

ARCO GROUND WATER MONITORING REPORT
Third and Fourth Quarters of 1995
February 20, 1996

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FEB 26 1996



1756-114th Avenue SE
Suite 110
Bellevue, WA 98004
206/450-7726
FAX: 206/450-8837

Facility No.: 6162 Address: 1403 NW Sammanish Road, Issaquah, WA
ARCO Environmental Engineer: Chuck Hutchens
Consulting Co./Contract Person: Delta Environmental Consultants, Inc./ Derek J. Tornow
Consultant Project Number: M094-503
Primary Agency/Regulatory ID No.: Washington State Department of Ecology

WORK PERFORMED DURING THE THIRD AND FOURTH QUARTERS OF 1995:

- Quarterly ground water monitoring was conducted by Pacific on September 8 and December 28, 1995.
- Prepared a semi-annual ground water monitoring report.
- Removed and replaced underground storage tanks (UST) in October of 1995.
- Began preparing the UST removal report.
- Prepared an air sparge pilot test report.
- Installed four air sparge wells on October 7, 1995.
- Began installation of an air sparge/soil vapor extraction (AS/SVE) remediation system.

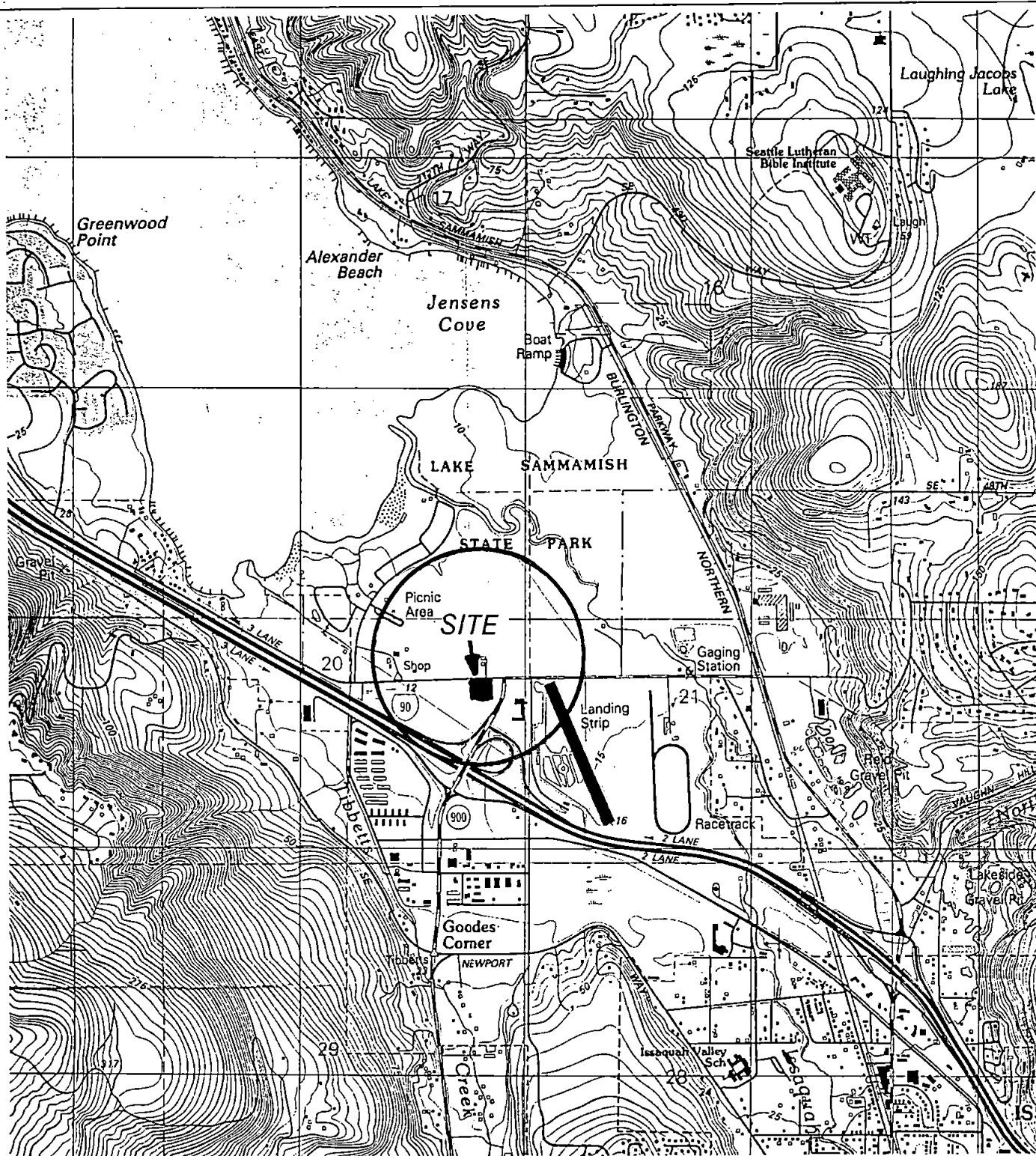
WORK SCHEDULED FOR THE FIRST AND SECOND QUARTERS OF 1996:

- Submit an UST removal report.
- Complete installation of the AS/SVE system and begin routine operation and maintenance monitoring.
- Prepare and submit an AS/SVE system installation report.
- Prepare and submit a quarterly remediation system operation report.
- Conduct quarterly ground water monitoring.
- Prepare a semi-annual ground water monitoring report.

Current Phase of Project:	Monitoring	(Phase I, Add'l Assmnt RAP/CAP, Remed., etc)
Frequency of Ground Water Sampling and Monitoring:	Quarterly	(Quarterly, etc)
Are LPH Present On-Site:	No	(Yes/No)
LPH Recovered this Reporting Period:	None	(gallons)
Cumulative LPH Recovered to Date:	None	(gallons)
Amount of Soil Removed to Date:	1637	(tons)
Current Remediation Techniques:	None	(SVES/Sparge/Pump and Treat)
Approximate Depth to Ground Water:	3.2 to 11.3	(Feet)
Ground Water Gradient:	Northwest	(Direction)
	Less than 0.01 feet/linear foot	(Magnitude)

Attachments:

- Figure 1 - Site Location Map
- Figure 2 - Inferred Water Table Contour Map - 09/08/95
- Figure 3 - Inferred Water Table Contour Map - 12/28/95
- Table 1 - Summary of Ground Water and Analytical Data
- Table 2 - Summary of Historical Ground Water Data
- Attachment A - Pacific October 4, 1995 and January 15, 1996 Sampling Reports
- Attachment B - Historical Ground Water Data from Geraghty & Miller Reports



GENERAL NOTES:
 BASE MAP FROM U.S.G.S.
 BELLEVUE SOUTH, WA.
 7.5 X 15 MINUTE TOPOGRAPHIC
 PRINTED 1983



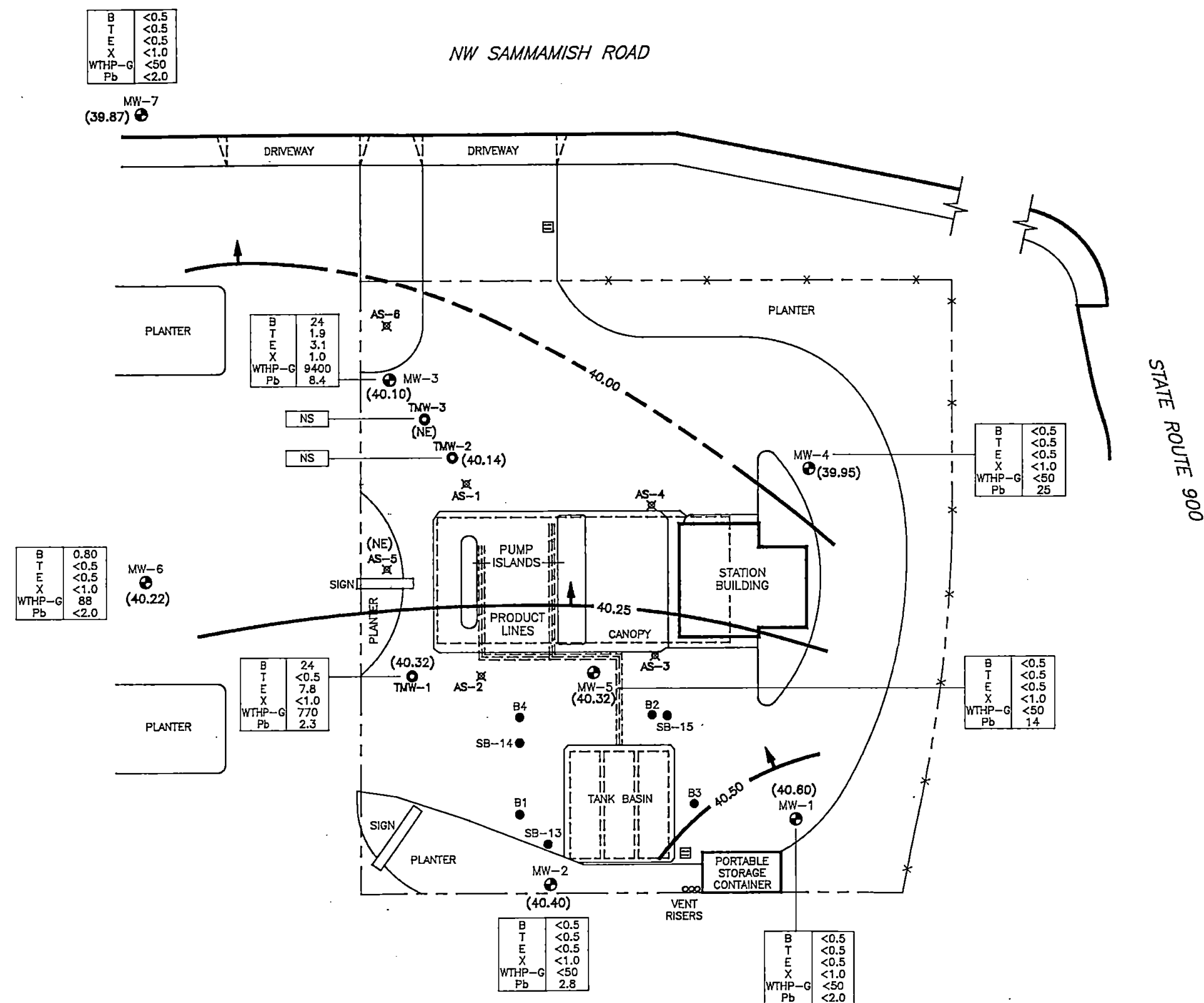
QUADRANGLE LOCATION

0 2000 FT
 SCALE 1 : 25,000

FIGURE 1
 SITE LOCATION MAP
 ARCO PRODUCTS COMPANY
 FACILITY NO. 6162
 1403 NW SAMMAMISH ROAD
 ISSAQUAH, WA.

PROJECT NO. M094-503	DRAWN BY I.H. 12/6/95
FILE NO. ---	PREPARED BY R.B.
REVISION NO. 1	REVIEWED BY

Delta
 Environmental
 Consultants, Inc.



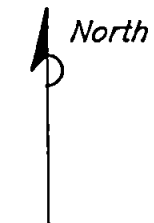
PROJECT NO. M094-503	DRAWN BY J.H. 2/1/98
FILE NO. M094503A	PREPARED BY K.K.
REVISION NO. 2	REVIEWED BY



B	<0.5
T	<0.5
E	<0.5
X	<1.0
WTHP-G	<50
Pb	<2.0

MW-7
(41.21)

NW SAMMAMISH ROAD



LEGEND:

- PROPERTY LINE
- x-x- FENCE
- ☐ CATCH BASIN
- B3 SOIL BORING LOCATION
- ⊙ MW-1 MONITORING WELL LOCATION
- ⊙ TMW-1 TEMPORARY MONITORING WELL LOCATION
- ✕ AS-1 AIR SPARGING WELL LOCATION
- (41.94) GROUND WATER ELEVATION IN FEET RELATIVE TO MEAN SEA LEVEL (MSL)
- 41.8 — WATER TABLE CONTOUR IN FEET RELATIVE TO MSL
- ➔ INFERRED GROUND WATER FLOW DIRECTION
- (NE) TOP OF CASING ELEVATION NOT SURVEYED

GROUND WATER DATA

B	<0.5	BENZENE IN MICROGRAMS PER LITER (ug/L)
T	<0.5	TOLUENE IN ug/L
E	<0.5	ETHYLBENZENE IN ug/L
X	<1.0	XYLENES IN ug/L
WTHP-G	<50	TOTAL PETROLEUM HYDROCARBONS AS GASOLINE IN ug/L
Pb	<2.0	LEAD IN ug/L

NS NOT SAMPLED



FIGURE 3
INFERRED WATER TABLE CONTOUR MAP - 12/28/95
ARCO PRODUCTS COMPANY
FACILITY NO. 6162
1403 NW SAMMAMISH ROAD
ISSAQUAH, WA.

PROJECT NO.	DRAWN BY
M084-503	I.H. 2/1/96
FILE NO.	PREPARED BY
M084503A	K.K.
REVISION NO.	REVIEWED BY
1	



B	1.3
T	<0.5
E	<0.5
X	<1.0
WTHP-G	320
Pb	3.5

MW-6
(41.56)

B	860
T	8.0
E	190
X	15
WTHP-G	8300
Pb	3.7

B	<0.5
T	<0.5
E	<0.5
X	<1.0
WTHP-G	<50
Pb	7.9

B	<0.5
T	<0.5
E	<0.5
X	<1.0
WTHP-G	<50
Pb	<2.0

B	<0.5
T	<0.5
E	<0.5
X	<1.0
WTHP-G	<50
Pb	<2.0

TABLE 1
SUMMARY OF GROUND WATER AND ANALYTICAL DATA
ARCO FACILITY NO. 6162
1403 N.W. SAMMAMISH ROAD
ISSAQUAH, WASHINGTON
DELTA PROJECT NO. M094-503

MONITORING WELL	DATE SAMPLED	BENZENE	TOLUENE	ETHYL-BENZENE	XYLENES	WTPH-G	TOTAL LEAD	DEPTH TO WATER	GROUND WATER ELEVATION	TOC
MW-1	09/08/95	<0.5	<0.5	<0.5	<1.0	<50	<2.0	4.54	40.60	45.14
	12/28/95	<0.5	<0.5	<0.5	<1.0	<50	<2.0	3.20	41.94	
MW-2	09/08/95	<0.5	<0.5	<0.5	<1.0	<50	2.8	5.73	40.40	46.13
	12/28/95	<0.5	<0.5	<0.5	<1.0	<50	<2.0	4.39	41.74	
MW-3	09/08/95	24	1.9	3.1	1.0	9400	8.4	5.81	40.10	45.91
	12/28/95	0.85	0.89	<0.5	<1.0	3200	75	4.47	41.44	
MW-4	09/08/95	<0.5	<0.5	<0.5	<1.0	<50	25	6.00	39.95	45.95
	12/28/95	<0.5	<0.5	<0.5	<1.0	<50	7.9	4.66	41.29	
MW-5	09/08/95	<0.5	<0.5	<0.5	<1.0	<50	14	5.63	40.32	45.95
	12/28/95	NS	NS	NS	NS	NS	NS	4.29	41.66	
MW-6	09/08/95	0.80	<0.5	<0.5	<1.0	88	<2.0	5.35	40.22	45.57
	12/28/95	1.3	<0.5	<0.5	<1.0	320	3.5	4.01	41.56	
MW-7	09/08/95	<0.5	<0.5	<0.5	<1.0	<50	<2.0	5.75	39.87	45.62
	12/28/95	<0.5	<0.5	<0.5	<1.0	<50	<2.0	4.41	41.21	
AS-1	09/08/95	NS	NS	NS	NS	NS	NS	5.85	NE	NE
	12/28/95	NS	NS	NS	NS	NS	NS	NM	NM	
AS-2	09/08/95	NS	NS	NS	NS	NS	NS	11.35	NE	NE
	12/28/95	NS	NS	NS	NS	NS	NS	NM	NM	
TMW-1	09/08/95	24	<0.5	7.8	<1.0	770	2.3	5.88	40.32	46.20
	12/28/95	860	8.0	190	15	8300	3.7	4.54	41.66	
TMW-2	09/08/95	NS	NS	NS	NS	NS	NS	5.70	40.14	45.84
	12/28/95	NS	NS	NS	NS	NS	NS	4.36	41.48	
TMW-3	09/08/95	NS	NS	NS	NS	NS	NS	5.61	NE	NE
	12/28/95	NS	NS	NS	NS	NS	NS	4.27	NE	
Laboratory Method		8020	8020	8020	8020	WTPH-G	7421			
MTCA Cleanup Levels		5.0	40.0	30.0	20.0	1000	5.0			

All concentrations are reported in ug/L (ppb).

All measurements are reported in feet.

WTPH-G = Total petroleum hydrocarbons as gasoline.

TOC = Top of well casing elevation.

NE = Top of well casing elevation not established.

LPH = Liquid Phase Hydrocarbons.

NM = Not measured.

NS = Not sampled.

REV.02/14/96.NF

PROJECTS\ARCO\94503\TABLES\1995\3-4QGWD.WQ2

TABLE 2
SUMMARY OF HISTORICAL GROUND WATER DATA
ARCO FACILITY NO. 6162
1403 N.W. SAMMAMISH ROAD
ISSAQUAH, WASHINGTON
DELTA PROJECT NO. M094-503

MONITORING WELL	DATE SAMPLED	BENZENE	TOLUENE	ETHYL-BENZENE	XYLENES	WTPH-G	TOTAL LEAD	DEPTH TO WATER	GROUND WATER ELEVATION	TOC
MW-1	09/23/94	<0.5	<0.5	<0.5	<1.0	<50	<2.0	5.01	40.19	45.20
	11/22/94	NS	NS	NS	NS	NS	NS	4.32	40.88	
	12/28/94	<0.5	<0.5	<0.5	<1.0	<50	8.6	3.85	41.35	
	02/17/95	<0.5	<0.5	<0.5	<1.0	<50	<2.0	2.94	42.20	45.14
	06/01/95	<0.5	<0.5	<0.5	<1.0	<50	6.0	4.00	41.14	
	09/08/95	<0.5	<0.5	<0.5	<1.0	<50	<2.0	4.54	40.60	
	12/28/95	<0.5	<0.5	<0.5	<1.0	<50	<2.0	3.20	41.94	
MW-2	09/23/94	<0.5	<0.5	<0.5	<1.0	<50	3.4	6.01	40.16	46.17
	11/22/94	NS	NS	NS	NS	NS	NS	4.65	41.52	
	12/28/94	<0.5	<0.5	<0.5	1.3	<50	<2.0	3.72	42.45	
	02/17/95	<0.5	<0.5	<0.5	<1.0	<50	<2.0	4.46	41.67	46.13
	06/01/95	<0.5	<0.5	<0.5	<1.0	<50	5.5	5.46	40.67	
	09/08/95	<0.5	<0.5	<0.5	<1.0	<50	2.8	5.73	40.40	
	12/28/95	<0.5	<0.5	<0.5	<1.0	<50	<2.0	4.39	41.74	
MW-3	09/23/94	4.4	1.0	1.3	<1.0	3600	20	6.23	39.69	45.92
	11/22/94	NS	NS	NS	NS	NS	NS	4.57	41.35	
	12/28/94	8.2	2.2	<2.0	<4.0	6900	<2.0	3.45	42.47	
	02/17/95	1.5	1.5	0.79	<1.0	4600	6.1	4.28	41.63	45.91
	06/01/95	27	9.8	<8.0	12	9300	<3.0	5.41	40.50	
	09/08/95	24	1.9	3.1	1.0	9400	8.4	5.81	40.10	
	12/28/95	0.85	0.89	<0.5	<1.0	3200	75	4.47	41.44	
MW-4	09/23/94	<0.5	<0.5	<0.5	<1.0	<50	95	6.46	39.54	46.00
	11/22/94	NS	NS	NS	NS	NS	NS	4.53	41.47	
	12/28/94	<0.5	<0.5	<0.5	<1.0	<50	8.7	3.61	42.39	
	02/17/95	<0.5	<0.5	<0.5	<1.0	<50	<2.0	4.12	41.83	45.95
	06/01/95	<0.5	<0.5	<0.5	<1.0	<50	22	5.48	40.47	
	09/08/95	<0.5	<0.5	<0.5	<1.0	<50	25	6.00	39.95	
	12/28/95	<0.5	<0.5	<0.5	<1.0	<50	7.9	4.66	41.29	

Continued...

