SECOR
International Incorporated

July 9, 1999

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JUL 12 1999
Department of Ecology
Industrial Section

Mr. Paul E. Skyllingstad
Department of Ecology
Industrial Section
P.O. Box 47706
Olympia, Washington 98504-7706

RE: Additional Subsurface Investigation Report
Former Columbia Marine Lines Facility, Vancouver, Washington
SECOR Job No.: F0319-001-01

Dear Mr. Skyllingstad:

SECOR International Incorporated, on behalf of Crowley Marine Services Incorporated (Crowley), is pleased to present the enclosed *Additional Subsurface Investigation Report* dated July 8, 1999. The investigation was completed in accordance with the *Limited Subsurface Investigation Workplan* dated April 27, 1999. Based on the results of this additional subsurface investigation, SECOR is currently preparing a work plan that will include a description of a pilot test for an interim remediation system to address the free product at the site. This workplan will also include a description for delineation of the impacted subsurface soils in the vicinity of monitoring wells MW-7 and MW-8 and geoprobes GP-2 and GP-3 with the intent of preparing a focused feasibility study for excavation, treatment and disposal of soils in the impacted area. It is Crowley's intent to initiate the workplan by August 1999.

If you have any questions or require additional information, please do not hesitate to contact Stephen Wilson of Crowley at (206) 443-8042 or myself at (503) 691-2030.

Sincerely
SECOR International Incorporated

Brent W. Brelje, P.E.
Principal Engineer

BWB:ald

Enclosure

cc: Mr. Stephen Wilson, Crowley Marine Services
Mr. Al Piecka, Alcoa
Mr. Rodney L. Brown, Marten & Brown, LLP

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SECOR
International Incorporated

ADDITIONAL SUBSURFACE INVESTIGATION REPORT

Former Columbia Marine Lines Facility
6305 Lower River Road
Vancouver, Washington

SECOR PN: F0319-001-01

Submitted by
SECOR International Incorporated
for

Crowley Marine Services
2401 Fourth Avenue
Post Office Box 2287
Seattle, Washington 98121

July 9, 1999

Prepared by:

Catherine M. Westersund
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Brent W. Brelje, P.E.
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1.0 INTRODUCTION AND SCOPE OF WORK

SECOR International Incorporated (SECOR) conducted additional subsurface investigation at the former Columbia Marine Lines facility located at 6305 Lower River Road in Vancouver, Washington (the site, see Figure 1). Nine geoprobe temporary well points were installed on May 6, 1999; soil samples were collected from the geoprobe temporary well points during installation. Groundwater samples were collected from the temporary well points subsequent to their installation on May 7, 1999. The temporary well points were abandoned on May 7, 1999 after groundwater samples were collected.

The purpose of the additional subsurface investigation was to better characterize site stratigraphy and assess the potential presence and extent of separate phase hydrocarbons (SPH) and dissolved hydrocarbon constituents. Additionally, the investigation was to confirm the presence of a linear depression on top of flood plain deposits, representing a former drainage or channel feeding into the Columbia River. SECOR will use the results of this investigation to identify and design the remedial approach most applicable to existing site conditions.

The additional subsurface investigation consisted of the following activities:

- Drilling nine geoprobe soil borings.
- Continuously collecting soil samples from each boring for visual inspection (staining and odors), lithologic description and field screening for the presence of volatile organic compounds using a photoionization detector (PID).
- Installing nine geoprobe temporary well points.
- Surveying the top of casing of each geoprobe point to allow calculation of the elevation of the water table surface.
- Analyzing soil and groundwater samples collected during the installation activities for evidence of SPH and dissolved hydrocarbon constituents.
- Abandoning geoprobe temporary well points after surveying and sampling.
- Preparing this Additional Subsurface Investigation Report.

2.0 SITE DESCRIPTION

The site is located immediately north of the Columbia River and approximately 3 miles west of the city of Vancouver in Section 44, Township 2N, Range 1E, as indicated on Figure 1. Section 44 is designated as Section 19 on Metsker's Clark County map. The site is relatively flat, with the highest point on the site lying at an approximate elevation of 32 feet above mean sea level (msl) datum. The Columbia River is tidally dominated and typically ranges from about minus 5 to positive 5 feet msl.

The majority of the site is sparsely vegetated with grasses and moss. Alders and willows form a brushy thicket from the river's edge to about 200 feet inland. Willows, alders, and brush are present in isolated low-lying areas in the northern portion of the site. Two settling ponds occupy a portion of the site to the northwest. The settling ponds are currently operated by Vanalco (formerly operated by ALCOA) as part of the aluminum manufacturing process. Figure 2 is a site plan of the subject property.

3.0 FIELD INVESTIGATION

3.1 SOIL BORINGS AND SAMPLING

Nine soil borings (GP-1 through GP-9) were drilled on May 6, 1999 by Cascade Drilling Inc. of Portland, Oregon, using a track-mounted Model CME850 geoprobe rig. The borings were located in the vicinity of wells MW-7, MW-8, and MW-19, the area south of well MW-19 toward the Columbia River, the area east of wells MW-6 and MW-8, and the area north of well MW-16. SECOR advanced four geoprobe borings (GP-4, GP-5, GP-6, GP-7) in the vicinity of wells MW-7, MW-8, and MW-19 to better identify the potential presence of a linear depression on top of flood plain deposits that may be a pathway for migration of SPH and/or dissolved constituents to the Columbia River. Two geoprobe borings (GP-2 and GP-3) were advanced in the vicinity of the former West Pit (west of MW-7) to assess whether additional SPH is present. One geoprobe boring (GP-1) east of wells MW-6 and MW-8, and two borings (GP-8 and GP-9) north of well MW-16 were advanced to evaluate whether dissolved constituents are migrating beyond the perimeter monitoring well locations. The geoprobe borings locations are depicted on Figure 2.

Soil borings were advanced through the dredge sand to the contact with the underlying, confining silts and were completed to depths ranging from approximately 12 to 20 feet below ground surface (bgs). Saturated soil conditions were observed at a depth of approximately 9 feet bgs. Subsurface soils generally consisted of fine- to medium-grained sands and sandy silts.

Soil samples were collected continuously to characterize site stratigraphy. Field screening methods (observation of staining and odor, as well as volatile organic compound [VOC] measurements using a PID) were used to select a soil sample near, but above the groundwater surface from each boring for laboratory analysis. Field screening was completed by placing a portion of the collected soil into a sealable plastic bag and then monitoring headspace VOC concentrations using a PID.

Temporary groundwater piezometers were installed in all of the Geoprobe boreholes to provide information on groundwater gradient and flow direction in the vicinity of the site. Each piezometer was constructed of 3/4-inch polyvinyl chloride (PVC) with 0.010-inch slotted screen from the base of the boring to a level above the observed water level. Each piezometer was allowed to equilibrate for one day before water level data were acquired. The piezometer elevations were surveyed to top of casing of existing monitoring wells using a laser level surveying instrument.

After groundwater measurements and soil and water sampling were completed, each soil boring was abandoned with bentonite and sealed at the top with concrete if necessary. Detailed descriptions of soil sampling and field screening methodology and field forms are presented in Appendix A. Lithologic descriptions and field screening results are included on the boring logs included in Appendix B.

3.2 GROUNDWATER SAMPLING

A groundwater sample was collected at each boring location from the temporary geoprobe well points using a peristaltic pump. As a prelude to sampling, SECOR purged each sample point using micropurging techniques, by sealing the selecting a discrete interval, sealing that interval, and removing a volume of water approximately equal to three geoprobe boring diameters. SECOR also measured the temperature, pH, and conductivity of each volume removed. Dissolved oxygen was not measured. It was difficult to maintain slow draw down requirements of mircopurging techniques due to the small diameter of the geoprobe points. Groundwater was allowed to recharge to within 80% of the observed static water level. Subsequently, a water sample was collected from within the geoprobe casing. The water samples were transferred into laboratory-prepared sample containers for laboratory analysis.

4.0 FINDINGS

4.1 SITE GEOLOGY AND HYDROGEOLOGY

The soils encountered during the additional subsurface investigation consisted of unconsolidated sands (dredge fill material) and a underlying silty flood plain deposit. The silt was encountered at depths ranging from 8 feet bgs at geoprobe boring GP-1 and 16.5 feet bgs at geoprobe boring GP-7. Saturated soil was encountered within the unconsolidated sands at a depth of approximately 4 to 9 feet bgs.

The elevation of the top of the silt unit was contoured using the data collected during the additional subsurface investigation and past well investigations. The top of the silt unit contour map is presented as Figure 3. The contours in the northern portion of the site slope toward the east between point GP-8 and well MW-12. The area of the former pits are shown as a topographic high. The contours on the southwest corner of the site indicate a depression, possibly a buried stream channel trending toward the north east from the western edge of the former pond locations.

SECOR personnel collected water level data on May 7, 1999. Static water levels in the piezometers ranged from 5.05 to 10.89 feet bgs, as measured from the top of each well casing. Free product (SPH) was not encountered in any of the temporary geoprobe well points. However, sheen was encountered on the water surface in geoprobes GP-2, GP-3, GP-4, GP-5, and GP-7. Based on the results of the water level measurements collected on May 7, 1999, groundwater flow in the area was oriented in a west-southwesterly direction toward the Columbia River. The gradient in the southern portion of the site was 0.01 foot/foot; however, the gradient in the northern portion of the site is relatively flat. Groundwater elevation data and flow direction are presented on Figure 2. Table 1 provides groundwater elevation data for geoprobes GP-1 through GP-9 and monitoring wells MW-1 through MW-21. Table 2 shows historical groundwater elevation data for monitoring wells MW-1 through MW-21, along with historical groundwater concentrations for monitoring wells MW-1 through MW-21.

4.2 ANALYTICAL METHODS

Eleven soil samples and nine water samples were submitted for chemical analysis. All samples were stored in an ice-filled cooler and transported to North Creek Analytical Laboratory of Beaverton, Oregon for analysis under chain-of-custody control. Eight of the soil samples, collected from near but above the groundwater surface, and the nine groundwater samples were analyzed for total petroleum hydrocarbon (TPH) as gasoline by NWTPH-Gx Method, TPH as diesel and oil by NWTPH-Dx Method, and benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8020A. An additional two soil samples from borings GP-2 and GP-3 at a depth of 3-4 feet bgs were also submitted to the laboratory for analysis based on field observations. One soil sample from boring GP-3 at a depth of 7-8 feet bgs, which yielded the most elevated PID reading, was also submitted to the laboratory for analytical speciation, in accordance with Washington Department of Ecology (WDOE) Interim TPH Policy Method. The WDOE Interim TPH Policy Method consists of the following analytical methods: extractable petroleum hydrocarbons (EPH), volatile petroleum hydrocarbons (VPH), polynuclear aromatic hydrocarbons by GC/MS-SIM, BTEX, naphthalene, and methyl tertiary-butyl ether (MTBE).

The laboratory analytical reports and chains-of-custody documentation are included in Appendix C. The geoprobe groundwater analytical results are shown on Table 3. Figure 4 shows groundwater analytical results for geoprobe points GP-1 through GP-9. The geoprobe soil analytical results are shown on Table 4 and Figure 5. The speciation analytical results are shown on Tables 5 and 6.

4.3 SOIL SAMPLE ANALYTICAL RESULTS

No constituents were detected at or above the laboratory reporting limits in the geoprobe soil samples submitted for analysis. TPH as gasoline was detected in soil samples collected from borings GP-1 (2.5-3.0 feet bgs) at 5.29 mg/Kg, GP-2 (7-8 feet bgs) at 584 mg/Kg, and GP-3 (3-4 feet bgs) at 13.7 mg/Kg. TPH as diesel was detected in GP-2 (3-4 feet bgs) and (7-8 feet bgs) at 104 and 6,700 mg/Kg, respectively and GP-3 (3-4 feet bgs) at 14,000 mg/Kg. No TPH as oil was detected at or above the laboratory reporting limits. The geoprobe soil analytical results for TPH as gasoline, diesel, oil, and BTEX are summarized on Table 4 and on Figure 5.

The soil sample collected from boring GP-3 (7-8 feet bgs) did not yield reportable concentrations of BTEX, naphthalene, and MTBE. Geoprobe sample GP-3 (7.8 feet bgs) was also analyzed for VPH and EPH. Carbon range C10-C12 aromatic and aliphatic compounds were detected at 649 and 856 mg/Kg, respectively. Carbon range C12-C13 aromatic compounds were detected at 1,500 mg/Kg. All other VPH range aromatic and aliphatic constituents were not detected above the associated laboratory reporting limits. The total detected concentration of VPH was 3,005 mg/Kg.

Carbon range C8-C10 aliphatic compounds were detected at 94.3 mg/Kg. Carbon range C10-C12, C12-C16, C16-C21, C21-C34 aromatic compounds were respectively detected at 46.6, 412, 409, and 237 mg/Kg. Carbon range C10-C12, C12-C16, C16-C21, C21-C34 aliphatic compounds were respectively detected at 961, 3,130, 1,730, and 339 mg/Kg. The total detected concentration of EPH was 7,360 mg/Kg. Analytical results for the carbon range speciation are shown on Table 5.

Acenaphthene, acenaphthylene, anthracene, chrysene, fluoranthene, fluorene, 2-methylnaphthalene, phenanthrene, and pyrene were detected at or above the laboratory reporting limit in concentrations ranging from 0.4 to 8.9 mg/Kg. Chrysene is the only carcinogenic petroleum aromatic hydrocarbon (cPAH) detected at a concentration of 0.485 mg/kg. The analytical results are summarized on Table 6.

4.4 GROUNDWATER SAMPLE ANALYTICAL RESULTS

Benzene, ethylbenzene, and total xylenes were not detected at or above laboratory reporting limits in any of the geoprobe groundwater samples. Toluene was detected in samples collected from points GP-2 and GP-3 at 5.85 and 0.515 ug/L, respectively. TPH as gasoline was detected in the samples collected from borings GP-2 at 2,170 ug/L; GP-3 at 2,780 ug/L; and GP-8 at 479 ug/L. With the exception of the sample collected from point GP-6, TPH as diesel was detected in samples collected from all geoprobe borings at or above the laboratory reporting limit. TPH as oil was not detected in any of the geoprobe groundwater samples. A summary of the geoprobe groundwater analytical results are shown on Figure 4 and on Table 3.

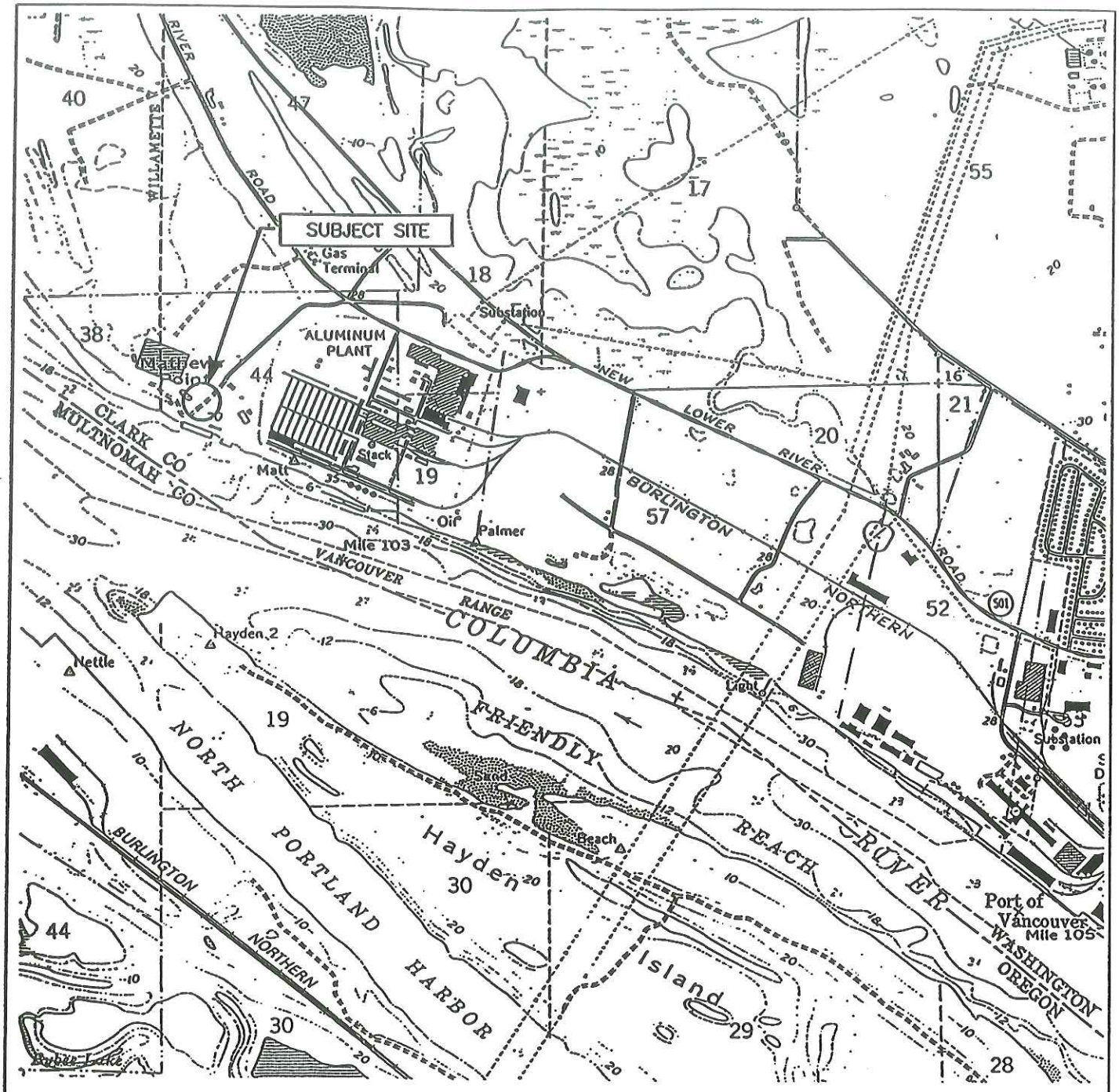
5.0 SUMMARY AND CONCLUSIONS

SECOR performed the described investigation to acquire additional data to more completely characterize the site subsurface, prior to initiating further remedial activities at the site. The investigation focused on assessing the potential presence and extent of SPH as well as dissolved hydrocarbon compounds beneath the site. Free product was not encountered in any of the geoprobe temporary well points installed, although a sheen was encountered on the water surface in borings GP-2, GP-3, GP-4, GP-5 and GP-7. Geoprobes GP-2 and GP-3 were located in the vicinity wells MW-7 and MW-8, inside the middle former pit; soil samples collected from these locations yielded high concentrations of TPH as diesel. TPH as diesel was not detected in soil samples collected from any of the other geoprobe temporary well points.

The geoprobe borings advanced during this investigation yielded water samples containing TPH as diesel across the site including the northern portion of the site in the vicinity of well MW-16. Geoprobe points GP-1, GP-4 and GP-6 yielded water samples containing TPH as diesel at concentrations less than 1 mg/L. Samples collected from the other geoprobe locations yielded TPH as diesel at concentrations between 1.97 and 17.9 mg/l. Those samples collected from points GP-2, GP-3, GP-7, and GP-8 yielded TPH as diesel in excess of 10 mg/L.

Based on the groundwater elevation contour as compared with the top of the silt contour, the top of the silt unit does not appear to dictate the groundwater flow direction, particularly in the northern portion of the site. In the northern portion of the site, the upper silt surface slopes to the east, however, the groundwater flow is to the west. The linear depression observed on aerial photographs (possibly a buried stream channel) may be a preferential path for groundwater flow, however, the analytical results from the geoprobe sample locations and existing monitoring wells do not suggest a preferential migration of dissolved hydrocarbons along this feature.

FIGURES



North

0 1/2 1

SCALE (MILES)

REFERENCE: USGS 7.5 MINUTE QUADRANGLE; VANCOUVER, WASHINGTON.

