

ARCO QUARTERLY GROUNDWATER MONITORING REPORT 4TH QUARTER 2001

Facility No: 0855
Address: 4603 Ocean Beach Highway
Longview, Washington
ARCO Environmental Engineer: Mr. Chuck Hutchens
Consulting Co./Contact Person: SECOR International Incorporated/Scott Miller
Consultant Project No.: 015.08921.704
Primary Agency: Washington Department of Ecology (Ecology)
Ecology LUST File No: 5421

WORK PERFORMED 4TH QUARTER 2001:

1. Groundwater monitoring and sampling of wells MW-1 through MW-7 on October 18, 2001.

WORK PROPOSED FOR 1ST QUARTER 2002:

1. Quarterly groundwater monitoring and sampling.

Current Phase of Project: Groundwater monitoring
Is Free Product (FP) Present On-Site: No
FP Recovered this Quarter (gallons): Not applicable (NA)
Cumulative FP Recovered to Date (gallons): NA
Current Remediation Techniques: NA
Approximate Depth to Groundwater (feet below top of casing): 4.83 (MW-2) to 6.92 (MW-4).
Groundwater Gradient (direction): East
Groundwater Gradient (magnitude): 0.02 ft/ft

DISCUSSION:

Groundwater monitoring field activities conducted on October 18, 2001 included measuring the water levels and collecting groundwater samples from MW-1 through MW-7. The water samples collected from MW-1 through MW-7 were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) by Environmental Protection Agency (EPA) Method 8021B and gasoline-range hydrocarbons (TPH-G) by NW TPH-Gx Method. The groundwater samples were collected under field procedures in accordance with SECOR's standard operating procedures for quality assurance and quality control. Samples were transported to the laboratory using strict chain-of-custody protocols.

Benzene was detected at concentrations above the laboratory method reporting limit (MRL) in monitoring wells MW-2, MW-3, MW-4 and MW-5 at concentrations ranging from 2.11 micrograms per liter ($\mu\text{g/L}$) in MW-2 to 7,200 $\mu\text{g/L}$ in MW-3. TPH-G was detected above the laboratory MRL in monitoring wells MW-2 through MW-7 at concentrations ranging from 286 $\mu\text{g/L}$ (MW-7) to 138,000 $\mu\text{g/L}$ (MW-3). Groundwater levels and concentrations found in monitoring wells are relatively consistent with previous monitoring events.

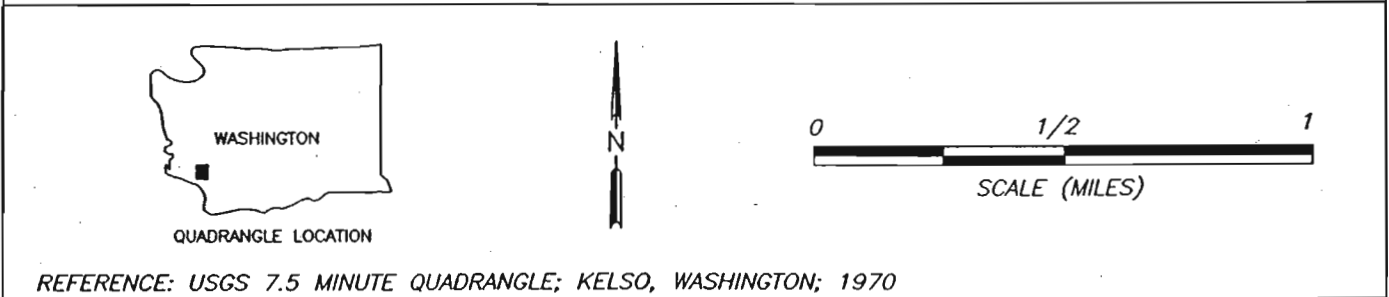
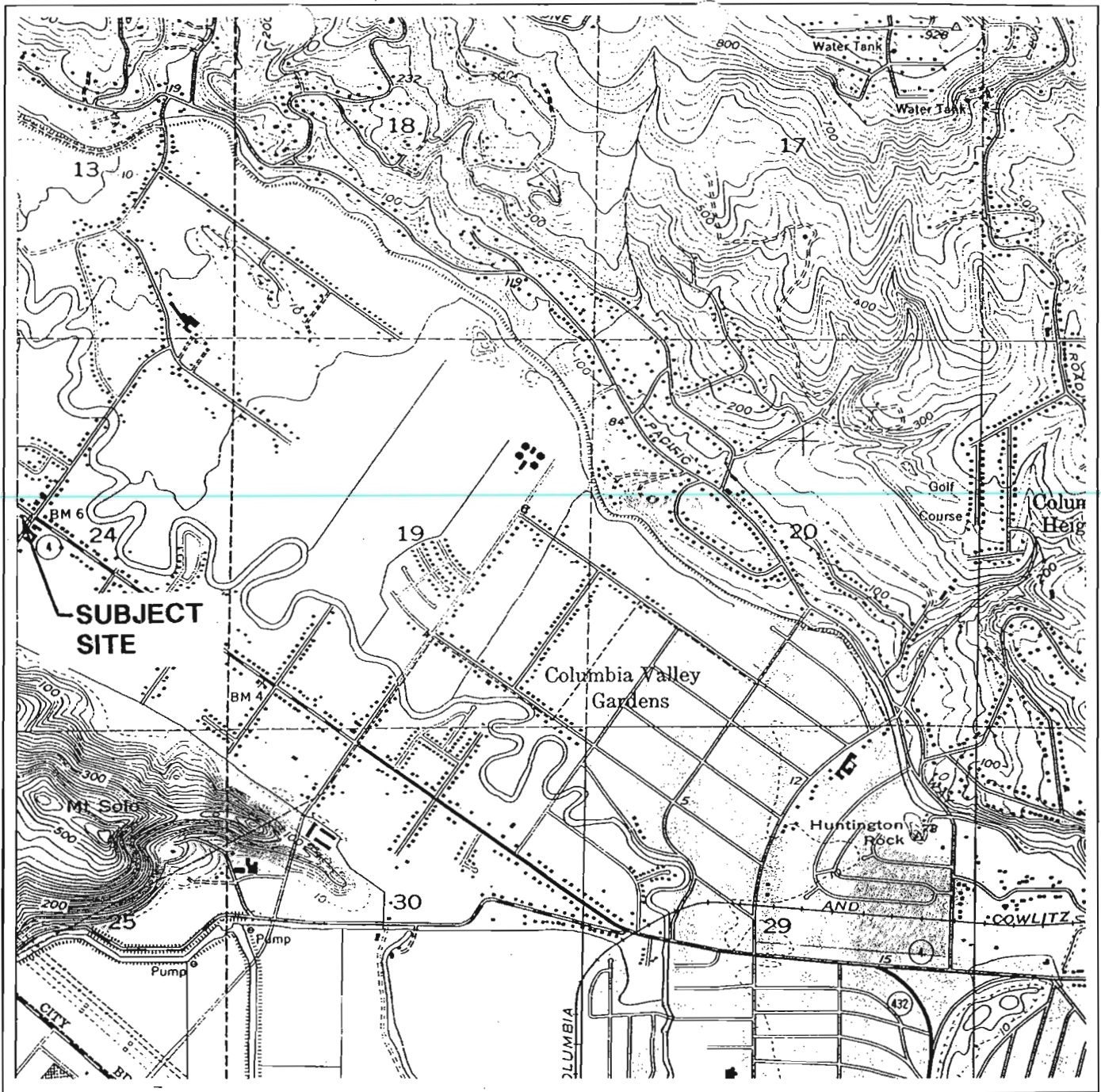
Based on a review of the laboratory reports, it appears that the submitted water samples were analyzed within the specified holding times, and that the appropriate quality assurance/quality control (QA/QC) procedures were followed during analysis. A summary of the laboratory analytical results is presented in Table 1 and Figure 2. A complete copy of the laboratory report and chain-of-custody documentation are also attached.