TABLE 2
SUMMARY OF HISTORICAL GROUND WATER DATA
ARCO FACILITY NO. 6162
1403 N.W. SAMMAMISH ROAD
ISSAQUAH, WASHINGTON
DELTA PROJECT NO. M094-503

MONITORING WELL	DATE SAMPLED	BENZENE	TOLUENE	ETHYL-BENZENE	XYLENES	WTPH-G	TOTAL LEAD	DEPTH TO WATER	GROUND WATER ELEVATION	TOC
MW-5	09/23/94	390	0.65	17	4.1	1100	13	5.99	40.00	45.99
	11/22/94	NS	NS	NS	NS	NS	NS	4.55	41.44	
	12/28/94	2000	14	430	71	12,000	3.5	3.75	42.24	
	02/17/95	710	20	230	52	7300	<2.0	4.40	41.55	45.95
	06/01/95	84	<0.5	41	6.6	1600	41	5.26	40.69	
	09/08/95	<0.5	<0.5	<0.5	<1.0	<50	14	5.63	40.32	
	12/28/95	NS	NS	NS	NS	NS	NS	4.29	41.66	
MW-6	02/17/95	15	<0.5	2.9	<1.0	1400	<2.0	4.05	41.52	45.57
	06/01/95	29	<0.5	2.0	<1.0	920	4.1	5.09	40.48	
	09/08/95	0.80	<0.5	<0.5	<1.0	88	<2.0	5.35	40.22	
	12/28/95	1.3	<0.5	<0.5	<1.0	320	3.5	4.01	41.56	
MW-7	02/17/95	<0.5	<0.5	<0.5	<1.0	<50	<2.0	4.03	41.59	45.62
	06/01/95	<0.5	<0.5	<0.5	<1.0	<50	<3.0	5.45	40.17	
	09/08/95	<0.5	<0.5	<0.5	<1.0	<50	<2.0	5.75	39.87	
	12/28/95	<0.5	<0.5	<0.5	<1.0	<50	<2.0	4.41	41.21	
AS-1	02/17/95	4.6	0.64	1.8	<1.0	<50	<2.0	9.22	NE	NE
	06/01/95	NS	NS	NS	NS	NS	NS	6.87	NE	
	09/08/95	NS	NS	NS	NS	NS	NS	5.85	NE	
	12/28/95	NS	NS	NS	NS	NS	NS	NM	NM	
AS-2	06/01/95	NS	NS	NS	NS	NS	NS	5.72	NE	NE
	09/08/95	NS	NS	NS	NS	NS	NS	11.35	NE	
	12/28/95	NS	NS	NS	NS	NS	NS	NM	NM	

Continued...

TABLE 2
SUMMARY OF HISTORICAL GROUND WATER DATA
ARCO FACILITY NO. 6162
1403 N.W. SAMMAMISH ROAD
ISSAQUAH, WASHINGTON
DELTA PROJECT NO. M094-503

MONITORING WELL	DATE SAMPLED	BENZENE	TOLUENE	ETHYL-BENZENE	XYLENES	WTPH-G	TOTAL LEAD	DEPTH TO WATER	GROUND WATER ELEVATION	TOC
TMW-1	06/01/95	910	1.3	310	4.6	19,000	6.3	5.60	40.60	46.20
	09/08/95	24	<0.5	7.8	<1.0	770	2.3	5.88	40.32	
	12/28/95	860	8.0	190	15	8300	3.7	4.54	41.66	
TMW-2	06/01/95	NS	NS	NS	NS	NS	NS	5.26	40.58	45.84
	09/08/95	NS	NS	NS	NS	NS	NS	5.70	40.14	
	12/28/95	NS	NS	NS	NS	NS	NS	4.36	41.48	
TMW-3	06/01/95	NS	NS	NS	NS	NS	NS	5.21	NE	NE
	09/08/95	NS	NS	NS	NS	NS	NS	5.61	NE	
	12/28/95	NS	NS	NS	NS	NS	NS	4.27	NE	
Laboratory Method		8020	8020	8020	8020	WTPH-G	7421			
MTCA Cleanup Levels		5.0	40.0	30.0	20.0	1000	5.0			

All concentrations are reported in ug/L (ppb).

All measurements are reported in feet.

WTPH-G = Total petroleum hydrocarbons as gasoline.

TOC = Top of well casing elevation.

NE = Top of well casing elevation not established.

LPH = Liquid Phase Hydrocarbons.

NM = Not measured.

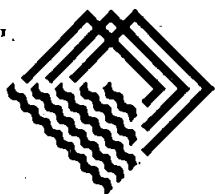
NS = Not sampled.

REV.02/14/96.NF

PROJECTS\ARCO\94513\TABLES\1995\3-4QGWD.WQ2

ATTACHMENT A

Pacific October 4, 1995 and January 15, 1996 Sampling Reports



PACIFIC
ENVIRONMENTAL
GROUP INC.

OCT - 5 1995

October 4, 1995
Project 530-031.2C

Mr. Andy Smith
Delta Environmental Consultants
3150 Richards Road, Suite 100
Bellevue, Washington 98005

Re: ARCO Service Station 6162
Issaquah, Washington

Dear Mr. Smith:

Pacific Environmental Group Inc. (PACIFIC) performed groundwater sampling activities at the above referenced ARCO service station on September 8, 1995. Enclosed are the following:

- Field Report
- Groundwater Sample Field Data Sheet
- Certified Analytical Report
- Chain-of-Custody Documentation

Sampling Protocol

The groundwater sampling procedure employed by PACIFIC consisted of first measuring the water level using a Slope Indicator Model SI453 and visually checking for the presence of sheens using a clear disposable polyethylene bailer. When separate-phase hydrocarbons are encountered, an oil/water interface probe (Keck Model No. KIR-89) is used to measure the thickness within the well. Wells containing separate-phase hydrocarbons are not sampled. The well sampling order is based on concentration information from previous sampling events provided to PACIFIC.

Each well was then purged of a minimum of three casing volumes of water (or until dry) by a disposable polyethylene bailer or a centrifugal pump with a polyethylene disposable

October 4, 1995

Page 2

hose. Information regarding each well was recorded on individual Groundwater Sample Field Data Sheets and summarized on the Field Report.

Groundwater samples were collected using disposable polyethylene bailers after the wells recovered to at least 80 percent of the pre-purge static water level. Wells which recovered slowly were allowed as much recovery as possible by sampling immediately prior to site departure. The samples were placed into appropriate EPA-approved containers, labeled, logged onto an ARCO chain-of-custody document, and transported on ice to North Creek Analytical, Bothell, Washington. Purge water was removed from the site by PACIFIC and transported the 3,500-gallon staging tank at ARCO service station No. 5567.

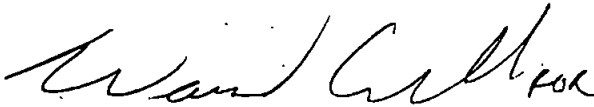
If you have any questions, please call.

Sincerely,

Pacific Environmental Group, Inc.



John. J. Blough
Field Services Manager



Eric Larsen
Project Manager

Enclosures

FIELD REPORT

DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT NO.: 530-031.2c

LOCATION: 1403 NW SAMAMISH RD
ISSAQUAH, WA

DATE: 9-8-85

CLIENT/STATION #: ARCO 6162

FIELD TECHNICIAN: ADS

DAY OF WEEK: _____

DTM ORDER	WELL ID	SURFACE SEAL	LID SECURE	GASKET	LOCK	EXPANDING CAP	TOTAL DEPTH (Feet)	FIRST DEPTH TO WATER (Feet)	SECOND DEPTH TO WATER (Feet)	DEPTH TO FLOATING PRODUCT (Feet)	FLOATING PRODUCT THICKNESS (Feet)	COMMENTS
	MW-1						16.65	4.54				
	MW-2						15.42	5.73				
	MW-3						19.20	5.81				
	MW-4						16.55	6.00				
	MW-5						18.11	5.63				
	MW-6				⊗		14.90	5.35				
	MW-7				⊗		15.90	5.75				
	TMW-1				⊗		8.18	15.10				
	TMW-2				⊗		-	5.70				Not Sampled - Water level only
	TMW-3				⊗		-	5.61				
	AS-1				⊗		19.60	5.85				
	AS-2				⊗		-	11.35				Well AS-2 under strong person
												⊗ = ADD PAD LOCK TO new well

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: 530-031.2c

WELL ID: MW-1

CLIENT/STATION #: ARCO 6162

ADDRESS: 1403 NW SAMAMISH Road
Issaquah, WA

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____

GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____

TD 16.65 - DTW 4.54 × $\frac{\text{GALLON}}{\text{LINEAR FT.}}$ 0.17 × $\frac{\text{CASING VOLUME}}{\text{VOLUME}}$ 3 = $\frac{\text{CALCULATED PURGE}}{\text{PURGE}}$ 6.17 ACTUAL PURGE 6.5

DATE PURGED: 9-8-95 START (2400 Hr) 11:50 END (2400 Hr) 11:58

DATE SAMPLED: 7-8-95 START (2400 Hr) 1400 END (2400 Hr) 1405

						COLOR (visual)	TURBIDITY (visual)
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☒ Centrifugal Pump ☐ Bailer (PVC)
☐ Submersible Pump ☐ Bailer (Stainless Steel)
☐ Dedicated
 Other: _____

SAMPLING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☐ DDL Sampler ☐ Bailer (Stainless Steel)
☐ Dipper ☐ Submersible Pump
☒ Bailer Disposable ☐ Dedicated
 Other: _____

REMARKS: _____

PAGE 1 OF 1

PRINT NAME: John Blough

SIGNATURE: John Blough

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: 530-031.2c

WELL ID: ML-2

CLIENT/STATION #: ARCO 6162

ADDRESS: 1403 NW SAMAMISH ROAD
ISSAQUAH, WA

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____

GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____

TD 15.42 DTW 5.73 X $\frac{\text{GALLON}}{\text{LINEAR FT.}}$ 0.17 X $\frac{\text{CASING}}{\text{VOLUME}}$ 3 = $\frac{\text{CALCULATED}}{\text{PURGE}}$ 4.94 ACTUAL PURGE 5

DATE PURGED: 9-8-95 START (2400 Hr) 1205 END (2400 Hr) 1215

DATE SAMPLED: 7-8-95 START (2400 Hr) 1410 END (2400 Hr) 1415

						COLOR (visual)	TURBIDITY (visual)
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☒ Centrifugal Pump ☐ Bailer (PVC)
☐ Submersible Pump ☐ Bailer (Stainless Steel)
☐ Dedicated
 Other: _____

SAMPLING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☐ DDL Sampler ☐ Bailer (Stainless Steel)
☐ Dipper ☐ Submersible Pump
☒ Bailer Disposable ☐ Dedicated
 Other: _____

REMARKS: _____

PRINT NAME: John Blough

SIGNATURE: John Blough

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: 530-031.2c

WELL ID: MW-3

CLIENT/STATION #: ARCO 6162

ADDRESS: 1403 NW SAMAMISH Road
Issaquah, WA

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____

GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____

TD 19.20 - DTW 5.81 X $\frac{\text{GALLON}}{\text{LINEAR FT.}}$ 0.17 X $\frac{\text{CASING VOLUME}}{\text{VOLUME}}$ 3 = $\frac{\text{CALCULATED PURGE}}$ 6.82 ACTUAL PURGE

DATE PURGED: 9-8-95 START (2400 Hr) 1330 END (2400 Hr) 1335

DATE SAMPLED: 7-8-95 START (2400 Hr) 1500 END (2400 Hr) 1505

					COLOR (visual)	TURBIDITY (visual)
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☒ Centrifugal Pump ☐ Bailer (PVC)
☐ Submersible Pump ☐ Bailer (Stainless Steel)
☐ Dedicated
 Other: _____

SAMPLING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☐ DDL Sampler ☐ Bailer (Stainless Steel)
☐ Dipper ☐ Submersible Pump
☒ Bailer Disposable ☐ Dedicated
 Other: _____

REMARKS: _____

PAGE 1 OF 1

PRINT NAME: John Blough

SIGNATURE: John Blough

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: 530-031.2c WELL ID: mw-4
 CLIENT/STATION #: ARCO 6162 ADDRESS: 1403 NW SAMAMISH ROAD
ISSAQUAH, WA

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____
 GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____
 TD 16.55 - DTW 6.00 X $\frac{\text{GALLON}}{\text{LINEAR FT.}}$ 0.17 X $\frac{\text{CASING VOLUME}}{\text{VOLUME}}$ 3 = $\frac{\text{CALCULATED PURGE}}$ 5.38 ACTUAL PURGE 5.5

DATE PURGED: 9-8-95 START (2400 Hr) 1240 END (2400 Hr) 1250
 DATE SAMPLED: 7-8-95 START (2400 Hr) 1430 END (2400 Hr) 1435

						COLOR (visual)	TURBIDITY (visual)
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

_____ 2" Bladder Pump _____ Bailer (Teflon®)
☒ Centrifugal Pump _____ Bailer (PVC)
 _____ Submersible Pump _____ Bailer (Stainless Steel)
 _____ Dedicated

Other: _____

SAMPLING EQUIPMENT

_____ 2" Bladder Pump _____ Bailer (Teflon®)
 _____ DDL Sampler _____ Bailer (Stainless Steel)
 _____ Dipper _____ Submersible Pump
☒ Bailer Disposable _____ Dedicated

Other: _____

REMARKS: _____

PRINT NAME: John Blough
 SIGNATURE: John Blough

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: 530-031.2c

WELL ID: MLW-5

CLIENT/STATION #: ARCO 6162

ADDRESS: 1403 NW SAMAMISH ROAD
ISSAQUAH, WA

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____

GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____

TD 1811 - DTW 5.63 X $\frac{\text{GALLON}}{\text{LINEAR FT.}}$ 0.17 X $\frac{\text{CASING VOLUME}}{\text{VOLUME}}$ 3 = $\frac{\text{CALCULATED PURGE}}$ 6-36 ACTUAL PURGE 6.5

DATE PURGED: 9-8-95 START (2400 Hr) 1310 END (2400 Hr) 1320

DATE SAMPLED: 7-8-95 START (2400 Hr) 1450 END (2400 Hr) 1455

						COLOR (visual)	TURBIDITY (visual)
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☒ Centrifugal Pump ☐ Bailer (PVC)
☐ Submersible Pump ☐ Bailer (Stainless Steel)
☐ Dedicated
 Other: _____

SAMPLING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☐ DDL Sampler ☐ Bailer (Stainless Steel)
☐ Dipper ☐ Submersible Pump
☒ Bailer Disposable ☐ Dedicated
 Other: _____

REMARKS: Replaced Check

PAGE 1 OF 1

PRINT NAME: John Blough

SIGNATURE: John Blough

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: 530-031.2c WELL ID: MW 6
 CLIENT/STATION #: ARCO 6162 ADDRESS: 1403 NW SAMAMISH Road
Issaquah, WA

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____
 GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____
 TD 1490 - DTW 535 X $\frac{\text{GALLON}}{\text{LINEAR FT.}}$ 0.17 X $\frac{\text{CASING VOLUME}}$ 3 = $\frac{\text{CALCULATED PURGE}}$ 4.87 ACTUAL PURGE

DATE PURGED: 9-8-95 START (2400 Hr) 1300 END (2400 Hr) 1305
 DATE SAMPLED: 7-8-95 START (2400 Hr) 1440 END (2400 Hr) 1445

						COLOR (visual)	TURBIDITY (visual)
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

_____ 2" Bladder Pump _____ Bailer (Teflon®)
☒ Centrifugal Pump _____ Bailer (PVC)
 _____ Submersible Pump _____ Bailer (Stainless Steel)
 _____ Dedicated

Other: _____

SAMPLING EQUIPMENT

_____ 2" Bladder Pump _____ Bailer (Teflon®)
 _____ DDL Sampler _____ Bailer (Stainless Steel)
 _____ Dipper _____ Submersible Pump
☒ Bailer Disposable _____ Dedicated

Other: _____

REMARKS: _____

Replaced Loc K

PAGE 1 OF 1

PRINT NAME: John Blough

SIGNATURE: John Blough

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: 530-031.2c
 CLIENT/STATION #: ARCO 6162

WELL ID: MW-7
 ADDRESS: 1403 NW SAMAMISH Road
Issaquah, WA

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____
 GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____
 TD 15.90 - DTW 5.75 X $\frac{\text{GALLON}}{\text{LINEAR FT.}}$ 0.17 X $\frac{\text{CASING VOLUME}}$ 3 = $\frac{\text{CALCULATED PURGE}}$ 5.17 ACTUAL PURGE 5.5

DATE PURGED: 9-8-95 START (2400 Hr) 1220 END (2400 Hr) 1230
 DATE SAMPLED: 7-8-95 START (2400 Hr) 1420 END (2400 Hr) 1425

						COLOR (visual)	TURBIDITY (visual)
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☒ Centrifugal Pump ☐ Bailer (PVC)
☐ Submersible Pump ☐ Bailer (Stainless Steel)
☐ Dedicated
 Other: _____

SAMPLING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☐ DDL Sampler ☐ Bailer (Stainless Steel)
☐ Dipper ☐ Submersible Pump
☒ Bailer Disposable ☐ Dedicated
 Other: _____

REMARKS:

Advised padlock

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: 530-031.2c
 CLIENT/STATION #: ARCO 6162

WELL ID: TMW-1
 ADDRESS: 1403 NW SAMAMISH Road
Issaquah, WA

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____
 GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____
 TD 8.18 DTW 5.88 X $\frac{\text{GALLON}}{\text{LINEAR FT.}}$ 0.17 X $\frac{\text{CASING}}{\text{VOLUME}}$ 3 = $\frac{\text{CALCULATED}}{\text{PURGE}}$ 1.17 ACTUAL PURGE 1.5

DATE PURGED: 9-8-95 START (2400 Hr) 1340 END (2400 Hr) 1350
 DATE SAMPLED: 9-8-95 START (2400 Hr) 1510 END (2400 Hr) 1515

					COLOR (visual)	TURBIDITY (visual)
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☒ Centrifugal Pump ☐ Bailer (PVC)
☐ Submersible Pump ☐ Bailer (Stainless Steel)
☐ Dedicated
 Other: _____

SAMPLING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☐ DDL Sampler ☐ Bailer (Stainless Steel)
☐ Dipper ☐ Submersible Pump
☒ Bailer Disposable ☐ Dedicated
 Other: _____

REMARKS: replaced lock

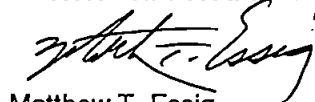
Strong odor

PAGE 1 OF 1 PRINT NAME: John Blough
 SIGNATURE: John Blough

Pacific Environmental Group
4020 148th Avenue NE, #B
Redmond, WA 98052
Attention: John BloughProject Name: ARCO Issaquah, #6162
Client Project : #530-031.2C
NCA Project #: B509147Received: Sep 11, 1995
Reported: Sep 22, 1995**PROJECT SUMMARY PAGE**

Laboratory Sample Number	Sample Description	Sample Matrix	Date Sampled
B509147-01	MW1-4	Water	9/8/95
B509147-02	MW2-5	Water	9/8/95
B509147-03	MW3-5	Water	9/8/95
B509147-04	MW4-6	Water	9/8/95
B509147-05	MW5-5	Water	9/8/95
B509147-06	MW6-5	Water	9/8/95
B509147-07	MW7-5	Water	9/8/95
B509147-08	TMW1-5	Water	9/8/95
B509147-09	TRIP BLANK	Water	9/8/95

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.

NORTH CREEK ANALYTICAL Inc.Matthew T. Essig
Project Manager

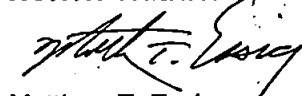
Pacific Environmental Group	Client Project ID: ARCO Issaquah, #6162	Sampled: Sep 8, 1995
4020 148th Avenue NE, #B	Sample Matrix: Water	Received: Sep 11, 1995
Redmond, WA 98052	Analysis Method: WTPH-G	Analyzed: Sep 12, 1995
Attention: John Blough	First Sample #: B509147-01	Reported: Sep 22, 1995

TOTAL PETROLEUM HYDROCARBONS-GASOLINE RANGE

Sample Number	Sample Description	Sample Result µg/L (ppb)	Surrogate Recovery %
B509147-01	MW1-4	N.D.	99
B509147-02	MW2-5	N.D.	101
B509147-03	MW3-5	9,400	S-2
B509147-04	MW4-6	N.D.	94
B509147-05	MW5-5	N.D.	114
B509147-06	MW6-5	88	122
B509147-07	MW7-5	N.D.	95
B509147-08	TMW1-5	770	S-2
B509147-09	TRIP BLANK	N.D.	97
BLK091295	Method Blank	N.D.	97

Reporting Limit:	50
-------------------------	-----------

4-Bromofluorobenzene surrogate recovery control limits are 50 - 150 %.
Volatile Total Petroleum Hydrocarbons are quantitated as Gasoline Range Organics (toluene - dodecane).
Analytes reported as N.D. were not detected above the stated Reporting Limit.

NORTH CREEK ANALYTICAL Inc.

Matthew T. Essig
Project Manager

Please Note:

S-2 = The Surrogate Recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample.

Pacific Environmental Group
4020 148th Avenue NE, #B
Redmond, WA 98052
Attention: John Blough

Client Project ID: ARCO Issaquah, #6162
Sample Matrix: Water
Analysis Method: WTPH-G
Units: µg/L (ppb)

Analyst: B. Christlieb
F. Shino

Analyzed: Sep 12, 1995
Reported: Sep 22, 1995

HYDROCARBON QUALITY CONTROL DATA REPORT

ACCURACY ASSESSMENT Laboratory Control Sample

Gasoline

Spike Conc.
Added: 100

Spike
Result: 93

%
Recovery: 93

Upper Control
Limit %: 132

Lower Control
Limit %: 56

PRECISION ASSESSMENT Sample Duplicate

Gasoline Range
Organics

Sample
Number: B509147-01

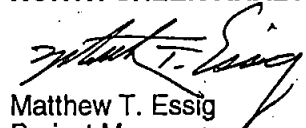
Original
Result: N.D.

Duplicate
Result: N.D.

Relative % Difference Relative Percent Difference values are not reported at sample concentration levels less than 10 times the Detection Limit.

Maximum
RPD: 50

NORTH CREEK ANALYTICAL In


Matthew T. Essig
Project Manager

% Recovery:	$\frac{\text{Spike Result}}{\text{Spike Concentration Added}} \times 100$	
-------------	---	--

Relative % Difference:	$\frac{\text{Original Result} - \text{Duplicate Result}}{(\text{Original Result} + \text{Duplicate Result}) / 2} \times 100$	
------------------------	--	--

Pacific Environmental Group	Client Project ID: ARCO Issaquah, #6162	Sampled: Sep 8, 1995
4020 148th Avenue NE, #B	Sample Matrix: Water	Received: Sep 11, 1995
Redmond, WA 98052	Analysis Method: EPA 8020	Analyzed: Sep 12, 1995
Attention: John Blough	First Sample #: B509147-01	Reported: Sep 22, 1995

BTEX DISTINCTION

Sample Number	Sample Description	Benzene µg/L (ppb)	Toluene µg/L (ppb)	Ethyl Benzene µg/L (ppb)	Xylenes µg/L (ppb)	Surrogate Recovery %
B509147-01	MW1-4	N.D.	N.D.	N.D.	N.D.	108
B509147-02	MW2-5	N.D.	N.D.	N.D.	N.D.	103
B509147-03	MW3-5	24	1.9	3.1	1.0	S-2
B509147-04	MW4-6	N.D.	N.D.	N.D.	N.D.	106
B509147-05	MW5-5	N.D.	N.D.	N.D.	N.D.	109
B509147-06	MW6-5	0.80	N.D.	N.D.	N.D.	112
B509147-07	MW7-5	N.D.	N.D.	N.D.	N.D.	107
B509147-08	TMW1-5	24	N.D.	7.8	N.D.	143
B509147-09	TRIP BLANK	N.D.	N.D.	N.D.	N.D.	106
BLK091295	Method Blank	N.D.	N.D.	N.D.	N.D.	105

Reporting Limits:

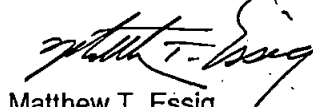
0.50

0.50

0.50

1.0

4-Bromofluorobenzene surrogate recovery control limits are 59 - 144 %.
Analytes reported as N.D. were not detected above the stated Reporting Limit.

NORTH CREEK ANALYTICAL Inc.


Matthew T. Essig
Project Manager

Please Note:

S-2 = The Surrogate Recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample.

Pacific Environmental Group
4020 148th Avenue NE, #B
Redmond, WA 98052
Attention: John Blough

Client Project ID: ARCO Issaquah, #6162
Sample Matrix: Water
Analysis Method: EPA 8020
Units: µg/L (ppb)
QC Sample #: B509147-02

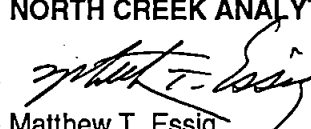
Analyst: B. Christlieb
F. Shino

Analyzed: Sep 12, 1995
Reported: Sep 22, 1995

MATRIX SPIKE QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Sample Result:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	10.0	10.0	10.0	30.0
Spike Result:	10.2	9.3	8.3	24.3
Spike % Recovery:	102%	93%	83%, Q-1	81%
Spike Dup. Result:	10.1	9.8	9.6	28.4
Spike Duplicate % Recovery:	101%	98%	96%	95%
Upper Control Limit %:	115	116	122	122
Lower Control Limit %:	82	81	85	85
Relative % Difference:	1.0%	5.2%	14%	16%
Maximum RPD:	16	16	16	17

NORTH CREEK ANALYTICAL Inc.


Matthew T. Essig
Project Manager

Please Note:

Q-1 = The Spike Recovery for this QC sample is outside of NCA established control limits.

Pacific Environmental Group
4020 148th Avenue NE, #B
Redmond, WA 98052
Attention: John Blough

Client Project ID: ARCO Issaquah, #6162
Sample Matrix: Water
Analysis Method: EPA 7421
First Sample #: B509147-01

Sampled: Sep 8, 1995
Received: Sep 11, 1995
Digested: Sep 13, 1995
Analyzed: Sep 13, 1995
Reported: Sep 22, 1995

METALS ANALYSIS FOR: TOTAL LEAD

Sample Number	Sample Description	Reporting Limit µg/L (ppb)	Sample Result µg/L (ppb)
B509147-01	MW1-4	2.0	N.D.
B509147-02	MW2-5	2.0	2.8
B509147-03	MW3-5	2.0	8.4
B509147-04	MW4-6	2.0	25
B509147-05	MW5-5	2.0	14
B509147-06	MW6-5	2.0	N.D.
B509147-07	MW7-5	2.0	N.D.
B509147-08	TMW1-5	2.0	2.3
BLK091395	Method Blank	2.0	N.D.

Analytes reported as N.D. were not detected above the stated Reporting Limit.

NORTH CREEK ANALYTICAL Inc.



Matthew T. Essig
Project Manager

Pacific Environmental Group
4020 148th Avenue NE, #B
Redmond, WA 98052
Attention: John Blough

Client Project ID: ARCO Issaquah, #6162
Sample Matrix : Water
Units: µg/L (ppb)

Analyst: K. Gendron
S. Davis

Digested: Sep 13-22, 1995
Reported: Sep 22, 1995

METALS QUALITY CONTROL DATA REPORT

ANALYTE

Lead

Lead

EPA Method: 7421 7421
Date Analyzed: Sep 13, 1995 Sep 22, 1995

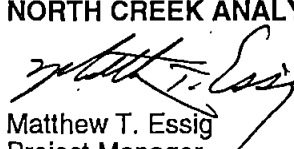
ACCURACY ASSESSMENT

LCS Spike Conc. Added:	25	25
LCS Spike Result:	26	26
LCS Spike % Recovery:	104	104
Upper Control Limit:	106	106
Lower Control Limit:	77	77
Matrix Spike Sample #:	B509147-07	B509147-08
Matrix Spike % Recovery:	112	89

PRECISION ASSESSMENT

Sample #:	B509147-07	B509147-08
Original:	N.D.	2.3
Duplicate:	N.D.	2.3

**Relative %
Difference:** RPD values are not reported at sample concentration levels <10 X the Reporting Limit.

NORTH CREEK ANALYTICAL In

Matthew T. Essig
Project Manager

Lab Control Sample	Conc. of L.C.S.	x 100
% Recovery:	L.C.S. Spike Conc. Added	
Relative % Difference:	Original Result - Duplicate Result	x 100
	(Original Result + Duplicate Result) / 2	

Division of Atlantic Richfield Company

530-Q3/-2c

Task Order No.

170-7600-L

Laboratory name

ARCO Facility no. 6162

City (Facility) ISSAQUAH

Project manager
(Consultant) = T. H. A. B. 454

ARCO engineer *check H₂ + chows*

Telephone no.
(ARCO)

Telephone no.
(Consultant) 206) 869-5099

Fax no. (Consultant) 869-5637

Consultant name Pacific Environmental Group

Address
(Consultant) 4020 148th Ave NE STE B Redmond, WA

NCA
Contract number

Method of shipment

Special detection
Limit/reporting

Special QA/QC

Remarks

Lab number

Turnaround time

Priority Rush
1 Business Day

	Rush
	2 Business Days

**Expedited
5 Business Days**

**Standard
10 Business Days**

Condition of sample:

Relinquished by sampler

Relinquished by

Relinquished by

Temperature received:

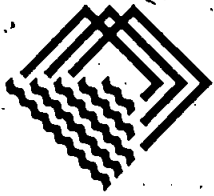
Received by

Received by

Received by laboratory

Date _____

Time



PACIFIC
ENVIRONMENTAL
GROUP, INC.

JAN 22 1996

January 15, 1996
Project 530-031.2C

Mr. Andy Smith
Delta Environmental Consultants
3150 Richards Road, Suite 100
Bellevue, Washington 98005

Re: ARCO Service Station 6162
Issaquah, Washington

Dear Mr. Smith:

Pacific Environmental Group Inc. (PACIFIC) performed groundwater sampling activities at the above referenced ARCO service station on December 28, 1995. Enclosed are the following:

- Field Report
- Groundwater Sample Field Data Sheet
- Certified Analytical Report
- Chain-of-Custody Documentation

Sampling Protocol

The groundwater sampling procedure employed by PACIFIC consisted of first measuring the water level using a Slope Indicator Model SI453 and visually checking for the presence of sheens using a clear disposable polyethylene bailer. When separate-phase hydrocarbons are encountered, an oil/water interface probe (Keck Model No. KIR-89) is used to measure the thickness within the well. Wells containing separate-phase hydrocarbons are not sampled. The well sampling order is based on concentration information from previous sampling events provided to PACIFIC.

Each well was then purged of a minimum of three casing volumes of water (or until dry) by a disposable polyethylene bailer or a centrifugal pump with a polyethylene disposable

January 15, 1996

Page 2

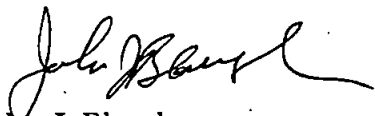
hose. Information regarding each well was recorded on individual Groundwater Sample Field Data Sheets and summarized on the Field Report.

Groundwater samples were collected using disposable polyethylene bailers after the wells recovered to at least 80 percent of the pre-purge static water level. Wells which recovered slowly were allowed as much recovery as possible by sampling immediately prior to site departure. The samples were placed into appropriate EPA-approved containers, labeled, logged onto an ARCO chain-of-custody document, and transported on ice to North Creek Analytical, Bothell, Washington. Purge water was removed from the site by PACIFIC and transported the 3,500-gallon staging tank at ARCO service station No. 5567.

If you have any questions, please call.

Sincerely,

Pacific Environmental Group, Inc.



John J. Blough
Field Services Manager



Eric Larsen
Project Manager

Enclosures

FIELD REPORT

DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT NO.: 530-031.2c

LOCATION: 1403 N.W. SAMAMISH RD.
ISSAQUAH, WA

DATE: 12-28-95

CLIENT/STATION #: ARCO 6162

FIELD TECHNICIAN: AS

DAY OF WEEK: Thurs

DTW ORDER	WELL ID	SURFACE SEAL	LID SECURE	GASKET	LOCK	EXPANDING CAP	TOTAL DEPTH (Feet)	FIRST DEPTH TO WATER (Feet)	SECOND DEPTH TO WATER (Feet)	DEPTH TO FLOATING PRODUCT (Feet)	FLOATING PRODUCT THICKNESS (Feet)	COMMENTS
	MW-1						16.65	3.20				
	MW-2						15.42	4.39				Well was Buried under BARK chips.
	MW-3						19.20	4.47				
	MW-4						16.55	4.66				
	MW-5				NO	NO	7.12	4.29	→	Not Sampled		Well head modified and blocked (see Field sheet)
	MW-6						14.90	4.01				
	MW-7						15.90	4.41				
	TMW-1						8.18	4.54				
	TMW-2						—	4.36		Not Sampled		Water level only
	TMW-3						—	4.27				Water level only
	AS-1	NEW	VAULT	NO	NO		—	—				WL only Slip cap JAMMED on — see Field sheet
	AS-2	NEW	VAULT	NO	NO		—	—				WL only

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: 530-0312C

WELL ID: MW-1

CLIENT/STATION #: ARCO 6162

ADDRESS: 1403 N.W. SAWMILLS RD.
ISSAQUAH, WA

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____
GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____

TD 16.65 - DTW 3.20 X $\frac{\text{GALLON}}{\text{LINEAR FT.}}$ 0.17 X $\frac{\text{CASING}}{\text{VOLUME}}$ 3 = $\frac{\text{CALCULATED}}{\text{PURGE}}$ 6.85 ACTUAL PURGE 7

DATE PURGED: 12-28-95 START (2400 Hr) 1030 END (2400 Hr) 1038
DATE SAMPLED: 12-28-95 START (2400 Hr) 1300 END (2400 Hr) 1305

					COLOR (visual)	TURBIDITY (visual)
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☒ Centrifugal Pump ☐ Bailer (PVC)
☐ Submersible Pump ☐ Bailer (Stainless Steel)
☐ Dedicated
 Other: _____

SAMPLING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☐ DDL Sampler ☐ Bailer (Stainless Steel)
☐ Dipper ☐ Submersible Pump
☒ Bailer Disposable ☐ Dedicated
 Other: _____

REMARKS: _____

PAGE 1 OF 1

PRINT NAME: John Blough

SIGNATURE: John Blough

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: 530-0312C

WELL ID: MW-2

CLIENT/STATION #: ARCO 6162

ADDRESS: 1403 N.W. SAWAMISH RD.
ISSAQUAH, WA

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____
GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____

TD 15.42 - DTW 4.39 X $\frac{\text{GALLON}}{\text{LINEAR FT.}}$ 0.17 X $\frac{\text{CASING VOLUME}}{\text{VOLUME}}$ 3 = $\frac{\text{CALCULATED PURGE}}{\text{PURGE}}$ 5.62 ACTUAL PURGE 5.75

DATE PURGED: 12-28-95 START (2400 Hr) 1045 END (2400 Hr) 1055
DATE SAMPLED: 12-28-95 START (2400 Hr) 1310 END (2400 Hr) 1315

					COLOR (visual)	TURBIDITY (visual)
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☒ Centrifugal Pump ☐ Bailer (PVC)
☐ Submersible Pump ☐ Bailer (Stainless Steel)
☐ Dedicated

Other: _____

SAMPLING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☐ DDL Sampler ☐ Bailer (Stainless Steel)
☐ Dipper ☐ Submersible Pump
☒ Bailer Disposable ☐ Dedicated

Other: _____

REMARKS:

Well Buried under BARK chips in plumer

PRINT NAME: John Blough

SIGNATURE: John Blough

PAGE 1 OF 1

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: 530-0312C

WELL ID: MW-3

CLIENT/STATION #: ARCO 6162

ADDRESS: 1403 N.W. SAWAMISH R.D.
ISSAQUAH, WA

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____

GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____

TD 19.20 - DTW 4.47 X $\frac{\text{GALLON}}{\text{LINEAR FT.}}$ 0.17 X $\frac{\text{CASING VOLUME}}{\text{VOLUME}}$ 3 = $\frac{\text{CALCULATED PURGE}}$ 7.51 ACTUAL PURGE 8

DATE PURGED: 12-28-95

START (2400 Hr) 1230

END (2400 Hr) 1240

DATE SAMPLED: 12-28-95

START (2400 Hr) 1400

END (2400 Hr) 1405

COLOR
(visual)

TURBIDITY
(visual)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

SAMPLING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☒ Centrifugal Pump ☐ Bailer (PVC)
☐ Submersible Pump ☐ Bailer (Stainless Steel)
☐ Dedicated

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☐ DDL Sampler ☐ Bailer (Stainless Steel)
☐ Dipper ☐ Submersible Pump
☒ Bailer Disposable ☐ Dedicated

Other: _____

Other: _____

REMARKS: _____

PAGE 1 OF 1

PRINT NAME: John Blough

SIGNATURE: John Blough

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: 530-0312C

WELL ID: MW-4

CLIENT/STATION #: ARCO 6162

ADDRESS: 1403 N.W. SAWAMISH RD.
ISSAQUAH, WA

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____
GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____

TD 16.55 - DTW 4.66 X $\frac{\text{GALLON}}{\text{LINEAR FT.}}$ 0.17 X $\frac{\text{CASING VOLUME}}{\text{VOLUME}}$ 3 = $\frac{\text{CALCULATED PURGE}}{\text{PURGE}}$ 6.06 ACTUAL PURGE 6.5

DATE PURGED: 12-28-95 START (2400 Hr) 1120 END (2400 Hr) 1128
DATE SAMPLED: 12-28-95 START (2400 Hr) 1330 END (2400 Hr) 1335

					COLOR (visual)	TURBIDITY (visual)
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☒ Centrifugal Pump ☐ Bailer (PVC)
☐ Submersible Pump ☐ Bailer (Stainless Steel)
☐ Dedicated

Other: _____

SAMPLING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☐ DDL Sampler ☐ Bailer (Stainless Steel)
☐ Dipper ☐ Submersible Pump
☒ Bailer Disposable ☐ Dedicated

Other: _____

REMARKS: _____

PRINT NAME: John Blough

SIGNATURE: John Blough

PAGE 1 OF 1

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: 530-0312C

WELL ID: MW-5

CLIENT/STATION #: ARCO 6162

ADDRESS: 1403 N.W. SANFELISH RD.
ISSAQUAH, WA

NOT Sampled

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____
GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____

TD 7.12 - DTW 4.29 X $\frac{\text{GALLON}}{\text{LINEAR FT.}}$ 0.17 X $\frac{\text{CASING VOLUME}}{\text{VOLUME}}$ 3 = $\frac{\text{CALCULATED PURGE}}$ ACTUAL PURGE

DATE PURGED: ~~12-28-95~~ START (2400 Hr) _____ END (2400 Hr) _____
DATE SAMPLED: ~~12-28-95~~ START (2400 Hr) _____ END (2400 Hr) _____

*Well is Blocked - Bailer
Will not fit past obstruction*

COLOR (visual) TURBIDITY (visual)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

SAMPLING EQUIPMENT

☐ 2" Bladder Pump	☐ Bailer (Teflon®)	☐ 2" Bladder Pump	☐ Bailer (Teflon®)
☒ Centrifugal Pump	☐ Bailer (PVC)	☐ DDL Sampler	☐ Bailer (Stainless Steel)
☐ Submersible Pump	☐ Bailer (Stainless Steel)	☐ Dipper	☐ Submersible Pump
☐ Dedicated		☒ Bailer Disposable	☐ Dedicated
Other: _____		Other: _____	

REMARKS: Something obstructing well APPROX. 5 ft BGS.
Well appears to be modified for VE system. Now total
depth is 7.2 feet up from 18 ft, so well appears to also
be filled in with soil. Bailer would not reach water due to obstruct

PAGE 1 OF 1 PRINT NAME: John Blough
SIGNATURE: John Blough

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: 530-0312c

WELL ID: WW-6

CLIENT/STATION #: ARCO 6162

ADDRESS: 1403 N.W. SAWAMISH R.D.
ISSAQUAH, WA

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____

GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____

TD 1490 - DTW 4.01 X $\frac{\text{GALLON}}{\text{LINEAR FT.}}$ 0.17 X $\frac{\text{CASING VOLUME}}{\text{VOLUME}}$ 3 = $\frac{\text{CALCULATED PURGE}}$ 5.55 ACTUAL PURGE 6

DATE PURGED: 12-28-95 START (2400 Hr) 1150 END (2400 Hr) 1158
DATE SAMPLED: 12-28-95 START (2400 Hr) 1340 END (2400 Hr) 1345

					COLOR (visual)	TURBIDITY (visual)
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☒ Centrifugal Pump ☐ Bailer (PVC)
☐ Submersible Pump ☐ Bailer (Stainless Steel)
☐ Dedicated

Other: _____

SAMPLING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☐ DDL Sampler ☐ Bailer (Stainless Steel)
☐ Dipper ☐ Submersible Pump
☒ Bailer Disposable ☐ Dedicated

Other: _____

REMARKS: _____

PAGE 1 OF 1

PRINT NAME: John Blough

SIGNATURE: John Blough

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: 530-0312C

WELL ID: MW-7

CLIENT/STATION #: ARCO 6162

ADDRESS: 1403 N.W. SAWMILL RD.
ISSAQUAH, WA

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____

GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____

TD 1590 - DTW 441 X $\frac{\text{GALLON}}{\text{LINEAR FT.}}$ 0.17 X $\frac{\text{CASING VOLUME}}{\text{VOLUME}}$ 3 = $\frac{\text{CALCULATED PURGE}}$ 5.85 ACTUAL PURGE 6

DATE PURGED: 12-28-95 START (2400 Hr) 1100 END (2400 Hr) 1110

DATE SAMPLED: 12-28-95 START (2400 Hr) 1320 END (2400 Hr) 1325

					COLOR (visual)	TURBIDITY (visual)
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☒ Centrifugal Pump ☐ Bailer (PVC)
☐ Submersible Pump ☐ Bailer (Stainless Steel)
☐ Dedicated
 Other: _____

SAMPLING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☐ DDL Sampler ☐ Bailer (Stainless Steel)
☐ Dipper ☐ Submersible Pump
☒ Bailer Disposable ☐ Dedicated
 Other: _____

REMARKS: _____

PRINT NAME: John Blough

SIGNATURE: John Blough

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: 530-0312C

WELL ID: FMW-1

CLIENT/STATION #: ARCO 6162

ADDRESS: 1403 N.W. SAMMISH RD.
ISSAQUAH, WA

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____
GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____

TD 8.18 - DTW 4.54 X $\frac{\text{GALLON}}{\text{LINEAR FT.}}$ 0.17 X $\frac{\text{CASING}}{\text{VOLUME}}$ 3 = $\frac{\text{CALCULATED}}{\text{PURGE}}$ 1.85 ACTUAL PURGE 1.75

DATE PURGED: 12-28-95 START (2400 Hr) 1205 END (2400 Hr) 1215
DATE SAMPLED: 12-28-95 START (2400 Hr) 1350 END (2400 Hr) 1355

					COLOR (visual)	TURBIDITY (visual)
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

_____ 2" Bladder Pump _____ Bailer (Teflon®)
☒ Centrifugal Pump _____ Bailer (PVC)
_____ Submersible Pump _____ Bailer (Stainless Steel)
_____ Dedicated

Other: _____

SAMPLING EQUIPMENT

_____ 2" Bladder Pump _____ Bailer (Teflon®)
_____ DDL Sampler _____ Bailer (Stainless Steel)
_____ Dipper _____ Submersible Pump
☒ Bailer Disposable _____ Dedicated

Other: _____

REMARKS: _____

well pumped dry after 1.75 gals

PRINT NAME: John Blough

SIGNATURE: John Blough

PAGE 1 OF 1

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: 530-0312C

WELL ID: AS-1

CLIENT/STATION #: ARCO 6162

ADDRESS: 1403 N.W. SAWMILL RD.

ISSAQUAH, WA

*Well appears to be connected to
As system. Well head has been modified.*

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____

GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____

TD _____ - DTW _____ X $\frac{\text{GALLON}}{\text{LINEAR FT.}}$ 0.17 X $\frac{\text{CASING}}{\text{VOLUME}}$ 3 = $\frac{\text{CALCULATED}}{\text{PURGE}}$ ACTUAL
PURGE

DATE PURGED: 12-28-95 START (2400 Hr) _____ END (2400 Hr) _____

DATE SAMPLED: 12-28-95 START (2400 Hr) _____ END (2400 Hr) _____

*Could not remove slip cap.
CAP is JAMMED on well head. Expanding CAP
I left in well last QTR is now GONE*

COLOR _____ TURBIDITY _____
(visual) (visual)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☒ Centrifugal Pump ☐ Bailer (PVC)
☐ Submersible Pump ☐ Bailer (Stainless Steel)
☐ Dedicated

Other: _____

SAMPLING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☐ DDL Sampler ☐ Bailer (Stainless Steel)
☐ Dipper ☐ Submersible Pump
☒ Bailer Disposable ☐ Dedicated

Other: _____

REMARKS: _____

PAGE 1 OF 1

PRINT NAME: John Blough

SIGNATURE: John Blough

GROUND WATER SAMPLE FIELD DATA SHEET

PROJECT NO: 530-0312C

WELL ID: AS-2

CLIENT/STATION #: ARCO 6162

ADDRESS: 1403 N.W. SAWAMISH R.D.
ISSAQUAH, WA

This well appears to now be connected to AS system, well lead modified

CASING DIAMETER (inches): 2 3 4 6 8 12 Other _____
GALLON/LINEAR FOOT: 0.17 0.38 0.66 1.5 2.6 5.8 Other _____

TD _____ - DTW _____ X $\frac{\text{GALLON LINEAR FT.}}{0.17}$ X $\frac{\text{CASING VOLUME}}{3}$ = $\frac{\text{CALCULATED PURGE}}{\text{ACTUAL PURGE}}$

DATE PURGED: 12-28-95 START (2400 Hr) _____ END (2400 Hr) _____
DATE SAMPLED: 12-28-95 START (2400 Hr) _____ END (2400 Hr) _____

Could not remove slip CAP. CAP is jammed on well lead. Expanding CAP I left on well last quarter is now missing.

COLOR (visual) _____
TURBIDITY (visual) _____

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): _____

PURGING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☒ Centrifugal Pump ☐ Bailer (PVC)
☐ Submersible Pump ☐ Bailer (Stainless Steel)
☐ Dedicated

Other: _____

SAMPLING EQUIPMENT

☐ 2" Bladder Pump ☐ Bailer (Teflon®)
☐ DDL Sampler ☐ Bailer (Stainless Steel)
☐ Dipper ☐ Submersible Pump
☒ Bailer Disposable ☐ Dedicated

Other: _____

REMARKS: _____

PAGE 1 OF 1

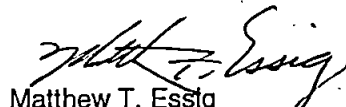
PRINT NAME: John Blough

SIGNATURE: John Blough

Pacific Environmental Group
4020 148th Avenue NE, #B
Redmond, WA 98052
Attention: John BloughProject Name: ARCO Issaquah, #6162
Client Project : #530-031.2C
NCA Project #: B512509Received: Dec 29, 1995
Reported: Jan 9, 1996**PROJECT SUMMARY PAGE**

Laboratory Sample Number	Sample Description	Sample Matrix	Date Sampled
B512509-01	MW1	Water	12/28/95
B512509-02	MW2	Water	12/28/95
B512509-03	MW3	Water	12/28/95
B512509-04	MW4	Water	12/28/95
B512509-05	MW6	Water	12/28/95
B512509-06	MW7	Water	12/28/95
B512509-07	TMW1	Water	12/28/95
B512509-08	TRIP BLANK	Water	12/28/95

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.

NORTH CREEK ANALYTICAL Inc.
Matthew T. Essig
Project Manager

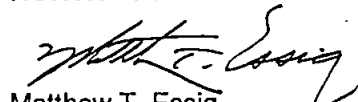
Pacific Environmental Group	Client Project ID: ARCO Issaquah, #6162	Sampled: Dec 28, 1995
4020 148th Avenue NE, #B	Sample Matrix: Water	Received: Dec 29, 1995
Redmond, WA 98052	Analysis Method: WTPH-G	Analyzed: Jan 4, 1996
Attention: John Blough	First Sample #: B512509-01	Reported: Jan 9, 1996

TOTAL PETROLEUM HYDROCARBONS-GASOLINE RANGE

Sample Number	Sample Description	Sample Result µg/L (ppb)	Surrogate Recovery %
B512509-01	MW1	N.D.	89
B512509-02	MW2	N.D.	91
B512509-03	MW3	3,200	S-2
B512509-04	MW4	N.D.	79
B512509-05	MW6	320	S-2
B512509-06	MW7	N.D.	83
B512509-07	TMW1	8,300	104
B512509-08	TRIP BLANK	N.D.	69
BLK010496	Method Blank	N.D.	74

Reporting Limit:	50
-------------------------	-----------

4-Bromofluorobenzene surrogate recovery control limits are 50 - 150 %.
Volatile Total Petroleum Hydrocarbons are quantitated as Gasoline Range Organics (toluene - dodecane).
Analytes reported as N.D. were not detected above the stated Reporting Limit.

NORTH CREEK ANALYTICAL Inc.

Matthew T. Essig
Project Manager

Please Note:

S-2 = The Surrogate Recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample.

Pacific Environmental Group
4020 148th Avenue NE, #B
Redmond, WA 98052
Attention: John Blough

Client Project ID: ARCO Issaquah, #6162
Sample Matrix: Water
Analysis Method: WTPH-G
Units: µg/L (ppb)

Analyzed: Jan 4, 1996
Reported: Jan 9, 1996

HYDROCARBON QUALITY CONTROL DATA REPORT

ACCURACY ASSESSMENT Laboratory Control Sample

Gasoline

Spike Conc.
Added: 100

Spike
Result: 89

%
Recovery: 89

Upper Control
Limit %: 132

Lower Control
Limit %: 56

PRECISION ASSESSMENT Sample Duplicate

Gasoline Range
Organics

Sample
Number: B512509-01

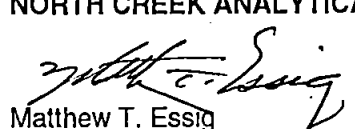
Original
Result: N.D.

Duplicate
Result: N.D.

Relative % Difference Relative Percent Difference values are not reported at sample concentration levels less than 10 times the Detection Limit.

Maximum
RPD: 50

NORTH CREEK ANALYTICAL Inc.


Matthew T. Essig
Project Manager

% Recovery:	$\frac{\text{Spike Result}}{\text{Spike Concentration Added}} \times 100$	
Relative % Difference:	$\frac{\text{Original Result} - \text{Duplicate Result}}{(\text{Original Result} + \text{Duplicate Result}) / 2} \times 100$	

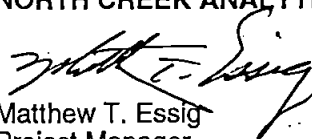
Pacific Environmental Group	Client Project ID: ARCO Issaquah, #6162	Sampled: Dec. 28, 1995
4020 148th Avenue NE, #B	Sample Matrix: Water	Received: Dec 29, 1995
Redmond, WA 98052	Analysis Method: EPA 8020	Analyzed: Jan 4, 1996
Attention: John Blough	First Sample #: B512509-01	Reported: Jan 9, 1996

BTEX DISTINCTION

Sample Number	Sample Description	Benzene µg/L (ppb)	Toluene µg/L (ppb)	Ethyl Benzene µg/L (ppb)	Xylenes µg/L (ppb)	Surrogate Recovery %
B512509-01	MW1	N.D.	N.D.	N.D.	N.D.	91
B512509-02	MW2	N.D.	N.D.	N.D.	N.D.	93
B512509-03	MW3	0.85	0.89	N.D.	N.D.	S-2
B512509-04	MW4	N.D.	N.D.	N.D.	N.D.	86
B512509-05	MW6	1.3	N.D.	N.D.	N.D.	S-2
B512509-06	MW7	N.D.	N.D.	N.D.	N.D.	91
B512509-07	TMW1	860	8.0	190	15	132
B512509-08	TRIP BLANK	N.D.	N.D.	N.D.	N.D.	84
BLK010496	Method Blank	N.D.	N.D.	N.D.	N.D.	80

Reporting Limits:	0.50	0.50	0.50	1.0
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4-Bromofluorobenzene surrogate recovery control limits are 59 - 144 %.
Analytes reported as N.D. were not detected above the stated Reporting Limit.

NORTH CREEK ANALYTICAL Inc

Matthew T. Essig
Project Manager

Please Note:

S-2 = The Surrogate Recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample.

Pacific Environmental Group
4020 148th Avenue NE, #B
Redmond, WA 98052
Attention: John Blough

Client Project ID: ARCO Issaquah, #6162

Sample Matrix: Water

Analysis Method: EPA 8020

Units: µg/L (ppb)

QC Sample #: B512509-01

Analyzed: Jan 4, 1996

Reported: Jan 9, 1996

MATRIX SPIKE QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Sample Result:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	10.0	10.0	10.0	30.0
Spike Result:	8.7	9.6	10.2	31.2
Spike % Recovery:	87%	96%	102%	104%
Spike Dup. Result:	9.0	10.1	10.5	31.1
Spike Duplicate % Recovery:	90%	101%	105%	104%
Upper Control Limit %:	115	116	122	122
Lower Control Limit %:	82	81	85	85
Relative % Difference:	3.4%	5.1%	2.9%	<1%
Maximum RPD:	16	16	16	17

NORTH CREEK ANALYTICAL Inc.

Matthew T. Essig
Project Manager

% Recovery:	$\frac{\text{Spike Result} - \text{Sample Result}}{\text{Spike Conc. Added}} \times 100$
Relative % Difference:	$\frac{\text{Spike Result} - \text{Spike Dup. Result}}{(\text{Spike Result} + \text{Spike Dup. Result}) / 2} \times 100$

Pacific Environmental Group
4020 148th Avenue NE, #B
Redmond, WA 98052
Attention: John Blough

Client Project ID: ARCO Issaquah, #6162
Sample Matrix: Water
Analysis Method: EPA 7421
First Sample #: B512509-01

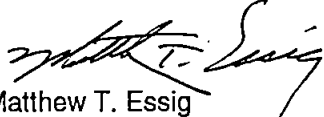
Sampled: Dec 28, 1995
Received: Dec 29, 1995
Digested: Jan 4, 1996
Analyzed: Jan 8, 1996
Reported: Jan 9, 1996

METALS ANALYSIS FOR: TOTAL LEAD

Sample Number	Sample Description	Reporting Limit µg/L (ppb)	Sample Result µg/L (ppb)
B512509-01	MW1	2.0	N.D.
B512509-02	MW2	2.0	N.D.
B512509-03	MW3	2.0	75
B512509-04	MW4	2.0	7.9
B512509-05	MW6	2.0	3.5
B512509-06	MW7	2.0	N.D.
B512509-07	TMW1	2.0	3.7
BLK010496	Method Blank	2.0	N.D.

Analytes reported as N.D. were not detected above the stated Reporting Limit.

NORTH CREEK ANALYTICAL Inc.


Matthew T. Essig
Project Manager

Pacific Environmental Group
4020 148th Avenue NE, #B
Redmond, WA 98052
Attention: John Blough

Client Project ID: ARCO Issaquah, #6162
Sample Matrix : Water
Units: µg/L (ppb)

Digested: Jan 4, 1996
Reported: Jan 9, 1996

METALS QUALITY CONTROL DATA REPORT

ANALYTE

Pb

EPA Method: 7421
Date Analyzed: Jan 8, 1996

ACCURACY ASSESSMENT

LCS Spike
Conc. Added: 25

LCS Spike
Result: 25.9

LCS Spike
% Recovery: 104

Upper Control
Limit: 122

Lower Control
Limit: 88

Matrix Spike
Sample #: B512485-01

Matrix Spike
% Recovery: 106

PRECISION ASSESSMENT

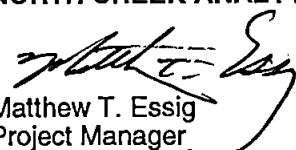
Sample #: B512485-01

Original: N.D.

Duplicate: N.D.

Relative %
Difference: RPD values are not reported at sample concentration levels <10 X the Reporting Limit.

NORTH CREEK ANALYTICAL In


Matthew T. Essig
Project Manager

Lab Control Sample	Conc. of L.C.S.	x 100
% Recovery:	L.C.S. Spike Conc. Added	
Relative % Difference:	Original Result - Duplicate Result	x 100
	(Original Result + Duplicate Result) / 2	

ARCO Products Company

Division of AtlanticRichfieldCompany

Task Order No.

530-03122 170-7600-L

Chain of Custody

ARCO Facility no.

6162

City

(Facility)

ISSAQUAH

Project manager
(Consultant)

869-5099

John Blyth

ARCO engineer

Chuck Hutchens

Telephone no.
(ARCO)Telephone no.
(Consultant)

869-5639

Fax no.

(Consultant)

Consultant name

PACIFIC Environmental Group

Address

(Consultant)

4020 148th Ave NE Ste B, Redmond, WA

Laboratory name

NCA

Contract number

Method of shipment

Special detection
Limit/reporting

Special QA/QC

Remarks

NO sample
for MW-5

Lab number

Turnaround time

Priority Rush
1 Business DayRush
2 Business DaysExpedited
5 Business DaysStandard
10 Business Days

Sample I.D.	Lab no.	Container no.	Matrix			Preservation		Sampling date	Sampling time	BTEX 602/EPA 8020	BTX/TPH EPA 1631/8020/8015	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	TCMP Metals ☐ VOA ☐ VOA ☐	Semi Metals ☐ VOA ☐ VOA ☐	CMM Metals EPA 6010/7000 TLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐				
			Soil	Water	Other	Ice	Acid																		
MW1-		2 VOA 1-50 mL		X		X	HCL NITRIC	12-28-95	1300		X				B512509							X			
MW2-									1310																
MW3-									1400																
MW4-									1330																
MW5-		NO sample																							
MW6-		2 VOA 1-50 mL		X					1340																
MW7-									1320																
TRIP									1350																
Blank		2 VOA					HCL	-	-																

Condition of sample:

Temperature received:

Relinquished by sampler

Date

12-29-95

Time

Received by

NCA

12/29

12:20pm

Relinquished by

Date

Time

Received by

Relinquished by

Date

Time

Received by laboratory

Date

Time

ATTACHMENT B

Historical Ground Water Data from Geraghty and Miller Reports

Table 1. Summary of Water-Level Measurements, December 1993 through June 1994
 ARCO Service Station No. 6162, Issaquah, Washington
 Project No. WA0273.050

Well ID	Measurement Date	Measuring Point Elevation (ft)	Depth to Water (ft bmp)	Water Elevation (ft)
MW-1	09-Dec-93	45.20	2.96	42.24
	09-Mar-94	45.20	3.28	41.92
	29-Apr-94	45.20	4.16	41.04
	31-May-94	45.20	4.27	40.93
	30-Jun-94	45.20	4.40	40.80
MW-2	09-Dec-93	46.17	4.70	41.47
	09-Mar-94	46.17	4.72	41.45
	29-Apr-94	46.17	5.15	41.02
	31-May-94	46.17	5.55	40.62
	30-Jun-94	46.17	5.75	40.42
MW-3	09-Dec-93	45.92	4.10	41.82
	09-Mar-94	45.92	4.10	41.82
	29-Apr-94	45.92	5.11	40.81
	31-May-94	45.92	5.40	40.52
	30-Jun-94	45.92	5.67	40.25
MW-4	09-Dec-93	46.00	3.20	42.80
	09-Mar-94	46.00	4.32	41.68
	29-Apr-94	46.00	4.60	41.40
	31-May-94	46.00	5.00	41.00
	30-Jun-94	46.00	5.76	40.24
MW-5	09-Dec-93	45.99	4.31	41.68
	09-Mar-94	45.99	4.39	41.60
	29-Apr-94	45.99	5.16	40.83
	31-May-94	45.99	5.33	40.66
	30-Jun-94	45.99	5.57	40.42

ft Feet, relative to National Geodetic Vertical Datum, 1929.

ft bmp Feet below measuring point.

Measuring point is located on the northern rim of the PVC well casing.

Table 2. Summary of Laboratory Results for Groundwater Samples Collected from December 1993 through June 1994
ARCO Service Station No. 6162, Issaquah, Washington
Project No. WA0273.050

Well ID	Sample ID	Date Sampled	TPH as Gasoline (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	Total Lead (ug/L)
MW-1	MW1-3	09-Dec-93	ND [<50]	ND [<0.5]	ND [<0.5]	ND [<0.5]	ND [<1.0]	ND [<2.0]
	MW1-3	09-Mar-94	ND [<50]	ND [<0.5]	ND [<0.5]	ND [<0.5]	ND [<1.0]	15
	MW1-4	30-Jun-94	ND [<50]	ND [<0.5]	ND [<0.5]	ND [<0.5]	ND [<1.0]	5.5
MW-2	MW2-4	09-Dec-93	ND [<50]	ND [<0.5]	ND [<0.5]	ND [<0.5]	ND [<1.0]	5.9
	MW2-4	09-Mar-94	ND [<50]	19	0.64	ND [<0.5]	ND [<1.0]	8.0
	MW2-5	30-Jun-94	ND [<50]	ND [<0.5]	ND [<0.5]	ND [<0.5]	ND [<1.0]	27
MW-3	MW3-4	09-Dec-93	17000 (J)	210	2.8	13	ND [<1.0]	3.1
	MW3-4	09-Mar-94	9000	8.3	2.6	1.4	1.4	63
	MW3-5	30-Jun-94	10,000 (S-2)	54 (S-2)	2.4 (S-2)	9.5 (S-2)	1.4 (S-2)	3.6
MW-4	MW4-3	09-Dec-93	ND [<50]	ND [<0.5]	ND [<0.5]	ND [<0.5]	ND [<1.0]	3.9
	MW4-4	09-Mar-94	ND [<50]	ND [<0.5]	ND [<0.5]	ND [<0.5]	ND [<1.0]	ND [<2.0]
	MW4-5	30-Jun-94	ND [<50]	ND [<0.5]	ND [<0.5]	ND [<0.5]	ND [<1.0]	160
MW-5	MW5-	09-Dec-93	3900	5700	ND [<0.5]	2400	790	ND [<2.0]
	MW5-4	09-Mar-94	17000 (S-2)	1900	320	720	290	19
	MW5-5	30-Jun-94	4,100 (S-2)	190 (S-2)	4.3 (S-2)	150 (S-2)	41 (S-2)	56
Trip Blank	Trip Blank	NA	ND [<50]	ND [<0.5]	ND [<0.5]	ND [<0.5]	ND [<1.0]	NA
MTCA Method A Cleanup Level for Groundwater (1):			1000.0	5.0	40.0	30.0	20.0	5.0

(1) Washington State Department of Ecology, Cleanup Standards Amendments to Model Toxics Control Act (MTCA), adopted January 28, 1991, effective February 28, 1991.

(J) Value estimated due to high surrogate recovery

(S-2) Surrogate recovery cannot be accurately quantified due to interference from coeluting organic compounds in sample

BTEX Benzene, toluene, ethylbenzene, and total xylenes

NA Not applicable

TPH Total petroleum hydrocarbons

ND [<50] Not detected at or above [laboratory reporting limit]

ug/L Micrograms per liter (parts per billion)

Analyses were performed by North Creek Analytical, Inc. of Bothell, Washington, using the following methods:

BTEX: U.S. Environmental Protection Agency (USEPA) Method 8020

Total Lead: USEPA Method 7421

TPH-G: Washington State Method WTPH-G