SECOR International Incorporated

SITE LOCATION MAP

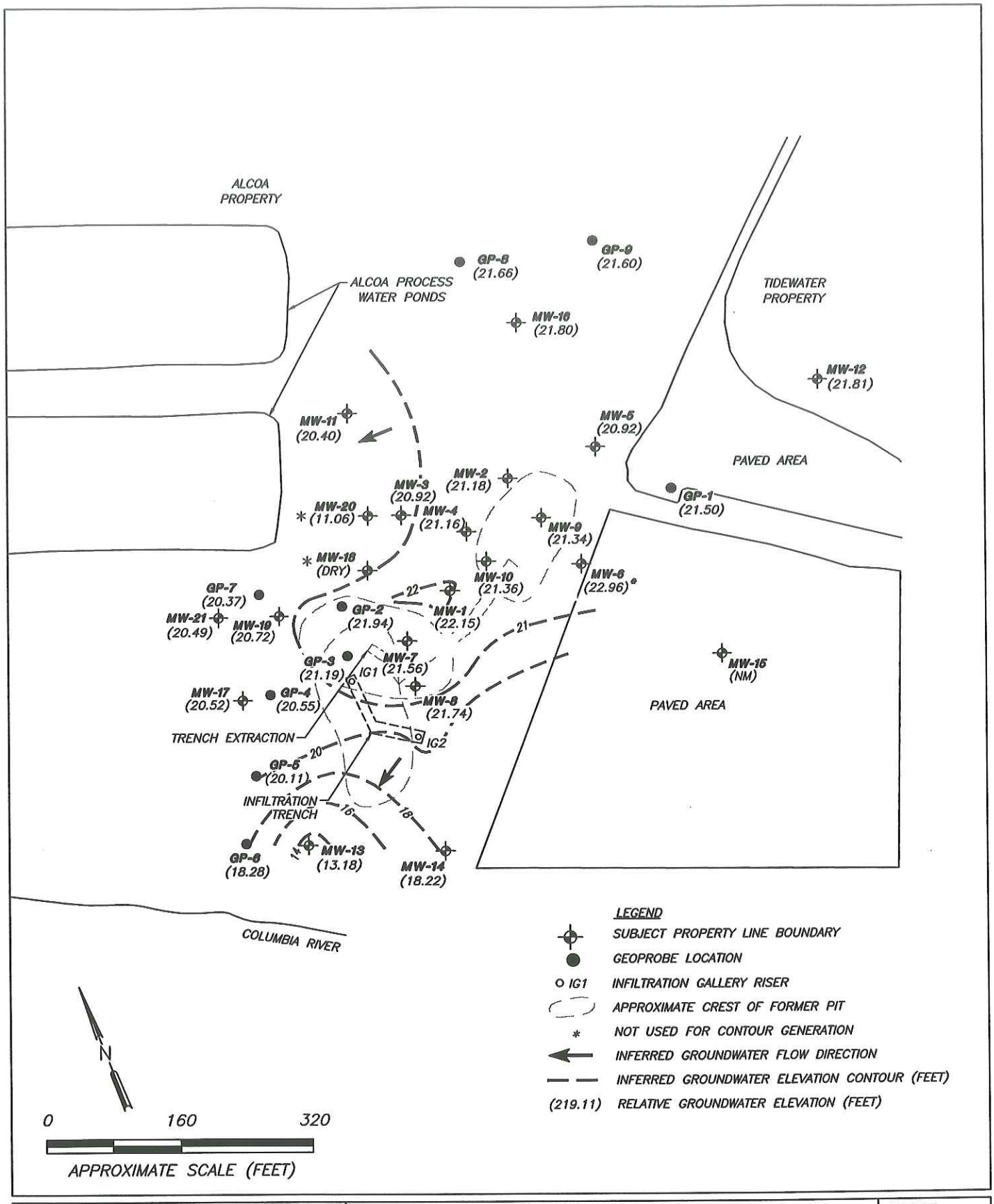
FORMER COLUMBIA MARINE LINES FACILITY

VANCOUVER, WASHINGTON

FIGURE: 1

JOB#: 00255-003-01 APPR: KSH DWN: DJM DATE: 12/2/97

DWG: CR003088



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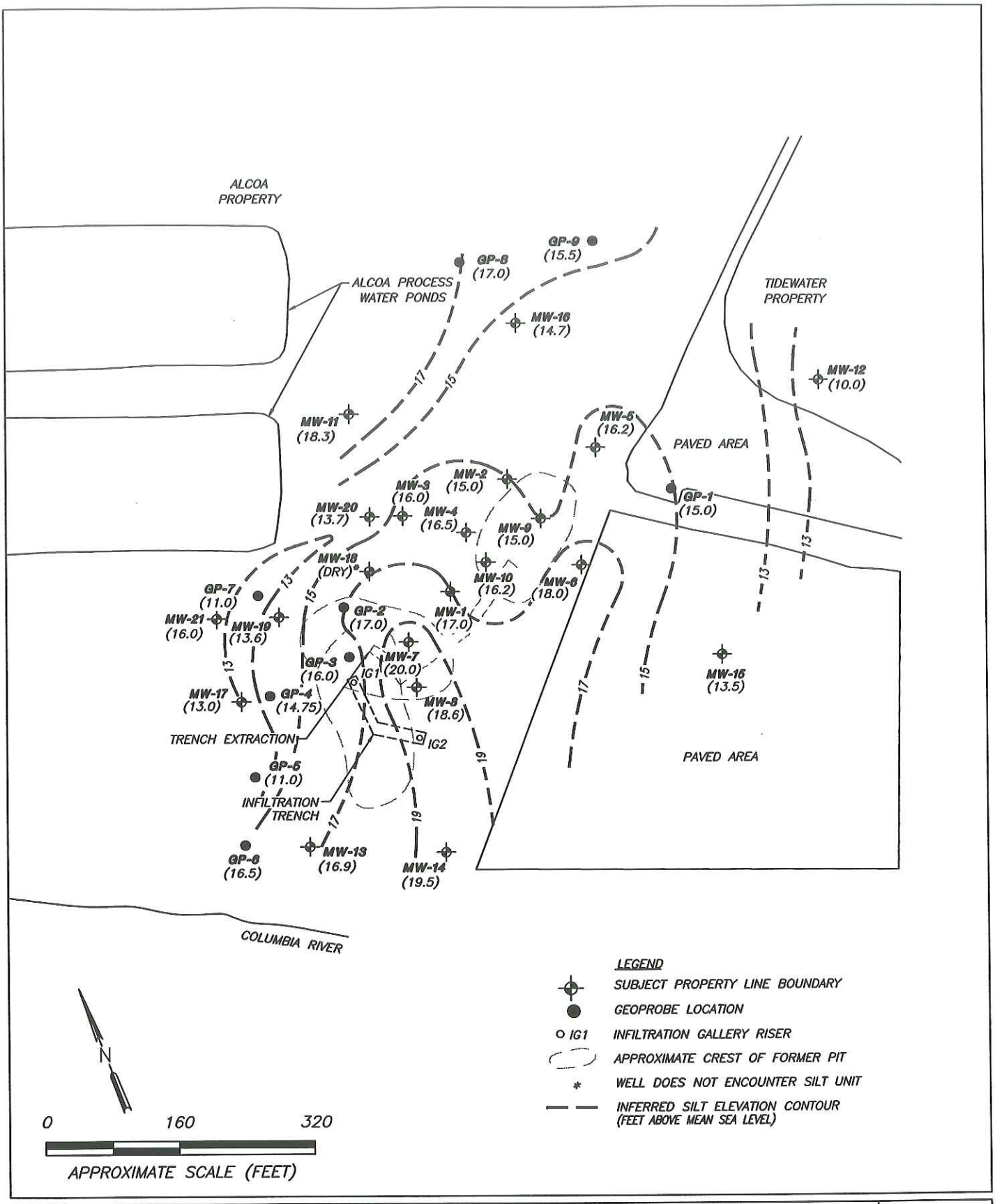
SITE PLAN AND GROUNDWATER ELEVATION (5/7/99)
FORMER COLUMBIA MARINE LINES FACILITY
6305 LOWER RIVER ROAD
VANCOUVER, WASHINGTON

FIGURE: 2

JOB#: F0319-001-01 APPR: DWN: KSM DATE: 7/7/99

DWG: F3190112



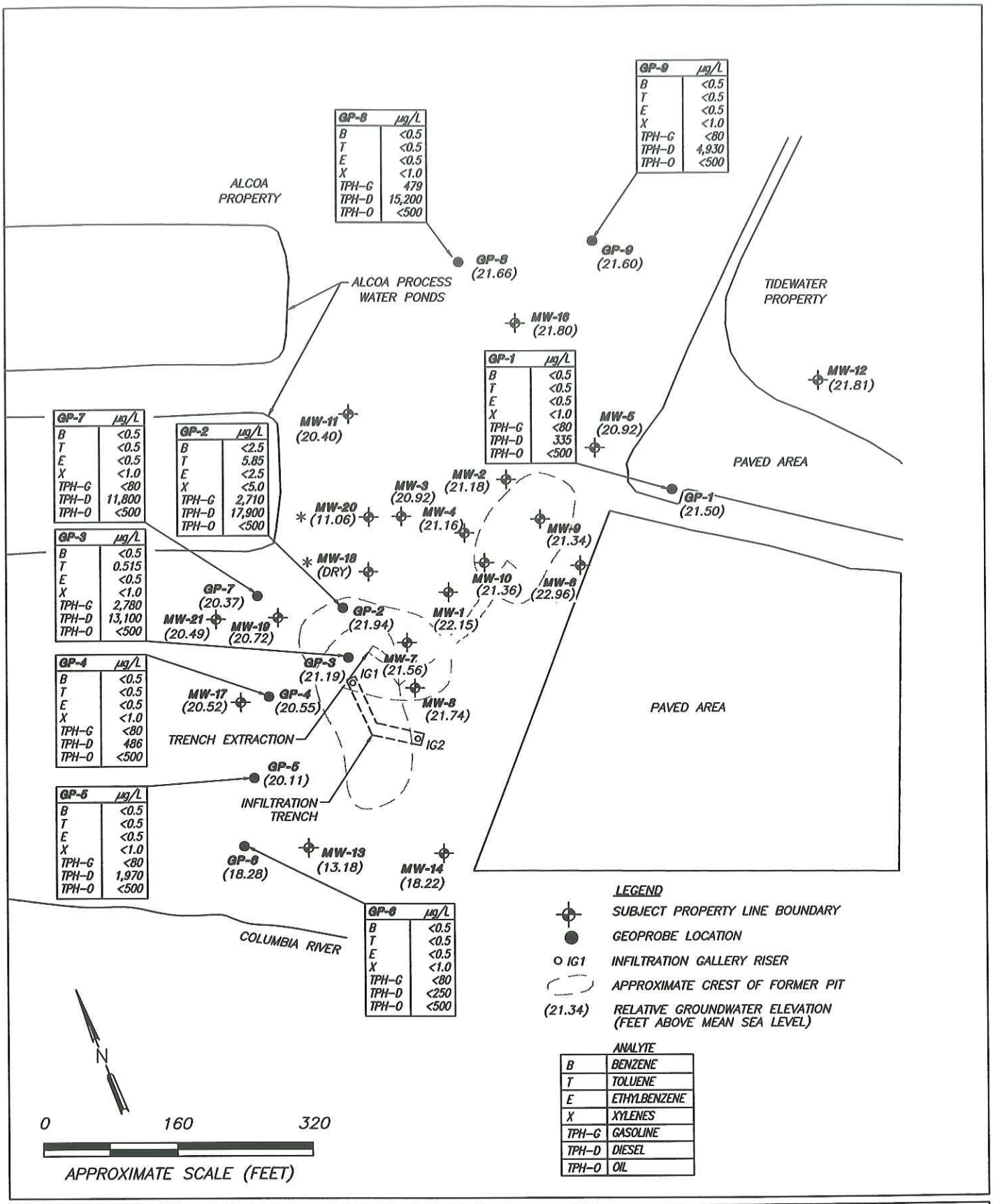
SECOR International Incorporated

TOP OF SILT UNIT
(FEET ABOVE MEAN SEA LEVEL)
FORMER COLUMBIA MARINE LINES FACILITY
6305 LOWER RIVER ROAD
VANCOUVER, WASHINGTON

FIGURE: 3

JOB#: F0319-001-01 APPR: DWN: K8M DATE: 7/7/99

DWG: F3190113



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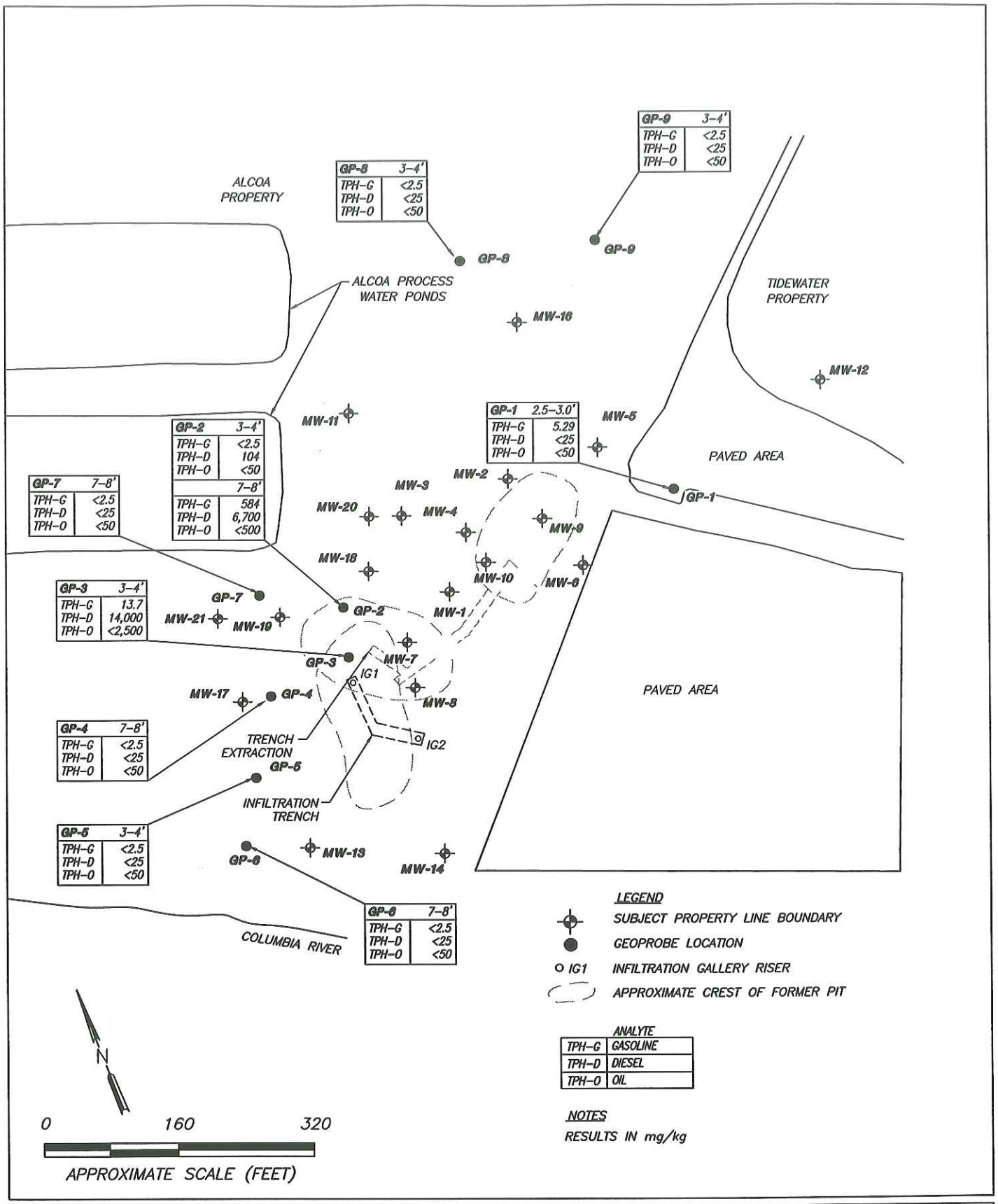
GROUNDWATER ANALYTICAL RESULTS (5/7/99)
FORMER COLUMBIA MARINE LINES FACILITY
6305 LOWER RIVER ROAD
VANCOUVER, WASHINGTON

FIGURE: 4

JOB#: F0319-001-01 APPR: DWN: KSM DATE: 7/7/99

DWG: F3190114



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GEOPROBE SOIL ANALYTICAL RESULTS (5/7/99)
FORMER COLUMBIA MARINE LINES FACILITY
6305 LOWER RIVER ROAD
VANCOUVER, WASHINGTON

FIGURE: 5

JOB#: F0319-001-01 APPR: DWN: KSM DATE: 7/7/99

DWG: F3190115

TABLES

Table 1. Geoprobe and Monitoring Well Groundwater Elevations (5/7/99)
Former Columbia Marine Lines Facility
6305 Lower River Road, Vancouver, Washington

Well Number	TOC Elevation (feet)	DTW (feet)	SPH	Relative Groundwater Elevation (feet)
GP-1	26.55	5.05	0.0	21.50
GP-2	32.24	10.30	0.0	21.94
GP-3	32.08	10.89	0.0	21.19
GP-4	30.75	10.20	0.0	20.55
GP-5	26.97	6.86	0.0	20.11
GP-6	27.17	8.89	0.0	18.28
GP-7	30.87	10.50	0.0	20.37
GP-8	29.37	7.71	0.0	21.66
GP-9	29.66	8.06	0.0	21.60
MW-1	31.66	9.51	0.0	22.15
MW-2	33.97	12.79	0.0	21.18
MW-3	30.90	9.98	0.0	20.92
MW-4	28.42	7.26	0.0	21.16
MW-5	23.37	2.45	0.0	20.92
MW-6	26.14	3.18	0.0	22.96
MW-7	33.36	11.82	11.80	21.56
MW-8	33.49	12.05	11.68	21.74
MW-9	26.36	5.02	0.0	21.34
MW-10	25.89	4.53	0.0	21.36
MW-11	25.89	5.49	0.0	20.40
MW-12	28.17	6.36	0.0	21.81
MW-13	22.78	9.60	0.0	13.18
MW-14	26.25	8.03	0.0	18.22
MW-16	31.13	9.33	0.0	21.80
MW-17	33.94	13.42	0.0	20.52
MW-18	33.19	DRY	DRY	DRY
MW-19	33.67	12.95	0.0	20.72
MW-20	30.36	19.30	0.0	11.06
MW-21	30.06	9.57	0.0	20.49

TOC = Top of casing.
DTW = Depth to water.
SPH = Depth to separate phase hydrocarbons.
WTE = Water table elevation.

Table 2. Historical Groundwater Table Database
Former Columbia Marine Lines Facility
6305 Lower River Road, Vancouver, Washington

Sample Location/ TOC Elevation (feet)	Date	TPH-G (mg/L)	TPH-D (mg/L)		BTEX (µg/L)				HVOCs (µg/L)	PAHs (µg/L)	DTW (feet)	LHT (feet)	WTE (feet)
			Diesel	Heavy Oil	Benzene	Toluene	Ethyl-benzene	Total Xylenes					
MW-1	11/08/83	--	--	--	<20	<20	<20	--	--	--	--	--	--
31.66	12/13/84	--	--	--	<5	<5	<5	<5	--	--	--	--	--
	11/13/95	<0.08	12	<5.0	<0.50	<0.50	<0.50	<0.50	ND	ND	9.19	0.00	22.47
	08/01/96	--	--	--	--	--	--	--	--	--	10.23	--	21.43
	10/30/97	--	--	--	--	--	--	--	--	--	9.54	--	22.12
	10/29/98	0.233	5.43	1.23	<0.50	<0.50	<0.50	<1.0	--	--	12.26	--	19.40
	05/07/99	--	--	--	--	--	--	--	--	--	9.51	0.00	22.15
MW-2	11/08/83	--	--	--	510	450	100	770	--	--	--	--	--
33.97	02/05/86	--	--	--	69	390	110	900	--	--	--	--	--
	08/28/90	<0.05	26.4	--	<100	<100	<100	566	--	--	--	--	--
	08/02/94	3.1	10	--	6.3	3.0	35	110	--	ND	--	--	--
	11/13/95	4.0	40	7.4	1.7	2.3	22	110	--	--	12.95	0.00	21.02
	08/01/96	<0.08	4.7	--	2.3	1.0	20	44	--	--	13.75	--	20.22
	10/30/97	--	--	--	--	--	--	--	--	--	13.55	--	20.42
	10/29/98	3.22	9.03	<2.50	<0.50	0.641	<0.50	6.21	--	--	14.92	--	19.05
	05/07/99	--	--	--	--	--	--	--	--	--	12.79	0.00	21.18
MW-3	11/08/83	--	--	--	95	64	15	90	--	--	--	--	--
30.90	12/17/84	--	--	--	<1	<1	<1	--	--	--	--	--	--
	11/13/95	0.29	4.6	<5.0	<0.50	<0.50	<0.50	<0.50	--	--	11.24	0.00	19.66
	08/01/96	--	--	--	--	--	--	--	--	--	11.11	--	19.79
	10/30/97	--	--	--	--	--	--	--	--	--	11.23	--	19.67
	10/30/98	0.28	11.4	4.1	<0.50	1.55	<0.50	<1.0	--	--	12.28	--	18.62
	05/07/99	--	--	--	--	--	--	--	--	--	9.98	0.00	20.92
MW-4	11/08/83	--	--	--	700	150	110	800	--	--	--	--	--
28.42	12/12/84	--	--	--	<1	<1	<1	<1	--	--	--	--	--
	11/13/95	0.39	7.8	<5.0	3.0	1.4	1.1	6.7	--	--	8.27	0.00	20.15
	08/01/96	0.38	11	--	1.6	5.0	<0.50	<1.0	--	--	8.40	--	20.02
	10/30/97	--	--	--	--	--	--	--	--	--	8.45	--	19.97
	10/29/98	1.12	11.2	2.92	<0.50	1.0	<0.50	<1.0	--	--	9.65	--	18.77
	05/07/99	--	--	--	--	--	--	--	--	--	7.26	0.00	21.16

Table 2. Historical Groundwater Table Database (Continued)
Former Columbia Marine Lines Facility
6305 Lower River Road, Vancouver, Washington

Sample Location/ TOC Elevation (feet)	Date	TPH-G (mg/L)	TPH-D (mg/L)		BTEX (µg/L)				HVOCs (µg/L)	PAHs (µg/L)	DTW (feet)	LHT (feet)	WTE (feet)
			Diesel	Heavy Oil	Benzene	Toluene	Ethyl-benzene	Total Xylenes					
MW-5	11/08/83	--	--	--	35	<2	<2	--	--	--	--	--	--
23.37	12/17/84	--	--	--	<20	380	<20	--	--	--	--	--	--
	11/13/95	<0.08	2.6	0.77	<0.50	<0.50	<0.50	<0.50	--	--	3.07	0.00	20.30
	08/01/96	--	--	--	--	--	--	--	--	--	3.60	--	19.77
	10/29/98	--	--	--	--	--	--	--	--	--	--	--	--
	05/07/99	--	--	--	--	--	--	--	--	--	2.45	0.0	20.92
MW-6	12/12/84	--	--	--	<1	<1	<1	<1	--	--	--	--	--
26.14	11/13/95	0.74	48	<5.0	<0.50	<0.50	<0.50	<0.50	--	--	5.23	0.00	20.91
	08/01/96	--	--	--	--	--	--	--	--	--	5.50	--	20.64
	10/30/98	<0.08	27	6.79	<0.50	<0.50	<0.50	<1.0	--	--	5.44	--	20.70
	05/07/99	--	--	--	--	--	--	--	--	--	3.18	0.00	22.96
MW-7	11/08/83	--	--	--	<20	<20	<20	--	--	--	--	--	--
33.36	08/02/94	1.6	7.7	--	<2.5	<2.5	<2.5	<2.5	--	ND	--	--	--
	11/13/95	1.8	43	<5.0	1.6	1.2	<1.0	<1.0	--	--	12.54	0.00	20.82
	08/01/96	--	--	--	--	--	--	--	--	--	13.55	0.62	20.31
	10/30/97	--	--	--	--	--	--	--	--	--	13.24	0.17	20.26
	10/30/98	DET_1	DET	ND	--	--	--	--	--	--	14.51	0.07	18.92
	05/07/99	--	--	--	--	--	--	--	--	--	11.82	11.80	21.56
MW-8	11/08/83	--	--	--	208	<2	<2	--	--	--	--	--	--
33.49	11/13/95	5.4	490	41	2.0	1.5	1.9	5.0	--	--	12.90	0.50	20.99
	08/01/96	--	--	--	--	--	--	--	--	--	12.98	0.15	20.63
	10/30/97	--	--	--	--	--	--	--	--	--	13.20	0.21	20.46
	10/30/98	DET_1	DET	DET	--	--	--	--	--	--	14.94	0.14	18.69
	05/07/99	--	--	--	--	--	--	--	--	--	12.05	11.68	21.74
MW-9	12/13/84	--	--	--	<1	<1	<1	<1	--	--	--	--	--
26.36	11/13/95	<0.08	0.88	0.63	<0.50	<0.50	<0.50	<0.50	--	--	4.25	0.00	22.11
	08/01/96	--	--	--	--	--	--	--	--	--	5.81	--	20.55
	10/30/97	--	--	--	--	--	--	--	--	--	1.87	--	24.49
	10/30/98	<0.08	5.76	2.3	<0.50	<0.50	<0.50	<1.0	--	--	6.31	--	20.05
	05/07/99	--	--	--	--	--	--	--	--	--	5.02	0.00	21.34

Table 2. Historical Groundwater Table Database (Continued)
Former Columbia Marine Lines Facility
6305 Lower River Road, Vancouver, Washington