ATTACHMENTS:

- Figure 1: Site Location Map
- Figure 2: Groundwater Contour and Groundwater Analytical Results Map
- Table 1: Historical Water Sample Analyses
- Table 2: Historical Water Level Elevations
- Laboratory Report and Chain of Custody
- Groundwater Sampling Field Data Sheets

cc: Ms. Patty Martin, Washington Department of Ecology, Olympia, Washington
Mr. David McDowell, Law Office of Jerome F. Eline II, Vancouver, Washington

FIGURES

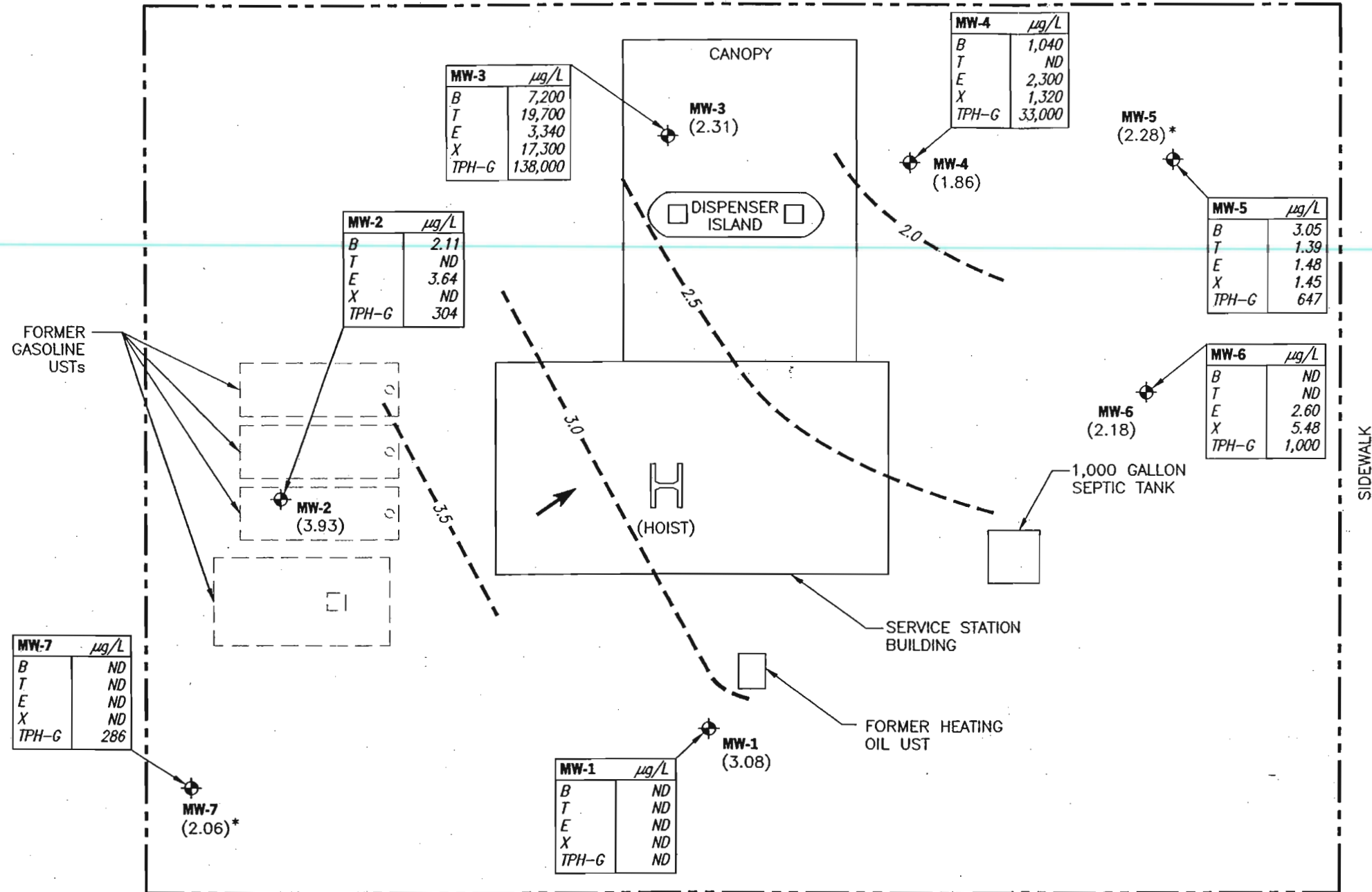


REFERENCE: USGS 7.5 MINUTE QUADRANGLE; KELSO, WASHINGTON; 1970

SECOR International Incorporated 015	SITE LOCATION MAP FORMER ARCO SERVICE STATION 0855 4803 OCEAN BEACH HIGHWAY LONGVIEW, WASHINGTON	FIGURE: 1
JOB#: 015.08698.702	APPR: C.W.G. DWN: KPM	DATE: 07/28/00

OCEAN BEACH HWY.

SIDEWALK



LEGEND

- SUBJECT PROPERTY LINE BOUNDARY
- MW-5 GROUNDWATER MONITORING WELL LOCATION
- INFERRED GROUNDWATER FLOW DIRECTION
- INFERRED GROUNDWATER ELEVATION CONTOUR (FEET)
- (2.19) RELATIVE GROUNDWATER ELEVATION (FEET)

ANALYTE

B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
TPH-G	GASOLINE

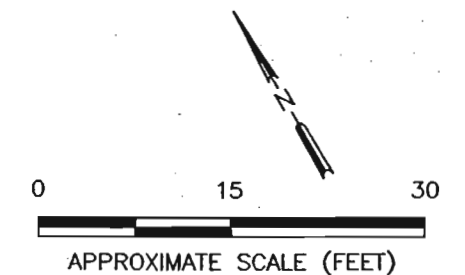
(NS) NOT SAMPLED

NOTES

CONTOUR INTERVAL = 0.50 FT

GROUNDWATER ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL

* INDICATES GROUNDWATER ELEVATION NOT USED TO GENERATE CONTOURS.



NOTE: MONITORING WELL LOCATIONS AND CORNERS OF BUILDING SURVEYED APRIL 2000 BY GIBBS & OLSEN, INC. OF LONGVIEW, WASHINGTON.

SOURCE: MAP BASED ON ATLANTIC RICHFIELD "GENERAL ARRANGEMENT" DRAWING, NOVEMBER 30, 1966, 1/8"-1'.

SECOR
International Incorporated
015

GROUNDWATER CONTOUR AND GROUNDWATER ANALYTICAL RESULTS MAP (10/18/01)
FORMER ARCO SERVICE STATION 0855
4603 OCEAN BEACH HIGHWAY
LONGVIEW, WASHINGTON

FIGURE:

2

JOB #: 015.08921.704 APPR: DWN: KPM DATE: 12/14/01

N:/ARCO/WASHINGTON

DWG: 15-08921-7042-1001

TABLES

Table 1. Historical Water Sample Analyses
Former ARCO Station No. 0855
4603 Ocean Beach Highway, Longview, Washington

Well Number	Sample Date	BTEX (µg/L)				VOCs (µg/L)				TPH-G (µg/L)	TPH-D (µg/L)	TPH-O (µg/L)
		Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	EDB	EDC	MTBE			
MW-1	03/27/00	ND	ND	ND	ND	—	—	—	—	ND	ND	ND
	05/23/00	ND	ND	ND	ND	—	—	—	—	ND	—	—
	07/20/00	ND	ND	ND	ND	—	—	—	—	ND	—	—
	10/18/00	ND	ND	1.61	ND	—	—	—	—	404	—	—
	01/18/01	ND	ND	ND	ND	ND	ND	ND	ND	95.6	—	—
	04/18/01	ND	ND	ND	ND	4.30	ND	ND	ND	—	—	—
	07/17/01	ND	2.63	1.46	ND	—	—	—	—	386.0	—	—
	10/18/01	ND	ND	ND	ND	—	—	—	—	ND	—	—
MW-2	03/27/00	6.89	49.5	599	2,490	—	—	—	—	17,100	ND	ND
	05/23/00	26.2	16.2	614	1,770	—	—	—	—	13,200	—	—
	07/20/00	11.9	11.8	304	330	—	—	—	—	7,220	—	—
	10/18/00	3.67	1.23	13.9	7.55	—	—	—	—	743	—	—
	01/18/01	ND	ND	41.1	5.62	ND	ND	ND	ND	691	—	—
	04/18/01	ND	ND	8.73	ND	ND	ND	ND	ND	—	—	—
	07/17/01	ND	1.26	14	ND	—	—	—	—	430	—	—
	10/18/01	2.11	ND	3.64	ND	—	—	—	—	304	—	—
MW-3	03/27/00	7,520	12,900	2,780	14,500	—	—	—	—	93,700	ND	ND
	05/23/00	4,710	8,330	2,280	11,200	—	—	—	—	65,200	—	—
	07/20/00	10,700	22,600	3,160	17,400	—	—	—	—	145,000	—	—
	10/18/00	12,900	33,000	4,890	26,700	—	—	—	—	179,000	—	—
	01/18/01	9,380	17,200	3,940	20,230	607	ND	155	ND	121,000	—	—
	04/18/01	7,700	15,300	3,430	16,990	405	ND	101	ND	—	—	—
	07/17/01	10,100	21,400	4,120	20,900	—	—	—	—	940,000	—	—
	10/18/01	7,200	19,700	3,340	17,300	—	—	—	—	138,000	—	—

Table 1. Historical Water Sample Analyses
Former ARCO Station No. 0855
4603 Ocean Beach Highway, Longview, Washington

Well Number	Sample Date	BTEX (µg/L)				VOCs (µg/L)				TPH-G (µg/L)	TPH-D (µg/L)	TPH-O (µg/L)
		Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	EDB	EDC	MTBE			
MW-4	11/15/00 ^a	1,310	53.6	2,430	7,250	—	—	—	—	45,500	—	—
	01/18/01	1,130	ND	2,030	2,764	331	ND	ND	ND	29,400	—	—
	04/18/01	1,280	ND	1,700	2,591	289	ND	ND	ND	—	—	—
	07/17/01	1,610	35	2,870	1,870	—	—	—	—	34,900	—	—
	10/18/01	1,040	ND	2,300	1,320	—	—	—	—	33,000	—	—
MW-5	11/15/00 ^a	ND	ND	ND	ND	—	—	—	—	ND	—	—
	01/18/01	ND	ND	ND	ND	2.44	ND	ND	ND	786	—	—
	04/18/01	9.42	ND	6.76	10.1	2.42	ND	ND	ND	—	—	—
	07/17/01	1.83	1.16	1.90	3.28	—	—	—	—	694	—	—
	10/18/01	3.05	1.39	1.48	1.45	—	—	—	—	647	—	—
MW-6	11/15/00 ^a	ND	ND	ND	ND	—	—	—	—	131	—	—
	01/18/01	ND	ND	ND	ND	ND	ND	ND	ND	732	—	—
	04/18/01	ND	ND	ND	ND	ND	ND	ND	ND	—	—	—
	07/17/01	ND	1.35	1.33	5.79	—	—	—	—	892	—	—
	10/18/01	ND	ND	2.60	5.48	—	—	—	—	1,000	—	—

Table 1. Historical Water Sample Analyses
Former ARCO Station No. 0855
4603 Ocean Beach Highway, Longview, Washington

Well Number	Sample Date	BTEX (µg/L)				VOCs (µg/L)				TPH-G (µg/L)	TPH-D (µg/L)	TPH-O (µg/L)
		Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	EDB	EDC	MTBE			
MW-7	11/15/00 ^a	ND	ND	ND	1.35	—	—	—	—	113	—	—
	01/18/01	ND	ND	ND	ND	ND	ND	ND	ND	242	—	—
	04/18/01	ND	ND	ND	ND	ND	ND	ND	ND	—	—	—
	07/17/01	ND	ND	ND	ND	—	—	—	—	275	—	—
	10/18/01	ND	ND	ND	ND	—	—	—	—	286	—	—
Current Laboratory MRLs		0.5	0.5	0.5	1.0	—	—	—	—	80.0	—	—

ND or < = Less than laboratory method reporting limit (MRL).

— = Not sampled or not available.

Benzene, toluene, ethylbenzene, and total xylenes (BTEX) analysis by EPA Method 8021B.

VOCs analyzed by EPA Method 8062B.

EDB = 1,2-dibromoethane and EDC = 1,2-dichloroethane.

Total petroleum hydrocarbons-gasoline range (TPH-G) analysis by Method NWTPH-Gx.

TPH-diesel range (TPH-D) and TPH-oil range (TPH-O) analysis by Method NWTPH-Dx.

a Monitoring wells MW-4 through MW-7 were installed on October 24 and sampled on November 15, 2000.

Note: Results in micrograms per liter (µg/L), or approximately parts per billion (ppb).

Table 2. Historical Water Level Elevations
Former ARCO Service Station No. 0855
4603 Ocean Beach Highway, Longview, Washington

Well Number/ TOC Elevation ^a (feet)	Date Measured	Static Water Level (feet BTOC) ^b	Floating Product Thickness (feet)	Groundwater Elevation (feet) ^c	Change in Water Level Elevation (feet)
MW-1 8.34	03/27/00	4.36	0.00	3.98	— ^d
	05/23/00	5.20	0.00	3.14	-0.84
	07/20/00	5.55	0.00	2.79	-0.35
	10/18/00	5.41	0.00	2.93	0.14
	01/18/01	4.81	0.00	3.53	0.60
	04/18/01	4.58	0.00	3.76	0.23
	07/17/01	5.54	0.00	2.80	-0.96
	10/18/01	5.26	0.00	3.08	0.28
MW-2 8.76	03/27/00	3.61	0.00	5.15	—
	05/23/00	4.64	0.00	4.12	-1.03
	07/20/00	5.06	0.00	3.70	-0.42
	10/18/00	5.19	0.00	3.57	-0.13
	01/18/01	3.96	0.00	4.80	1.23
	04/18/01	3.83	0.00	4.93	0.13
	07/17/01	5.08	0.00	3.68	-1.25
	10/18/01	4.83	0.00	3.93	0.25
MW-3 8.78	03/27/00	5.61	0.00	3.17	—
	05/23/00	6.46	0.00	2.32	-0.85
	07/20/00	7.05	0.00	1.73	-0.59
	10/18/00	6.84	0.00	1.94	0.21
	01/18/01	6.37	0.00	2.41	0.47
	04/18/01	5.46	0.00	3.32	0.91
	07/17/01	6.93	0.00	1.85	-1.47
	10/18/01	6.47	0.00	2.31	0.46
MW-4 8.78	11/15/00 ^e	6.88	0.00	1.90	—
	01/18/01	6.78	0.00	2.00	0.10
	04/18/01	6.90	0.00	1.88	-0.12
	07/17/01	7.50	0.00	1.28	-0.60
	10/18/01	6.92	0.00	1.86	0.58
MW-5 8.78	11/15/00 ^e	6.54	0.00	2.24	—
	01/18/01	6.07	0.00	2.71	0.47
	04/18/01	5.46	0.00	3.32	0.61
	07/17/01	6.79	0.00	1.99	-1.33
	10/18/01	6.50	0.00	2.28	0.29

Table 2. Historical Water Level Elevations
Former ARCO Service Station No. 0855
4603 Ocean Beach Highway, Longview, Washington

Well Number/ TOC Elevation ^a (feet)	Date Measured	Static Water Level (feet BTOC) ^b	Floating Product Thickness (feet)	Groundwater Elevation (feet) ^c	Change in Water Level Elevation (feet)
MW-6 8.21	11/15/00 ^e	6.15	0.00	2.06	—
	01/18/01	5.85	0.00	2.36	0.30
	04/18/01	5.70	0.00	2.51	0.15
	07/17/01	6.02	0.00	2.19	-0.32
	10/18/01	6.03	0.00	2.18	-0.01
MW-7 8.45	11/15/00 ^e	6.52	0.00	1.93	—
	01/18/01	6.24	0.00	2.21	0.28
	04/18/01	5.98	0.00	2.47	0.26
	07/17/01	6.44	0.00	2.01	-0.46
	10/18/01	6.39	0.00	2.06	0.05

a Top of casing (TOC) elevations, NAVD, 1988

b Measurements in feet below top of well casing.

c Elevation relative to mean sea level. Static water level corrected if floating product thickness (FPT) is present; corrected water level elevation = TOC - Static Water Level + (FPT x 0.80).

d — = Data not applicable or not measured.

e Monitoring wells MW-4 through MW-7 were installed on October 24 and measured on November 15, 2000.

**LABORATORY REPORT AND
CHAIN OF CUSTODY**



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Project: ARCO #0855, Longview, WA
Project Number: 015.08921
Project Manager: Scott Miller

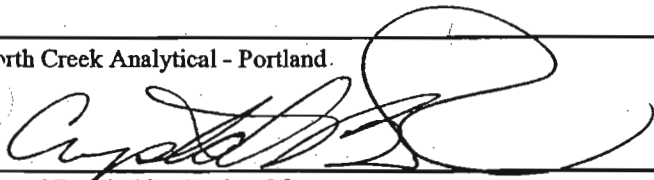
Reported:
10/24/01 16:50

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1-0855	P1J0688-01	Water	10/18/01 10:57	10/19/01 14:45
MW-2-0855	P1J0688-02	Water	10/18/01 11:03	10/19/01 14:45
MW-3-0855	P1J0688-03	Water	10/18/01 11:40	10/19/01 14:45
MW-4-0855	P1J0688-04	Water	10/18/01 11:34	10/19/01 14:45
MW-5-0855	P1J0688-05	Water	10/18/01 11:26	10/19/01 14:45
MW-6-0855	P1J0688-06	Water	10/18/01 11:18	10/19/01 14:45
MW-7-0855	P1J0688-07	Water	10/18/01 11:11	10/19/01 14:45

North Creek Analytical - Portland

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Crystal Burkholder, Project Manager

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1 of 7



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Project: ARCO #0855, Longview, WA
Project Number: 015.08921
Project Manager: Scott Miller

Reported:
10/24/01 16:50

Gasoline Hydrocarbons per NW TPH-Gx Method and BTEX per EPA Method 8021B
North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-1-0855 (P1J0688-01) Water						Sampled: 10/18/01 Received: 10/19/01			
Benzene	ND	0.500	ug/l	1	NW-G, 8021B	10/22/01	10/22/01	1100866	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	80.0	"	"	"	"	"	"	
Surr: 4-BFB (FID)	110 %	50-150							
Surr: 4-BFB (PID)	97.2 %	75-120							
MW-2-0855 (P1J0688-02) Water						Sampled: 10/18/01 Received: 10/19/01			
Benzene	2.11	0.500	ug/l	1	NW-G, 8021B	10/22/01	10/22/01	1100866	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	3.64	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	304	80.0	"	"	"	"	"	"	
Surr: 4-BFB (FID)	116 %	50-150							
Surr: 4-BFB (PID)	99.6 %	75-120							
MW-3-0855 (P1J0688-03) Water						Sampled: 10/18/01 Received: 10/19/01			
Benzene	7200	250	ug/l	500	NW-G, 8021B	10/22/01	10/22/01	1100866	
Toluene	19700	250	"	"	"	"	"	"	
Ethylbenzene	3340	250	"	"	"	"	"	"	
Xylenes (total)	17300	500	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	138000	40000	"	"	"	"	"	"	
Surr: 4-BFB (FID)	110 %	50-150							
Surr: 4-BFB (PID)	91.6 %	75-120							

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Crystal Burkholder, Project Manager

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Tualatin, OR 97062

Project: ARCO #0855, Longview, WA
Project Number: 015.08921
Project Manager: Scott Miller

Reported:
10/24/01 16:50

Gasoline Hydrocarbons per NW TPH-Gx Method and BTEX per EPA Method 8021B
North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-4-0855 (P1J0688-04) Water					Sampled: 10/18/01 Received: 10/19/01				
Benzene	1040	25.0	ug/l	50	NW-G, 8021B	10/22/01	10/22/01	1100866	
Toluene	ND	25.0	"	"	"	"	"	"	
Ethylbenzene	2300	25.0	"	"	"	"	"	"	
Xylenes (total)	1320	50.0	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	33300	4000	"	"	"	"	"	"	
Surr: 4-BFB (FID)	110 %	50-150							
Surr: 4-BFB (PID)	88.0 %	75-120							
MW-5-0855 (P1J0688-05) Water					Sampled: 10/18/01 Received: 10/19/01				
Benzene	3.05	0.500	ug/l	1	NW-G, 8021B	10/22/01	10/22/01	1100866	R-12
Toluene	1.39	0.500	"	"	"	"	"	"	
Ethylbenzene	1.48	0.500	"	"	"	"	"	"	
Xylenes (total)	1.45	1.00	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	647	80.0	"	"	"	"	"	"	
Surr: 4-BFB (FID)	122 %	50-150							
Surr: 4-BFB (PID)	94.2 %	75-120							
MW-6-0855 (P1J0688-06) Water					Sampled: 10/18/01 Received: 10/19/01				
Benzene	ND	0.500	ug/l	1	NW-G, 8021B	10/22/01	10/22/01	1100866	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	2.60	0.500	"	"	"	"	"	"	
Xylenes (total)	5.48	1.00	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	1000	80.0	"	"	"	"	"	"	
Surr: 4-BFB (FID)	150 %	50-150							
Surr: 4-BFB (PID)	103 %	75-120							

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Secor
P.O. Box 1508
Tualatin, OR 97062

Project: ARCO #0855, Longview, WA
Project Number: 015.08921
Project Manager: Scott Miller

Reported:
10/24/01 16:50

Gasoline Hydrocarbons per NW TPH-Gx Method and BTEX per EPA Method 8021B
North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-7-0855 (P1J0688-07) Water						Sampled: 10/18/01 Received: 10/19/01			
Benzene	ND	0.500	ug/l	1	NW-G, 8021B	10/22/01	10/22/01	1100866	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	286	80.0	"	"	"	"	"	"	
Surr: 4-BFB (FID)	121 %	50-150							
Surr: 4-BFB (PID)	94.8 %	75-120							

North Creek Analytical - Portland

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Crystal Burkholder, Project Manager

North Creek Analytical, Inc.
Environmental Laboratory Network

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Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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Project: ARCO #0855, Longview, WA
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Project Manager: Scott Miller

Reported:
10/24/01 16:50

Gasoline Hydrocarbons per NW TPH-Gx Method and BTEX per EPA Method 8021B - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
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Batch 1100866 - EPA 5030B

Blank (1100866-BLK1)

Prepared & Analyzed: 10/22/01

Benzene	ND	0.500	ug/l						
Toluene	ND	0.500	"						
Ethylbenzene	ND	0.500	"						
Xylenes (total)	ND	1.00	"						
Gasoline Range Hydrocarbons	ND	80.0	"						
Surr: 4-BFB (FID)	55.9		"	50.0		112		50-150	
Surr: 4-BFB (PID)	49.0		"	50.0		98.0		75-120	

LCS (1100866-BS1)

Prepared & Analyzed: 10/22/01

Gasoline Range Hydrocarbons	1010	80.0	ug/l	1000		101		70-130	
4-BFB (FID)	65.3		"	50.0		131		50-150	

(1100866-BS2)

Prepared & Analyzed: 10/22/01

Benzene	17.4	0.500	ug/l	20.0		87.0		70-130	
Toluene	19.0	0.500	"	20.0		95.0		70-130	
Ethylbenzene	19.0	0.500	"	20.0		95.0		70-130	
Xylenes (total)	55.0	1.00	"	60.0		91.7		70-130	
Surr: 4-BFB (PID)	47.2		"	50.0		94.4		75-120	

Duplicate (1100866-DUP1)

Source: P1J0688-03

Prepared & Analyzed: 10/22/01

Gasoline Range Hydrocarbons	129000	40000	ug/l		138000		6.74	50	
Surr: 4-BFB (FID)	54.5		"	50.0		109		50-150	

Matrix Spike (1100866-MS1)

Source: P1J0688-03

Prepared & Analyzed: 10/22/01

Benzene	15300	250	ug/l	10000	7200	81.0		70-130	
Toluene	27000	250	"	10000	19700	73.0		70-130	
Ethylbenzene	11600	250	"	10000	3340	82.6		70-130	
Xylenes (total)	39500	500	"	30000	17300	74.0		70-130	
Surr: 4-BFB (PID)	42.0		"	50.0		84.0		75-120	

North Creek Analytical - Portland

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Project: ARCO #0855, Longview, WA
Project Number: 015.08921
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Reported:
10/24/01 16:50

Gasoline Hydrocarbons per NW TPH-Gx Method and BTEX per EPA Method 8021B - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 1100866 - EPA 5030B

Matrix Spike Dup (1100866-MSD1)

Source: P1J0688-03

Prepared & Analyzed: 10/22/01

Benzene	16100	250	ug/l	10000	7200	89.0	70-130	5.10	15	
Toluene	28000	250	"	10000	19700	83.0	70-130	3.64	15	
Ethylbenzene	12200	250	"	10000	3340	88.6	70-130	5.04	15	
Xylenes (total)	41300	500	"	30000	17300	80.0	70-130	4.46	15	
Surr: 4-BFB (PID)	43.8		"	50.0		87.6	75-120			

North Creek Analytical - Portland

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Project: ARCO #0855, Longview, WA
Project Number: 015.08921
Project Manager: Scott Miller

Reported:
10/24/01 16:50

Notes and Definitions

R-12 Result could not be accurately quantitated due to coeluting organic compounds.

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. MRLs are adjusted if %Solids are less than 50%.

wet Sample results reported on a wet weight basis (as received)

RPD Relative Percent Difference

North Creek Analytical - Portland

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North Creek Analytical, Inc.
Environmental Laboratory Network

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**GROUNDWATER SAMPLING
FIELD DATA SHEETS**

OR

GROUNDWATER LEVEL DATA

PROJECT:
QGWM

SITE: ARCO Facility 0855

PROJECT #:
015.08921.050

CLIENT:
ARCO

RECORDED BY: Nash Lush

MEASURING DEVICE:

SITE LOCATION: 4603 Ocean Beach Hwy, Longview,
Washington

[illegible]

* All measurements from top of PVC casing unless noted.

SECOR
GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PN: 015.08921.050 DATE: 10/18/01 WELL NO. MW1
FACILITY NAME: Arco 0855, Longview, Washington TEMPERATURE: 48 °F or °C
FIELD PERSONNEL: Josh Lusha WEATHER: Foggy

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: 5.26 FT.
B. Thickness of Free Product, if present: _____ Inches _____ FT.
C. Total Depth of well (TD) from top of casing/piezometer: _____ FT.
D. Height of Water Column in casing (h = TD - SWL): _____ FT.
E. Casing Size (in.): _____
F. Calculated Purge Volume (3 Well Volumes): _____ gal

PURGING METHOD: NP DURATION: _____

OBSERVATIONS:

	Time	Turbidity	Color	Sheen	pH	Temp.	Conduct.	SWL
1st Volume:								
2nd Volume:	<u>No purge Sampling</u>							
3rd Volume:								
4th Volume:								
Addl. Volumes:								

TOTAL VOLUME OF WATER PURGED FROM WELL: _____

PURGE WATER STORED/DISPOSED OF WHERE/HOW: ARCO 5893, Vancouver, Washington

SAMPLES COLLECTED: Depth to Water at time of sample collection: _____

Sample Number(s)	Time	Size/Number of Container(s)	Preservative
<u>MW1-0855</u>	<u>1057</u>	<u>3x40ml VOA's</u>	<u>HCl</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

COMMENTS:

Casing Capacities:

2-inch hole.....0.16 gal/lin ft.
4-inch hole.....0.65 gal/lin ft.
6.5-inch hole.....1.70 gal/lin ft.
8-inch hole.....2.60 gal/lin ft.
10-inch hole.....4.10 gal/lin ft.

Recharge Calculation at Time of Sample Collection:

Original Water Column: _____ x 0.80 = -- (_____) Total Depth of Well: _____
Collect sample when Depth to Water measures Less than or equal to:

Signature: J. Lusha

SECOR GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PN: 015.08921.050 DATE: 10/18/01 WELL NO. MW2

FACILITY NAME: Arco 0855, Longview, Washington TEMPERATURE: 49 °F or °C

FIELD PERSONNEL: Josh Lusha WEATHER: Fog

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: 4.83 FT.
 B. Thickness of Free Product, if present: Inches FT.
 C. Total Depth of well (TD) from top of casing/piezometer: FT.
 D. Height of Water Column in casing (h = TD - SWL): FT.
 E. Casing Size (in.):
 F. Calculated Purge Volume (3 Well Volumes): gal

PURGING METHOD: NP DURATION:

OBSERVATIONS:

	Time	Turbidity	Color	Sheen	pH	Temp.	Conduct.	SWL
1st Volume:								
2nd Volume:	<u>No purge sampling</u>							
3rd Volume:								
4th Volume:								
Addl. Volumes:								

TOTAL VOLUME OF WATER PURGED FROM WELL:

PURGE WATER STORED/DISPOSED OF WHERE/HOW: ARCO 5893, Vancouver, Washington

SAMPLES COLLECTED: Depth to Water at time of sample collection:

Sample Number(s)	Time	Size/Number of Container(s)	Preservative
<u>MW2-0855</u>	<u>1103</u>	<u>3x40ml VOA's</u>	<u>HCL</u>

COMMENTS:

Casing Capacities:

2-inch hole.....0.16 gal/lin ft.
 4-inch hole.....0.65 gal/lin ft.
 6.5-inch hole.....1.70 gal/lin ft.
 8-inch hole.....2.60 gal/lin ft.
 10-inch hole.....4.10 gal/lin ft.

Recharge Calculation at Time of Sample Collection:

Total Depth of Well:
 Original Water Column: x 0.80 =
 Collect sample when Depth to Water measures
 Less than or equal to:

Signature: J. A. [Signature]

SECOR GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PN: 015.08921.050 DATE: 10/18/01 WELL NO. MW3
 FACILITY NAME: Arco 0855, Longview, Washington TEMPERATURE: 49.0 or °C
 FIELD PERSONNEL: Josh Lusha WEATHER: Fog

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: 6.47 FT.
 B. Thickness of Free Product, if present: _____ Inches _____ FT.
 C. Total Depth of well (TD) from top of casing/piezometer: _____ FT.
 D. Height of Water Column in casing (h = TD - SWL): _____ FT.
 E. Casing Size (in.): _____
 F. Calculated Purge Volume (3 Well Volumes): _____ gal

PURGING METHOD: NP DURATION: —

OBSERVATIONS:

	Time	Turbidity	Color	Sheen	pH	Temp.	Conduct.	SWL
1st Volume:								
2nd Volume:	<u>No purge Sampling</u>							
3rd Volume:								
4th Volume:								
Addl. Volumes:								

TOTAL VOLUME OF WATER PURGED FROM WELL: —

PURGE WATER STORED/DISPOSED OF WHERE/HOW: ARCO 5893, Vancouver, Washington

SAMPLES COLLECTED: Depth to Water at time of sample collection: —

Sample Number(s)	Time	Size/Number of Container(s)	Preservative
<u>MW3-0855</u>	<u>1140</u>	<u>3x40ml VOA's</u>	<u>HCl</u>

COMMENTS:

Sheen

Casing Capacities:

2-inch hole.....0.16 gal/lin ft.
 4-inch hole.....0.65 gal/lin ft.
 6.5-inch hole.....1.70 gal/lin ft.
 8-inch hole.....2.60 gal/lin ft.
 10-inch hole.....4.10 gal/lin ft.

Recharge Calculation at Time of Sample Collection:

Total Depth of Well: _____
 Original Water Column: _____ x 0.80 = — ()
 Collect sample when Depth to Water measures
Less than or equal to:

Signature: [Signature]

SECOR GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PN: 015.08921.050 DATE: 10/18/01 WELL NO. MW4
 FACILITY NAME: Arco 0855, Longview, Washington TEMPERATURE: 74.0 or °C
 FIELD PERSONNEL: Josh Lusho WEATHER: Fog

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: 6.92 FT.
 B. Thickness of Free Product, if present: — Inches — FT.
 C. Total Depth of well (TD) from top of casing/piezometer: — FT.
 D. Height of Water Column in casing ($h = TD - SWL$): — FT.
 E. Casing Size (in.): —
 F. Calculated Purge Volume (3 Well Volumes): — gal

PURGING METHOD: NP DURATION: —

OBSERVATIONS:

	Time	Turbidity	Color	Sheen	pH	Temp.	Conduct.	SWL
1st Volume:								
2nd Volume:	<u>No purge Sampling</u>							
3rd Volume:								
4th Volume:								
Addl. Volumes:								

TOTAL VOLUME OF WATER PURGED FROM WELL: —

PURGE WATER STORED/DISPOSED OF WHERE/HOW: ARCO 5893, Vancouver, Washington

SAMPLES COLLECTED: Depth to Water at time of sample collection: —

Sample Number(s)	Time	Size/Number of Container(s)	Preservative
<u>MW4-0855</u>	<u>1734</u>	<u>3x40ml VOA's</u>	<u>HCL</u>

COMMENTS:

Casing Capacities:
 2-inch hole.....0.16 gal/lin ft.
 4-inch hole.....0.65 gal/lin ft.
 6.5-inch hole.....1.70 gal/lin ft.
 8-inch hole.....2.60 gal/lin ft.
 10-inch hole.....4.10 gal/lin ft.

Recharge Calculation at Time of Sample Collection:

Total Depth of Well: —
 Original Water Column: — x 0.80 = —
 Collect sample when Depth to Water measures Less than or equal to:

Signature: J. A. Lusho

SECOR GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PN: 015.08921.050 DATE: 10/18/01 WELL NO. MW5
 FACILITY NAME: Arco 0855, Longview, Washington TEMPERATURE: 49°F or °C
 FIELD PERSONNEL: Josh Lusher WEATHER: Fog

FIELD MEASUREMENTS:

- A. Static Water Level (SWL) below top of casing/piezometer: 6.50 FT.
 B. Thickness of Free Product, if present: _____ Inches _____ FT.
 C. Total Depth of well (TD) from top of casing/piezometer: _____ FT.
 D. Height of Water Column in casing ($h = TD - SWL$): _____ FT.
 E. Casing Size (in.): _____
 F. Calculated Purge Volume (3 Well Volumes): _____ gal

PURGING METHOD: NP DURATION: —

OBSERVATIONS:

	Time	Turbidity	Color	Sheen	pH	Temp.	Conduct.	SWL
1st Volume:								
2nd Volume:	<u>No purge sampling</u>							
3rd Volume:								
4th Volume:								
Addl. Volumes:								

TOTAL VOLUME OF WATER PURGED FROM WELL: —

PURGE WATER STORED/DISPOSED OF WHERE/HOW: ARCO 5893, Vancouver, Washington

SAMPLES COLLECTED: Depth to Water at time of sample collection: —

Sample Number(s)	Time	Size/Number of Container(s)	Preservative
<u>MW5-0855</u>	<u>1126</u>	<u>3x40ml VOA's</u>	<u>HCL</u>

COMMENTS:

Casing Capacities:
 2-inch hole.....0.16 gal/lin ft.
 4-inch hole.....0.65 gal/lin ft.
 6.5-inch hole.....1.70 gal/lin ft.
 8-inch hole.....2.60 gal/lin ft.
 10-inch hole.....4.10 gal/lin ft.

Recharge Calculation at Time of Sample Collection:

Total Depth of Well: _____
 Original Water Column: _____ x 0.80 = — ()
 Collect sample when Depth to Water measures
Less than or equal to:

Signature: [Signature]

SECOR GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PN: 015.08921.050 DATE: 10/18/01 WELL NO. MW6
 FACILITY NAME: Arco 0855, Longview, Washington TEMPERATURE: 49°F or °C
 FIELD PERSONNEL: Dash Lusher WEATHER: Fog

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: 6.03 FT.
 B. Thickness of Free Product, if present: _____ Inches _____ FT.
 C. Total Depth of well (TD) from top of casing/piezometer: _____ FT.
 D. Height of Water Column in casing ($h = TD - SWL$): _____ FT.
 E. Casing Size (in.): _____
 F. Calculated Purge Volume (3 Well Volumes): _____ gal

PURGING METHOD: NP DURATION: —

OBSERVATIONS:

	Time	Turbidity	Color	Sheen	pH	Temp.	Conduct.	SWL
1st Volume:								
2nd Volume:	<u>No purge Sampling</u>							
3rd Volume:								
4th Volume:								
Addl. Volumes:								

TOTAL VOLUME OF WATER PURGED FROM WELL: —

PURGE WATER STORED/DISPOSED OF WHERE/HOW: ARCO 5893, Vancouver, Washington

SAMPLES COLLECTED: Depth to Water at time of sample collection: —

Sample Number(s)	Time	Size/Number of Container(s)	Preservative
<u>MW6-0855</u>	<u>11/8</u>	<u>3x40ml VOA's</u>	<u>HCl</u>

COMMENTS:

Casing Capacities:
 2-inch hole.....0.16 gal/lin ft.
 4-inch hole.....0.65 gal/lin ft.
 6.5-inch hole.....1.70 gal/lin ft.
 8-inch hole.....2.60 gal/lin ft.
 10-inch hole.....4.10 gal/lin ft.

Recharge Calculation at Time of Sample Collection:

Total Depth of Well: _____
 Original Water Column: _____ x 0.80 = — ()
 Collect sample when Depth to Water measures
Less than or equal to:

Signature: [Signature]

SECOR GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PN: 015.08921.050 DATE: 10/18/01 WELL NO. MW7
 FACILITY NAME: Arco 0855, Longview, Washington TEMPERATURE: 49.6 or °C
 FIELD PERSONNEL: Josh Lusher WEATHER: Fog

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: 6.39 FT.
 B. Thickness of Free Product, if present: _____ Inches _____ FT.
 C. Total Depth of well (TD) from top of casing/piezometer: _____ FT.
 D. Height of Water Column in casing (h = TD - SWL): _____ FT.
 E. Casing Size (in.): _____
 F. Calculated Purge Volume (3 Well Volumes): _____ gal

PURGING METHOD: NP DURATION: —

OBSERVATIONS:

	Time	Turbidity	Color	Sheen	pH	Temp.	Conduct.	SWL
1st Volume:								
2nd Volume:	<u>No purge sampling</u>							
3rd Volume:								
4th Volume:								
Addl. Volumes:								

TOTAL VOLUME OF WATER PURGED FROM WELL: —

PURGE WATER STORED/DISPOSED OF WHERE/HOW: ARCO 5893, Vancouver, Washington

SAMPLES COLLECTED: Depth to Water at time of sample collection: —

Sample Number(s)	Time	Size/Number of Container(s)	Preservative
<u>MW7-0855</u>	<u>1111</u>	<u>3x40ml VOA's</u>	<u>HCl</u>

COMMENTS:

Casing Capacities:

2-inch hole.....0.16 gal/lin ft.
 4-inch hole.....0.65 gal/lin ft.
 6.5-inch hole.....1.70 gal/lin ft.
 8-inch hole.....2.60 gal/lin ft.
 10-inch hole.....4.10 gal/lin ft.

Recharge Calculation at Time of Sample Collection:

Total Depth of Well: _____
 Original Water Column: _____ x 0.80 = — ()
 Collect sample when Depth to Water measures
Less than or equal to:

Signature: [Signature]