

PACIFIC
ENVIRONMENTAL
GROUP, INC.

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August 18, 1997
PACIFIC Project No. 530-033.5D

Mr. Mike Whelan
ARCO Products Company
704 - 228th Avenue Northeast, Suite 482
Redmond, Washington 98053

Re: **Semi-Annual Groundwater Monitoring Report**
First/Second Quarter 1997
Former ARCO Service Station No. 4051
7002 Woodlawn Avenue
Seattle, Washington

Dear Mr. Whelan:

Attached is the first and second quarter, 1997 groundwater monitoring report for the site referenced above. If there are any questions regarding the contents of this report, please call us at 425-869-5099.

Sincerely,

Pacific Environmental Group, Inc.


John J. Blough
Field Services Manager


Brett Amero
Project Manager

cc: Wally Moon, Department of Ecology
Mr. Darrell Johanson, Pacific Color Lab (property owner)

Date: 8/18/97
Quarters: 1st/2nd, 1997

ARCO SEMI-ANNUAL GROUNDWATER MONITORING REPORT

Facility No.: 4051 Address: 7002 Woodlawn Avenue, Seattle, WA
ARCO Environmental Engineer: Mike Whelan
Consulting Co./Contact Person: Pacific Environmental Group/Brett Amero
Consultant Project No.: 530-033.5D
Primary Agency/Regulatory ID No: Department of Ecology/5970
Department of Ecology Contact: Wally Moon

WORK PERFORMED THESE QUARTERS (First/Second - 1997):

Quarterly groundwater sampling and semi-annual reporting

WORK PROPOSED FOR NEXT QUARTER (Third/Fourth - 1997):

Quarterly groundwater sampling and semi-annual reporting

Current Phase of Project:	<u>Sampling</u>	(Assmnt, Remed., etc.)
Frequency of Groundwater Sampling:	<u>Quarterly</u>	(Quarterly, etc.)
Frequency of Groundwater Monitoring:	<u>Quarterly</u>	(Monthly, etc.)
Is Free Product (FP) Present On-Site:	<u>No</u>	(Yes/No)
FP Recovered this Quarter:	<u>NA</u>	(gallons)
Cumulative FP Recovered to Date:	<u>NA</u>	(gallons)
Bulk Soil Removed This Quarter:	<u>NA</u>	(cubic yards)
Bulk Soil Removed to Date:	<u>NA</u>	(cubic yards)
Current Remediation Techniques:	<u>SVE/Air Sparge/Bioventing</u>	(SVES/Sparge/FP Removal, etc.)
Approximate Depth to Groundwater:	<u>9 to 15-feet</u>	(Measure Feet)
Groundwater Gradient:	<u>west, northwest</u>	(Direction)
	<u>0.01 to 0.02-feet</u>	(Magnitude)

DISCUSSION: PACIFIC monitors and samples four groundwater wells on a quarterly schedule and manages the operation and maintenance of an SVE/air sparge remediation system. During the first quarter sampling event, two wells had concentrations above MTCA Method A Cleanup levels.

A hydrocarbon sheen and a diesel odor were observed in Well MW-3 during the first quarter sampling event. Monitoring Well MW-3 was subsequently sampled and analyzed for TPH-diesel and TPH-oil on March 20 and June 2, 1997. The groundwater samples were found to contain diesel concentrations of 364 ppm and 27,800 ppm on March 20 and June 2, respectively. TPH-oil was not detected in either groundwater sample.

The second quarterly groundwater sampling event was performed on June 13, 1997. All four wells were sampled and analyzed for TPH-gasoline and BTEX. Only Well MW-1 contained concentrations of TPH-gasoline and BTEX above MTCA Method A Cleanup levels.

ATTACHMENTS:

- Table 1 - Groundwater Analytical Results
- Figure 1 - Groundwater Elevation and TPH-Gasoline/Benzene Concentration Map
3/4/97
- Figure 2 - Groundwater Elevation and TPH-Gasoline/Benzene Concentration Map
6/13/97
- Attachment A - Groundwater Monitoring and Sample Collection Protocol
Field Data Sheets
- Attachment B - Certified Analytical Reports and Chain-of-Custody Documentation

ATTACHMENT A
GROUNDWATER MONITORING AND
SAMPLE COLLECTION PROTOCOL
FIELD DATA SHEETS

TABLE 1
GROUNDWATER ANALYTICAL RESULTS

Former ARCO Service Station 4051
7002 Woodlawn Avenue
Seattle, Washington

Sample I.D. / Casing Elev. (feet)	Sample Date	Depth to Groundwater (feet)	Separate-Phase		Groundwater Elevation (feet)	TPH Diesel (ppb)	TPH Oil (ppb)	TPH- Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl- benzene (ppb)	Xylenes (ppb)
			Hydrocarbon Thickness (feet)									
MW-1	07/12/91	15.28	0.00		157.12	NA	NA	97,000	23,000	27,000	3,000	16,700
duplicate	07/12/91	15.28	0.00		157.12	NA	NA	99,000	22,000	26,000	3,000	16,800
172.40	03/12/92	12.86	0.00		159.54	NA	NA	570,000	45,000	61,000	9,400	39,000
duplicate	03/12/92	12.86	0.00		159.54	NA	NA	280,000	41,000	50,000	4,200	24,200
	11/04/94	15.82	1.62		157.88	NA	NA	NS	NS	NS	NS	NS
	11/21/95	15.12	1.89		158.79	NA	NA	NS	NS	NS	NS	NS
	02/20/96	12.19	0.00		160.21	NA	NA	NS	NS	NS	NS	NS
Dilution	05/13/96	11.00	sheen		161.40	NA	NA	24,700	10,300	14,800	1,710	11,400
	08/21/96	10.60	sheen		161.80	NA	NA	NS	NS	NS	NS	NS
	11/11/96	10.86	0.00		161.54	NA	NA	8,720	5.45	10.8	14.8	247
	03/04/97	5.70	0.00		166.70	NA	NA	163	1.05	2.20	ND	16.6
Dilution	06/13/97	15.15	0.00		157.25	NA	NA	46,200	4,260	2,330	467	7,950
MW-2	07/12/91	12.16	0.00		158.32	NA	NA	ND	ND	ND	ND	ND
170.48	03/12/92	10.56	0.00		159.92	NA	NA	4,000	200	6	270	280
	11/04/94	13.31	0.00		157.17	NA	NA	ND	ND	ND	ND	ND
	11/21/95	12.45	0.00		158.03	NA	NA	ND	ND	ND	ND	ND
	02/20/96	10.91	0.00		159.57	NA	NA	ND	ND	ND	ND	ND
	05/13/96	11.42	0.00		159.06	NA	NA	ND	ND	ND	ND	ND
	08/21/96	10.64	0.00		159.84	NA	NA	ND	ND	ND	ND	ND
	11/11/96	12.38	0.00		158.10	NA	NA	ND	ND	ND	ND	ND
	03/04/97	11.22	0.00		159.26	NA	NA	ND	ND	ND	ND	ND
	06/13/97	11.85	0.00		158.63	NA	NA	245	1.78	0.560	7.20	8.35

TABLE 1
GROUNDWATER ANALYTICAL RESULTS

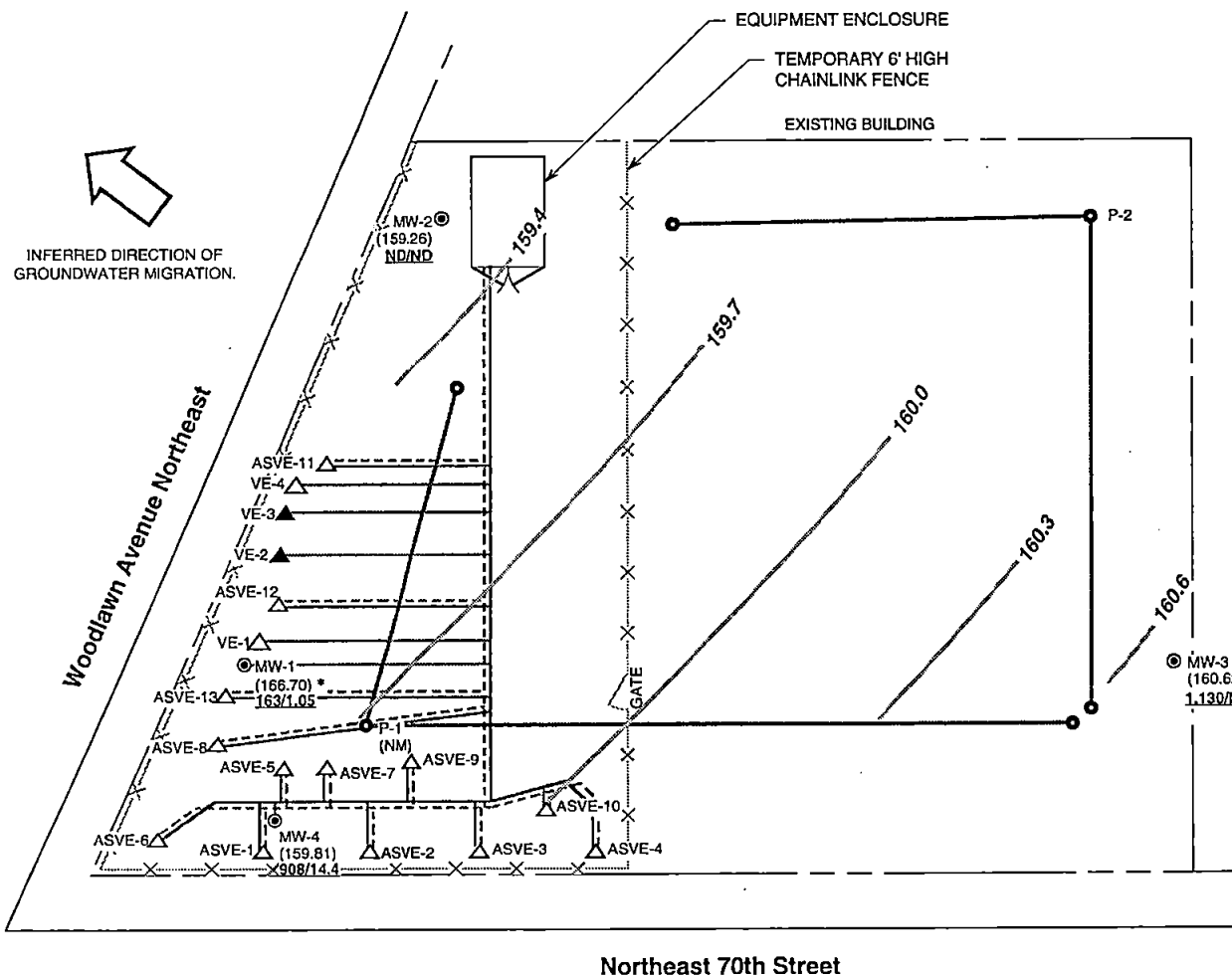
Former ARCO Service Station 4051
7002 Woodlawn Avenue
Seattle, Washington

Sample I.D. / Casing Elev. (feet)	Sample Date	Depth to Groundwater (feet)	Separate-Phase Hydrocarbon	Groundwater	TPH Diesel (ppb)	TPH Oil (ppb)	TPH- Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl- benzene (ppb)	Xylenes (ppb)
			Thickness (feet)	Elevation (feet)							
MW-3	07/12/91	10.15	0.00	160.02	NA	NA	ND	ND	ND	ND	ND
170.17	03/12/92	8.52	0.00	161.65	NA	NA	ND	ND	ND	ND	ND
	11/04/94	11.85	0.00	158.32	NA	NA	56	ND	ND	0.58	3.2
	11/21/95	10.86	0.00	159.31	NA	NA	ND	ND	ND	ND	ND
	02/20/96	9.03	0.00	161.14	NA	NA	ND	ND	ND	ND	ND
	05/13/96	9.84	0.00	160.33	NA	NA	ND	ND	ND	ND	ND
	08/21/96	10.80	0.00	159.37	NA	NA	ND	ND	ND	ND	ND
	11/11/96	10.73	0.00	159.44	NA	NA	ND	ND	ND	ND	ND
	03/04/97	9.55	sheen	160.62	NA	NA	1,130	ND	ND	ND	ND
	03/20/97	NM	sheen	--	364	ND	NA	NA	NA	NA	NA
	06/02/97	9.31	sheen	160.86	27,800	ND	NA	NA	NA	NA	NA
	06/13/97	9.61	0.00	160.56	NA	NA	52.3	ND	ND	ND	ND
MW-4	07/12/91	12.31	0.00	157.04	NA	NA	12,000	820	390	210	2,950
169.35	03/12/92	10.75	0.00	158.60	NA	NA	NS	NS	NS	NS	NS
	11/04/94	14.60	0.00	154.75	NA	NA	13,000	860	170	1,000	3,200
	11/21/95	13.23	Sheen	156.12	NA	NA	8,600	300	84	130	1,100
	02/20/96	11.24	0.00	158.11	NA	NA	12,000	360	200	460	2,200
Dilution	05/13/96	11.73	0.00	157.62	NA	NA	2,010	25.2	15.5	47.3	250
	08/21/96	11.81	0.00	157.54	NA	NA	2,300	180	1.18	10.7	59.1
	11/11/96	11.21	0.00	158.14	NA	NA	8,550	3.27	3.00	46.0	189
	03/04/97	9.54	0.00	159.81	NA	NA	908	14.4	2.09	27.1	31.3
	06/13/97	11.30	0.00	158.05	NA	NA	ND	ND	ND	ND	ND

TABLE 1
GROUNDWATER ANALYTICAL RESULTS

Former ARCO Service Station 4051
7002 Woodlawn Avenue
Seattle, Washington

Sample I.D. / Casing Elev. (feet)	Sample Date	Depth to Groundwater (feet)	Separate-Phase Hydrocarbon		Groundwater		TPH		Benzene (ppb)	Toluene (ppb)	Ethyl- benzene (ppb)	Xylenes (ppb)
			Thickness (feet)		Elevation (feet)	TPH Diesel (ppb)	TPH Oil (ppb)	Gasoline (ppb)				
P-1	11/04/94	12.56	0.00		NM	NA	NA	3,300	2,200	ND	390.0	300.0
MTCA Method A		--	--		--			1,000	5	40	30	20
Cleanup Levels:												
Laboratory Reporting		--	-		--			50	0.50	0.50	0.50	1.0
Limits:												
Concentrations in ppb (ug/L) ND - Not Detected NS - Not Sampled MN - Not Measured Dilution - Sample diluted, higher detection limit. Well locations are shown on Figures 2 and 3 Certified Analytical Results are included in Appendix C Data for 07-12-91 and 03-12-92 from Enviros, Inc. report titled "March 12, 1992 Groundwater Sampling" dated April 19, 1992. TPH as Gasoline - Analysis by Washington DOE Method WTPH-G BTEX Compounds - Analysis by EPA Method 8020 Total Lead - Analysis by EPA Method 7421												



LEGEND

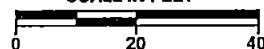
- MW-2 ● GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION.
- P-1 ● 4" (ID) PVC RISER PIPE LOCATION AND DESIGNATION, (where applicable).
- VE-2 ▲ SOIL VAPOR EXTRACTION WELL LOCATION AND DESIGNATION
- VE-1 △ SOIL VAPOR EXTRACTION WELL TO BE INCLUDED IN REMEDIAL SYSTEM
- ASVE-1 △ DUAL COMPLETION AIR SPARGING / SOIL VAPOR EXTRACTION WELL LOCATION AND DESIGNATION
- 4" (ID) PVC PERFORATED PIPE
- - - ABOVE GROUND AIR SPARGING CONVEYANCE PIPING
- ABOVE GROUND SOIL VAPOR EXTRACTION CONVEYANCE PIPING
- 160.3 GROUNDWATER ELEVATION CONTOUR IN FEET, MEAN LOWER LOW WATER
- (159.81) GROUNDWATER ELEVATION IN FEET, MEAN LOWER LOW WATER, 3/4/97
- (166.70) * GROUNDWATER ELEVATION NOT REPRESENTATIVE OF CONDITIONS DUE TO THE VE SYSTEM OPERATION
- SHEEN THICKNESS OF SEPARATE PHASE HYDROCARBONS PRESENT IN WELL
- (NM) NOT MEASURED, WELL HEAD ELEVATION NOT AVAILABLE
- 163/1.05 TPH-GASOLINE / BENZENE CONCENTRATION IN PARTS PER BILLION, 3/4/97
- ND NOT DETECTED
- NA NOT ANALYZED DUE TO PRESENCE OF SEPARATE PHASE HYDROCARBONS

NOTE: Map Based on Figure From Enviro Inc.



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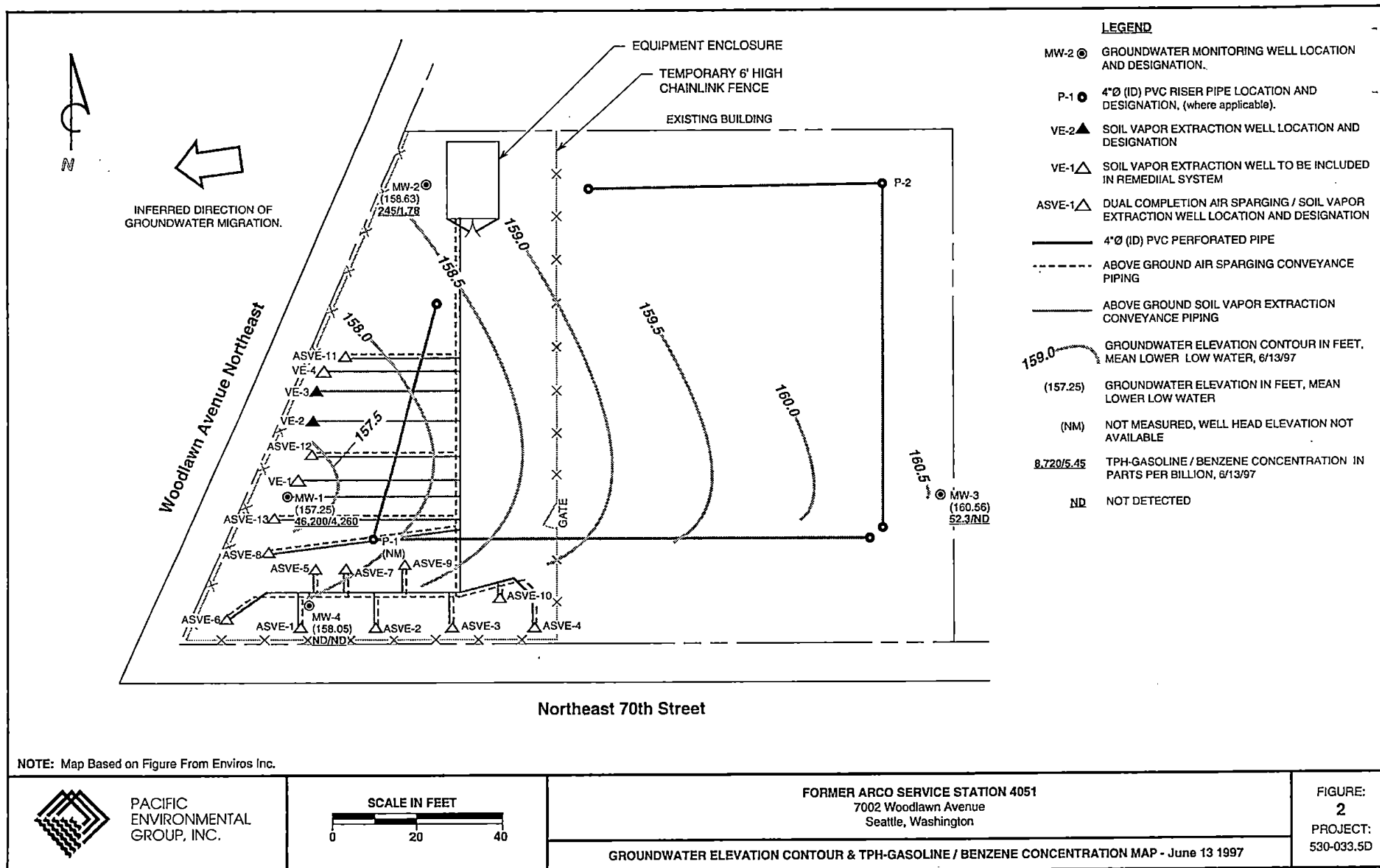
SCALE IN FEET



FORMER ARCO SERVICE STATION 4051
7002 Woodlawn Avenue
Seattle, Washington

GROUNDWATER ELEVATION CONTOUR & TPH-GASOLINE / BENZENE CONCENTRATION MAP - March 4, 1997

FIGURE:
1
PROJECT:
530-033.5D



ATTACHMENT A

Groundwater Monitoring

The groundwater sampling procedure consisted of measuring the water level in each well using an electronic water level indicator. The monitoring order is based on previous analytical data, moving from lowest to highest concentrations. Wells suspected to contain separate-phase hydrocarbons (SPH) were measured using an oil/water interface probe to measure the product thickness. Wells containing SPH are further checked using a clear bailer to observe viscosity and color of the SPH. Monitoring equipment in contact with groundwater was washed between wells with detergent and triple rinsed with distilled water.

Groundwater Sampling

The groundwater monitoring wells were purged of three casing volumes of water or until dry using a centrifugal pump with disposable polyethylene tubing or bailed by hand using disposable bailers.

After the water level in each well recovered to within at least 60% of the initial measurement, a sample was collected using a disposable bailer and was placed into appropriate EPA-approved containers. Slow recharging wells were allowed to recharge as long as possible before sample collection. Samples requiring filtering were filtered in the laboratory. Information about each well, purge, recovery data and observations were noted on the groundwater sample data sheets which are included in this attachment. The samples were labeled, logged onto a chain-of-custody document, sealed, and transported to an ARCO approved laboratory.

Duplicate samples and blind samples were not collected unless specifically requested by ARCO.

FIELD REPORT

DEPTH TO WATER/SEPARATE-PHASE HYDROCARBON SURVEY

PROJECT No.: 530-031.2 LOCATION: 7002 Woodlawn
Seattle Wa

DATE: 3/4/97

CLIENT/STATION NO.: 4051 FIELD TECHNICIAN: Starr

DAY OF WEEK: Tuesday

PROBE TYPE/ID No.

☐ Oil/Water If _____

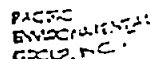
H₂O level

indicator

☐ Other:

CLIENT/STATION NO.: 4051 FIELD TECHNICIAN:										SEPARATE-PHASE HYDROCARBONS (SPH)										
Drw 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	SPH Depth (feet) TOB/TOC	SPH Thickness (feet)	Fresh	Weathered	Gas	Oil	VISCOSITY			Liquid Removed (gallons)
													COLOR						SPH	H ₂ O
	MW-1	1500	✓✓✓✓✓					21.20	* 5.70											/
	MW-2	1450	✓✓✓✓✓					28.85	11.22			Slight sheen								/
	MW-3	1430	✓✓✓✓✓					24.00	9.55			Diesel smell								/
	MW-4	1440	✓✓✓✓✓					20.40	9.54											/
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Comments: * W/L on MW-1 was influenced by UE System, don't use for maps.



ECT No.: 530-031-20 LOCATION: Woodlawn ave, JOAHM WELL ID #: MW-2

WT/STATION No.: 4051 FIELD TECHNICIAN: Alan Starr

WELL INFORMATION
Depth to Liquid: _____ TOB _____ TOC _____
Depth to water: _____ TOB _____ TOC _____
Total depth: _____ TOB _____ TOC _____
Date: 3/4/97 Time (2400): _____
Sample Type and I.D. #
☐ Oil/Water interface _____
☒ Electronic indicator _____
☐ Other: _____

CASING
DIAMETER
☐ 2 _____
☐ 3 _____
☒ 4 _____
☐ 4.5 _____
☐ 5 _____
☐ 6 _____
☐ 8 _____

GAL
LINEAR FT.
0.17
0.35
0.66
0.83
1.02
1.5
2.6

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

28.85 - DTW = 11.22 Gal/Linear x Foot 0.66 = 11.63 Number of x Casings 3 Calculated = Purge 34.90

DATE PURGED: 3/4/97 START: 1340 END (2400 hr): 1355 PURGED BY: A.S.
DATE SAMPLED: 3/4/97 START: _____ END (2400 hr): _____ SAMPLED BY: A.S.

TIME (2400 hr)	VOLUME (±1.1)	pH (units)	EC (umhos/cm @ 25°C)	TEMPERATURE (°F)	COLOR	TURBIDITY	ODOR

Pumped dry Yes / No _____

FIELD MEASUREMENTS AT TIME OF SAMPLE, AFTER RECHARGE:

DTW: _____ TOB/TOC _____

PURGING EQUIPMENT/I.D. #
☒ Bailor: _____
☐ Centrifugal: _____
☐ Other: _____

☐ Airlift: _____
☐ Dedicated: _____

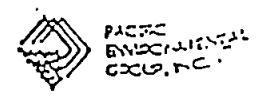
SAMPLING EQUIPMENT/I.D. #
☒ Bailor: _____
☐ Dedicated: _____
☐ Other: _____

SAMPLE I.D.	DATE	TIME (2400)	No. of Cont.	SIZE	CONTAINER	PRESERVE	ANALYTICAL PARAMETER
<u>MW-2</u>	<u>3/4/97</u>	<u>1450</u>	<u>2</u>	<u>40ml</u>	<u>VOA</u>	<u>HCL</u>	<u>GAS/BTEX</u>

WELL INTEGRITY: ☒ Good ☐ Fair ☐ Poor

REMARKS: _____

SIGNATURE: Alan Starr



ECT No.: 530-031-20 LOCATION: Woodlawn ave, Seattle WELL ID: MW-3

NT/STATION No.: 4051 FIELD TECHNICIAN: Alan Starr

WELL INFORMATION

Depth to Liquid: _____ TOB _____ TOC _____
Depth to water: _____ TOB _____ TOC _____
Total depth: _____ TOB _____ TOC _____
Date: 3/4/97 Time (2400): _____

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

CASING
DIAMETER

☐ 2	_____	0.17
☐ 3	_____	0.35
☒ 4	_____	0.66
☐ 4.5	_____	0.83
☐ 5	_____	1.02
☐ 6	_____	1.5
☐ 8	_____	2.6

GAL/
LINEAR FT.

SAMPLE TYPE

☐ Groundwater
☐ Duplicate
☐ Extraction vial
☐ Trip blank
☐ Field blank
☐ Equipment blank
☐ Other: _____

24.00 - DTW = 9.55 Gal/Linear x Foot 0.66 = 9.53 Number of x Casings 3 Calculated = Purge 28.61

DATE PURGED: 3/4/97 START: 1300 END (2400 hr): 1315 PURGED BY: A.S.
DATE SAMPLED: 3/4/97 START: _____ END (2400 hr): 1430 SAMPLED BY: A.S.

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

Pumped dry Yes / No _____

FIELD MEASUREMENTS AT TIME OF SAMPLE, AFTER RECHARGE:

DTW: _____ TOB/TOC _____

PURGING EQUIPMENT/I.D.#

☒ Bailor: _____	☐ Airlift: _____
☐ Centrifugal: _____	☐ Dedicated: _____
☐ Other: _____	

SAMPLING EQUIPMENT/I.D.#

☒ Bailor: _____
☐ Dedicated: _____
☐ Other: _____

SAMPLE I.D.	DATE	TIME (2400)	No. of Cont.	SIZE	CONTAINER	PRESERVE	ANALYTICAL PARAMETER
<u>MW-3</u>	<u>3/4/97</u>	<u>1430</u>	<u>2</u>	<u>40 ml</u>	<u>VOA</u>	<u>HCL</u>	<u>GAS/BTEX</u>
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

WELL INTEGRITY: ☒ Good ☐ Fair ☐ Poor

REMARKS: Slight smell of Diesel

SIGNATURE: Alan Starr



JECT No.: 030-031-20 LOCATION: Woodlawn ave, Juchitán WELL ID: MW-4

ENT/STATION No.: 4051 FIELD TECHNICIAN: Alan Starr

WELL INFORMATION
Depth to Liquid: _____ TOB _____ TOC _____
Depth to water: _____ TOB _____ TOC _____
Total depth: _____ TOB _____ TOC _____
Date: 3/4/97 Time (2400): _____
Probe Type and I.D. #
☐ Oil/Water interface _____
☒ Electronic indicator _____
☐ Other: _____

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

GAL LINEAR FT.
☐ Groundwater
☐ Duplicate
☐ Extraction well
☐ Trip blank
☐ Field blank
☐ Equipment blank
☐ Other: _____

20.40 - DTW = 9.54 Gal/Linear x Foot 0.66 = 7.16 Number of x Casings 3 Calculated = Purge 21.50

DATE PURGED: 3/4/97 START: 1320 END (2400 hr): 1330 PURGED BY: A.S.
DATE SAMPLED: 3/4/97 START: _____ END (2400 hr): 1440 SAMPLED BY: A.S.

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

Pumped dry Yes / No _____
FIELD MEASUREMENTS AT TIME OF SAMPLE, AFTER RECHARGE:
DTW: _____ TOB/TOC _____

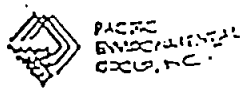
PURGING EQUIPMENT/I.D. #
☒ Bailor: _____ ☐ Airlift: _____
☐ Centrifugal: _____ ☐ Dedicated: _____
☐ Other: _____

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

SAMPLE I.D.	DATE	TIME (2400)	No. of Cont.	SIZE	CONTAINER	PRESERVE	ANALYTICAL PARAMETER
<u>MW-4</u>	<u>3/4/97</u>	<u>1440</u>	<u>2</u>	<u>40ml</u>	<u>VOA</u>	<u>HEL</u>	<u>GAS/BTEX</u>
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

WELL INTEGRITY: ☒ Good ☐ Fair ☐ Poor _____
REMARKS: _____

SIGNATURE: Alan Starr



FIELD REPORT

DEPTH TO WATER/SEPARATE-PHASE HYDROCARBON SURVEY

PROJECT No.: 530-033.5D
530-031.2E LOCATION: 7002 Woodlawn
Seattle, WA DATE: 3/20/97

CLIENT/STATION NO.: 4051 FIELD TECHNICIAN: JS DAY OF WEEK: Thurs.

PROBE TYPE/ID No. _____

- ☐ Oil/Water IF _____
☐ H₂O level _____
 indicator _____
☐ Other: _____

Dth Order	Well ID	Time	Surface Seal	Lid Secure	Gasket	Lock	Expanding Cap	Total Depth (feet)	First Depth to Water (feet) TOB/TOC	Second Depth to Water (feet) TOB/TOC	SERARATE-PHASE HYDROCARBONS (SPH)										LIQUID REMOVED (gallons)			
											SPH Depth (feet) TOB/TOC	SPH Thickness (feet)	Fresh	Weathered	Gas	Oil	VISCOSITY			SPH / H ₂ O				
																	Lite	Medium	Heavy					
	MW-3	1530						24.00	9.65		Shreen													

Comments: MW-3 - collected a no-purge sample for Diesel plus extended only

FIELD REPORT

DEPTH TO WATER/SEPARATE-PHASE HYDROCARBON SURVEY

PROJECT No.: 530-031.2E LOCATION: 7002 Woodlawn
Seattle Wa DATE: 6/2/97
CLIENT/STATION NO.: 4051 FIELD TECHNICIAN: Starr DAY OF WEEK: Monday

PROBE TYPE/ID No.

☐ Oil/Water IF _____
☒ H₂O level
 indicator _____
☐ Other: _____

[illegible]

Comments: Has diesel like smell. Full purge sample

FIELD DATA SHEET

WATER SAMPLE FIELD DATA SHEET

PROJECT No.: 530-031-2E LOCATION: Seattle, Wa WELL ID #: MW-3
 CLIENT/STATION No.: 4051 FIELD TECHNICIAN: Alan Starr

WELL INFORMATION

Depth to Liquid: _____ TOB _____ TOC _____
 Depth to water: _____ TOB _____ TOC _____
 Total depth: _____ TOB _____ TOC _____
 Date: 6/2/97 Time (2400): _____

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

CASING
DIAMETER

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

GAL/
LINEAR FT.

SAMPLE TYPE

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

TD 24.00 - DTW = 9.31 Gal/Linear x Foot 0.66 = 9.69 Number of x Casings 3 Calculated = Purge 29.08

DATE PURGED: 6/2/97 START: 945 END (2400 hr): 1015 PURGED BY: A.S.
 DATE SAMPLED: 6/2/97 START: _____ END (2400 hr): 1030 SAMPLED BY: A.S.

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

Pumped dry Yes / No

FIELD MEASUREMENTS AT TIME OF SAMPLE, AFTER RECHARGE:

DTW: _____ TOB/TOC _____

PURGING EQUIPMENT/I.D.

☒ Bailer: _____ ☐ Airlift: _____
☐ Centrifugal: _____ ☐ Dedicated: _____
☐ Other: _____

SAMPLING EQUIPMENT/I.D.

☒ Bailer: _____
☐ Dedicated: _____
☐ Other: _____

SAMPLE I.D.	DATE	TIME (2400)	No. of Cont.	SIZE	CONTAINER	PRESERVE	ANALYTICAL PARAMETER
<u>MW-3</u>	<u>6/2</u>	<u>1030</u>	<u>1</u>	<u>1000ml</u>	<u>Amber</u>	<u>No</u>	<u>Diesel & EXT</u>
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

WELL INTEGRITY: ☐ Good ☐ Fair ☐ Poor

REMARKS: _____

SIGNATURE: _____

Alan Starr



PACIFIC
ENVIRONMENTAL
GROUP, INC.

FIELD REPORT

DEPTH TO WATER/SEPARATE-PHASE HYDROCARBON SURVEY

PROJECT No.: 530-033.5D LOCATION: 7002 Woodlawn DATE: 6/13/97
530-031.2E Seattle, Wa
 CLIENT/STATION NO.: 4051 FIELD TECHNICIAN: Alan Starr DAY OF WEEK: Friday

PROBE TYPE/ID No.

- ☐ Oil/Water IF _____
☒ H₂O level indicator _____
☐ Other: _____

CLIENT/STATION NO.: 1057 FIELD TECHNICIAN: [Signature]											SEPARATE-PHASE HYDROCARBONS (SPH)										Other: [Signature]
Dtw Order	Well ID	Time	Surface Seal	Lid Secure	Gasket	Lock	Expanding Cap	Total Depth (feet)	First Depth to Water (feet) TOB/TOC	Dissolved Oxygen (mg/kg)	SPH Depth (feet) TOB/TOC	SPH Thickness (feet)	Fresh	Weathered	Gas	Oil	VISCOSITY			LIQUID REMOVED (gallon)	
																	Light	Medium	Heavy		SPH H ₂ O
	MW-1	1130	✓	✓	✓	✓	✓	20.35	15.15	0.89											
	MW-2	1145	✓	✓	✓	✓	✓	12.40	11.85	1.34											
	MW-3	1115	✓	✓	✓	✓	✓	24.00	9.61	2.31											
	MW-4	1200	✓	✓	✓	✓	✓	20.40	11.30	1.01											

Comments: _____

WELLHEAD MAINTENANCE CHECKLIST

SITE INFORMATION:

DATE: 6/13/97

FACILITY NO.: 4051

SITE LOCATION (CITY): *Seattle*

[illegible]

ATTACHMENT B

LABORATORY ANALYTICAL REPORTS

CHAIN-OF-CUSTODY DOCUMENTATION



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530-033.5E

Pacific Environmental Group	Project: ARCO #4051	Sampled: 3/4/97
4020 148th Ave NE, Ste B	Project Number: 530-031.2E	Received: 3/5/97
Redmond, WA 98052	Project Manager: John Blough	Reported: 3/19/97 14:28

Summary Report*

(Please refer to the Analytical Report for a thorough review of the complete data set.)

Method	Analyte	Units	MW-1 Water 3/4/97 B703071-01	MW-2 Water 3/4/97 B703071-02	MW-3 Water 3/4/97 B703071-03	MW-4 Water 3/4/97 B703071-04
WTPH-G/8020	Gasoline Range Hydrocarbons	ug/l	163	<50.0	1130	908
"	Benzene	"	1.05	<0.500	<2.50	14.4
"	Toluene	"	2.20	<0.500	<2.50	2.09
"	Ethylbenzene	"	<0.500	<0.500	<2.50	27.1
"	Xylenes (total)	"	16.6	<1.00	<5.00	31.3

North Creek Analytical, Inc.


Matthew Essig, Project Manager

**The Summary Report is a subset of the final Analytical Report and does not include substantial supportive information such as quality control data; this report accurately summarizes sample results for your convenience only.*

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530-033.5D

Pacific Environmental Group
4020 148th Ave NE, Ste B
Redmond, WA 98052

Project: ARCO #4051
Project Number: 530-031.2E
Project Manager: John Blough

Sampled: 3/4/97
Received: 3/5/97
Reported: 3/19/97 14:26

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
MW-1	B703071-01	Water	3/4/97
MW-2	B703071-02	Water	3/4/97
MW-3	B703071-03	Water	3/4/97
MW-4	B703071-04	Water	3/4/97

North Creek Analytical, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document.
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Pacific Environmental Group
4020 148th Ave NE, Ste B
Redmond, WA 98052

Project: ARCO #4051
Project Number: 530-031.2E
Project Manager: John Blough

Sampled: 3/4/97
Received: 3/5/97
Reported: 3/19/97 14:26

Gasoline Hydrocarbons (Toluene to Dodecane) and BTEX by WTPH-G and EPA 8020A North Creek Analytical - Bothell

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
MW-1				B703071-01		Water		
Gasoline Range Hydrocarbons	0370391	3/17/97	3/17/97		50.0	163	ug/l	
Benzene	"	"	"		0.500	1.05	"	
Toluene	"	"	"		0.500	2.20	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		1.00	16.6	"	
Surrogate: 4-BFB (FID)	"	"	"	50.0-150		111	%	
Surrogate: 4-BFB (PID)	"	"	"	50.0-150		91.3	"	
MW-2				B703071-02		Water		
Gasoline Range Hydrocarbons	0370391	3/17/97	3/17/97		50.0	ND	ug/l	
Benzene	"	"	"		0.500	ND	"	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		1.00	ND	"	
Surrogate: 4-BFB (FID)	"	"	"	50.0-150		100	%	
Surrogate: 4-BFB (PID)	"	"	"	50.0-150		86.9	"	
MW-3				B703071-03		Water		
Gasoline Range Hydrocarbons	0370391	3/17/97	3/17/97		250	1130	ug/l	1
Benzene	"	"	"		2.50	ND	"	
Toluene	"	"	"		2.50	ND	"	
Ethylbenzene	"	"	"		2.50	ND	"	
Xylenes (total)	"	"	"		5.00	ND	"	
Surrogate: 4-BFB (FID)	"	"	"	50.0-150		96.2	%	
Surrogate: 4-BFB (PID)	"	"	"	50.0-150		95.6	"	
MW-4				B703071-04		Water		
Gasoline Range Hydrocarbons	0370391	3/17/97	3/18/97		50.0	908	ug/l	
Benzene	"	"	"		0.500	14.4	"	
Toluene	"	"	"		0.500	2.09	"	
Ethylbenzene	"	"	"		0.500	27.1	"	
Xylenes (total)	"	"	"		1.00	31.3	"	
Surrogate: 4-BFB (FID)	"	"	"	50.0-150		167	%	2
Surrogate: 4-BFB (PID)	"	"	"	50.0-150		100	"	

North Creek Analytical, Inc.

*Refer to end of report for text of notes and definitions.

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Pacific Environmental Group	Project: ARCO #4051	Sampled: 3/4/97
4020 148th Ave NE, Ste B	Project Number: 530-031.2E	Received: 3/5/97
Redmond, WA 98052	Project Manager: John Blough	Reported: 3/19/97 14:26

Gasoline Hydrocarbons (Toluene to Dodecane) and BTEX by WTPH-G and EPA 8020A/Quality Control

North Creek Analytical - Bothell

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Batch: 0370391										
Blank										
0370391-BLK1										
Extraction Method: EPA 5030										
Gasoline Range Hydrocarbons	3/17/97			ND	ug/l	50.0				
Benzene	"			ND	"	0.500				
Toluene	"			ND	"	0.500				
Ethylbenzene	"			ND	"	0.500				
Xylenes (total)	"			ND	"	1.00				
Surrogate: 4-BFB (FID)	"	16.0		15.3	"	50.0-150	95.6			
Surrogate: 4-BFB (PID)	"	16.0		14.2	"	50.0-150	88.7			
LCS										
0370391-BS1										
Gasoline Range Hydrocarbons	3/17/97	500		491	ug/l	80.0-120	98.2			
Surrogate: 4-BFB (FID)	"	16.0		19.2	"	50.0-150	120			
Duplicate										
0370391-DUP1 B703071-01										
Gasoline Range Hydrocarbons	3/17/97		163	137	ug/l			25.0	17.3	3
Surrogate: 4-BFB (FID)	"	16.0		14.7	"	50.0-150	91.9			
Duplicate										
0370391-DUP2 B703192-01										
Gasoline Range Hydrocarbons	3/17/97		ND	ND	ug/l			25.0		3
Surrogate: 4-BFB (FID)	"	16.0		13.8	"	50.0-150	86.3			
Matrix Spike										
0370391-MS1 B703071-02										
Benzene	3/17/97	10.0	ND	9.82	ug/l	70.0-130	98.2			
Toluene	"	10.0	ND	9.90	"	70.0-130	99.0			
Ethylbenzene	"	10.0	ND	9.45	"	70.0-130	94.5			
Xylenes (total)	"	30.0	ND	28.5	"	70.0-130	95.0			
Surrogate: 4-BFB (PID)	"	16.0		14.5	"	50.0-150	90.6			
Matrix Spike Dup										
0370391-MSD1 B703071-02										
Benzene	3/17/97	10.0	ND	9.36	ug/l	70.0-130	93.6	15.0	4.80	
Toluene	"	10.0	ND	9.37	"	70.0-130	93.7	15.0	5.50	
Ethylbenzene	"	10.0	ND	9.39	"	70.0-130	93.9	15.0	0.637	
Xylenes (total)	"	30.0	ND	28.1	"	70.0-130	93.7	15.0	1.38	
Surrogate: 4-BFB (PID)	"	16.0		14.9	"	50.0-150	93.1			

North Creek Analytical, Inc.

*Refer to end of report for text of notes and definitions.


 Matthew Essig, Project Manager

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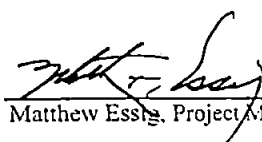
Pacific Environmental Group	Project: ARCO #4051	Sampled: 3/4/97
4020 148th Ave NE, Ste B	Project Number: 530-031.2E	Received: 3/5/97
Redmond, WA 98052	Project Manager: John Blough	Reported: 3/19/97 14:26

Notes and Definitions

#	Note
---	------

- 1 This sample appears to contain extractable diesel range organics.
 - 2 The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample.
 - 3 Analyses are not controlled on RPD values from sample concentrations less than 10 times the reporting limit.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- Recov. Recovery
- RPD Relative Percent Difference

North Creek Analytical, Inc.


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Redmond, WA 98052

Project: ARCO #4051
Project Number: 530-033.5B
Project Manager: John Blough

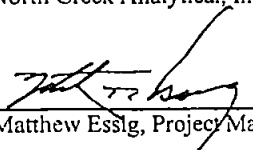
Sampled: 3/20/97
Received: 3/21/97
Reported: 4/1/97 15:44

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
MW-3	B703446-01	Water	3/20/97

North Creek Analytical, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document.
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Pacific Environmental Group
4020 148th Ave NE, Ste B
Redmond, WA 98052

Project: ARCO #4051
Project Number: 530-033.5B
Project Manager: John Blough

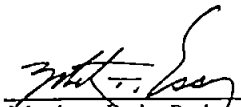
Sampled: 3/20/97
Received: 3/21/97
Reported: 4/1/97 15:44

Diesel Hydrocarbons (C12-C24) and Heavy Oil (C24-C40) by WTPH-D (extended) North Creek Analytical - Bothell

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
<u>MW-3</u>				<u>B703446-01</u>			<u>Water</u>	
Diesel Range Hydrocarbons	0370655	3/25/97	3/27/97		0.250	0.364	mg/l	
Heavy Oil Range Hydrocarbons	"	"	"		0.750	ND	"	
Surrogate: 2-FBP	"	"	"	50.0-150		85.9	%	

North Creek Analytical, Inc.

*Refer to end of report for text of notes and definitions.


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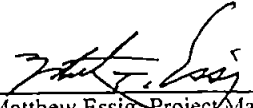
Pacific Environmental Group	Project: ARCO #4051	Sampled: 3/20/97
4020 148th Ave NE, Ste B	Project Number: 530-033.5B	Received: 3/21/97
Redmond, WA 98052	Project Manager: John Blough	Reported: 4/1/97 15:44

Diesel Hydrocarbons (C12-C24) and Heavy Oil (C24-C40) by WTPH-D (extended)/Quality Control North Creek Analytical - Bothell

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Batch: 0370655		Date Prepared: 3/25/97		Extraction Method: EPA 3520/600 Series						
Blank		0370655-BLK1								
Diesel Range Hydrocarbons	3/28/97			ND	mg/l	0.250				
Heavy Oil Range Hydrocarbons	"			ND	"	0.750				
Surrogate: 2-FBP	"	0.344		0.339	"	50.0-150	98.5			
LCS		0370655-BS1								
Diesel Range Hydrocarbons	3/28/97	2.04		2.25	mg/l	52.0-131	110			
Surrogate: 2-FBP	"	0.344		0.330	"	50.0-150	95.9			
Duplicate		0370655-DUP1		B703446-01						
Diesel Range Hydrocarbons	3/27/97		0.364	0.433	mg/l			44.0	17.3	1
Surrogate: 2-FBP	"	0.687		0.574	"	50.0-150	83.6			

North Creek Analytical, Inc.

*Refer to end of report for text of notes and definitions.


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Pacific Environmental Group
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Redmond, WA 98052

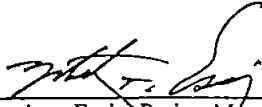
Project: ARCO #4051
Project Number: 530-033.5B
Project Manager: John Blough

Sampled: 3/20/97
Received: 3/21/97
Reported: 4/1/97 15:44

Notes and Definitions

#	Note
1	Analyses are not controlled on RPD values from sample concentrations less than 10 times the reporting limit.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
Recov.	Recovery
RPD	Relative Percent Difference

North Creek Analytical, Inc.


Matthew Essig, Project Manager

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530-033.50

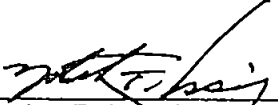
Pacific Environmental Group	Project: ARCO Seattle, #4051	Sampled: 6/2/97
4020 148th Ave NE, Ste B	Project Number: 530-031.2E	Received: 6/3/97
Redmond, WA 98052	Project Manager: John Blough	Reported: 6/10/97 13:42

Summary Report*

(Please refer to the Analytical Report for a thorough review of the complete data set.)

Method	Analyte	Units	MW-3 Water 6/2/97 B706039-01				
WTPH-Dext	Diesel Range Hydrocarbons	mg/l		27.8			
"	Heavy Oil Range Hydrocarbons	"		<8.25			

North Creek Analytical, Inc.


Matthew Essig, Project Manager

**The Summary Report is a subset of the final Analytical Report and does not include substantial supportive information such as quality control data; this report accurately summarizes sample results for your convenience only.*

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Pacific Environmental Group
4020 148th Ave NE, Ste B
Redmond, WA 98052

Project: ARCO Seattle, #4051
Project Number: 530-031.2E
Project Manager: John Blough

Sampled: 6/2/97
Received: 6/3/97
Reported: 6/10/97 13:38

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
MW-3	B706039-01	Water	6/2/97

North Creek Analytical, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document.
This analytical report must be reproduced in its entirety.*


Matthew Essig, Project Manager

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Project: ARCO Seattle, #4051
Project Number: 530-031.2E
Project Manager: John Blough

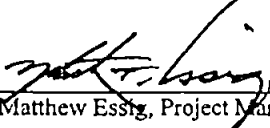
Sampled: 6/2/97
Received: 6/3/97
Reported: 6/10/97 13:38

Diesel Hydrocarbons (C12-C24) and Heavy Oil (C24-C40) by WTPH-D (extended) North Creek Analytical - Bothell

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
<u>MW-3</u>				<u>B706039-01</u>			<u>Water</u>	
Diesel Range Hydrocarbons	0670162	6/5/97	6/9/97		2.75	27.8	mg/l	
Heavy Oil Range Hydrocarbons	"	"	"		8.25	ND	"	
Surrogate: 2-FBP	"	"	"	50.0-150		114	%	

North Creek Analytical, Inc.

*Refer to end of report for text of notes and definitions.


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Pacific Environmental Group
4020 148th Ave NE, Ste B
Redmond, WA 98052

Project: ARCO Seattle, #4051
Project Number: 530-031.2E
Project Manager: John Blough

Sampled: 6/2/97
Received: 6/3/97
Reported: 6/10/97 13:38

Diesel Hydrocarbons (C12-C24) and Heavy Oil (C24-C40) by WTPH-D (extended)/Quality Control North Creek Analytical - Bothell

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Batch: 0670162										
Blank										
		Date Prepared: 6/5/97			Extraction Method: EPA 3520/600 Series					
		0670162-BLK1								
Diesel Range Hydrocarbons	6/6/97			ND	mg/l	0.250				
Heavy Oil Range Hydrocarbons	"			ND	"	0.750				
Surrogate: 2-FBP	"	0.350		0.298	"	50.0-150	85.1			
LCS										
		0670162-BS1								
Diesel Range Hydrocarbons	6/6/97	2.04		1.90	mg/l	52.0-131	93.1			
Surrogate: 2-FBP	"	0.350		0.267	"	50.0-150	76.3			
Duplicate										
		0670162-DUP1			B706024-04					
Diesel Range Hydrocarbons	6/6/97		ND	ND	mg/l				44.0	
Surrogate: 2-FBP	"	0.661		0.501	"	50.0-150	75.8			

North Creek Analytical, Inc.

*Refer to end of report for text of notes and definitions.


Matthew Essig, Project Manager

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Pacific Environmental Group
4020 148th Ave NE, Ste B
Redmond, WA 98052

Project: ARCO Seattle, #4051
Project Number: 530-031.2E
Project Manager: John Blough

Sampled: 6/2/97
Received: 6/3/97
Reported: 6/10/97 13:38

Notes and Definitions

#	Note
---	------

DET	Analyte DETECTED
-----	------------------

ND	Analyte NOT DETECTED at or above the reporting limit
----	--

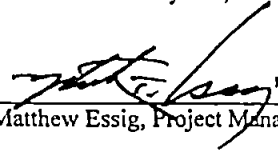
NR	Not Reported
----	--------------

dry	Sample results reported on a dry weight basis
-----	---

Recov.	Recovery
--------	----------

RPD	Relative Percent Difference
-----	-----------------------------

North Creek Analytical, Inc.


Matthew Essig, Project Manager

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Chain of Custody

[illegible]

Condition of sample:		Temperature received:		1 Business Day	☐		
Relinquished by sampler <i>Alan Starr</i>	Date 6/3/97	Time 12 ³⁰	Received by <i>Pyzish NCA</i>	6/3/97	12 ³⁰	Rush 2 Business Days	☐
Relinquished by <i>Pyzish</i>	Date 6/3/97	Time 13 ¹⁰	Received by <i>Chen NCA</i>	6/3/97	13 ¹⁰	Expedited 5 Business Days	☐
Relinquished by	Date	Time	Received by laboratory	Date	Time	Standard 10 Business Days	☒

100 ... 5...



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530-033.5E

Pacific Environmental Group
4020 148th Ave NE, Ste B
Redmond, WA 98052

Project: ARCO #4051
Project Number: 530-031.2E
Project Manager: John Blough

Sampled: 6/13/97
Received: 6/16/97
Reported: 6/24/97 13:33

Summary Report*

(Please refer to the Analytical Report for a thorough review of the complete data set.)

Method	Analyte	Units	MW-1 Water 6/13/97 B706380-01	MW-2 Water 6/13/97 B706380-02	MW-3 Water 6/13/97 B706380-03	MW-4 Water 6/13/97 B706380-04
WTPH-G/8020	Gasoline Range Hydrocarbons	ug/l	46200	245	52.3	<50.0
"	Benzene	"	4260	1.78	<0.500	<0.500
"	Toluene	"	2330	0.561	<0.500	<0.500
"	Ethylbenzene	"	467	7.20	<0.500	<0.500
"	Xylenes (total)	"	7950	8.35	<1.00	<1.00

North Creek Analytical, Inc.

**The Summary Report is a subset of the final Analytical Report and does not include substantial supportive information such as quality control data; this report accurately summarizes sample results for your convenience only.*

Toy B Chang, Project Manager

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Pacific Environmental Group
4020 148th Ave NE, Ste B
Redmond, WA 98052

Project: ARCO #4051
Project Number: 530-031.2E
Project Manager: John Blough

Sampled: 6/13/97
Received: 6/16/97
Reported: 6/24/97 13:23

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
MW-1	B706380-01	Water	6/13/97
MW-2	B706380-02	Water	6/13/97
MW-3	B706380-03	Water	6/13/97
MW-4	B706380-04	Water	6/13/97

North Creek Analytical, Inc.

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Pacific Environmental Group
4020 148th Ave NE, Ste B
Redmond, WA 98052

Project: ARCO #4051
Project Number: 530-031.2E
Project Manager: John Blough

Sampled: 6/13/97
Received: 6/16/97
Reported: 6/24/97 13:23

Gasoline Hydrocarbons (Toluene to Dodecane) and BTEX by WTPH-G and EPA 8020A North Creek Analytical - Bothell

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
MW-1								
				B706380-01		Water		
Gasoline Range Hydrocarbons	0670709	6/23/97	6/23/97		5000	46200	ug/l	
Benzene	"	"	"		50.0	4260	"	
Toluene	"	"	"		50.0	2330	"	
Ethylbenzene	"	"	"		50.0	467	"	
Xylenes (total)	"	"	"		100	7950	"	
Surrogate: 4-BFB (FID)	"	"	"	50.0-150		95.0	%	
Surrogate: 4-BFB (PID)	"	"	"	50.0-150		112	"	
MW-2								
				B706380-02		Water		
Gasoline Range Hydrocarbons	0670709	6/23/97	6/24/97		50.0	245	ug/l	
Benzene	"	"	"		0.500	1.78	"	
Toluene	"	"	"		0.500	0.561	"	
Ethylbenzene	"	"	"		0.500	7.20	"	
Xylenes (total)	"	"	"		1.00	8.35	"	
Surrogate: 4-BFB (FID)	"	"	"	50.0-150		98.8	%	
Surrogate: 4-BFB (PID)	"	"	"	50.0-150		113	"	
MW-3								
				B706380-03		Water		
Gasoline Range Hydrocarbons	0670709	6/23/97	6/24/97		50.0	52.3	ug/l	1
Benzene	"	"	"		0.500	ND	"	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		1.00	ND	"	
Surrogate: 4-BFB (FID)	"	"	"	50.0-150		91.3	%	
Surrogate: 4-BFB (PID)	"	"	"	50.0-150		105	"	
MW-4								
				B706380-04		Water		
Gasoline Range Hydrocarbons	0670709	6/23/97	6/23/97		50.0	ND	ug/l	
Benzene	"	"	"		0.500	ND	"	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		1.00	ND	"	
Surrogate: 4-BFB (FID)	"	"	"	50.0-150		86.9	%	
Surrogate: 4-BFB (PID)	"	"	"	50.0-150		103	"	

North Creek Analytical, Inc.

*Refer to end of report for text of notes and definitions.

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Pacific Environmental Group	Project: ARCO #4051	Sampled: 6/13/97
4020 148th Ave NE, Ste B	Project Number: 530-031.2E	Received: 6/16/97
Redmond, WA 98052	Project Manager: John Blough	Reported: 6/24/97 13:23

Gasoline Hydrocarbons (Toluene to Dodecane) and BTEX by WTPH-G and EPA 8020A/Quality Control

North Creek Analytical - Bothell

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Batch: 0670709		Date Prepared: 6/23/97		Extraction Method: EPA 5030						
Blank		0670709-BLK1								
Gasoline Range Hydrocarbons	6/23/97			ND	ug/l	50.0				
Benzene	"			ND	"	0.500				
Toluene	"			ND	"	0.500				
Ethylbenzene	"			ND	"	0.500				
Xylenes (total)	"			ND	"	1.00				
Surrogate: 4-BFB (FID)	"	16.0		14.8	"	50.0-150	92.5			
Surrogate: 4-BFB (PID)	"	16.0		16.5	"	50.0-150	103			
LCS		0670709-BS1								
Gasoline Range Hydrocarbons	6/23/97	500		487	ug/l	80.0-120	97.4			
Surrogate: 4-BFB (FID)	"	16.0		16.8	"	50.0-150	105			
Duplicate		0670709-DUP1		B706353-07						
Gasoline Range Hydrocarbons	6/23/97		1870	2050	ug/l				25.0	9.18
Surrogate: 4-BFB (FID)	"	16.0		17.7	"	50.0-150	111			
Duplicate		0670709-DUP2		B706380-04						
Gasoline Range Hydrocarbons	6/23/97		ND	ND	ug/l				25.0	
Surrogate: 4-BFB (FID)	"	16.0		14.0	"	50.0-150	87.5			
Matrix Spike		0670709-MS1		B706353-01						
Benzene	6/23/97	10.0	ND	10.0	ug/l	70.0-130	100			
Toluene	"	10.0	ND	10.4	"	70.0-130	104			
Ethylbenzene	"	10.0	ND	10.2	"	70.0-130	102			
Xylenes (total)	"	30.0	ND	31.0	"	70.0-130	103			
Surrogate: 4-BFB (PID)	"	16.0		17.4	"	50.0-150	109			
Matrix Spike Dup		0670709-MSD1		B706353-01						
Benzene	6/23/97	10.0	ND	9.93	ug/l	70.0-130	99.3	15.0	0.702	
Toluene	"	10.0	ND	10.2	"	70.0-130	102	15.0	1.94	
Ethylbenzene	"	10.0	ND	10.2	"	70.0-130	102	15.0	0	
Xylenes (total)	"	30.0	ND	31.0	"	70.0-130	103	15.0	0	
Surrogate: 4-BFB (PID)	"	16.0		17.6	"	50.0-150	110			

North Creek Analytical, Inc.

*Refer to end of report for text of notes and definitions.

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Pacific Environmental Group	Project: ARCO #4051	Sampled: 6/13/97
4020 148th Ave NE, Ste B	Project Number: 530-031.2E	Received: 6/16/97
Redmond, WA 98052	Project Manager: John Blough	Reported: 6/24/97 13:23

Notes and Definitions

#	Note
---	------

1 This sample appears to contain extractable diesel range organics.

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

Recov. Recovery

RPD Relative Percent Difference

North Creek Analytical, Inc.

Joy B Chang, Project Manager

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Division of AtlanticRichfieldCompany

Task Order No.

21334-00-L

Chain of Custody

[illegible]

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

✓ No

Independent Action Report Update

Site Name: Auto # 4051
Inc. #: 2169 Date of Report: 3-3-98
County: King Date Report Rec'd: 3-4-98
Reviewed by: Ben Amosah-Forsen

Comments (please include: free prod., tank info., contaminant migration,
GW depth & flow, conc. trends, PCS treated?):

Elevated levels and
them in MW-1 & MW-3
respectively

Interim