Sample Location/ TOC Elevation (feet)	Date	TPH-G (mg/L)	TPH-D (mg/L)		BTEX (µg/L)				HVOCs (µg/L)	PAHs (µg/L)	DTW (feet)	LHT (feet)	WTE (feet)
			Diesel	Heavy Oil	Benzene	Toluene	Ethyl-benzene	Total Xylenes					
MW-10 25.89	11/13/95	0.76	<0.25	<5.0	1.1	1.0	1.2	1.5	--	--	5.09	0.00	20.80
	08/01/96	--	--	--	--	--	--	--	--	--	5.62	--	20.27
	10/30/97	--	--	--	--	--	--	--	--	--	5.64	--	20.25
	10/30/98	--	--	--	--	--	--	--	--	--	DRY	DRY	DRY
	05/07/99	--	--	--	--	--	--	--	--	--	4.53	0.00	21.36
MW-11 25.89	12/17/84	--	--	--	<1	<1	<1	--	--	--	--	--	--
	08/02/94	<0.20	<0.50	--	<0.50	<0.50	<0.50	0.92	--	ND	--	--	--
	11/13/95	<0.08	11	<5.0	<0.50	<0.50	<0.50	<0.50	--	--	6.57	0.00	19.32
	08/01/96	--	--	--	--	--	--	--	--	--	6.71	--	19.18
	10/30/97	--	--	--	--	--	--	--	--	--	6.75	--	19.14
	10/29/98	<0.08	3.16	0.70	<0.50	<0.50	<0.50	<1.0	--	--	8.12	--	17.77
	05/07/99	--	--	--	--	--	--	--	--	--	5.49	0.00	20.40
MW-12 28.17	12/18/84	--	--	--	<1	<1	<1	--	--	--	--	--	--
	11/13/95	<0.08	<0.25	<0.50	<0.50	<0.50	<0.50	<0.50	--	--	6.07	0.00	22.10
	08/01/96	<0.08	<0.25	--	<0.50	<0.50	<0.50	<1	--	--	7.15	--	21.02
	10/30/97	--	--	--	--	--	--	--	--	--	6.61	--	21.56
	10/29/98	<0.08	<0.25	<0.50	<0.50	<0.50	<0.50	<1.0	--	--	8.01	--	20.16
	05/07/99	--	--	--	--	--	--	--	--	--	6.36	0.00	21.81
MW-13 22.78	12/19/84	--	--	--	<1	<1	<1	<2	--	--	--	--	--
	02/05/86	--	--	--	<1	<1	<1	<2	--	--	--	--	--
	08/28/90	<0.05	<0.05	--	<100	<100	<100	<100	--	--	--	--	--
	08/02/94	<0.20	1.2	--	<0.50	<0.50	<0.50	<0.50	--	ND	--	--	--
	11/13/95	<0.08	1.4	<0.50	<0.50	<0.50	<0.50	<0.50	--	--	10.60	0.00	12.18
	08/01/96	<0.08	0.90	--	<0.50	<0.50	<0.50	<1	--	--	10.70	--	12.08
	10/30/97	<0.08	1.53	0.75	<0.50	<0.50	<0.50	<1	--	--	10.48	--	12.30
	10/29/98	--	--	--	--	--	--	--	--	--	--	--	--
	05/07/99	--	--	--	--	--	--	--	--	--	9.60	0.00	13.18

Table 2. Historical Groundwater Table Database (Continued)
Former Columbia Marine Lines Facility
6305 Lower River Road, Vancouver, Washington

Sample Location/ TOC Elevation (feet)	Date	TPH-G (mg/L)	TPH-D (mg/L)		BTEX (µg/L)				HVOCs (µg/L)	PAHs (µg/L)	DTW (feet)	LHT (feet)	WTE (feet)
			Diesel	Heavy Oil	Benzene	Toluene	Ethyl-benzene	Total Xylenes					
MW-14	12/19/84	--	--	--	<1	<1	<1	--	--	--	--	--	--
26.25	11/13/95	<0.08	1.0	<0.50	<0.50	<0.50	<0.50	<0.50	--	--	8.08	0.00	18.17
	08/01/96	<0.08	1.8	--	<0.50	<0.50	<0.50	<1	--	--	9.15	--	17.10
	10/30/97	<0.08	<0.25	<0.50	<0.50	<0.50	<0.50	<1	--	--	8.89	--	17.36
	10/29/98	--	--	--	--	--	--	--	--	--	--	--	--
	05/07/99	--	--	--	--	--	--	--	--	--	8.03	0.00	18.22
MW-15	02/05/86	--	--	--	<1	<1	<1	<2	--	--	--	--	--
26.24	08/02/94	<0.20	<0.50	--	<0.50	<0.50	<0.50	<0.50	--	ND	--	--	--
	11/13/95	--	--	--	--	--	--	--	--	--	--	--	--
	08/01/96	--	--	--	--	--	--	--	--	--	--	--	--
	05/07/99	--	--	--	--	--	--	--	--	--	--	--	--
MW-16	02/05/86	--	--	--	93	<10	<10	240	--	--	--	--	--
31.13	08/28/90	1.0	4.91	--	<100	<100	<100	445	--	--	--	--	--
	08/02/94	1.1*	11*	--	2.0*	0.73*	0.74*	4.8*	--	11*	--	--	--
	11/13/95	0.90	10	2.1	0.64	1.3	53	7.9	--	--	9.94	0.00	21.19
	08/01/9	0.74	<0.50	--	<0.50	2.2	<0.50	3.0	--	--	10.36	--	20.77
	10/30/97	1.22	9.01	2.70	<0.50	<0.50	7.86	4.43	--	--	10.26	--	20.87
	10/29/98	0.482	11.6	2.59	<0.50	3.73	<0.50	<1.0	--	--	11.43	--	19.70
	05/07/99	--	--	--	--	--	--	--	--	--	9.33	0.00	21.80
MW-17	02/05/86	--	--	--	<1	<1	<1	<2	--	--	--	--	--
33.94	11/13/95	--	--	--	--	--	--	--	--	--	DRY	DRY	DRY
	08/01/96	--	--	--	--	--	--	--	--	--	14.62	--	19.32
	10/30/97	--	--	--	--	--	--	--	--	--	15.61	--	18.33
	10/29/98	--	--	--	--	--	--	--	--	--	DRY	DRY	DRY
	05/07/99	--	--	--	--	--	--	--	--	--	13.42	0.00	20.52
MW-18	11/13/95	<0.08	4.9	2.1	<0.50	<0.50	<0.50	<0.50	--	--	8.47	0.00	24.72
33.19	08/01/96	<0.08	9.6	--	<0.50	1.1	0.82	<1.0	--	--	9.96	0.00	23.23
	10/30/97	--	--	--	--	--	--	--	--	--	DRY	DRY	DRY
	10/29/98	--	--	--	--	--	--	--	--	--	DRY	DRY	DRY
	05/07/99	--	--	--	--	--	--	--	--	--	DRY	DRY	DRY

Table 2. Historical Groundwater Table Database (Continued)
Former Columbia Marine Lines Facility
6305 Lower River Road, Vancouver, Washington

Sample Location/ TOC Elevation (feet)	Date	TPH-G (mg/L)	TPH-D (mg/L)		BTEX (µg/L)				HVOCs (µg/L)	PAHs (µg/L)	DTW (feet)	LHT (feet)	WTE (feet)
			Diesel	Heavy Oil	Benzene	Toluene	Ethyl-benzene	Total Xylenes					
MW-19	12/05/86	--	--	--	140	<10	30	<20	--	--	--	--	--
33.67	08/28/90	<0.05	35.2	--	<100	<100	<100	<100	--	--	--	--	--
	11/13/95	4.3	69	<25	<2.5	<2.5	<2.5	<2.5	--	--	14.77	0.00	18.90
	08/01/96	--	--	--	--	--	--	--	--	--	14.24	0.00	19.43
	10/30/97	2.86	21.6	3.18	<0.50	<0.50	<0.50	1.45	--	--	14.47	--	19.20
	10/30/98	DET_1	DET	DET	--	--	--	--	--	--	16.11	0.75	18.31
	05/07/99	--	--	--	--	--	--	--	--	--	12.95	0.00	20.72
MW-20	02/05/86	--	--	--	<1	<1	<1	<2	--	--	--	--	--
30.36	11/13/95	<0.08	0.87	0.73	<0.50	<0.50	<0.50	<0.50	ND	--	21.99	0.00	8.37
	08/01/96	--	--	--	--	--	--	--	--	--	22.66	--	7.70
	10/30/97	--	--	--	--	--	--	--	--	--	23.72	--	6.64
	10/30/98	<0.08	<0.25	<0.50	<0.50	<0.50	<0.50	<1.0	--	--	27.70	--	2.66
	05/07/99	--	--	--	--	--	--	--	--	--	19.30	0.00	11.06
MW-21	02/05/86	--	--	--	<1	<1	<1	<2	--	--	--	--	--
30.06	11/13/95	--	--	--	--	--	--	--	--	--	DRY	DRY	DRY
	08/01/96	--	--	--	--	--	--	--	--	--	10.65	--	19.41
	10/30/97	--	--	--	--	--	--	--	--	--	11.50	--	18.56
	10/29/98	--	--	--	--	--	--	--	--	--	DRY	DRY	DRY
	05/07/99	--	--	--	--	--	--	--	--	--	9.57	0.00	20.49
P-1	11/13/95	--	--	--	--	--	--	--	--	--	9.74	0.00	19.61
29.35	08/01/96	--	--	--	--	--	--	--	--	--	--	--	29.35
P-2	11/13/95	--	--	--	--	--	--	--	--	--	4.35	0.00	20.87
25.22	08/01/96	--	--	--	--	--	--	--	--	--	--	--	25.22
EX-1	11/13/95	--	--	--	--	--	--	--	--	--	14.72	0.00	18.57
32.30	08/01/96	--	--	--	--	--	--	--	--	--	--	--	25.22
EX-2	02/03/96	5.3	13	2.5	1.4	1.3	0.54	2.4	--	--	--	--	--
33.53	08/01/96	--	--	--	--	--	--	--	--	--	--	--	33.53

Table 2. Historical Groundwater Table Database (Concluded)
Former Columbia Marine Lines Facility
6305 Lower River Road, Vancouver, Washington

Sample Location/ TOC Elevation (feet)	Date	TPH-G (mg/L)	TPH-D (mg/L)		BTEX (μg/L)				HVOCs (μg/L)	PAHs (μg/L)	DTW (feet)	LHT (feet)	WTE (feet)
			Diesel	Heavy Oil	Benzene	Toluene	Ethyl-benzene	Total Xylenes					
PMX-5 26.70	08/02/94	<0.2	1.3	--	<0.5	<0.5	<0.5	<0.5	--	ND	--	--	--
	11/13/95	--	--	--	--	--	--	--	--	--	--	--	--
	08/01/96	--	--	--	--	--	--	--	--	--	--	--	26.70
MTCA Method A Cleanup Levels		1	1		5	40	30	20	Various	0.1**			

TOC = Top of casing elevation relative to assigned benchmark.
DTW = Depth to water below top of casing.
LHT = Liquid hydrocarbon thickness.
WTE = Water table elevation.
DRY = Well was dry
-- = Not measured, not analyzed, or not sampled.
ND = Not detected above laboratory method reporting limit (MRL).
* = Results include higher of 08/02/94 MW-16 or bind duplicate listed as "MW-30." Fluorene was detected at 11 μg/L in MW-30; all other PAH results were below method reporting limits.
** = MTCA Method A cleanup level for carcinogenic PAHs.

TPH-G analysis by Washington DOE Method WTPH-G.
TPH-D analysis by Washington DOE Method WTPH-D Extended.
BTEX analysis by EPA Method 8020.
HVOC analysis by EPA Method 8010.
PAH analysis by EPA Method 8310.

1 Detected hydrocarbons in gasoline range appear to be due to overlap of diesel-range hydrocarbons.

Analytical methods prior to 1995 include Hydrocarbon Scan by EPA Methods 3510/Modified 8015, and Oil and Grease by EPA Method 413.1.

Note: Water elevation corrected if liquid hydrocarbon present, corrected water level elevation = TOC - [(depth to water) -(LH thickness x 0.80)].

Table 3. Geoprobe Groundwater Analytical Results
Former Columbia Marine Lines Facility
6305 Lower River Road, Vancouver, Washington

Geoprobe Sample No.	Date	BTEX (ug/L)				TPH-G (ug/L)	TPH-D (mg/L)	TPH-O (mg/L)
		Benzene	Toluene	Ethylbenzene	Total Xylenes			
GP - 1	5/7/99	< 0.50	< 0.50	< 0.50	< 1.0	< 80	0.335	< 0.50
GP - 2	5/7/99	< 2.5	5.85	< 2.5	< 5.0	2710	17.9	< 0.50
GP - 3	5/7/99	< 0.50	0.515	< 0.50	< 1.0	2780	13.1	< 0.50
GP - 4	5/7/99	< 0.50	< 0.50	< 0.50	< 1.0	< 80	0.486	< 0.50
GP - 5	5/7/99	< 0.50	< 0.50	< 0.50	< 1.0	< 80	1.97	< 0.50
GP - 6	5/7/99	< 0.50	< 0.50	< 0.50	< 1.0	< 80	< 0.25	< 0.50
GP - 7	5/7/99	< 0.50	< 0.50	< 0.50	< 1.0	< 80	11.8	< 0.50
GP - 8	5/7/99	< 0.50	< 0.50	< 0.50	< 1.0	479	15.2	< 0.50
GP - 9	5/7/99	< 0.500	< 0.50	< 0.50	< 1.0	< 80	4.93	< 0.50

Notes:

TPH-G = Total petroleum hydrocarbons as gasoline by NWTPH-Gx Method.
TPH-D = Total petroleum hydrocarbons as diesel by NWTPH-Dx Method.
TPH-O = Total petroleum hydrocarbons as heavy oil by NWTPH-Dx Method.
Benzene, Toluene, Ethylbenzene, and Total Xylenes (BTEX) by EPA Method 8020A.
< = Less than laboratory method reporting limits (MRLs).
ug/L = Micrograms per liter; approximate parts per billion.
mg/L = Milligrams per liter, approximate parts per million.

Table 4. Geoprobe Soil Analytical Results
Former Columbia Marine Lines Facility
6305 Lower River Road, Vancouver, Washington

Sample No.	Depth (feet bgs)	Date	BTEX (mg/Kg)				TPH-G (mg/Kg)	TPH-D (mg/Kg)	TPH-O (mg/Kg)	Naphthalene (mg/Kg)	MTBE (mg/Kg)
			Benzene	Toluene	Ethylbenzene	Total Xylenes					
GP-1	2.5 - 3.0	5/6/99	< 0.05	< 0.05	< 0.05	< 0.05	5.29	< 25	< 50	--	--
GP-2	3 - 4	5/6/99	< 0.05	< 0.05	< 0.05	< 0.05	< 2.50	104	< 50	--	--
	7 - 8	5/6/99	< 0.50	< 0.50	< 0.50	< 0.50	584	6,700[a]	< 500[a]	--	--
GP-3	3 - 4	5/6/99	< 0.05	< 0.05	< 0.05	< 0.05	13.7	14,000[a]	< 2,500[a]	--	--
	7 - 8*	5/6/99	< 1.00	< 1.00	< 1.00	< 2.00	--	--	--	< 1.00	< 10.0
GP-4	7 - 8	5/6/99	< 0.05	< 0.05	< 0.05	< 0.05	< 2.50	< 25	< 50	--	--
GP-5	3 - 4	5/6/99	< 0.05	< 0.05	< 0.05	< 0.05	< 2.50	< 25	< 50	--	--
GP-6	7 - 8	5/6/99	< 0.05	< 0.05	< 0.05	< 0.05	< 2.50	< 25	< 50	--	--
GP-7	7 - 8	5/6/99	< 0.05	< 0.05	< 0.05	< 0.05	< 2.50	< 25	< 50	--	--
GP-8	3 - 4	5/6/99	< 0.05	< 0.05	< 0.05	< 0.05	< 2.50	< 25	< 50	--	--
GP-9	3 - 4	5/6/99	< 0.05	< 0.05	< 0.05	< 0.05	< 2.50	< 25	< 50	--	--

Notes:

TPH-G = Total petroleum hydrocarbons as gasoline by NWTPH-Gx Method.
TPH-D = Total petroleum hydrocarbons as diesel by NWTPH-Dx Method.
TPH-O = Total petroleum hydrocarbons as heavy oil by NWTHP-Dx Method.
MTBE = Methyl tert-butyl ether, analyzed by WDOE Interim TPH Policy Method using GC/MS.
a = Reporting limits raised due to dilution necessary for analysis.
* = BTEX and Naphthalene for GP3 depth 7-8 analyzed by WDOE Interim TPH Policy Method using GC/MS. This sample was analyzed outside the EPA recommended holding time.
< = Less than laboratory method reporting limits (MRLs).
mg/Kg = milligrams per kilogram; approximate parts per million.
bgs = Below ground surface.
-- = Not analyzed.

Table 5. Geoprobe Soil Analytical Results - Petroleum Hydrocarbons
Former Columbia Marine Lines Facility
6305 Lower River Road, Vancouver, Washington

EPH (mg/kg)					
Sample	*Depth*	*Carbon Range*	*Aromatics*	*Carbon Range*	*Aliphatics*
GP3	7 - 8	C8 - C10	--	C8 - C10	94.3
		C10 - C12	46.6	C10 - C12	961
		C12 - C16	412	C12 - C16	3,130
		C16 - C21	409	C16 - C21	1,730
		C21 - C34	237	C21 - C34	339
Total EPH = 7,360					
VPH (mg/kg)					
Sample	*Depth*	*Carbon Range*	*Aromatics*	*Carbon Range*	*Aliphatics*
GP3	7 - 8	C5 - C6	--	C5 - C6	< 250
		C6 - C8	--	C6 - C8	< 250
		C8 - C10	< 250	C8 - C10	< 250
		C10 - C12	649	C10 - C12	856
		C12 - C13	1,500	C12 - C13	--
Total VPH = 3,005					

Notes:

EPH Extractable Petroleum Hydrocarbons by modified WDOE Interim TPH Policy Method
VPH Volatile Petroleum Hydrocarbons by modified WDOE Interim TPH Policy Method.

Table 6. Geoprobe Soil Analytical Results - Polynuclear Aromatic Hydrocarbons
GP-3, 7-8 feet bgs (5/6/99)
Former Columbia Marine Lines Facility
6305 Lower River Road, Vancouver, Washington

cPAH (mg/Kg)		non-cPAH	
Benzo(a)anthracene	<0.4	Acenaphthene	0.685
Benzo(a)pyrene	<0.4	Acenaphthylene	0.4
Benzo(b)fluoranthene	<0.4	Anthracene	3.48
Benzo(ghi)perylene	<0.4	Fluoranthene	0.428
Benzo(k)fluoranthene	<0.4	Fluorene	2.45
Chrysene	0.485	2-methylnaphthalene	0.4
Dibenz(a,h)anthracene	<0.4	Naphthalene	<0.4
Ideno(1,2,3-cd)pyrene	<0.4	Phenanthrene	8.9
		Pyrene	0.999

Notes:

cPAH = Carcinogenic polynuclear aromatic hydrocarbon.
non-cPAH = Noncarcinogenic polynuclear aromatic hydrocarbon.
All units tested in milligrams per kilogram (mg/kg).
bgs = Below ground surface.
< = Less than laboratory method reporting limits by GC/MS-SIM.

APPENDIX A
FIELD SCREENING METHODS

Additional Subsurface Investigation Report
Former Columbia Marine Lines Facility
6305 Lower River Road
SECOR PN: F0319-001-01
July 9, 1999

APPENDIX A
FIELD PROCEDURES

UNDERGROUND UTILITY LOCATIONS

A call was placed with One Call Concepts Utilities Notification Center to notify public utilities of the scheduled subsurface investigation. SECOR verified that the appropriate utilities were marked at the site prior to drilling.

DRILLING PROCEDURES

Soil borings were hand-probed from ground surface to 5 feet below ground surface (bgs) to ensure that underground utilities would not be encountered and damaged during drilling. The soil borings were drilled with a track-mounted Geoprobe rig. Each soil boring was abandoned with bentonite and sealed with concrete at the top of the borehole. All equipment was decontaminated in a non-phosphate detergent wash, rinsed in tap water, and rinsed a second time in distilled water before use in each borehole to minimize cross-contamination between boreholes.

Soil cuttings were not generated using Geoprobe direct push drilling methods.

SOIL SAMPLE COLLECTION

Soil samples were collected from approximately 1 to 15 feet bgs during drilling to describe lithology and to field screen for the presence of volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) . Samples were collected using a hydraulically driven 4-foot-long split-spoon sampler lined with 4-foot-long polyethylene (PE) lining sleeves. The sampler was advanced into undisturbed soils at the bottom of the borehole and then withdrawn from the boring and removed from the Geoprobe casing. The PE liners containing the soil were prepared for evaluation and analysis. Soil samples retained for analysis were promptly extruded and transferred from the lower portion of the PE liner into a threaded laboratory-prepared glass jar and capped with a Teflon-lined lid. The samples were labeled and placed in a cooler with ice for transport to North Creek Analytical of Beaverton, Oregon under standard chain-of-custody procedures. The remaining upper portion of the sample retained in the PE liner was used to field screen for evidence of VOCs and SVOCs and to characterize soil lithology.

A log was compiled for each borehole, including descriptions of the soil types, color, texture, degree of consolidation, moisture content, and field screening results. Soil types were based on the Unified Soil Classification System.

FIELD SCREENING OF SOIL SAMPLES

Soil samples for field screening were observed for visual or olfactory indications of VOCs and SVOCs and tested for headspace vapor concentrations using a photoionization detector (PID).

Data generated from field screening instruments is considered qualitative in nature. Although semi-quantitative data are 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 considerations during site reconnaissance and subsequent intrusive activities.

- Quantitative data, if contaminant is known and the instrument is calibrated to that substance.

Field Screening Using Vapor Headspace Testing. The instrument used for headspace vapor testing was a Thermo-Environmental OVM 580B. Prior to use, this instrument was calibrated to a known isobutylene standard 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 placed directly from the sampler into a new, sealable Ziploc-type plastic bag. The bag was immediately sealed.

- The sealed bag containing the sample was allowed to sit at field ambient temperature for approximately 2 minutes.

- After the 2-minute period, 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 parts per million; 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 parts per million 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 which may affect measurable concentrations and which 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.

SAMPLE DOCUMENTATION AND CUSTODY

Chain-of-custody for a sample was defined by the following criteria:

- The sample was in SECOR's possession or in view after being in possession.
- The sample was in SECOR's possession and locked up, or transferred to a designated secure area by SECOR.

Each time the sample bottles or samples was transferred, both the sender and receiver signed and dated the chain-of-custody form and specified what was transferred. After transfer of sample custody from the sampling team to the laboratory sample custodian, one copy of the chain-of-custody record was given to the sampling team for placement into the project files; the original remained with the laboratory. A chain-of-custody record was completed for each shipment of containers.

The following information was included on the chain-of-custody form:

- Sample container type and container number
- Date and time of collection
- Sample collection location(s)
- Signatures of sampler, submitter, and receiver of samples
- Date and time samples were received by laboratory
- Total number of samples received
- Laboratory analyses requested for each sample
- Requested laboratory turn-around time

LABORATORY AND FIELD QUALITY CONTROL AND QUALITY ASSURANCE

Routine quality control procedures outlined in the laboratory's Quality Assurance Manual were used for this project. Routine procedures used by the laboratory included:

- Daily instrument calibration prior to analysis of any samples.
- Method blank analysis daily or at a frequency of one per 20 samples analyzed, whichever is greater.
- Daily analysis of EPA or NBS reference standards to assess the accuracy of calibration at the mid-range of the calibration curve.
- Analysis of matrix spike recoveries at approximately 10% frequency on each matrix to assess accuracy and identify possible matrix interferences.
- Analysis of laboratory duplicates on an approximate 10% frequency to assess the precision of the analysis.

EQUIPMENT CALIBRATION AND MAINTENANCE

All instruments and equipment used during this project were operated, calibrated, and maintained according to the manufacturers' guidelines and recommendations. Operation, calibration, and maintenance were performed by personnel who have been properly trained in these procedures. In addition, field instruments were checked periodically in the field using the above standards to verify meter calibrations. All calibration and field measurements were recorded in respective instrument log books and charted on respective control charts contained in each instrument log book.

Field screening instruments used were appropriate for detection of VOCs and SVOCs. Instruments were calibrated and maintained according to manufacturers' instructions.

SECOR

GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PN: 00255-003-01 DATE: 5/7/99 WELL NO. GP-1

FACILITY NAME: Former Columbia Marine TEMPERATURE: 60 °F or °C

FIELD PERSONNEL: K. Warren WEATHER: cloudy

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: 5.05 FT. or IN.

B. Thickness of Free Product, if present: _____ Inches

C. Total Depth of well (TD) from top of casing/piezometer: 12.06 FT. or IN.

D. Height of Water Column in casing (h = TD - SWL): 7.01 FT. or IN.

E. Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes:

	3 Well Vols.	5 Well Vols.			
2" diameter =	0.5 gals/ft	0.82 gals/ft	X feet of water ____	=	____ PV (gallons)
4" diameter =	2.0 gals/ft	3.25 gals/ft	X feet of water ____	=	____ PV (gallons)
6" diameter =	4.4 gals/ft	7.35 gals/ft	X feet of water ____	=	____ PV (gallons)
3/4" DIA =	0.07 gal/ft		X FEET OF H2O	=	0.49 PV (gals)

PURGING METHOD: peristaltic pump DURATION: 8 min

OBSERVATIONS:

	Time	Turbidity	Color	Sheen	pH	Temp.	Conduct.	SWL
1st Volume:	3:08	turb.	brown	non	6.7	11.4	188.3	
2nd Volume:	3:10	"	"	"	6.8	12.2	114.3	
3rd Volume:	3:12	clear	clear	non	6.7	12.4	112.2	
4th Volume:	3:14	"	"	"	6.7	12.5	110.2	
Addl. Volumes:	3:16	"	"	"	6.7	12.5	110.6	

TOTAL VOLUME OF WATER PURGED FROM WELL: 0.60

PURGE WATER STORED/DISPOSED OF WHERE/HOW: on site drum

SAMPLES COLLECTED:

Depth to Water at time of sample collection: _____

Sample Number(s)	Time	Size/Number of Container(s)	Preservative
990507-GP1	320	2-40 ml VOAs	HCl
		1-liter Amber	HCl

COMMENTS:

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

Recharge Calculation at Time of Sample Collection:

Total Depth of Well: _____

Original Water Column: _____ x 0.80 = --( )

Collect sample when Depth to Water measures Less than or equal to: _____

SECOR

GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PN: 00255-003-01 DATE: 5/7/99 WELL NO. GP-2

FACILITY NAME: Former Colombia Marine TEMPERATURE: 60 °F or °C

FIELD PERSONNEL: K. Warner WEATHER: Cloudy

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: 10.30 FT. or IN.
B. Thickness of Free Product, if present: _____ Inches
C. Total Depth of well (TD) from top of casing/piezometer: 17.04 FT. or IN.

D. Height of Water Column in casing (h = TD - SWL): 6.74 FT. or IN.

E. Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes:

	3 Well Vols.	5 Well Vols.			
2" diameter =	0.5 gals/ft	0.82 gals/ft	X feet of water ____	=	____ PV (gallons)
4" diameter =	2.0 gals/ft	3.25 gals/ft	X feet of water ____	=	____ PV (gallons)
6" diameter =	4.4 gals/ft	7.35 gals/ft	X feet of water ____	=	____ PV (gallons)
3/4" DIA =	0.07 gal/ft		X FEET OF H2O	=	0.32 PV (gals)

PURGING METHOD: peristaltic pump DURATION: 8 min

OBSERVATIONS:

	Time	Turbidity	Color	Sheen	pH	Temp.	Conduct.	SWL
1st Volume:	1258	slightly turbid	brown	yes	6.1	12.7	251.4	____
2nd Volume:	1011	Clear	Clear	yes	6.1	12.9	258.9	____
3rd Volume:	104	"	"	"	6.1	12.9	244.6	____
4th Volume:	106	"	"	"	6.1	12.8	259.3	____
Addl. Volumes:	____	____	____	____	____	____	____	____

TOTAL VOLUME OF WATER PURGED FROM WELL: 0.50 gallons
PURGE WATER STORED/DISPOSED OF WHERE/HOW: on site drum

SAMPLES COLLECTED:

Depth to Water at time of sample collection: _____

Sample Number(s)	Time	Size/Number of Container(s)	Preservative
990507-GP2	1310	2-40 ML VOAs	HCl
		1-1 liter Amber	HCl

COMMENTS:

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

Recharge Calculation at Time of Sample Collection:

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

SECOR

GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PN: 02255-003 -01 DATE: 5/7/99 WELL NO. GP-3

FACILITY NAME: Former Columbia Marine TEMPERATURE: 60° °F or °C

FIELD PERSONNEL: K. Warner WEATHER: cloudy

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: 10.89 FT. or IN.
B. Thickness of Free Product, if present: _____ Inches
C. Total Depth of well (TD) from top of casing/piezometer: 16.90 FT. or IN.
D. Height of Water Column in casing (h = TD - SWL): 6.01 FT. or IN.

E. Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes:

	3 Well Vols.	5 Well Vols.			
2" diameter =	0.5 gals/ft	0.82 gals/ft	X feet of water ____	=	____ PV (gallons)
4" diameter =	2.0 gals/ft	3.25 gals/ft	X feet of water ____	=	____ PV (gallons)
6" diameter =	4.4 gals/ft	7.35 gals/ft	X feet of water ____	=	____ PV (gallons)
3/4" DIA =	0.07 gal/ft		X FEET OF H2O 6.01	=	0.42 PV (gals)

PURGING METHOD: peristaltic pump DURATION: 8 min

OBSERVATIONS:

	Time	Turbidity	Color	Sheen	pH	Temp.	Conduct.	SWL
1st Volume:	1238	turbid	Grey	yes	6.2	12.5	206.1	____
2nd Volume:	1242	Clear	Clear	yes	6.2	12.8	215.7	____
3rd Volume:	1244	Clear	"	yes	6.2	12.7	216.1	____
4th Volume:	1246	Clear	"	yes	6.2	12.8	217.6	____
Addl. Volumes:	____	____	____	____	____	____	____	____

TOTAL VOLUME OF WATER PURGED FROM WELL: 0.50 gallons
PURGE WATER STORED/DISPOSED OF WHERE/HOW: on site drum

SAMPLES COLLECTED:

Depth to Water at time of sample collection: _____

Sample Number(s)	Time	Size/Number of Container(s)	Preservative
990507-GP-3	1248	2 40 mL VOA	HCl
		1-liter Amber	HCl

COMMENTS:

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

Recharge Calculation at Time of Sample Collection:

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

SECOR

GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PN: 00255-003-01 DATE: 5/7/99 WELL NO. GP-4

FACILITY NAME: Fort Columbia Marina TEMPERATURE: 60 °F or °C

FIELD PERSONNEL: K. Warner WEATHER: Cloudy

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: 10.20 FT. or IN.

B. Thickness of Free Product, if present: _____ Inches

C. Total Depth of well (TD) from top of casing/piezometer: 16.92 FT. or IN.

D. Height of Water Column in casing (h = TD - SWL): 6.72 FT. or IN.

E. Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes:

	3 Well Vols.	5 Well Vols.			
2" diameter =	0.5 gals/ft	0.82 gals/ft	X feet of water _____	=	_____ PV (gallons)
4" diameter =	2.0 gals/ft	3.25 gals/ft	X feet of water _____	=	_____ PV (gallons)
6" diameter =	4.4 gals/ft	7.35 gals/ft	X feet of water _____	=	_____ PV (gallons)
3/4" DIA =	0.07 gal/ft		X FEET OF H2O 6.72	=	0.47 PV (gals)

PURGING METHOD: Peristaltic pump DURATION: 6 min

OBSERVATIONS:

	Time	Turbidity	Color	Sheen	pH	Temp.	Conduct.	SWL
1st Volume:	1220	turbid	brown	yes	6.6	11.8	53.2	
2nd Volume:	1222	"	"	"	6.6	12.0	55.7	
3rd Volume:	1224	slightly turbid	"	"	6.5	12.1	61.8	
4th Volume:	1226	Clear	Clear	"	6.5	12.1	66.3	
Add'l. Volumes:								

TOTAL VOLUME OF WATER PURGED FROM WELL: 0.50 gallons

PURGE WATER STORED/DISPOSED OF WHERE/HOW: on site drum

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

Sample Number(s)	Time	Size/Number of Container(s)	Preservative
990507-GP4	1230	2-40mL VOAs	HCL
	1230	1 Liter Amber	HCL

COMMENTS:

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

Recharge Calculation at Time of Sample Collection:

Total Depth of Well: _____

Original Water Column: _____ x 0.80 = -( )

Collect sample when Depth to Water measures Less than or equal to: _____

SECOR

GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PN: 00255-003-01 DATE: 5/7/99 WELL NO. 6P-5

FACILITY NAME: Former Columbia Marine TEMPERATURE: 60 °F or °C

FIELD PERSONNEL: K. Warner WEATHER: Cloudy

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: 6.86 FT. or IN.
B. Thickness of Free Product, if present: _____ Inches
C. Total Depth of well (TD) from top of casing/piezometer: 16.81 FT. or IN.
D. Height of Water Column in casing (h = TD - SWL): 9.95 FT. or IN.

E. Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes:

	3 Well Vols.	5 Well Vols.			
2" diameter =	0.5 gals/ft	0.82 gals/ft	X feet of water ____	=	____ PV (gallons)
4" diameter =	2.0 gals/ft	3.25 gals/ft	X feet of water ____	=	____ PV (gallons)
6" diameter =	4.4 gals/ft	7.35 gals/ft	X feet of water ____	=	____ PV (gallons)
3/4" DIA =	0.07 gal/ft		X FEET OF H2O	=	1.69 PV (gals)

PURGING METHOD: Peristaltic pump DURATION: 6 min

OBSERVATIONS:

	Time	Turbidity	Color	Sheen	pH	Temp.	Conduct.	SWL
1st Volume:	1:22	turbid	brown	yes	6.3	12.5	121.4	____
2nd Volume:	1:24	slightly turbid	brown	yes	6.1	12.6	153.9	____
3rd Volume:	1:26	"	"	"	6.1	12.6	169.8	____
4th Volume:	1:28	Clear	Clear	"	6.1	12.4	169.7	____
Add. Volumes:	____	____	____	____	____	____	____	____

TOTAL VOLUME OF WATER PURGED FROM WELL: 0.70 gallons
PURGE WATER STORED/DISPOSED OF WHERE/HOW: On site drum

SAMPLES COLLECTED:

Depth to Water at time of sample collection: _____

Sample Number(s)	Time	Size/Number of Container(s)	Preservative
990507-GP5	1:30	2 - 40ml VOAs	HCl
		1 - liter Amber	HCl

COMMENTS:

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

Recharge Calculation at Time of Sample Collection:

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

SECOR

GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PN: 00255-003-01 DATE: 5/7/99 WELL NO. GP-6

FACILITY NAME: Former Columbia Marine TEMPERATURE: 60 °F or °C

FIELD PERSONNEL: K. Wayne WEATHER: Cloudy

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: 8.89 FT. or IN.

B. Thickness of Free Product, if present: _____ Inches

C. Total Depth of well (TD) from top of casing/piezometer: 13.40 FT. or IN.

D. Height of Water Column in casing (h = TD - SWL): 4.51 FT. or IN.

E. Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes:

	3 Well Vols.	5 Well Vols.			
2" diameter =	0.5 gals/ft	0.82 gals/ft	X feet of water ____	=	____ PV (gallons)
4" diameter =	2.0 gals/ft	3.25 gals/ft	X feet of water ____	=	____ PV (gallons)
6" diameter =	4.4 gals/ft	7.35 gals/ft	X feet of water ____	=	____ PV (gallons)
3/4" DIA =	0.07 gal/ft		X FEET OF H2O 4.51	=	0.32 PV (gals)

PURGING METHOD: peristaltic pump DURATION: 3 min

OBSERVATIONS:

	Time	Turbidity	Color	Sheen	pH	Temp.	Conduct.	SWL: well pumped dry
1st Volume:	1:52	turbid	brown	none	6.1	14.1	543.	
2nd Volume:	1:55	"	"	"	6.0	14.4	512	
3d Volume:								
4th Volume:								
Addl. Volumes:								

TOTAL VOLUME OF WATER PURGED FROM WELL: 0.34 gallons

PURGE WATER STORED/DISPOSED OF WHERE/HOW: on site Drum

SAMPLES COLLECTED:

Depth to Water at time of sample collection: 0.

Sample Number(s)	Time	Size/Number of Container(s)	Preservative
990507-GP6	1:58	2-40 ml VOAs	HCl
		1-1 liter Amber	HCl

COMMENTS:

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

Recharge Calculation at Time of Sample Collection:

Total Depth of Well: _____

Original Water Column: _____ x 0.80 = --( )

Collect sample when Depth to Water measures Less than or equal to: _____

SECOR

GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PN: 00255-003-01 DATE: 5/7/99 WELL NO. GP-7

FACILITY NAME: Lower Columbia Marine TEMPERATURE: 60 °F or °C

FIELD PERSONNEL: F. Warner WEATHER: Cloudy

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: 10.50 FT. or IN.

B. Thickness of Free Product, if present: _____ Inches

C. Total Depth of well (TD) from top of casing/piezometer: 22.45 FT. or IN.

D. Height of Water Column in casing (h = TD - SWL): 11.95 FT. or IN.

E. Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes:

	3 Well Vols.	5 Well Vols.			
2" diameter =	0.5 gals/ft	0.82 gals/ft	X feet of water ____	=	____ PV (gallons)
4" diameter =	2.0 gals/ft	3.25 gals/ft	X feet of water ____	=	____ PV (gallons)
6" diameter =	4.4 gals/ft	7.35 gals/ft	X feet of water ____	=	____ PV (gallons)
3/4" DIA =	0.07 gal/ft		X FEET OF H2O 11.95	=	0.84 PV (gals)

PURGING METHOD: Peristaltic pump DURATION: 2 min

OBSERVATIONS:

	Time	Turbidity	Color	Sheen	pH	Temp.	Conduct.	SWL
1st Volume:	1155	turbidy	Brown	yes	6.3	13.2	353.5	____
2nd Volume:	1157	Clear	Clear	yes	6.1	13.2	319.1	____
3rd Volume:	1200	Clear	Clear	yes	6.1	13.3	323.4	____
4th Volume:	12.02	"	"	"	6.1	13.3	322.9	____
Addl. Volumes:	____	____	____	____	____	____	____	____

TOTAL VOLUME OF WATER PURGED FROM WELL: 1 gallon

PURGE WATER STORED/DISPOSED OF WHERE/HOW: on site drum

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

Sample Number(s)	Time	Size/Number of Container(s)	Preservative
990507-GP7	1205	2-40mL VOA	HCL
		1-Liter Amber	HCL

COMMENTS:

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

Recharge Calculation at Time of Sample Collection:

Total Depth of Well: _____

Original Water Column: _____ x 0.80 = --( )

Collect sample when Depth to Water measures Less than or equal to: _____

SECOR

GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PN: 00255-003-01 DATE: 5-7-99 WELL NO. GP-8

FACILITY NAME: Former Columbia Marine TEMPERATURE: 60 °F or °C

FIELD PERSONNEL: K. Warner WEATHER: Cloudy

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: 7.71 FT. or IN.

B. Thickness of Free Product, if present: _____ Inches

C. Total Depth of well (TD) from top of casing/piezometer: 13.5 FT. or IN.

D. Height of Water Column in casing (h = TD - SWL): 5.79 FT. or IN.

E. Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes:

	3 Well Vols.	5 Well Vols.			
2" diameter =	0.5 gals/ft	0.82 gals/ft	X feet of water ____	=	____ PV (gallons)
4" diameter =	2.0 gals/ft	3.25 gals/ft	X feet of water ____	=	____ PV (gallons)
6" diameter =	4.4 gals/ft	7.35 gals/ft	X feet of water ____	=	____ PV (gallons)
3/4" DIA =	0.07 gal/ft		X FEET OF H2O	=	0.41 PV (gals)

PURGING METHOD: Peristaltic Pump DURATION: 6 min

OBSERVATIONS:

	Time	Turbidity	Color	Sheen	pH	Temp.	Conduct.	SWL
1st Volume:	2:28	turbid	brown	none	6.4	12.8	205.5	____
2nd Volume:	2:30	Clear	Clear	none	6.3	12.6	197.2	____
3rd Volume:	2:32	Clear	"	none	6.2	12.7	194.9	____
4th Volume:	2:34	"	"	"	6.2	12.7	192.9	____
Addl. Volumes:	____	____	____	____	____	____	____	____

TOTAL VOLUME OF WATER PURGED FROM WELL: 1.5 gallons

PURGE WATER STORED/DISPOSED OF WHERE/HOW: Onsite Drums

SAMPLES COLLECTED:

Depth to Water at time of sample collection: _____

Sample Number(s)	Time	Size/Number of Container(s)	Preservative
990507-GP8	240	2- 40 ml VOAs	HCl
		1- liter Amber	

COMMENTS:

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

Recharge Calculation at Time of Sample Collection:

Total Depth of Well: _____

Original Water Column: _____ x 0.80 = --( )

Collect sample when Depth to Water measures Less than or equal to: _____

SECOR

GROUNDWATER SAMPLING FIELD DATA SHEET

SECOR PN: 00255-003-01 DATE: 5/7/99 WELL NO. GP-9

FACILITY NAME: Former Columbia Marine TEMPERATURE: 60 °F or °C

FIELD PERSONNEL: K. Wave WEATHER: Raining

FIELD MEASUREMENTS:

A. Static Water Level (SWL) below top of casing/piezometer: 8.06 FT. or IN.

B. Thickness of Free Product, if present: _____ Inches

C. Total Depth of well (TD) from top of casing/piezometer: 13.15 FT. or IN.

D. Height of Water Column in casing (h = TD - SWL): 5.05 FT. or IN.

E. Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes:

	3 Well Vols.	5 Well Vols.			
2" diameter =	0.5 gals/ft	0.82 gals/ft	X feet of water ____	=	____ PV (gallons)
4" diameter =	2.0 gals/ft	3.25 gals/ft	X feet of water ____	=	____ PV (gallons)
6" diameter =	4.4 gals/ft	7.35 gals/ft	X feet of water ____	=	____ PV (gallons)
3/4" DIA =	0.07 gal/ft		x FEET OF H2O	=	1.36 PV (gals)

PURGING METHOD: Peristaltic pump DURATION: 7 min

OBSERVATIONS:

	Time	Turbidity	Color	Sheen	pH	Temp.	Conduct.	SWL
1st Volume:	247	turbid	Brown	none	6.7	12.0	2056	____
2nd Volume:	250	slightly turbid	"	"	6.5	12.3	188.0	____
3rd Volume:	252	Clear	Clear	none	6.5	12.3	188.3	____
4th Volume:	254	"	"	"	6.5	12.3	187.6	____
Add'l. Volumes:	____	____	____	____	____	____	____	____

TOTAL VOLUME OF WATER PURGED FROM WELL: .5 gallons

PURGE WATER STORED/DISPOSED OF WHERE/HOW: On site Drum

SAMPLES COLLECTED:

Depth to Water at time of sample collection: _____

Sample Number(s)	Time	Size/Number of Container(s)	Preservative
990507-GP9	255	2-40 ml VOAs	HCl
		1-liter Amber	HCl

COMMENTS:

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

Recharge Calculation at Time of Sample Collection:

Total Depth of Well: _____

Original Water Column: _____ x 0.80 = -( )

Collect sample when Depth to Water measures Less than or equal to: _____

APPENDIX B
BORING LOGS

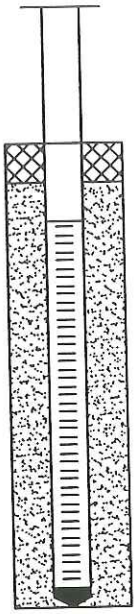
Additional Subsurface Investigation Report
Former Columbia Marine Lines Facility
6305 Lower River Road
SECOR PN: F0319-001-01
July 9, 1999

SECOR
International Incorporated

FACILITY **FORMER COLUMBIA MARINE LINES FACILITY** JOB # **F0319-001-01** BORING/WELL **GP-1**
LOCATION **6305 LOWER RIVER ROAD, VANCOUVER, WASHINGTON** SURFACE ELEVATION **23.05**
START **10 am** FINISH **10:30 am** CASING TOP ELEVATION **26.55**
LOGGED BY **DEC** MONITORING DEVICE **MODEL 580B OVM**
SUBCONTRACTOR AND EQUIPMENT **CASCADE DRILLING INC. TRACK MOUNTED CME850 GEOPROBE RIG**
COMMENTS **200 MACRO SAMPLER W/ ACRYLIC LINER 1.75" I.D.**

Penetration Results Blows 6"/6"/6"	Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Depth Below Surface, feet
				0	Asphalt surface		0
		3.9	NS	5	Brown SAND (SP). Sand is medium grained, well sorted, very loose, dry, no odor.	SP	5
		0	NS				
		0	NS	10	Dark grey SILT (ML). Silt contains a few micas, dense, moist, no odor.	ML	10
				15	Boring terminated at 12' feet bgs Groundwater encountered at approximately 3.5 feet during drilling.		15
				20			20
				25			25

Well Construction Schematic



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

3/4" PVC Blank Casing
3/4" PVC Screen Casing (0.010 slots)
End Cap

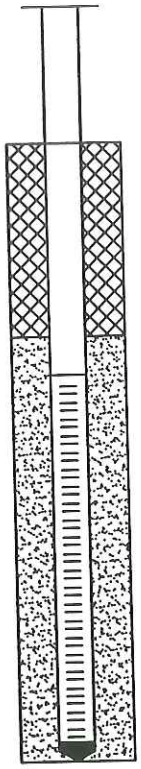
DWG: F319011L

SECOR
International Incorporated

FACILITY **FORMER COLUMBIA MARINE LINES FACILITY** JOB # **F0319-001-01** BORING/WELL **GP-2**
LOCATION **6305 LOWER RIVER ROAD, VANCOUVER, WASHINGTON** SURFACE ELEVATION **28.74**
START **11:20 am** FINISH **11:45 am** CASING TOP ELEVATION **32.24**
LOGGED BY **DEC** MONITORING DEVICE **MODEL 580B OVM**
SUBCONTRACTOR AND EQUIPMENT **CASCADE DRILLING INC. TRACK MOUNTED CME850 GEOPROBE RIG**
COMMENTS **200 MACRO SAMPLER W/ ACRYLIC LINER 1.75" I.D.**

Penetration Results Blows 6"/6"/6"	Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Depth Below Surface, feet
				0	Vegetative cover (moss)		0
		0	NS	5	Brown SAND (SP). Sand is fine to medium grained, well sorted, very loose, dry, no odor.	SP	5
		35.2	SD		Grey silty SAND (SM). Sand is fine grained, damp, product odor.		
		105.8	SD	10	(Same)		10
		50	SD	15	Grey sandy SILT (ML). Firm, wet, no odor.	ML	15
					Boring terminated at 16' feet bgs Groundwater encountered at approximately 9.5 feet during drilling.		
				20			20
				25			25

Well Construction Schematic



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
3/4" PVC Blank Casing
3/4" PVC Screen Casing (0.010 slots)
End Cap

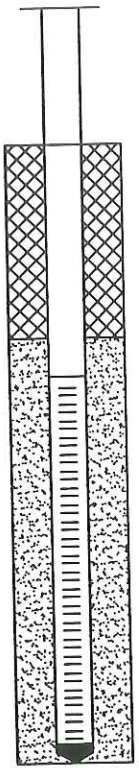
DWG: F319011L

SECOR
International Incorporated

FACILITY **FORMER COLUMBIA MARINE LINES FACILITY** JOB # **F0319-001-01** BORING/WELL **GP-3**
LOCATION **6305 LOWER RIVER ROAD, VANCOUVER, WASHINGTON** SURFACE ELEVATION **28.58**
START **11:50 am** FINISH **12:35 pm** CASING TOP ELEVATION **32.08**
LOGGED BY **DEC** MONITORING DEVICE **MODEL 580B OVM**
SUBCONTRACTOR AND EQUIPMENT **CASCADE DRILLING INC. TRACK MOUNTED CME850 GEOPROBE RIG**
COMMENTS **200 MACRO SAMPLER W/ ACRYLIC LINER 1.75" I.D.**

Penetration Results (Blows 6"/6"/6")	Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Depth Below Surface, feet
				0	Vegetative cover (moss)		0
		0	NS	5	Brown SAND (SP). Sand is fine to medium grained. Some organic matter present. Loose, damp.	SP	5
		200	SD		Same, color change to grey, odor		
		137.1	SD	10	Same, wet		10
		11.7	NS	15	Grey Sandy SILT (ML). Firm, wet	ML	15
					Boring terminated at 16' feet bgs Groundwater encountered at approximately 9.5 feet during drilling.		20
				20			25
				25			

Well Construction Schematic



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
3/4" PVC Blank Casing
3/4" PVC Screen Casing (0.010 slots)
End Cap

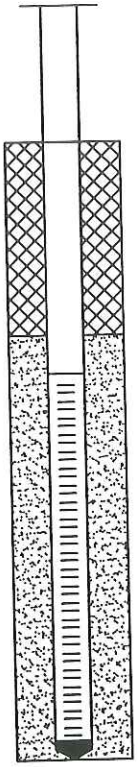
DWG: F319011L

SECOR
International Incorporated

FACILITY **FORMER COLUMBIA MARINE LINES FACILITY** JOB # **F0319-001-01** BORING/WELL **GP-4**
LOCATION **6305 LOWER RIVER ROAD, VANCOUVER, WASHINGTON** SURFACE ELEVATION **27.25**
START **13:05 pm** FINISH **13:35 pm** CASING TOP ELEVATION **30.75**
LOGGED BY **DEC** MONITORING DEVICE **MODEL 580B OVM**
SUBCONTRACTOR AND EQUIPMENT **CASCADE DRILLING INC. TRACK MOUNTED CME850 GEOPROBE RIG**
COMMENTS **200 MACRO SAMPLER W/ ACRYLIC LINER 1.75" I.D.**

Penetration Results Blows 6"/6"/6"	Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Depth Below Surface, feet
				0	Sand, medium, loose, dry		0
		3.9	NS	5	Brown SAND (SP). Sand is medium grained, well sorted, loose, dry, no odor.	SP	5
		0	NS		Same		
		0	NS	10	Same, wet, color changes to grey		10
		0	NS	15	Grey fine silty SAND (ML), loose, wet	ML	15
					Boring terminated at 16' feet bgs Groundwater encountered at approximately 9.5 feet during drilling.		20
				20			25
				25			

Well Construction Schematic



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

3/4" PVC Blank Casing
3/4" PVC Screen Casing (0.010 slots)
End Cap

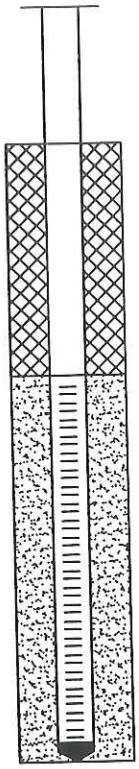
DWG: F319011L

SECOR
International Incorporated

FACILITY **FORMER COLUMBIA MARINE LINES FACILITY** JOB # **F0319-001-01** BORING/WELL **GP-5**
LOCATION **6305 LOWER RIVER ROAD, VANCOUVER, WASHINGTON** SURFACE ELEVATION **23.47**
START **14:03 pm** FINISH **14:35 pm** CASING TOP ELEVATION **26.97**
LOGGED BY **DEC** MONITORING DEVICE **MODEL 580B OVM**
SUBCONTRACTOR AND EQUIPMENT **CASCADE DRILLING INC. TRACK MOUNTED CME850 GEOPROBE RIG**
COMMENTS **200 MACRO SAMPLER W/ ACRYLIC LINER 1.75" I.D.**

Penetration Results (Blows 6"/6"/6")	Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Depth Below Surface, feet
				0	Sand, grey, medium, loose, dry		0
		0	NS	5	Brown SAND (SP). Sand is medium grained, well sorted, loose damp.	SP	5
		0	NS		Brown silty SAND (SP). Sand is fine grained, loose, wet.		
		0	NS	10	Same		10
		0	NS	15	Grey/brown sandy SILT (ML). Sand is fine grained, mottled, firm. Some reddish brown appears as rust.	ML	15
					Boring terminated at 16' feet bgs Groundwater encountered at approximately 6 feet during drilling.		
				20			20
				25			25

Well Construction Schematic



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
3/4" PVC Blank Casing
3/4" PVC Screen Casing (0.010 slots)
End Cap

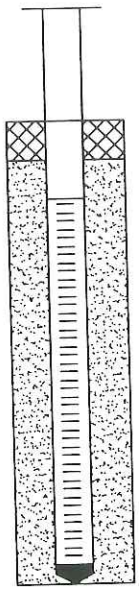
DWG: F319011L

SECOR
International Incorporated

FACILITY **FORMER COLUMBIA MARINE LINES FACILITY** JOB # **F0319-001-01** BORING/WELL **GP-6**
LOCATION **6305 LOWER RIVER ROAD, VANCOUVER, WASHINGTON** SURFACE ELEVATION **24.17**
START **14:42 pm** FINISH **15:03 pm** CASING TOP ELEVATION **27.17**
LOGGED BY **DEC** MONITORING DEVICE **MODEL 580B OVM**
SUBCONTRACTOR AND EQUIPMENT **CASCADE DRILLING INC. TRACK MOUNTED CME850 GEOPROBE RIG**
COMMENTS **200 MACRO SAMPLER W/ ACRYLIC LINER 1.75" I.D.**

Penetration Results Blows 6"/6"/6"	Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Depth Below Surface, feet
				0	Gravel, SAND, dirt		0
		0	NS	5	Brown SAND (SP). Sand is fine to medium grained. Some organic matter. Loose, dry.	SP	5
		0	NS		Color change to grey		
		0	NS	10	Grey SILT (ML). Firm, wet.	ML	10
					Boring terminated at 12' feet bgs Groundwater encountered at approximately 9 feet during drilling.		15
				15			20
				20			25
				25			

Well Construction Schematic



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
3/4" PVC Blank Casing
3/4" PVC Screen Casing (0.010 slots)
End Cap

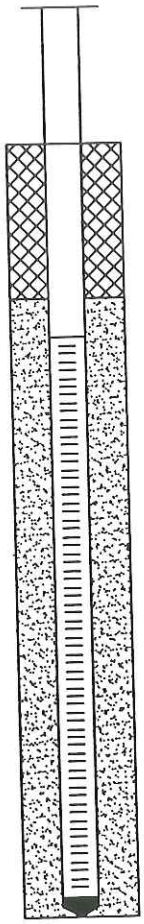
DWG: F319011L

SECOR
International Incorporated

FACILITY **FORMER COLUMBIA MARINE LINES FACILITY** JOB # **F0319-001-01** BORING/WELL **GP-7**
LOCATION **6305 LOWER RIVER ROAD, VANCOUVER, WASHINGTON** SURFACE ELEVATION **24.17**
START **15:20 pm** FINISH **15:55 pm** CASING TOP ELEVATION **27.17**
LOGGED BY **DEC** MONITORING DEVICE **MODEL 580B OVM**
SUBCONTRACTOR AND EQUIPMENT **CASCADE DRILLING INC. TRACK MOUNTED CME850 GEOPROBE RIG**
COMMENTS **200 MACRO SAMPLER W/ ACRYLIC LINER 1.75" I.D.**

Penetration Results (Blows 6"/6"/6")	Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Depth Below Surface, feet
				0	Vegetative cover		0
		0	NS	5	Grey/brown SAND (SP). Sand is medium grained, loose, dry.	SP	5
		0	NS		Same		
		0	NS	10	Same w/mica, color change to grey at 10.5 bgs		10
		0	NS	15	Same		15
		0	NS		Grey SILT (ML). Firm, wet.	ML	
		0	NS	20	Boring terminated at 20' feet bgs Groundwater encountered at approximately 9.5 feet during drilling.		20
				25			25

Well Construction Schematic



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

3/4" PVC Blank Casing
3/4" PVC Screen Casing (0.010 slots)
End Cap

DWG: F319011L

SECOR
International Incorporated

FACILITY **FORMER COLUMBIA MARINE LINES FACILITY** JOB # **F0319-001-01** BORING/WELL **GP-8**
LOCATION **6305 LOWER RIVER ROAD, VANCOUVER, WASHINGTON** SURFACE ELEVATION **26.37**
START **16:30 pm** FINISH **17:09 pm** CASING TOP ELEVATION **29.37**
LOGGED BY **DEC** MONITORING DEVICE **MODEL 580B OVM**
SUBCONTRACTOR AND EQUIPMENT **CASCADE DRILLING INC. TRACK MOUNTED CME850 GEOPROBE RIG**
COMMENTS **200 MACRO SAMPLER W/ ACRYLIC LINER 1.75" I.D.**

Penetration Results: Blows 6"/6"/6"	Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Depth Below Surface, feet	Well Construction Schematic
				0	Vegetative cover		0	
		0	NS	5	Brown SAND (SP). Sand is medium grained, loose, damp.	SP	5	
		0	NS		Same			
		0	NS	10	Grey SILT (ML). Firm, wet.	ML	10	
					Boring terminated at 12' feet bgs Groundwater encountered at approximately 5.75 feet during drilling.		15	
				15			20	
				20			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
3/4" PVC Blank Casing
3/4" PVC Screen Casing (0.010 slots)
End Cap

DWG: F319011L

SECOR
International Incorporated

FACILITY **FORMER COLUMBIA MARINE LINES FACILITY** JOB # **F0319-001-01** BORING/WELL **GP-9**
LOCATION **6305 LOWER RIVER ROAD, VANCOUVER, WASHINGTON** SURFACE ELEVATION **26.66**
START **17:15 pm** FINISH **17:45 pm** CASING TOP ELEVATION **29.66**
LOGGED BY **DEC** MONITORING DEVICE **MODEL 580B OVM**
SUBCONTRACTOR AND EQUIPMENT **CASCADE DRILLING INC. TRACK MOUNTED CME850 GEOPROBE RIG**
COMMENTS **200 MACRO SAMPLER W/ ACRYLIC LINER 1.75" I.D.**

Penetration Results (Blows 6"/6"/6")	Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Depth Below Surface, feet	Well Construction Schematic
				5			5	
				0	Vegetative cover		0	
		0	NS	5	Brown SAND (SP). Sand is medium grained, loose, damp.	SP	5	
		0	NS		Same			
				10			10	
		0	NS		Grey SILT (ML). Firm, wet.	ML		
					Boring terminated at 12' feet bgs Groundwater encountered at approximately 5.75 feet during drilling.			
				15			15	
				20			20	
				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
3/4" PVC Blank Casing
3/4" PVC Screen Casing (0.010 slots)
End Cap

DWG: F319011L

APPENDIX C
LABORATORY ANALYSIS REPORTS AND CHAIN-OF-CUSTODY DOCUMENTATION

Additional Subsurface Investigation Report
Former Columbia Marine Lines Facility
6305 Lower River Road
SECOR PN: F0319-001-01
July 9, 1999

www.ncalabs.com

Seattle 18939 120th Avenue NE, Suite 101, Bothell, WA 98011-9508
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 20354 Empire Avenue, Suite E-9, Bend, OR 97708-1883
541.383.9310 fax 541.382.7588

Secor	Project:	Former Columbia Marine	Sampled:	5/7/99
P.O. Box 1508	Project Number:	F0319-001-01	Received:	5/10/99
Tualatin, OR 97062	Project Manager:	Katy Westersund	Reported:	5/17/99 17:42

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
990507-GP1	P905177-01	Water	5/7/99
990507-GP2	P905177-02	Water	5/7/99
990507-GP3	P905177-03	Water	5/7/99
990507-GP4	P905177-04	Water	5/7/99
990507-GP5	P905177-05	Water	5/7/99
990507-GP6	P905177-06	Water	5/7/99
990507-GP7	P905177-07	Water	5/7/99
990507-GP8	P905177-08	Water	5/7/99
990507-GP9	P905177-09	Water	5/7/99

www.ncalabs.com

Seattle 18939 120th Avenue NE, Suite 101, Bothell, WA 98011-9508
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 20354 Empire Avenue, Suite E-9, Bend, OR 97708-1883
541.383.9310 fax 541.382.7588

Secor	Project:	Former Columbia Marine	Sampled: 5/7/99
P.O. Box 1508	Project Number:	F0319-001-01	Received: 5/10/99
Tualatin, OR 97062	Project Manager:	Katy Westersund	Reported: 5/17/99 17:42

Gasoline Hydrocarbons per NW TPH-Gx Method and BTEX per EPA Method 8020A
North Creek Analytical - Portland

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
990507-GP1			**P905177-01**				**Water**	
Benzene	0590258	5/11/99	5/11/99		0.500	ND	ug/l	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		1.00	ND	"	
Gasoline Range Hydrocarbons	"	"	"		80.0	ND	"	
Surrogate: 4-BFB (PID)	"	"	"	*50.0-150*		*77.7*	%	
Surrogate: 4-BFB (FID)	"	"	"	*50.0-150*		*77.3*	"	
990507-GP2			**P905177-02**				**Water**	
Benzene	0590385	5/14/99	5/14/99		2.50	ND	ug/l	
Toluene	"	"	"		2.50	**5.85**	"	
Ethylbenzene	"	"	"		2.50	ND	"	
Xylenes (total)	"	"	"		5.00	ND	"	
Gasoline Range Hydrocarbons	"	"	"		400	**2710**	"	
Surrogate: 4-BFB (PID)	"	"	"	*50.0-150*		*92.0*	%	
Surrogate: 4-BFB (FID)	"	"	"	*50.0-150*		*107*	"	
990507-GP3			**P905177-03**				**Water**	
Benzene	0590299	5/12/99	5/13/99		0.500	ND	ug/l	
Toluene	"	"	"		0.500	**0.515**	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		1.00	ND	"	
Gasoline Range Hydrocarbons	"	"	"		80.0	**2780**	"	
Surrogate: 4-BFB (PID)	"	"	"	*50.0-150*		*99.0*	%	
Surrogate: 4-BFB (FID)	"	"	"	*50.0-150*		*NR*	"	*1*
990507-GP4			**P905177-04**				**Water**	
Benzene	0590258	5/11/99	5/11/99		0.500	ND	ug/l	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		1.00	ND	"	
Gasoline Range Hydrocarbons	"	"	"		80.0	ND	"	
Surrogate: 4-BFB (PID)	"	"	"	*50.0-150*		*87.3*	%	
Surrogate: 4-BFB (FID)	"	"	"	*50.0-150*		*85.7*	"	
990507-GP5			**P905177-05**				**Water**	
Benzene	0590258	5/11/99	5/11/99		0.500	ND	ug/l	
Toluene	"	"	"		0.500	ND	"	

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Secor	Project:	Former Columbia Marine	Sampled: 5/7/99
P.O. Box 1508	Project Number:	F0319-001-01	Received: 5/10/99
Tualatin, OR 97062	Project Manager:	Katy Westersund	Reported: 5/17/99 17:42

Gasoline Hydrocarbons per NW TPH-Gx Method and BTEX per EPA Method 8020A
North Creek Analytical - Portland

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
990507-GP5 (continued)			**P905177-05**				**Water**	
Ethylbenzene	0590258	5/11/99	5/11/99		0.500	ND	ug/l	
Xylenes (total)	"	"	"		1.00	ND	"	
Gasoline Range Hydrocarbons	"	"	"		80.0	ND	"	
Surrogate: 4-BFB (PID)	"	"	"	*50.0-150*		*86.7*	%	
Surrogate: 4-BFB (FID)	"	"	"	*50.0-150*		*82.7*	"	
990507-GP6			**P905177-06**				**Water**	
Benzene	0590258	5/11/99	5/11/99		0.500	ND	ug/l	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		1.00	ND	"	
Gasoline Range Hydrocarbons	"	"	"		80.0	ND	"	
Surrogate: 4-BFB (PID)	"	"	"	*50.0-150*		*85.0*	%	
Surrogate: 4-BFB (FID)	"	"	"	*50.0-150*		*81.3*	"	
990507-GP7			**P905177-07**				**Water**	
Benzene	0590258	5/11/99	5/11/99		0.500	ND	ug/l	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		1.00	ND	"	
Gasoline Range Hydrocarbons	"	"	"		80.0	ND	"	
Surrogate: 4-BFB (PID)	"	"	"	*50.0-150*		*80.7*	%	
Surrogate: 4-BFB (FID)	"	"	"	*50.0-150*		*88.7*	"	
990507-GP8			**P905177-08**				**Water**	
Benzene	0590258	5/11/99	5/11/99		0.500	ND	ug/l	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		1.00	ND	"	
Gasoline Range Hydrocarbons	"	"	"		80.0	**479**	"	
Surrogate: 4-BFB (PID)	"	"	"	*50.0-150*		*88.3*	%	
Surrogate: 4-BFB (FID)	"	"	"	*50.0-150*		*108*	"	
990507-GP9			**P905177-09**				**Water**	
Benzene	0590258	5/11/99	5/11/99		0.500	ND	ug/l	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		1.00	ND	"	

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Secor	Project:	Former Columbia Marine	Sampled: 5/7/99
P.O. Box 1508	Project Number:	F0319-001-01	Received: 5/10/99
Tualatin, OR 97062	Project Manager:	Katy Westersund	Reported: 5/17/99 17:42

Gasoline Hydrocarbons per NW TPH-Gx Method and BTEX per EPA Method 8020A
North Creek Analytical - Portland

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
990507-GP9 (continued)			**P905177-09**				**Water**	
Gasoline Range Hydrocarbons	0590258	5/11/99	5/11/99		80.0	ND	ug/l	
Surrogate: 4-BFB (PID)	"	"	"	*50.0-150*		*86.0*	%	
Surrogate: 4-BFB (FID)	"	"	"	*50.0-150*		*87.7*	"	

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P.O. Box 1508	Project Number:	F0319-001-01	Received: 5/10/99
Tualatin, OR 97062	Project Manager:	Katy Westersund	Reported: 5/17/99 17:42

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

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
990507-GP1			**P905177-01**				**Water**	
Diesel Range Organics	0590407	5/14/99	5/14/99		0.250	**0.335**	mg/l	2
Heavy Oil Range Hydrocarbons	"	"	"		0.500	ND	"	
Surrogate: 1-Chlorooctadecane	"	"	"	*50.0-150*		*102*	%	
990507-GP2			**P905177-02**				**Water**	
Diesel Range Organics	0590407	5/14/99	5/15/99		0.250	**17.9**	mg/l	2
Heavy Oil Range Hydrocarbons	"	"	"		0.500	ND	"	
Surrogate: 1-Chlorooctadecane	"	"	"	*50.0-150*		*112*	%	
990507-GP3			**P905177-03**				**Water**	
Diesel Range Organics	0590407	5/14/99	5/15/99		0.250	**13.1**	mg/l	2
Heavy Oil Range Hydrocarbons	"	"	"		0.500	ND	"	
Surrogate: 1-Chlorooctadecane	"	"	"	*50.0-150*		*120*	%	
990507-GP4			**P905177-04**				**Water**	
Diesel Range Organics	0590407	5/14/99	5/15/99		0.250	**0.486**	mg/l	2
Heavy Oil Range Hydrocarbons	"	"	"		0.500	ND	"	
Surrogate: 1-Chlorooctadecane	"	"	"	*50.0-150*		*104*	%	
990507-GP5			**P905177-05**				**Water**	
Diesel Range Organics	0590407	5/14/99	5/15/99		0.250	**1.97**	mg/l	2
Heavy Oil Range Hydrocarbons	"	"	"		0.500	ND	"	
Surrogate: 1-Chlorooctadecane	"	"	"	*50.0-150*		*111*	%	
990507-GP6			**P905177-06**				**Water**	
Diesel Range Organics	0590407	5/14/99	5/15/99		0.250	ND	mg/l	
Heavy Oil Range Hydrocarbons	"	"	"		0.500	ND	"	
Surrogate: 1-Chlorooctadecane	"	"	"	*50.0-150*		*91.0*	%	
990507-GP7			**P905177-07**				**Water**	
Diesel Range Organics	0590407	5/14/99	5/15/99		0.250	**11.8**	mg/l	2
Heavy Oil Range Hydrocarbons	"	"	"		0.500	ND	"	
Surrogate: 1-Chlorooctadecane	"	"	"	*50.0-150*		*70.5*	%	
990507-GP8			**P905177-08**				**Water**	
Diesel Range Organics	0590407	5/14/99	5/15/99		0.250	**15.2**	mg/l	2
Heavy Oil Range Hydrocarbons	"	"	"		0.500	ND	"	
Surrogate: 1-Chlorooctadecane	"	"	"	*50.0-150*		*106*	%	

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Secor	Project:	Former Columbia Marine	Sampled:	5/7/99
P.O. Box 1508	Project Number:	F0319-001-01	Received:	5/10/99
Tualatin, OR 97062	Project Manager:	Katy Westersund	Reported:	5/17/99 17:42

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

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
990507-GP9			**P905177-09**				**Water**	
Diesel Range Organics	0590407	5/14/99	5/15/99		0.250	**4.93**	mg/l	2
Heavy Oil Range Hydrocarbons	"	"	"		0.500	ND	"	
Surrogate: 1-Chlorooctadecane	"	"	"	*50.0-150*		*82.0*	%	

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Secor	Project:	Former Columbia Marine	Sampled: 5/7/99
P.O. Box 1508	Project Number:	F0319-001-01	Received: 5/10/99
Tualatin, OR 97062	Project Manager:	Katy Westersund	Reported: 5/17/99 17:42

Gasoline Hydrocarbons per NW TPH-Gx Method and BTEX per EPA Method 8020A/Quality Control
North Creek Analytical - Portland

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit / Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Batch: 0590258	**Date Prepared: 5/11/99**					**Extraction Method: EPA 5030**				
Blank	**0590258-BLK1**									
Benzene	5/11/99			ND	ug/l	**0.500**				
Toluene	"			ND	"	**0.500**				
Ethylbenzene	"			ND	"	**0.500**				
Xylenes (total)	"			ND	"	**1.00**				
Gasoline Range Hydrocarbons	"			ND	"	**80.0**				
Surrogate: 4-BFB (PID)	"	*50.0*		*42.2*	"	*50.0-150*	*84.4*			
Surrogate: 4-BFB (FID)	"	*50.0*		*40.5*	"	*50.0-150*	*81.0*			
LCS	**0590258-BS1**									
Gasoline Range Hydrocarbons	5/11/99	1250		1230	ug/l	50.0-150	98.4			
Surrogate: 4-BFB (FID)	"	*50.0*		*57.4*	"	*50.0-150*	*115*			
LCS	**0590258-BS2**									
Benzene	5/11/99	20.0		17.4	ug/l	67.0-130	87.0			
Toluene	"	20.0		17.8	"	75.0-126	89.0			
Ethylbenzene	"	20.0		17.9	"	76.0-124	89.5			
Xylenes (total)	"	60.0		54.1	"	75.0-126	90.2			
Surrogate: 4-BFB (PID)	"	*50.0*		*47.2*	"	*50.0-150*	*94.4*			
Duplicate	**0590258-DUP1**		**P905177-04**							
Gasoline Range Hydrocarbons	5/11/99		ND	ND	ug/l			50.0		
Surrogate: 4-BFB (FID)	"	*30.0*		*24.6*	"	*50.0-150*	*82.0*			
Matrix Spike	**0590258-MS1**		**P905177-01**							
Benzene	5/11/99	20.0	ND	16.5	ug/l	67.0-130	**82.5**			
Toluene	"	20.0	ND	17.4	"	75.0-126	**87.0**			
Ethylbenzene	"	20.0	ND	16.8	"	76.0-124	**84.0**			
Xylenes (total)	"	60.0	ND	51.3	"	75.0-126	**85.5**			
Surrogate: 4-BFB (PID)	"	*30.0*		*29.3*	"	*50.0-150*	*97.7*			
Matrix Spike Dup	**0590258-MSD1**		**P905177-01**							
Benzene	5/11/99	20.0	ND	16.4	ug/l	67.0-130	**82.0**	13.0	**0.608**	
Toluene	"	20.0	ND	16.4	"	75.0-126	**82.0**	13.0	**5.92**	
Ethylbenzene	"	20.0	ND	16.5	"	76.0-124	**82.5**	15.0	**1.80**	
Xylenes (total)	"	60.0	ND	50.2	"	75.0-126	**83.7**	13.0	**2.13**	
Surrogate: 4-BFB (PID)	"	*30.0*		*28.7*	"	*50.0-150*	*95.7*			

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Secor	Project:	Former Columbia Marine	Sampled: 5/7/99
P.O. Box 1508	Project Number:	F0319-001-01	Received: 5/10/99
Tualatin, OR 97062	Project Manager:	Katy Westersund	Reported: 5/17/99 17:42

Gasoline Hydrocarbons per NW TPH-Gx Method and BTEX per EPA Method 8020A/Quality Control
North Creek Analytical - Portland

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit / Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Batch: 0590299	**Date Prepared: 5/12/99**					**Extraction Method: EPA 5030**				
Blank	**0590299-BLK1**									
Benzene	5/13/99			**ND**	ug/l	**0.500**				
Toluene	"			**ND**	"	**0.500**				
Ethylbenzene	"			**ND**	"	**0.500**				
Xylenes (total)	"			**ND**	"	**1.00**				
Gasoline Range Hydrocarbons	"			**ND**	"	**80.0**				
Surrogate: 4-BFB (PID)	"	*50.0*		*47.9*	"	*50.0-150*	*95.8*			
Surrogate: 4-BFB (FID)	"	*50.0*		*52.5*	"	*50.0-150*	*105*			
LCS	**0590299-BS1**									
Gasoline Range Hydrocarbons	5/13/99	1250		1220	ug/l	50.0-150	97.6			
Surrogate: 4-BFB (FID)	"	*50.0*		*58.1*	"	*50.0-150*	*116*			
LCS	**0590299-BS2**									
Benzene	5/13/99	20.0		17.9	ug/l	67.0-130	89.5			
Toluene	"	20.0		18.2	"	75.0-126	91.0			
Ethylbenzene	"	20.0		18.4	"	76.0-124	92.0			
Xylenes (total)	"	60.0		54.8	"	75.0-126	91.3			
Surrogate: 4-BFB (PID)	"	*50.0*		*44.8*	"	*50.0-150*	*89.6*			
Batch: 0590385	**Date Prepared: 5/14/99**					**Extraction Method: EPA 5030**				
Blank	**0590385-BLK1**									
Benzene	5/14/99			**ND**	ug/l	**0.500**				
Toluene	"			**ND**	"	**0.500**				
Ethylbenzene	"			**ND**	"	**0.500**				
Xylenes (total)	"			**ND**	"	**1.00**				
Gasoline Range Hydrocarbons	"			**ND**	"	**80.0**				
Surrogate: 4-BFB (PID)	"	*50.0*		*46.2*	"	*50.0-150*	*92.4*			
Surrogate: 4-BFB (FID)	"	*50.0*		*44.8*	"	*50.0-150*	*89.6*			
LCS	**0590385-BS1**									
Gasoline Range Hydrocarbons	5/14/99	1250		1420	ug/l	50.0-150	114			
Surrogate: 4-BFB (FID)	"	*50.0*		*57.7*	"	*50.0-150*	*115*			
LCS	**0590385-BS2**									
Benzene	5/14/99	20.0		19.4	ug/l	67.0-130	97.0			
Toluene	"	20.0		19.5	"	75.0-126	97.5			
Ethylbenzene	"	20.0		19.7	"	76.0-124	98.5			

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Tualatin, OR 97062	Project Manager:	Katy Westersund	Reported: 5/17/99 17:42

Gasoline Hydrocarbons per NW TPH-Gx Method and BTEX per EPA Method 8020A/Quality Control
North Creek Analytical - Portland

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
LCS (continued)	0590385-BS2									
Xylenes (total)	5/14/99	60.0		59.6	ug/l	75.0-126	99.3			
Surrogate: 4-BFB (PID)	"	*50.0*		*51.0*	"	*50.0-150*	*102*			

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Tualatin, OR 97062	Project Manager:	Katy Westersund	Reported: 5/17/99 17:42

Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method/Quality Control
North Creek Analytical - Portland

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit / Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Batch: 0590407	**Date Prepared: 5/14/99**					**Extraction Method: TPH-D Extraction**				
Blank	**0590407-BLK1**									
Diesel Range Organics	5/14/99			**ND**	mg/l	**0.250**				
Heavy Oil Range Hydrocarbons	"			**ND**	"	**0.500**				
Surrogate: 1-Chlorooctadecane	"	*0.100*		*0.108*	"	*50.0-150*	*108*			
LCS	**0590407-BS1**									
Diesel Range Organics	5/14/99	2.57		2.18	mg/l	50.0-150	84.8			
Heavy Oil Range Hydrocarbons	"	1.02		0.925	"	50.0-150	90.7			
Surrogate: 1-Chlorooctadecane	"	*0.100*		*0.0980*	"	*50.0-150*	*98.0*			
LCS Dup	**0590407-BSD1**									
Diesel Range Organics	5/14/99	2.57		2.40	mg/l	50.0-150	93.4	50.0	9.65	
Heavy Oil Range Hydrocarbons	"	1.02		1.03	"	50.0-150	101	50.0	10.7	
Surrogate: 1-Chlorooctadecane	"	*0.100*		*0.107*	"	*50.0-150*	*107*			

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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

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Secor	Project:	Former Columbia Marine	Sampled:	5/7/99
P.O. Box 1508	Project Number:	F0319-001-01	Received:	5/10/99
Tualatin, OR 97062	Project Manager:	Katy Westersund	Reported:	5/17/99 17:42

Notes and Definitions

#	Note
1	The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample.
2	Detected hydrocarbons in the diesel range do not have a distinct diesel pattern and may be due to heavily weathered diesel.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
Recov.	Recovery
RPD	Relative Percent Difference

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

NORTH CREEK ANALYTICAL
Environmental Laboratory Services

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CHAIN OF CUSTODY REPORT

Work Order # 965177

REPORT TO:	SECOR
ATTENTION:	Katy Westersund
ADDRESS:	7230 SW Mohawk St.
	Tualatin, Oregon
PHONE:	691-2030 FAX: 692-7074
PROJECT NAME:	Former Columbia Marine
PROJECT NUMBER:	~~09255-003-01~~ F0319-001-01
SAMPLED BY:	K. Warner

INVOICE TO:
ATTENTION:
ADDRESS:
P.O. NUMBER: NCA QUOTE #:

TURNAROUND REQUEST in Business Days *
Organic & Inorganic Analyses: 10 Standard | 7 | 5 | 4 | 3 | 2 | 1 | Same Day
Fuels & Hydrocarbon Analyses: 5 Standard | 3-4 | 2 | 1 | Same Day
OTHER Specify:
* Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	NCA SAMPLE ID (Laboratory Use Only)	Analysis Request: NW-BTEX	NWTPH-Dx	MATRIX (W, S, A, O)	# OF CONTAINERS	COMMENTS
1.	990507 - GP1	5/7/99 3:20		X	X	W	~~2~~ 3	
2.	990507 - GP2	5/7/99 1:10		X	X	W	~~2~~ 3	
3.	990507 - GP3	5/7/99 1248		X	X	W	3	
4.	990507 - GP4	5/7/99 1230		X	X	W	3	
5.	990507 - GP5	5/7/99 1130		X	X	W	3	
6.	990507 - GP6	5/7/99 1158		X	X	W	3	
7.	990507 - GP7	5/7/99 1205		X	X	W	3	
8.	990507 - GP8	5/7/99 240		X	X	W	3	
9.	990507 - GP9	5/7/99 255		X	X	W	3	
10.								

RELINQUISHED BY (Signature): DATE: 5/10/99
PRINT NAME: Kirk L. Warner FIRM: SECOR TIME: 1235
RELINQUISHED BY (Signature): DATE: 5-10-99
PRINT NAME: Mary Spangler FIRM: NCA TIME:

RECEIVED BY (Signature): DATE: 5-10-99
PRINT NAME: Mary Spangler FIRM: NCA TIME: 1235
RECEIVED BY (Signature): Jessica Roberts DATE: 5/10/99
PRINT NAME: JESSICA ROBERTS FIRM: NCA TIME: 1500

ADDITIONAL REMARKS:

PAGE 1 OF 1

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Secor	Project:	Crowley - Vancouver, WA	Sampled: 5/6/99
P.O. Box 1508	Project Number:	00255-003-01	Received: 5/7/99
Tualatin, OR 97062	Project Manager:	Brian Pletcher	Reported: 5/28/99 16:19

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
GP1 @ 2.5-3.0	P905167-01	Soil	5/6/99
GP2 @ 3-4	P905167-04	Soil	5/6/99
GP2 @ 7-8	P905167-05	Soil	5/6/99
GP3 @ 3-4	P905167-08	Soil	5/6/99
GP3 @ 7-8	P905167-09	Soil	5/6/99
GP4 @ 7-8	P905167-13	Soil	5/6/99
GP5 @ 3-4	P905167-16	Soil	5/6/99
GP6 @ 7-8	P905167-21	Soil	5/6/99
GP7 @ 7-8	P905167-24	Soil	5/6/99
GP8 @ 3-4	P905167-28	Soil	5/6/99
GP9 @ 3-4	P905167-31	Soil	5/6/99

North Creek Analytical - Portland

Lisa Domenighini, 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.

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Secor	Project:	Crowley - Vancouver, WA	Sampled: 5/6/99
P.O. Box 1508	Project Number:	00255-003-01	Received: 5/7/99
Tualatin, OR 97062	Project Manager:	Brian Pletcher	Reported: 5/28/99 16:19

Gasoline Hydrocarbons per NW TPH-Gx Method and BTEX per EPA Method 8020A
North Creek Analytical - Portland

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
GP1 @ 2.5-3.0			**P905167-01**				**Soil**	
Benzene	0590228	5/10/99	5/11/99		0.0500	ND	mg/kg dry	
Toluene	"	"	"		0.0500	ND	"	
Ethylbenzene	"	"	"		0.0500	ND	"	
Xylenes (total)	"	"	"		0.0500	ND	"	
Gasoline Range Hydrocarbons	"	"	"		2.50	**5.29**	"	
Surrogate: a,a,a-TFT (FID)	"	"	"	*50.0-150*		*97.4*	*%*	
Surrogate: a,a,a-TFT (PID)	"	"	"	*50.0-150*		*71.9*	"	
GP2 @ 3-4			**P905167-04**				**Soil**	
Benzene	0590228	5/10/99	5/11/99		0.0500	ND	mg/kg dry	
Toluene	"	"	"		0.0500	ND	"	
Ethylbenzene	"	"	"		0.0500	ND	"	
Xylenes (total)	"	"	"		0.0500	ND	"	
Gasoline Range Hydrocarbons	"	"	"		2.50	ND	"	
Surrogate: a,a,a-TFT (FID)	"	"	"	*50.0-150*		*99.3*	*%*	
Surrogate: a,a,a-TFT (PID)	"	"	"	*50.0-150*		*73.4*	"	
GP2 @ 7-8			**P905167-05**				**Soil**	
Benzene	0590228	5/10/99	5/11/99		0.500	ND	mg/kg dry	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		0.500	ND	"	
Gasoline Range Hydrocarbons	"	"	"		25.0	**584**	"	
Surrogate: a,a,a-TFT (FID)	"	"	"	*50.0-150*		*59.7*	*%*	
Surrogate: a,a,a-TFT (PID)	"	"	"	*50.0-150*		*74.5*	"	
GP3 @ 3-4			**P905167-08**				**Soil**	
Benzene	0590228	5/10/99	5/13/99		0.0500	ND	mg/kg dry	
Toluene	"	"	"		0.0500	ND	"	
Ethylbenzene	"	"	"		0.0500	ND	"	
Xylenes (total)	"	"	"		0.0500	ND	"	
Gasoline Range Hydrocarbons	"	"	"		2.50	**13.7**	"	
Surrogate: a,a,a-TFT (FID)	"	"	"	*50.0-150*		*67.9*	*%*	
Surrogate: a,a,a-TFT (PID)	"	"	"	*50.0-150*		*63.4*	"	
GP4 @ 7-8			**P905167-13**				**Soil**	
Benzene	0590228	5/10/99	5/12/99		0.0500	ND	mg/kg dry	
Toluene	"	"	"		0.0500	ND	"	

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Secor	Project:	Crowley - Vancouver, WA	Sampled:	5/6/99
P.O. Box 1508	Project Number:	00255-003-01	Received:	5/7/99
Tualatin, OR 97062	Project Manager:	Brian Pletcher	Reported:	5/28/99 16:19

Gasoline Hydrocarbons per NW TPH-Gx Method and BTEX per EPA Method 8020A
North Creek Analytical - Portland

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
GP4 @ 7-8 (continued)			**P905167-13**				**Soil**	
Ethylbenzene	0590228	5/10/99	5/12/99		0.0500	ND	mg/kg dry	
Xylenes (total)	"	"	"		0.0500	ND	"	
Gasoline Range Hydrocarbons	"	"	"		2.50	ND	"	
Surrogate: a,a,a-TFT (FID)	"	"	"	*50.0-150*		*84.2*	*%*	
Surrogate: a,a,a-TFT (PID)	"	"	"	*50.0-150*		*75.1*	"	
GP5 @ 3-4			**P905167-16**				**Soil**	
Benzene	0590228	5/10/99	5/11/99		0.0500	ND	mg/kg dry	
Toluene	"	"	"		0.0500	ND	"	
Ethylbenzene	"	"	"		0.0500	ND	"	
Xylenes (total)	"	"	"		0.0500	ND	"	
Gasoline Range Hydrocarbons	"	"	"		2.50	ND	"	
Surrogate: a,a,a-TFT (FID)	"	"	"	*50.0-150*		*95.9*	*%*	
Surrogate: a,a,a-TFT (PID)	"	"	"	*50.0-150*		*71.0*	"	
GP6 @ 7-8			**P905167-21**				**Soil**	
Benzene	0590228	5/10/99	5/11/99		0.0500	ND	mg/kg dry	
Toluene	"	"	"		0.0500	ND	"	
Ethylbenzene	"	"	"		0.0500	ND	"	
Xylenes (total)	"	"	"		0.0500	ND	"	
Gasoline Range Hydrocarbons	"	"	"		2.50	ND	"	
Surrogate: a,a,a-TFT (FID)	"	"	"	*50.0-150*		*91.6*	*%*	
Surrogate: a,a,a-TFT (PID)	"	"	"	*50.0-150*		*68.4*	"	
GP7 @ 7-8			**P905167-24**				**Soil**	
Benzene	0590228	5/10/99	5/11/99		0.0500	ND	mg/kg dry	
Toluene	"	"	"		0.0500	ND	"	
Ethylbenzene	"	"	"		0.0500	ND	"	
Xylenes (total)	"	"	"		0.0500	ND	"	
Gasoline Range Hydrocarbons	"	"	"		2.50	ND	"	
Surrogate: a,a,a-TFT (FID)	"	"	"	*50.0-150*		*105*	*%*	
Surrogate: a,a,a-TFT (PID)	"	"	"	*50.0-150*		*77.7*	"	
GP8 @ 3-4			**P905167-28**				**Soil**	
Benzene	0590228	5/10/99	5/11/99		0.0500	ND	mg/kg dry	
Toluene	"	"	"		0.0500	ND	"	
Ethylbenzene	"	"	"		0.0500	ND	"	
Xylenes (total)	"	"	"		0.0500	ND	"	

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

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Secor	Project:	Crowley - Vancouver, WA	Sampled: 5/6/99
P.O. Box 1508	Project Number:	00255-003-01	Received: 5/7/99
Tualatin, OR 97062	Project Manager:	Brian Pletcher	Reported: 5/28/99 16:19

Gasoline Hydrocarbons per NW TPH-Gx Method and BTEX per EPA Method 8020A
North Creek Analytical - Portland

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
GP8 @ 3-4 (continued)			**P905167-28**				**Soil**	
Gasoline Range Hydrocarbons	0590228	5/10/99	5/11/99		2.50	ND	mg/kg dry	
Surrogate: a,a,a-TFT (FID)	"	"	"	*50.0-150*		*97.0*	*%*	
Surrogate: a,a,a-TFT (PID)	"	"	"	*50.0-150*		*73.4*	"	
GP9 @ 3-4			**P905167-31**				**Soil**	
Benzene	0590228	5/10/99	5/11/99		0.0500	ND	mg/kg dry	
Toluene	"	"	"		0.0500	ND	"	
Ethylbenzene	"	"	"		0.0500	ND	"	
Xylenes (total)	"	"	"		0.0500	ND	"	
Gasoline Range Hydrocarbons	"	"	"		2.50	ND	"	
Surrogate: a,a,a-TFT (FID)	"	"	"	*50.0-150*		*105*	*%*	
Surrogate: a,a,a-TFT (PID)	"	"	"	*50.0-150*		*77.9*	"	

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Secor	Project:	Crowley - Vancouver, WA	Sampled: 5/6/99
P.O. Box 1508	Project Number:	00255-003-01	Received: 5/7/99
Tualatin, OR 97062	Project Manager:	Brian Pletcher	Reported: 5/28/99 16:19

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

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
GP1 @ 2.5-3.0			**P905167-01**				**Soil**	
Diesel Range Organics	0590315	5/12/99	5/12/99		25.0	ND	mg/kg dry	
Heavy Oil Range Hydrocarbons	"	"	"		50.0	ND	"	
Surrogate: 1-Chlorooctadecane	"	"	"	*50.0-150*		*117*	*%*	
GP2 @ 3-4			**P905167-04**				**Soil**	
Diesel Range Organics	0590315	5/12/99	5/13/99		25.0	**104**	mg/kg dry	
Heavy Oil Range Hydrocarbons	"	"	"		50.0	ND	"	
Surrogate: 1-Chlorooctadecane	"	"	"	*50.0-150*		*109*	*%*	
GP2 @ 7-8			**P905167-05**				**Soil**	
Diesel Range Organics	0590315	5/12/99	5/13/99		250	**6700**	mg/kg dry	1
Heavy Oil Range Hydrocarbons	"	"	"		500	ND	"	1
Surrogate: 1-Chlorooctadecane	"	"	"	*50.0-150*		*55.0*	*%*	
GP3 @ 3-4			**P905167-08**				**Soil**	
Diesel Range Organics	0590315	5/12/99	5/13/99		1250	**14000**	mg/kg dry	1
Heavy Oil Range Hydrocarbons	"	"	"		2500	ND	"	1
Surrogate: 1-Chlorooctadecane	"	"	"	*50.0-150*		*NR*	*%*	*2*
GP4 @ 7-8			**P905167-13**				**Soil**	
Diesel Range Organics	0590315	5/12/99	5/13/99		25.0	ND	mg/kg dry	
Heavy Oil Range Hydrocarbons	"	"	"		50.0	ND	"	
Surrogate: 1-Chlorooctadecane	"	"	"	*50.0-150*		*104*	*%*	
GP5 @ 3-4			**P905167-16**				**Soil**	
Diesel Range Organics	0590315	5/12/99	5/13/99		25.0	ND	mg/kg dry	
Heavy Oil Range Hydrocarbons	"	"	"		50.0	ND	"	
Surrogate: 1-Chlorooctadecane	"	"	"	*50.0-150*		*108*	*%*	
GP6 @ 7-8			**P905167-21**				**Soil**	
Diesel Range Organics	0590315	5/12/99	5/13/99		25.0	ND	mg/kg dry	
Heavy Oil Range Hydrocarbons	"	"	"		50.0	ND	"	
Surrogate: 1-Chlorooctadecane	"	"	"	*50.0-150*		*111*	*%*	
GP7 @ 7-8			**P905167-24**				**Soil**	
Diesel Range Organics	0590315	5/12/99	5/13/99		25.0	ND	mg/kg dry	
Heavy Oil Range Hydrocarbons	"	"	"		50.0	ND	"	
Surrogate: 1-Chlorooctadecane	"	"	"	*50.0-150*		*99.1*	*%*	

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

Lisa Domenighini, Project Manager

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Secor	Project:	Crowley - Vancouver, WA	Sampled: 5/6/99
P.O. Box 1508	Project Number:	00255-003-01	Received: 5/7/99
Tualatin, OR 97062	Project Manager:	Brian Pletcher	Reported: 5/28/99 16:19

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

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
GP8 @ 3-4			**P905167-28**				**Soil**	
Diesel Range Organics	0590315	5/12/99	5/13/99		25.0	ND	mg/kg dry	
Heavy Oil Range Hydrocarbons	"	"	"		50.0	ND	"	
Surrogate: 1-Chlorooctadecane	"	"	"	*50.0-150*		*98.9*	%	
GP9 @ 3-4			**P905167-31**				**Soil**	
Diesel Range Organics	0590315	5/12/99	5/13/99		25.0	ND	mg/kg dry	
Heavy Oil Range Hydrocarbons	"	"	"		50.0	ND	"	
Surrogate: 1-Chlorooctadecane	"	"	"	*50.0-150*		*106*	%	

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Secor	Project:	Crowley - Vancouver, WA	Sampled: 5/6/99
P.O. Box 1508	Project Number:	00255-003-01	Received: 5/7/99
Tualatin, OR 97062	Project Manager:	Brian Pletcher	Reported: 5/28/99 16:19

Volatile Petroleum Hydrocarbons by modified WDOE Interim TPH Policy Method
North Creek Analytical - Bothell

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
GP3 @ 7-8			**P905167-09**				**Soil**	
C5-C6 Aliphatics	0590417	5/17/99	5/21/99		250	ND	mg/kg dry	
C6-C8 Aliphatics	"	"	"		250	ND	"	
C8-C10 Aliphatics	"	"	"		250	ND	"	
C10-C12 Aliphatics	"	"	"		250	**856**	"	
C8-C10 Aromatics	"	"	"		250	ND	"	
C10-C12 Aromatics	"	"	"		250	**649**	"	
C12-C13 Aromatics	"	"	"		250	**1500**	"	
Surrogate: 4-BFB (FID)	"	"	"	*60.0-140*		*NR*	*%*	*2*
Surrogate: 4-BFB (PID)	"	"	"	*60.0-140*		*NR*	"	*2*

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Secor	Project:	Crowley - Vancouver, WA	Sampled: 5/6/99
P.O. Box 1508	Project Number:	00255-003-01	Received: 5/7/99
Tualatin, OR 97062	Project Manager:	Brian Pletcher	Reported: 5/28/99 16:19

BTEX, MTBE and Naphthalene by WDOE Interim TPH Policy Method using GC/MS
North Creek Analytical - Bothell

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
GP3 @ 7-8			**P905167-09**				**Soil**	3
Methyl tert-butyl ether	0590750	5/27/99	5/27/99		10.0	ND	mg/kg dry	
Benzene	"	"	"		1.00	ND	"	
Toluene	"	"	"		1.00	ND	"	
Ethylbenzene	"	"	"		1.00	ND	"	
m,p-Xylene	"	"	"		2.00	ND	"	
o-Xylene	"	"	"		1.00	ND	"	
Naphthalene	"	"	"		1.00	ND	"	
Surrogate: 2-Bromopropene	"	"	"	*70.0-130*		*122*	*%*	
Surrogate: 1,2-DCA-d4	"	"	"	*70.0-130*		*112*	"	
Surrogate: Toluene-d8	"	"	"	*70.0-130*		*94.9*	"	
Surrogate: 4-BFB	"	"	"	*70.0-130*		*94.4*	"	

North Creek Analytical - Portland

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

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Secor	Project:	Crowley - Vancouver, WA	Sampled: 5/6/99
P.O. Box 1508	Project Number:	00255-003-01	Received: 5/7/99
Tualatin, OR 97062	Project Manager:	Brian Pletcher	Reported: 5/28/99 16:19

Extractable Petroleum Hydrocarbons by modified WDOE Interim TPH Policy Method
North Creek Analytical - Bothell

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
GP3 @ 7-8			**P905167-09**				**Soil**	
C8-C10 Aliphatics	0590526	5/20/99	5/21/99		20.0	**94.3**	mg/kg dry	
C10-C12 Aliphatics	"	"	"		20.0	**961**	"	
C12-C16 Aliphatics	"	"	"		20.0	**3130**	"	
C16-C21 Aliphatics	"	"	"		20.0	**1730**	"	
C21-C34 Aliphatics	"	"	"		20.0	**339**	"	
C10-C12 Aromatics	"	"	5/24/99		20.0	**46.6**	"	
C12-C16 Aromatics	"	"	"		20.0	**412**	"	
C16-C21 Aromatics	"	"	"		20.0	**409**	"	
C21-C34 Aromatics	"	"	"		20.0	**237**	"	
Extractable Petroleum Hydrocarbons	"	"	"			7360	"	
Surrogate: 2-FBP	"	"	"	*50.0-150*		*116*	%	
Surrogate: Octacosane	"	"	*5/21/99*	*50.0-150*		*118*	"	
Surrogate: Undecane	"	"	"	*30.0-150*		*NR*	"	4

hexane high mw + polar

DCM

no polar cmps

weathered bunker cmps
low grade fuels
heating oil

eph - biased low

hexane

- more weathering @ 3-4'
dissolution of product
more product @ depth
or more activity - more degraded 3-4'

extract of 14,000 run through the tmt

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Secor	Project:	Crowley - Vancouver, WA	Sampled: 5/6/99
P.O. Box 1508	Project Number:	00255-003-01	Received: 5/7/99
Tualatin, OR 97062	Project Manager:	Brian Pletcher	Reported: 5/28/99 16:19

Polynuclear Aromatic Hydrocarbons by GC/MS-SIM
North Creek Analytical - Bothell

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
GP3 @ 7-8			**P905167-09**				**Soil**	
Acenaphthene	0590526	5/20/99	5/23/99		0.400	**0.685**	mg/kg dry	
Acenaphthylene	"	"	"		0.400	**0.400**	"	
Anthracene	"	"	"		0.400	**3.48**	"	
Benzo (a) anthracene	"	"	"		0.400	ND	"	
Benzo (a) pyrene	"	"	"		0.400	ND	"	
Benzo (b) fluoranthene	"	"	"		0.400	ND	"	
Benzo (ghi) perylene	"	"	"		0.400	ND	"	
Benzo (k) fluoranthene	"	"	"		0.400	ND	"	
Chrysene	"	"	"		0.400	**0.485**	"	
Dibenz (a,h) anthracene	"	"	"		0.400	ND	"	
Fluoranthene	"	"	"		0.400	**0.428**	"	
Fluorene	"	"	"		0.400	**2.45**	"	
Indeno (1,2,3-cd) pyrene	"	"	"		0.400	ND	"	
2-Methylnaphthalene	"	"	"		0.400	**0.400**	"	
Naphthalene	"	"	"		0.400	ND	"	
Phenanthrene	"	"	"		0.400	**8.90**	"	
Pyrene	"	"	"		0.400	**0.999**	"	
Surrogate: p-Terphenyl-d14	"	"	"	*30.0-150*		*110*	*%*	

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Environmental Laboratory Network

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Secor	Project:	Crowley - Vancouver, WA	Sampled:	5/6/99
P.O. Box 1508	Project Number:	00255-003-01	Received:	5/7/99
Tualatin, OR 97062	Project Manager:	Brian Pletcher	Reported:	5/28/99 16:19

Dry Weight Determination
North Creek Analytical - Bothell

Sample Name	Lab ID	Matrix	Result	Units
GP3 @ 7-8	P905167-09	Soil	93.4	%

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Secor	Project:	Crowley - Vancouver, WA	Sampled:	5/6/99
P.O. Box 1508	Project Number:	00255-003-01	Received:	5/7/99
Tualatin, OR 97062	Project Manager:	Brian Pletcher	Reported:	5/28/99 16:19

Dry Weight Determination
North Creek Analytical - Portland

Sample Name	Lab ID	Matrix	Result	Units
GP1 @ 2.5-3.0	P905167-01	Soil	91.2	%
GP2 @ 3-4	P905167-04	Soil	93.6	%
GP2 @ 7-8	P905167-05	Soil	75.8	%
GP3 @ 3-4	P905167-08	Soil	86.2	%
GP4 @ 7-8	P905167-13	Soil	94.3	%
GP5 @ 3-4	P905167-16	Soil	85.3	%
GP6 @ 7-8	P905167-21	Soil	90.8	%
GP7 @ 7-8	P905167-24	Soil	94.7	%
GP8 @ 3-4	P905167-28	Soil	95.1	%
GP9 @ 3-4	P905167-31	Soil	94.9	%

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Secor	Project:	Crowley - Vancouver, WA	Sampled: 5/6/99
P.O. Box 1508	Project Number:	00255-003-01	Received: 5/7/99
Tualatin, OR 97062	Project Manager:	Brian Pletcher	Reported: 5/28/99 16:19

Gasoline Hydrocarbons per NW TPH-Gx Method and BTEX per EPA Method 8020A/Quality Control
North Creek Analytical - Portland

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit / Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Batch: 0590228	**Date Prepared: 5/10/99**					**Extraction Method: MeOH Extraction**				
Blank	**0590228-BLK1**									
Benzene	5/11/99			ND	mg/kg dry	**0.0500**				
Toluene	"			ND	"	**0.0500**				
Ethylbenzene	"			ND	"	**0.0500**				
Xylenes (total)	"			ND	"	**0.0500**				
Gasoline Range Hydrocarbons	"			ND	"	**2.50**				
Surrogate: a,a,a-TFT (FID)	"	*2.50*		*2.47*	"	*50.0-150*	*98.8*			
Surrogate: a,a,a-TFT (PID)	"	*2.50*		*2.53*	"	*50.0-150*	*101*			
LCS	**0590228-BS1**									
Gasoline Range Hydrocarbons	5/13/99	31.3		34.5	mg/kg dry	50.0-150	110			
Surrogate: a,a,a-TFT (FID)	"	*2.50*		*2.90*	"	*50.0-150*	*116*			
LCS	**0590228-BS2**									
Benzene	5/13/99	0.500		0.485	mg/kg dry	69.0-138	97.0			
Toluene	"	0.500		0.530	"	53.0-151	106			
Ethylbenzene	"	0.500		0.523	"	61.0-141	105			
Xylenes (total)	"	1.50		1.62	"	62.0-144	108			
Surrogate: a,a,a-TFT (PID)	"	*2.50*		*1.82*	"	*50.0-150*	*72.8*			
Duplicate	**0590228-DUP1**		**P905148-02**							
Gasoline Range Hydrocarbons	5/11/99		955	654	mg/kg dry			50.0	**37.4**	
Surrogate: a,a,a-TFT (FID)	"	*3.12*		*2.30*	"	*50.0-150*	*73.7*			
Duplicate	**0590228-DUP2**		**P905167-01**							
Gasoline Range Hydrocarbons	5/11/99		5.29	ND	mg/kg dry			50.0		
Surrogate: a,a,a-TFT (FID)	"	*2.74*		*2.74*	"	*50.0-150*	*100*			
Matrix Spike	**0590228-MS1**		**P905148-01**							
Benzene	5/11/99	0.535	ND	0.444	mg/kg dry	56.0-123	**83.0**			
Toluene	"	0.535	ND	0.473	"	54.0-123	**88.4**			
Ethylbenzene	"	0.535	ND	0.489	"	45.0-130	**91.4**			
Xylenes (total)	"	1.60	ND	1.54	"	50.0-127	**96.2**			
Surrogate: a,a,a-TFT (PID)	"	*2.67*		*1.69*	"	*50.0-150*	*63.3*			
Matrix Spike Dup	**0590228-MSD1**		**P905148-01**							
Benzene	5/11/99	0.535	ND	0.425	mg/kg dry	56.0-123	**79.4**	17.0	**4.43**	
Toluene	"	0.535	ND	0.465	"	54.0-123	**86.9**	24.0	**1.71**	

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Secor	Project:	Crowley - Vancouver, WA	Sampled: 5/6/99
P.O. Box 1508	Project Number:	00255-003-01	Received: 5/7/99
Tualatin, OR 97062	Project Manager:	Brian Pletcher	Reported: 5/28/99 16:19

Gasoline Hydrocarbons per NW TPH-Gx Method and BTEX per EPA Method 8020A/Quality Control
North Creek Analytical - Portland

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Matrix Spike Dup (continued)	**0590228-MSD1**		**P905148-01**							
Ethylbenzene	5/11/99	0.535	ND	0.484	mg/kg dry	45.0-130	**90.5**	20.0	**0.990**	
Xylenes (total)	"	1.60	ND	1.53	"	50.0-127	**95.6**	20.0	**0.626**	
Surrogate: a,a,a-TFT (PID)	"	*2.67*		*1.51*	"	*50.0-150*	*56.6*			

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Secor	Project:	Crowley - Vancouver, WA	Sampled: 5/6/99
P.O. Box 1508	Project Number:	00255-003-01	Received: 5/7/99
Tualatin, OR 97062	Project Manager:	Brian Pletcher	Reported: 5/28/99 16:19

Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method/Quality Control
North Creek Analytical - Portland

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit / Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Batch: 0590315	**Date Prepared: 5/12/99**					**Extraction Method: TPH-D Extraction**				
Blank	**0590315-BLK1**									
Diesel Range Organics	5/12/99			**ND**	mg/kg dry	**25.0**				
Heavy Oil Range Hydrocarbons	"			**ND**	"	**50.0**				
Surrogate: 1-Chlorooctadecane	"	*5.00*		*5.08*	"	*50.0-150*	*102*			
LCS	**0590315-BS1**									
Diesel Range Organics	5/12/99	128		131	mg/kg dry	50.0-150	102			
Heavy Oil Range Hydrocarbons	"	51.0		53.8	"	50.0-150	105			
Surrogate: 1-Chlorooctadecane	"	*5.00*		*6.30*	"	*50.0-150*	*126*			
Duplicate	**0590315-DUP1**		**P905167-01**							
Diesel Range Organics	5/12/99		ND	ND	mg/kg dry			50.0		
Heavy Oil Range Hydrocarbons	"		ND	ND	"			50.0		
Surrogate: 1-Chlorooctadecane	"	*5.48*		*5.62*	"	*50.0-150*	*103*			
Duplicate	**0590315-DUP2**		**P905167-04**							
Diesel Range Organics	5/13/99		104	103	mg/kg dry			50.0	**0.966**	
Heavy Oil Range Hydrocarbons	"		ND	ND	"			50.0		5
Surrogate: 1-Chlorooctadecane	"	*5.34*		*5.80*	"	*50.0-150*	*109*			
Duplicate	**0590315-DUP3**		**P905167-31**							
Diesel Range Organics	5/13/99		ND	ND	mg/kg dry			50.0		
Heavy Oil Range Hydrocarbons	"		ND	ND	"			50.0		
Surrogate: 1-Chlorooctadecane	"	*5.27*		*5.51*	"	*50.0-150*	*105*			

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Secor	Project:	Crowley - Vancouver, WA	Sampled: 5/6/99
P.O. Box 1508	Project Number:	00255-003-01	Received: 5/7/99
Tualatin, OR 97062	Project Manager:	Brian Pletcher	Reported: 5/28/99 16:19

Volatile Petroleum Hydrocarbons by modified WDOE Interim TPH Policy Method/Quality Control
North Creek Analytical - Bothell

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit / Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Batch: 0590417	**Date Prepared: 5/17/99**					**Extraction Method: EPA 5030B (MeOH)**				
Blank	**0590417-BLK1**									
C5-C6 Aliphatics	5/20/99			ND	mg/kg dry	5.00				
C6-C8 Aliphatics	"			ND	"	5.00				
C8-C10 Aliphatics	"			ND	"	5.00				
C10-C12 Aliphatics	"			ND	"	5.00				
C8-C10 Aromatics	"			ND	"	5.00				
C10-C12 Aromatics	"			ND	"	5.00				
C12-C13 Aromatics	"			ND	"	5.00				
Surrogate: 4-BFB (FID)	"	*4.00*		*3.97*	"	*60.0-140*	*99.3*			
Surrogate: 4-BFB (PID)	"	*4.00*		*4.06*	"	*60.0-140*	*101*			
Blank	**0590417-BLK2**									
C5-C6 Aliphatics	5/22/99			ND	mg/kg dry	5.00				
C6-C8 Aliphatics	"			ND	"	5.00				
C8-C10 Aliphatics	"			ND	"	5.00				
C10-C12 Aliphatics	"			ND	"	5.00				
C8-C10 Aromatics	"			ND	"	5.00				
C10-C12 Aromatics	"			ND	"	5.00				
C12-C13 Aromatics	"			ND	"	5.00				
Surrogate: 4-BFB (FID)	"	*4.00*		*3.75*	"	*60.0-140*	*93.8*			
Surrogate: 4-BFB (PID)	"	*4.00*		*4.23*	"	*60.0-140*	*106*			
LCS	**0590417-BS1**									
C5-C6 Aliphatics	5/20/99	2.00		1.32	mg/kg dry	70.0-130	66.0			6
C6-C8 Aliphatics	"	1.00		1.08	"	70.0-130	108			
C8-C10 Aliphatics	"	1.00		1.16	"	70.0-130	116			
C10-C12 Aliphatics	"	1.00		1.22	"	70.0-130	122			
C8-C10 Aromatics	"	4.00		4.10	"	70.0-130	102			
C10-C12 Aromatics	"	1.00		1.10	"	70.0-130	110			
C12-C13 Aromatics	"	2.00		2.30	"	70.0-130	115			
Surrogate: 4-BFB (FID)	"	*4.00*		*4.15*	"	*60.0-140*	*104*			
Surrogate: 4-BFB (PID)	"	*4.00*		*4.12*	"	*60.0-140*	*103*			
Duplicate	**0590417-DUP1**		**P905167-09**							
C5-C6 Aliphatics	5/21/99		ND	ND	mg/kg dry			25.0		
C6-C8 Aliphatics	"		ND	ND	"			25.0		
C8-C10 Aliphatics	"		ND	ND	"			25.0		
C10-C12 Aliphatics	"		856	911	"			25.0	**6.23**	

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Volatile Petroleum Hydrocarbons by modified WDOE Interim TPH Policy Method/Quality Control
North Creek Analytical - Bothell

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit / Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Duplicate (continued)	**0590417-DUP1**		**P905167-09**							
C8-C10 Aromatics	5/21/99		ND	ND	mg/kg dry			25.0		
C10-C12 Aromatics	"		649	651	"			25.0	**0.308**	
C12-C13 Aromatics	"		1500	1350	"			25.0	**10.5**	
Surrogate: 4-BFB (FID)	"	*4.28*		*ND*	"	*60.0-140*	*NR*			*2*
Surrogate: 4-BFB (PID)	"	*4.28*		*21.1*	"	*60.0-140*	*NR*			*4*
Duplicate	**0590417-DUP2**		**B905273-03**							
C5-C6 Aliphatics	5/24/99		ND	ND	mg/kg dry			25.0		
C6-C8 Aliphatics	"		ND	ND	"			25.0		
C8-C10 Aliphatics	"		ND	ND	"			25.0		
C10-C12 Aliphatics	"		ND	ND	"			25.0		
C8-C10 Aromatics	"		ND	ND	"			25.0		
C10-C12 Aromatics	"		ND	ND	"			25.0		
C12-C13 Aromatics	"		5.45	7.42	"			25.0	**30.6**	7
Surrogate: 4-BFB (FID)	"	*5.13*		*4.22*	"	*60.0-140*	*82.3*			
Surrogate: 4-BFB (PID)	"	*5.13*		*4.44*	"	*60.0-140*	*86.5*			

North Creek Analytical - Portland

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

Lisa Domenighini, Project Manager

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541.383.9310 fax 541.382.7588

Secor	Project:	Crowley - Vancouver, WA	Sampled: 5/6/99
P.O. Box 1508	Project Number:	00255-003-01	Received: 5/7/99
Tualatin, OR 97062	Project Manager:	Brian Pletcher	Reported: 5/28/99 16:19

BTEX, MTBE and Naphthalene by WDOE Interim TPH Policy Method using GC/MS/Quality Control
North Creek Analytical - Bothell

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit / Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Batch: 0590750	**Date Prepared: 5/27/99**					**Extraction Method: EPA 5030B [P/T]**				
Blank	**0590750-BLK1**									
Methyl tert-butyl ether	5/27/99			**ND**	mg/kg dry	**1.00**				
Benzene	"			**ND**	"	**0.100**				
Toluene	"			**ND**	"	**0.100**				
Ethylbenzene	"			**ND**	"	**0.100**				
m,p-Xylene	"			**ND**	"	**0.200**				
o-Xylene	"			**ND**	"	**0.100**				
Naphthalene	"			**ND**	"	**0.100**				
Surrogate: 2-Bromopropene	"	*2.00*		*1.73*	"	*70.0-130*	*86.5*			
Surrogate: 1,2-DCA-d4	"	*2.00*		*1.41*	"	*70.0-130*	*70.5*			
Surrogate: Toluene-d8	"	*2.00*		*1.69*	"	*70.0-130*	*84.5*			
Surrogate: 4-BFB	"	*2.00*		*1.76*	"	*70.0-130*	*88.0*			
LCS	**0590750-BS1**									
Benzene	5/27/99	1.00		0.922	mg/kg dry	70.0-130	92.2			
Toluene	"	1.00		0.872	"	70.0-130	87.2			
Surrogate: 2-Bromopropene	"	*2.00*		*1.96*	"	*70.0-130*	*98.0*			
Surrogate: 1,2-DCA-d4	"	*2.00*		*1.92*	"	*70.0-130*	*96.0*			
Surrogate: Toluene-d8	"	*2.00*		*1.88*	"	*70.0-130*	*94.0*			
Surrogate: 4-BFB	"	*2.00*		*1.83*	"	*70.0-130*	*91.5*			
Matrix Spike	**0590750-MS1**		**B905510-05**							
Benzene	5/27/99	1.08	ND	0.988	mg/kg dry	70.0-130	**91.5**			
Toluene	"	1.08	ND	0.942	"	70.0-130	**87.2**			
Surrogate: 2-Bromopropene	"	*2.16*		*1.96*	"	*70.0-130*	*90.7*			
Surrogate: 1,2-DCA-d4	"	*2.16*		*1.99*	"	*70.0-130*	*92.1*			
Surrogate: Toluene-d8	"	*2.16*		*1.84*	"	*70.0-130*	*85.2*			
Surrogate: 4-BFB	"	*2.16*		*1.76*	"	*70.0-130*	*81.5*			
Matrix Spike Dup	**0590750-MSD1**		**B905510-05**							
Benzene	5/27/99	1.08	ND	0.960	mg/kg dry	70.0-130	**88.9**	20.0	**2.88**	
Toluene	"	1.08	ND	0.942	"	70.0-130	**87.2**	20.0	**0**	
Surrogate: 2-Bromopropene	"	*2.16*		*1.94*	"	*70.0-130*	*89.8*			
Surrogate: 1,2-DCA-d4	"	*2.16*		*1.87*	"	*70.0-130*	*86.6*			
Surrogate: Toluene-d8	"	*2.16*		*1.90*	"	*70.0-130*	*88.0*			
Surrogate: 4-BFB	"	*2.16*		*1.84*	"	*70.0-130*	*85.2*			

North Creek Analytical - Portland

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Secor	Project:	Crowley - Vancouver, WA	Sampled: 5/6/99
P.O. Box 1508	Project Number:	00255-003-01	Received: 5/7/99
Tualatin, OR 97062	Project Manager:	Brian Pletcher	Reported: 5/28/99 16:19

Extractable Petroleum Hydrocarbons by modified WDOE Interim TPH Policy Method/Quality Control
North Creek Analytical - Bothell

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit / Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Batch: 0590526	**Date Prepared: 5/20/99**					**Extraction Method: EPA 3550B**				
Blank	**0590526-BLK1**									
C8-C10 Aliphatics	5/21/99			ND	mg/kg dry	5.00				
C10-C12 Aliphatics	"			ND	"	5.00				
C12-C16 Aliphatics	"			ND	"	5.00				
C16-C21 Aliphatics	"			ND	"	5.00				
C21-C34 Aliphatics	"			ND	"	5.00				
C10-C12 Aromatics	"			ND	"	5.00				
C12-C16 Aromatics	"			ND	"	5.00				
C16-C21 Aromatics	"			ND	"	5.00				
C21-C34 Aromatics	"			ND	"	5.00				
Extractable Petroleum Hydrocarbons	"			ND	"					
Surrogate: 2-FBP	"	*12.0*		*10.8*	"	*50.0-150*	*90.0*			
Surrogate: Octacosane	"	*12.3*		*12.6*	"	*50.0-150*	*102*			
Surrogate: Undecane	"	*13.3*		*11.0*	"	*30.0-150*	*82.7*			
Blank	**0590526-BLK2**									
C8-C10 Aliphatics	5/21/99			ND	mg/kg dry	5.00				
C10-C12 Aliphatics	"			ND	"	5.00				
C12-C16 Aliphatics	"			ND	"	5.00				
C16-C21 Aliphatics	"			ND	"	5.00				
C21-C34 Aliphatics	"			ND	"	5.00				
C10-C12 Aromatics	"			ND	"	5.00				
C12-C16 Aromatics	"			ND	"	5.00				
C16-C21 Aromatics	"			ND	"	5.00				
C21-C34 Aromatics	"			ND	"	5.00				
Extractable Petroleum Hydrocarbons	"			ND	"					
Surrogate: 2-FBP	"	*12.0*		*11.4*	"	*50.0-150*	*95.0*			
Surrogate: Octacosane	"	*12.3*		*12.0*	"	*50.0-150*	*97.6*			
Surrogate: Undecane	"	*13.3*		*10.6*	"	*30.0-150*	*79.7*			
LCS	**0590526-BS1**									
Extractable Petroleum Hydrocarbons	5/21/99	167		141	mg/kg dry	30.0-120	84.4			
Surrogate: 2-FBP	"	*12.0*		*11.4*	"	*50.0-150*	*95.0*			
Surrogate: Octacosane	"	*12.3*		*12.1*	"	*50.0-150*	*98.4*			
Surrogate: Undecane	"	*13.3*		*10.3*	"	*30.0-150*	*77.4*			
LCS Dup	**0590526-BSD1**									
Extractable Petroleum Hydrocarbons	5/21/99	167		135	mg/kg dry	30.0-120	80.8	40.0	4.36	

North Creek Analytical - Portland

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541.383.9310 fax 541.382.7588

Secor	Project:	Crowley - Vancouver, WA	Sampled: 5/6/99
P.O. Box 1508	Project Number:	00255-003-01	Received: 5/7/99
Tualatin, OR 97062	Project Manager:	Brian Pletcher	Reported: 5/28/99 16:19

Extractable Petroleum Hydrocarbons by modified WDOE Interim TPH Policy Method/Quality Control
North Creek Analytical - Bothell

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit / Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
LCS Dup (continued)	**0590526-BSD1**									
Surrogate: 2-FBP	*5/21/99*	*12.0*		*9.86*	*mg/kg dry*	*50.0-150*	*82.2*			
Surrogate: Octacosane	*"*	*12.3*		*11.6*	*"*	*50.0-150*	*94.3*			
Surrogate: Undecane	*"*	*13.3*		*10.3*	*"*	*30.0-150*	*77.4*			
Matrix Spike	**0590526-MS1**		**P905167-09**							
Extractable Petroleum Hydrocarbons	5/21/99	178	7360	1810	mg/kg dry	30.0-120	NR			8
Surrogate: 2-FBP	*"*	*12.9*		*31.3*	*"*	*50.0-150*	*NR*			*9*
Surrogate: Octacosane	*"*	*13.2*		*14.5*	*"*	*50.0-150*	*110*			
Surrogate: Undecane	*"*	*14.2*		*ND*	*"*	*30.0-150*	*NR*			*4*

North Creek Analytical - Portland

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541.383.9310 fax 541.382.7588

Secor	Project:	Crowley - Vancouver, WA	Sampled: 5/6/99
P.O. Box 1508	Project Number:	00255-003-01	Received: 5/7/99
Tualatin, OR 97062	Project Manager:	Brian Pletcher	Reported: 5/28/99 16:19

Polynuclear Aromatic Hydrocarbons by GC/MS-SIM/Quality Control
North Creek Analytical - Bothell

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit / Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Batch: 0590526	**Date Prepared: 5/20/99**					**Extraction Method: EPA 3550B**				
Blank	**0590526-BLK1**									
Acenaphthene	5/23/99			ND	mg/kg dry	**0.0100**				
Acenaphthylene	"			ND	"	**0.0100**				
Anthracene	"			ND	"	**0.0100**				
Benzo (a) anthracene	"			ND	"	**0.0100**				
Benzo (a) pyrene	"			ND	"	**0.0100**				
Benzo (b) fluoranthene	"			ND	"	**0.0100**				
Benzo (ghi) perylene	"			ND	"	**0.0100**				
Benzo (k) fluoranthene	"			ND	"	**0.0100**				
Chrysene	"			ND	"	**0.0100**				
Dibenz (a,h) anthracene	"			ND	"	**0.0100**				
Fluoranthene	"			ND	"	**0.0100**				
Fluorene	"			ND	"	**0.0100**				
Indeno (1,2,3-cd) pyrene	"			ND	"	**0.0100**				
2-Methylnaphthalene	"			ND	"	**0.0100**				
Naphthalene	"			ND	"	**0.0100**				
Phenanthrene	"			ND	"	**0.0100**				
Pyrene	"			ND	"	**0.0100**				
Surrogate: p-Terphenyl-d14	"	*0.267*		*0.269*	"	*30.0-150*	*101*			
LCS	**0590526-BS1**									
Chrysene	5/23/99	0.333		0.310	mg/kg dry	10.0-125	93.1			
Fluorene	"	0.333		0.248	"	11.0-116	74.5			
Indeno (1,2,3-cd) pyrene	"	0.333		0.285	"	10.0-147	85.6			
Surrogate: p-Terphenyl-d14	"	*0.267*		*0.286*	"	*30.0-150*	*107*			
LCS Dup	**0590526-BSD1**									
Chrysene	5/23/99	0.333		0.316	mg/kg dry	10.0-125	94.9	28.0	1.91	
Fluorene	"	0.333		0.187	"	11.0-116	56.2	32.0	28.0	
Indeno (1,2,3-cd) pyrene	"	0.333		0.278	"	10.0-147	83.5	34.0	2.48	
Surrogate: p-Terphenyl-d14	"	*0.267*		*0.279*	"	*30.0-150*	*104*			
Matrix Spike	**0590526-MS1**		**P905167-09**							
Chrysene	5/23/99	0.357	0.485	0.770	mg/kg dry	10.0-125	**79.8**			
Fluorene	"	0.357	2.45	2.43	"	10.0-154	**NR**			10
Indeno (1,2,3-cd) pyrene	"	0.357	ND	0.371	"	10.0-144	**104**			
Surrogate: p-Terphenyl-d14	"	*0.285*		*0.285*	"	*30.0-150*	*100*			

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Secor	Project:	Crowley - Vancouver, WA	Sampled: 5/6/99
P.O. Box 1508	Project Number:	00255-003-01	Received: 5/7/99
Tualatin, OR 97062	Project Manager:	Brian Pletcher	Reported: 5/28/99 16:19

Notes and Definitions

#	Note
1	Reporting limits raised due to dilution necessary for analysis.
2	The surrogate recovery for this sample is not available due to sample dilution required from high analyte concentration and/or matrix interferences.
3	This sample was analyzed outside the EPA recommended holding time.
4	The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample.
5	RPD is not applicable for analyte concentrations less than 5 times the MRL.
6	The spike recovery 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.
7	Analyses are not controlled on RPD values from sample concentrations less than 10 times the reporting limit.
8	Analyses are not controlled on matrix spike RPD and/or percent recoveries when the sample concentration is significantly higher than the spike level.
9	The recovery of this surrogate is outside control limits due to sample dilution required from high analyte concentration and/or matrix interferences.
10	The percent recovery for this QC spike sample cannot be accurately calculated due to the high concentration of analyte already 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
Recov.	Recovery
RPD	Relative Percent Difference

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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CHAIN OF CUSTODY REPORT

Work Order # P905167

REPORT TO: SECOR
ATTENTION: Brian Pletcher
ADDRESS: 7730 SW. Mohawk St.
Tualatin Oregon 97062
PHONE: 503-691-2030 FAX: 503-692-7074
PROJECT NAME: Crowley Marine Lines
PROJECT NUMBER: 00255-003-01
SAMPLED BY: DEC

INVOICE TO:
ATTENTION: Same
ADDRESS:
P.O. NUMBER: NCA QUOTE #:

TURNAROUND REQUEST in Business Days *
Organic & Inorganic Analyses: 10 (Standard) | 7 | 5 | 4 | 3 | 2 | 1 | Same Day
Fuels & Hydrocarbon Analyses: 5 (Standard) | 3-4 | 2 | 1 | Same Day
OTHER Specify:
* Turnaround Requests less than standard may incur Rush Charges.

Analysis Request:

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	NCA SAMPLE ID (Laboratory Use Only)	MATRIX (W, S, A, O)	# OF CONTAINERS	COMMENTS
1.	GP1 @ 2.5-3.0	5/6/99 1006		S	1	hold
2.	GP1 @ 4.5-5.0	1040				
3.	GP1 @ 12	1025				
4.	GP2 @ 3-4	1123				
5.	GP2 @ 7-8	1128				
6.	GP2 @ 11-12	1133				
7.	GP2 @ 15-16	1138				
8.	GP3 @ 3-4	1154				
9.	GP3 @ 7-8	1200				
10.	GP3 @ 11-12	1212				

RELINQUISHED BY (Signature): J. Edward Cafferty DATE: 5-7-99
PRINT NAME: J. Edward Cafferty FIRM: SECOR TIME: 11 00
RECEIVED BY (Signature): DATE: 5-7-99
PRINT NAME: Larry Spangler FIRM: NCA TIME: 1100

RELINQUISHED BY (Signature): DATE: 5-7-99
PRINT NAME: Larry Spangler FIRM: NCA TIME: 1040
RECEIVED BY (Signature): Sara Mc Clurg DATE: 5-7-99
PRINT NAME: Sara Mc Clurg FIRM: NCA TIME: 1000

ADDITIONAL REMARKS:

NORTH CREEK ANALYTICAL
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CHAIN OF CUSTODY REPORT

Work Order # P905167

REPORT TO: SECOR
ATTENTION: Brian Pletcher
ADDRESS: 7730 SW. Mohawk St.
Tualatin Oregon 97062
PHONE: 503-691-2030 FAX: 503-692-7074
PROJECT NAME: Crowley Marine Lines
PROJECT NUMBER: 00255-007-01
SAMPLED BY: DEC

INVOICE TO:
ATTENTION: Same
ADDRESS:
P.O. NUMBER: NCA QUOTE #:

TURNAROUND REQUEST in Business Days *
Organic & Inorganic Analyses: 10 Standard | 7 | 5 | 4 | 3 | 2 | 1 | Same Day
Fuels & Hydrocarbon Analyses: 5 Standard | 3-4 | 2 | 1 | Same Day
OTHER Specify:
* Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	NCA SAMPLE ID (Laboratory Use Only)	MATRIX (W, S, A, O)	# OF CONTAINERS	COMMENTS
1.	GP3 @ 15-16	5/6/99 1220		S	1	hold
2.	GP4 @ 3-4	1309				
3.	GP4 @ 7-8	1312				
4.	GP4 @ 11-12	1316				
5.	GP4 @ 15-16	1321				
6.	GP5 @ 3-4	1406				
7.	GP5 @ 7-8	1410				
8.	GP5 @ 11-12	1418				
9.	GP5 @ 15-16	1422				
10.	GP6 @ 3-4	1446				

RELINQUISHED BY (Signature): V. Edward Coffey DATE: 5-7-99
PRINT NAME: V. Edward Coffey FIRM: SECOR TIME: 1100

RECEIVED BY (Signature): Larry Spangler DATE: 5-7-99
PRINT NAME: Larry Spangler FIRM: NCA TIME: 1100

RELINQUISHED BY (Signature): Larry Spangler DATE: 5-7-99
PRINT NAME: Larry Spangler FIRM: NCA TIME: 1000

RECEIVED BY (Signature): Sara Mc Clung DATE: 5-7-99
PRINT NAME: Sara Mc Clung FIRM: NCA TIME: 1000

ADDITIONAL REMARKS:

NORTH CREEK ANALYTICAL
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CHAIN OF CUSTODY REPORT

Work Order # P905167

REPORT TO: SECOR
ATTENTION: Brian Pletcher
ADDRESS: 7730 SW. Mohawk St.
Tualatin Oregon 97062
PHONE: 503-691-2030 FAX: 503-692-7074
PROJECT NAME: Crowley Marine Liner
PROJECT NUMBER: 00255-003-01
SAMPLED BY: DEC

INVOICE TO:
ATTENTION: Same
ADDRESS:
P.O. NUMBER: NCA QUOTE #:

TURNAROUND REQUEST in Business Days *
Organic & Inorganic Analyses: 10 Standard | 7 | 5 | 4 | 3 | 2 | 1 | Same Day
Fuels & Hydrocarbon Analyses: 5 Standard | 3-4 | 2 | 1 | Same Day
OTHER Specify:
* Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	NCA SAMPLE ID (Laboratory Use Only)	Analysis Request	MATRIX (W, S, A, O)	# OF CONTAINERS	COMMENTS
1.	GP6 @ 7-8	5/6/99 1453			S	1	hold
2.	GP6 @ 11-12	1458					
3.	GP7 @ 3-4	1523					
4.	GP7 @ 7-8	1526					
5.	GP7 @ 11-12	1530					
6.	GP7 @ 15-16	1535					
7.	GP7 @ 19-20	1540					
8.	GP8 @ 3-4	1635					
9.	GP8 @ 7-8	1640					
10.	GP8 @ 11-12	1651					

RELINQUISHED BY (Signature): D. Edward Coffey DATE: 5-7-99
PRINT NAME: D. Edward Coffey FIRM: SECOR TIME: 1100

RELINQUISHED BY (Signature): Larry Spangler DATE: 5-7-99
PRINT NAME: Larry Spangler FIRM: NCA TIME: 1000

RECEIVED BY (Signature): Larry Spangler DATE: 5-7-99
PRINT NAME: Larry Spangler FIRM: NCA TIME: 1100

RECEIVED BY (Signature): Sara McClurg DATE: 5-7-99
PRINT NAME: Sara McClurg FIRM: NCA TIME: 1000

ADDITIONAL REMARKS:

NORTH CREEK ANALYTICAL
Environmental Laboratory Services

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CHAIN OF CUSTODY REPORT

Work Order # P905167

REPORT TO: SECOR
ATTENTION: Brian Pletcher
ADDRESS: 7730 SW. Mohawk St.
Tualatin Oregon 97062
PHONE: 503-691-2030 FAX: 503-692-7074
PROJECT NAME: Crowley Marine Liner
PROJECT NUMBER: 00255-003-01
SAMPLED BY: DEC

INVOICE TO:
ATTENTION: Same
ADDRESS:
P.O. NUMBER: NCA QUOTE #:

TURNAROUND REQUEST in Business Days *
Organic & Inorganic Analyses: 10 (Standard) | 7 | 5 | 4 | 3 | 2 | 1 | Same Day
Fuels & Hydrocarbon Analyses: 5 (Standard) | 3-4 | 2 | 1 | Same Day
OTHER Specify:
* Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	NCA SAMPLE ID (Laboratory Use Only)	Analysis Request	MATRIX (W, S, A, O)	# OF CONTAINERS	COMMENTS
1.	GP9 @ 3-4	5/6/99 1720			S	1	hold
2.	GP9 @ 7-8	1725					
3.	GP9 @ 11-12	1735					
4.							
5.							
6.							
7.							
8.							
9.							
10							

RELINQUISHED BY (Signature): D. Edward Coffey		DATE: 5-7-99	RECEIVED BY (Signature): Tom Lee		DATE: 5-7-99
PRINT NAME: D. Edward Coffey	FIRM: SECOR	TIME: 1100	PRINT NAME: Larry Spangler	FIRM: NCA	TIME: 1100
RELINQUISHED BY (Signature): Larry Spangler		DATE: 5-7-99	RECEIVED BY (Signature): Sara McClung		DATE: 5-7-99
PRINT NAME: Larry Spangler	FIRM: NCA	TIME: 1000	PRINT NAME: Sara McClung	FIRM: NCA	TIME: 100

ADDITIONAL REMARKS:

Digi 2.3 Ray 7.0

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9405 S.W. Nimbus Avenue, Beaverton, OR 97008-7132 (503) 906-9200 FAX 906-9210

CHAIN OF CUSTODY REPORT

Work Order #

REPORT TO: SECOR
ATTENTION: ~~Brian Fletcher~~ Katy Westersund
ADDRESS: 7730 SW. Mohawk St.
Tualatin Oregon 97062
PHONE: 503-691-2030 FAX: 503-692-7074
PROJECT NAME: Conoco, Morris Lines
PROJECT NUMBER: ~~00255-003-01~~ F0319-001-01
SAMPLED BY: DEC

INVOICE TO:
ATTENTION: Same
ADDRESS:
P.O. NUMBER: NCA QUOTE #:

TURNAROUND REQUEST in Business Days *
Organic & Inorganic Analyses: 10 Standard | 7 | 5 | 4 | 3 | 2 | 1 | Same Day
Fuels & Hydrocarbon Analyses: 5 Standard | 3-4 | 2 | 1 | Same Day
OTHER Specify:
* Turnaround Requests less than standard may incur Rush Charges.

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	NCA SAMPLE ID (Laboratory Use Only)	Analysis Request: G-BTEX	NWTPH-Dx	EPH/VPH	MATRIX (W, S, A, O)	# OF CONTAINERS	COMMENTS
1. GP1 @ 2.5-3.0	5/6/99 1006		X	X		S	1	hold
2. GP1 @ 4.5-5.0	1040							
3. GP1 @ 12	1025							
4. GP2 @ 3-4	1123		X	X				
5. GP2 @ 7-8	1128		X	X				
6. GP2 @ 11-12	1133							
7. GP2 @ 15-16	1138							
8. GP3 @ 3-4	1154		X	X				
9. GP3 @ 7-8	1200				X			
10. GP3 @ 11-12	1212							

RELINQUISHED BY: D. Edward Cotter DATE:
PRINT NAME: D. Edward Cotter FIRM: SECOR TIME:
RELINQUISHED BY: DATE:
PRINT NAME: FIRM: TIME:

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:
RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS:

PAGE 1 OF 4

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CHAIN OF CUSTODY REPORT

Work Order #

REPORT TO: SECOR
ATTENTION: ~~Brian Pletcher~~ Katy Westersund
ADDRESS: 7730 SW. Mohawk St.
Tualatin Oregon 97062
PHONE: 503-691-2030 FAX: 503-692-7074
PROJECT NAME: Conoco Marine Lines
PROJECT NUMBER: ~~00255-003-01~~ F0319-001-01
SAMPLED BY: DEC

INVOICE TO:
ATTENTION: same
ADDRESS:
P.O. NUMBER: NCA QUOTE #:

TURNAROUND REQUEST in Business Days *
Organic & Inorganic Analyses: 10 Standard | 7 | 5 | 4 | 3 | 2 | 1 | Same Day
Fuels & Hydrocarbon Analyses: 5 Standard | 3-4 | 2 | 1 | Same Day
OTHER Specify:
* Turnaround Requests less than standard may incur Rush Charges.

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	NCA SAMPLE ID (Laboratory Use Only)	Analysis Request: G-BTEX	NWTPHdx	MATRIX (W, S, A, O)	# OF CONTAINERS	COMMENTS
1. GP3 @ 15-16	8/6/99 1220				S	1	hold
2. GP4 @ 3-4	1309						
3. GP4 @ 7-8	1312		X	X			
4. GP4 @ 11-12	1316						
5. GP4 @ 15-16	1321						
6. GP5 @ 3-4	1406		X	X			
7. GP5 @ 7-8	1410						
8. GP5 @ 11-12	1418						
9. GP5 @ 15-16	1422						
10. GP6 @ 3-4	1446						

RELINQUISHED BY: V. Edward Coffey DATE:
PRINT NAME: V. Edward Coffey FIRM: SECOR TIME:
RELINQUISHED BY: DATE:
PRINT NAME: FIRM: TIME:

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:
RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS:

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CHAIN OF CUSTODY REPORT

Work Order #

REPORT TO: SECOR
ATTENTION: ~~Brian Fletcher~~ Katy Westersund
ADDRESS: 7730 SW. Mohawk St.
Tualatin Oregon 97062
PHONE: 503-691-2030 FAX: 503-692-7074
PROJECT NAME: Crosby Marine Lines
PROJECT NUMBER: ~~00255-003-01~~ F0819-001-01
SAMPLED BY: DEC

INVOICE TO:
ATTENTION: Same
ADDRESS:
P.O. NUMBER: NCA QUOTE #:

TURNAROUND REQUEST in Business Days *
Organic & Inorganic Analyses: 10 Standard | 7 | 5 | 4 | 3 | 2 | 1 | Same Day
Fuels & Hydrocarbon Analyses: 6 Standard | 3-4 | 2 | 1 | Same Day
OTHER Specify:
* Turnaround Requests less than standard may incur Rush Charges.

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	NCA SAMPLE ID (Laboratory Use Only)	Analysis Request: G-BTEX	NWTPH-dx	MATRIX (W, S, A, O)	# OF CONTAINERS	COMMENTS
1. GP6 @ 7-8	5/16/97 1453		X	X	S	1	hold
2. GP6 @ 11-12	1458						
3. GP7 @ 7-4	1523						
4. GP7 @ 7-8	1526		X	X			
5. GP7 @ 11-12	1530						
6. GP7 @ 15-16	1535						
7. GP7 @ 19-20	1540						
8. GP8 @ 3-4	1635		X	X			
9. GP8 @ 7-8	1640						
10. GP8 @ 11-12	1651						

RELINQUISHED BY: D. Edward Coffey DATE:
PRINT NAME: D. Edward Coffey FIRM: SECOR TIME:
RELINQUISHED BY: DATE:
PRINT NAME: FIRM: TIME:

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:
RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS:

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CHAIN OF CUSTODY REPORT

Work Order #

REPORT TO: SECOR	INVOICE TO:
ATTENTION: Brian Fletcher Katy Westersund	ATTENTION: Same
ADDRESS: 7730 SW. Mohawk St. Tualatin Oregon 97062	ADDRESS:
PHONE: 503-691-2030 FAX: 503-692-7074	P.O. NUMBER: NCA QUOTE #:
PROJECT NAME: Crude Marine Lines	
PROJECT NUMBER: 00255-003-01 P019-001-01	
SAMPLED BY: DEC	

TURNAROUND REQUEST in Business Days *
Organic & Inorganic Analytes: 10 (Standard) | 7 | 5 | 4 | 3 | 2 | 1 | Same Day
Fuels & Hydrocarbon Analyses: 5 (Standard) | 3-4 | 2 | 1 | Same Day
OTHER Specify:
* Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	NCA SAMPLE ID (Laboratory Use Only)	Analysis Requested: BTEX	Analysis Requested: NWTPH-Gx	MATRIX (W, S, A, O)	# OF CONTAINERS	COMMENTS
1.	GP9 @ 3-4	5/6/99 1720		X	X	S	1	hold
2.	GP9 @ 7-8	1725						
3.	GP9 @ 11-12	1735						
4.								
5.								
6.								
7.								
8.								
9.								
10.								

RELINQUISHED BY (Signature): O. Edward Coffey	DATE:
PRINT NAME: O. Edward Coffey FIRM: SECOR	TIME:
RELINQUISHED BY (Signature):	DATE:
PRINT NAME: FIRM:	TIME:
RECEIVED BY (Signature):	DATE:
PRINT NAME: FIRM:	TIME:
RECEIVED BY (Signature):	DATE:
PRINT NAME: FIRM:	TIME:

ADDITIONAL REMARKS: