146.53
	02/19/92		6.48	--	147.70
	03/09/92		5.45	--	148.73
	04/15/92	153.64	7.75	--	145.89
	05/12/92		7.45	--	146.19
	06/16/92		7.51	--	146.13
	07/14/92		7.60	--	146.04

Table A-1 (continued)
Historical Liquid Surface Elevation Data

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

Well Number	Date Gauged	Well Elevation (feet, MSL)	Depth to Liquid (feet, TOC)	SPH Thickness (feet)	Liquid Surface Elevation (feet, MSL)
MW-3	08/07/92		7.85	--	145.79
(cont.)	09/22/92		7.73	--	145.91
	10/12/92		7.83	--	145.81
	11/23/92		6.98	--	146.66
	12/16/92		5.96	--	147.68
	01/21/93		4.62	--	149.02
	02/22/93		5.15	--	148.49
	03/25/93		5.45	--	148.19
	04/27/93		5.79	--	147.85
	08/04/93		7.24	--	146.40
	10/13/93		8.03	--	145.61
	02/03/94		6.66	--	146.98
	04/29/94		7.70	--	145.94
	08/02/94		7.47	--	146.17
	11/12/94		5.91	--	147.73
	02/23/95		7.18	--	146.46
	05/09/95		5.96	--	147.68
	08/07/95		7.83	--	145.81
	11/02/95		7.83	--	145.81
MW-4	07/20/89	157.08	8.09	--	148.99
	08/30/89		8.45	Sheen	148.63
	10/04/89		8.57	Sheen	148.51
	01/10/90		7.26	--	149.82
	08/07/90		6.87	--	150.21
	12/06/90		8.02	Sheen	149.06
	12/19/90		7.69	--	149.39
	01/29/91		8.39	Sheen	148.69
	02/20/91		8.16	--	148.92
	04/25/91		7.14	--	149.94
	05/31/91		7.64	--	149.44
	07/08/91		8.34	--	148.74
	08/09/91		8.60	--	148.48
	09/25/91		8.80	--	148.28
	10/17/91		8.98	--	148.10
	11/20/91		8.78	--	148.30
	12/27/91		8.82	--	148.26
	01/19/92		8.18	--	148.90
	02/19/92		7.62	--	149.46
	03/09/92		6.68	--	150.40
	04/15/92	156.53	6.96	--	149.57
	05/12/92		7.45	--	149.08
	06/16/92		7.94	--	148.59
	07/14/92		8.21	--	148.32
	08/07/92		8.41	--	148.12
	09/22/92		6.14	--	150.39
	10/12/92		6.45	--	150.08
	11/23/92		7.48	--	149.05
	12/16/92		6.95	--	149.58
	01/21/93		5.53	--	151.00
	02/22/93		5.83	--	150.70
	03/25/93		5.96	--	150.57
	04/27/93		6.30	--	150.23
	08/04/93		7.71	--	148.82
	10/13/93		8.53	--	148.00
	02/03/94		9.27	--	147.26

Table A-1 (continued)
Historical Liquid Surface Elevation Data

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

Well Number	Date Gauged	Well Elevation (feet, MSL)	Depth to Liquid (feet, TOC)	SPH Thickness (feet)	Liquid Surface Elevation (feet, MSL)
MW-4	04/29/94		9.50	--	147.03
(cont.)	08/02/94		8.69	--	147.84
	11/12/94		6.88	--	149.65
	02/23/95		9.38	--	147.15
	05/09/95		9.00	--	147.53
	08/07/95		9.55	--	146.98
	11/02/95		9.58	--	146.95
MW-5	04/15/92	151.33	8.05	--	143.28
	05/12/92		8.44	--	142.89
	06/16/92		8.74	--	142.59
	07/14/92		9.70	--	141.63
	08/07/92		9.10	--	142.23
	09/22/92		9.26	--	142.07
	10/25/92		9.24	--	142.09
	11/23/92		---------- Well Inaccessible ----------		
	12/16/92		8.20	--	143.13
	01/21/93		7.89	--	143.44
	02/22/93		7.29	--	144.04
	03/25/93		7.51	--	143.82
	04/27/93		7.72	--	143.61
	08/05/93		8.66	--	142.67
	10/13/93		9.00	--	142.33
	02/03/94		9 38	--	141.95
	04/29/94		---------- Well Inaccessible ----------		
	08/02/94		8.71	--	142.62
	11/12/94		8.65	--	142.68
	02/23/95		9.23	--	142.10
	05/09/95		7.65	--	143.68
	08/07/95		8.25	--	143.08
	11/02/95		8.60	--	142.73
MW-6	04/15/92	153.84	4.55	--	149.29
	05/12/92		5.32	--	148.52
	06/16/92		5.91	--	147.93
	07/14/92		6.08	--	147.76
	08/07/92		6.36	--	147.48
	09/22/92		6.53	--	147.31
	10/25/92		6.54	--	147.30
	11/23/92		5.75	--	148.09
	12/16/92		4.69	--	149.15
	01/21/93		3.82	--	150.02
	02/22/93		3.78	--	150.06
	03/25/93		3.93	--	149.91
	04/27/93		4.30	--	149.54
	08/05/93		5.39	--	148.45
	10/13/93		7.12	--	146.72
	02/03/94		5.17	--	148.67
	04/29/94		4.66	--	149.18
	08/02/94		5.64	--	148.20
	11/12/94		6.32	--	147.52
	02/23/95		5.60	--	148.24
	05/09/95		5.21	--	148.63

Table A-1 (continued)
Historical Liquid Surface Elevation Data

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

Well Number	Date Gauged	Well Elevation (feet, MSL)	Depth to Liquid (feet, TOC)	SPH Thickness (feet)	Liquid Surface Elevation (feet, MSL)
MW-6	08/07/95		5.68	--	148.16
(cont.)	11/02/95		6.60	--	147.24

SPH = Separate-phase hydrocarbons
MSL = Mean sea level
TOC = Top of casing

Table A-2

Total Purgeable Petroleum Hydrocarbons
(TPPH as Gasoline, BTEX Compounds, TEPH as Diesel, and Oil and Grease)

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

Well Number	Date Sampled		TPPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Xylenes (ppb)	TEPH as Diesel (ppb)	Oil and Grease (ppb)
MW-1	07/21/89		33	0.77	1.6	15	5	NA	NA
	08/30/89		<20	<0.50	<0.50	<0.50	<0.50	NA	NA
	10/04/89		<20	<0.50	<0.50	<0.50	<0.50	NA	NA
	01/10/90		<20	<0.50	<0.50	<0.50	<0.50	NA	NA
	08/07/90		<20	<0.50	<0.50	<0.50	<0.50	NA	NA
	12/06/90		<50	3.6	2.7	0.60	5.8	NA	NA
	02/20/91		<50	<0.50	<0.50	<0.50	<0.50	NA	NA
	07/08/91		<30	<0.30	<0.30	<0.30	<0.30	NA	NA
	09/25/91		<30	57	57	54	1.7	NA	NA
	11/20/91		57	9.2	3.7	0.63	25	NA	NA
	03/09/92		<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	04/15/92		<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	07/14/92		<50	<0.5	0.7	<0.5	1.3	NA	NA
	10/12/92		<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	01/21/93		<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	04/27/93		<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	08/04/93		<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	10/13/93		<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	02/03/94		<50	1.4	2.1	<0.5	2	NA	NA
	04/29/94		<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	08/02/94		<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	11/12/94		<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	02/23/95		<50	<0.50	<0.50	<0.50	<0.50	NA	NA
	05/09/95		<50	<0.50	<0.50	<0.50	<0.50	NA	NA
	08/07/95	a	<500	<5.0	<5.0	<5.0	<5.0	NA	NA
	11/02/95		<50	3.6	<0.50	<0.50	<0.50	NA	NA
MW-2	07/21/89		4,200	280	210	38	24	NA	NA
	08/30/89		4,200	160	260	45	240	NA	NA
	10/04/89		4,300	860	300	29	330	NA	NA
	01/10/90		8,000	890	710	120	760	NA	NA
	08/07/90		6,000	880	76	25	80	NA	NA
	12/06/90		1,600	330	69	18	63	NA	NA
	02/20/91		1,300	160	46	13	48	NA	NA
	07/08/91		310	76	18	7.7	24	NA	NA
	09/25/91		83	17	0.69	2.2	4.1	NA	NA
	11/20/91		180	46	6.1	3	8.7	NA	NA
	03/09/92		690	170	25	21	58	NA	NA
	04/15/92		86	20	2.3	3.8	85	NA	NA
	07/14/92		160	46	1.4	1.2	35	NA	NA
	10/12/92		230	59	7	55	11	NA	NA
	01/21/93		450	70	6.6	22	54	NA	NA
	04/27/93		<50	6.6	<0.5	0.7	1.1	NA	NA
	08/04/93		<50	2.1	<0.5	<0.5	<0.5	NA	NA
	10/13/93		<50	14	<0.5	<0.5	<0.5	NA	NA
	02/03/94		<50	4.4	<0.5	<0.5	0.8	NA	NA
	04/29/94		150	38	0.7	4.3	4.8	NA	NA
	08/02/94		<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	11/12/94		95	28	0.7	2.5	7.5	NA	NA

Table A-2 (continued)

Total Purgeable Petroleum Hydrocarbons
(TPPH as Gasoline, BTEX Compounds, TEPH as Diesel, and Oil and Grease)

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

Well Number	Date Sampled	TPPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Xylenes (ppb)	TEPH as Diesel (ppb)	Oil and Grease (ppb)
MW-2	02/23/95	<50	1.8	<0.50	<0.50	<0.50	NA	NA
(cont.)	05/09/95	<50	1.9	<0.50	<0.50	<0.50	NA	NA
	08/07/95	<50	0.66	<0.50	<0.50	<0.50	NA	NA
	11/02/95	<50	<0.50	<0.50	<0.50	<0.50	NA	NA
MW-3	07/21/89	430	9	4.8	<0.50	50	NA	NA
	08/30/89	1,200	85	46	84	55	NA	NA
	10/04/89	7,000	580	900	120	670	NA	NA
	01/10/90	940	130	59	21	73	NA	NA
	08/07/90	2,300	180	64	59	120	NA	NA
	12/06/90	460	52	55	14	39	350	NA
	02/20/91	470	36	30	9.3	31	<100	<5,000
	07/08/91	2500	240	470	74	320	NA	NA
	09/25/91	1,100	120	110	34	120	NA	NA
	11/20/91	1,000	180	140	43	140	NA	NA
	03/10/92	1,200	200	110	53	130	NA	NA
	04/15/92	1,600	200	13	110	81	NA	NA
	07/14/92	5,200	620	44	310	250	NA	NA
	10/12/92	850	150	5.2	55	46	NA	NA
	01/21/93	620	100	12	35	35	NA	NA
	04/27/93	1,700	180	83	64	100	NA	NA
	08/04/93	380	70	12	29	41	NA	NA
	10/13/93	780	90	6	40	31	NA	NA
	02/03/94	340	42	8.7	9.2	28	NA	NA
	04/29/94	830	150	38	27	48	NA	NA
	08/02/94	220	25	1.7	7.6	8.3	NA	NA
	11/12/94	160	6.0	<0.5	3.2	4.1	NA	NA
	02/23/95	120	1.3	<0.50	1.1	1.6	NA	NA
	05/09/95	190	20	6.6	8.9	20	NA	NA
	08/07/95	<50	2.3	0.51	0.51	0.57	NA	NA
	11/02/95	<50	2.3	<0.50	<0.50	0.94	NA	NA
MW-4	07/21/89	8,700	720	360	120	640	NA	NA
	08/30/89	7,300	630	220	N/A	320	NA	NA
	10/04/89	21,000	2,300	1,300	280	1,300	NA	NA
	01/10/90	4,300	470	250	63	430	NA	NA
	08/07/90	69,000	8,700	4,200	540	4,600	28,000	<5,000
	12/06/90	---------- Separate-Phase Hydrocarbon Sheen ----------						
	02/20/91	5,200	690	200	95	580	<100	<5,000
	07/08/91	1,700	280	68	37	170	NA	NA
	09/25/91	6,300	2,100	290	210	590	NA	NA
	11/20/91	2,700	1,200	200	110	320	NA	NA
	03/10/92	690	180	80	18	43	NA	NA
	04/15/92	8,500	2,100	750	280	1,000	NA	NA
	07/14/92	10,000	2,900	530	290	930	NA	NA
	10/12/92	19,000	5,200	1,600	490	1,800	690	NA
	01/21/93	22,000	4,400	1,300	580	2,200	1,400	NA
	04/27/93	21,000	4,800	1,200	630	2,400	1,100	NA
	08/04/93	23,000	6,600	1,700	770	2,600	1500	NA

Table A-2 (continued)

Total Purgeable Petroleum Hydrocarbons
(TPPH as Gasoline, BTEX Compounds, TEPH as Diesel, and Oil and Grease)

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

Well Number	Date Sampled	TPPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Xylenes (ppb)	TEPH as Diesel (ppb)	Oil and Grease (ppb)
MW-4	10/13/93	16,000	3,500	800	470	1,800	670	NA
(cont.)	02/03/94	850	140	84	7.9	59	59	NA
	04/29/94	68	1.1	<0.5	<0.5	1.7	<50	NA
	08/02/94	52	5.7	<0.5	1.2	1.9	<50	NA
	11/12/94	1,600	230	51	81	190	90	NA
	02/23/95	1,700	340	81	52	130	NA	NA
	05/09/95	<50	<0.50	<0.50	<0.50	<0.50	NA	NA
	08/07/95	<50	<0.50	<0.50	<0.50	<0.50	NA	NA
	11/02/95	<50	<0.50	<0.50	<0.50	<0.50	NA	NA
MW-5	04/15/92	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	07/14/92	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	10/25/92	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	01/21/93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	04/27/93	<50	0.5	1	<0.5	0.8	NA	NA
	08/05/93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	10/14/93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	02/03/94	<50	0.8	1.7	<0.5	15	NA	NA
	04/29/94	---------- Well Inaccessible ----------						
	08/02/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	11/12/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	02/23/95	<50	<0.50	0.56	<0.50	0.50	NA	NA
	05/09/95	<50	<0.50	0.56	<0.50	0.50	NA	NA
	08/07/95	<50	<0.50	<0.50	<0.50	<0.50	NA	NA
	11/02/95	<50	<0.50	1.8	<0.50	<0.50	NA	NA
MW-6	04/15/92	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	07/15/92	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	10/25/92	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	01/21/93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	04/27/93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	08/05/93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	10/13/93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	02/03/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	04/29/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	08/02/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	11/12/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	02/23/95	<50	<0.50	<0.50	<0.50	<0.50	NA	NA
	05/09/95	<50	<0.50	<0.50	<0.50	<0.50	NA	NA
	08/07/95	<50	<0.50	<0.50	<0.50	<0.50	NA	NA
	11/02/95	<50	<0.50	<0.50	<0.50	<0.50	NA	NA

TEPH = Total extractable petroleum hydrocarbons
ppb = Parts per billion
NA = Not analyzed
N/A = Not available
a. Detection limits were raised due to analysis for MTBE
Prior to June 1995, TPPH as gasoline and TEPH as diesel were reported as TPH as gasoline and diesel, respectively.

Table A-3
Historical Groundwater Analytical Data
Total Methyl t-Butyl Ether

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

Well Number	Date Sampled	Methyl t-Butyl Ether (ppb)
MW-1	08/07/95	510
MW-2	08/07/95	37
MW-3	08/07/95	<2.5
MW-4	08/07/95	<2.5
MW-5	08/07/95	<2.5
MW-6	08/07/95	160

ppb = Parts per billion
See certified analytical report for detection limit.

ATTACHMENT B

FIELD AND LABORATORY PROCEDURES

ATTACHMENT B
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, and xylenes. The analyses were performed according to EPA Methods 8015 (modified), 8020, and 5030 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 C

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

FIELD SERVICES / O & M REQUEST

SITE INFORMATION FORM

Project #:330-084.2I

Station #:374

Site Address:6407 Telegraph ave Berkeley, California

County: Alameda

Project Manager: Kelly Brown

Requestor: Chuck Graves

Client: Arco

Prefield contacts: None

☐ **1st time visit**

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

☐ **Monthly**

☐ **Semi-Monthly**

☐ **Weekly**

☐ **One time Event**

☐ **Other.**_____

Client P.O.C.: Mike Whelan

Date of Request: 4/96

Ideal Field Date:

Budget Hrs._____

Actual Hrs. 2hrs

Mob de Mob 1hr

Total hrs = 3

Total Purge = 71.50

Field Tasks: For General Description

Second Quarter 1996 Groundwater sampling event: DTW/DTL on all wells TOB/TOC sample per attached protocol.

WA# 19348 00

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

MW-5 HAD CAR PARKED ON WELL; NO SAMPLE TAKEN.

Completed by: W Peck Date: 4/10/96

Checked by:_____

WELL SAMPLING REQUEST

SAMPLING PROTOCOL								
Project No.	**Station #**	**Project Name**	**SEQUENCE**	**Project Manager**	**Approval**	**Date/s**	**Laboratory:**	**Client Engineer:**
330-084.2I	374	6407 Telegraph Berkeley	2Q96	Kelly Brown	KB 3/28/96		Sequoia	Mike Whelan

Well Number	**Ideal Sampling Order**	**Sample I.D.**	***Sampling Frequency***	***Analyses***	***TOB TOC***	***Well Depth***	***Casing Diameter***	***Well goes Dry?***	**Comments**
MW-1			ANNUAL-3Q	DTW ONLY	TOB/TOC	26.5	4"	NO	
MW-2			ANNUAL-3Q	DTW ONLY	TOB/TOC	26	4"	NO	
MW-3			QLY	GAS/BTEX	TOB/TOC	27	4"	NO	
MW-4			QLY	GAS/BTEX	TOB/TOC	27	4"	NO	
MW-5			QLY	GAS/BTEX	TOB/TOC	22	4"	NO	
MW-6			ANNUAL-3Q	DTW ONLY	TOB/TOC	14.5	4"	NO	
TB-1			QLY	GAS/BTEX					

3/25/96SMPLRQST.XLS

FIELD REPORT

DEPTH TO WATER/SEPARATE-PHASE HYDROCARBON SURVEY

PROJECT No.: 330-084 21 LOCATION: 6407 TELEGRAPH AVE. BERKELEY CA. DATE: ~~4~~ 4-10-96

CLIENT/STATION NO.: ARCO #374 FIELD TECHNICIAN: W. PECK DAY OF WEEK: WED.

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

	Dtw Order	Well ID	Time	Surface Seal	Lid Secure	Gasket	Lock	Expanding Cap	Total Depth (feet)	First Depth to Water (feet) TOB/TOC	Second Depth to Water (feet) TOB/TOC	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
4"	1	MW-1	9:40	X	X	X	X	X	26.68	5.82 / 5.82	6.08 / 6.08										/
4"	4	MW-2	9:50	X	X	X	X	X	26.32	6.94 / 6.94	7.20 / 7.20										/
4"	5	MW-3	9:55	X	X	X	X	X	26.68	7.82 / 7.82	8.12 / 8.12										/
4"	6	MW-4	10:00	X	X		~~X~~	X	26.90	6.66 / 6.66	7.40 / 7.40										/
	3	MW-5								/	/										/
4"	2	MW-6	9:45	X	X	X	X	X	14.60	4.58 / 4.58	5.05 / 5.05										/
										/	/										/
										/	/										/
										/	/										/

Comments: UNABLE TO TAKE D.T.W. CAR PARKED ON WELL 9:50 TRY AGAIN AFTER WELL'S SAMPLED. CAR STILL ON WELL, KNOCKED ON DOORS AT NEARBY HOUSES, COULDN'T SAMPLE WELL. 11:45.

FIELD DATA SHEET

ATER SAMPLE FIELD DATA SHEET

PROJECT No.: 330-084 2I LOCATION: 6407 TELEGRAPH AV. BERKELEY CA. WELL ID #: MW-3

CLIENT/STATION No.: ARCO #374 FIELD TECHNICIAN: W. PECK

WELL INFORMATION

Depth to Liquid: — TOB — TOC
Depth to water: 8.12 TOB 7.82 TOC
Total depth: — TOB 26.68 TOC
Date: 4-10-96 Time (2400): 9:55

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

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

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

TD 26.68 - DTW 7.82 = 18.86 x Gal/Linear Foot .66 = 12.44 x Number of Casings 3 = Calculated Purge 37.32

DATE PURGED: 4-10-96 START: 10:40 END (2400 hr): 10:58 PURGED BY: W. PECK

DATE SAMPLED: 4-10-96 START: 10:55 END (2400 hr): 11:00 SAMPLED BY: W. PECK

TIME (2400 hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm @ 25°C)	TEMPERATURE (°F)	COLOR	TURBIDITY	ODOR
10:45	12.50	7.24	780	69.5	CLOUDY	MOD.	NONE
10:50	25.00	6.98	720	67.0	CLOUDY	LIGHT	NONE
~~10:55~~		~~WENT DRY~~					
10:55	31.00	7.38	700	66.2	CLOUDY	LIGHT	NONE

Pumped dry (Yes) / No

Cobalt 0-100 Clear Cloudy Yellow Brown | NTU 0-200 Heavy Moderate Light Trace | Strong Moderate Faint None

FIELD MEASUREMENTS AT TIME OF SAMPLE, AFTER RECHARGE:

DTW: 24.35 TOB/TOC 7.24 670 65.2 BRN MOD. NONE

PURGING EQUIPMENT/I.D. #
- ☒ Bailer:
- ☒ Centrifugal Pump: #5
- ☐ Airlift Pump:
- ☐ Dedicated:
- ☐ Other:

SAMPLING EQUIPMENT/I.D. #
- ☒ Bailer: G-3
- ☐ Dedicated:
- ☐ Other:

AMP. CNTRL #	DATE	TIME (2400)	No. of Cont.	SIZE	CONTAINER	PRESERVE	ANALYTICAL PARAMETER
MW-3	4-10-96	11:00	3	40mL	VOA	HCL	GAS / BTEX

REMARKS: WENT DRY AT 31.0 GAL.

SIGNATURE: Walter S. Peck

PACIFIC ENVIRONMENTAL GROUP, INC.

FIELD DATA SHEET

/ATER SAMPLE FIELD DATA SHEET

PROJECT No.: 330-084 2I LOCATION: 6407 TELEGRAPH AV. BERKELEY CA. WELL ID #: MW4

CLIENT/STATION No.: ARCO #374 FIELD TECHNICIAN: W. PECK

WELL INFORMATION

Depth to Liquid: — TOB — TOC
Depth to water: 7.40 TOB 6.66 TOC
Total depth: — TOB 26.90 TOC
Date: 4-10-96 Time (2400): 10:00

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

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

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

TD 26.90 - DTW 6.66 = 20.24 x Gal/Linear Foot .66 = 13.35 x Number of Casings 3 = Calculated Purge 40.07

DATE PURGED: 4-10-96 START: 11:05 END (2400 hr): 11:25 PURGED BY: W. PECK

DATE SAMPLED: 4-10-96 START: 11:25 END (2400 hr): 11:30 SAMPLED BY: W. PECK

TIME (2400 hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm @ 25°C)	TEMPERATURE (°F)	COLOR	TURBIDITY	ODOR
11:15	13.50	7.03	1050	67.8	MUDDY	MOD	FAINT
11:20	27.00	7.00	1010	68.9	CLOUDY	MOD	NONE
11:25	40.50	7.38	960	69.4	CLOUDY	MOD	NONE

Pumped dry Yes. / No

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

FIELD MEASUREMENTS AT TIME OF SAMPLE, AFTER RECHARGE:

DTW: ____ TOB/TOC ____

PURGING EQUIPMENT/I.D.

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

SAMPLING EQUIPMENT/I.D.

- ☒ Bailer: G-8
- ☐ Dedicated:
- ☐ Other:

SAMP. CNTRL #	DATE	TIME (2400)	No. of Cont.	SIZE	CONTAINER	PRESERVE	ANALYTICAL PARAMETER
MW-4	4-10-96	11:30	3	40mL	VOA	HCL	GAS / BTEX

REMARKS:

SIGNATURE: Walter J. Peck

PACIFIC ENVIRONMENTAL GROUP, INC.

FIELD DATA SHEET

ATER SAMPLE FIELD DATA SHEET

PROJECT No.: 330-084 21 LOCATION: 6407 TELEGRAPH AV. BERKELEY CA. WELL ID #: MW-5

CLIENT/STATION No.: ARCO #374 FIELD TECHNICIAN: W. PECK

WELL INFORMATION

Depth to Liquid: _____ TOB _____ TOC
Depth to water: _____ TOB _____ TOC
Total depth: _____ TOB _____ TOC
Date: 4-10-96 Time (2400): _____

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

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

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

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

DATE PURGED: 4-10-96 START: _____ END (2400 hr): _____ PURGED BY: W. PECK

DATE SAMPLED: 4-10-96 START: _____ END (2400 hr): _____ SAMPLED BY: W. PECK

TIME (2400 hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm @ 25°C)	TEMPERATURE (°F)	COLOR	TURBIDITY	ODOR
	NO SAMPLE TAKEN						

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: _____
- ☒ Centrifugal Pump: _____
- ☐ Airlift Pump: _____
- ☐ Dedicated: _____
- ☐ Other: _____

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

MP. CNTRL #	DATE	TIME (2400)	No. of Cont.	SIZE	CONTAINER	PRESERVE	ANALYTICAL PARAMETER
MW-5	4-10-96	_____	3	40mL	VOA	HCL	GAS / BTEX

MARKS: CAR ON WELL UNABLE TO SAMPLE

SIGNATURE: _____

PACIFIC ENVIRONMENTAL GROUP, INC.

FIELD DATA SHEET

ATER SAMPLE FIELD DATA SHEET

PROJECT No.: 330-084 21 LOCATION: 6407 TELEGRAPH AV. BERKELEY CA. WELL ID #: TB-1

CLIENT/STATION No.: ARCO #374 FIELD TECHNICIAN: W. Peck

WELL INFORMATION

Depth to Liquid: _____ TOB _____ TOC
Depth to water: _____ TOB _____ TOC
Total depth: _____ TOB _____ TOC
Date: 4-10-96 Time (2400): _____

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

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

SAMPLE TYPE
- ☒ ~~Groundwater~~ (w/o)
- ☐ Duplicate
- ☐ Extraction well
- ☒ Trip blank
- ☐ Field blank
- ☐ Equipment blank
- ☐ Other; _____

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

DATE PURGED: 4-10-96 START: _____ END (2400 hr): _____ PURGED BY: W. Peck

DATE SAMPLED: 4-10-96 START: _____ END (2400 hr): _____ SAMPLED BY: W. Peck

TIME (2400 hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm @ 25°C)	TEMPERATURE (° F)	COLOR	TURBIDITY	ODOR
			TRIP BLANK				

Pumped dry Yes / No

Cobalt 0-100 Clear Cloudy Yellow Brown

NTU 0-200 Heavy Moderate Light Trace

Strong Moderate Faint None

FIELD MEASUREMENTS AT TIME OF SAMPLE, AFTER RECHARGE:

DTW: _____ TOB/TOC _____

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

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

AMP. CNTRL #	DATE	TIME (2400)	No. of Cont.	SIZE	CONTAINER	PRESERVE	ANALYTICAL PARAMETER
TB-1	4-10-96	1719	3	40mL	VOA	HCL	GAS / BTEX

MARKS: TRIP BLANK

SIGNATURE: Walter L. Peck

PACIFIC ENVIRONMENTAL GROUP, INC.

ARCO Products Company Division of AtlanticRichfieldCompany — 33084 21 — **Task Order No.** 193480 — **Chain of Custody**

ARCO Facility no. 374	City (Facility) 6407 Telegraph Ave. Berkeley	Project manager (Consultant) Kelly Brown	Laboratory name Sequoia
ARCO engineer Mike Whelan	Telephone no. (ARCO)	Telephone no. (Consultant) (408) 441 7500	Fax no. (Consultant) (408) 441 7539
Consultant name Pacific Environmental Group	Address (Consultant) 2025 Gateway Place Suite 440 San Jose CA 95110		Contract number

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid HCl	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH/Gas EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
MW-3		3		V		X	Y	4/10/96	11:00		Y											
MW-4		3		X		Y	Y	4/10/96	11:30		↓											
TB-1		2		Y		X	Y	4/10/96	N/A		↓											

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:

	Date	Time	
Relinquished by sampler	4/10/96	13:25	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory / Date / Time

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: Kelly Brown

Project: 330-084.2l/374,Berkeley

Enclosed are the results from samples received at Sequoia Analytical on April 11, 1996. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE COLLECTED	TEST METHOD
9604912 -01	LIQUID, MW-3	04/10/96	TPHGBW Purgeable TPH/BTEX
9604912 -02	LIQUID, MW-4	04/10/96	TPHGBW Purgeable TPH/BTEX
9604912 -03	LIQUID, TB-1	04/10/96	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

Claudia Hirotsu
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	Client Proj. ID: 330-084.2I/374,Berkeley	Sampled: 04/10/96
2025 Gateway Place, Suite 440	Sample Descript: MW-3	Received: 04/11/96
San Jose, CA 95110	Matrix: LIQUID	
	Analysis Method: 8015Mod/8020	Analyzed: 04/17/96
Attention: Kelly Brown	Lab Number: 9604912-01	Reported: 04/19/96

QC Batch Number: GC041796BTEX22A
Instrument ID: GCHP22

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX

Analyte	Detection Limit ug/L	Sample Results ug/L
TPPH as Gas	**50**	**84**
Benzene	**0.50**	**2.4**
Toluene	0.50	N.D.
Ethyl Benzene	**0.50**	**1.9**
Xylenes (Total)	**0.50**	**1.1**
Chromatogram Pattern:		**Gas**

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	99

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

SEQUOIA ANALYTICAL - ELAP #1210

Claudia Hirotsu
Project Manager

Sequoia Analytical

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

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

Attention: Kelly Brown

Client Proj. ID: 330-084.2I/374,Berkeley
Sample Descript: MW-4
Matrix: LIQUID
Analysis Method: 8015Mod/8020
Lab Number: 9604912-02

Sampled: 04/10/96
Received: 04/11/96

Analyzed: 04/17/96
Reported: 04/19/96

QC Batch Number: GC041796BTEX22A
Instrument ID: GCHP22

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX

Analyte	Detection Limit ug/L	Sample Results ug/L
TPPH as Gas	1000	7300
Benzene	10	1600
Toluene	10	350
Ethyl Benzene	10	350
Xylenes (Total)	10	830
Chromatogram Pattern:		Gas

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	94

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

SEQUOIA ANALYTICAL - ELAP #1210

Claudia Hirotsu
Project Manager

Sequoia Analytical

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

Pacific Environmental Group	Client Proj. ID: 330-084.2I/374,Berkeley	Sampled: 04/10/96
2025 Gateway Place, Suite 440	Sample Descript: TB-1	Received: 04/11/96
San Jose, CA 95110	Matrix: LIQUID	
	Analysis Method: 8015Mod/8020	Analyzed: 04/17/96
Attention: Kelly Brown	Lab Number: 9604912-03	Reported: 04/19/96

QC Batch Number: GC041796BTEX22A
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.

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	87

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

SEQUOIA ANALYTICAL - ELAP #1210

Claudia Hirotsu
Project Manager

Sequoia Analytical

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

Pacific Environmental Group
2025 Gateway Place, Suite 440
San Jose, CA 95110
Attention: Kelly Brown

Client Project ID: 330-084.2I / 374, Berkeley
Matrix: LIQUID
Work Order #: 9604912 01-03

Reported: Apr 22, 1996

QUALITY CONTROL DATA REPORT

Analyte:	Benzene	Toluene	Ethyl Benzene	Xylenes
QC Batch#:	GC041796BTEX22A	GC041796BTEX22A	GC041796BTEX22A	GC041796BTEX22A
Analy. Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Prep. Method:	EPA 5030	EPA 5030	EPA 5030	EPA 5030
Analyst:	J. Heider	J. Heider	J. Heider	J. Heider
MS/MSD #:	960478953	960478953	960478953	960478953
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Prepared Date:	4/17/96	4/17/96	4/17/96	4/17/96
Analyzed Date:	4/17/96	4/17/96	4/17/96	4/17/96
Instrument I.D.#:	GCHP22	GCHP22	GCHP22	GCHP22
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Result:	9.5	9.5	9.4	28
MS % Recovery:	95	95	94	93
Dup. Result:	8.9	8.8	8.8	26
MSD % Recov.:	89	88	88	87
RPD:	6.5	7.7	6.6	7.4
RPD Limit:	0-50	0-50	0-50	0-50
LCS #:	BLK041796	BLK041796	BLK041796	BLK041796
Prepared Date:	4/17/96	4/17/96	4/17/96	4/17/96
Analyzed Date:	4/17/96	4/17/96	4/17/96	4/17/96
Instrument I.D.#:	GCHP22	GCHP22	GCHP22	GCHP22
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
LCS Result:	9.4	9.3	9.5	28
LCS % Recov.:	94	93	95	93
MS/MSD LCS Control Limits	70-130	70-130	70-130	70-130

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

SEQUOIA ANALYTICAL

Claudia Hirotsu
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 SAMPLE RECEIPT LOG

CLIENT NAME: Pace
REC. BY (PRINT): CW

WORKORDER: 9604912
DATE OF LOG-IN: 4/12/96

CIRCLE THE APPROPRIATE RESPONSE

1. Custody Seal(s): Present / Absent
   Intact / Broken*
2. Custody Seal Nos.: Put In Remarks Section
3. Chain-of-Custody Records: Present / Absent*
4. Traffic Reports or Packing List: Present / Absent
5. Airbill: Airbill / Sticker
   Present / Absent
6. Airbill No.:
7. Sample Tags: Present / Absent*
   Sample Tag Nos.: Listed / Not Listed on Chain-of-Custody
8. Sample Condition: Intact / Broken* / Leaking*
9. Does information on custody reports, traffic reports and sample tags agree? Yes / No*
10. Proper preservatives used: Yes / No*
11. Date Rec. at Lab: 4/12/96
12. Temp. Rec. at Lab: 6°C
13. Time Rec. at Lab: 1140

LAB SAMPLE #	DASH #	CLIENT IDENTIFICATION	CONTAINER DESCRIPTION	SAMPLE MATRIX	DATE SAMP.	REMARKS: CONDITION(ETC.)
1	a-c	MW 3	3 VOA	~~H2O~~ Water	4/10/96	
2	↓	MW 4	↓	↓	↓	
3	a-b	TB-1	2 VOA	↓	↓	

* if Circled, contact Project manager and attach record of resolution

ARCO Products Company Division of AtlanticRichfieldCompany — 33008421 — **Task Order No.** 1934800 — **Chain of Custody**

ARCO Facility no. 374	City (Facility) 6407 Telegraph ave Berkeley	Project manager (Consultant) Kelly Brown	Laboratory name Sequoia
ARCO engineer Mike Whelan	Telephone no. (ARCO)	Telephone no. (Consultant) (408) 441 7500	Fax no. (Consultant) (408) 441 7539	Contract number
Consultant name Pacific Environmental Group	Address (Consultant) 2025 Gateway Place Suite 440 San Jose CA 95110			Method of shipment

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Water	Other	Preservation: Ice	Acid HCl	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH/Gas EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐
MW-3	1	3		V		X	X	4/10/96	11:00		X									
MW-4	2	3		X		X	X	4/10/96	11:30		↓									
TB-1	3	2		X		X	X	4/10/96	N/A		↓									

Special detection Limit/reporting

Special QA/QC

Remarks: 1 of 1 ... = 1143

Lab number: 604912

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

Condition of sample: Good — Temperature received: 4°C

	Date	Time		Date	Time
Relinquished by sampler	4/10/96	13:25	Received by		
Relinquished by	4-11-96	0955	Received by		
Relinquished by	4/11/96	1140	Received by laboratory	4/11/96	1140

ATTACHMENT D

REMEDIAL SYSTEM PERFORMANCE EVALUATION

ATTACHMENT D
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 (GAC) 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 No. 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 D-1 and D-2. Graphical presentations of TPPH-g and benzene mass removal and concentration data are shown on Figures D-1 and D-2, respectively.

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. Due to diminishing dissolved oxygen concentrations the ORCs were replaced with the same number of new ORCs on June 6, 1996. 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.

Data collected from Well MW-3 has indicated that dissolved oxygen concentrations have increased since ORCs were installed. Available bioremediation enhancement data are shown on Table D-3. Selected bioremediation indicator parameters will be monitored during the

third quarter 1996 groundwater monitoring event to evaluate results of dissolved oxygen enhancement. ORC sock will be replenished on an as needed basis. Bioremediation enhancement field data sheets are presented as Attachment D-A.

Conclusions

As indicated above, GWE at the site has been terminated with verbal approval from ACHCSA. Bioremediation enhancement program will continue during third quarter 1996.

Attachments:
- Table D-1 - Historical Groundwater Extraction System Performance Data
- Table D-2 - Historical Groundwater Extraction System Analytical Data - Total Purgeable Petroleum Hydrocarbons (TPPH as Gasoline and BTEX Compounds)
- Table D-3 - Groundwater Biodegradation Study Field and Laboratory Data
- Figure D-1 - Historical Groundwater Extraction System Mass Removal Trend
- Figure D-2 - Historical Groundwater Extraction System Hydrocarbon Concentrations
- Attachment D-A - Bioremedation Enhancement Field Data Sheets

Table D-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

REPORTING PERIOD: 03/31/96 - 06/31/96 (i)			
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 D-2
Historical Groundwater Extraction System Analytical Data
Total Purgeable Petroleum Hydrocarbons
(TPPH as Gasoline and BTEX Compounds)

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

Sample I.D.	Date Sampled	TPPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylenes (µg/L)
Influent Samples						
SP-105	01/10/94	1,100	180	2.7	26	51
SP-105	02/07/94	3,500	370	120	67	230
SP-105	04/03/95	5,000	1,000	41	88	300
INFL	05/01/95	580	40	ND	1.2	17
SP-105	06/09/95	1,400	420	7	10	20
SP-105	07/05/95	750	41	ND	2.8	17
SP-105	08/10/95	610	29	0.64	3.4	16
SP-105	09/18/95	600	10	ND	ND	20
105	10/02/95	790	52	ND	8.4	67
Midpoint-1 Samples						
SP-106	01/10/94	ND	ND	ND	ND	ND
SP-106	02/07/94	ND	ND	ND	ND	ND
SP-106	04/03/95	ND	ND	ND	ND	ND
MID-1	05/01/95	ND	ND	ND	ND	ND
SP-106	06/09/95	ND	ND	ND	ND	ND
SP-106	07/05/95	ND	ND	ND	ND	ND
SP-106	08/10/95	ND	ND	ND	ND	ND
SP-106	09/18/95	ND	ND	ND	ND	ND
106	10/02/95	ND	ND	ND	ND	ND
Midpoint-2 Samples						
MID-2	11/17/94	ND	ND	ND	ND	ND
SP-107	01/10/94	ND	ND	ND	ND	ND
SP-107	02/07/94	ND	ND	ND	ND	ND
SP-107	04/03/95	ND	ND	ND	ND	ND
SP-107	06/09/94	ND	ND	ND	ND	ND
SP-107	09/18/95	ND	ND	ND	ND	ND
Effluent Samples						
SP-108	01/10/94	ND	ND	ND	ND	ND
SP-108	02/07/94	ND	ND	ND	ND	ND
SP-108	04/03/95	ND	ND	ND	ND	ND
EFFL	05/01/95	ND	ND	ND	ND	ND
SP-108	06/09/95	79	ND	ND	ND	ND
SP-108	07/05/95	ND	ND	ND	ND	ND
SP-108	08/10/95	ND	ND	ND	ND	ND
SP-108	09/18/95	ND	ND	ND	ND	ND
108	10/02/95	ND	ND	ND	ND	ND

µg/L = Micrograms per liter
ND = Not detected above detection limits
System startup on 12/21/93 by RESNA Industries, Inc.
Pacific Environmental Group, Inc. (PACIFIC) became consultant 9/01/94.
PACIFIC restarted system on 11/17/94
See certified analytical reports for individual detection limits.

Table D-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)	DO (mg/L)	Nitrite as Nitrite (mg/L)	Nitrate as Nitrate (mg/L)
MW-3	11/14/95	65.5*	6.76*	508*	7.17†	<1.0	6.6
	06/06/96	66.2	7.38	700	12.28	NS	NS
MW-6	06/06/96	NA	NA	NA	3.47	NS	NS

DO = Dissolved oxygen
deg F = Degrees Fahrenheit
µmhos = Micromhos
mg/L = Milligrams per liter

* = Field measurements collected on November 2, 1995.
† = DO measurement taken in office.
NS = Not sampled
NA = Not analyzed

Figure D-1
Histocial Groundwater Extraction System Mass Removal Trend

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

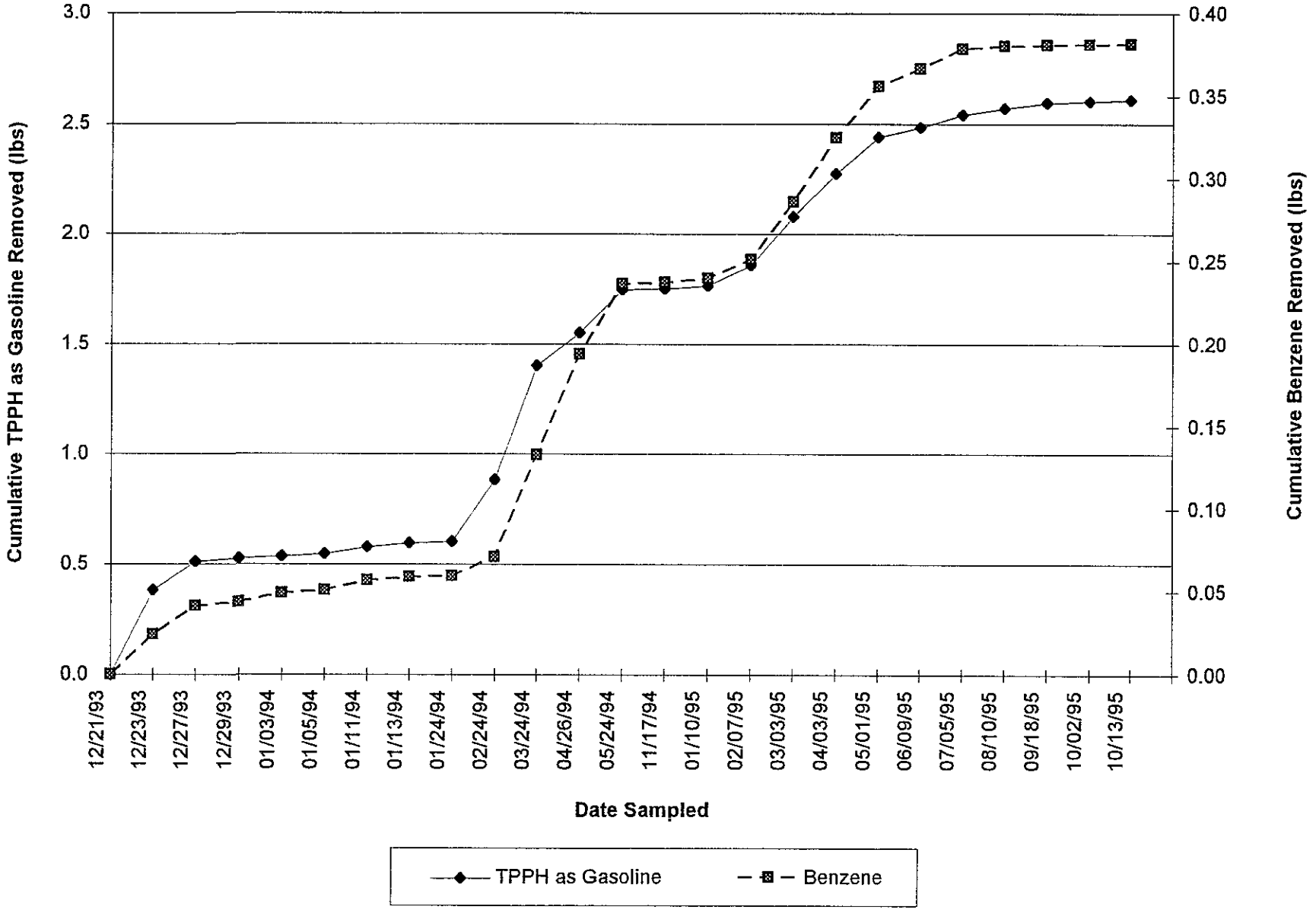
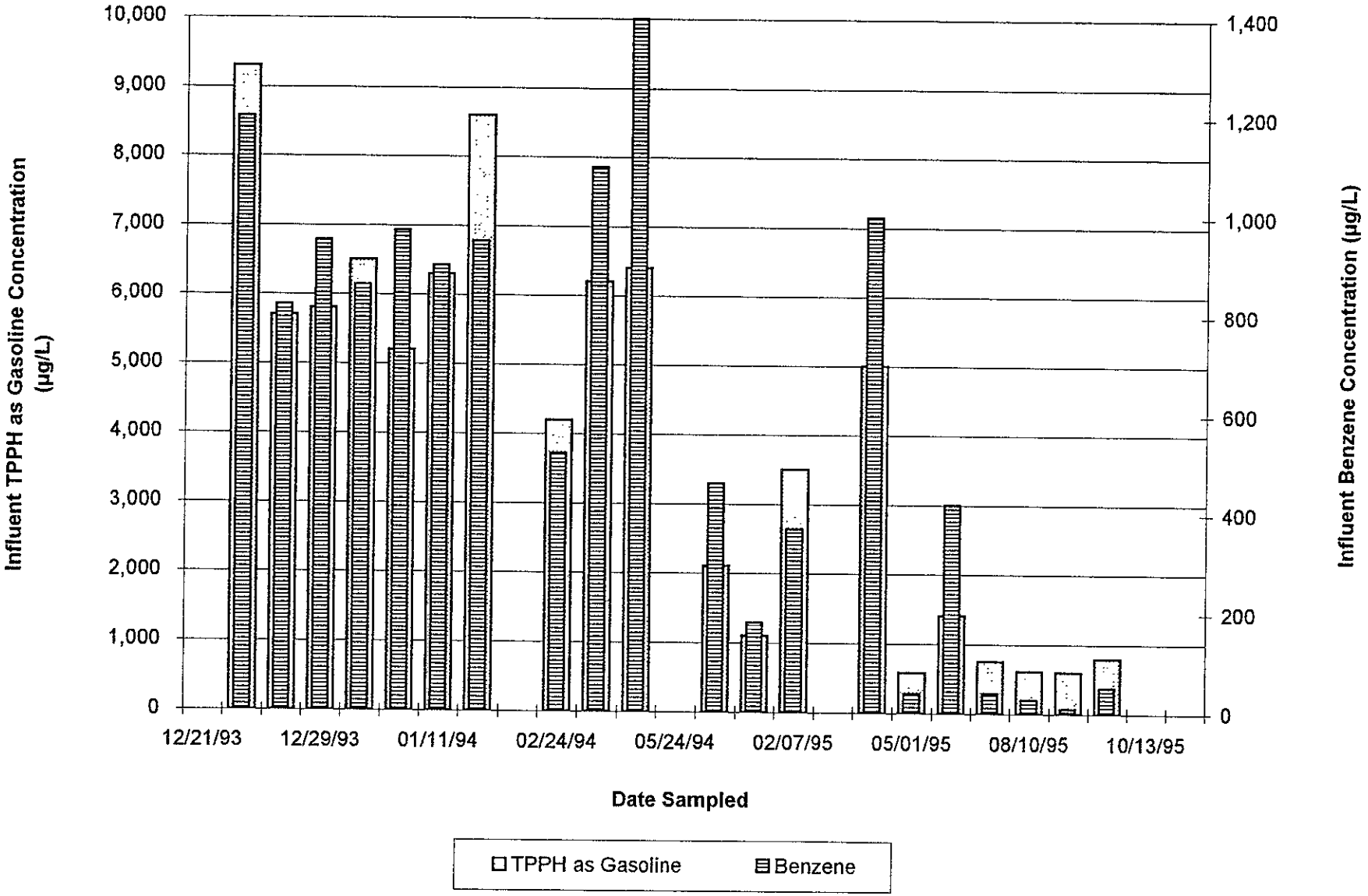


Figure D-2
Historical Groundwater Extraction System Hydrocarbon Concentrations

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



ATTACHMENT D-A

BIOREMEDIATION ENHANCEMENT
FIELD DATA SHEETS

FIELD SERVICES REQUEST

SITE INFORMATION FORM

Identification

Project # 330-084.5C
Station ID #0374
Site Address: 6407 Telegraph Ave, Oakland
Lab: Sequoia
County:
Project Manager: Shaw Garakani
Requester: David S. Nanstad
Client: ARCO
Client P.O.C: MIKE WHELAN
Date of Request: June 17, 1996

Project Type

☒ Operation & Maintenance
☐ Sampling
☐ 1st time visit
☐ Quarterly
☐ 1st ☐ 2nd ☐ 3rd ☐ 4th
X Monthly
☐ Semi-Monthly
☐ Weekly
☐ One time event
☐ Other:
Ideal field date: asap

Check Appropriate Category

X In Budget Site Visit
☐ Out of Budget Site Visit

Budget Hours: 4
Actual Hours: 1.5
Mob de Mob: 1.5

Site Safety Concerns

STANDARD

Field Tasks General Description

OBJECTIVE: Measure DO in well MW-3 with ORC's in well. If DO Less tban 7 mg/l then remove the 12, 2" ORC's in well MW-3. Monitor well MW-3 according to the attached schedule. Also monitor MW-6 according to the attached schedule. Replace the 12, 2" ORC's in well MW-3.

Place the removed ORC's in a bucket and leave on-site in the enclosure to dry out.

They are to be disposed of during the next quarterly event. Review the attached ORC installation instructions and take great care in lacing the ORC's together. They harden to a cement like consistancy and could be difficult to pull out if not correctly laced up.

Comments, remarks from field staff

- MEASURED DO WITH METER, CHEMETS USED AS COMPARISON, SEE DATA
- ORC'S REPLACED

Completed By: JMK Date: 6.6.96

Pacific Environmental Group, Inc.

2nd Quarter Intrinsic Groundwater Bioremediation Enhancement Program Monitoring Schedule

ARCO Service Station 0375
6407 Telegraph Road
Oakland, CA

Well	Temp.	pH	Conductivity	D.O. Before Purging	D.O. After Purging	Ferrous Iron	Laboratory Analyses: Nitrate as Nitrate	Sulfate	Nitrite as Nitrite	Total Iron	B.O.D.	Hetero-trophic Plate Count	C.O.D.
MW-3*	Y	Y	Y	Y	Y	N	Y	N	Y	N	N	N	N
MW-6	Y	Y	Y	Y	Y	N	Y	N	y	N	N	N	N

D.O. = Dissolved oxygen
B.O.D. = Biological oxygen demand
C.O.D. = Chemical oxygen demand
ORC = Oxygen releasing compound
Y/N = Monitor/Don't monitor
* = Well containing ORC
All measurements and samples taken after purge unless specified (example: DO before purge)

Bioremediation Assessment Field and Laboratory Procedures

Field Procedures

Parameter	Instrument or Technique
Color	Manually
Odor	Manually
Oxidation Reduction Potential (ORP)	YSI Model 3560 water quality monitoring system with YSI Model 3540 ORP electrode assembly
Turbidity	Nepholemetric turbidity unit or manually
Hydrogen Sulfide	HACH hydrogen sulfide test kit Model HS-C, catalog No. 25378-00
Dissolved Oxygen	YSI Model 50 in-situ dissolved oxygen meter
Ferrous Iron	HACH TPTZ iron reagent method, Model IR-21, catalog No. 22993-00 and ferrous iron Powder Pillows Catalog No. 1037-69

Laboratory Procedures

Analysis	Method	Technique
TPPH-g & BTEX Compounds	EPA Methods 8015 (modified), 8020, and 5030	Purge-and-trap extraction. Final detection by gas chromatography using flame- and photo-ionization detectors.
Nitrate as Nitrate	EPA Method 300, G or P, keep cool, 100ml, 24 hr hold	Ion chromatography
Sulfate	EPA Method 300, G or P, keep cool, 100ml, 28 day hold	Ion chromatography
Nitrogen as Ammonia	EPA Method 350.3, G or P, 500 ml with H_2SO4, keep cool, 28 day hold time	Probe method
B.O.D.	EPA Method 405.1, P, 1L, 48 hour hold	
C.O.D.	EPA Method 410.4, VOA w/ H_2SO_4, 28 day hold time	
Heterotrophic Plate Count	SM 907, P, 100ml, $NA_2S_2O_3$, keep cool, 30 hour hold; or non-preserved: keep cool, 12 hour hold time	
Total Iron	EPA Method 6010, P, G, C, 200ml, HNO_3 6 month hold	Inductively coupled plasma

DATE: 6-6-96 TECHNICIAN: Jmx

Dissolved Oxygen Meter Checklist and Data Sheet

PART A: WELL DATA
MATERIALS
Check off materials list before leaving office

DO METER	✓	PROBE AND REEL	✓
CALIBRATION BOTTLE	✓	KCL SOLUTION	✓
SPARE MEMBRANES	✓	6 SPARE D BATTERIES	✓
BUCKET	✓	PAPER TOWEL	✓
INSTRUCTION BINDER	✓	SPARE O-RINGS	✓
SCISSORS	✓	SPARE DATA SHEETS	✓
ALCONOX	✓	STICK	
WATER BOTTLE	✓	WATER LEVEL INDICATOR	✓

BEFORE MEASUREMENTS

INSPECT MEMBRANE (DAMAGED OR 1/8"BUBBLES)?	REPLACED MEMBRANE	WARM UP UNIT FOR 20 MINUTES?	YES

CALIBRATION

INSPECT MEMBRANE (DAMAGED OR 1/8"BUBBLES)?	↓	CALIBRATE UNIT?	YES
4a. CALIBRATION TEMPERATURE (C)	34.8°C	4b. CALIBRATION DO READING (mg/L)	6.96 mg/L

COMPARED TO CALIBRATION DO TABLE VALUE?	6.97	4d. CALIBRATION BOTTLE READINING (mg/L)	6.94 mg/L

FIELD MEASUREMENTS

WELL MW-3

DISSOLVED OXYGEN (mg/L)
Allow 2 minute minumum stabilization time

2' From top	12.28 mg/L
PROBE & CORD RINSED?	YES
DO Reading Stabalized?	YES

CHEMETS ⇒ 10 ppm

DATE: 6-6-96 TECHNICIAN: Jmx

WELL MW-6

DISSOLVED OXYGEN (mg/L)
Allow 2 minute minumum stabilization time

2' From top	3.47 mg/L
PROBE & CORD RINSED?	YES
DO Reading Stabalized?	YES

CHEMETS ⇒ 1ppm < 2ppm

WELL ____

DISSOLVED OXYGEN (mg/L)
Allow 2 minute minumum stabilization time

2' From top	
PROBE & CORD RINSED?	
DO Reading Stabalized?	