

June 20, 2001

Mr. Chuck Hutchens  
Atlantic Richfield Company  
12520 NE 160<sup>th</sup> Place  
Woodinville, Washington 98072

RE: Groundwater Monitoring Well Installation and Geoprobe Boring Report  
Former ARCO Service Station No. 0855  
4603 Ocean Beach Highway, Longview, Washington  
SECOR PN: 015.08794.330

Dear Mr. Hutchens:

SECOR International Incorporated (SECOR) has prepared this Groundwater Monitoring Well Installation and Geoprobe Boring Report for Atlantic Richfield Company (ARCO). This report includes the procedures performed, soil lithology results, and analytical results from the installation and sampling of four monitoring wells and six Geoprobe borings at the referenced site. The location of the site is shown on Figure 1. This additional environmental assessment was conducted to further investigate on-site and off-site soil and groundwater conditions in relation to the former petroleum retail operations at the site.

#### **SUBSURFACE INVESTIGATION**

On October 24, 2000, GeoTech Explorations, Inc. (GeoTech) installed four on-site groundwater monitoring wells under the supervision of SECOR. The four monitoring wells (MW4, MW5, MW6, and MW7) were installed using a hollow-stem-auger rig equipped with 8-inch outside diameter, 6 and 1/4-inch inside diameter augers. Each of the monitoring wells was installed to a depth of approximately 20 feet below ground surface (bgs). The locations of the groundwater monitoring wells, relative to existing site features, are shown on Figure 2. Soil samples were collected at 5-foot intervals using an 18-inch-long split-spoon sampler lined with three 2-inch by 6-inch-long stainless steel tubes. Groundwater was encountered at a depth ranging from 5 to 20.5 feet bgs. The monitoring wells were constructed of 2-inch diameter polyvinyl chloride (PVC) well casing. Soil encountered at the four groundwater monitoring wells consisted of clayey silts and sandy silts. Well construction details and soil lithology are presented on the boring logs in Attachment 1. Copies of the Washington Resource Protection Well Report start card for the wells are provided in Attachment 2.

On April 19, 2001, GeoTech returned to the site and drilled six off-site soil Geoprobe borings under the supervision of SECOR. The six Geoprobe boreholes (GP1 through GP3 and GP5 through GP7) were pushed using a Geoprobe rig equipped with a 4-foot by 1.25-inch outside diameter macrosampler. The location of the six Geoprobe borings, relative to existing site features, are shown on Figure 2. The borings were advanced to a depth of 16 to 20 feet bgs. Each of the six Geoprobe borings was advanced through the subsurface lithology until the boring had encountered

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groundwater. Soil samples were collected continuously from each of the borings for visual inspection, lithologic description, and field screening for the presence of volatile organic constituents. Groundwater was encountered at a depth ranging from 8.0 to 16.5 feet bgs. Soil encountered at the six Geoprobe locations consisted of mainly sand and silt. Soil lithology of the six Geoprobos is presented on the boring logs in Attachment 1.

Drilling procedures for the groundwater monitoring wells and the Geoprobos are described in Attachment 3, and field screening, and soil and groundwater sampling procedures are described in Attachment 4. Field screening of soil samples included visual observation, sheen testing, and vapor headspace analysis using a photoionization detector (PID). Soil lithology was described using the United Soil Classification System. Lithologic descriptions included describing soil types, color, grain size/texture, degree of consolidation, and moisture content. Field screening results and lithological descriptions are included on the boring logs presented in Attachment 1.

All soil and groundwater samples collected from each monitoring well and borehole location were tightly sealed, uniquely labeled, and then stored on ice for transport to North Creek Analytical laboratory.

Soil cuttings generated during well installation activities were placed into drums and stored on site. Eight soil drums, approximately 2 tons of soil, were generated by the installation of the four groundwater monitoring wells. The soil was profiled and disposed at TPS Technologies, Inc. The disposal receipts are included as Attachment 5.

The top of casing (TOC) elevations for MW4, MW5, MW6, and MW7 were surveyed relative to the existing well of known TOC elevation by SECOR personnel.

Well Number	Depth to Water (feet)	Relative Elevation (TOC) (feet)	Relative Groundwater Elevation (feet)
MW4	6.88	8.78	1.90
MW5	6.54	8.78	2.24
MW6	6.15	8.21	2.06
MW7	6.52	8.45	1.93

#### SOIL SAMPLE ANALYTICAL RESULTS

Eight soil samples from the on-site well installation were submitted for laboratory analysis based on field screening results. Each sample was analyzed for hydrocarbon identification per the Environmental Protection Agency (EPA) NW-TPH Methodology. If petroleum hydrocarbons were detected, the sample was further analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) per EPA Method 8021B, and Polynuclear Aromatic Hydrocarbons (PAHs) per

EPA 8270M-SIM. Soil sample analytical results for the four on-site groundwater monitoring wells (MW4 to MW7) are summarized in Table 1, 2, and 3. A copy of the laboratory analytical report and chain-of-custody document is included as Attachment 5. Hydrocarbons per NW-TPH methodology were detected above the laboratory method reporting limit (MRL) in MW4, MW6, and MW7. The gasoline range hydrocarbons detected ranged from 133 mg/Kg (MW4-5) to 258 mg/Kg (MW7-5). The diesel range hydrocarbons detected ranged from 68.8 mg/Kg (MW6-5) to 199 mg/Kg (MW7-5). The oil range hydrocarbons were detected in MW6-5 at a concentration of 53.5 mg/Kg. MW4-5 and MW7-5 were further analyzed for BTEX and naphthalene per EPA Method 8021B. Benzene and toluene were not detected above laboratory MRL in the soil samples collected. Ethylbenzene and xylene were detected in MW4-5 at a concentration of 4.85 mg/Kg and 9.82 mg/Kg, respectively. Naphthalene was detected at 3.73 mg/Kg in MW4-5 and 1.59 mg/Kg in MW7-5. PAH analysis per EPA 8270M-SIM was conducted on MW4-5, MW6-5, and MW7-5. MW6-5 had concentrations of PAH below the laboratory MRL. MW4-5 had detectable concentrations of naphthalene at 2,030 µg/kg. MW7-5 had detectable concentrations of acenaphthene at 113 µg/kg, anthracene at 58.8 µg/kg, fluoranthene at 40.5 µg/kg, fluorene at 416 µg/kg, phenanthrene at 626 µg/kg, and pyrene at 58.2 µg/kg.

Twelve soil samples from the on-site Geoprobe investigation were submitted for laboratory analysis based on field screening results. Each sample was analyzed for hydrocarbon identification per the EPA NW-TPH Methodology. Soil sample analytical results for the six offsite Geoprobe are summarized in Table 1. A copy of the laboratory analytical report and chain-of-custody document is included as Attachment 5. Hydrocarbons per NW-TPH methodology were not detected above the laboratory MRL in GP1 through GP3 and GP5 through GP7.

## GROUNDWATER SAMPLE ANALYTICAL RESULTS

The groundwater monitoring wells MW4 to MW7 were sampled during the first quarter 2001 quarterly groundwater monitoring event on January 18, 2001. The seven on-site wells (MW-1 to MW-7) were analyzed for Gasoline Hydrocarbons per NW-TPH-Gx Method and Volatile Organic Compounds per EPA Method 8260B. Groundwater sample analytical results for the seven on-site groundwater monitoring wells (MW1 to MW7) are summarized in Table 4. A copy of the laboratory analytical report and chain-of-custody document is included as Attachment 5. The gasoline range hydrocarbons detected ranged from 95.6 µg/L (MW1) to 121,000 µg/L (MW3). MW1 had VOC concentrations per EPA Method 8260B below the laboratory MRL. Benzene, toluene, ethylbenzene, total xylene, sec-butylbenzene, 1,2-dichloroethane, isopropyltoluene, naphthalene, n-propylbenzene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene were detected above the laboratory MRL in one or more of the seven on-site wells.

Seven groundwater samples from the Geoprobe investigation were submitted for laboratory analysis based on field screening results. Each sample was analyzed for BTEX per EPA Method 8021B. Groundwater sample analytical results for the seven Geoprobe samples (GP1 through GP3 and GP5 through GP7) are summarized in Table 6. A copy of the laboratory analytical

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### SUMMARY

Based on the soil and groundwater analysis generated from the well installation and Geoprobe investigation, no off-site petroleum related impacts were found in the shallow soil and groundwater downgradient from the former ARCO site.

If you have any questions regarding this report, please call me at (503) 691-2030.

Sincerely,  
**SECOR International Incorporated**

A handwritten signature in black ink, appearing to read "R. Scott Miller", with a long horizontal flourish extending to the right.

R. Scott Miller, P.E.  
Principal Engineer

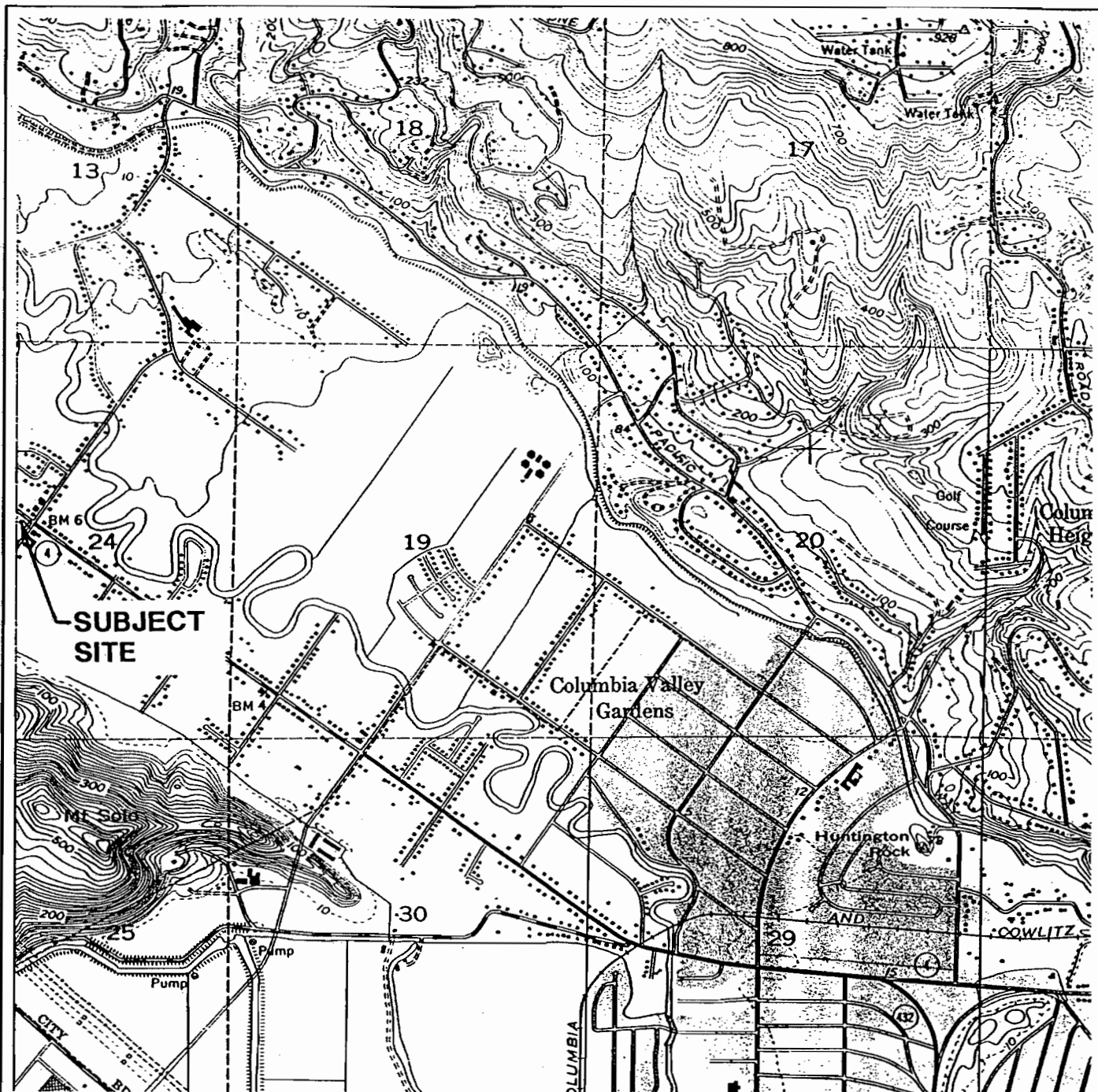
Attachments

cc: Ms. Patricia L. Martin, Washington Department of Ecology

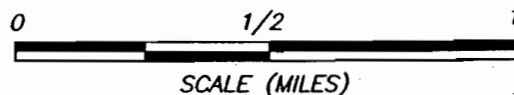
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## FIGURES





QUADRANGLE LOCATION



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

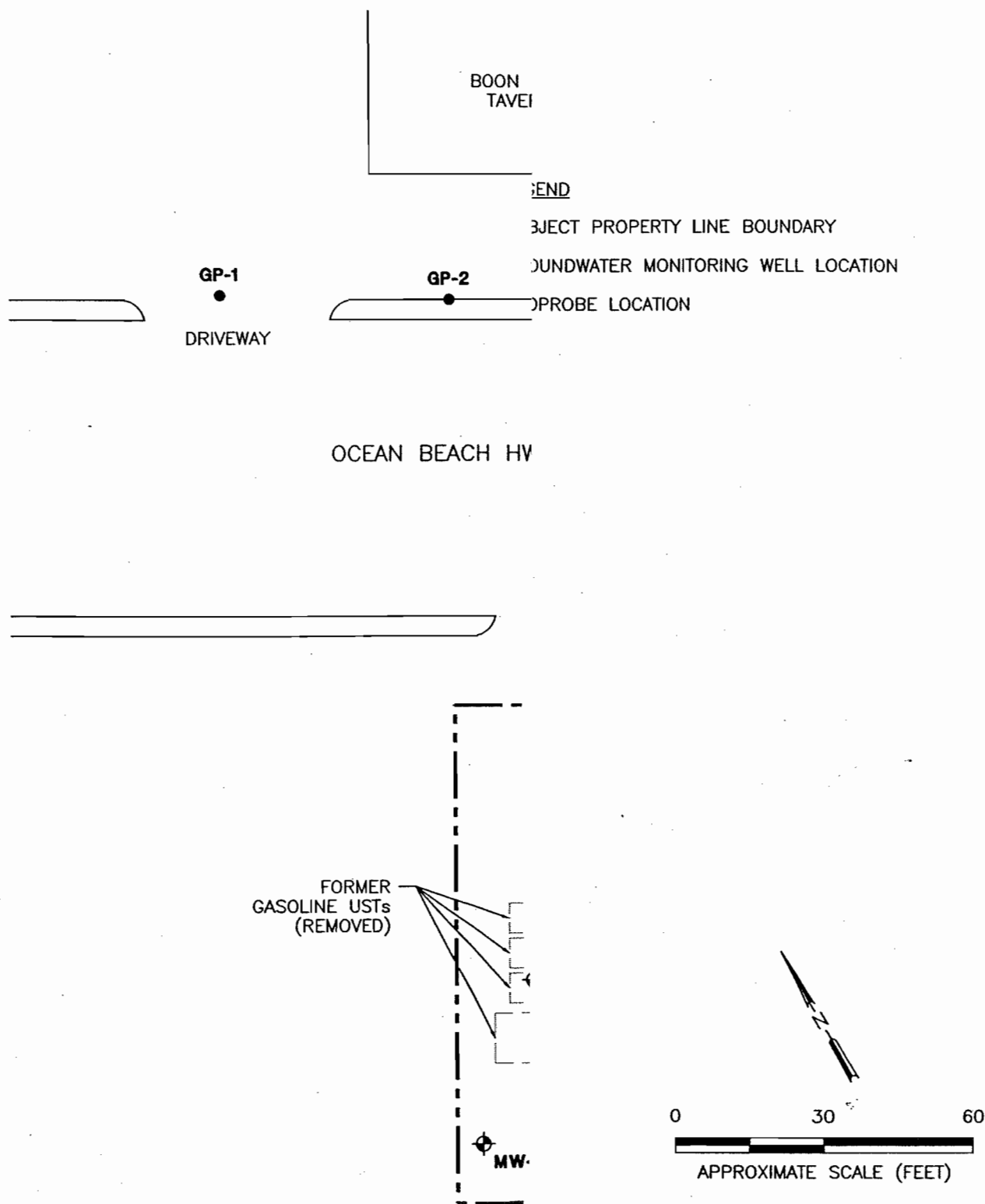
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**SITE LOCATION MAP**  
**FORMER ARCO SERVICE STATION 0855**  
**4603 OCEAN BEACH HIGHWAY**  
**LONGVIEW, WASHINGTON**

FIGURE:

**1**

JOB#: 015.08898.702 APPR: C W G DWN: KPM DATE: 07/28/00



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

SOURCE: MAP BASED ON ATLANTIC RICHFIELD "GENERAL ARRANGEMENT" DRAWING, NOVEMBER 30, 1966, 1/4

# **MONITORING WELL LOCATIONS**

GO SERVICE STATION 0855  
OCEAN BEACH HIGHWAY  
VIEW, WASHINGTON

FIGURE:

2

PR: *Rom* DWN: KPM

DATE: 04/30/01

DWG: 15-8794-3302

## TABLES



Table 1. Summary of Soil Sample Hydrocarbon Analytical Results  
Former ARCO Service Station No. 855  
4603 Ocean Beach Highway,  
Longview, Washington

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Sample Location	Date	TPH-G <sup>a</sup> (mg/Kg)	TPH-D <sup>b</sup> (mg/Kg)	TPH-O <sup>c</sup> (mg/Kg)
MW4-5	10/24/01	258 <sup>d</sup>	<50.0 <sup>c</sup>	<100
MW4-15	10/24/01	<20.0	<50.0	<100
MW5-5	10/24/01	<20.0	<50.0	<100
MW5-20	10/24/01	<20.0	<50.0	<100
MW6-5	10/24/01	<20.0	68.8	53.5
MW6-10	10/24/01	<40.8	<102	<204
MW7-5	10/24/01	133	199	<50.0
MW7-15	10/24/01	<20.0	<50.0	<100
GP1-8	04/19/01	<20.0	<25.0	<50.0
GP1-16	04/19/01	<20.0	<50.0	<100
GP2-8	04/19/01	<20.0	<50.0	<100
GP2-16	04/19/01	<20.0	<50.0	<100
GP3-8	04/19/01	<20.0	<50.0	<100
GP3-16	04/19/01	<20.0	<50.0	<100
GP5-8	04/19/01	<20.0	<50.0	<100
GP5-16	04/19/01	<20.0	<50.0	<100
GP6-4	04/19/01	<20.0	<50.0	<100
GP6-16	04/19/01	<20.0	<50.0	<100
GP7-8	04/19/01	<20.0	<50.0	<100
GP7-16	04/19/01	<20.0	<50.0	<100

- a Total Petroleum Hydrocarbons - Gasoline Range Hydrocarbons by NW-TPH Methodology. Results reported in milligrams per kilogram (mg/Kg).
- b Total Petroleum Hydrocarbons - Diesel Range Hydrocarbons by NW-TPH Methodology. Results reported in milligrams per kilogram (mg/Kg).
- c Total Petroleum Hydrocarbons - Heavy Oil Hydrocarbons by NW-TPH Methodology. Results reported in milligrams per kilogram (mg/Kg).
- d Analyte detected above laboratory method reporting limit.
- e Analyte detected below laboratory method reporting limit.

**Table 2. Summary of Soil Sample BTEX/Naphthalene Analytical Results**  
**Former ARCO Service Station No. 855**  
**4603 Ocean Beach Highway,**  
**Longview, Washington**

Sample Location	Date	Benzene	Toluene	Ethylbenzene	Xylenes (total)	Naphthalene
MW4-5	10/24/00	<0.200 <sup>a</sup>	<0.200	4.85 <sup>b</sup>	9.82	3.73
MW7-5	10/24/00	<0.100	<0.100	<1.00	<1.00	1.59

Notes: Samples analyzed for BTEX/N per EPA Method 8021B. Results in milligrams per kilograms (mg/Kg).

a Analyte detected below laboratory MRL.

b Analyte detected above laboratory MRL.

**Table 3. Summary of Soil Sample Polynuclear Aromatic Hydrocarbon Analytical Results**  
**Former ARCO Service Station No. 855**  
**4603 Ocean Beach Highway,**  
**Longview, Washington**

Sample Location	Date	Acenaphthene	Anthracene	Fluoranthene	Fluorene	Naphthalene	Phenanthrene	Pyrene
MW4-5	10/24/00	<67.0 <sup>a</sup>	<67.0	<67.0	<67.0	2030	<67.0	<67.0
MW6-5	10/24/00	<13.4	<13.4	<13.4	<13.4	<67.0	<13.4	<13.4
MW7-5	10/24/00	113 <sup>b</sup>	58.8	40.5	416	<335	626	58.2

Notes: Sample analyzed for Polynuclear Aromatic Compounds per EPA 8270M-SIM. Results in micrograms per kilograms (ug/Kg)

a Analyte detected below laboratory MRL.

b Analyte detected above laboratory MRL.

Table 4. Summary of Groundwater Samples Hydrocarbon Results  
 Former ARCO Service Station No. 855  
 4603 Ocean Beach Highway  
 Longview, Washington

Sample Location	Sample Collection Date	Gasoline Range Hydrocarbons (ug/L)
MW-1	1/18/01	95.6
MW-2	1/18/01	691
MW-3	1/18/01	121000
MW-4	1/18/01	29400
MW-5	1/18/01	786
MW-6	1/18/01	732
MW-7	1/18/01	242

Notes: Samples analyzed for Gasoline Hydrocarbons per EPA Method NW-TPH-Gx. Results reported in micrograms per liter (ug/L).

Table 5. Summary of Groundwater Samples Volatile Organic Compounds Results  
Former ARCO Service Station No. 855  
4603 Ocean Beach Highway  
Longview, Washington

Sample Location	Sample Collection Date	Benzene	Toluene	Ethylbenzene	Total Xylenes	Chlorobenzene	Sec-Butylbenzene	1,2-Dichloroethane	Isopropyltoluene	Naphthalene	m-Propylbenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene
MW-1	1/18/01	<1.00	<1.00	<1.00	<2.00	<1.00	<1.00	<1.00	<2.00	<2.00	<1.00	<1.00	<1.00
MW-2	1/18/01	<2.00	<2.00	41.1	5.62	<2.00	3.7	<2.00	5.88	<4.00	13.5	23	2.02
MW-3	1/18/01	9380	17200	3940	20230	<100	<100	155	203	607	625	4550	1140
MW-4	1/18/01	1130	<50.0	2030	2764	<50.0	<50.0	<50.0	213	331	576	2170	414
MW-5	1/18/01	<1.00	<1.00	<1.00	<2.00	<1.00	1.48	<1.00	9.63	2.44	14.3	<1.00	<1.00
MW-6	1/18/01	<1.00	<1.00	<1.00	<2.00	<1.00	3.81	<1.00	4.72	<2.00	2.73	<1.00	<1.00
MW-7	1/18/01	<1.00	<1.00	<1.00	<2.00	<1.00	1.48	<1.00	2.78	<2.00	3.36	<1.00	<1.00

Notes: Samples analyzed for VOCs per EPA Method 8260B. Results reported in micrograms per liter (µg/L).

a = Analyte was detected below laboratory method reporting limit (MRL).

**Table 6. Summary of Groundwater Samples BTEX Results**  
**Former ARCO Service Station No. 855**  
**4603 Ocean Beach Highway**  
**Longview, Washington**

Sample Location	Sample Collection Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
GP-1	4/19/01	<0.500	<0.500	<0.500	<1.00
GP-2	4/19/01	<0.500	<0.500	<0.500	<1.00
GP-3	4/19/01	<0.500	<0.500	<0.500	<1.00
GP-5	4/19/01	<0.500	<0.500	<0.500	<1.00
GP-6	4/19/01	<0.500	<0.500	<0.500	<1.00
GP-7	4/19/01	<0.500	<0.500	<0.500	<1.00

Notes:        Samples analyzed for BTEX per EPA Method 8021.  
                  Results reported in micrograms per liter (mg/L).



**ATTACHMENT 1**  
**BORING LOGS**

Groundwater Monitoring Well Installation Geoprobe Boring Report  
Former ARCO Service Station No. 855  
4603 Ocean Beach Highway  
Longview, Washington  
SECOR PN: 015.08794.330  
June 20, 2001

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FACILITY ARCO 0855 JOB # 015.08794.320 BORING/WELL MW-4  
LOCATION 4603 OCEAN BEACH HWY; LONGVIEW, WA SURFACE ELEVATION NA  
START 0840 10/24/00 FINISH 1045 10/24/00 CASING TOP ELEVATION NA  
LOGGED BY DEC MONITORING DEVICE OVM 580B W/100 ppm Isobutylene  
SUBCONTRACTOR AND EQUIPMENT GEOTECH HSA W/8 O.D, 4 1/4 ID  
COMMENTS \_\_\_\_\_

PENETRATION RESULTS	Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Depth Below Surface, feet	Well Construction Schematic
BLOWS 6"/6"/6"								
				5			5	
				0	Asphalt surface		0	
1/1/1		269	NT	5	Clayey SILT, gray; some medium grained gray sand; trace medium gravel - minimal recovery; no sheen test; odor; damp	OH	5	
1/2/2		12.4	NS	10	Clayey SILT, brown/tan; organic debris; odor; damp		10	
1/2/3		4.1	NS	15	Same; moist; no odor		15	
2/3/5		18.2	NS	20	Sandy SILT, gray; sand is fine grained; moist to wet	SM	20	
					Boring terminated at 20 feet, sampler advanced to 21.5 feet. Groundwater encountered at approximately 20.5 feet during drilling.			
				25			25	

Field Screen/Lithologic Description Sample  
Preserved Sample  
No Recovery  
\* Sample Submitted for Laboratory Analysis

Groundwater Level at Time of Drilling  
Static Groundwater Level  
SD Sheen Detected  
NS No Sheen Detected  
NT Not Tested

(2.5Y 4/2) Munsell (1990) Soil Color Charts

Gradational Contact  
Contact Located Approximately  
Contact

Concrete  
Bentonite

10/20 Colorado Silica Sand

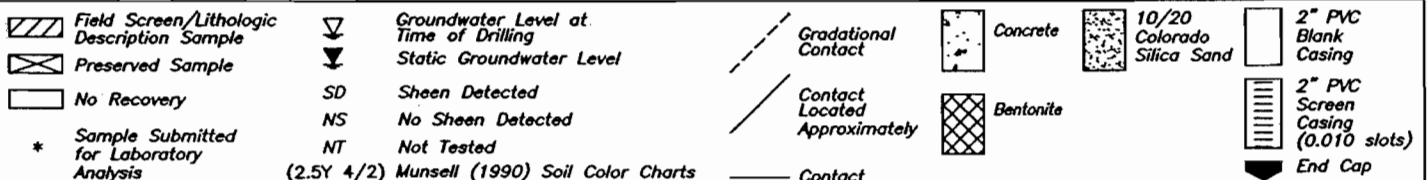
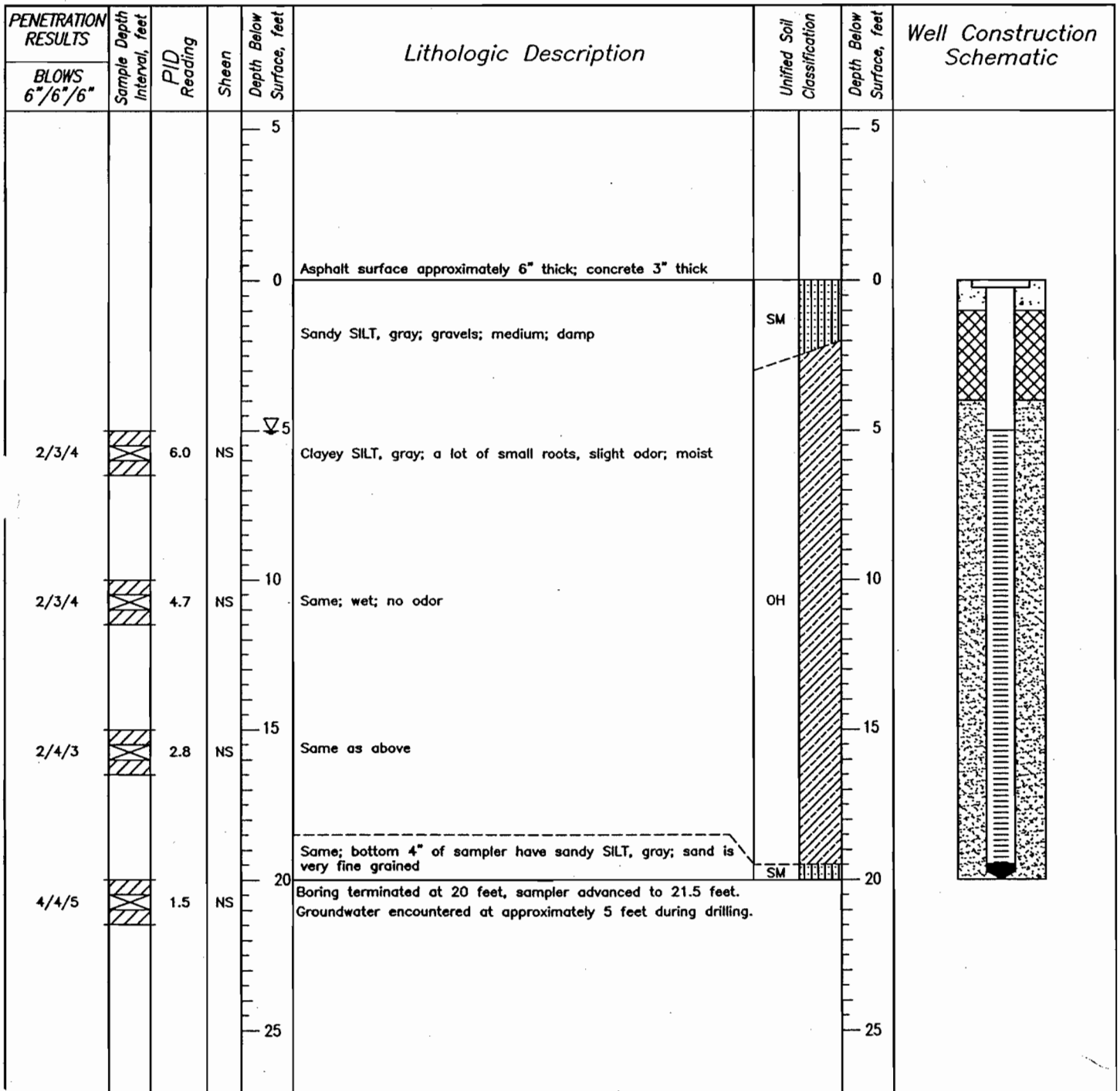
2" PVC Blank Casing  
2" PVC Screen Casing (0.010 slots)  
End Cap

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FACILITY **ARCO 0855** JOB # **015.08794.320** BORING/WELL **MW-5**  
LOCATION **4603 OCEAN BEACH HWY; LONGVIEW, WA** SURFACE ELEVATION **NA**  
START **1125 10/24/00** FINISH **1315 10/24/00** CASING TOP ELEVATION **NA**  
LOGGED BY **DEC** MONITORING DEVICE **OVM 580B W/100 ppm Isobutylene**  
SUBCONTRACTOR AND EQUIPMENT **GEOTECH HSA W/8 O.D., 4 1/4 ID**  
COMMENTS



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FACILITY **ARCO 0855** JOB # **015.08794.320** BORING/WELL **MW-6**  
 LOCATION **4603 OCEAN BEACH HWY; LONGVIEW, WA** SURFACE ELEVATION **NA**  
 START **1315 10/24/00** FINISH **1435 10/24/00** CASING TOP ELEVATION **NA**  
 LOGGED BY **DEC** MONITORING DEVICE **OVM 580B W/100 ppm Isobutylene**  
 SUBCONTRACTOR AND EQUIPMENT **GEOTECH HSA W/8 O.D, 4 1/4 ID**  
 COMMENTS

PENETRATION RESULTS	Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Depth Below Surface, feet	Well Construction Schematic
BLOWS 6"/6"/6"								
				5			5	
				0	Asphalt surface		0	
					Sandy SILT; sand is fine-to medium-grained; moist	SM		
2/3/4		25.3	NS	5	Clayey SILT, gray; a lot of root debris; odor present; moist		5	
1/2/3		3.5	NS	10	Same; no odor	OH	10	
1/1/3		3.5	NS	15	Same, but wet		15	
					Same; bottom half of sampler has Sandy SILT, gray; sand is very fine grained			
8/5/8		2.8	NS	20	Boring terminated at 20 feet, sampler advanced to 21.5 feet. Groundwater encountered at approximately 15 feet during drilling.		20	
				25			25	

	Groundwater Level at Time of Drilling		Concrete		2" PVC Blank Casing
	Static Groundwater Level		Bentonite		2" PVC Screen Casing (0.010 slots)
	SD Sheen Detected				End Cap
* Sample Submitted for Laboratory Analysis	NS No Sheen Detected				
	NT Not Tested				
	(2.5Y 4/2) Munsell (1990) Soil Color Charts				

FACILITY **ARCO 0855** JOB # **015.08794.320** BORING/WELL **MW-7**  
 LOCATION **4603 OCEAN BEACH HWY; LONGVIEW, WA** SURFACE ELEVATION **NA**  
 START **1450 10/24/00** FINISH **1640 10/24/00** CASING TOP ELEVATION **NA**  
 LOGGED BY **DEC** MONITORING DEVICE **OVM 580B W/100 ppm Isobutylene**  
 SUBCONTRACTOR AND EQUIPMENT **GEOTECH HSA W/8 O.D., 4 1/4 ID**  
 COMMENTS

PENETRATION RESULTS	Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Depth Below Surface, feet	Well Construction Schematic
BLOWS 6"/6"/6"								
				5			5	
				0	Asphalt surface/gravel surface		0	
				5	SAND, tan to orange/brown, gray; fine-to medium-grained; dry	SM		
2/3/3		176.1	SD	5	Clayey SILT, gray; strong odor; minimal recovery; damp		5	
				10	Same w/trace cobble; also interspersed in clayey SILT; dark gray; medium grained pockets of sand w/ hydrocarbon smell; some tan/orange sand pockets	OH	10	
2/3/3		4.7	NS	10				
				15	Clayey SILT; gray; a lot of root debris present; moist		15	
1/1/2		2.2	NS	15				
				20	Sandy SILT; gray; sand is very fine grained; wet		20	
2/4/6		0.3	NS	20	Boring terminated at 20 feet, sampler advanced to 21.5 feet. Groundwater encountered at approximately 20 feet during drilling.		20	
				25			25	

	Field Screen/Lithologic Description Sample		Groundwater Level at Time of Drilling		Gradational Contact		Concrete		10/20 Colorado Silica Sand		2" PVC Blank Casing
	Preserved Sample		Static Groundwater Level		Contact Located Approximately		Bentonite		2" PVC Screen Casing (0.010 slots)		End Cap
	No Recovery	SD	Sheen Detected		Contact						
*	Sample Submitted for Laboratory Analysis	NS	No Sheen Detected								
		NT	Not Tested								
		(2.5Y 4/2) Munsell (1990) Soil Color Charts									

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From: ARCO 855 Job # 015.08794.800 Date: April 19, 2001 Boring/Well GP-1  
 Location: 4603 Ocean Beach Highway, Longview, WA Surface Elevation: NA Top of Casing Elevation: NA  
 Logged By: AMK Monitoring Device: Mini Rac 2000  
 Subcontractor and Equipment: Geo Tech Explorations, Truck mounted geoprobe rig  
 Comments: No well installed





Penetration Results	Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description	United Soil Classification	Groundwater Level	Depth Below Surface, feet
Blows 6" / 6" / 6"								
				0	Gravel Fill	GP		0
		0.3	NS		Sand, moist, 30-40% quartz, well sorted	SP		
				-5				-5
					Silt, trace organics, grey, moderate plasticity, trace gravel	MH		
		2.2	NS					
				-10	Sand, trace silt, fine grained, brown, wet, sorted	SW		-10
					Silt, dark grey, moderate plasticity, moist	MH		
		1.9	NS		Silty gravel, to 1", rounded, wet, sorted	GM		
					Silt, trace organics, wet, brown, moderate plasticity	OL		
		2.1	NS	-15				-15
				-20				-20
				-25				-25
				-30				-30

Boring termination at 16 feet, sampler advanced to 16 feet.

Groundwater encountered at approximately 12.5 feet during drilling.

No Recovery      Groundwater Level at Time of Drilling      Contact  
 SD Sheen Detected      Static Groundwater Level  
 NS No Sheen Detected  
 NT Not Tested



	No Recovery		Groundwater Level at		Contact
			Time of Drilling		
SD	Sheen Detected				
NS	No Sheen Detected		Static Groundwater Level		
NT	Not Tested				

**International Incorporated**

Page 1 of 1

Facility: ARCO 855

Job # 015.08794.800

Date: April 19, 2001

Boring/Well GP-3

**L** 4603 Ocean Beach Highway, Longview, WA

Surface Elevation: NA

Top of Casing Elevation: NA

Loz sy: AMK

Monitoring Device: Mini Rae 2000

**Subcontractor and Equipment:** Geo Tech Explorations, Truck mounted geoprobe rig

**Comments:** No well installed

Penetration Results		Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description		United Soil Classification	Groundwater Level	Depth Below Surface, feet
Blows 6" / 6" / 6"										
					0	Gravel Fill		GP		0
					-2.0	Sand, well sorted, medium grained, rounded, moist		SP		-2.0
					-3.0	Silt, trace organics, moderate plasticity, grey, moist		ML		-3.0
					-10.0	Silt, with sand, and gravel, brown, moist, low plasticity		MH		-10.0
					-10.0	Silt, trace organics, moderate plasticity, grey, moist		ML		-10.0
					-13.0	Sandy silt, trace gravel, brown, wet, low plasticity		ML		-13.0
					-13.0	Silt, moderate plasticity, grey, moist to wet, trace organics		MH		-13.0
					-20.0					-20.0
					-25.0					-25.0
					-30.0					-30.0

Boring termination at 18	feet, sampler advanced to 18	feet.
--------------------------	------------------------------	-------

Groundwater encountered at approximately 15 feet during drilling.

11

### No Recovery

Groundwater Level at  
Time of Drilling

---

## Contact

SD Sheen Detected

NS No Sheen Detected

NT Not Tested

Σ

### Static Groundwater Level

# SECOR

**International Incorporated**

Page 1 of 1

Facilitator ARCO 855

Job # 015.08794.800

Date: April 19, 2001

Boring/Well GP-5

**L 4603 Ocean Beach Highway, Longview, WA**

**Surface Elevation:** NA

Top of Casing Elevation: NA

Lo. By: AMK

Monitoring Device: Mini Rae 2000

**Subcontractor and Equipment:** Geo Tech Explorations, Truck mounted geoprobe rig

Comments: No well installed

Penetration Results		Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description	United Soil Classification	Groundwater Level	Depth Below Surface, feet
Blows 6" 16" 16"									
					0	Gravel Fill	GP		0
						Silt, moderate plasticity, dark brown, moist, trace organics	ML		
		3.5	NS		-5				-5
		2.6	NS		-10	Sandy silt, sand medium grained, light to dark brown, moist	MH		-10
		3.4	NS		-15	Silt, moderate plasticity, grey, moist	MH		-15
		2.5	NS		-20	Silt, moderate plasticity, grey, wet	MH		-20
		0.7	NS		-25	Silty sand, very fine grained, moist to wet, trace organics, low plasticity, dark grey	ML		-25
					-30				-30

Boring termination at 20 feet, sampler advanced to 20 feet.

Groundwater encountered at approximately 12.5 feet during drilling.

11/11

### No Recovery

**X**

Groundwater Level at  
Time of Drilling

---

## Contact

SD Shoen Detected

NS No Sheen Detected

**NT** Not Tested

Σ

### Static Groundwater Level

Facility: ARCO 855

Job # 015.08794.800

Date: April 19, 2001

Boring/Well GP-6

Location: 4603 Ocean Beach Highway, Longview, WA

Surface Elevation: NA

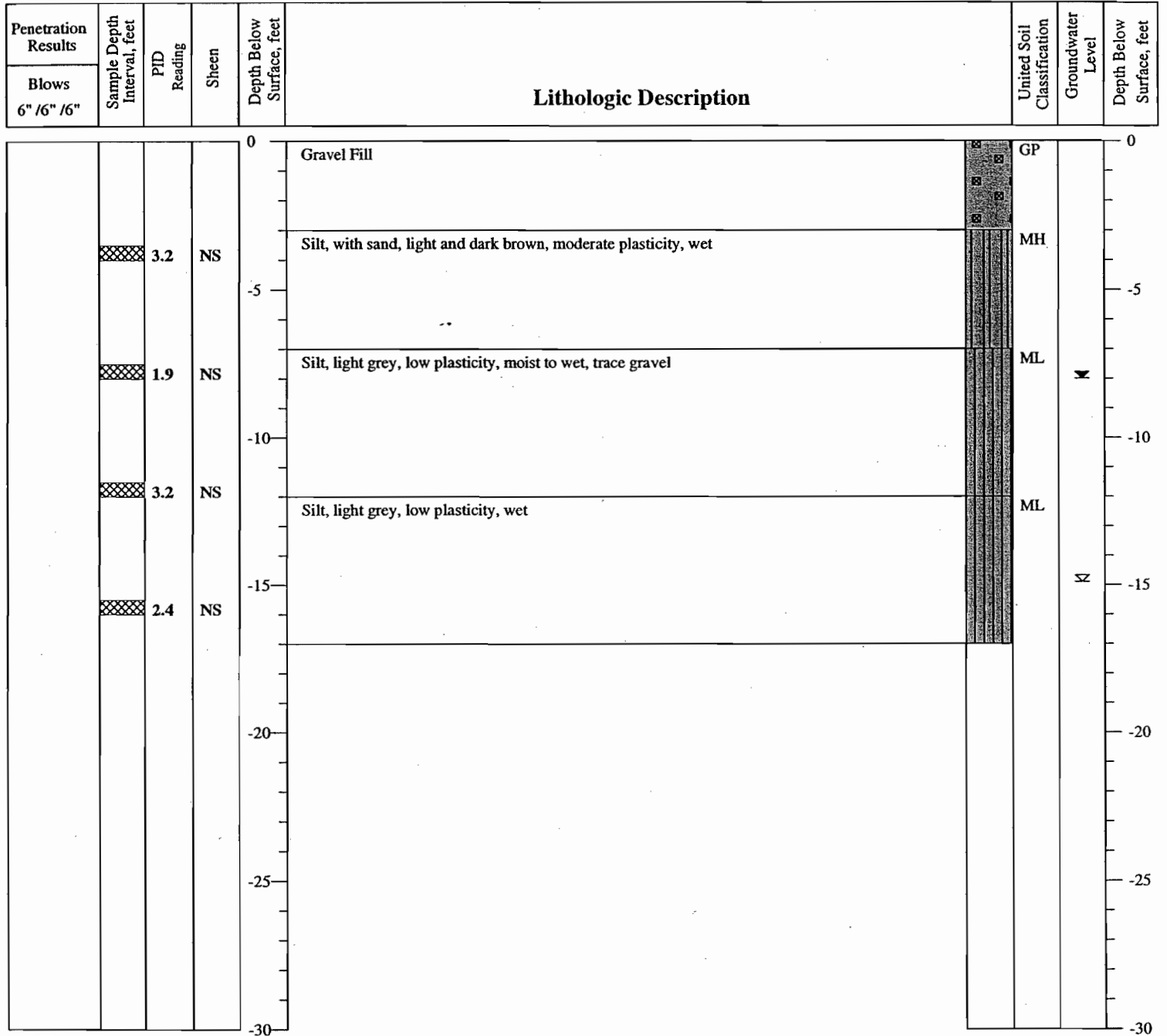
Top of Casing Elevation: NA

By: AMK

Monitoring Device: Mini Rae 2000

Subcontractor and Equipment: Geo Tech Explorations, Truck mounted geoprobe rig

Comments: No well installed



Boring termination at 17 feet, sampler advanced to 17 feet.

Groundwater encountered at approximately 8 feet during drilling.

☐ No Recovery      Groundwater Level at Time of Drilling      Contact  
 SD Sheen Detected      Static Groundwater Level  
 NS No Sheen Detected      NT Not Tested

# SECOR

International Incorporated

Page 1 of 1

Facility: ARCO 855

Job # 015.08794.800

Date: April 19, 2001

Boring/Well GP-7

Location: 4603 Ocean Beach Highway, Longview, WA

Surface Elevation: NA

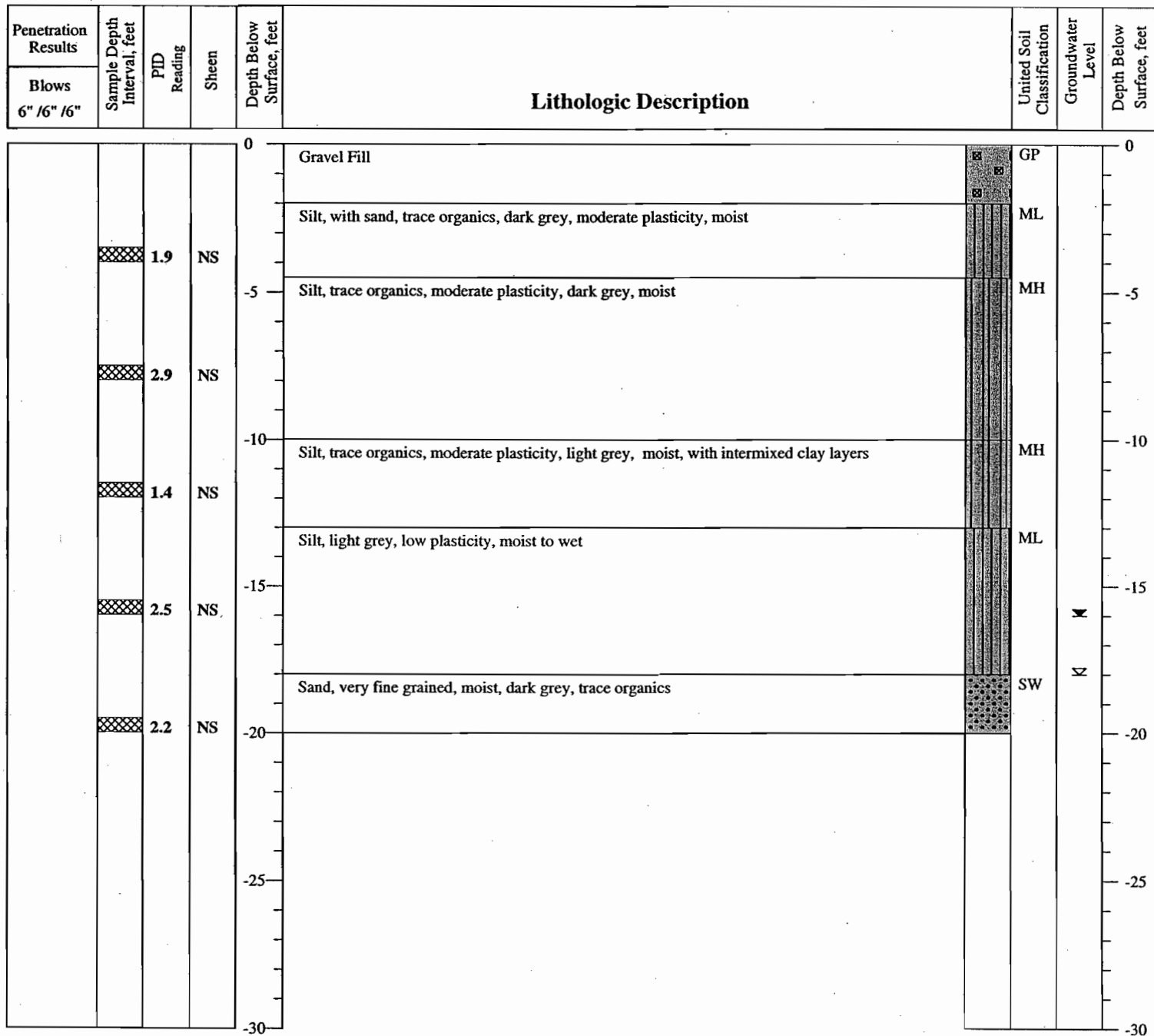
Top of Casing Elevation: NA

Logged By: AMK

Monitoring Device: Mini Rae 2000

Subcontractor and Equipment: Geo Tech Explorations, Truck mounted geoprobe rig

Comments: No well installed



Boring termination at 20 feet, sampler advanced to 20 feet.

Groundwater encountered at approximately 16 feet during drilling.

[ ] No Recovery      [X] Groundwater Level at Time of Drilling      [ ] Contact  
 SD Sheen Detected      [X] Static Groundwater Level  
 NS No Sheen Detected  
 NT Not Tested

**Table 4. Summary of Groundwater Samples Hydrocarbon Results**  
**Former ARCO Service Station No. 855**  
**4603 Ocean Beach Highway**  
**Longview, Washington**

Sample Location	Sample Collection Date	Gasoline Range Hydrocarbons (ug/L)
MW-1	1/18/01	95.6
MW-2	1/18/01	691
MW-3	1/18/01	121000
MW-4	1/18/01	29400
MW-5	1/18/01	786
MW-6	1/18/01	732
MW-7	1/18/01	242

**Notes:**

Samples analyzed for Gasoline Hydrocarbons per EPA Method NW-TPH-Gx  
 Results reported in micrograms per liter (ug/L).



Table 5. Summary of Groundwater Samples Volatile Organic Compounds Results  
Former ARCO Service Station No. 855  
4603 Ocean Beach Highway  
Longview, Washington

Sample Location	Sample Collection Date	Benzene	Toluene	Ethylbenzene	Total Xylenes	Chlorobenzene	Sec-Butylbenzene	1,2-Dichloroethane	Isopropyltoluene	Naphthalene	n-Propylbenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene
MW-1	1/18/01	<1.00	<1.00	<1.00	<2.00	<1.00	<1.00	<1.00	<2.00	<2.00	<1.00	<1.00	<1.00
MW-2	1/18/01	<2.00	<2.00	41.1	5.62	<2.00	3.7	<2.00	5.88	<4.00	13.5	23	2.02
MW-3	1/18/01	9380	17200	3940	20230	<100	<100	155	203	607	625	4550	1140
MW-4	1/18/01	1130	<50.0	2030	2764	<50.0	<50.0	<50.0	213	331	576	2170	414
MW-5	1/18/01	<1.00	<1.00	<1.00	<2.00	<1.00	1.48	<1.00	9.63	2.44	14.3	<1.00	<1.00
MW-6	1/18/01	<1.00	<1.00	<1.00	<2.00	<1.00	3.81	<1.00	4.72	<2.00	2.73	<1.00	<1.00
MW-7	1/18/01	<1.00	<1.00	<1.00	<2.00	<1.00	1.48	<1.00	2.78	<2.00	3.36	<1.00	<1.00

Notes:

Samples analyzed for VOCs per EPA Method 8260B. Results reported in micrograms per liter (µg/L).

- a Analyte was detected below laboratory method reporting limit (MRL).

**Table 6. Summary of Groundwater Samples BTEX Results  
Former ARCO Service Station No. 855  
4603 Ocean Beach Highway**

Sample Location	Sample Collection Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
GP-1	4/19/01	<0.500	<0.500	<0.500	<1.00
GP-2	4/19/01	<0.500	<0.500	<0.500	<1.00
GP-3	4/19/01	<0.500	<0.500	<0.500	<1.00
GP-5	4/19/01	<0.500	<0.500	<0.500	<1.00
GP-6	4/19/01	<0.500	<0.500	<0.500	<1.00
GP-7	4/19/01	<0.500	<0.500	<0.500	<1.00

**Notes:**

Samples analyzed for BTEX per EPA Method 8021. Results reported in micrograms per liter (µg/L).

**ATTACHMENT 2**

**WASHINGTON START CARD**

Groundwater Monitoring Well Installation Geoprobe Boring Report  
Former ARCO Service Station No. 855  
4603 Ocean Beach Highway  
Longview, Washington  
SECOR PN: 015.08794.330  
June 20, 2001



## Notice of Intent to Construct a

R 44641

## MONITORING/RESOURCE PROTECTION WELL

This form must be received by the Department of Ecology with the required fees 72 hours before your well is constructed. Submit one form for each new well and submit one check or money order for each form, payable to the Department of Ecology, P.O. Box 5128, Lacey, WA 98509-5128. Do not send cash. Instructions for filling out this form are printed on the back.

1. Property Owner WAKEFIELD REALTY Phone No. \_\_\_\_\_  
 Address (include city, state, zip) P.O. Box 95, CARPENTERS, CA 93014
2. Agent (if different from #1) SECOR INTERNATIONAL Phone No. 503-691-2030  
 Address (include city, state, zip) P.O. Box 1508, TUALATIN, OR 97062
3. Project Name LONGVIEW
4. Well location: 1/4 of the \_\_\_\_\_ 1/4 Section 24 Township 8N Range 3 EWM (circle one)  
 Address (if known) 4603 OCEAN BEACH HWY, LONGVIEW WWM

5. Well Tag ID # \_\_\_\_\_

## 6. Location of wells

- |   |   |  |
|---|---|--|
| <input type="checkbox"/> Adams County 01-ERO              | <input type="checkbox"/> Grays Harbor County 14-SWR | <input type="checkbox"/> Pierce County 27-SWR      |
| <input type="checkbox"/> Asotin County 02-ERO             | <input type="checkbox"/> Island County 15-NWR       | <input type="checkbox"/> San Juan County 28-NWR    |
| <input type="checkbox"/> Benton County 03-CRO             | <input type="checkbox"/> Jefferson County 16-SWR    | <input type="checkbox"/> Skagit County 29-NWR      |
| <input type="checkbox"/> Chelan County 04-CRO             | <input type="checkbox"/> King County 17-NWR         | <input type="checkbox"/> Skamania County 30-SWR    |
| <input type="checkbox"/> Clallam County 05-SWR            | <input type="checkbox"/> Kitsap County 18-NWR       | <input type="checkbox"/> Snohomish County 31-NWR   |
| <input type="checkbox"/> Clark County 06-SWR              | <input type="checkbox"/> Kittitas County 19-CRO     | <input type="checkbox"/> Spokane County 32-ERO     |
| <input type="checkbox"/> Columbia County 07-ERO           | <input type="checkbox"/> Klickitat County 20-CRO    | <input type="checkbox"/> Stevens County 33-ERO     |
| <input checked="" type="checkbox"/> Cowlitz County 08-SWR | <input type="checkbox"/> Lewis County 21-SWR        | <input type="checkbox"/> Thurston County 34-SWR    |
| <input type="checkbox"/> Douglas County 09-CRO            | <input type="checkbox"/> Lincoln County 22-ERO      | <input type="checkbox"/> Wahkiakum County 35-SWR   |
| <input type="checkbox"/> Ferry County 10-ERO              | <input type="checkbox"/> Mason County 23-SWR        | <input type="checkbox"/> Walla Walla County 36-ERO |
| <input type="checkbox"/> Franklin County 11-ERO           | <input type="checkbox"/> Okanogan County 24-CRO     | <input type="checkbox"/> Whatcom County 37-NWR     |
| <input type="checkbox"/> Garfield County 12-ERO           | <input type="checkbox"/> Pacific County 25-SWR      | <input type="checkbox"/> Whitman County 38-ERO     |
| <input type="checkbox"/> Grant County 13-ERO              | <input type="checkbox"/> Pend Oreille County 26-ERO | <input type="checkbox"/> Yakima County 39-CRO      |

7. Will the intended withdrawal from this well exceed 5000 gallons per day? (check one) ☐ Yes (Copy of Water Right Permit Attached) ☒ No

8. Well Drilling Co. Geo-Tech Explorations Phone No. 503-692-6400
9. Well Driller's Name ARTURO MADRIGAL Driller's License No. 2514
10. Approx Well Construction Date 10-24-00 11. Contractor's L & I Registration No. 110 CZ

12. Please fill out the portion below carefully. The return address label must contain the name and address of the person submitting this notification. This portion will be validated and returned to them as proof of notification. Send the entire form to Department of Ecology, Cashiering Section, P.O. Box 5128, Lacey, WA 98509-5128.

This notification number must be provided to your well driller:

Amount of payment: \$40.00 per well:

x 4 Number of wells to be constructed on this job site

= \$ 160.00 Total Due and Amount Enclosed

Submitted by (return address)

R 44641

Name Geo-Tech Explorations, Inc.  
 Mailing Address 19700 SW Teton Ave, Tualatin OR  
97062  
 City (503) 692-6400 Fax 692-4759

Agency Validation

C.J.# \_\_\_\_\_

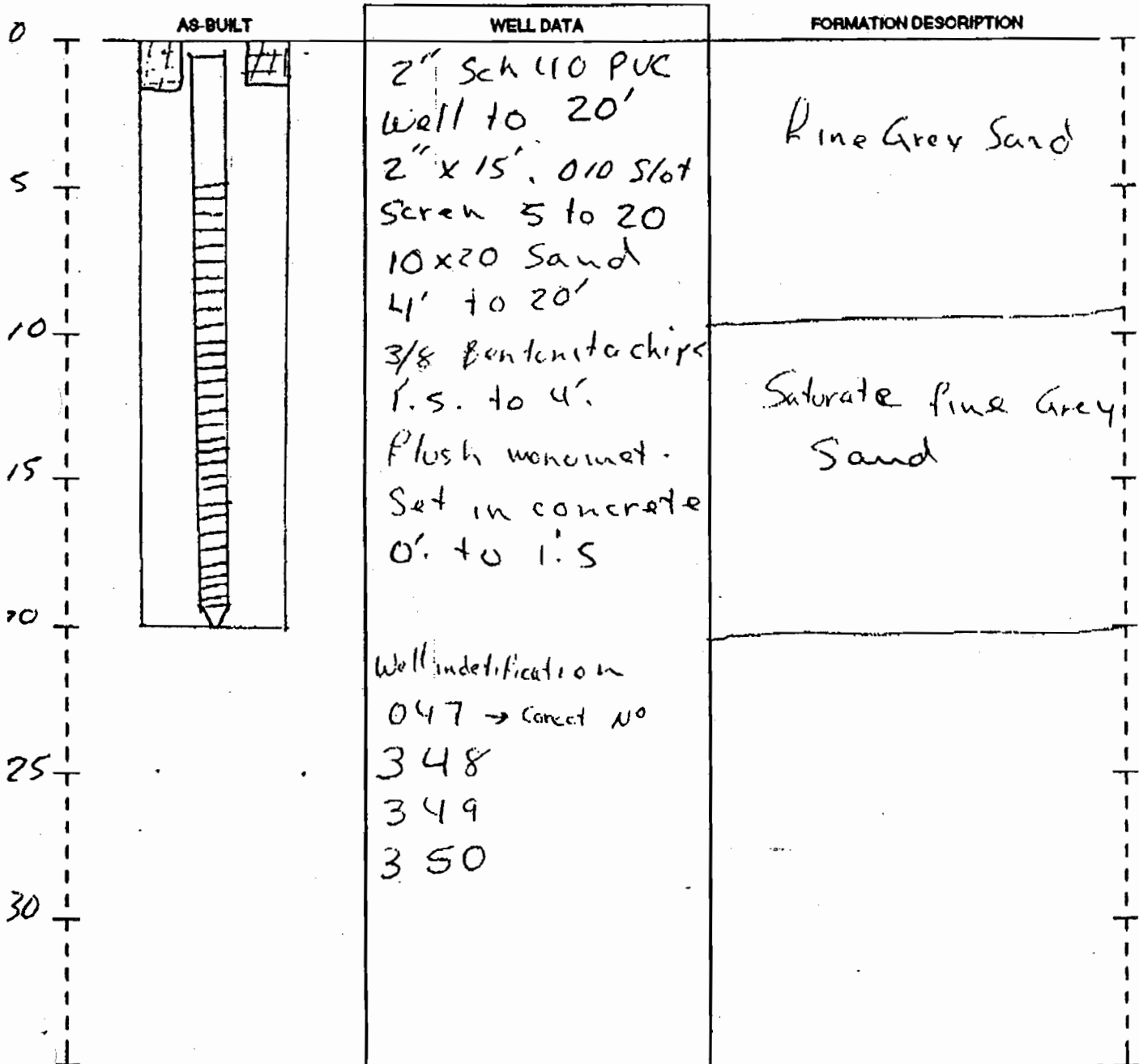
Date \_\_\_\_\_

## RESOURCE PROTECTION WELL REPORT

START CARD NO. 44641

PROJECT NAME: Luxview  
 WELL IDENTIFICATION NO. 047, 348, 349, 350  
 DRILLING METHOD: ISA  
 DRILLER: Arturo Madrigal  
 FIRM: Geo Tech Exp.  
 SIGNATURE: Arturo Madrigal  
 CONSULTING FIRM: Secor  
 REPRESENTATIVE: Ruth

COUNTY: Cowlitz  
 LOCATION: 1/4 1/4 Sec 24 Twn 2N R 3W  
 STREET ADDRESS OF WELL: 443 Ocean Beach Hwy  
Luxview  
 WATER LEVEL ELEVATION: 8"  
 GROUND SURFACE ELEVATION: \_\_\_\_\_  
 INSTALLED: 10-24-00  
 DEVELOPED: \_\_\_\_\_

SCALE: 1" = 5'PAGE 1 OF 1

**ATTACHMENT 3**  
**DRILLING AND CONSTRUCTION**  
**PROCEDURES**

Groundwater Monitoring Well Installation and Geoprobe Boring Report  
Former ARCO Service Station No. 855  
4603 Ocean Beach Highway  
Longview, Washington  
SECOR PN: 015.08794.330  
June 20, 2001



## **ATTACHMENT 3 DRILLING AND CONSTRUCTION PROCEDURES**

### **UNDERGROUND UTILITY LOCATIONS**

Prior to initiating the field investigation, a request was placed with the Utilities Notification Center to conduct an underground utility survey in the vicinity of the proposed groundwater monitoring wells and Geoprobe. Applied Professional Services, Inc., (APS) was contracted to clear the proposed groundwater monitoring well locations and Geoprobe boring locations of private underground utilities.

### **DRILLING PROCEDURES**

A hollow-stem-auger rig equipped with an 8-inch outside diameter, 6 and 1/4-inch inside diameter augers was used to drill the groundwater monitoring wells, while the soil borings were drilled using a Geoprobe rig equipped with a 4-foot by 1.25-inch outside diameter macrosampler for the Geoprobe. The auger was decontaminated with a hot water pressure wash before use in the borehole to minimize any cross-contamination. Decontamination water was temporarily stored in 55-gallon drums on site. The decontamination water was then removed from the site and stored at ARCO site 5893, where it is periodically removed and treated. Soil cuttings generated during drill activities were collected and briefly stored on site in 55-gallon steel drums. APS removed and disposed of the eight 55-gallon drums of soil.

### **GROUNDWATER MONITORING WELL CONSTRUCTION**

The groundwater monitoring wells were constructed with a 2-inch inside diameter, flush-threaded, Schedule 40 PVC well casing and a 15-foot screened interval consisting of machine-slotted PVC casing with 0.010-inch-wide slots. All four groundwater monitoring wells (MW-4, MW-5, MW-6, and MW-7) were screened from 5 to 20 feet bgs and have blank PVC casing from 5 feet bgs to ground surface. The annular space in the well was backfilled with 10/20 grade sand from the base of the boring to one foot above the respective screened interval. A bentonite seal was placed above the sand pack in the well and filled to within 1 foot bgs. A traffic-rated monument was set to grade.

**ATTACHMENT 4**  
**SOIL AND GROUNDWATER**  
**SAMPLING PROTOCOL**

Groundwater Monitoring Well Installation Geoprobe Boring Report  
Former ARCO Service Station No. 855  
4603 Ocean Beach Highway  
Longview, Washington  
SECOR PN: 015.08794.330  
June 20, 2001

## **ATTACHMENT 4 SOIL AND GROUNDWATER SAMPLING PROTOCOL**

### **SOIL SAMPLE COLLECTION**

Soil samples for the groundwater monitoring wells were collected at 5-foot intervals using an 18-inch-long split-spoon sampler lined with three 2-inch by 6-inch-long stainless steel tubes. Each of the split spoon samples containing soil was segregated and prepared for evaluation and analysis. Soil samples were collected from the 4-foot macrosampler that was lined with acrylic sleeves in the Geoprobe borings. The macrosampler was advanced into undisturbed soils at the bottom of the borehole. The macrosampler contents were segregated and prepared for evaluation and analysis. The sample was used to field screen for evidence of petroleum hydrocarbons and was used to describe lithology. Field screening was completed by placing a portion of the collected soil into a sealable plastic bag and then monitoring headspace vapor concentrations using a portable PID.

A log was compiled for each groundwater monitoring well and soil boring, including descriptions of the soil types, color, texture, degree of consolidation, and moisture content. Soil types were based on the Unified Soil Classification System.

### **GROUNDWATER SAMPLE COLLECTION**

Groundwater samples were collected from each Geoprobe borehole location. Samples were collected by deploying Geoprobe rods back down the borehole with a 4-foot screened interval set at the base of the boring. Clean, dedicated Teflon tubing was inserted through the Geoprobe rods to the base of the boring, and a peristaltic pump was used to bring the groundwater to the surface for collection into laboratory prepared sampling containers.

### **FIELD SCREENING OF SOIL SAMPLES**

Soil samples were field screened for visual or olfactory indications of petroleum hydrocarbons, tested for sheen by water immersion, and tested for headspace vapor concentrations using a portable Mini Rae 2000 PID.

Data generated from field screening instruments was considered qualitative in nature. Although semi-quantitative data is generated using a PID, the results cannot be relied upon with the confidence of a laboratory analysis. Data generated from this type of analysis may provide the following:

- Identification of soil, water, air, and waste locations that have a high likelihood of showing contamination through subsequent laboratory analysis.
- Real-time data used for health and safety consideration during site reconnaissance and subsequent intrusive activities.
- Quantitative data, if contaminant is known and the instrument is calibrated to that substance.

### **FIELD SCREENING USING WATER SHEEN TESTING**

A representative soil sample was immersed into a plastic goldpan filled with oil-free water. The mixture was agitated to maximize the exposure of the soil particles to the water. Visual evidence (or lack thereof) of a sheen forming on the water surface was noted. The following nomenclature was used to characterize the visual observations:

- NS - No sheen observed.
- SS - Slight film or sheen present; no iridescent colorations observed.
- M/HS - Moderate to heavy sheen observed; iridescent coloration and/or hydrocarbon droplets present.

Field observations of sheen were logged onto the boring log form.

### **FIELD SCREENING USING VAPOR HEADSPACE TESTING**

The instrument used for headspace vapor testing was an OVM 580B PID. Prior to use, this instrument was calibrated to a known isobutylene calibrant standard (100 parts per million [ppm]), in accordance with the manufacturer's specifications.

The following sequential steps were completed for each sample analyzed:

- A representative portion of the soil sample was collected directly from a brass sample ring into a new, sealable Ziploc-type plastic bag. The bag was immediately sealed.
- The sealed bag with sample was allowed to sit at field ambient temperature for several minutes.
- One end of the bag seal was slightly opened, and the intake port of a PID was carefully inserted through the opening.
- The stabilized numerical value was observed and recorded onto the boring log form.

This number does not represent a concentration of volatiles in ppm; it is a relative measure of the amount of ionized compounds present. As the exact chemical species present is unknown, the units of concentration are referred to as ppm of isobutylene.

Vapor headspace screening is only applicable as a screening method for the presence of ionizable compounds with first ionization potentials of less than 10.6 electron volts. In addition, variables that affect measurable concentrations and are unaccounted for in this procedure include, but are not limited to, temperature, soil moisture content, and soil organic content. Vapor headspace screening is not designed for screening for evidence of contamination by semi-volatile or non-volatile organic compounds or for the presence of elemental metals or compounds.

**ATTACHMENT 5**  
**LABORATORY ANALYTICAL REPORT**  
**AND CHAIN-OF-CUSTODY DOCUMENTATION**  
Groundwater Monitoring Well Installation Geoprobe Boring Report  
Former ARCO Service Station No. 855  
4603 Ocean Beach Highway  
Longview, Washington  
SECOR PN: 015.08794.330  
June 20, 2001



Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244  
425.420.9200 fax 425.420.9210  
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  
503.906.9200 fax 503.906.9210  
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711  
541.383.9310 fax 541.382.7588

Secor  
P.O. Box 1508  
Tualatin, OR 97062

Project: ARCO #0855, Longview, WA  
Project Number: 26551 00  
Project Manager: Scott Miller

Reported:  
04/30/01 17:04

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
GP 1 @ 8'	PID0709-02	Soil	04/19/01 15:06	04/20/01 16:30
GP 1 @ 16'	PID0709-04	Soil	04/19/01 15:14	04/20/01 16:30
GP 2 @ 8'	PID0709-06	Soil	04/19/01 16:04	04/20/01 16:30
GP 2 @ 16'	PID0709-08	Soil	04/19/01 16:20	04/20/01 16:30
GP 3 @ 8'	PID0709-11	Soil	04/19/01 17:14	04/20/01 16:30
GP 3 @ 16'	PID0709-13	Soil	04/19/01 17:22	04/20/01 16:30
GP 5 @ 8'	PID0709-15	Soil	04/19/01 13:26	04/20/01 16:30
GP 5 @ 16'	PID0709-17	Soil	04/19/01 13:34	04/20/01 16:30
GP 6 @ 4'	PID0709-19	Soil	04/19/01 11:44	04/20/01 16:30
GP 6 @ 12'	PID0709-21	Soil	04/19/01 11:52	04/20/01 16:30
GP 7 @ 8'	PID0709-24	Soil	04/19/01 10:38	04/20/01 16:30
GP 7 @ 16'	PID0709-26	Soil	04/19/01 10:46	04/20/01 16:30
GP 1 -041901	PID0709-28	Water	04/19/01 15:26	04/20/01 16:30
GP 2 -041901	PID0709-29	Water	04/19/01 16:38	04/20/01 16:30
GP 3 -041901	PID0709-30	Water	04/19/01 17:12	04/20/01 16:30
GP 5 -041901	PID0709-31	Water	04/19/01 13:57	04/20/01 16:30
GP 6 -041901	PID0709-32	Water	04/19/01 12:12	04/20/01 16:30
GP 7 -041901	PID0709-33	Water	04/19/01 11:06	04/20/01 16:30

Creek Analytical - Portland

Crystal Burkholder, Project Manager

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.



Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244  
425.420.9200 fax 425.420.9210  
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  
503.906.9200 fax 503.906.9210  
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711  
541.383.9310 fax 541.382.7588

Secor  
P.O. Box 1508  
Tualatin, OR 97062

Project: ARCO #0855, Longview, WA  
Project Number: 26551 00  
Project Manager: Scott Miller

Reported:  
04/30/01 17:04

**Hydrocarbon Identification per NW-TPH Methodology**  
**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>GP 1 @ 8' (P1D0709-02) Soil</b>					Sampled: 04/19/01 Received: 04/20/01				
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	04/24/01	04/24/01	1040814	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	DET	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	139 %	50-150							
<b>GP 1 @ 16' (P1D0709-04) Soil</b>					Sampled: 04/19/01 Received: 04/20/01				
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	04/24/01	04/24/01	1040814	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	116 %	50-150							
<b>GP 2 @ 8' (P1D0709-06) Soil</b>					Sampled: 04/19/01 Received: 04/20/01				
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	04/24/01	04/26/01	1040814	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	109 %	50-150							
<b>GP 2 @ 16' (P1D0709-08) Soil</b>					Sampled: 04/19/01 Received: 04/20/01				
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	04/24/01	04/24/01	1040814	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	112 %	50-150							
<b>GP 3 @ 8' (P1D0709-11) Soil</b>					Sampled: 04/19/01 Received: 04/20/01				
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	04/24/01	04/26/01	1040814	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	113 %	50-150							

Creek Analytical - Portland

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P.O. Box 1508  
Tualatin, OR 97062

Project: ARCO #0855, Longview, WA  
Project Number: 26551 00  
Project Manager: Scott Miller

Reported:  
04/30/01 17:04

**Hydrocarbon Identification per NW-TPH Methodology**  
**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>GP 3 @ 16' (P1D0709-13) Soil</b>					Sampled: 04/19/01 Received: 04/20/01				
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	04/24/01	04/26/01	1040814	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	106 %	50-150							
<b>GP 5 @ 8' (P1D0709-15) Soil</b>					Sampled: 04/19/01 Received: 04/20/01				
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	04/24/01	04/26/01	1040814	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	80.3 %	50-150							
<b>GP 5 @ 16' (P1D0709-17) Soil</b>					Sampled: 04/19/01 Received: 04/20/01				
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	04/24/01	04/26/01	1040814	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	77.6 %	50-150							
<b>GP 6 @ 4' (P1D0709-19) Soil</b>					Sampled: 04/19/01 Received: 04/20/01				
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	04/24/01	04/26/01	1040814	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	83.0 %	50-150							
<b>GP 6 @ 12' (P1D0709-21) Soil</b>					Sampled: 04/19/01 Received: 04/20/01				
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	04/24/01	04/26/01	1040814	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	83.9 %	50-150							

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Project: ARCO #0855, Longview, WA  
Project Number: 26551 00  
Project Manager: Scott Miller

Reported:  
04/30/01 17:04

**Hydrocarbon Identification per NW-TPH Methodology**  
**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>GP 7 @ 8' (PID0709-24) Soil</b>						Sampled: 04/19/01 Received: 04/20/01			
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	04/24/01	04/26/01	1040814	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
<i>Surr: 1-Chlorooctadecane</i>	82.6 %	50-150							
<b>GP 7 @ 16' (PID0709-26) Soil</b>						Sampled: 04/19/01 Received: 04/20/01			
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	04/24/01	04/24/01	1040814	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
<i>Surr: 1-Chlorooctadecane</i>	109 %	50-150							

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Project: ARCO #0855, Longview, WA  
Project Number: 26551 00  
Project Manager: Scott Miller


Reported:  
04/30/01 17:04

**Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method**  
**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>GP 1 @ 8' (PID0709-02) Soil</b>						Sampled: 04/19/01 Received: 04/20/01			
Diesel Range Organics	ND	25.0	mg/kg dry	1	NWTPH-Dx	04/27/01	04/27/01	1040992	
Heavy Oil Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
<i>Surr: 1-Chlorooctadecane</i>	86.1 %	50-150							

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Project: ARCO #0855, Longview, WA  
Project Number: 26551 00  
Project Manager: Scott Miller


Reported:  
04/30/01 17:04

**BTEX per EPA Method 8021B**  
**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>GP 1 -041901 (P1D0709-28) Water</b>						Sampled: 04/19/01 Received: 04/20/01			
Benzene	ND	0.500	ug/l	1	EPA 8021B	04/24/01	04/24/01	1040804	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
Surr: 4-BFB (PID)	106 %	75-120							
<b>GP 2 -041901 (P1D0709-29) Water</b>						Sampled: 04/19/01 Received: 04/20/01			
Benzene	ND	0.500	ug/l	1	EPA 8021B	04/24/01	04/24/01	1040804	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
Surr: 4-BFB (PID)	109 %	75-120							
<b>GP 3 -041901 (P1D0709-30) Water</b>						Sampled: 04/19/01 Received: 04/20/01			
Benzene	ND	0.500	ug/l	1	EPA 8021B	04/24/01	04/24/01	1040804	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
Surr: 4-BFB (PID)	101 %	75-120							
<b>GP 5 -041901 (P1D0709-31) Water</b>						Sampled: 04/19/01 Received: 04/20/01			
Benzene	ND	0.500	ug/l	1	EPA 8021B	04/24/01	04/24/01	1040804	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
Surr: 4-BFB (PID)	101 %	75-120							

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Project: ARCO #0855, Longview, WA  
Project Number: 26551 00  
Project Manager: Scott Miller


Reported:  
04/30/01 17:04

**BTEX per EPA Method 8021B**  
**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>GP 6 -041901 (P1D0709-32) Water</b>					Sampled: 04/19/01 Received: 04/20/01				
Benzene	ND	0.500	ug/l	1	EPA 8021B	04/24/01	04/24/01	1040804	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
Surr: 4-BFB (PID)	101 %	75-120							
<b>GP 7 -041901 (P1D0709-33) Water</b>					Sampled: 04/19/01 Received: 04/20/01				
Benzene	ND	0.500	ug/l	1	EPA 8021B	04/24/01	04/24/01	1040804	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
Surr: 4-BFB (PID)	105 %	75-120							

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Project: ARCO #0855, Longview, WA  
Project Number: 26551 00  
Project Manager: Scott Miller

Reported:  
04/30/01 17:04

**Percent Dry Weight (Solids) per Standard Methods**  
**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>GP 1 @ 8' (P1D0709-02) Soil</b>						Sampled: 04/19/01 Received: 04/20/01			
% Solids	70.4	1.00	% by Weight	1	NCA SOP	04/24/01	04/25/01	1040818	
<b>GP 1 @ 16' (P1D0709-04) Soil</b>						Sampled: 04/19/01 Received: 04/20/01			
% Solids	56.6	1.00	% by Weight	1	NCA SOP	04/24/01	04/25/01	1040818	
<b>GP 2 @ 8' (P1D0709-06) Soil</b>						Sampled: 04/19/01 Received: 04/20/01			
% Solids	61.3	1.00	% by Weight	1	NCA SOP	04/24/01	04/25/01	1040818	
<b>GP 2 @ 16' (P1D0709-08) Soil</b>						Sampled: 04/19/01 Received: 04/20/01			
% Solids	50.9	1.00	% by Weight	1	NCA SOP	04/24/01	04/25/01	1040818	
<b>GP 3 @ 8' (P1D0709-11) Soil</b>						Sampled: 04/19/01 Received: 04/20/01			
% Solids	58.5	1.00	% by Weight	1	NCA SOP	04/24/01	04/25/01	1040818	
<b>GP 3 @ 16' (P1D0709-13) Soil</b>						Sampled: 04/19/01 Received: 04/20/01			
% Solids	67.6	1.00	% by Weight	1	NCA SOP	04/24/01	04/25/01	1040818	
<b>GP 5 @ 8' (P1D0709-15) Soil</b>						Sampled: 04/19/01 Received: 04/20/01			
% Solids	62.4	1.00	% by Weight	1	NCA SOP	04/24/01	04/25/01	1040818	
<b>GP 5 @ 16' (P1D0709-17) Soil</b>						Sampled: 04/19/01 Received: 04/20/01			
% Solids	59.9	1.00	% by Weight	1	NCA SOP	04/24/01	04/25/01	1040818	
<b>GP 6 @ 4' (P1D0709-19) Soil</b>						Sampled: 04/19/01 Received: 04/20/01			
% Solids	55.2	1.00	% by Weight	1	NCA SOP	04/24/01	04/25/01	1040818	

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Project: ARCO #0855, Longview, WA  
Project Number: 26551 00  
Project Manager: Scott Miller


Reported:  
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**Percent Dry Weight (Solids) per Standard Methods**  
**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>GP 6 @ 12' (P1D0709-21) Soil</b>					Sampled: 04/19/01 - Received: 04/20/01				
% Solids	65.1	1.00	% by Weight	1	NCA SOP	04/24/01	04/25/01	1040818	
<b>GP 7 @ 8' (P1D0709-24) Soil</b>					Sampled: 04/19/01 Received: 04/20/01				
% Solids	66.2	1.00	% by Weight	1	NCA SOP	04/24/01	04/25/01	1040818	
<b>GP 7 @ 16' (P1D0709-26) Soil</b>					Sampled: 04/19/01 Received: 04/20/01				
% Solids	66.8	1.00	% by Weight	1	NCA SOP	04/24/01	04/25/01	1040818	

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Project Number: 26551 00  
Project Manager: Scott Miller

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Hydrocarbon Identification per NW-TPH Methodology - 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 1040814 - TPH-HCID Extraction

Blank (1040814-BLK1)

Prepared & Analyzed: 04/24/01

Gasoline Range Hydrocarbons	ND	20.0	mg/kg wet
Diesel Range Hydrocarbons	ND	50.0	"
Heavy Oil Range Hydrocarbons	ND	100	"

Surr: 1-Chlorooctadecane	DET	"	3.96	103	50-150
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Duplicate (1040814-DUP1)

Source: P1D0709-08

Prepared & Analyzed: 04/24/01

Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	ND	50
Diesel Range Hydrocarbons	ND	50.0	"	ND	50
Heavy Oil Range Hydrocarbons	ND	100	"	ND	50

Surr: 1-Chlorooctadecane	DET	"	7.78	107	50-150
--------------------------	-----	---	------	-----	--------

Duplicate (1040814-DUP2)

Source: P1D0709-26

Prepared & Analyzed: 04/24/01

Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	ND	50
Diesel Range Hydrocarbons	ND	50.0	"	ND	50
Heavy Oil Range Hydrocarbons	ND	100	"	ND	50

Surr: 1-Chlorooctadecane	DET	"	5.93	107	50-150
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Project: ARCO #0855, Longview, WA  
Project Number: 26551 00  
Project Manager: Scott Miller

Reported:  
04/30/01 17:04

**Diesel and Heavy Range Hydrocarbons per NWIPIEDx Method - Quality Control**

**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 1040992 - EPA 3550 Fuels</b>										
<b>Blank (1040992-BLK1)</b>				Prepared & Analyzed: 04/27/01						
Diesel Range Organics	ND	25.0	mg/kg wet							
Heavy Oil Range Hydrocarbons	ND	50.0	"							
Surr: 1-Chlorooctadecane	4.17		"	4.80		86.9	50-150			
<b>LCS (1040992-BS1)</b>				Prepared & Analyzed: 04/27/01						
Diesel Range Organics	110	25.0	mg/kg wet	129		85.3	50-150			
Heavy Oil Range Hydrocarbons	61.7	50.0	"	79.0		78.1	50-150			
Surr: 1-Chlorooctadecane	4.69		"	4.80		97.7	50-150			
<b>Duplicate (1040992-DUP1)</b>				Source: P1D0888-04		Prepared & Analyzed: 04/27/01				
Diesel Range Organics	ND	25.0	mg/kg dry		ND				50	
Heavy Oil Range Hydrocarbons	ND	50.0	"		ND				50	
Surr: 1-Chlorooctadecane	6.79		"	5.90		115	50-150			
<b>Duplicate (1040992-DUP2)</b>				Source: P1D0891-03		Prepared & Analyzed: 04/27/01				
Diesel Range Organics	ND	250	mg/kg wet		ND				50	Q-14
Heavy Oil Range Hydrocarbons	2660	500	"		4640			54.2	50	Q-14
Surr: 1-Chlorooctadecane	3.10		"	4.80		64.6	50-150			

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**Bend** 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711  
 541.383.9310 fax 541.382.7588

Secor  
 P.O. Box 1508  
 Tualatin, OR 97062

Project: ARCO #0855, Longview, WA  
 Project Number: 26551 00  
 Project Manager: Scott Miller

Reported:  
 04/30/01 17:04

**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 1040804 - EPA 5030**

**Blank (1040804-BLK1)**

Prepared & Analyzed: 04/24/01

Benzene	ND	0.500	ug/l							
Toluene	ND	0.500	"							
Ethylbenzene	ND	0.500	"							
Xylenes (total)	ND	1.00	"							

<i>Surr: 4-BFB (PID)</i>	50.2		"	50.0		100	75-120			
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**LCS (1040804-BS2)**

Prepared & Analyzed: 04/24/01

Benzene	19.5	0.500	ug/l	20.0		97.5	70-130			
Toluene	19.5	0.500	"	20.0		97.5	70-130			
Ethylbenzene	19.8	0.500	"	20.0		99.0	70-130			
Xylenes (total)	60.1	1.00	"	60.0		100	70-130			

<i>Surr: 4-BFB (PID)</i>	53.6		"	50.0		107	75-120			
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**Max. Spike (1040804-MS1)**

Source: P1D0709-28

Prepared & Analyzed: 04/24/01

Benzene	20.3	0.500	ug/l	20.0	ND	99.2	70-130			
Toluene	20.4	0.500	"	20.0	ND	102	70-130			
Ethylbenzene	20.5	0.500	"	20.0	ND	102	70-130			
Xylenes (total)	62.4	1.00	"	60.0	ND	104	70-130			

<i>Surr: 4-BFB (PID)</i>	58.3		"	50.0		117	75-120			
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**Matrix Spike Dup (1040804-MSD1)**

Source: P1D0709-28

Prepared & Analyzed: 04/24/01

Benzene	19.8	0.500	ug/l	20.0	ND	96.7	70-130	2.49	15	
Toluene	19.8	0.500	"	20.0	ND	99.0	70-130	2.99	15	
Ethylbenzene	19.7	0.500	"	20.0	ND	98.5	70-130	3.98	15	
Xylenes (total)	60.1	1.00	"	60.0	ND	100	70-130	3.76	15	

<i>Surr: 4-BFB (PID)</i>	55.3		"	50.0		111	75-120			
--------------------------	------	--	---	------	--	-----	--------	--	--	--

North Creek Analytical - Portland

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Project: ARCO #0855, Longview, WA  
Project Number: 26551 00  
Project Manager: Scott Miller

Reported:  
04/30/01 17:04

Percent Dry Weight (Solids) per Standard Methods - 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 1040818 - Dry Weight

<b>Duplicate (1040818-DUP1)</b>		<b>Source: P1D0702-02</b>		<b>Prepared: 04/24/01 Analyzed: 04/25/01</b>						
% Solids	61.6	1.00 % by Weight			56.2			9.17	20	
<b>Duplicate (1040818-DUP2)</b>		<b>Source: P1D0678-01</b>		<b>Prepared: 04/24/01 Analyzed: 04/25/01</b>						
% Solids	79.2	1.00 % by Weight			78.3			1.14	20	
<b>Duplicate (1040818-DUP3)</b>		<b>Source: P1D0649-01</b>		<b>Prepared: 04/24/01 Analyzed: 04/25/01</b>						
% Solids	99.2	1.00 % by Weight			99.3			0.101	20	
<b>Duplicate (1040818-DUP4)</b>		<b>Source: P1D0502-01</b>		<b>Prepared: 04/24/01 Analyzed: 04/25/01</b>						
% Solids	88.4	1.00 % by Weight			85.9			2.87	20	

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Project: ARCO #0855, Longview, WA  
Project Number: 26551 00  
Project Manager: Scott Miller

Reported;  
04/30/01 17:04

#### Notes and Definitions

Q-14 The Spike Recovery and/or RPD is outside of control limits due to a non-homogeneous sample matrix.

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

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Environmental Laboratory Network

14 of 14

**Task Order No.** +100107

**Chain of Custody**

**ARCO Facility** RLO 855 **City** Longview, WA **Project** Scoth Miller

**ARCO engineer** Chuck Hutchins **Telephone no. (ARCO)** 803/691-2030 **Telephone no. (Consultant)** 803/691-2030 **Fax no. (Consultant)** 803/692-2014

**Consultant name** SECOR **Address (Consultant)** 7730 SW Mohawk St. Tualatin OR 97062

Sample I.D.	Lab no.	Container no.	Matrix			Preservation		Sampling date	Sampling time	BTEX/TPH EPA 802/8020	TPH Modified 8015 EPA 802/8020/8015	Gas Diesel	Oil and Grease 413.1 413.2	TPH EPA 418.1/SM503E	EPA 801/8010	EPA 824/8240	EPA 825/8270	TCMP Metals VOA	CAM Metals EPA 8010/7000 TLIC STLC	Lead Org/DHS 7420/7421	TPH HCL W	Follow up
			Soil	Water	Other	Ice	Acid															
GP108'			X			X		4/19/01	1506	X											X	
GP1016'									1514													
GP208'									1604													
GP2016'									1620													
GP308'									1714													
GP3016'									1722													
GP508'									1326													
GP5016'									1334													
GP604'									1144													
GP6012'									1152													
GP708'									1038													
GP7016'									1046													
GP1-04901				X			X		1406 <sup>52</sup>													
GP2-041901									1638 <sup>72</sup>													
GP3-041901									1712													
GP5-041901									1357													

**Condition of sample:**

Relinquished by sampler *[Signature]* **Date** 4/20/01 **Time** 1630

Relinquished by *[Signature]* **Date** **Time**

Relinquished by **Date** **Time**

**Temperature received:**

Received by *[Signature]* **Date** 4/20/01 **Time** 1630

Received by **Date** **Time**

Received by laboratory **Date** **Time**

**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

**Method of shipment**

**Contract number** WAK 2655100

ARCO Facility		City (Facility)		Project (Consultant)		Telephone no. (ARCO)		Address (Consultant)		Telephone no. (Consultant)		Fax no. (Consultant)		Contract number		Labor								
887		Longview, WA		Chuck Hutchins		SECOR		7730 SW Melbank Tualatin OR 97062		503/691-2020		503/692-7074		26551 00		NCH								
Sample I.D.	Lab no.	Container no.	Matrix			Preservation		Sampling date	Sampling time	RTX EPA 8020	BTEX/TPH EPA 1602/8020/8015	TPH Modified B015 Gas Diesel	Oil and Grease 413.1 413.2	TPH EPA 418.1/SM503E	EPA 801/8010	EPA 824/8240	EPA 825/8270	TCLP Metals VOCs VOA	CAM Metals EPA 801/7000	TLC STC	Lead Org/MS	Lead EPA 7420/7421	TPH HCD w Follow up	
6P6-041901																								
6P7-041901																								
					</																			



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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:  
01/29/01 17:16

#### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	P1A0548-01	Water	01/18/01 10:15	01/19/01 16:06
MW-2	P1A0548-02	Water	01/18/01 10:47	01/19/01 16:06
MW-3	P1A0548-03	Water	01/18/01 11:01	01/19/01 16:06
MW-4	P1A0548-04	Water	01/18/01 10:53	01/19/01 16:06
MW-5	P1A0548-05	Water	01/18/01 10:33	01/19/01 16:06
MW-6	P1A0548-06	Water	01/18/01 10:24	01/19/01 16:06
MW-7	P1A0548-07	Water	01/18/01 10:39	01/19/01 16:06

North Creek Analytical - Portland

  
Crystal Burkholder, Project Manager

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

Reported:  
01/29/01 17:16

**Gasoline Hydrocarbons per NW TPH-Gx Method**  
**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>MW-1 (P1A0548-01) Water</b>						Sampled: 01/18/01 Received: 01/19/01			
Gasoline Range Hydrocarbons	95.6	80.0	ug/l	1	NW TPH-Gx	01/22/01	01/22/01	1010598	
Surr: 4-BFB	96.6 %	50-150							
<b>MW-2 (P1A0548-02) Water</b>						Sampled: 01/18/01 Received: 01/19/01			
Gasoline Range Hydrocarbons	691	80.0	ug/l	1	NW TPH-Gx	01/22/01	01/22/01	1010598	
Surr: 4-BFB	78.2 %	50-150							
<b>MW-3 (P1A0548-03RE1) Water -</b>						Sampled: 01/18/01 Received: 01/19/01			
Gasoline Range Hydrocarbons	121000	8000	ug/l	100	NW TPH-Gx	01/23/01	01/23/01	1010636	
Surr: 4-BFB	128 %	50-150							
<b>4 (P1A0548-04) Water</b>						Sampled: 01/18/01 Received: 01/19/01			
Gasoline Range Hydrocarbons	29400	800	ug/l	10	NW TPH-Gx	01/22/01	01/22/01	1010598	
Surr: 4-BFB	NR	50-150							S-02
<b>MW-5 (P1A0548-05) Water</b>						Sampled: 01/18/01 Received: 01/19/01			
Gasoline Range Hydrocarbons	786	80.0	ug/l	1	NW TPH-Gx	01/22/01	01/22/01	1010598	
Surr: 4-BFB	150 %	50-150							
<b>MW-6 (P1A0548-06) Water</b>						Sampled: 01/18/01 Received: 01/19/01			
Gasoline Range Hydrocarbons	732	80.0	ug/l	1	NW TPH-Gx	01/22/01	01/23/01	1010598	
Surr: 4-BFB	137 %	50-150							
<b>MW-7 (P1A0548-07) Water</b>						Sampled: 01/18/01 Received: 01/19/01			
Gasoline Range Hydrocarbons	242	80.0	ug/l	1	NW TPH-Gx	01/22/01	01/23/01	1010598	
Surr: 4-BFB	101 %	50-150							

North Creek Analytical - Portland

Crystal Burkholder, Project Manager

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

Reported:  
01/29/01 17:16

**Volatile Organic Compounds per EPA Method 8260B**  
**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-1 (P1A0548-01) Water						Sampled: 01/18/01 Received: 01/19/01			
Acetone	ND	10.0	ug/l	1	EPA 8260B	01/24/01	01/24/01	1010689	
Benzene	ND	1.00	"	"	"	"	"	"	
Bromobenzene	ND	1.00	"	"	"	"	"	"	
Bromochloromethane	ND	1.00	"	"	"	"	"	"	
Bromodichloromethane	ND	1.00	"	"	"	"	"	"	
Bromoform	ND	1.00	"	"	"	"	"	"	
Bromomethane	ND	5.00	"	"	"	"	"	"	
2-Butanone	ND	10.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.00	"	"	"	"	"	"	
sec-Butylbenzene	ND	1.00	"	"	"	"	"	"	
tert-Butylbenzene	ND	1.00	"	"	"	"	"	"	
Carbon disulfide	ND	10.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.00	"	"	"	"	"	"	
o-benzene	ND	1.00	"	"	"	"	"	"	
Chloroethane	ND	1.00	"	"	"	"	"	"	
Chloroform	ND	1.00	"	"	"	"	"	"	
Chloromethane	ND	5.00	"	"	"	"	"	"	
2-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
4-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.00	"	"	"	"	"	"	
Dibromochloromethane	ND	1.00	"	"	"	"	"	"	
1,2-Dibromoethane	ND	1.00	"	"	"	"	"	"	
Dibromomethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.00	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	1.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,3-Dichloropropane	ND	1.00	"	"	"	"	"	"	
2,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloropropene	ND	1.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
Ethylbenzene	ND	1.00	"	"	"	"	"	"	

North Creek Analytical - Portland

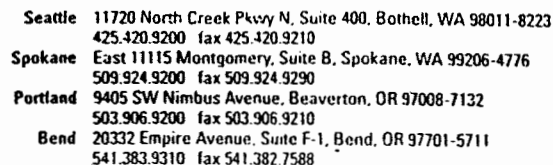
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**Reported:**  
01/29/01 17:16

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>MW-1 (PIA0548-01) Water</b>					Sampled: 01/18/01 Received: 01/19/01				
Hexachlorobutadiene	ND	2.00	ug/l	1	EPA 8260B	01/24/01	01/24/01	1010689	
2-Hexanone	ND	10.0	"	"	"	"	"	"	
Isopropylbenzene	ND	2.00	"	"	"	"	"	"	
p-Isopropyltoluene	ND	2.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	5.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	1.00	"	"	"	"	"	"	
Methylene chloride	ND	5.00	"	"	"	"	"	"	
Naphthalene	ND	2.00	"	"	"	"	"	"	
n-Propylbenzene	ND	1.00	"	"	"	"	"	"	
Styrene	ND	1.00	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	1.00	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	1.00	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
Vinyl chloride	ND	1.00	"	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	"	
Surr: 4-BFB	106 %	75-125							
Surr: 1,2-DCA-d4	104 %	75-125							
Surr: Dibromofluoromethane	102 %	75-125							
Surr: Toluene-d8	99.0 %	75-125							

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Tualatin, OR 97062

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

Reported:  
01/29/01 17:16

**Volatile Organic Compounds per EPA Method 8260B**  
**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>MW-2 (P1A0548-02RE1) Water</b>					Sampled: 01/18/01 Received: 01/19/01				
Acetone	ND	20.0	ug/l	2	EPA 8260B	01/25/01	01/25/01	1010727	
Benzene	ND	2.00	"	"	"	"	"	"	
Bromobenzene	ND	2.00	"	"	"	"	"	"	
Bromochloromethane	ND	2.00	"	"	"	"	"	"	
Bromodichloromethane	ND	2.00	"	"	"	"	"	"	
Bromoform	ND	2.00	"	"	"	"	"	"	
Bromomethane	ND	10.0	"	"	"	"	"	"	
2-Butanone	ND	20.0	"	"	"	"	"	"	
n-Butylbenzene	ND	10.0	"	"	"	"	"	"	
sec-Butylbenzene	3.70	2.00	"	"	"	"	"	"	
tert-Butylbenzene	ND	2.00	"	"	"	"	"	"	
Carbon disulfide	ND	20.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	2.00	"	"	"	"	"	"	
Chlorobenzene	ND	2.00	"	"	"	"	"	"	
Chloroethane	ND	2.00	"	"	"	"	"	"	
Chloroform	ND	2.00	"	"	"	"	"	"	
Chloromethane	ND	10.0	"	"	"	"	"	"	
2-Chlorotoluene	ND	2.00	"	"	"	"	"	"	
4-Chlorotoluene	ND	2.00	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	10.0	"	"	"	"	"	"	
Dibromochloromethane	ND	2.00	"	"	"	"	"	"	
1,2-Dibromoethane	ND	2.00	"	"	"	"	"	"	
Dibromomethane	ND	2.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	2.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	2.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	2.00	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	10.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.00	"	"	"	"	"	"	
1,2-Dichloroethane	ND	2.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	2.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	2.00	"	"	"	"	"	"	
1,3-Dichloropropane	ND	2.00	"	"	"	"	"	"	
2,2-Dichloropropane	ND	2.00	"	"	"	"	"	"	
1,1-Dichloropropene	ND	2.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	2.00	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	2.00	"	"	"	"	"	"	
Ethylbenzene	41.1	2.00	"	"	"	"	"	"	

North Creek Analytical - Portland

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**Reported:**  
01/29/01 17:16

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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:  
01/29/01 17:16

**Volatile Organic Compounds per EPA Method 8260B**  
**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>MW-3 (P1A0548-03) Water</b>					Sampled: 01/18/01 Received: 01/19/01				
Acetone	ND	1000	ug/l	100	EPA 8260B	01/24/01	01/24/01	1010689	
Benzene	9380	100	"	"	"	"	"	"	
Bromobenzene	ND	100	"	"	"	"	"	"	
Bromochloromethane	ND	100	"	"	"	"	"	"	
Bromodichloromethane	ND	100	"	"	"	"	"	"	
Bromoform	ND	100	"	"	"	"	"	"	
Bromomethane	ND	500	"	"	"	"	"	"	
2-Butanone	ND	1000	"	"	"	"	"	"	
n-Butylbenzene	ND	500	"	"	"	"	"	"	
sec-Butylbenzene	ND	100	"	"	"	"	"	"	
tert-Butylbenzene	ND	100	"	"	"	"	"	"	
Carbon disulfide	ND	1000	"	"	"	"	"	"	
Carbon tetrachloride	ND	100	"	"	"	"	"	"	
Chlorobenzene	ND	100	"	"	"	"	"	"	
Chloroethane	ND	100	"	"	"	"	"	"	
Chloroform	ND	100	"	"	"	"	"	"	
Chloromethane	ND	500	"	"	"	"	"	"	
2-Chlorotoluene	ND	100	"	"	"	"	"	"	
4-Chlorotoluene	ND	100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	500	"	"	"	"	"	"	
Dibromochloromethane	ND	100	"	"	"	"	"	"	
1,2-Dibromoethane	ND	100	"	"	"	"	"	"	
Dibromomethane	ND	100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	100	"	"	"	"	"	"	
1,2-Dichloroethane	155	100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	100	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	100	"	"	"	"	"	"	
Ethylbenzene	3940	100	"	"	"	"	"	"	

North Creek Analytical - Portland

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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:  
01/29/01 17:16

**Volatile Organic Compounds per EPA Method 8260B**  
**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>MW-3 (P1A0548-03) Water</b>					Sampled: 01/18/01 Received: 01/19/01				
Hexachlorobutadiene	ND	200	ug/l	100	EPA 8260B	01/24/01	01/24/01	1010689	
2-Hexanone	ND	1000	"	"	"	"	"	"	
Isopropylbenzene	203	200	"	"	"	"	"	"	
p-Isopropyltoluene	ND	200	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	500	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	100	"	"	"	"	"	"	
Methylene chloride	ND	500	"	"	"	"	"	"	
Naphthalene	607	200	"	"	"	"	"	"	
n-Propylbenzene	625	100	"	"	"	"	"	"	
Styrene	ND	100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	17200	100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	100	"	"	"	"	"	"	
Trichloroethene	ND	100	"	"	"	"	"	"	
Trichlorofluoromethane	ND	100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	4550	100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	1140	100	"	"	"	"	"	"	
Vinyl chloride	ND	100	"	"	"	"	"	"	
o-Xylene	5930	100	"	"	"	"	"	"	
m,p-Xylene	14300	200	"	"	"	"	"	"	
Surr: 4-BFB	105 %	75-125							
Surr: 1,2-DCA-d4	104 %	75-125							
Surr: Dibromofluoromethane	103 %	75-125							
Surr: Toluene-d8	101 %	75-125							

North Creek Analytical - Portland

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Environmental Laboratory Network

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Secor  
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Tualatin, OR 97062

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

Reported:  
01/29/01 17:16

# Volatile Organic Compounds per EPA Method 8260B North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-4 (P1A0548-04) Water					Sampled: 01/18/01 Received: 01/19/01				
Acetone	ND	500	ug/l	50	EPA 8260B	01/24/01	01/24/01	1010689	
Benzene	1130	50.0	"	"	"	"	"	"	
Bromobenzene	ND	50.0	"	"	"	"	"	"	
Bromochloromethane	ND	50.0	"	"	"	"	"	"	
Bromodichloromethane	ND	50.0	"	"	"	"	"	"	
Bromoform	ND	50.0	"	"	"	"	"	"	
Bromomethane	ND	250	"	"	"	"	"	"	
2-Butanone	ND	500	"	"	"	"	"	"	
n-Butylbenzene	ND	250	"	"	"	"	"	"	
sec-Butylbenzene	ND	50.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	50.0	"	"	"	"	"	"	
Carbon disulfide	ND	500	"	"	"	"	"	"	
on tetrachloride	ND	50.0	"	"	"	"	"	"	
benzene	ND	50.0	"	"	"	"	"	"	
Chloroethane	ND	50.0	"	"	"	"	"	"	
Chloroform	ND	50.0	"	"	"	"	"	"	
Chloromethane	ND	250	"	"	"	"	"	"	
2-Chlorotoluene	ND	50.0	"	"	"	"	"	"	
4-Chlorotoluene	ND	50.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	250	"	"	"	"	"	"	
Dibromochloromethane	ND	50.0	"	"	"	"	"	"	
1,2-Dibromoethane	ND	50.0	"	"	"	"	"	"	
Dibromomethane	ND	50.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	50.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	50.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	50.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	250	"	"	"	"	"	"	
1,1-Dichloroethane	ND	50.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	50.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	50.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	50.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	50.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	50.0	"	"	"	"	"	"	
1,3-Dichloropropane	ND	50.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	50.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	50.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	50.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	50.0	"	"	"	"	"	"	
Thylbenzene	2030	50.0	"	"	"	"	"	"	

North Creek Analytical - Portland

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P.O. Box 1508  
Tualatin, OR 97062

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

Reported:  
01/29/01 17:16

**Volatile Organic Compounds per EPA Method 8260B**  
**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>MW-4 (P1A0548-04) Water</b>						Sampled: 01/18/01 Received: 01/19/01			
Hexachlorobutadiene	ND	100	ug/l	50	EPA 8260B	01/24/01	01/24/01	1010689	
2-Hexanone	ND	500	"	"	"	"	"	"	
Isopropylbenzene	213	100	"	"	"	"	"	"	
p-Isopropyltoluene	ND	100	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	250	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	50.0	"	"	"	"	"	"	
Methylene chloride	ND	250	"	"	"	"	"	"	
Naphthalene	331	100	"	"	"	"	"	"	
n-Propylbenzene	576	50.0	"	"	"	"	"	"	
Styrene	ND	50.0	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	50.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	50.0	"	"	"	"	"	"	
chloroethene	ND	50.0	"	"	"	"	"	"	
ne	ND	50.0	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	50.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	50.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	50.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	50.0	"	"	"	"	"	"	
Trichloroethene	ND	50.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	50.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	50.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	2170	50.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	414	50.0	"	"	"	"	"	"	
Vinyl chloride	ND	50.0	"	"	"	"	"	"	
o-Xylene	184	50.0	"	"	"	"	"	"	
m,p-Xylene	2580	100	"	"	"	"	"	"	
Surr: 4-BFB	105 %	75-125							
Surr: 1,2-DCA-d4	104 %	75-125							
Surr: Dibromofluoromethane	99.5 %	75-125							
Surr: Toluene-d8	103 %	75-125							

North Creek Analytical - Portland

Crystal Burkholder, Project Manager

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


Reported:  
01/29/01 17:16

**Volatile Organic Compounds per EPA Method 8260B**  
**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>MW-5 (PIA0548-05) Water</b>						Sampled: 01/18/01 Received: 01/19/01			
Acetone	ND	10.0	ug/l	1	EPA 8260B	01/24/01	01/24/01	1010689	
Benzene	ND	1.00	"	"	"	"	"	"	
Bromobenzene	ND	1.00	"	"	"	"	"	"	
Bromochloromethane	ND	1.00	"	"	"	"	"	"	
Bromodichloromethane	ND	1.00	"	"	"	"	"	"	
Bromoform	ND	1.00	"	"	"	"	"	"	
Bromomethane	ND	5.00	"	"	"	"	"	"	
2-Butanone	ND	10.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.00	"	"	"	"	"	"	
sec-Butylbenzene	1.48	1.00	"	"	"	"	"	"	
tert-Butylbenzene	ND	1.00	"	"	"	"	"	"	
Carbon disulfide	ND	10.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.00	"	"	"	"	"	"	
Cumyl benzene	ND	1.00	"	"	"	"	"	"	
Chloroethane	ND	1.00	"	"	"	"	"	"	
Chloroform	ND	1.00	"	"	"	"	"	"	
Chloromethane	ND	5.00	"	"	"	"	"	"	
2-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
4-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.00	"	"	"	"	"	"	
Dibromochloromethane	ND	1.00	"	"	"	"	"	"	
1,2-Dibromoethane	ND	1.00	"	"	"	"	"	"	
Dibromomethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.00	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	1.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,3-Dichloropropane	ND	1.00	"	"	"	"	"	"	
2,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloropropene	ND	1.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
Styrene	ND	1.00	"	"	"	"	"	"	

North Creek Analytical - Portland

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Crystal Burkholder, Project Manager

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

Reported:  
01/29/01 17:16

**Volatile Organic Compounds per EPA Method 8260B**  
**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>MW-5 (P1A0548-05) Water</b>						Sampled: 01/18/01 Received: 01/19/01			
Hexachlorobutadiene	ND	2.00	ug/l	1	EPA 8260B	01/24/01	01/24/01	1010689	
2-Hexanone	ND	10.0	"	"	"	"	"	"	
Isopropylbenzene	9.63	2.00	"	"	"	"	"	"	
p-Isopropyltoluene	ND	2.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	5.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	1.00	"	"	"	"	"	"	
Methylene chloride	ND	5.00	"	"	"	"	"	"	
Naphthalene	2.44	2.00	"	"	"	"	"	"	
n-Propylbenzene	14.3	1.00	"	"	"	"	"	"	
Styrene	ND	1.00	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.00	"	"	"	"	"	"	
Trichloroethene	ND	1.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	1.00	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
Vinyl chloride	ND	1.00	"	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	"	
Surr: 4-BFB	104 %	75-125							
Surr: 1,2-DCA-d4	106 %	75-125							
Surr: Dibromofluoromethane	104 %	75-125							
Surr: Toluene-d8	104 %	75-125							

North Creek Analytical - Portland

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Environmental Laboratory Network

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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:  
01/29/01 17:16

**Volatile Organic Compounds per EPA Method 8260B**  
**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>MW-6 (PIA0548-06) Water</b>						Sampled: 01/18/01 Received: 01/19/01			
Acetone	ND	10.0	ug/l	1	EPA 8260B	01/24/01	01/24/01	1010689	
Benzene	ND	1.00	"	"	"	"	"	"	
Bromobenzene	ND	1.00	"	"	"	"	"	"	
Bromochloromethane	ND	1.00	"	"	"	"	"	"	
Bromodichloromethane	ND	1.00	"	"	"	"	"	"	
Bromoform	ND	1.00	"	"	"	"	"	"	
Bromomethane	ND	5.00	"	"	"	"	"	"	
2-Butanone	ND	10.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.00	"	"	"	"	"	"	
sec-Butylbenzene	3.81	1.00	"	"	"	"	"	"	
tert-Butylbenzene	ND	1.00	"	"	"	"	"	"	
Carbon disulfide	ND	10.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.00	"	"	"	"	"	"	
Chlorobenzene	ND	1.00	"	"	"	"	"	"	
Chloroethane	ND	1.00	"	"	"	"	"	"	
Chloroform	ND	1.00	"	"	"	"	"	"	
Chloromethane	ND	5.00	"	"	"	"	"	"	
2-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
4-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.00	"	"	"	"	"	"	
Dibromochloromethane	ND	1.00	"	"	"	"	"	"	
1,2-Dibromoethane	ND	1.00	"	"	"	"	"	"	
Dibromomethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.00	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	1.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,3-Dichloropropane	ND	1.00	"	"	"	"	"	"	
2,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloropropene	ND	1.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
Fluorobenzene	ND	1.00	"	"	"	"	"	"	

North Creek Analytical - Portland

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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:  
01/29/01 17:16

**Volatile Organic Compounds per EPA Method 8260B**  
**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-6 (P1A0548-06) Water						Sampled: 01/18/01 Received: 01/19/01			
Hexachlorobutadiene	ND	2.00	ug/l	1	EPA 8260B	01/24/01	01/24/01	1010689	
2-Hexanone	ND	10.0	"	"	"	"	"	"	
Isopropylbenzene	4.72	2.00	"	"	"	"	"	"	
p-Isopropyltoluene	ND	2.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	5.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	1.00	"	"	"	"	"	"	
Methylene chloride	ND	5.00	"	"	"	"	"	"	
Naphthalene	ND	2.00	"	"	"	"	"	"	
n-Propylbenzene	2.37	1.00	"	"	"	"	"	"	
Styrene	ND	1.00	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.00	"	"	"	"	"	"	
Trichloroethene	ND	1.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	1.00	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
Vinyl chloride	ND	1.00	"	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	"	
Surr: 4-BFB	106 %	75-125							
Surr: 1,2-DCA-d4	104 %	75-125							
Surr: Dibromofluoromethane	101 %	75-125							
Surr: Toluene-d8	102 %	75-125							

North Creek Analytical - Portland

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Tualatin, OR 97062

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

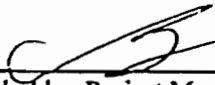
Reported:  
01/29/01 17:16

**Volatile Organic Compounds per EPA Method 8260B**  
**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>MW-7 (P1A0548-07) Water</b>						Sampled: 01/18/01 Received: 01/19/01			
Acetone	ND	10.0	ug/l	1	EPA 8260B	01/24/01	01/24/01	1010689	
Benzene	ND	1.00	"	"	"	"	"	"	
Bromobenzene	ND	1.00	"	"	"	"	"	"	
Bromochloromethane	ND	1.00	"	"	"	"	"	"	
Bromodichloromethane	ND	1.00	"	"	"	"	"	"	
Bromoform	ND	1.00	"	"	"	"	"	"	
Bromomethane	ND	5.00	"	"	"	"	"	"	
2-Butanone	ND	10.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.00	"	"	"	"	"	"	
sec-Butylbenzene	1.48	1.00	"	"	"	"	"	"	
tert-Butylbenzene	ND	1.00	"	"	"	"	"	"	
Carbon disulfide	ND	10.0	"	"	"	"	"	"	
( ) tetrachloride	ND	1.00	"	"	"	"	"	"	
Chlorobenzene	ND	1.00	"	"	"	"	"	"	
Chloroethane	ND	1.00	"	"	"	"	"	"	
Chloroform	ND	1.00	"	"	"	"	"	"	
Chloromethane	ND	5.00	"	"	"	"	"	"	
2-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
4-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.00	"	"	"	"	"	"	
Dibromochloromethane	ND	1.00	"	"	"	"	"	"	
1,2-Dibromoethane	ND	1.00	"	"	"	"	"	"	
Dibromomethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.00	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	1.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,3-Dichloropropane	ND	1.00	"	"	"	"	"	"	
2,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloropropene	ND	1.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
ibenzene	ND	1.00	"	"	"	"	"	"	

North Creek Analytical - Portland

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Crystal Burkholder, Project Manager

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

Reported:  
01/29/01 17:16

**Volatile Organic Compounds per EPA Method 8260B**  
**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>MW-7 (P1A0548-07) Water</b>						Sampled: 01/18/01 Received: 01/19/01			
Hexachlorobutadiene	ND	2.00	ug/l	1	EPA 8260B	01/24/01	01/24/01	1010689	
2-Hexanone	ND	10.0	"	"	"	"	"	"	
Isopropylbenzene	2.78	2.00	"	"	"	"	"	"	
p-Isopropyltoluene	ND	2.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	5.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	1.00	"	"	"	"	"	"	
Methylene chloride	ND	5.00	"	"	"	"	"	"	
Naphthalene	ND	2.00	"	"	"	"	"	"	
n-Propylbenzene	3.36	1.00	"	"	"	"	"	"	
Styrene	ND	1.00	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethene	ND	1.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.00	"	"	"	"	"	"	
Trichloroethene	ND	1.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	1.00	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
Vinyl chloride	ND	1.00	"	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	"	
Surr: 4-BFB	105 %	75-125							
Surr: 1,2-DCA-d4	104 %	75-125							
Surr: Dibromofluoromethane	101 %	75-125							
Surr: Toluene-d8	102 %	75-125							

North Creek Analytical - Portland

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

Reported:  
01/29/01 17:16

**Gasoline Hydrocarbons per NW TPH-Gx Method - 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 1010598 - EPA 5030B**

**Blank (1010598-BLK1)**

Prepared & Analyzed: 01/22/01

Gasoline Range Hydrocarbons	ND	80.0	ug/l							
Surr: 4-BFB	52.5		"	50.0		105	50-150			

**LCS (1010598-BS1)**

Prepared & Analyzed: 01/22/01

Gasoline Range Hydrocarbons	1320	80.0	ug/l	1250		106	70-120			
Surr: 4-BFB	60.3		"	50.0		121	50-150			

**Duplicate (1010598-DUP1)**

Source: P1A0548-01

Prepared & Analyzed: 01/22/01

Gasoline Range Hydrocarbons	110	80.0	ug/l		95.6			14.0	50	
Surr: 4-BFB	46.7		"	50.0		93.4	50-150			

**Duplicate (1010598-DUP2)**

Source: P1A0548-02

Prepared & Analyzed: 01/22/01

Gasoline Range Hydrocarbons	1180	80.0	ug/l		691			52.3	50	Q-01
Surr: 4-BFB	64.1		"	50.0		128	50-150			

**Batch 1010636 - EPA 5030B**

**Blank (1010636-BLK1)**

Prepared & Analyzed: 01/23/01

Gasoline Range Hydrocarbons	ND	80.0	ug/l							
Surr: 4-BFB	49.0		"	50.0		98.0	50-150			

**LCS (1010636-BS1)**

Prepared & Analyzed: 01/23/01

Gasoline Range Hydrocarbons	1270	80.0	ug/l	1250		102	70-120			
Surr: 4-BFB	57.8		"	50.0		116	50-150			


**LCS (1010636-BS2)**

Prepared & Analyzed: 01/23/01

Gasoline Range Hydrocarbons	323	80.0	ug/l				70-120			
Surr: 4-BFB	50.5		"	50.0		101	50-150			

North Creek Analytical - Portland

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

Reported:  
01/29/01 17:16

**Gasoline Hydrocarbons per NW TPH-Gx Method - 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 1010636 - EPA 5030B**

**Duplicate (1010636-DUP1)**

Source: P1A0572-01

Prepared & Analyzed: 01/23/01

Gasoline Range Hydrocarbons	ND	80.0	ug/l		ND			50	
Surr: 4-BFB	48.0		"	50.0		96.0	50-150		

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

Reported:  
01/29/01 17:16

**Volatile Organic Compounds per EPA Method 8260B - 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 1010689 - EPA 5030B**

**Blank (1010689-BLK1)**

Prepared & Analyzed: 01/24/01

Acetone	ND	10.0	ug/l
Benzene	ND	1.00	"
Bromobenzene	ND	1.00	"
Bromochloromethane	ND	1.00	"
Bromodichloromethane	ND	1.00	"
Bromoform	ND	1.00	"
Bromomethane	ND	5.00	"
2-Butanone	ND	10.0	"
n-Butylbenzene	ND	5.00	"
sec-Butylbenzene	ND	1.00	"
tert-Butylbenzene	ND	1.00	"
Cyclohexane disulfide	ND	10.0	"
Carbon tetrachloride	ND	1.00	"
Chlorobenzene	ND	1.00	"
Chloroethane	ND	1.00	"
Chloroform	ND	1.00	"
Chloromethane	ND	5.00	"
2-Chlorotoluene	ND	1.00	"
4-Chlorotoluene	ND	1.00	"
1,2-Dibromo-3-chloropropane	ND	5.00	"
Dibromochloromethane	ND	1.00	"
1,2-Dibromoethane	ND	1.00	"
Dibromomethane	ND	1.00	"
1,2-Dichlorobenzene	ND	1.00	"
1,3-Dichlorobenzene	ND	1.00	"
1,4-Dichlorobenzene	ND	1.00	"
Dichlorodifluoromethane	ND	5.00	"
1,1-Dichloroethane	ND	1.00	"
1,2-Dichloroethane	ND	1.00	"
1,1-Dichloroethene	ND	1.00	"
cis-1,2-Dichloroethene	ND	1.00	"
trans-1,2-Dichloroethene	ND	1.00	"
1,2-Dichloropropane	ND	1.00	"
1,3-Dichloropropane	ND	1.00	"
2,2-Dichloropropane	ND	1.00	"
1,1-Dichloropropene	ND	1.00	"

North Creek Analytical - Portland

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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:  
01/29/01 17:16

**Volatile Organic Compounds per EPA Method 8260B - 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 1010689 - EPA 5030B**

**Blank (1010689-BLK1)**


Prepared & Analyzed: 01/24/01

cis-1,3-Dichloropropene	ND	1.00	ug/l
trans-1,3-Dichloropropene	ND	1.00	"
Ethylbenzene	ND	1.00	"
Hexachlorobutadiene	ND	2.00	"
2-Hexanone	ND	10.0	"
Isopropylbenzene	ND	2.00	"
p-Isopropyltoluene	ND	2.00	"
4-Methyl-2-pentanone	ND	5.00	"
Methyl tert-butyl ether	ND	1.00	"
Methylene chloride	ND	5.00	"
lthalene	ND	2.00	"
ylbenzene	ND	1.00	"
Sty,ene	ND	1.00	"
1,1,1,2-Tetrachloroethane	ND	1.00	"
1,1,2,2-Tetrachloroethane	ND	1.00	"
Tetrachloroethene	ND	1.00	"
Toluene	ND	1.00	"
1,2,3-Trichlorobenzene	ND	1.00	"
1,2,4-Trichlorobenzene	ND	1.00	"
1,1,1-Trichloroethane	ND	1.00	"
1,1,2-Trichloroethane	ND	1.00	"
Trichloroethene	ND	1.00	"
Trichlorofluoromethane	ND	1.00	"
1,2,3-Trichloropropane	ND	1.00	"
1,2,4-Trimethylbenzene	ND	1.00	"
1,3,5-Trimethylbenzene	ND	1.00	"
Vinyl chloride	ND	1.00	"
o-Xylene	ND	1.00	"
m,p-Xylene	ND	2.00	"

Surr: 4-BFB	20.5	"	20.0	103	75-125
Surr: 1,2-DCA-d4	20.5	"	20.0	103	75-125
Surr: Dibromofluoromethane	20.1	"	20.0	101	75-125
Surr: Toluene-d8	20.4	"	20.0	102	75-125

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

Reported:  
01/29/01 17:16

**Volatile Organic Compounds per EPA Method 8260B - 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 1010689 - EPA 5030B**

**LCS (1010689-BS1)**

Prepared & Analyzed: 01/24/01

Benzene	20.6	1.00	ug/l	20.0	103	80-125
Chlorobenzene	20.2	1.00	"	20.0	101	80-125
1,1-Dichloroethene	21.5	1.00	"	20.0	108	70-135
Toluene	19.6	1.00	"	20.0	98.0	80-125
Trichloroethene	19.1	1.00	"	20.0	95.5	70-130
Surr: 4-BFB	21.5		"	20.0	108	75-125
Surr: 1,2-DCA-d4	20.7		"	20.0	104	75-125
Surr: Dibromofluoromethane	20.0		"	20.0	100	75-125
Surr: Toluene-d8	19.7		"	20.0	98.5	75-125

**Dup (1010689-BS1)**

Prepared & Analyzed: 01/24/01

	20.8	1.00	ug/l	20.0	104	80-125	0.966	25
Chlorobenzene	21.1	1.00	"	20.0	106	80-125	4.36	25
1,1-Dichloroethene	21.3	1.00	"	20.0	106	70-135	0.935	25
Toluene	20.9	1.00	"	20.0	104	80-125	6.42	25
Trichloroethene	19.1	1.00	"	20.0	95.5	70-130	0	25
Surr: 4-BFB	21.0		"	20.0	105	75-125		
Surr: 1,2-DCA-d4	20.7		"	20.0	104	75-125		
Surr: Dibromofluoromethane	19.9		"	20.0	99.5	75-125		
Surr: Toluene-d8	20.3		"	20.0	101	75-125		

**Batch 1010727 - EPA 5030B**

**Blank (1010727-BLK1)**

Prepared & Analyzed: 01/25/01

Acetone	ND	10.0	ug/l
Benzene	ND	1.00	"
Bromobenzene	ND	1.00	"
Bromochloromethane	ND	1.00	"
Bromodichloromethane	ND	1.00	"
Bromoform	ND	1.00	"
Bromomethane	ND	5.00	"
2-Butanone	ND	10.0	"
n-Butylbenzene	ND	5.00	"
sec-Butylbenzene	ND	1.00	"
tert-Butylbenzene	ND	1.00	"
Carbon disulfide	ND	10.0	"

North Creek Analytical - Portland

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

Reported:  
01/29/01 17:16

**Volatile Organic Compounds per EPA Method 8260B - 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 1010727 - EPA 5030B**


**Blank (1010727-BLK1)**

Prepared & Analyzed: 01/25/01

Carbon tetrachloride	ND	1.00	ug/l
Chlorobenzene	ND	1.00	"
Chloroethane	ND	1.00	"
Chloroform	ND	1.00	"
Chloromethane	ND	5.00	"
2-Chlorotoluene	ND	1.00	"
4-Chlorotoluene	ND	1.00	"
1,2-Dibromo-3-chloropropane	ND	5.00	"
Dibromochloromethane	ND	1.00	"
1,2-Dibromoethane	ND	1.00	"
Dibromomethane	ND	1.00	"
Chlorobenzene	ND	1.00	"
1,2-Dichlorobenzene	ND	1.00	"
1,4-Dichlorobenzene	ND	1.00	"
Dichlorodifluoromethane	ND	5.00	"
1,1-Dichloroethane	ND	1.00	"
1,2-Dichloroethane	ND	1.00	"
1,1-Dichloroethene	ND	1.00	"
cis-1,2-Dichloroethene	ND	1.00	"
trans-1,2-Dichloroethene	ND	1.00	"
1,2-Dichloropropane	ND	1.00	"
1,3-Dichloropropane	ND	1.00	"
2,2-Dichloropropane	ND	1.00	"
1,1-Dichloropropene	ND	1.00	"
cis-1,3-Dichloropropene	ND	1.00	"
trans-1,3-Dichloropropene	ND	1.00	"
Ethylbenzene	ND	1.00	"
Hexachlorobutadiene	ND	2.00	"
2-Hexanone	ND	10.0	"
Isopropylbenzene	ND	2.00	"
p-Isopropyltoluene	ND	2.00	"
4-Methyl-2-pentanone	ND	5.00	"
Methyl tert-butyl ether	ND	1.00	"
Methylene chloride	ND	5.00	"
Naphthalene	ND	2.00	"
n-Propylbenzene	ND	1.00	"

North Creek Analytical - Portland

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

Reported:  
01/29/01 17:16

**Volatile Organic Compounds per EPA Method 8260B - 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 1010727 - EPA 5030B**

**Blank (1010727-BLK1)**

Prepared & Analyzed: 01/25/01

Styrene	ND	1.00	ug/l						
1,1,1,2-Tetrachloroethane	ND	1.00	"						
1,1,2,2-Tetrachloroethane	ND	1.00	"						
Tetrachloroethene	ND	1.00	"						
Toluene	ND	1.00	"						
1,2,3-Trichlorobenzene	ND	1.00	"						
1,2,4-Trichlorobenzene	ND	1.00	"						
1,1,1-Trichloroethane	ND	1.00	"						
1,1,2-Trichloroethane	ND	1.00	"						
Trichloroethene	ND	1.00	"						
Trifluoromethane	ND	1.00	"						
Trichloropropane	ND	1.00	"						
1,2,4-Trimethylbenzene	ND	1.00	"						
1,3,5-Trimethylbenzene	ND	1.00	"						
Vinyl chloride	ND	1.00	"						
o-Xylene	ND	1.00	"						
m,p-Xylene	ND	2.00	"						
Surr: 4-BFB	21.8		"	20.0		109	75-125		
Surr: 1,2-DCA-d4	19.9		"	20.0		99.5	75-125		
Surr: Dibromofluoromethane	19.3		"	20.0		96.5	75-125		
Surr: Toluene-d8	19.2		"	20.0		96.0	75-125		

**LCS (1010727-BS1)**

Prepared & Analyzed: 01/25/01

Benzene	20.4	1.00	ug/l	20.0		102	80-125		
Chlorobenzene	20.7	1.00	"	20.0		104	80-125		
1,1-Dichloroethene	20.9	1.00	"	20.0		104	70-135		
Toluene	20.4	1.00	"	20.0		102	80-125		
Trichloroethene	18.7	1.00	"	20.0		93.5	70-130		
Surr: 4-BFB	21.3		"	20.0		106	75-125		
Surr: 1,2-DCA-d4	20.3		"	20.0		101	75-125		
Surr: Dibromofluoromethane	19.6		"	20.0		98.0	75-125		
Surr: Toluene-d8	19.9		"	20.0		99.5	75-125		

North Creek Analytical - Portland

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

Reported:  
01/29/01 17:16

**Volatile Organic Compounds per EPA Method 8260B - 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 1010727 - EPA 5030B**


**LCS Dup (1010727-BSD1)**

Prepared & Analyzed: 01/25/01

Benzene	20.2	1.00	ug/l	20.0		101	80-125	0.985	25
Chlorobenzene	20.7	1.00	"	20.0		104	80-125	0	25
1,1-Dichloroethene	20.9	1.00	"	20.0		104	70-135	0	25
Toluene	20.2	1.00	"	20.0		101	80-125	0.985	25
Trichloroethene	18.6	1.00	"	20.0		93.0	70-130	0.536	25
Surr: 4-BFB	21.4		"	20.0		107	75-125		
Surr: 1,2-DCA-d4	20.0		"	20.0		100	75-125		
Surr: Dibromofluoromethane	19.2		"	20.0		96.0	75-125		
Surr: Toluene-d8	19.7		"	20.0		98.5	75-125		

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


Reported:  
01/29/01 17:16

#### Notes and Definitions

- Q-01 The spike recovery, and/or RPD, for this QC sample is outside of established control limits. Review of associated batch QC indicates the recovery for this analyte does not represent an out-of-control condition for the batch.
- S-02 The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample.
- 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
- RPD Relative Percent Difference

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Project: ARCO #0855, Longview, WA  
Project Number: 015.08794.320  
Project Manager: Scott Miller

Reported:  
11/16/00 08:48

#### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW4-5	P010857-01	Soil	10/24/00 09:08	10/26/00 17:50
MW4-15	P010857-03	Soil	10/24/00 09:22	10/26/00 17:50
MW5-5	P010857-05	Soil	10/24/00 11:41	10/26/00 17:50
MW5-20	P010857-08	Soil	10/24/00 12:08	10/26/00 17:50
MW6-5	P010857-09	Soil	10/24/00 13:30	10/26/00 17:50
MW6-10	P010857-10	Soil	10/24/00 13:36	10/26/00 17:50
MW7-5	P010857-13	Soil	10/24/00 15:06	10/26/00 17:50
MW7-15	P010857-15	Soil	10/24/00 15:20	10/26/00 17:50

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Project: ARCO #0855, Longview, WA  
Project Number: 015.08794.320  
Project Manager: Scott Miller

Reported:  
11/16/00 08:48

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

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>MW4-5 (P010857-01) Soil</b>					Sampled: 10/24/00 Received: 10/26/00				
Benzene	ND	0.200	mg/kg dry	4	NW-G, 8021B	11/03/00	11/06/00	0110156	
Toluene	ND	0.200	"	"	"	"	"	"	
Ethylbenzene	4.85	0.200	"	"	"	"	"	"	
Xylenes (total)	9.82	0.200	"	"	"	"	"	"	
Naphthalene	3.73	0.200	"	"	"	"	"	"	T-05
Gasoline Range Hydrocarbons	258	8.00	"	"	"	"	"	"	
Surr: 4-BFB (FID)	NR	50-150							S-02
Surr: 4-BFB (PID)	179 %	65-125							S-02
<b>MW7-5 (P010857-13) Soil</b>					Sampled: 10/24/00 Received: 10/26/00				
Benzene	ND	0.100	mg/kg dry	2	NW-G, 8021B	11/03/00	11/06/00	0110156	
Toluene	ND	0.100	"	"	"	"	"	"	
Ethylbenzene	ND	0.100	"	"	"	"	"	"	
Xylenes (total)	ND	0.100	"	"	"	"	"	"	
Naphthalene	1.59	0.100	"	"	"	"	"	"	T-05
Gasoline Range Hydrocarbons	133	4.00	"	"	"	"	"	"	
Surr: 4-BFB (FID)	NR	50-150							S-02
Surr: 4-BFB (PID)	109 %	65-125							

Creek Analytical - Portland

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Project: ARCO #0855, Longview, WA  
Project Number: 015.08794.320  
Project Manager: Scott Miller


Reported:  
11/16/00 08:48

**Hydrocarbon Identification per NW-TPH Methodology**  
**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>MW4-5 (P010857-01) Soil</b>						Sampled: 10/24/00 Received: 10/26/00			
Gasoline Range Hydrocarbons	DET	20.0	mg/kg dry	1	NWTPH HCID	11/01/00	11/02/00	0110046	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	111 %	50-150							
<b>MW4-15 (P010857-03) Soil</b>						Sampled: 10/24/00 Received: 10/26/00			
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	11/01/00	11/02/00	0110046	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	122 %	50-150							
<b>MW5-5 (P010857-05) Soil</b>						Sampled: 10/24/00 Received: 10/26/00			
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	11/01/00	11/02/00	0110046	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	122 %	50-150							
<b>MW5-20 (P010857-08) Soil</b>						Sampled: 10/24/00 Received: 10/26/00			
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	11/01/00	11/02/00	0110046	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	122 %	50-150							
<b>MW6-5 (P010857-09) Soil</b>						Sampled: 10/24/00 Received: 10/26/00			
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	11/01/00	11/02/00	0110046	
Diesel Range Hydrocarbons	DET	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	120 %	50-150							

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Secor  
P.O. Box 1508  
Tualatin, OR 97062

Project: ARCO #0855, Longview, WA  
Project Number: 015.08794.320  
Project Manager: Scott Miller


Reported:  
11/16/00 08:48

**Hydrocarbon Identification per NW-TPH Methodology**  
**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>MW6-10 (P010857-10) Soil</b>						Sampled: 10/24/00 Received: 10/26/00			
Gasoline Range Hydrocarbons	ND	40.8	mg/kg dry	1	NWTPH HCID	11/01/00	11/02/00	0110046	
Diesel Range Hydrocarbons	ND	102	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	204	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	126 %	50-150							
<b>MW7-5 (P010857-13) Soil</b>						Sampled: 10/24/00 Received: 10/26/00			
Gasoline Range Hydrocarbons	DET	20.0	mg/kg dry	1	NWTPH HCID	11/01/00	11/02/00	0110046	
Diesel Range Hydrocarbons	DET	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	DET	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	125 %	50-150							
<b>MW15 (P010857-15) Soil</b>						Sampled: 10/24/00 Received: 10/26/00			
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	11/01/00	11/02/00	0110046	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	124 %	50-150							

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Project: ARCO #0855, Longview, WA  
Project Number: 015.08794.320  
Project Manager: Scott Miller

Reported:  
11/16/00 08:48

**Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method**  
**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>MW6-5 (P010857-09) Soil</b>						Sampled: 10/24/00 Received: 10/26/00			
Diesel Range Organics	68.8	25.0	mg/kg dry	1	NWTPH-Dx	11/06/00	11/07/00	0110209	
Heavy Oil Range Hydrocarbons	53.5	50.0	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	103 %	50-150							
<b>MW7-5 (P010857-13) Soil</b>						Sampled: 10/24/00 Received: 10/26/00			
Diesel Range Organics	199	25.0	mg/kg dry	1	NWTPH-Dx	11/06/00	11/07/00	0110209	
Heavy Oil Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	110 %	50-150							

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Crystal Burkholder, Project Manager

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Project: ARCO #0855, Longview, WA  
Project Number: 015.08794.320  
Project Manager: Scott Miller

Reported:  
11/16/00 08:48

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**  
**North Creek Analytical - Portland**

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>MW4-5 (P010857-01) Soil</b>					Sampled: 10/24/00 Received: 10/26/00			R-05	
Acenaphthene	ND	67.0	ug/kg dry	5	EPA 8270B-m	11/07/00	11/13/00	0110234	
Acenaphthylene	ND	67.0	"	"	"	"	"	"	
Anthracene	ND	67.0	"	"	"	"	"	"	
Benzo (a) anthracene	ND	67.0	"	"	"	"	"	"	
Benzo (a) pyrene	ND	67.0	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	67.0	"	"	"	"	"	"	
Benzo (ghi) perylene	ND	67.0	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	67.0	"	"	"	"	"	"	
Chrysene	ND	67.0	"	"	"	"	"	"	
Dibenzo (a,h) anthracene	ND	67.0	"	"	"	"	"	"	
Fluoranthene	ND	67.0	"	"	"	"	"	"	
Fluorene	ND	67.0	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	67.0	"	"	"	"	"	"	
Naphthalene	2130	67.0	"	"	"	"	"	"	
Phenanthrene	ND	67.0	"	"	"	"	"	"	
Pyrene	ND	67.0	"	"	"	"	"	"	
Surr: 2-Fluorobiphenyl	92.5 %	20-158							
Surr: Nitrobenzene-d5	78.9 %	26-146							
Surr: p-Terphenyl-d14	120 %	41-141							

<b>MW6-5 (P010857-09) Soil</b>					Sampled: 10/24/00 Received: 10/26/00				
Acenaphthene	ND	13.4	ug/kg dry	1	EPA 8270B-m	11/07/00	11/09/00	0110234	
Acenaphthylene	ND	13.4	"	"	"	"	"	"	
Anthracene	ND	13.4	"	"	"	"	"	"	
Benzo (a) anthracene	ND	13.4	"	"	"	"	"	"	
Benzo (a) pyrene	ND	13.4	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	13.4	"	"	"	"	"	"	
Benzo (ghi) perylene	ND	13.4	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	13.4	"	"	"	"	"	"	
Chrysene	ND	13.4	"	"	"	"	"	"	
Dibenzo (a,h) anthracene	ND	13.4	"	"	"	"	"	"	
Fluoranthene	ND	13.4	"	"	"	"	"	"	
Fluorene	ND	13.4	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	13.4	"	"	"	"	"	"	
Naphthalene	ND	67.0	"	"	"	"	"	"	
Phenanthrene	ND	13.4	"	"	"	"	"	"	
Pyrene	ND	13.4	"	"	"	"	"	"	
Surr: 2-Fluorobiphenyl	68.5 %	20-158							

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Secor  
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 Tualatin, OR 97062

Project: ARCO #0855, Longview, WA  
 Project Number: 015.08794.320  
 Project Manager: Scott Miller

Reported:  
 11/16/00 08:48

## Polynuclear Aromatic Compounds per EPA 8270M-SIM

### North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>MW6-5 (P010857-09) Soil</b>					Sampled: 10/24/00 Received: 10/26/00				
Surr: Nitrobenzene-d5	97.6 %	26-146							
Surr: p-Terphenyl-d14	105 %	41-141							
<b>MW7-5 (P010857-13) Soil</b>					Sampled: 10/24/00 Received: 10/26/00				
Acenaphthene	113	67.0	ug/kg dry	5	EPA 8270B-m	11/07/00	11/14/00	0110234	
Acenaphthylene	ND	67.0	"	"	"	"	"	"	R-03
Anthracene	58.8	26.8	"	2	"	"	11/10/00	"	
Benzo (a) anthracene	ND	26.8	"	"	"	"	"	"	
Benzo (a) pyrene	ND	26.8	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	26.8	"	"	"	"	"	"	
Benzo (ghi) perylene	ND	26.8	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	26.8	"	"	"	"	"	"	
Benzo (e) anthracene	ND	26.8	"	"	"	"	"	"	
Fluoranthene	40.5	26.8	"	"	"	"	"	"	
Fluorene	416	67.0	"	5	"	"	11/14/00	"	
Indeno (1,2,3-cd) pyrene	ND	26.8	"	2	"	"	11/10/00	"	
Naphthalene	ND	335	"	5	"	"	11/14/00	"	R-03
Phenanthrene	626	26.8	"	2	"	"	11/10/00	"	
Pyrene	58.2	26.8	"	"	"	"	"	"	
Surr: 2-Fluorobiphenyl	93.2 %	20-158							
Surr: Nitrobenzene-d5	189 %	26-146							S-09
Surr: p-Terphenyl-d14	117 %	41-141							

North Creek Analytical - Portland

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Project: ARCO #0855, Longview, WA  
 Project Number: 015.08794.320  
 Project Manager: Scott Miller

Reported:  
 11/16/00 08:48

### Miscellaneous Physical/Conventional Chemistry Parameters

#### North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
<b>MW4-5 (P010857-01) Soil</b>						Sampled: 10/24/00 Received: 10/26/00			
% Solids	62.7	1.00	% by Weight	1	NCA SOP	10/30/00	10/31/00	0101954	
<b>MW4-15 (P010857-03) Soil</b>						Sampled: 10/24/00 Received: 10/26/00			
% Solids	66.9	1.00	% by Weight	1	NCA SOP	10/30/00	10/31/00	0101954	
<b>MW5-5 (P010857-05) Soil</b>						Sampled: 10/24/00 Received: 10/26/00			
% Solids	65.5	1.00	% by Weight	1	NCA SOP	10/30/00	10/31/00	0101954	
<b>MW5-20 (P010857-08) Soil</b>						Sampled: 10/24/00 Received: 10/26/00			
% Solids	75.2	1.00	% by Weight	1	NCA SOP	10/30/00	10/31/00	0101954	
<b>MW5-5 (P010857-09) Soil</b>						Sampled: 10/24/00 Received: 10/26/00			
% Solids	65.5	1.00	% by Weight	1	NCA SOP	10/30/00	10/31/00	0101954	
<b>MW6-10 (P010857-10) Soil</b>						Sampled: 10/24/00 Received: 10/26/00			
% Solids	49.1	1.00	% by Weight	1	NCA SOP	10/30/00	10/31/00	0101954	
<b>MW7-5 (P010857-13) Soil</b>						Sampled: 10/24/00 Received: 10/26/00			
% Solids	63.2	1.00	% by Weight	1	NCA SOP	10/30/00	10/31/00	0101954	
<b>MW7-15 (P010857-15) Soil</b>						Sampled: 10/24/00 Received: 10/26/00			
% Solids	63.5	1.00	% by Weight	1	NCA SOP	10/30/00	10/31/00	0101954	

North Creek Analytical - Portland

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Secor	Project: ARCO #0855, Longview, WA	Reported:
P.O. Box 1508	Project Number: 015.08794.320	11/16/00 08:48
Tualatin, OR 97062	Project Manager: Scott Miller	

### Gasoline Hydrocarbons per NW TPH-Gx Method and BTEX/N 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 0110156 - EPA 5030B

##### Blank (0110156-BLK1)

Prepared: 11/03/00 Analyzed: 11/06/00

Benzene	ND	0.0500	mg/kg wet							
Toluene	ND	0.0500	"							
Ethylbenzene	ND	0.0500	"							
Xylenes (total)	ND	0.0500	"							
Naphthalene	ND	0.0500	"							
Gasoline Range Hydrocarbons	ND	2.00	"							
Surr: 4-BFB (FID)	1.10		"	1.25		88.0	50-150			
Surr: 4-BFB (PID)	1.35		"	1.25		108	65-125			

##### LCS (0110156-BS1)

Prepared: 11/03/00 Analyzed: 11/06/00

Gasoline Range Hydrocarbons	27.1	2.00	mg/kg wet	31.3		86.6	50-150			
Surr: 4-BFB (FID)	1.35		"	1.25		108	50-150			

##### LCS (0110156-BS2)

Prepared: 11/03/00 Analyzed: 11/06/00

Benzene	0.421	0.0500	mg/kg wet	0.500		84.2	65-130			
Toluene	0.439	0.0500	"	0.500		87.8	65-130			
Ethylbenzene	0.470	0.0500	"	0.500		94.0	65-130			
Xylenes (total)	1.39	0.0500	"	1.50		92.7	65-130			
Naphthalene	ND	0.0500	"				65-130			
Surr: 4-BFB (PID)	1.37		"	1.25		110	65-125			

##### Matrix Spike (0110156-MS1)

Source: P0K0052-10

Prepared: 11/03/00 Analyzed: 11/06/00

Benzene	1.11	0.121	mg/kg dry	1.21	ND	91.7	65-130			
Toluene	1.20	0.121	"	1.21	ND	99.2	65-130			
Ethylbenzene	1.32	0.121	"	1.21	ND	109	65-130			
Xylenes (total)	3.87	0.121	"	3.64	ND	106	65-130			
Naphthalene	ND	0.121	"		ND		65-130			
Surr: 4-BFB (PID)	3.37		"	3.03		111	65-125			

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Project: ARCO #0855, Longview, WA  
Project Number: 015.08794.320  
Project Manager: Scott Miller

Reported:  
11/16/00 08:48

Gasoline Hydrocarbons per NW TPH-Gx Method and BTEX/N 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 0110156 - EPA 5030B

Matrix Spike Dup (0110156-MSD1) Source: P0K0052-10 Prepared: 11/03/00 Analyzed: 11/06/00

Benzene	1.13	0.121	mg/kg dry	1.21	ND	93.4	65-130	1.79	20	
Toluene	1.22	0.121	"	1.21	ND	101	65-130	1.65	20	
Ethylbenzene	1.34	0.121	"	1.21	ND	111	65-130	1.50	20	
Xylenes (total)	3.94	0.121	"	3.64	ND	108	65-130	1.79	20	
Naphthalene	ND	0.121	"		ND		65-130		20	
Surr: 4-BFB (PID)	3.41		"	3.03		113	65-125			

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Project: ARCO #0855, Longview, WA  
Project Number: 015.08794.320  
Project Manager: Scott Miller

Reported:  
11/16/00 08:48

### Hydrocarbon Identification per NW-TPH Methodology - 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 0110046 - TPH-HCID Extraction

##### Blank (0110046-BLK1)

Prepared: 11/01/00 Analyzed: 11/03/00

Gasoline Range Hydrocarbons	ND	20.0	mg/kg wet						
Diesel Range Hydrocarbons	ND	50.0	"						
Heavy Oil Range Hydrocarbons	ND	100	"						
Surr: 1-Chlorooctadecane	DET		"	3.96		132	50-150		

##### Duplicate (0110046-DUP1)

Source: P010857-15

Prepared: 11/01/00 Analyzed: 11/03/00

Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry		ND			50	
Diesel Range Hydrocarbons	ND	50.0	"		ND			50	
Heavy Oil Range Hydrocarbons	ND	100	"		ND			50	
Surr: 1-Chlorooctadecane	DET		"	6.24		94.9	50-150		

##### Duplicate (0110046-DUP2)

Source: P010927-17

Prepared: 11/01/00 Analyzed: 11/03/00

Gasoline Range Hydrocarbons	ND	91.1	mg/kg dry		ND			50	
Diesel Range Hydrocarbons	DET	228	"		DET		21.0	50	
Heavy Oil Range Hydrocarbons	DET	456	"		DET		23.2	50	
Surr: 1-Chlorooctadecane	DET		"	18.0		123	50-150		

North Creek Analytical - Portland

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Crystal Burkholder, Project Manager

North Creek Analytical, Inc.  
Environmental Laboratory Network

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Secor  
P.O. Box 1508  
Tualatin, OR 97062

Project: ARCO #0855, Longview, WA  
Project Number: 015.08794.320  
Project Manager: Scott Miller

Reported:  
11/16/00 08:48

**Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method - 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 0110209 - EPA 3550 Fuels**

**Blank (0110209-BLK1)**

Prepared: 11/06/00 Analyzed: 11/07/00

Diesel Range Organics	ND	25.0	mg/kg wet
Heavy Oil Range Hydrocarbons	ND	50.0	"

Surr: 1-Chlorooctadecane	4.83	"	4.80	101	50-150
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**LCS (0110209-BS1)**

Prepared: 11/06/00 Analyzed: 11/07/00

Diesel Range Organics	116	25.0	mg/kg wet	129	89.9	50-150
Heavy Oil Range Hydrocarbons	89.5	50.0	"	79.0	113	50-150

Surr: 1-Chlorooctadecane	5.75	"	4.80	120	50-150
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**Duplicate (0110209-DUP1)**

Source: P010807-30


Prepared: 11/06/00 Analyzed: 11/07/00

Diesel Range Organics	ND	25.0	mg/kg dry	ND		50
Oil Range Hydrocarbons	267	50.0	"	172	43.3	50

Surr: 1-Chlorooctadecane	11.0	"	8.04	137	50-150
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Tualatin, OR 97062

Project: ARCO #0855, Longview, WA  
Project Number: 015.08794.320  
Project Manager: Scott Miller

Reported:  
11/16/00 08:48

Polynuclear Aromatic Compounds per EPA 8270M-SIM - 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 0110234 - EPA 3550

Blank (0110234-BLK1)

Prepared: 11/07/00 Analyzed: 11/09/00

Acenaphthene	ND	13.4	ug/kg wet							
Acenaphthylene	ND	13.4	"							
Anthracene	ND	13.4	"							
Benzo (a) anthracene	ND	13.4	"							
Benzo (a) pyrene	ND	13.4	"							
Benzo (b) fluoranthene	ND	13.4	"							
Benzo (ghi) perylene	ND	13.4	"							
Benzo (k) fluoranthene	ND	13.4	"							
Chrysene	ND	13.4	"							
Dibenzo (a,h) anthracene	ND	13.4	"							
Indeno (1,2,3-cd) pyrene	ND	13.4	"							
Naphthalene	ND	13.4	"							
Phenanthrene	ND	13.4	"							
Pyrene	ND	13.4	"							
Surr: 2-Fluorobiphenyl	77.4		"	83.3		92.9	20-158			
Surr: Nitrobenzene-d5	62.4		"	83.3		74.9	26-146			
Surr: p-Terphenyl-d14	104		"	83.3		125	41-141			

LCS (0110234-BS1)

Prepared: 11/07/00 Analyzed: 11/10/00

Q-23

Acenaphthene	74.1	13.4	ug/kg wet	83.3		89.0	33-139			
Benzo (a) pyrene	78.0	13.4	"	83.3		93.6	45-149			
Pyrene	82.3	13.4	"	83.3		98.8	39-138			
Surr: 2-Fluorobiphenyl	81.7		"	83.3		98.1	20-158			
Surr: Nitrobenzene-d5	79.9		"	83.3		95.9	26-146			
Surr: p-Terphenyl-d14	101		"	83.3		121	41-141			

North Creek Analytical - Portland

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Tualatin, OR 97062

Project: ARCO #0855, Longview, WA  
Project Number: 015.08794.320  
Project Manager: Scott Miller

Reported:  
11/16/00 08:48

Polynuclear Aromatic Compounds per EPA 8270M-SIM - 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 0110234 - EPA 3550

Duplicate (0110234-DUP1)	Source: P010927-01			Prepared: 11/07/00 Analyzed: 11/14/00			R-05		
Acenaphthene	ND	67.0	ug/kg dry	ND			19.5	50	
Acenaphthylene	ND	67.0	"	ND			15.8	50	
Anthracene	ND	67.0	"	ND			4.73	50	
Benzo (a) anthracene	223	67.0	"	217			2.73	50	
Benzo (a) pyrene	376	67.0	"	357			5.18	50	
Benzo (b) fluoranthene	271	67.0	"	228			17.2	50	
Benzo (ghi) perylene	371	67.0	"	344			7.55	50	
Benzo (k) fluoranthene	208	67.0	"	222			6.51	50	
Chrysene	274	67.0	"	271			1.10	50	
Dibenzo (a,h) anthracene	ND	67.0	"	ND			5.64	50	
Fluoranthene	378	67.0	"	441			15.4	50	
Indeno (1,2,3-cd) pyrene	ND	67.0	"	ND				50	
Indeno (1,2,3-cd) pyrene	270	67.0	"	260			3.77	50	
Naphthalene	ND	67.0	"	ND				50	
Phenanthrene	77.6	67.0	"	72.8			6.38	50	
Pyrene	551	67.0	"	566			2.69	50	
Surr: 2-Fluorobiphenyl	113		"	118	95.8	20-158			
Surr: Nitrobenzene-d5	84.7		"	118	71.8	26-146			
Surr: p-Terphenyl-d14	147		"	118	125	41-141			

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Project: ARCO #0855, Longview, WA  
Project Number: 015.08794.320  
Project Manager: Scott Miller

Reported:  
11/16/00 08:48


Miscellaneous Physical/Conventional Chemistry Parameters - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 0101954 - Dry Weight</b>									
<b>Duplicate (0101954-DUP1)</b>									
		<b>Source: P010634-01</b>		<b>Prepared: 10/30/00 Analyzed: 10/31/00</b>					
% Solids	90.9	1.00 % by Weight		81.8			10.5	10	Q-14
<b>Duplicate (0101954-DUP2)</b>									
		<b>Source: P010673-01</b>		<b>Prepared: 10/30/00 Analyzed: 10/31/00</b>					
% Solids	77.7	1.00 % by Weight		81.3			4.53	10	

North Creek Analytical - Portland

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Secor  
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Tualatin, OR 97062

Project: ARCO #0855, Longview, WA  
Project Number: 015.08794.320  
Project Manager: Scott Miller

**Reported:**  
11/16/00 08:48

#### Notes and Definitions

- Q-14 The Spike Recovery and/or RPD is outside of control limits due to a non-homogeneous sample matrix.
- Q-23 The Matrix Spike/Duplicate for this batch could not be reported. Source sample contains high levels of target analyte, non-target analyte, and/or matrix interference requiring high dilution.
- R-03 The reporting limit for this analyte was raised due to matrix interference.
- R-05 Reporting limits raised due to dilution necessary for analysis. Sample contains high levels of reported analyte, non-target analyte, and/or matrix interference.
- S-02 The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample.
- S-09 Surrogate recovery is outside control limits due to matrix interference.
- T-05 Analyte hit confirmed by GC/MS.
- DET Analyte DETECTED
- NTD Analyte NOT DETECTED at or above the reporting limit
- N Not Reported
- dry Sample results reported on a dry weight basis
- wet Sample results reported on a wet weight basis
- RPD Relative Percent Difference

North Creek Analytical - Portland

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Crystal Burkholder, Project Manager

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**NORTH CREEK ANALYTICAL**  
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(503) 906-9200 FAX 906-9210

## CHAIN OF CUSTODY REPORT

Work Order #

9010857

REPORT TO: SECOR		INVOICE TO: Same	
ATTENTION: Scott Miller		ATTENTION:	
ADDRESS: 7730 SW. Mohawk St.		ADDRESS:	
Tualatin, Oregon 97062		NCA QUOTE #:	
PHONE: 503-691-2030 FAX: 503-692-7074		P.O. NUMBER:	
PROJECT NAME: Area PSS		Analysis Request:	
PROJECT NUMBER: 015 08794.320		NCA SAMPLE ID (Laboratory Use Only)	
SAMPLED BY: DEC		SAMPLING DATE/TIME	
CLIENT SAMPLE IDENTIFICATION		DATE/TIME	
1. MW4-5	10/24/00 0908	X	X
2. MW4-10	0915	X	X
3. MW4-15	0922	X	X
4. MW4-20	0930	X	X
5. MW5-5	1141	X	X
6. MW5-10	1153	X	X
7. MW5-15	1158	X	X
8. MW5-20	1208	X	X
9. MW6-5	1330	X	X
10. MW6-10	1336	X	X

RECEIVED BY (Signature): <i>[Signature]</i>		DATE: 10-26-00	
PRINT NAME: Mary Sample		FIRM: NCA	
RECEIVED BY (Signature): <i>[Signature]</i>		DATE: 10-26-00	
PRINT NAME: Mary Sample		FIRM: NCA	
RECEIVED BY (Signature): <i>[Signature]</i>		DATE: 10-26-00	
PRINT NAME: Mary Sample		FIRM: NCA	
ADDITIONAL REMARKS: TPH-HCID follow up as TPH-G if needed and NCA			





**N ITH**  
**CREEK**  
**ANALYTICAL**  
Environmental Laboratory Services

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(509) 924-9200 F 9290  
(503) 906-9200 FAX 906-9210

## CHAIN OF CUSTODY REPORT

Work Order #

9010857

REPORT TO: SECOR				INVOICE TO: Same		TURNAROUND REQUEST IN BUSINESS DAYS *	
ATTENTION: Scott Miller				ATTENTION:		Organic & Inorganic Analyses	
ADDRESS: 7730 SW. Mohawk St.				ADDRESS:		Fuels & Hydrocarbon Analyses	
Tualatin, Oregon 97062							
PHONE: 503-691-2030 FAX: 503-692-7074				P.O. NUMBER:		OTHER	
PROJECT NAME: Area 855				Analysis Request:		Specify:	
PROJECT NUMBER: 015. 08 794.320				NCA QUOTE #:			
SAMPLED BY: DEE				NCA QUOTE #:			
CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	NCA SAMPLE ID (Laboratory Use Only)	MATRIX (W, S, A, O)	# OF CONTAINERS	COMMENTS		
1. MW6-15	10/24/00 1342		S	3	hold please		
2. MW6-20	1356			3	" "		
3. MW7-5	1506			2			
4. MW7-10	1516			3	hold please		
5. MW7-15	1520			3	" "		
6. MW7-20	1528			3	" "		
7.							
8.							
9.							
10.							

RECEIVED BY (Signature)	DATE	PRINT NAME	FIRM	TIME
<i>[Signature]</i>	10-26-00	Sammy Spangola	NCA	1205
<i>[Signature]</i>	10-26-00	Dana Sarvela	NCA	1750
<i>[Signature]</i>	10-26-00	NCA	NCA	102600

RECEIVED BY (Signature): *[Signature]* DATE: 10-26-00  
PRINT NAME: O. Edward Caffery FIRM: SECOR TIME: 1205  
RECEIVED BY (Signature): *[Signature]* DATE: 10-26-00  
PRINT NAME: *[Signature]* FIRM: NCA TIME: 102600  
ADDITIONAL REMARKS: