Interim soil, gw 8K 12-29.

PREPARED FOR

MR. JIM BLACKSTOCK
C/O ARMADA/LAGERQUIST COMPANY

Marcus L. Pierce

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Senior Hydrogeologist

1/2 NW 4000985 J

UNDERGROUND STORAGE TANK CLOSURE OBSERVATION AND DOCUMENTATION

Former Blackstock Lumber Site
501-601 Elliott Avenue West
Seattle, Washington

12/2/92 AA soil GW interim
004926

E-5122-2

November 18, 1992

Earth Consultants, Inc.
1805 - 136th Place Northeast, Suite 101
Bellevue, Washington 98005
(206) 643-3780

222 East 26th Street, Suite 103
Tacoma, Washington 98411-9998
(206) 272-6608

Site Name: Blackstock Lumber

Inc. #: 1456 Date of Report: 11/18/92

County: King Date Report Rec'd: 12/16/92

Reviewed by: A. Ademasu

Comments (e.g.free prod.,tank info.,contaminant migration,PCS treated?):

- Total of ≃ 200 cy of diesel/Bunker C contaminated soil stockpiled (up to 27,000 TPHppm)
- 1/8 inch free product in excavation of concrete slab. GW sample 27000ppm TPH
- 2500ppm TPH left in-place in bottom of excavation of concrete slab area (4.5'-6' deep)
- Only found source of Bunk C contamination. No mention of source of diesel contamination.
- Report explains 5 tanks removed. Tank disposal reciept shows 6 tanks removed from site.
- Needed: GW wells in former concrete slab area; soil at 4.5'-6' need to be excavated

Media: soil, GW Status: on-going

[redacted]

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EXECUTIVE SUMMARY

From July to October 1991, five underground storage tanks (USTs) at the Blackstock Lumber property at 501 to 601 Elliott Avenue West in Seattle, Washington were closed in accordance with applicable Ecology regulations (Chapter 173-360 WAC) and guidelines. Two of the USTs were identified during a previous investigation (Hart-Crowser, March 1989) and include a 10,000-gallon diesel tank (Tank 1) and a 300-gallon heating oil tank (Tank 2). During this project, three additional USTs were discovered on the northwest portion of the property and include a 250-gallon gasoline tank (Tank 3), 1,000 gallon heavy heating oil tank (Tank 4), and 1,760-gallon heavy heating oil tank (Tank 5). Exploratory excavation was conducted on the south side of the property to locate a gasoline UST and heating oil UST reported in the previous investigation (Hart-Crowser, March 1989). Apparently, the gasoline UST had already been removed and the heating oil UST was actually an above ground storage tank, which had also been removed.

No evidence of a release from Tanks 1, 2, and 3 was observed. Soils containing heavy hydrocarbons were found in the vicinity of Tanks 4 and 5 and approximately 75 cubic yards of affected soils were removed along with these tanks. Due to the shallow groundwater table encountered at a depth of three to five feet below ground surface on the northwest portion of the property, two groundwater monitoring wells were installed in the vicinity of Tanks 3, 4, and 5. Well MW-1 was installed in the vicinity of Tanks 3 and 5 and Well MW-2 was installed in the vicinity of Tank 4. Trace concentrations of benzene, toluene, and xylenes were detected in Well MW-1, but were below their respective Washington State Model Toxics Control Act (MTCA) Method A cleanup levels. Total petroleum hydrocarbons (TPH) and gasoline were not detected in Well MW-1. No TPH was detected in Well MW-2.

Soils containing diesel were discovered under the north side of the former Humane Society building. The affected soils appeared to be associated with product lines from Tank 5. The vertical extent of the affected soils appeared to be approximately 1.5 to 6 feet below ground surface. On October 3, 1991, the 3 to 4 feet of affected soil above the top of the water table were excavated. The excavation was approximately 28 by 40 feet in areal extent and the western sidewall coincided with the western property line. Confirmation soil samples collected from the sidewalls of the excavation showed that, except for the west sidewall (260 mg/Kg), soils containing diesel in excess of the MTCA Method A cleanup level of 200 mg/Kg had been removed.

A hydrocarbon sheen was observed on groundwater seepage in the excavation pit beneath the former concrete slab. A groundwater "grab" sample and a soil sample from the affected soils left-in-place were collected. The laboratory reported that the groundwater "grab" sample contained free product. Diesel concentrations of 2,700 mg/L and 2,500 mg/Kg were detected in the groundwater and soil, respectively. These concentrations are well above their respective MTCA Method A cleanup levels of 1 mg/L and 200 mg/Kg.

The following interim actions are recommended:

- Send two copies of this report to the Washington State Department of Ecology;
- Install additional groundwater monitoring wells to evaluate the extent of affected groundwater discovered beneath the former Humane Society Building;
- Properly treat or dispose of the stockpiled soils; and
- Monitor the proposed and existing groundwater wells for diesel.

UNDERGROUND STORAGE TANK CLOSURE OBSERVATION AND DOCUMENTATION

1.0 INTRODUCTION

The following report describes the closure of five underground storage tanks (USTs) at the former Blackstock Lumber Site in Seattle, Washington. Mr. Jim Blackstock (c/o Armada/Lagerquist Company) retained Earth Consultants, Inc. (ECI) to conduct the closure of the tanks in accordance with the scope of work outlined in ECI's proposals dated June 26, August 12, and August 30, 1991.

1.1 Site Description

The subject property is located at 501 to 601 Elliott Avenue West in Seattle, Washington (See Plates 1.1 and 1.2) and is approximately 3 acres in total area. The property is bounded by Burlington Northern Railroad Tracks (west), Elliott Avenue West (east), and commercial/light industrial businesses(north and south). A vacated extension of West Mercer Street cuts across the northern half of the property. The subsurface footprint of former Blackstock Lumber Building covers the central portion of the property, south of West Mercer Street. A Burlington Northern railroad spur is located along the west side of the building's footprint. The property slopes gently toward the west with an approximate elevation difference of 5 to 10 feet.

1.2 Project Background

Based on the available historical information (Hart-Crowser, 1989), the subject property was developed by the early 1900's. Various commercial and industrial entities have occupied the property throughout its history and include the Seattle Lumber Company, Blackstock Lumber, and the Humane Society. The Seattle Lumber Company apparently occupied the entire property from the 1910's to the 1930's. Blackstock Lumber occupied a portion of the south side of the property (south of West Mercer Street) from the 1930's to the 1980's. The Humane Society occupied the area north of West Mercer Street from the 1930's to the 1970's. Blackstock Lumber took over the area north of West Mercer Street in the 1980's.

Hart-Crowser conducted a Preliminary Environmental Assessment and Phase 2 Subsurface Soil Sampling and Analysis at the Blackstock Lumber property in 1989. They identified four USTs on the subject property, including:

- One heating oil UST near the northeast corner of the Blackstock Lumber building,
- One heating oil UST near the southeast corner of the Blackstock Lumber building,
- One 10,000 gallon diesel UST near the southeast corner of the property, and
- One 1,000 gallon gasoline UST reportedly located just south of the diesel tank.

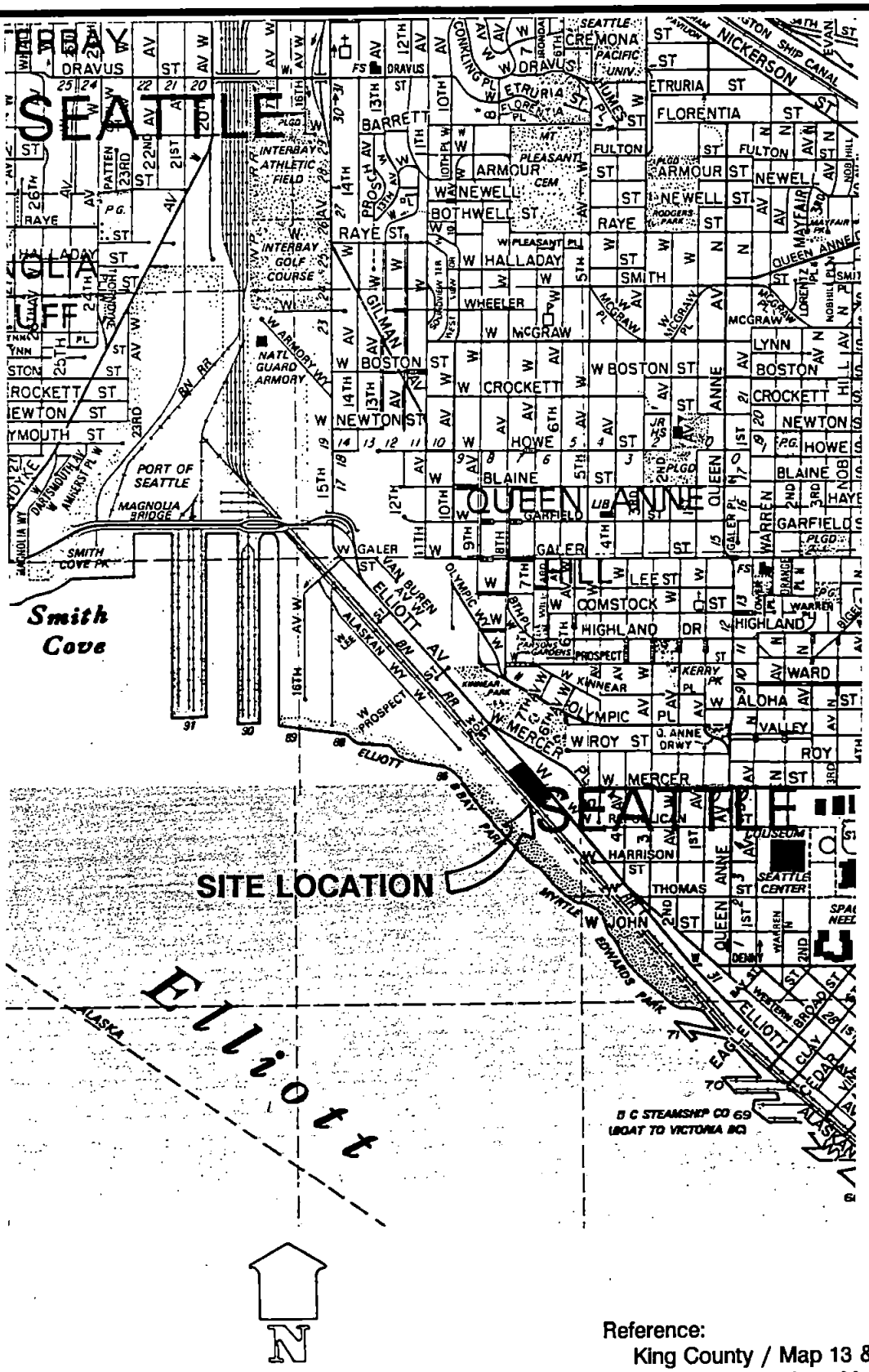
Three borings were augured near these UST locations and soil samples were collected for laboratory analysis for petroleum hydrocarbons. Soil samples collected in the vicinity of the heating oil USTs (Borings HC-1 and HC-2) were analyzed for total petroleum hydrocarbons (TPH) by EPA Method 418.1. One soil sample collected in the vicinity of the diesel and gasoline USTs (Boring HC-3) was analyzed for gasoline and diesel by Modified EPA Method 8015, and benzene, toluene, ethyl benzene (BTEX) and total xylenes by EPA Method 8020.

Concentrations of 390 and <1.0 mg/Kg TPH were detected in Boring HC-1 at depths of 2.5 to 4.0 and 7.5 to 9.0 feet, respectively. In Boring HC-2, concentrations of 290 and 240 mg/Kg TPH were detected at depths of 2.5 to 4.0 and 10.0 to 11.5, respectively. The concentrations of gasoline and diesel in Boring HC-3 at a depth of 2.5 to 4.0 feet were 25 and 520 mg/Kg, respectively. BTEX was not detected in the HC-3 soil sample. The current soil cleanup levels for TPH as gasoline and TPH as diesel or heavier hydrocarbons are 100 and 200 mg/Kg, respectively.

1.3 Scope Of Work

ECI was retained to document the closure of the on-site USTs and excavation of up to 500 cubic yards of soil containing petroleum hydrocarbons. The scope of this project was initially limited to the following tasks at the Blackstock Lumber property:

- Observe and document the closure of four USTs and excavation of affected soils (500 cubic yards maximum);
- Collect soil and groundwater samples for laboratory analysis in accordance with Washington State Department of Ecology guidelines.
- Prepare this written report.

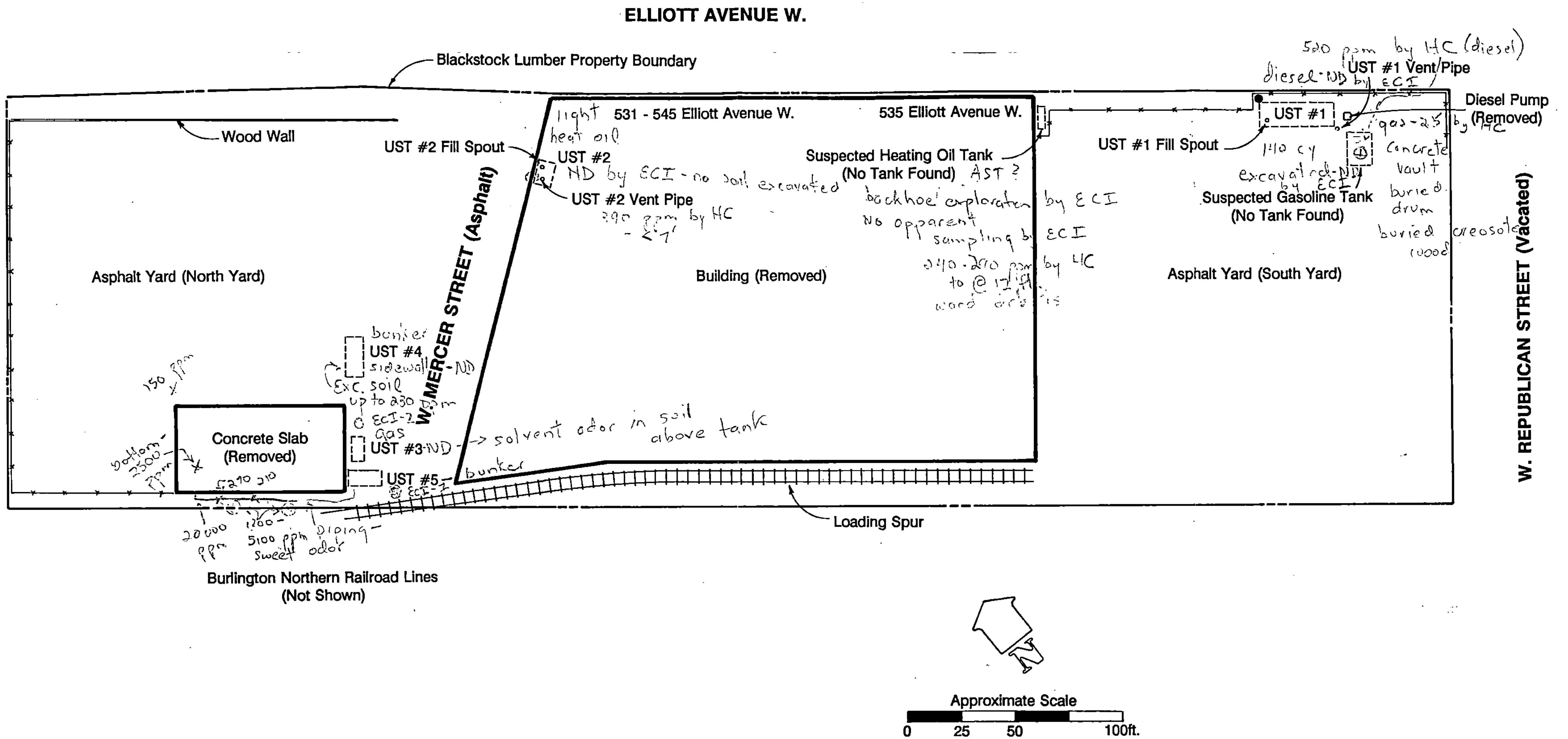


Reference:
King County / Map 13 & 19
By Thomas Brothers Maps
Dated 1990

Earth Consultants Inc.
Geotechnical Engineers, Geologists & Environmental Scientists

Vicinity Map
Blackstock Lumber
Seattle, Washington

Proj. No. 5122-2	Drwn. GLS	Date Nov. '91	Checked MP	Date 11/7/91	Plate 1.1



ELLIOTT AVENUE W.
Blackstock Lumber Property Boundary
Wood Wall
UST #2 Fill Spout
UST #2
UST #2 Vent Pipe
531 - 545 Elliott Avenue W.
535 Elliott Avenue W.
Suspected Heating Oil Tank
(No Tank Found)
UST #1 Vent Pipe
Diesel Pump
(Removed)
UST #1
UST #1 Fill Spout
Suspected Gasoline Tank
(No Tank Found)
Asphalt Yard (North Yard)
W. MERCER STREET (Asphalt)
Building (Removed)
Asphalt Yard (South Yard)
W. REPUBLICAN STREET (Vacated)
UST #4
Concrete Slab
(Removed)
UST #3
UST #5
Loading Spur
Burlington Northern Railroad Lines
(Not Shown)
N
Approximate Scale
0
25
50
100ft.
light heat oil
ND by ECI - no soil excavated
backhoe exploration by ECI
No apparent sampling by ECI
diesel - ND by ECI
solvent odor in soil above tank
concrete vault
buried drum
buried creosote wood
bunker

Note: Tank Outlines Not To Scale.

Reference:
Job No. J-2352 / Figure 1
Site Plan and Vicinity Map
By Hart Crowser
Dated 3/89

Earth Consultants Inc.
Geotechnical Engineers, Geologists & Environmental Scientists

Site Plan
Blackstock Lumber
Seattle, Washington

Proj No. 5122-2	Drwn. GLS	Date Nov. '91	Checked MP	Date 11/7/91	Plate 1.2

2.0 INVESTIGATION METHODOLOGY

2.1 Observation and Documentation of UST Closure

Northwest Envirofield Services (NES) was responsible for supervising the proper decommissioning of each UST. NES performed the required UST preparation, which included cleaning, inerting, removing, and disposing of each tank (see Appendix A - NES Tank Disposal Documentation). ECI was responsible for conducting a visual survey of the condition of soils in the tank hold, as well as the general condition of the tank and product lines. ECI also screened excavated soils for organic vapors using a photoionization detector (PID) and provided technical guidance for excavating soil containing petroleum hydrocarbons. Observations of soil discoloration, odors, PID response, and tank and line integrity were noted in the field log.

2.1.1 Soil Sampling

In accordance with Ecology's Guidance for Site Assessment for USTs, soil samples were collected from the sidewalls and base of each tank excavation, below product lines and fuel pumps, and approximately every 25 cubic yards of excavated soil. Soil samples were collected directly from the backhoe bucket and stockpile soil samples were collected with hand tools. In order to collect a representative sample, the upper 6 to 12 inches of soil were removed from the top of the stockpile before sampling. Soil samples were collected in laboratory supplied glassware, labelled, placed on ice in a cooler, and transported under chain-of-custody to Analytical Services, Inc.

2.2 Groundwater Monitoring Well Installations

On August 14,1991, ECI installed two groundwater monitoring wells to comply with Ecology's Guidance for Site Assessments of USTs. Groundwater was encountered above the bottom of three USTs located near the northwest corner of the property (Tanks 3, 4, and 5), and the two wells were installed to assess whether a release to groundwater had occurred in the vicinity of these USTs.

2.2.1 Well Installation Procedures

The groundwater monitoring wells were installed in accordance with procedures and guidelines recommended by the Environmental Protection Agency (EPA) (Resource Conservation and Recovery Act [RCRA] Groundwater Monitoring Technical Enforcement Guidance Document, 1986) and Washington Administrative Code (WAC) 173-160. These procedures were implemented to assure proper well construction and to minimize the potential for cross-contamination during drilling and construction of the wells. Due to shallow groundwater table at the property, a variance was obtained from Mr. Rod Thompson of Ecology for reducing the thickness of the surface seal. Well installations were conducted using the following general specifications:

- Borings were augured to depths of approximately 10 feet using an 8-inch outside diameter (OD) hollow stem auger.

- Monitoring wells were completed within each boring using pre-cleaned 2-inch ID (inside diameter) PVC (polyvinyl chloride) blank and slotted casing (slot size = 0.010 inches). One 5-foot section of slotted casing and one 5-foot section of blank casing were used in the construction of each well. The slotted casing was installed in the zone of saturation.

- The blank and slotted PVC casings were threaded together. PVC bottom caps were threaded to the base of the slotted sections. Glue, solvents, and adhesives were not used in the assembly of the individual casing sections.

- The annular space surrounding the slotted intervals was packed with clean sand (size 10-20) from the bottom of the well screen to a level approximately 0.5 feet above the top of the screen. This allowed for settlement of the sand and ensured the entire slotted interval was surrounded by sand.

- The surface seal in each well was completed by filling the remaining annular space with bentonite chips from the top of the sand pack to a depth of approximately 1 foot below ground surface. The bentonite was activated with potable water.

- A traffic-rated concrete and steel monument was cemented in-place around the top of each well and a water-tight PVC slip cap was placed on top of the PVC casing.

- The drill rig and sampling equipment were steam-cleaned prior to each well installation and after the completion of the last well.

- Each well was developed by bailing with a Teflon bailer for a period of 30 minutes before the water quality parameters stabilized. Approximately 16 gallons were purged from each well during development.

- Decontamination water and purge water produced during the well installations were stored on-site in sealed and labeled 55-gallon drums.

2.3 Groundwater Monitoring

Groundwater monitoring occurred in conjunction with well development on August 15, 1991. Prior to development, the static water in each well was measured with an electronic water level indicator. During the development of each well, water pH and specific conductance (SC) were monitored. These

parameters were considered stabilized when the last two consecutive readings were within the following ranges: ±0.10 standard units for pH; and for SC, within ±5 percent of meter range. Groundwater sampling took place at the end of well development.

Groundwater purging and sample collection were performed using a clean Teflon bailer. Groundwater samples were collected in laboratory supplied glassware, labeled, placed on ice in a cooler, and transported under chain-of-custody to North Creek Analytical Laboratories in Bothell, Washington.

All sampling equipment was washed in a detergent (Alconox) solution and rinsed in distilled water prior to sampling each well. Purge water was containerized in labeled 55-gallon drums and left on-site.

2.4 Laboratory Analysis

The selected laboratory analysis of each soil and groundwater sample collected during this project was based on the reported and observed contents of each tank, visual and olfactory observations of released contaminants, Ecology's recommended soil analytical procedures for Site Assessments of USTs, and/or landfill disposal requirements. Soil samples were analyzed for one or more of the following constituents:

- Total petroleum hydrocarbons (TPH) by Ecology Method WTPH-418.1;
- Diesel by Ecology Method WTPH-Diesel or Modified EPA Method 8015;
- Gasoline by Ecology Method WTPH-Gas or Modified EPA Method 8015;
- Benzene, toluene, xylenes, and ethylbenzene (BTXE) by EPA Method 8020);
- Volatile organics by EPA Method 8240);
- Total lead by EPA Method 7000;
- Petroleum range hydrocarbons by Ecology Method WTPH-HCID; and
- Polynuclear aromatic hydrocarbons by EPA Method 8100.

It should be noted that Ecology changed the required analytical methods for total petroleum hydrocarbons after this project was started. The contract laboratory started using Ecology's methods during this project, although the analytical documentation indicates EPA methodology was used.

3.0 RESULTS

The results of the closure of five USTs, exploration for two reported USTs, and removal/disposal of soils containing petroleum hydrocarbons is discussed in the following subsections. The field work and observations are discussed and the soil sample analytical results are tabulated (see Table 3.1) in chronological order.

3.1 Tank 1 - 10,000 Gallon Diesel Fuel

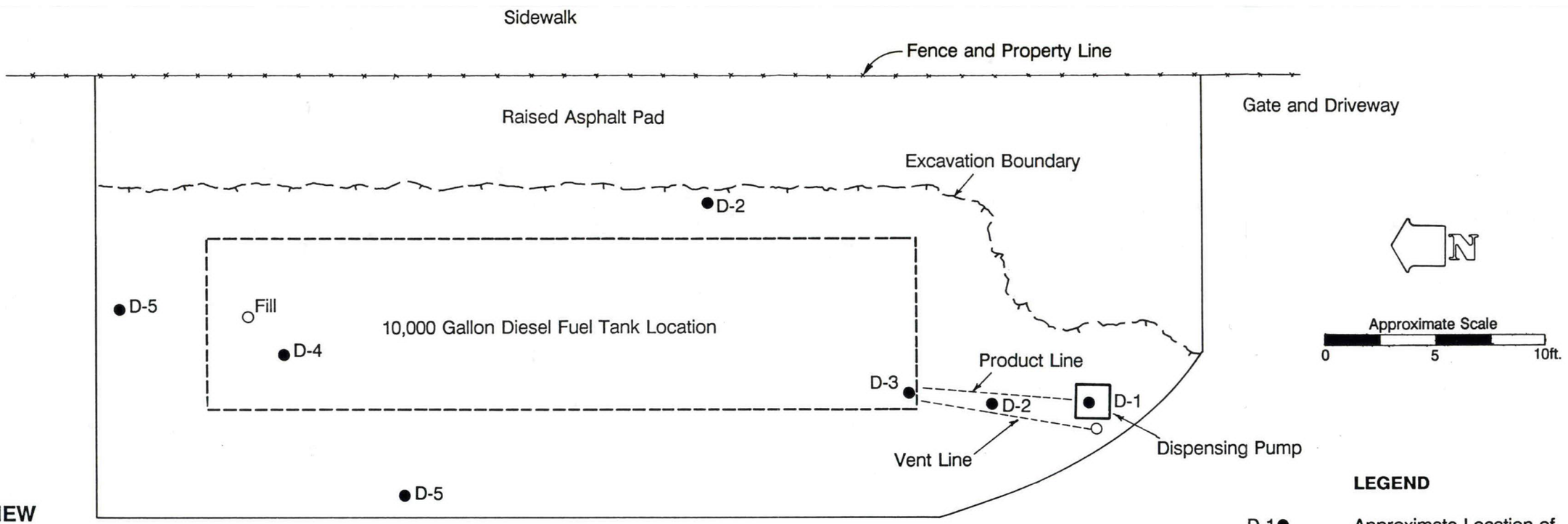
The Tank 1 system, which included a diesel fuel pump and associated underground piping, was excavated and removed on July 25, 1991 (see Plates 1.2 and 3.1, and Table 3.1). No visual or olfactory evidence of a release was observed. Soil samples were collected from the base and sidewalls of the tank excavation (D-2, D-4, and D-5), below the diesel pump (D-1), and below the product line (D-3). Each soil sample was analyzed for diesel using Modified EPA Method 8015. No diesel was detected in the soil samples.

3.2 Gasoline Tank Exploration

On July 26, 1991, Northwest Envirofield Services attempted to find the gasoline UST reportedly located immediately south/southwest of Tank 1 (Hart-Crowser, July 1989). Mr. Scott Blackstock of Blackstock Lumber had originally reported the tank to Hart Crowser (Hart Crowser, July 1989) and was consulted during the exploratory excavation. The excavation covered an area of approximately 30 x 21 feet and was approximately 6 to 7 feet deep (see Plates 1.2 and 3.2, and Table 3.1). A concrete vault was uncovered on the east side of the excavation, however, no tank was found and no evidence of a UST release was observed. One soil sample (G1) was collected from the base of the excavation and three samples [ES1(G), ES2(G), and ES3(G)] were collected from the soil stockpile for a WTPH-HCID analysis (see Table 3.1). No petroleum hydrocarbons in the gasoline or diesel range were detected in the four soil samples.

The former Hart Crowser Boring HC-3, which was terminated due to high LEL readings was located in the excavation. Apparently, their boring had intercepted a buried drum, which when excavated contained bentonite from their abandonment of the borehole. No evidence of liquids or chemical odors were associated with the drum. However, what appeared to be creosote-treated wood was buried at an approximate depth of 6 feet. The extent of this wood appeared to be limited, and Mr. Eric Wagner of Armada/Lagerquist requested that it be left in place for subsequent handling and disposal during the proposed development of the property.

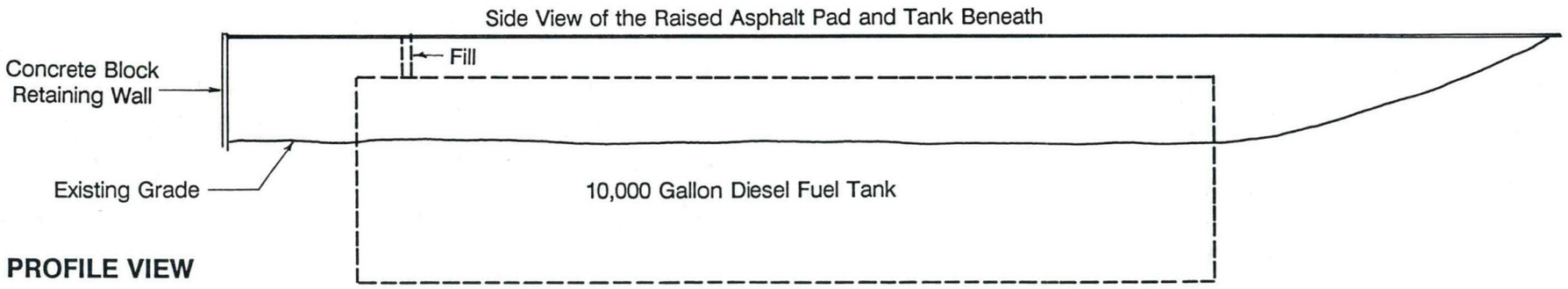
ELLIOTT AVENUE W.



PLAN VIEW

LEGEND

D-1● Approximate Location of ECI Soil Sample
Note: More than 1 location with the same number indicates composite samples.



PROFILE VIEW

Earth Consultants Inc.
Geotechnical Engineers, Geologists & Environmental Scientists

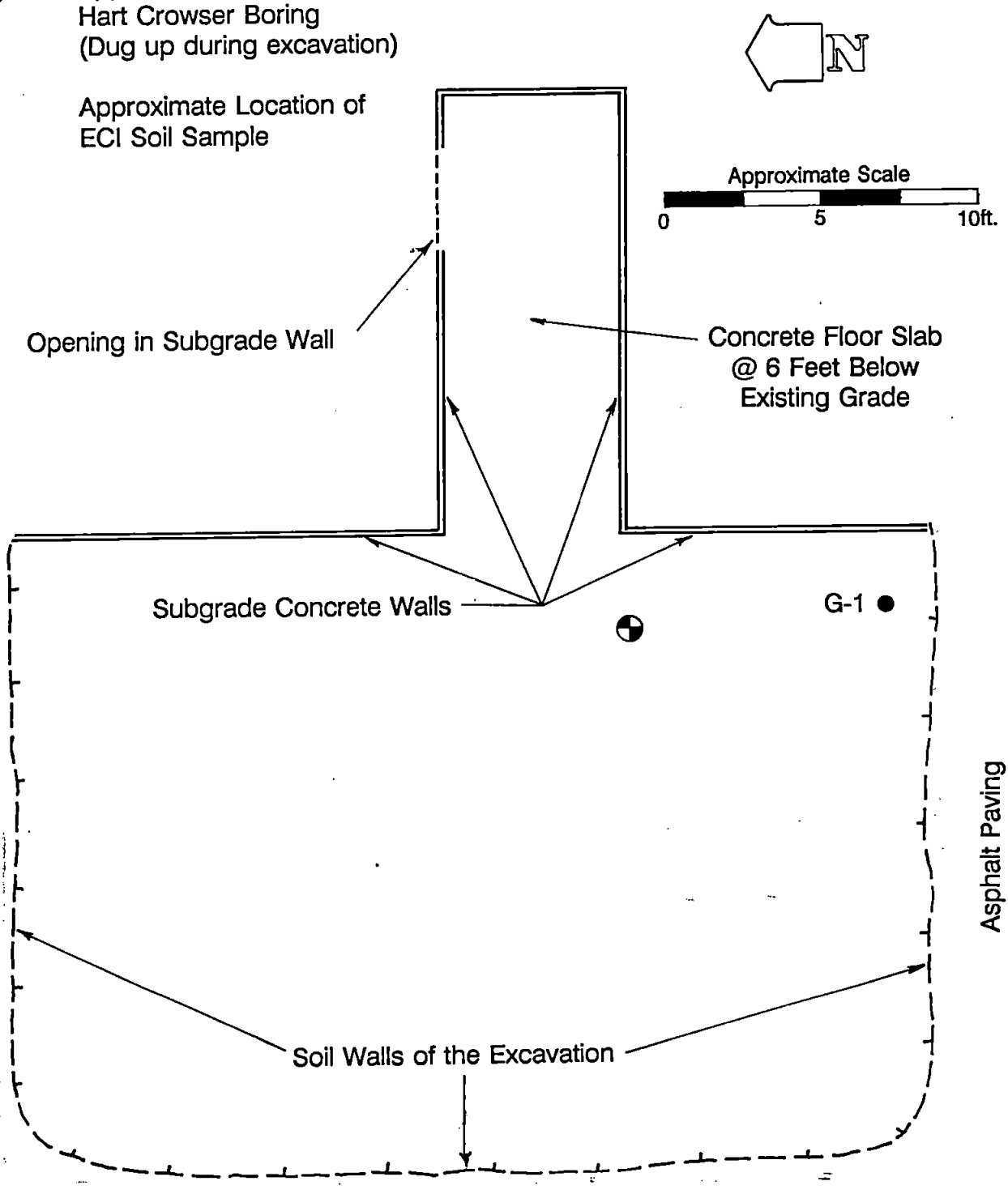
Tank 1 Excavation
Blackstock Lumber
Seattle, Washington

Proj No. 5122-2	Drwn. GLS	Date Aug. '91	Checked TC	Date 8/26/91	Plate 3.1

LEGEND

Approximate Location of Hart Crowser Boring (Dug up during excavation)

G-1 ● Approximate Location of ECI Soil Sample



Earth Consultants Inc. Geotechnical Engineers, Geologists & Environmental Scientists			Gas Tank Exploratory Excavation Blackstock Lumber Seattle, Washington		
Proj. No. 5122-2	**Drwn.** GLS	**Date** Aug. '91	**Checked** TC	**Date** 8/26/91	**Plate** 3.2

TABLE 3.1
SOIL ANALYTICAL RESULTS
BLACKSTOCK LUMBER PROPERTY
SEATTLE, WASHINGTON
E-5122-2

Sample Number	Date	Location	Depth in Feet	Analyte Concentration (mg/Kg) [a]									
				Gas	Diesel	TPH	HCID	B	T	X	E	Total Lead	PAHs
D1	7/25/91	Tank 1, Below Fuel Pump & Product Line	4	—	<40	—	—	—	—	—	—	—	—
D2	7/25/91	Tank 1, South & East Sidewall Composite	8	—	<40	—	—	—	—	—	—	—	—
D3	7/25/91	Tank 1, Below South Side	12	—	<40	—	—	—	—	—	—	—	—
D4	7/25/91	Tank 1, North and West Sidewall Composite	12	—	<40	—	—	—	—	—	—	—	—
D5	7/25/91	Tank 1, North & West Sidewall Composite	8	—	<40	—	—	—	—	—	—	—	—
SSD1	7/25/91	Tank 1, Excavated Soil	0.5-1.0 below surface of pile		<40	—	—	—	—	—	—	—	—
SSD2	7/25/91	Tank 1, Excavated Soil		—	<40	—	—	—	—	—	—	—	—
SSD3	7/25/91	Tank 1, Excavated Soil		—	<40	—	—	—	—	—	—	—	—
G1	7/26/91	Reported Gasoline Tank Location	7	—	—	—	<20 Gas <40 Diesel	—	—	—	—	—	—
ES1(G)	7/26/91	Reported Gasoline Tank Location, excavated soil	0.5 - 1.0 below surface of pile	—	—	—	<20 Gas <40 Diesel	—	—	—	—	—	—
ES2(G)	7/26/91	Reported Gasoline Tank Location, excavated soil		—	—	—	<20 Gas <40 Diesel	—	—	—	—	—	—
ES3(G)	7/26/91	Reported Gasoline Tank Location, excavated soil		—	—	—	<20 Gas <40 Diesel	—	—	—	—	—	—
MTCA Method A Compliance Cleanup Levels				100.0	200.0	200.0	N/A	0.5	40.0	20.0	20.0	250.0	1.0

a Gas = TPH as Gasoline; Diesel = TPH as Diesel; TPH = Total Petroleum Hydrocarbons; HCID = WTPH-HCID, Hydrocarbon Identification; B = Benzene; T = Toluene; X = Total Xylenes; E = Ethylbenzene; Total Lead = Total Lead; PAHs = Polynuclear Aromatic Hydrocarbons

b Analyte was also found in the blank sample.

c Analyte detected, but below the quantitation limit.

d Analyzed for volatile organics by EPA Method 8240 and none were detected.

Note: mg/Kg is equivalent to parts per million (ppm)

TABLE 3.1
(Continued)

Sample Number	Date	Location	Depth in Feet	Analyte Concentration (mg/Kg)[a]									
				Gas	Diesel	TPH	HCID	B	T	X	E	Total Lead	PAHs
HO-1	7/25/91	Tank 2, Below Center	4	—	—	—	<30	—	—	—	—	—	—
HO-2	7/25/91	Tank 2, North and East Sidewall Composite	4	—	—	—	<30	—	—	—	—	—	—
HO-3	7/30/91	Tank 2, South & West Sidewall Composite	4	—	—	—	<30	—	—	—	—	—	—
WW (4')	7/30/91	Tank 3, West Sidewall	4	<50	—	—	—	<0.050	<0.050	<0.290[c]	<0.180[b,c]	33	—
NW (4')	7/30/91	Tank 3, North Sidewall	4	<50	—	—	—	<0.050	<0.050	<0.050	0.130[b,c]	55	—
EW (4')	7/30/91	Tank 3 East Sidewall	4	<50	—	—	—	<0.050	<0.050	<0.050	0.062[b,c]	30	—
SW (4')	7/30/91	Tank 3, South Sidewall	4	<50	—	—	—	<0.050	<0.050	<0.050	0.058[b,c]	<10	—
ES1	7/30/91	Tank 3, Excavated Soil	.5-1.0 below surface of pile	<50	—	—	—	<0.050	0.100[c]	0.440	0.130[b,c]	60	—
ES2	7/30/91	Tank 3, Excavated Soil		<50	—	—	—	0.170[c]	4.3	15.2	2.0[b]	65	—
BEW1 (4')	8/1/91	Tank 4, East Sidewall	4	—	—	110	—	—	—	—	—	—	—
BNW2 (4')	8/1/91	Tank 4, North Sidewall	4	—	—	25	—	—	—	—	—	—	—
BWW3 (4')	8/1/91	Tank 4, West Sidewall	4	—	—	170	—	—	—	—	—	—	—
BSW4 (4')	8/1/91	Tank 4, South Sidewall	4	—	—	<25	—	—	—	—	—	—	—
BPL5	8/1/91	Tank 4, Below Product Line	3	—	—	89	—	—	—	—	—	—	—
SP1	8/1/91	Tank 4, Excavated Soil	.5-1.0 below surface of pile	—	—	44	—	—	—	—	—	—	—
MTCA Method A Compliance Cleanup Levels				100.0	200.0	200.0	—	0.5	40.0	20.0	20,0	250.0	1.0

a Gas = TPH as Gasoline; Diesel = TPH as Diesel; TPH = Total Petroleum Hydrocarbons; HCID = WTPH-HCID, Hydrocarbon Identification; B = Benzene; T = Toluene; X = Total Xylenes; E = Ethylbenzene; Total Lead = Total Lead; PAHs = Polynuclear Aromatic Hydrocarbons

b Analyte was also found in the blank sample.

c Analyte detected, but below the quantitation limit.

d Analyzed for volatile organics by EPA Method 8240 and none were detected.

Note: mg/Kg is equivalent to parts per million (ppm)

TABLE 3.1
(Continued)

Sample Number	Date	Location	Depth in Feet	Analyte Concentration (mg/Kg)[a]									
				Gas	Diesel	TPH	HCID	B	T	X	E	Total Lead	PAHs
SP2	8/1/91	Tank 4, Excavated Soil	.5-1.0 below surface of pile	—	—	230	—	—	—	—	—	—	—
SP3	8/1/91	Tank 4, Excavated Soil		—	—	230	Hydrocarbons in heavy oils range (C>C24)	—	—	—	—	—	—
NW SLAB	8/1/91	Tank 5, Below product line	2	—	—	22,000	Hydrocarbons in diesel (C12-C24) & heavy oils range (>C24)	—	—	—	—	—	—
T5E	8/6/91	Tank 5, East Sidewall	4	—	—	420	—	—	—	—	—	—	—
T5N	8/6/91	Tank 5, North Sidewall	4	—	—	100	—	—	—	—	—	—	—
T5W	8/6/91	Tank 5, West Sidewall	4	—	—	<25	—	—	—	—	—	—	—
T5S	8/6/91	Tank 5, South Sidewall	4	—	—	<25	—	—	—	—	—	—	—
SS1	8/6/91	Tank 5, Excavated Soil	.5 - 1.0 below surface of pile	—	—	150	—	—	—	—	—	—	—
SS2	8/6/91	Tank 5, Excavated Soil		—	—	170	—	—	—	—	—	—	—
SS3	8/6/91	Tank 5, Excavated Soil		—	—	44	—	—	—	—	—	—	—
T4WW	8/6/91	Tank 4, Below Product Line	4	—	—	150	—	—	—	—	—	—	—
SP4	8/8/91	Tanks 3, 4, & 5 Excavated Soil	.5 - 1.0 below surface of pile	—	—	380	—	—	—	—	—	—	—
SP5	8/8/91			—	—	210	—	—	—	—	—	—	—
SP6	8/8/91			—	—	220	—	—	—	—	—	—	—
MTCA Method A Compliance Cleanup Levels				100.00	200.00	200.00	—	0.5	40.0	20.0	20.0	250.0	1.0

a Gas = TPH as Gasoline; Diesel = TPH as Diesel; TPH = Total Petroleum Hydrocarbons; HCID = WTPH-HCID, Hydrocarbon Identification; B = Benzene; T = Toluene; X = Total Xylenes; E = Ethylbenzene; Total Lead = Total Lead; PAHs = Polynuclear Aromatic Hydrocarbons

b Analyte was also found in the blank sample.

c Analyte detected, but below the quantitation limit.

d Analyzed for volatile organics by EPA Method 8240 and none were detected.

Note: mg/Kg is equivalent to parts per million (ppm)

TABLE 3.1
(Continued)

Sample Number	Date	Location	Depth in Feet	Analyte Concentration (mg/Kg)[a]									
				Gas	Diesel	TPH	HCID	B	T	X	E	Total Lead	PAHs
S1[d]	9/20/91	Soil below broken pipe exhibiting solvent-like odor	2.5	—	—	—	—	<0.200	<0.200	<0.200	<0.200	—	—
S2[d]	9/20/91	Soil below broken pipe exhibiting solvent-like odor	2.5	—	—	—	—	<0.200	<0.200	<0.200	<0.200		
03	9/20/91	Exploratory excavation below concrete slab	4	—	8,500	6,100	Hydrocarbons in diesel range (C11-C24)	—	—	—	—	—	—
04	9/20/91	Exploratory excavation below concrete slab	4	—	7,200	7,400	—	—	—	—	—	—	—
5	9/20/91	Exploratory excavation below concrete slab	4	—	6,500	8,600	Hydrocarbons in diesel range (C11-C24) & Lubricant range (>C24)	—	—	—	—	—	—
SS1-1	9/23/91	Tanks 3, 4 & 5 excavated soil stockpile	.5 - 1.0 below suface of pile	—	—	260	—	—	—	—	—	—	—
SS1-2	9/23/91	Tanks 3, 4 & 5 excavated soil stockpile		—	—	290	—	—	—	—	—	—	—
SS1-3	9/23/91	Tanks 3, 4 & 5 excavated soil stockpile		—	—	160	—	—	—	—	—	—	—
SS1-4	9/23/91	Tanks 3, 4 & 5 excavated soil stockpile		—	—	170	—	—	—	—	—	—	—
SS1-5	9/23/91	Tanks 3, 4 & 5 excavated soil stockpile		—	—	370	Hydrocarbson in lubricant range (C24)	—	—	—	—	—	—
SS1-6	9/23/91	Tanks 3, 4 & 5 excavated soil stockpile		—	—	330	—	—	—	—	—	—	—
MTCA Method A Compliance Cleanup Levels				100.0	200.0	200.0	—	0.5	40.0	20.0	20.0	250.0	1.0

a Gas = TPH as Gasoline; Diesel = TPH as Diesel; TPH = Total Petroleum Hydrocarbons; HCID = WTPH-HCID, Hydrocarbon Identification; B = Benzene; T = Toluene; X = Total Xylenes; E = Ethylbenzene; Total Lead = Total Lead; PAHs = Polynuclear Aromatic Hydrocarbons

b Analyte was also found in the blank sample.

c Analyte detected, but below the quantitation limit.

d Analyzed for volatile organics by EPA Method 8240 and none were detected.

Note: mg/Kg is equivalent to parts per million (ppm)

TABLE 3.1
(Continued)

Sample Number	Date	Location	Depth in Feet	Analyte Concentration (mg/Kg)[a]									
				Gas	Diesel	TPH	HCID	B	T	X	E	Total Lead	PAHs
SS2-1	9/23/91	Exploratory Excavation	.5 -1.0 below surface of pile	—	8,200	—	—	—	—	—	—	—	—
SS2-2	9/23/91	Excavated Soil		—	6,000	—	—	—	—	—	—	—	—
SS2-3	9/23/91	Exploratory Excavation Excavated Soil		—	2,000	—	—	—	—	—	—	—	—
SW	9/23/91	South Wall of Exploratory Excavation	3	—	600	—	—	—	—	—	—	—	—
NW	9/23/91	North Wall of Exploratory Excavation	3	—	400	—	—	—	—	—	—	—	—
OE-1	10/3/91	Excavation below concrete slab, northeast corner sidewall	4	—	<40	150	—	—	—	—	—	—	—
OE-2	10/3/91	Excavation below concrete slab, southeast corner sidewall	4	—	<40	—	—	—	—	—	—	—	—
OE-3	10/3/91	Excavation below concrete slab, center south sidewall	4	—	<40	—	—	—	—	—	—	—	—
OE-4	10/3/91	Excavation below concrete slab, southwest corner sidewall	4	—	78	210	—	—	—	—	—	—	—
OE-5	10/3/91	Excavation below concrete lab, center west sidewall	4	—	260	270	—	—	—	—	—	—	—
MTCA Method A Compliance Cleanup Levels				100.0	200.0	200.0	—	0.5	40.0	20.0	20.0	250.0	1.0

a Gas = TPH as Gasoline; Diesel = TPH as Diesel; TPH = Total Petroleum Hydrocarbons; HCID = WTPH-HCID, Hydrocarbon Identification; B = Benzene; T = Toluene; X = Total Xylenes; E = Ethylbenzene; Total Lead = Total Lead; PAHs = Polynuclear Aromatic Hydrocarbons

b Analyte was also found in the blank sample.

c Analyte detected, but below the quantitation limit.

d Analyzed for volatile organics by EPA Method 8240 and none were detected.

Note: mg/Kg is equivalent to parts per million (ppm)

TABLE 3.1
(Continued)

Sample Number	Date	Location	Depth in Feet	Analyte Concentration (mg/Kg)[a]									
				Gas	Diesel	TPH	HCID	B	T	X	E	Total Lead	PAHs
OE-6	10/3/91	Excavation below concrete slab, northwest corner sidewall	4	—	130	—	—	—	—	—	—	—	—
OE-7	10/3/91	Excavation below concrete slab, center west sidewall	4	—	<40	—	—	—	—	—	—	—	—
0E-8	10/3/91	Excavation below concrete slab, center excavation floor (water table)	4.5	—	2,500	—	—	<0.050	<0.050	<0.050	<0.050	—	—
0ES-1	10/3/91	Excavated soil below concrete slab	.5 - 1.0 below surface of pile	—	660	—	—	—	—	—	—	—	—
OES-2	10/3/91	Excavated soil below concrete slab		—	680	—	—	—	—	—	—	—	—
OES-3	10/3/91	Excavated Soil below concrete slab		—	1,200	—	—	—	—	—	—	—	—
Excavated Soil	10/28/91	Soil Stockpile		—	—	—	—	—	—	—	—	—	None Detected
MTCA Method A Compliance Cleanup Levels				100.0	200.0	200.0	—	0.5	40.0	20.0	20.0	250.0	1.0

a Gas = TPH as Gasoline; Diesel = TPH as Diesel; TPH = Total Petroleum Hydrocarbons; HCID = WTPH-HCID, Hydrocarbon Identification; B = Benzene; T = Toluene; X = Total Xylenes; E = Ethylbenzene; Total Lead = Total Lead; PAHs = Polynuclear Aromatic Hydrocarbons

b Analyte was also found in the blank sample.

c Analyte detected, but below the quantitation limit.

d Analyzed for volatile organics by EPA Method 8240 and none were detected.

Note: mg/Kg is equivalent to parts per million (ppm)

3.3 Heating Oil Tank Exploration

On July 26, 1991 Northwest Envirofield Services attempted to locate the suspected heating oil tank (identified in the March 1989 Hart Crowser report) located near the southeast corner of the former Blackstock Lumber building using a backhoe (see Plate 1.2). Mr. Scott Blackstock was consulted about the location of the tank and he reported that it was actually a small aboveground storage tank (<500 gallons) used to heat several administrative offices. He could not recall whether the tank had been removed when a retaining wall was constructed in the vicinity of the tank in the 1970's or 1980's. The heating oil tank exploration focused on the area that Mr. Blackstock reported the tank would be if it was still present. No tank or evidence of a release was found.

3.4 Tank 2 - 300 Gallon Light Heating Oil

Tank 2 was excavated and removed on July 30, 1991 (see Plates 1.2 and 3.3, and Table 3.1). The residual contents of the 300 gallon tank were pumped out by Northwest Envirofield Services and they reported that the tank contained light heating oil. No piping was found with Tank 2 and no evidence of a release was observed. Groundwater seepage was not encountered in the excavation which measured approximately 5 feet deep.

A soil sample was collected from the base of the excavation (Sample HO-1) and composite soil samples were taken from the sidewalls of the excavation (Samples HO-2 and HO-3) for analysis for diesel (see Table 3.1). Diesel was not detected in the three soil samples. The excavation was backfilled with the excavated soil and adjacent site soil/fill.

3.5 Tank 3 - 250 Gallon Gasoline

Tank 3 was excavated and removed on July 30, 1991 (see Plates 1.2 and 3.4 and Table 3.1). Residual gasoline was present in the tank when it was pumped out. Groundwater was encountered above the bottom of the tank at a depth of 3 to 5 feet. A solvent-like odor was detected in the soil overlying Tank 3. The solvent-like odor was also strong in a broken pipe that originated underneath the concrete slab of the former Humane Society building. The soil exhibiting this odor was excavated and stockpiled (approximately 5 to 10 cubic yards). No evidence of a release from the tank was observed.

Four soil samples were collected from the sidewalls of the excavation, including WW(4'), NW(4'), EW(4'), and SW(4'). Two additional samples, ES1 and ES2, were collected from the portion of the soil pile exhibiting the strongest solvent-like odor. These samples were analyzed for gas/BTEX and total lead. Sample ES2 was also screened for petroleum-range hydrocarbons using Ecology Method WTPH-HCID.

Gasoline was not detected above the laboratory detection limit (50 mg/Kg) in the six soil samples. However, the WTPH-HCID test on Sample ES2 showed the presence of hydrocarbons in the gasoline range (C7 to C12) and the heavy oil range (>C24). Concentrations of benzene (<50 to 170 to μg/Kg), toluene (<50 to 4,300 μg/Kg), ethylbenzene (58 to 2,000 μg/Kg), and total xylenes (<50 to 15,200 μg/Kg) were detected in some or all of the six soil samples, however, these constituents did not exceed their respective MTCA Method A soil cleanup levels.

On August 14, 1991, a groundwater monitoring well (MW-1) was installed approximately 20 feet west of the former gasoline tank and in the inferred downgradient groundwater flow direction to comply with Ecology guidelines. The well was also positioned to assess groundwater quality in the vicinity of Tank 5 (see Section 3.7). Groundwater samples collected on August 15, 1991 were analyzed for Gas/BTEX and TPH-418.1 (see Table 3.2).

Gasoline and TPH were not detected in Well MW-1. Benzene (2.7 μg/L), toluene (0.98μg/L), and xylenes (2.1 μg/L) were detected in Well MW-1 at trace concentrations that did not exceed their respective MTCA Method A groundwater cleanup levels.

On September 20, 1991, the concrete foundation slab of the former Humane Society building was removed. No additional soil with a solvent-like odor was found in the vicinity of the pipe underneath the concrete slab. Two soil samples (S1 and S2) were collected from the area where the pipe went under the former slab and laboratory analysis of these samples did not detect any volatile organic compounds. Apparently, the affected soil was very limited and was almost entirely removed during the tank excavation.

3.6 Tank 4 - 1,000 Gallon Heavy Heating Oil

Tank 4 and associated piping outside of the building slab were excavated and removed on August 1, 1991 (see Plates 1.2 and 3.4 and Table 3.1). One set of product lines ran west toward Tank 5 where they were capped. Another set of product lines ran west approximately 10 feet to an elbow, which connected them to lines running north beneath the concrete slab. Based on visual observation, the soils containing heavy heating oil (20 to 25 cubic yards) were excavated and stockpiled for eventual off-site disposal. Groundwater was encountered above the bottom of the tank at a depth of 3 to 5 feet. No hydrocarbon sheen was observed on the groundwater in the vicinity of the tank.

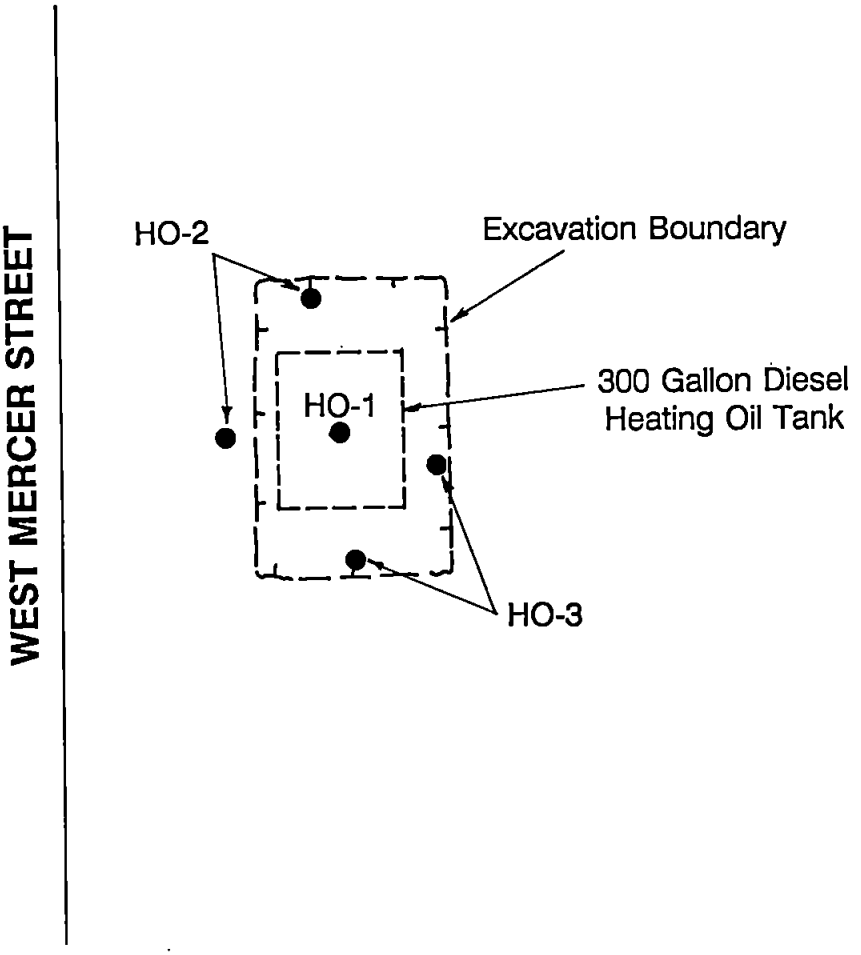
Soil samples were collected from the sidewalls of the tank excavation (BEW1, BEW2, BEW3, and BEW4), beneath the product lines (BPL5 and T4WN), and from the excavated soil stockpile (SP-1 to SP-6). The soil stockpile was sampled on August 1, 1991 (SP-1 to SP-3) and again on August 8, 1991 (SP-4 to SP-6) to further assess the marginally elevated TPH concentrations. The soil samples were analyzed for heavy heating oil by EPA Method 418.1. Concentrations of TPH in the sidewall and product line samples ranged from <25 to 170 mg/Kg, which were below the MTCA Method A soil cleanup level of 200 mg/Kg. Concentrations of TPH in the five of the six stockpile soil samples were slightly greater than the cleanup standard. These concentrations ranged from 44 mg/Kg to 380 mg/Kg, with an average value of 219 mg/Kg.

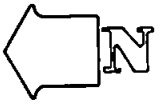
On August 14, 1991, a groundwater monitoring well (MW-2) was installed approximately 10 feet west of Tank 4 and in the inferred downgradient groundwater flow direction. This well was installed to assess whether a release to groundwater had occurred from Tank 4 and comply with Ecology guidelines. A groundwater sample collected on August 15, 1991 was analyzed for heavy petroleum hydrocarbons by EPA Method 418.1 (see Table 3.2). No TPH was detected in the groundwater sample.

On September 20, 1991, the concrete slab of the former Humane Society building was removed. The product lines running from Tank 4 underneath the concrete slab were removed before ECI arrived on-site. However, the area where these lines had been was visually inspected and no evidence of a release was observed.

3.7 Tank 5 - 1,760 Gallon Heavy Heating Oil

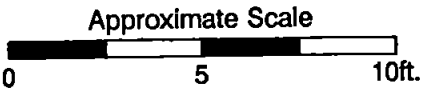
Tank 5 and associated product lines outside of the concrete slab were excavated and removed on August 1 and 6, 1991 (see Plates 1.2 and 3.4 and Table 3.1). Several small holes were observed in Tank 5, which apparently contained residual heavy heating oil. Groundwater seepage was encountered above the bottom of Tank 5 at a depth of 3 to 5 feet. The tank was adjacent to the western property line and approximately one foot of soil was excavated from the adjacent property to facilitate removal of Tank 5. No hydrocarbon sheen was observed on the groundwater in the Tank 5 excavation. Evidence of releases of heating oil was observed below a joint in the product lines near Tank 5 and below the product lines where they entered the west side of former Humane Society building approximately 80 feet north of the tank. Approximately 20 cubic yards of affected soils were removed and stockpiled for eventual off-site disposal.





LEGEND

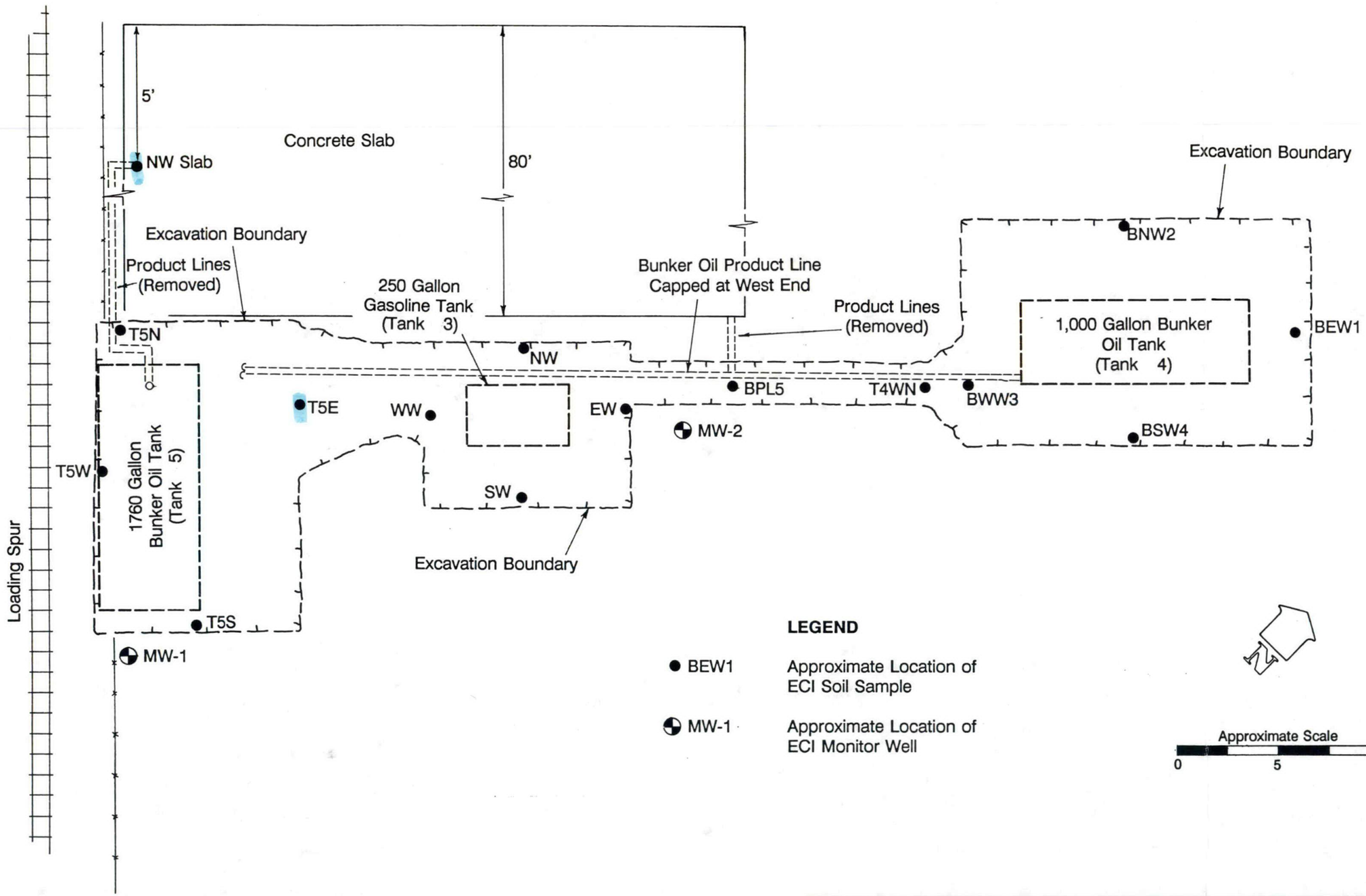
● HO-1 Approximate Location of ECI Soil Sample
Note: More than one location with the same sample number indicates composite samples.



Earth Consultants Inc.
Geotechnical Engineers, Geologists & Environmental Scientists

Tank 2 Excavation
Blackstock Lumber
Seattle, Washington

Proj. No. 5122-2	Drwn. GLS	Date Aug. '91	Checked TC	Date 8/26/91	Plate 3.3



LEGEND

● BEW1	Approximate Location of ECI Soil Sample
◒ MW-1	Approximate Location of ECI Monitor Well

Approximate Scale
0 5 10ft.

Earth Consultants Inc.
Geotechnical Engineers, Geologists & Environmental Scientists

Tanks 3, 4 and 5 Excavation
Blackstock Lumber
Seattle, Washington

Proj No.	Drwn.	Date	Checked	Date	Plate
5122-2	GLS	Aug. '91	TC	8/26/91	3.4

Table 3.2

GROUNDWATER ANALYTICAL RESULTS
FOR MONITORING WELLS MW-1 and MW-2
Blackstock Lumber Property
Seattle, Washington
August 15, 1991

Analyze	Sample Concentration (μg/L)			
	MW-1	MW-2	Detection Limit	MTCA Method A Compliance
Gas	N.D.	--	50	1,000
TPH-418.1	N.D.	N.D.	1,000	1,000
Benzene	2.7	--	0.50	5
Toluene	0.98	--	0.50	40
Xylenes	2.1	--	0.50	20
Ethylbenzene	N.D.	--	0.50	30

N.D. = Not detected at or above limit of detection

Soil samples were collected from the sidewalls of the tank excavation (T5W, T5N, T5E, and T5S), below the product lines (NW Slab, also T5N), and the stockpiled soil (SS1, SS2, and SS3). Each soil sample was analyzed for TPH by EPA Method 418.1. Sample T5E (420 mg/Kg), collected from the eastern sidewall, was the only sidewall sample that contained TPH in excess Ecology's MTCA Method A soil cleanup level of 200 mg/Kg. A concentration of 22,000 mg/Kg was detected in Sample NW Slab, located approximately 80 feet from Tank 5 and below the Tank 5 product lines at the point where they ran underneath the concrete slab. The further characterization and excavation of affected soils in the vicinity of Sample NW Slab are discussed in Section 3.8.

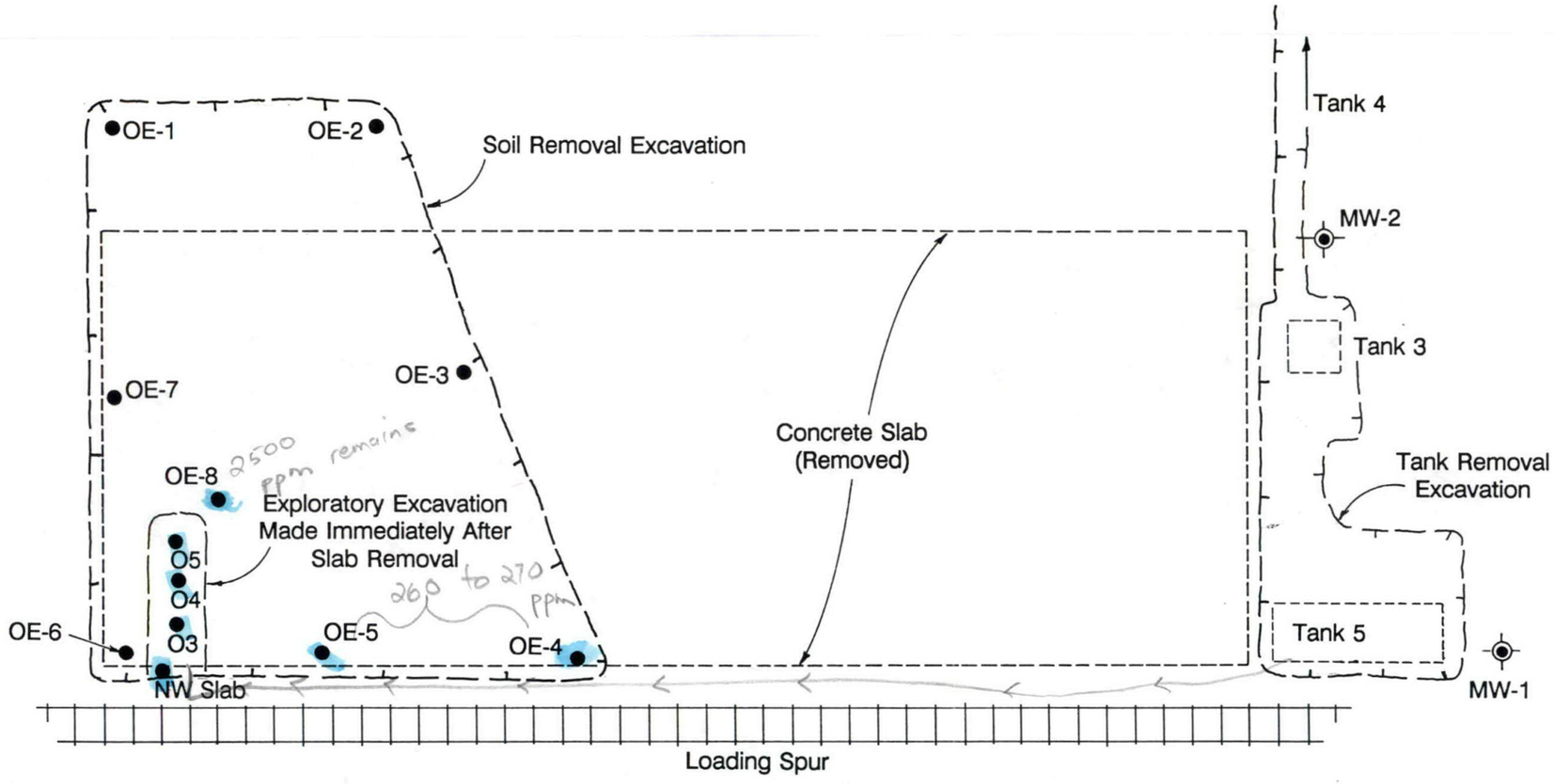
Sample T5E was located in a small volume (5 to 10 cubic yards) of undisturbed soil between the west wall of the Tank 3 excavation and the east wall of the Tank 5 excavation. On August 15, 1991, this soil was excavated and stockpiled for eventual off-site disposal.

On August 14, 1991, Monitoring Well MW-1 was installed near the southern edge of the Tank 5 excavation to assess whether the limited release in the vicinity of Tank 5 had affected groundwater and comply with Ecology's Guidance for Site Assessments for Underground Storage Tanks. Groundwater samples were collected from Well MW-1 on August 15, 1991 and analyzed for TPH by EPA Method 418.1 and gasoline by Modified EPA Method 8015 (see Table 3.2). No TPH or gasoline were detected in the groundwater and only trace concentrations of BTEX were present (see Section 3.5).

3.8 Diesel Release Beneath the Former Humane Society Building

The concrete slab of the former Humane Society building was removed on September 20, 1991 (see Plates 1.2 and 3.5 and Table 3.1). The product lines from Tank 5 that ran underneath this concrete slab were removed at this time. The release identified earlier near the point where the product line ran underneath the concrete slab appeared to affect soils underlying the north side of the slab from a depth of approximately 1.5 to 6 feet. Animal residue from the former Humane Society's operations was also present underneath the north side of the concrete slab.

On September 20, 1991, three soil samples (03, 04, and 05) were collected from a 3-foot deep exploratory trench excavated beneath the removed product lines under the former concrete slab and where the hydrocarbon odor and soil staining indicated the highest concentration of TPH. Approximately 50 cubic yards of soil were excavated during exploratory trenching and were stockpiled on-site for eventual off-site disposal. Two additional soil samples (SW and NW) were collected on the north and south sides of the exploratory trench on September 23, 1991. The five soil samples were analyzed petroleum hydrocarbons by WTPH-HCID, TPH by EPA Method 418.1, and/or diesel by Modified EPA Method 8015. The WTPH-HCID analysis identified the hydrocarbons as being primarily diesel (C11 to C24). Heavier hydrocarbons (>C24) were also present in Sample 05. Concentrations of diesel and TPH in the three exploratory trench samples ranged from 6,500 to 8,500 and 6,100 to 8,600, respectively. The samples collected south (SW) and north (NW) of the exploratory trench contained 600 and 400 mg/Kg, respectively.



Approximate Scale
0 5 10 20ft.

LEGEND

OE-1 ● Approximate Location of ECI Soil Sample

MW-1 ⊕ Approximate Location of Monitor Well

Reference:
Site Sketch
Contaminated Soil Removal Excavation
By Earth Consultants, Inc.
Dated 11/5/91

Earth Consultants Inc.
Geotechnical Engineers, Geologists & Environmental Scientists

Contaminated Soil Removal Excavation
Blackstock Lumber
Seattle, Washington

Proj No. 5122-2	Drwn. GLS	Date Nov. '91	Checked MP	Date 11/7/91	Plate 3.5

On October 3, 1991, the soils underneath the north side of the former concrete slab were excavated down to the groundwater table (approximately 3 to 4 feet). The affected soils left in place were below the groundwater table and could not be excavated due to caving. The approximate aerial extent of the excavation was 40 by 28 feet. Approximately 75 to 100 cubic yards of soil were excavated and stockpiled for eventual off-site disposal. The groundwater in the excavation had a noticeable hydrocarbon sheen and a thin product layer (< 1/8 inch) was present in some areas. The visibly contaminated soil left-in-place appeared to be limited to a depth of 3 to 6 feet. The diesel appeared to have been spread through this zone by tidally influenced fluctuations in the local groundwater table.

Soil samples were collected from the sidewalls (OE-1 to OE-7) and base (OE-8) of the excavation and analyzed for diesel and/or TPH. Sample OE-8 was also analyzed for BTEX by EPA Method 8020. The sidewall sample collected along the western property line was the only side wall sample that contained concentrations of diesel (260 mg/Kg) and TPH (270 mg/Kg) that exceeded Ecology's MTCA Method A soil cleanup level of 200 mg/Kg. Soil Sample OE-8, which is representative of the contamination left-in-place, contained 2,500 mg/Kg diesel. BTEX was not detected in Sample OE-8.

A groundwater "grab" sample was collected from the excavation pit on October 17, 1991. The laboratory reported that a thin product layer was present in the sample. Concentrations of 30,000 mg/L TPH and 2,700 mg/L diesel were detected in the sample. The significantly higher TPH concentration probably resulted from unequal partitioning of the product layer during sample preparation and the presence of animal fat which can interfere with EPA Method 418.1 results. The diesel concentration is considered to be more representative of petroleum hydrocarbon concentration in the groundwater.

3.9 Disposal of Excavated Soils

On September 20, 1991 the excavated soils associated with Tanks 4 and 5 were moved to facilitate the removal of the concrete slab. All of the stockpiled soil was placed into one 50 to 75 cubic yard pile (Stockpile 1). Soils excavated from beneath the northwest corner of the concrete slab on September 20, 1991 were placed into an adjacent pile of approximately 50 cubic yards in volume (Stockpile 2). At the request of Mr. Eric Wagner of Armada/Lagerquist, six additional soil samples (SS1-1 to SS1-6) were collected from Stockpile 1 to confirm the original concentrations of TPH. Three soil samples (SS2-1 to SS2-3) were also taken from Stockpile 2 to assess the soil excavated that day. Stockpile 1 samples were analyzed for TPH by EPA Method 418.1 and Stockpile 2 samples were analyzed for diesel. The TPH in Stockpile 1 ranged from 160 to 370 mg/Kg. A WTPH-HCID analysis was performed on Sample SS1-5, which had the highest concentration of TPH. Only heavy hydrocarbons (>C24) were detected in Sample SS1-5. Diesel in the Stockpile 2 soil samples ranged from 2,000 to 6,000 mg/Kg.

On October 3, 1991, additional soil containing diesel was excavated from underneath the north side of the former concrete slab. Before this excavation occurred, Stockpiles 1 and 2 were relocated into one pile east and north of the excavation area. The 75 to 100 cubic yards of soil containing diesel excavated on October 3, 1991 was placed on top of the existing stockpile. Three samples (OES-1 to OES-3) were collected from the soil added to the stockpile and analyzed for diesel. Diesel concentrations in this excavated soil ranged from 660 to 1,200 mg/Kg.

The disposal of the stockpiled soils was supervised by RZA-AGRA and is discussed in a separate report by RZA-AGRA.

4.0 SUMMARY AND CONCLUSIONS

During July through October 1991, five USTs at the Blackstock Lumber property at 501 to 601 Elliott Avenue West in Seattle, Washington were closed in accordance with Ecology's Guidance for Site Assessments of Underground Storage Tanks and Chapter 173-360 WAC. Two of the USTs were identified during a previous Phase 1 ESA (Hart-Crowser, March 1989) and include a 10,000 gallon diesel tank (Tank 1) and a 300 gallon heating oil tank (Tank 2). During this project three additional USTs were discovered on the northwest portion of the property and include a 250 gallon gasoline tank (Tank 3), 1,000 gallon heavy heating oil tank (Tank 4), and 1,760 gallon heavy heating oil tank (Tank 5). Exploratory excavation was conducted on the south side of the property to locate a gasoline tank and a heating oil tank reported in the Phase 1 ESA. Apparently, the gasoline UST had already been removed and the heating oil tank was actually an above ground tank that had also been removed. The following summary and conclusions are based on observations and interpretations discussed in the body of this report.

- No evidence of a release from Tanks 1, 2 and 3 was observed. A solvent-like odor was detected in soil overlying Tank 3 that appeared to be associated with a pipe originating from the former Humane Society building. Gasoline, BTEX, and lead were detected, but did not exceed MTCA Method A soil cleanup levels in this soil. After the concrete building slab was removed, the soils underlying the pipe were analyzed for volatile organics. No volatile organics were detected.

- Evidence of a limited release to soil in the vicinity of Tanks 4 and 5 was observed. The affected soils were excavated and stockpiled on-site. Approximately 50 to 75 cubic yards of affected soils were excavated in the vicinity of Tanks 4 and 5, respectively.

- Groundwater was encountered above the bottom of Tanks 3, 4, and 5. In accordance with Ecology's Guidance for Site Assessments of Underground Storage tanks, two monitoring wells were installed in the vicinity of these tanks to assess whether groundwater was impacted. No TPH or gasoline were detected in Well MW-1, which is located in the vicinity of Tanks 3 and 5. Trace concentrations of BTEX were detected in Well MW-1, but these concentrations were below their respective MTCA Method A groundwater cleanup levels. No TPH was detected in Well MW-2, which is located in the vicinity of Tank 4.

- Soils containing diesel were discovered under the north side of the former Humane Society building. The affected soils appeared to be associated with product lines from Tank 5. The vertical extent of the affected soils appeared to be approximately 1.5 to 6 feet below ground surface. On October 3, 1991, the 3 to 4 feet of affected soil above the top of the water table were excavated. The excavation was approximately 28 by 40 feet in areal extent and the western sidewall coincided with the western property line. Confirmation soil samples collected from the sidewalls of the excavation showed that, except for the west sidewall (260 mg/Kg), soils containing diesel in excess of 200 mg/Kg were removed.

- A hydrocarbon sheen was observed on groundwater seepage in the excavation pit beneath the former concrete slab. A groundwater "grab" sample and a soil sample from the affected soils left in place were collected. The laboratory reported that the groundwater "grab" sample contained free product. Diesel concentrations of 2,700 mg/L and 2,500 mg/Kg were detected in the groundwater and soil, respectively. These concentrations are well above their respective MTCA Method A cleanup levels of 1 mg/L and 200 mg/Kg.

5.0 RECOMMENDATIONS

Based on the findings of this investigation, the following interim actions are recommended:

- Send two copies of this report to: Underground Storage Tank Section, Department of Ecology, Mail Stop PV-11, Olympia, WA. 98504-8711.
- Properly treat or dispose of the stockpiled soils.
- Install additional groundwater monitoring wells to evaluate the extent of affected groundwater discovered beneath the former Humane Society Building.
- Monitor the proposed and existing groundwater wells for diesel.

6.0 STANDARD LIMITATIONS

The findings and conclusions documented in this report have been prepared for specific application to this project and have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area, and in accordance with the terms and conditions set forth in our proposals dated June 26, August 12, and August 30, 1991. Any conclusions and recommendations are professional opinions based on our interpretation of information currently available to us and are made within the operational budget and schedule constraints of this project. No warranty, expressed or implied, is made.

This report is for the exclusive use of Mr. Jim Blackstock, Armada Lagerquist, and their representatives. Any future consultations or other professional services by ECI to others requires prior written agreement from Jim Blackstock. Any such services to others will be new work requiring formal agreement with the new client, and will be done on a time-and-materials basis in accordance with ECI's prevailing Standard Fee Schedule and General Conditions.

7.0 REFERENCES

1) United States Environmental Protection Agency, Hazardous Waste Land Treatment, SW-874, April 1983.

2) United States Environmental Protection Agency, RCRA Groundwater Monitoring Technical Enforcement Guidance Document, September 1986.

3) Washington State Department of Ecology, Minimum Standards for Construction and Maintenance of Wells, Chapter 173-160 WAC, March 1990.

4) Washington State Department of Ecology, The Model Toxics Control Act Cleanup Regulation, Chapter 173-340 WAC, February 1991.

5) Washington State Department of Ecology, Underground Storage Tank Program, Guidance for Site Checks and Site Assessments for Underground Storage Tanks, February 1991.

6) Washington State Department of Ecology, Toxics Cleanup Program, Guidance for Remediation of Releases from Underground Storage Tanks, July 1991.

7) Hart-Crowser, Preliminary Environmental Assessment, Blackstock Lumber Property, March 3, 1989.

8) Hart-Crowser, Phase 2 Subsurface Soil Sampling and Analysis and Preliminary Cost Estimate for Phase 3 Remediation, Blackstock Lumber Property, July 10, 1989.

APPENDIX A

NES TANK DISPOSAL DOCUMENTATION

Northwest EnviroField Services

TELECOPY (206) 762-9362

TELECOPIER TRANSMITTTAL REQUEST

DATE: Nov. 13, 1992

TIME: 10:20AM

FROM: LORI HOLDEN

NORTHWEST ENVIROFIELD SERVICES
54 SOUTH DAWSON / P. O. BOX 80743
SEATTLE, WASHINGTON 98108

TO: Mark Pearce

COMPANY: Earth Consultants

TELECOPIER #: 746-0860 RE: Blackstock Lumber

TOTAL NUMBER OF PAGES: 2 INCLUDING COVER PAGE

IF YOU DO NOT RECEIVE ALL OF THE PAGES, PLEASE CALL (206) 762-1190.

Will let you know when I hear from J.R. Abbott

Northwest EnviroField Services

DISPOSAL CERTIFICATION

DATE: August 16, 1991

TO: Ray C. Blackstock c/o Armada Lagerquist Co
2001 - 6th Ave Ste #3202
Seattle, WA 98121

REFERENCE P.O. # Eric Wagner

To whom it may concern,

This letter is to certify that Northwest EnviroField Services has received the following tank(s) for cleaning and disposal in accordance with all federal, state and local rules and regulations:

1.)	One	(1)	10,000	gallon diesel ✓
2.)	One	(1)	300	gallon gasoline ✓
3.)	One	(1)	300	gallon diesel ✓
4.)	One	(1)	1,500	gallon bunker C ✓
5.)	One	(1)	275	gallon heating oil ? AST ?
6.)	One	(1)	2,500	gallon diesel ✓

NWEFS JOB#: 32-23509

DATE RECEIVED: 07-25-91

DATE CLEANED: 08-13-91

DATE OF DISPOSAL: 08-13-91

METHOD OF DISPOSAL: Scrap Steel

LOCATION OF TANK ORIGIN: Blackstock Lumber / 545 Elliott Ave. / Seattle, WA

If you have any questions or requests for service, feel free to contact this office at (206) 762-1190.

Thank you for your business and we look forward to being of service in the future.

Sincerely,

Northwest EnviroField Services

Kim Ducatt
Underground Tank Division

APPENDIX B

BORING LOGS AND

WELL CONSTRUCTION SUMMARIES

MAJOR DIVISIONS			GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTION
Coarse Grained Soils	Gravel And Gravelly Soils	Clean Gravels (little or no fines)		GW gw	Well-Graded Gravels, Gravel-Sand Mixtures, Little Or No Fines
				GP gp	Poorly-Graded Gravels, Gravel-Sand Mixtures, Little Or No Fines
	More Than 50% Coarse Fraction Retained On No. 4 Sieve	Gravels With Fines (appreciable amount of fines)		GM gm	Silty Gravels, Gravel-Sand-Silt Mixtures
				GC gc	Clayey Gravels, Gravel-Sand-Clay Mixtures
	Sand And Sandy Soils	Clean Sand (little or no fines)		SW sw	Well-Graded Sands, Gravelly Sands, Little Or No Fines
				SP sp	Poorly-Graded Sands, Gravelly Sands, Little Or No Fines
More Than 50% Material Larger Than No. 200 Sieve Size	More Than 50% Coarse Fraction Passing No. 4 Sieve	Sands With Fines (appreciable amount of fines)		SM sm	Silty Sands, Sand-Silt Mixtures
				SC sc	Clayey Sands, Sand-Clay Mixtures
Fine Grained Soils	Silts And Clays	Liquid Limit Less Than 50		ML ml	Inorganic Silts & Very Fine Sands, Rock Flour, Silty-Clayey Fine Sands; Clayey Silts w/ Slight Plasticity
				CL cl	Inorganic Clays Of Low To Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean
				OL ol	Organic Silts And Organic Silty Clays Of Low Plasticity
More Than 50% Material Smaller Than No. 200 Sieve Size	Silts And Clays	Liquid Limit Greater Than 50		MH mh	Inorganic Silts, Micaceous Or Diatomaceous Fine Sand Or Silty Soils
				CH ch	Inorganic Clays Of High Plasticity, Fat Clays.
				OH oh	Organic Clays Of Medium To High Plasticity, Organic Silts
Highly Organic Soils				PT pt	Peat, Humus, Swamp Soils With High Organic Contents

Topsoil		Humus And Duff Layer
Fill		Highly Variable Constituents

The Discussion In The Text Of This Report Is Necessary For A Proper Understanding Of The Nature Of The Material Presented In The Attached Logs

Notes :

Dual symbols are used to indicate borderline soil classification. Upper case letter symbols designate sample classifications based upon laboratory testing; lower case letter symbols designate classifications not verified by laboratory testing.

- I 2"O.D. SPLIT SPOON SAMPLER
- II 2.4"I.D. RING SAMPLER OR SHELBY TUBE SAMPLER
- P SAMPLER PUSHED
- ✳ SAMPLE NOT RECOVERED
- ▽ WATER LEVEL (DATE)
- ▮ WATER OBSERVATION WELL

- C TORVANE READING, tsf
- qu PENETROMETER READING, tsf
- W MOISTURE, percent of dry weight
- pcf DRY DENSITY, pounds per cubic ft.
- LL LIQUID LIMIT, percent
- PI PLASTIC INDEX

Earth Consultants Inc.
Geotechnical Engineers, Geologists & Environmental Scientists

LEGEND

Proj. No. 5122-2 | Date 8-22-91 | Plate A1

Environmental Boring Log

Project Name: BLACKSTOCK LUMBER				Sheet 1 of 1
Job No.: 5122-2	Logged by: TSC	Start Date: 8-14-91	Completion Date: 8-14-91	Boring No: **MW-1**
Drilling Contractor: Soil Sampling Service		Drilling Method: HST		Sampling Method: N/A
Ground Surface Elevation: N/A		Hole Completion: ☒ Monitoring Well ☐ Piezometer ☐ Abandoned, sealed with bentonite		

Microtip Reading (ppm)	Sample ID	Blow Count	Litho-graphy	Depth in Feet	USCS Symbol	Surface Conditions:
				1	sp	Reddish brown silty, gravelly SAND. Fill
				2		
				3		
				4	sm	Medium gray silty SAND with numerous shell fragments.
				5		Water level at 5 feet during drilling
				6		
				7		
				8		
				9		
				10		Total drilled depth 10 feet
				11		
				12		
				13		
				14		
				15		
				16		
				17		
				18		
				19		

Notes/Location
No samples were collected during drilling
Lithologic description based on observations of adjacent excavation walls

Earth Consultants Inc.

Proj. No. 5122-2 | **Date** 8-22-91 | **Plate** A2

Monitor Well Completion Form

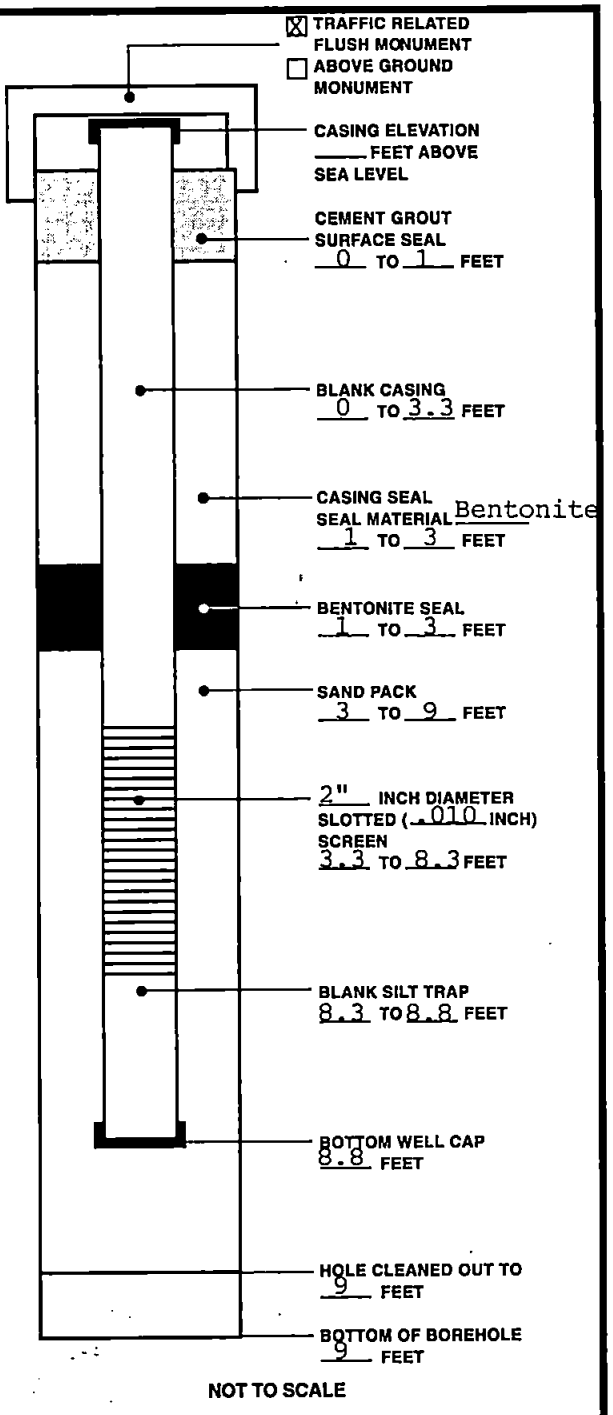
PROJECT NAME:	BLACKSTOCK LUMBER		
PROJECT NUMBER:	5122-2	PROJECT MANAGER:	MLP
LOGGED BY:	TSC	REVIEWED BY:	
WELL I.D.:	MW-1	DATE:	8-14-91
DRILLING COMPANY:	Soil Sampling Service		
METHOD OF DECONTAMINATION PRIOR TO DRILLING:	High Pressure Wash		

DEVELOPMENT

METHOD OF DEVELOPMENT:	Bailer		
DEVELOPMENT DATE:	8-15-91		
YIELD (GAL)	16	TIME: FROM 0830 TO 0900	
DESCRIPTION OF TURBIDITY AT END OF DEVELOPMENT:	☐ CLEAR	☒ SLIGHTLY CLOUDY	
	☐ MOD. TURBID	☐ VERY MUDDY	
ODOR OF WATER:	None		
WATER DISCHARGED TO:	☐ GROUND SURFACE	☐ TANK TRUCK	
	☐ SANITARY SEWERS	☐ STORAGE TANK	
	☒ DRUMS	☐ OTHER	
DEPTH TO WATER AT START OF DEVELOPMENT:	5 ft	DEPTH TO WATER AFTER DEVELOPMENT:	4.9 ft
RECOVERY TIME:	Not taken		

MATERIALS USED

1.5 SACKS OF 10-20 Colorado Silica SAND	
.5 SACKS OF premix CEMENT	
_____ SACKS OF GROUT:	
_____ SACKS OF POWDERED BENTONITE:	
1.5 SACKS OF BENTONITE CHIPS:	
_____ BUCKETS OF BENTONITE PELLETS:	
5 FEET OF 2" INCH BLANK CASING	☒ PVC ☐ _____
5 FEET OF 2" INCH SCREEN	.010 INCH SLOT SIZE
☒ SLOTTED PVC	☐ _____
_____ FEET OF _____ INCH STEEL CONDUCTOR CASING	
_____ YARD^3 CEMENT-SAND (REDI-MIX) ORDERED:	
_____ YARD^3 CEMENT-SAND (REDI-MIX) USED:	
CONCRETE PUMPER USED?	☐ YES ☒ NO
NAME:	



NOT TO SCALE

ADDITIONAL INFORMATION

BLACKSTOCK LUMBER
SEATTLE, WASHINGTON

Earth Consultants Inc.

Proj. No.	Drwn.	Date	Checked	Date	Plate
5122-2	GLS	Aug '91	MLP	8-22-91	A3

Environmental Boring Log

Project Name: BLACKSTOCK LUMBER				Sheet 1 of 1
Job No.: 5122-2	Logged by: TSC	Start Date: 8-14-91	Completion Date: 8-14-91	Boring No: **MW-2**
Drilling Contractor: Soil Sampling Service		Drilling Method: HST		Sampling Method: N/A
Ground Surface Elevation: N/A		Hole Completion: ☒ Monitoring Well ☐ Piezometer ☐ Abandoned, sealed with bentonite		

Microtip Reading (ppm)	Sample ID	Blow Count	Litho-graphy	Depth in Feet	USCS Symbol	Surface Conditions: Clear
				1	sp	Reddish brown silty, gravelly SAND. Fill
				2		
				3		
				4	sm	Medium gray silty SAND with numerous shell fragments.
				5		Water at 4 feet druing drilling
				6		
				7		
				8		
				9		
				10		Total drilled depth 10 feet
				11		
				12		
				13		
				14		
				15		
				16		
				17		
				18		
				19		

Notes/Location
No samples were collected during drilling. Lithologic description based on observations of adjacent excavation walls.

Earth Consultants Inc.

Proj. No. 5122-2	Date 8-22-91	Plate A4

Monitor Well Completion Form

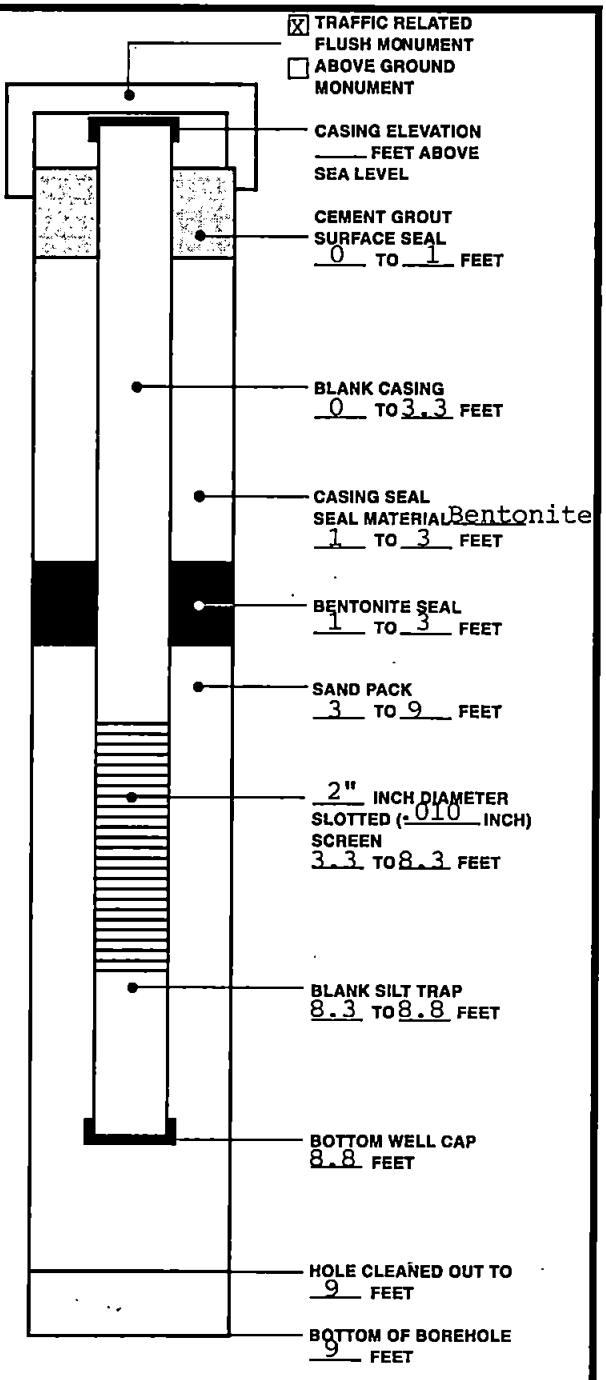
PROJECT NAME:	BLACKSTOCK LUMBER		
PROJECT NUMBER:	5122-2	PROJECT MANAGER:	MLP
LOGGED BY:	TSC	REVIEWED BY:	
WELL I.D.:	MW-2	DATE:	8-14-91
DRILLING COMPANY:	Soil Sampling Service		
METHOD OF DECONTAMINATION PRIOR TO DRILLING:	High Pressure Wash		

DEVELOPMENT

METHOD OF DEVELOPMENT:	Bailer		
DEVELOPMENT DATE:	8-15-91		
YIELD (GAL)	16	TIME: FROM 1010 TO 1040	
DESCRIPTION OF TURBIDITY AT END OF DEVELOPMENT:	☐ CLEAR	☒ SLIGHTLY CLOUDY	
	☐ MOD. TURBID	☐ VERY MUDDY	
ODOR OF WATER:	None		
WATER DISCHARGED TO:	☐ GROUND SURFACE	☐ TANK TRUCK	
	☐ SANITARY SEWERS	☐ STORAGE TANK	
	☒ DRUMS	☐ OTHER	
DEPTH TO WATER AT START OF DEVELOPMENT:	3.9	DEPTH TO WATER AFTER DEVELOPMENT:	3.9
RECOVERY TIME:	Not taken		

MATERIALS USED

1.5	SACKS OF 10-20 Colorado Silica SAND
.5	SACKS OF premix CEMENT
	SACKS OF GROUT:
	SACKS OF POWDERED BENTONITE:
1.5	SACKS OF BENTONITE CHIPS:
	BUCKETS OF BENTONITE PELLETS:
5	FEET OF 2" INCH BLANK CASING ☒ PVC ☐
5	FEET OF 2" INCH SCREEN .010 INCH SLOT SIZE ☒ SLOTTED PVC ☐
	FEET OF INCH STEEL CONDUCTOR CASING
	YARD³ CEMENT-SAND (REDI-MIX) ORDERED:
	YARD³ CEMENT-SAND (REDI-MIX) USED:
	CONCRETE PUMPER USED? ☐ YES ☒ NO
	NAME:



NOT TO SCALE

ADDITIONAL INFORMATION

BLACKSTOCK LUMBER
SEATTLE, WASHINGTON

Earth Consultants Inc.

Proj. No.	Drwn.	Date	Checked	Date	Plate
5122-2	GLS	Aug '91	MLP	8-22-91	A5

APPENDIX C

GROUNDWATER MONITORING FIELD NOTES

Date: 8-15-91 Sampler T.S. Clawson

Weather Conditions: Clear

Groundwater Sampling Field Notes

Well I.D.	Initial water level and bottom of casing (feet)	Casing diameter (inches)	Casing volume (gallons)	Time	Gallons purged	pH	Specific conductivity (umhos/cm)	Temperature (° C)	Sample method*	Analysis	No. and type of containers	Preservative	Comments (turbidity, odor, microtip reading, etc.)
MW-1	WL 5' TD 8.8'	2"	.61	0830 0840 0850 0900	4 8 12 16	7.01 7.13 7.16 7.16	685 690 693 693		B	8015 8020 418.1	2 - 40 MLVOA 1 - IL AMBER		Slightly cloudy No odor or sheen
MW-2	WL 3.9' TD 8.8'	2"	.78	1010 1020 1030 1040	4 8 12 16	7.20 7.28 7.29 7.28	675 579 578 575	NA	B	418.1	1 - IL AMBER		Slightly cloudy No odor or sheen

Casing volume constants
- 2" well 0.16 gallons/lineal foot
- 4" well 0.65 gallons/lineal foot

*B - Teflon or Stainless Steel Bailer
P - Bladder Pump

BLACKSTOCK LUMBER
SEATTLE, WASHINGTON

Earth Consultants Inc.

Proj. No. 5122-2 | Date 8-22-91 | Plate A6

APPENDIX D

SOIL AND GROUNDWATER

ANALYTICAL RESULTS

August 5, 1991

Ted Clawson
Earth Consultants, Inc.
1805 136th Place N.E.
Suite 101
Bellevue, WA 98005

Dear Ted:

Enclosed are the results of the analyses of samples submitted on July 25, 1991 from Project 5122-1.

Please note that in compliance with Washington DOE all soil samples will now be reported in dry weight concentrations.

We appreciate this opportunity to be of service to you on this project. If you have any questions regarding this report, please feel free to call me.

Sincerely,

Stephen J. Loague
Chemist

SJL

Enclosures

Date of Report: August 5, 1991
Samples Submitted: July 25, 1991
Lab Traveler: 07-066
Project: 5122-1

RESULTS OF ANALYSES OF SAMPLES FOR DIESEL #2 BY MODIFIED EPA METHOD 8015

Sample #	Matrix	Dilution Factor	Diesel #2 (ppm)	Surrogate Recovery (%)
D1	soil	2	<40	110%
D2	soil	2	<40	110%
D3	soil	2	<40	110%
D4	soil	2	<40	110%
D5	soil	2	<40	110%
SS D1	soil	2	<40	110%
SS D2	soil	2	<40	110%
SS D3	soil	2	<40	110%
Quality Assurance				
Method Blank		2	<40	110%
D4 Duplicate	soil	2	<40	110%
D4 Matrix Spike @ 100ppm Per Cent Recovery	soil	2	110%	120%
D4 Matrix Spike Duplicate	soil	2	120%	110%

RESULTS OF DRY WEIGHT

Sample #	Per Cent Moisture
D1	15%
D2	9%
D3	15%
D4	8%
D5	10%
SS D1	13%
SS D2	9%
SS D3	12%

Earth Consultants Inc.

Geotechnical Engineers, Geologists & Environmental Scientists

07-066

CHAIN OF CUSTODY RECORD

SHEET 1 OF 1

Rush

PROJECT			SAMPLERS: (Signature)								
5122-1			S J Clawson								
LAB NUMBER	DATE	TIME	SAMPLE TYPE						NO OF CONTAINERS	REMARKS	
			WATER	SEDIMENT	TISSUE	AIR	OIL	OTHER			
D1	3/25/91	1340		X						8015 Diesel	
D2		1345							2	composite	
D3		1350									
D4		1357									
D5		1355							2	composite	
SSD1		1400									
SSD2		~~1405~~ 1403									
SSD3		1405									

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature) S J Clawson	RECEIVED BY MOBILE LAB FOR FIELD ANALYSIS: (Signature)	DATE/TIME
DISPATCHED BY: (Signature)	DATE/TIME	RECEIVED FOR LABORATORY BY: (Signature) Tom Stapp ASL.
METHOD OF SHIPMENT:		DATE/TIME 7/25 | 3:25

Distribution: Original - Accompany Shipment
One Copy - Survey Coordinator Field Files

Analytical Services, Inc.
12277 134th Court NE Redmond, Washington 98052
(206) 820-4551 (fax) 820-633712277

August 1, 1991

Ted Clawson, Project Manager
Earth Consultants, Inc.
1805 136th Place N.E.
Suite 101
Bellevue, WA 98005

Dear Ted:

Enclosed are the results of the analyses of samples submitted on July 26, 1991 from Project 5122-1/Blackstock.

Please note that in compliance with Washington DOE all soil samples will now be reported in dry weight concentrations.

We appreciate this opportunity to be of service to you on this project. If you have any questions regarding this report, please feel free to call me.

Sincerely,

Stephen J. Loague
Chemist

SJL:tmh

Enclosures

Date of Report: August 1, 1991
Samples Submitted: July 26, 1991
Lab Traveler: 07-073
Project: 5122-1/Blackstock

HYDROCARBON INDENTIFICATION
BY METHOD WTPH-HCID

Sample #	GC Characterization	Surr. Recovery
G1(7')	<20 ppm Gasoline <40 ppm Diesel Fuel	100%
ES1(G)	<20 ppm Gasoline <40 ppm Diesel Fuel	100%
ES2(G)	<20 ppm Gasoline <40 ppm Diesel Fuel	91%
ES3(G)	<20 ppm Gasoline <40 ppm Diesel Fuel	96%
Method Blank	<20 ppm Gasoline <40 ppm Diesel Fuel	110%

07-073

Earth Consultants Inc.

Geotechnical Engineers, Geologists & Environmental Scientists

CHAIN OF CUSTODY RECORD

SHEET 1 OF 1

PROJECT			SAMPLERS: (Signature)								
5122-1 Blackstock			D.J. Lawson								
LAB NUMBER	DATE	TIME	SAMPLE TYPE						NO. OF CONTAINERS	REMARKS	
			WATER	SEDIMENT	TISSUE	AIR	OIL	OTHER			
G1 (7')	7/26/91	1010		X					1	WHCID	
ES1(G)	↓	1130		↓					↓	↓	
ES2(G)		1135									
ES3(G)		1140									
debris		1030						X		HOLD	

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
D.J. Lawson	Andrew L. Bak	7/26 | 3:15
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY MOBILE LAB FOR FIELD ANALYSIS: (Signature)	DATE/TIME
DISPATCHED BY: (Signature) / DATE/TIME	RECEIVED FOR LABORATORY BY: (Signature)	DATE/TIME
METHOD OF SHIPMENT:		

Distribution: Original - Accompany Shipment
One Copy - Survey Coordinator Field Files

August 9, 1991

Ted Clawson
Earth Consultants, Inc.
1805 136th Place N.E.
Suite 101
Bellevue, WA 98005

Dear Ted:

Enclosed are the results of the analyses of samples submitted on July 30, 1991 from Project E5122-1 Blackstock.

Please note that in compliance with Washington DOE all soil samples will now be reported in dry weight concentrations.

We appreciate this opportunity to be of service to you on this project. If you have any questions regarding this report, please feel free to call me.

Sincerely,

Stephen J. Loague
Chemist

SJL

Enclosures

Analytical Services, Inc. (206) 820-4551 (fax) 820-6337
12277 134th Court NE Redmond, Washington 98052

Date of Report: August 9, 1991
Samples Submitted: July 30, 1991
Lab Traveler: 07-079
Project: E5122-1 Blackstock

RESULTS OF ANALYSES OF SAMPLES FOR DIESEL #2 BY MODIFIED EPA METHOD 8015

Sample #	Matrix	Dilution Factor	Diesel #2 (ppm)	Surrogate Recovery (%)
HO-1	soil	3	<30	130%
HO-2	soil	3	<30	140%
HO-3	soil	3	<30	150%
Quality Assurance				
Method Blank		3	<30	100%
HO-2 Duplicate	soil	3	<30	130%
HO-2 Matrix Spike @100ppm Per Cent Recovery	soil	3	61%	140%
HO-2 M.S. Duplicate	soil	3	53%	150%

Date of Report: August 9, 1991Samples Submitted: July 30, 1991
Lab Traveler: 07-079
Project: E5122-1 Blackstock

ANALYSIS FOR BTEX AND TPH-GAS
EPA MOD. 8015 (PURGE & TRAP)

Sample #:	WW 4'	NW 4'	EW 4'	SW 4'	ES1
Matrix	soil	soil	soil	soil	soil
Dilution Factor	50	50	50	50	50
Units	ppb	ppb	ppb	ppb	ppb
Analyte:					
Benzene	<50	<50	<50	<50	<50
Toluene	<50	<50	<50	<50	100^{J}
Ethylbenzene	180^{J,A}	130^{J,A}	62^{J,A}	58^{J,A}	130^{J,A}
m- & p-Xylene	290^{J}	<50	<50	<50	300
o-Xylene	<50	<50	<50	<50	140^{J}
Units	ppm	ppm	ppm	ppm	ppm
TPH/Gas	<50	<50	<50	<50	<50
Surr. Recovery	75%	80%	82%	83%	78%

J - Analyte detected, but below the quantitation limit.
A - The analyte indicated was also found in the blank sample.

ıte of Report: August 9, 1991
Samples Submitted: July 30, 1991
ıb Traveler: 07-079
:oject: E5122-1 Blackstock

ANALYSIS FOR BTEX AND TPH-GAS
EPA MOD. 8015 (PURGE & TRAP)

mple #:	ES2
trix	soil
lution Factor	50
its	ppb
alyte:	
benzene	170[J]
luene	4300
Ethylbenzene	2000[A]
& p-Xylene	11,000
o-Xylene	4200
Units	ppm
l/Gas	<50
r. Recovery	84%

A - The analyte indicated was also found in the blank sample.
J - Analyte detected, but below the quantitation limit.

Date of Report: August 9, 1991
Samples Submitted: July 30, 1991
Lab Traveler: 07-079
Project: E5122-1 Blackstock

ANALYSIS FOR BTEX AND TPH-GAS
EPA MOD. 8015 (PURGE & TRAP)

QUALITY CONTROL

Sample #:	Method Blank	SW 4' Original	SW 4' Duplicate	SW 4' Matrix Spike @1000ppb	SW 4' M Spike. Duplicate
Matrix		soil	soil	soil	soil
Dil.Fact.	50	50	50	50	50
Units	ppb	ppb	ppb	%Rec.	%Rec.
Analyte:					
Benzene	<50	<50	<50	86%	85%
Toluene	<50	<50	<50	86%	87%
Ethylbenzene	100[J]	58[J,A]	63[J,A]	87%	88%
m- & p-Xylene	<50	<50	<50	86%	86%
o-Xylene	<50	<50	<50	87%	87%
Units	ppm	ppm	ppm	%Rec.	%Rec.
TPH/Gas	<50	<50	<50	NA	NA
Surr. Recovery	89%	83%	77%	85%	83%

Date of Report: August 9, 1991
Samples Submitted: July 30, 1991
Lab Traveler: 07-079
Project: E5122-1 Blackstock

Analysis for Selected Metals
Using EPA Method 7000
mg/Kg (ppm)

Sample#	WW 4'	NW 4'	EW 4'	SW 4'	ES1
Matrix	soil	soil	soil	soil	soil
Analyte:					
Lead	33	55	30	<10	60

Date of Report: August 9, 1991
Samples Submitted: July 30, 1991
Lab Traveler: 07-079
Project: E5122-1 Blackstock

Analysis for Selected Metals
Using EPA Method 7000
mg/Kg (ppm)

Sample#	ES2
Matrix	soil
Analyte:	
Lead	65

Date of Report: August 9, 1991
Samples Submitted: July 30, 1991
Lab Traveler: 07-079
Project: E5122-1 Blackstock

Analysis for Selected Metals
Using EPA Method 7000

Quality Assurance

Sample #	ES2 (Original)	ES2 (Dup.)	Matrix Spike	Amount Spiked	Method Blank
Matrix	soil	soil	soil		
Units	ppm	ppm	ppm	ppm	ppm
Analyte					
Lead	65	65	85%	125	<10

Date of Report: August 9, 1991
Samples Submitted: July 30, 1991
Lab Traveler: 07-079
Project: E5122-1 Blackstock

HYDROCARBON INDENTIFICATION
BY METHOD WTPH-HCID

Sample #	GC Characterization	Surr. Recovery
ES-2	The chromatogram indicates the presence of hydrocarbons in the gasoline (C7-C12) region and the heavy oil (C24) region.	110%
Method Blank	<20 ppm gasoline by HCID <50 ppm by diesel fuel HCID	110%

Date of Report: August 9, 1991
Samples Submitted: July 30, 1991
Lab Traveler: 07-079
Project: E5122-1 Blackstock

RESULTS OF DRY WEIGHT

Sample #	Matrix	Per Cent Moisture
HO-1		10%
HO-2		13%
HO-3		14%
WW 4'		15%
NW 4'		14%
EW 4'		7%
SW 4'		6%
ES1		13%
ES2		10%

Earth Consultants Inc.

Geotechnical Engineers, Geologists & Environmental Scientists

CHAIN OF CUSTODY RECORD

SHEET 1 OF 1

PROJECT: ES122-1

SAMPLERS: *(Signature)*

LAB NUMBER	DATE	TIME	SAMPLE TYPE: WATER	SEDIMENT	TISSUE	AIR	OIL	OTHER	NO. OF CONTAINERS	REMARKS
HO-1	7/30/91	1030		X					1	8015 Diesel
HO-2	7/30/91	1040		X					2	↓
HO-3	↓	1035		↓					2	↓
WW (4')		1130							1	8015/8020
NW (4')		1140							↓	↓
EW (4')		1135								
SW (4')		1132								
ES1		1045								
ES2	↓	1150		↓					↓	↓

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RELINQUISHED BY: *(Signature)*	**RECEIVED BY:** *(Signature)*	**DATE/TIME**
RELINQUISHED BY: *(Signature)*	**RECEIVED BY:** *(Signature)*	**DATE/TIME**
RELINQUISHED BY: *(Signature)* D. Clawson	**RECEIVED BY MOBILE LAB FOR FIELD ANALYSIS:** *(Signature)*	**DATE/TIME**
DISPATCHED BY: *(Signature)*	**DATE/TIME**	**RECEIVED FOR LABORATORY BY:** *(Signature)* [illegible] **DATE/TIME** 7/30
METHOD OF SHIPMENT:		

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One Copy - Survey Coordinator Field Files

Analytical Services, Inc.
12277 134th Court NE Redmond, Washington 98052
(206) 820-4551 (fax) 820-633712277

August 5, 1991

Ted Clawson
Earth Consultants, Inc.
1805 136th Place N.E.
Suite 101
Bellevue, WA 98005

Dear Ted:

Enclosed are the results of the analyses of samples submitted on August 1, 1991 from Project 5122-1/Blackstock.

Please note that in compliance with Washington DOE all soil samples will now be reported in dry weight concentrations.

We appreciate this opportunity to be of service to you on this project. If you have any questions regarding this report, please feel free to call me.

Sincerely,

Stephen J. Loague
Chemist

SJL:tmh

Enclosures

Date of Report: August 5, 1991
Samples Submitted: August 1, 1991
Lab Traveler: 08-002
Project: 5122-1/Blackstock

RESULTS OF ANALYSES OF ENVIRONMENTAL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS BY IR (EPA METHOD 418.1) Extracted Using EPA Method 3550

Sample #	Matrix	Dilution Factor	Total Petroleum Hydrocarbons (ppm)
BEW1 (4')	soil	5	110
BEW2 (4')	soil	5	25
BEW3 (4')	soil	5	170
BEW4 (4')	soil	5	<25
BPL5	soil	5	89
SP1	soil	5	44
SP2	soil	5	230
SP3	soil	5	230
NW SLAB	soil	500	22,000

Quality Assurance

Method Blank	5	<25
SP-2 Duplicate	5	210

Date of Report: August 8, 1991
Samples Submitted: August 1, 1991
Lab Traveler: 08-002
Project: 5122-1/Blackstock

HYDROCARBON INDENTIFICATION
BY METHOD WTPH-HCID

Sample #	GC Characterization	Surr. Recovery
SP3	The chromatogram indicates the presence of hydrocarbons in the heavy oils range (>C24).	120%
NW Slab	The chromatogram indicates the presence of hydrocarbons in the diesel range (C12-C24) and heavy oils range (>C24).	A
Method Blank	<20ppm gasoloine by WTPH-HCID <50ppm diesel fuel by WTPH-HCID	110%

A - Surrogate recovery data not available due to the presence of hydrocarbons in the heavy oil range.

Date of Report: August 5, 1991
Samples Submitted: August 1, 1991
Lab Traveler: 08-002
Project: 5122-1/Blackstock

RESULTS OF DRY WEIGHT

Sample #	Per Cent Moisture
BEW1 (4')	11%
BEW2 (4')	13%
BEW3 (4')	23%
BEW4 (4')	9%
BPL5	5%
SP1	12%
SP2	11%
SP3	9%
NW SLAB	13%

Earth Consultants Inc.

Geotechnical Engineers, Geologists & Environmental Scientists

CHAIN OF CUSTODY RECORD

SHEET 1 OF 1

PROJECT: 5122-2

SAMPLERS: (Signature) T. J. Clawson

LAB NUMBER	DATE	TIME	SAMPLE TYPE: WATER	SEDIMENT	TISSUE	AIR	OIL	OTHER	NO. OF CONTAINERS	REMARKS
BEW1 (4')	8/1/91	1050		X					1	418.1
BNW2 (4')		1100							2	
BWW3 (4')		1110							1	
BSW4 (4')		1115								
BPL 5		1120								
SP1		1125								
SP2		1127								
SP3		1130								
NW, slab		1155								

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RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature) T. J. Clawson	RECEIVED BY MOBILE LAB FOR FIELD ANALYSIS: (Signature)	DATE/TIME
DISPATCHED BY: (Signature) / DATE/TIME	RECEIVED FOR LABORATORY BY: (Signature)	DATE/TIME 8/1
METHOD OF SHIPMENT:		

Distribution: Original - Accompany Shipment
One Copy - Survey Coordinator Field Files

August 13, 1991

Ted Clawson, Project Manager
Earth Consultants, Inc.
1805 136th Place N.E.
Suite 101
Bellevue, WA 98005

Dear Ted:

Enclosed are the results of the analyses of samples submitted on August 6, 1991 from Project Blackstock 5122-2.

Please note that in compliance with Washington DOE all soil samples will now be reported in dry weight concentrations.

We appreciate this opportunity to be of service to you on this project. If you have any questions regarding this report, please feel free to call me.

Sincerely,

Stephen J. Loague
Chemist

SJL:tmh

Enclosures

Analytical Services, Inc. (206) 820-4551 (fax) 820-6337
12277 134th Court NE Redmond, Washington 98052

Date of Report: August 13, 1991
Samples Submitted: August 6, 1991
Lab Traveler: 08-022
Project: Blackstock 5122-2

RESULTS OF ANALYSES OF ENVIRONMENTAL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS BY IR (EPA METHOD 418.1) (Sonication Extraction)

Sample #	Matrix	Dilution Factor	Total Petroleum Hydrocarbons (ppm)
T5E	Soil	5	420
T5N	Soil	5	100
T5W	Soil	5	<25
T5S	Soil	5	<25
SS1	Soil	5	150
SS2	Soil	5	170
SS3	Soil	5	44
T4WW	Soil	5	150
Quality Assurance			
Method Blank		5	<25
08-033-2	Soil	5	180
08-033-2 (Duplicate)	Soil	5	190

Date of Report: August 13, 1991
Samples Submitted: August 6, 1991
Lab Traveler: 08-022
Project: Blackstock 5122-2

RESULTS OF DRY WEIGHT

Sample #	Moisture
T5E	7%
T5N	8%
T5W	1%
T5S	2%
SS1	11%
SS2	11%
SS3	14%
T4WW	12%

08-022

Earth Consultants Inc.

Geotechnical Engineers, Geologists & Environmental Scientists

CHAIN OF CUSTODY RECORD

SHEET 1 OF 1

PROJECT			SAMPLERS: (Signature)								
Blackstock 5122-2			T. Lawson								
LAB NUMBER	DATE	TIME	SAMPLE TYPE						NO. OF CONTAINERS	REMARKS	
			WATER	SEDIMENT	TISSUE	AIR	OIL	OTHER			
-1 T5E	8/6/91	1110		X					1	418.1	
-2 T5N		1115									
-3 T5W		1117									
-4 T5S		1120									
-5 SS1		1130									
-6 SS2		1135									
-7 SS3		1140									
-8 T4WW		1200									

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature) T. Lawson	RECEIVED BY MOBILE LAB FOR FIELD ANALYSIS: (Signature)	DATE/TIME
DISPATCHED BY: (Signature) / DATE/TIME	RECEIVED FOR LABORATORY BY: (Signature)	DATE/TIME 8/6 1:50
METHOD OF SHIPMENT:		

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One Copy - Survey Coordinator Field Files

August 13, 1991

Ted Clawson, Project Manager
Earth Consultants, Inc.
1805 136th Place N.E.
Suite 101
Bellevue, WA 98005

Dear Ted:

Enclosed are the results of the analyses of samples submitted on August 8, 1991 from Project 5122-2 Blackstock.

Please note that in compliance with Washington DOE all soil samples will now be reported in dry weight concentrations.

We appreciate this opportunity to be of service to you on this project. If you have any questions regarding this report, please feel free to call me.

Sincerely,

Stephen J. Loague
Chemist

SJL:tmh

Enclosures

Analytical Services, Inc. (206) 820-4551 (fax) 820-6337
12277 134th Court NE Redmond, Washington 98052

Date of Report: August 13, 1991
Samples Submitted: August 8, 1991
Lab Traveler: 08-033
Project: 5122-2 Blackstock

RESULTS OF ANALYSES OF ENVIRONMENTAL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS BY IR (EPA METHOD 418.1) (Sonication Extraction)

Sample #	Matrix	Dilution Factor	Total Petroleum Hydrocarbons (ppm)
SP-4	Soil	5	380
SP-5	Soil	5	210
SP-6	Soil	5	220
Quality Assurance			
Method Blank		5	30
08-044-4	Soil	5	97
08-044-4 (Duplicate)	Soil	5	71

Date of Report: August 13, 1991
Samples Submitted: August 8, 1991
Lab Traveler: 08-033
Project: 5122-2 Blackstock

RESULTS OF DRY WEIGHT

Sample #	Moisture
SP-4	3%
SP-5	5%
SP-6	9%

08-033

Earth Consultants Inc.

Geotechnical Engineers, Geologists & Environmental Scientists

CHAIN OF CUSTODY RECORD

SHEET 1 OF 1

PROJECT	SAMPLERS: (Signature)
5122-2 Blackstock	T S Clawson

	LAB NUMBER	DATE	TIME	SAMPLE TYPE: WATER	SEDIMENT	TISSUE	AIR	OIL	OTHER	NO. OF CONTAINERS	REMARKS
-1	SP-4	8/8/91	1300		X					1	418.1
-2	SP-5	"	1302		"					1	"
-3	SP-6	"	1305		"					1	"

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature) T S Clawson	RECEIVED BY MOBILE LAB FOR FIELD ANALYSIS: (Signature)	DATE/TIME
DISPATCHED BY: (Signature) / DATE/TIME	RECEIVED FOR LABORATORY BY: (Signature) R J Brown	DATE/TIME 8/8/91 12:10PM
METHOD OF SHIPMENT:		

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Analytical Services, Inc.
12277 134th Court NE Redmond, Washington 98052
(206) 820-4551 (fax) 820-6337

October 4, 1991

Ted Clawson, Project Manager
Earth Consultants, Inc.
1805 136th Place N.E.
Suite 101
Bellevue, WA 98005

Dear Ted:

Enclosed are the results of the analyses of samples submitted on September 20, 1991 from Project 5122-2/Black Stock.

We appreciate this opportunity to be of service to you on this project. If you have any questions regarding this report, please feel free to call me.

Sincerely,

Stephen J. League
Senior Chemist

SJL:tmh

Enclosures

Date of Report: October 4, 1991
Samples Submitted: September 20, 1991
Lab Traveler: 09-061
Project: 5122-2/Black Stock

RESULTS OF ANALYSES OF ENVIRONMENTAL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS BY IR (EPA METHOD 418.1) (Extracted using EPA Method 3550)

Sample #	Matrix	Dilution Factor	Total Petroleum Hydrocarbons (ppm)
03	soil	50	6,100
04	soil	100	7,400
5	soil	100	8,600
Quality Assurance			
Method Blank			<25
04 (Duplicate)	soil	50	5,700

Data reported in dry weight concentrations.

Date of Report: October 4, 1991
Samples Submitted: September 20, 1991
Lab Traveler: 09-061
Project: 5122-2/Black Stock

HYDROCARBON INDENTIFICATION
BY METHOD WTPH-HCID

Sample #	GC Characterization	Surr. Recovery
03	Soil	
	The chromatogram indicates the presence of hydrocarbons in the Diesel Fuel range (C11-C24)	A
05	Soil	
	The chromatogram indicates the presence of hydrocarbons in the Diesel Fuel range(C11-C24), and in the Lubricant range(>C24).	A
Method Blank	<20 ppm Gasoline <40 ppm Diesel Fuel	100%

A-Surrogate recovery not reported due to interferences from sample.

Date of Report: October 4, 1991
Samples Submitted: September 20, 1991
Lab Traveler: 09-061
Project: 5122-2/Black Stock

RESULTS OF ANALYSES OF SAMPLES FOR DIESEL #2 BY MODIFIED EPA METHOD 8015

Sample #	Matrix	Dilution Factor	Diesel #2 (ppm)	Surrogate Recovery (%)
03	soil	20	8,500	A
04	soil	20	7,200	A
5	soil	40	6,500	A
Quality Assurance				
Method Blank			<40	110%
09-081-4	soil	2	<40	110%
09-081-4 (Duplicate)	soil	2	<40	110%
(Matrix Spike) Spiked @ 200 ppm Recovery			75%	110%
(M.S. Duplicate) Spiked @ 200 ppm Recovery			60%	110%

A-Surrogate recovery not calculated due top the necessary dilution of sample

Date of Report: October 4, 1991
Samples Submitted: September 20, 1991
Lab Traveler: 09-061
Project: 5122-2/Black Stock

ANALYSIS OF ENVIRONMENTAL SAMPLES
FOR VOLATILE COMPOUNDS
BY EPA METHOD 8240
Results Reported as ug/g (ppb)

Sample #:	S1	S2
Matrix	soil	soil
Chloromethane	<400	<400
Bromomethane	<400	<400
Vinyl Chloride	<400	<400
Chloroethane	<400	<400
Methylene Chloride	<200	<200
Acetone	<4,000	<4,000
Carbon Disulfide	<200	<200
1,1-Dichloroethene	<200	<200
1,1-Dichloroethane	<200	<200
1,2-Dichloroethene	<200	<200
Chloroform	<200	<200
1,2-Dichloroethane	<200	<200
2-Butanone	<1,000	<1,000
1,1,1-Trichloroethane	<200	<200
Carbon Tetrachloride	<200	<200
Vinyl Acetate	<1,000	<1,000
Bromodichloromethane	<200	<200
1,2-Dichloropropane	<200	<200
cis-1,3-Dichloropropene	<200	<200
Trichloroethene	<200	<200
Dibromochloromethane	<200	<200
1,1,2-Trichloroethane	<200	<200
Benzene	<200	<200
Trans-1,3-Dichloropropene	<200	<200
Bromoform	<200	<200
4-Methyl-2-Pentanone	<1,000	<1,000
2-Hexanone	<200	<200

Analysis performed by subcontract.

Date of Report: October 4, 1991
Samples Submitted: September 20, 1991
Lab Traveler: 09-061
Project: 5122-2/Black Stock

ANALYSIS OF ENVIRONMENTAL SAMPLES
FOR VOLATILE COMPOUNDS
BY EPA METHOD 8240
Results Reported as ug/g (ppb)

(Continued)

Sample #:	S1	S2
Matrix	soil	soil
Tetrachloroethene	<200	<200
1,1,2,2-Tetrachloroethane	<200	<200
Toluene	<200	<200
Chlorobenzene	<200	<200
Ethyl Benzene	<200	<200
Styrene	<200	<200
Total Xylenes	<200	<200

Quality Assurance

Surrogate Recovery

Toluene D8	92%	92%
Bromofluorobenzene	102%	104%
1,2-Dichloroethane D4	102%	103%

Analysis performed by subcontract.

Date of Report: October 4, 1991
Samples Submitted: September 20, 1991
Lab Traveler: 09-061
Project: 5122-2/Black Stock

RESULTS OF DRY WEIGHT

Sample #	Matrix	Moisture
03	soil	13%
04	soil	13%
5	soil	8%

09-061

Earth Consultants Inc.

Geotechnical Engineers, Geologists & Environmental Scientists

CHAIN OF CUSTODY RECORD

SHEET 1 OF 1

PROJECT: Blackstock 5122-2

SAMPLERS: (Signature) J. S. Lawson

LAB NUMBER	DATE	TIME	SAMPLE TYPE: WATER	SEDIMENT	TISSUE	AIR	OIL	OTHER	NO. OF CONTAINERS	REMARKS
S1	9/20/91	1030		X					1	8240
S2		1035								8240
03		1230				HCID				418.1
04		1235								
5		1300				HCID				

RELINQUISHED BY: (Signature)	**RECEIVED BY:** (Signature)	**DATE/TIME** 9/20/91 1430
RELINQUISHED BY: (Signature)	**RECEIVED BY:** (Signature)	**DATE/TIME**
RELINQUISHED BY: (Signature)	**RECEIVED BY:** (Signature)	**DATE/TIME**
RELINQUISHED BY: (Signature) J. S. Lawson	**RECEIVED BY MOBILE LAB FOR FIELD ANALYSIS:** (Signature)	**DATE/TIME**
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Analytical Services, Inc.
12277 134th Court NE Redmond, Washington 98052
(206) 820-4551 (fax) 820-6337

October 1, 1991

Ted Clawson, Project Manager
Earth Consultants, Inc.
1805 136th Place N.E.
Suite 101
Bellevue, WA 98005

Dear Ted:

Enclosed are the results of the analyses of samples submitted on September September 23, 1991 from Project 5122-2/Black stock.

We appreciate this opportunity to be of service to you on this project. If you have any questions regarding this report, please feel free to call me.

Sincerely,

Stephen J. Loague
Senior Chemist

SJL:tmh

Enclosures

Date of Report: October 1, 1991
Samples Submitted: September September 23, 1991
Lab Traveler: 09-068
Project: 5122-2/Black stock

RESULTS OF ANALYSES OF ENVIRONMENTAL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS BY IR (EPA METHOD 418.1) (Extracted using EPA Method 3550)

Sample #	Matrix	Dilution Factor	Total Petroleum Hydrocarbons (ppm)
SS1-1	soil	5	260
SS1-2	soil	5	290
SS1-3	soil	5	160
SS1-4	soil	5	170
SS1-5	soil	5	370
SS1-6	soil	5	330
Quality Assurance			
Method Blank		5	<25
SS1-3 (Duplicate)	soil	5	200

*Data reported in dry weight concentrations.

Date of Report: October 15, 1991
Samples Submitted: October 3, 1991
Lab Traveler: 10-013
Project: 5122-2/Blackstock

RESULTS OF ANALYSES OF ENVIRONMENTAL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS BY IR (EPA METHOD 418.1) (Extracted using EPA Method 3550)

Sample #	Matrix	Dilution Factor	Total Petroleum Hydrocarbons (ppm)
OE-1	Soil	5	150
OE-4	Soil	5	210
OE-5	Soil	5	270
Quality Assurance			
Method Blank			<25
OE-4 (Duplicate)	Soil	5	160

All data in dry weight concentrations.

Date of Report: October 15, 1991
Samples Submitted: October 3, 1991
Lab Traveler: 10-013
Project: 5122-2/Blackstock

RESULTS OF DRY WEIGHT

Sample #	Matrix	Moisture
OE-1	Soil	7%
OE-2	Soil	2%
OE-3	Soil	3%
OE-4	Soil	6%
OE-5	Soil	5%
OE-6	Soil	4%
OE-7	Soil	3%
OE-8	Soil	14%
OES-1	Soil	8%
OES-2	Soil	6%
OES-3	Soil	9%

Earth Consultants Inc.

Geotechnical Engineers, Geologists & Environmental Scientists

CHAIN OF CUSTODY RECORD

SHEET 1 OF 1

PROJECT			SAMPLERS: (Signature)								
Blackstock 5122-2			T J Clawson								
LAB NUMBER	DATE	TIME	SAMPLE TYPE						NO. OF CONTAINERS	REMARKS	
			WATER	SEDIMENT	TISSUE	AIR	OIL	OTHER			
OE 1	10/3/91	1135		X					1	8015 Diesel	
OE 2		1145									
OE 3		1147									
OE 4		1156									
OE 5		1207									
OE 6		1213									
OE 7		1220									
OE 8		1225								BTEX	ON OE8
OES 1		1230									
OES 2		1235									
OES 3		1240									

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
T J Clawson	ASI	10/3/91 2:40 PM
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY MOBILE LAB FOR FIELD ANALYSIS: (Signature)	DATE/TIME
DISPATCHED BY: (Signature) / DATE/TIME	RECEIVED FOR LABORATORY BY: (Signature)	DATE/TIME
METHOD OF SHIPMENT:		

Distribution: Original - Accompany Shipment
One Copy - Survey Coordinator Field Files

Analytical Services, Inc.
12277 134th Court NE Redmond, Washington 98052
(206) 820-4551 (fax) 820-6337

October 23, 1991

Ted Clawson, Project Manager
Earth Consultants, Inc.
1805 136th Place N.E.
Suite 101
Bellevue, WA 98005

Dear Ted:

Enclosed are the results of the analyses of sample submitted on October 17, 1991 from Project 5122-2/Blackstock.

We appreciate this opportunity to be of service to you on this project. If you have any questions regarding this report, please feel free to call me.

Sincerely,

Cynthia L. Rezania
Senior Chemist

CLR:tmh

Enclosures

Date of Report: October 23, 1991
Sample Submitted: October 17, 1991
Lab Traveler: 10-074
Project: 5122-2/Blackstock

RESULTS OF ANALYSES OF ENVIRONMENTAL SAMPLE FOR TOTAL PETROLEUM HYDROCARBONS BY IR (EPA METHOD 418.1) (Extracted using EPA Method 3550)

Sample #	Matrix	Dilution Factor	Total Petroleum Hydrocarbons (ppm)
Pit	Water	2,000	30,000[A]

Quality Assurance

Method Blank			<0.5
Pit (Duplicate)	Water	100	7,300[A]

A-High sample duplicate relative percent difference due to free product in the sample.

Date of Report: October 23, 1991
Sample Submitted: October 17, 1991
Lab Traveler: 10-074
Project: 5122-2/Blackstock

RESULTS OF ANALYSES OF SAMPLE FOR DIESEL #2 BY MODIFIED EPA METHOD 8015

Sample #	Matrix	Dilution Factor	Diesel #2 (ppm)
Pit	Soil	40	2,700

Quality Assurance

Method Blank			<0.8
10-059-1	Water	0.04	<0.8
10-059-1 (Duplicate)	Water	0.04	<0.8

10-074

Earth Consultants Inc.

Geotechnical Engineers, Geologists & Environmental Scientists

CHAIN OF CUSTODY RECORD

SHEET 1 OF 1

PROJECT: Blackstock 5122-2

SAMPLERS: (Signature) T J Lawson

LAB NUMBER	DATE	TIME	SAMPLE TYPE: WATER	SEDIMENT	TISSUE	AIR	OIL	OTHER	NO OF CONTAINERS	REMARKS
-1a,b Pit	10/17/91	1110	X						2	8015 Diesel
										418.1

RELINQUISHED BY: (Signature) T J Lawson	RECEIVED BY: (Signature) R J Brown	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY MOBILE LAB FOR FIELD ANALYSIS: (Signature)	DATE/TIME
DISPATCHED BY: (Signature)	DATE/TIME	RECEIVED FOR LABORATORY BY: (Signature) R J Brown — DATE/TIME 10/17 11:55 AM
METHOD OF SHIPMENT:		

Distribution: Original - Accompany Shipment
One Copy - Survey Coordinator Field Files

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 • Bothell, WA 98011-2569
Phone (206) 481-9200 • FAX (206) 485-2992

Earth Consultants Inc.	Client Project ID:	Blackstock 5122-2		
1805 136th Place N.E., Suite 101	Matrix:	Soil		
Bellevue, WA 98005	Analysis for:	Total Solids	Received:	Oct 28, 1991
Attention: Ted Clawson	First Sample #:	110-1077	Reported:	Nov 4, 1991

LABORATORY ANALYSIS FOR: Total Solids

Sample Number	Sample Description	Sample Result %
110-1077	Excavated Soil	96

rth Creek Analytical routinely provides analytical results for soils, sediments or sludges in a wet weight "as received" basis. To attain dry weight equivalents for regulatory compliance, divide the soil result by the decimal fraction of percent solids.

ORTH CREEK ANALYTICAL

Cocanour
Laboratory Director

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 • Bothell, WA 98011-2569
Phone (206) 481-9200 • FAX (206) 485-2992

Earth Consultants Inc.	Client Project ID:	Blackstock 5122-2	Sampled:	Oct 28, 1991
1805 136th Place N.E., Suite 101	Sample Descript:	Soil, Excavated Soil	Received:	Oct 28, 1991
Bellevue, WA 98005	Analysis Method:	EPA 8100	Extracted:	Oct 29, 1991
Attention: Ted Clawson	Lab Number:	110-1077	Analyzed:	Nov 1, 1991
			Reported:	Nov 4, 1991

POLYNUCLEAR AROMATIC HYDROCARBONS (EPA 8100)

Analyte	Detection Limit mg/kg (ppm)	Sample Results mg/kg (ppm)
Acenaphthene	5.0	N.D.
Acenaphthylene	5.0	N.D.
Anthracene	5.0	N.D.
Benzo (a) anthracene	5.0	N.D.
Benzo (a) pyrene	5.0	N.D.
Benzo (b) fluoranthene	5.0	N.D.
Benzo (ghi) perylene	5.0	N.D.
Benzo (k) fluoranthene	5.0	N.D.
Chrysene	5.0	N.D.
Dibenzo (a,h) anthracene	5.0	N.D.
Fluoranthene	5.0	N.D.
Fluorene	5.0	N.D.
Indeno (1,2,3-cd) pyrene	5.0	N.D.
Naphthalene	5.0	N.D.
Phenanthrene	5.0	N.D.
Pyrene	5.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

Please Note:
The detection limit shown is the best attainable using EPA 8100. Lower detection limit's may be reached by alternate methods such as EPA 8310 or 8270.

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Earth Consultants Inc.	Client Project ID:	Blackstock 5122-2		
1805 136th Place N.E., Suite 101	Sample Descript:	Method Blank		
Bellevue, WA 98005	Analysis Method:	EPA 8100	Extracted:	Oct 29, 1991
Attention: Ted Clawson	Lab Number:	BLK102991	Analyzed:	Nov 1, 1991
			Reported:	Nov 4, 1991

POLYNUCLEAR AROMATIC HYDROCARBONS (EPA 8100)

Analyte	Detection Limit mg/kg (ppm)	Sample Results mg/kg (ppm)
Acenaphthene	0.50	N.D.
Acenaphthylene	0.50	N.D.
Anthracene	1.0	N.D.
Benzo (a) anthracene	0.50	N.D.
Benzo (a) pyrene	0.50	N.D.
Benzo (b) fluoranthene	1.0	N.D.
Benzo (ghi) perylene	1.0	N.D.
Benzo (k) fluoranthene	1.0	N.D.
Chrysene	0.50	N.D.
Dibenzo (a,h) anthracene	1.0	N.D.
Fluoranthene	0.50	N.D.
Fluorene	0.50	N.D.
Indeno (1,2,3-cd) pyrene	1.0	N.D.
Naphthalene	0.50	N.D.
Phenanthrene	0.50	N.D.
Pyrene	0.50	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

NORTH CREEK ANALYTICAL

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Phone (206) 481-9200 • FAX (206) 485-2992

Earth Consultants Inc.	Client Project ID: Blackstock 5122-2	Analyst :	S. Kouri
1805 136th Place N.E., Suite 101	Method : EPA 8100		
Bellevue, WA 98005	Sample Matrix : Soil	Extracted:	Oct 29, 1991
Attention: Ted Clawson	Units : µg/kg	Analyzed:	Nov 1, 1991
	QC Sample #: BLK102991	Reported:	Nov 4, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Napthalene	Acenapthene	Chrysene
Sample Conc.:	N.D.	N.D.	N.D.
Spike Conc. Added:	667	667	667
Conc. Matrix Spike:	533	567	499
Matrix Spike % Recovery:	80	85	75
Conc. Matrix Spike Dup.:	456	492	468
Matrix Spike Duplicate % Recovery:	68	74	70
Relative % Difference:	16	14	6.0

NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

23 pt

Earth Consultants Inc.

Geotechnical Engineers, Geologists & Environmental Scientists

CHAIN OF CUSTODY RECORD

SHEET 1 OF 1

2-3 DAY Turnaround

PROJECT: Blackstock 5122-2

SAMPLERS: (Signature) J. Clawson

LAB NUMBER	DATE	TIME	SAMPLE TYPE: WATER	SEDIMENT	TISSUE	AIR	OIL	OTHER	NO. OF CONTAINERS	REMARKS
c·077 Excavated Soil	10/28/91	1225		X					2	
										Composite and Analyze for PAH EPA 8100

RELINQUISHED BY: (Signature)	**RECEIVED BY:** (Signature)	**DATE/TIME**
RELINQUISHED BY: (Signature)	**RECEIVED BY:** (Signature)	**DATE/TIME**
RELINQUISHED BY: (Signature)	**RECEIVED BY:** (Signature)	**DATE/TIME**
RELINQUISHED BY: (Signature) J. Clawson	**RECEIVED BY MOBILE LAB FOR FIELD ANALYSIS:** (Signature)	**DATE/TIME**
DISPATCHED BY: (Signature)	**DATE/TIME**	**RECEIVED FOR LABORATORY BY:** (Signature) Kuehe — **DATE/TIME** 10/28 1:15
METHOD OF SHIPMENT:		

Distribution: Original - Accompany Shipment
One Copy - Survey Coordinator Field Files

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 • Bothell, WA 98011
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Earth Consultants Inc.	Client Project ID:	Not Provided	Sampled:	Aug 15, 1991
1805 136th Place N.E., Suite 101	Matrix Descript:	Water	Received:	Aug 15, 1991
Bellevue, WA 98005	Analysis Method:	EPA 418.1 (I.R. with clean-up)	Extracted:	Aug 19, 1991
Attention: Ted Clawson	First Sample #:	108-0745	Analyzed:	Aug 19, 1991
			Reported:	Aug 20, 1991

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Sample Number	Sample Description	Petroleum Oil mg/L (ppm)
108-0745	MW-1	N.D.
108-0746	MW-2	N.D.
BLK081991	Method Blank	N.D.

Detection Limits:	**1.0**

Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 • Bothell, WA 98011
Phone (206) 481-9200 • FAX (206) 485-2992

Earth Consultants Inc.	Client Project ID:	Not Provided	Sampled:	Aug 15, 1991
1805 136th Place N.E., Suite 101	Matrix Descript:	Water	Received:	Aug 15, 1991
Bellevue, WA 98005	Analysis Method:	EPA 5030/8015/8020	Analyzed:	Aug 19, 1991
Attention: Ted Clawson	First Sample #:	108-0745	Reported:	Aug 20, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION

Sample Number	Sample Description	Purgeable Hydrocarbons µg/L (ppb)	Benzene µg/L (ppb)	Toluene µg/L (ppb)	Ethyl Benzene µg/L (ppb)	Xylenes µg/L (ppb)	Surrogate Recovery %
108-0745	MW-1	N.D.	2.7	0.98	N.D.	2.1	103
BLK081991	Method Blank	N.D.	N.D.	N.D.	N.D.	N.D.	96
Detection Limits:		**50**	**0.50**	**0.50**	**0.50**	**0.50**	

Purgeable Hydrocarbons are quantitated against a gasoline standard (nC5 - nC14). Surrogate recovery reported is for Bromofluorobenzene.
Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

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18939 120th Avenue N.E., Suite 101 · Bothell, WA 98011
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Earth Consultants Inc.	Client Project ID: Not Provided	Analyst : J. Kimball
1805 136th Place N.E., Suite 101	Method : EPA 418.1	
Bellevue, WA 98005	Sample Matrix : Water	Extracted: Aug 19, 1991
Attention: Ted Clawson	Units : mg/L	Analyzed: Aug 19, 1991
	QC Sample #: BLK081991	Reported: Aug 20, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Petroleum Oil
Sample Conc.:	N.D.
Spike Conc. Added:	15.6
Conc. Matrix Spike:	14.4
Matrix Spike % Recovery:	92
Conc. Matrix Spike Dup.:	14.4
Matrix Spike Duplicate % Recovery:	92
Relative % Difference:	0

NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

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Earth Consultants Inc.
1805 136th Place N.E., Suite 101
Bellevue, WA 98005
Attention: Ted Clawson

Client Project ID: Not Provided
Method : EPA 8020
Sample Matrix : Water
Units : µg/L
QC Sample #: 108-0808

Analyst : R. Lister

Analyzed: Aug 19, 1991
Reported: Aug 20, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	5.0	5.0	5.0	15.0
Conc. Matrix Spike:	4..2	4.4	4.6	13.6
Matrix Spike % Recovery:	84	88	92	91
Conc. Matrix Spike Dup.:	4.2	4.2	4.4	13.0
Matrix Spike Duplicate % Recovery:	84	84	88	87
Relative % Difference:	0	4.6	4.4	4.5

NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

% Recovery:	$\frac{\text{Conc. of M.S. - Conc. of Sample}}{\text{Spike Conc. Added}}$	x 100
Relative % Difference:	$\frac{\text{Conc. of M.S. - Conc. of M.S.D.}}{\text{(Conc. of M.S. + Conc. of M.S.D.) / 2}}$	x 100

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Box 9
pf

Earth Consultants Inc.

Geotechnical Engineers, Geologists & Environmental Scientists

CHAIN OF CUSTODY RECORD

SHEET 1 OF 1

3-5 day Turnaround

PROJECT			SAMPLERS: *(Signature)*							
LAB NUMBER	DATE	TIME	SAMPLE TYPE						NO. OF CONTAINERS	REMARKS
			WATER	SEDIMENT	TISSUE	AIR	OIL	OTHER		
MW-1	8/15/91	0900	X		1080745				3	8015/8020 418.1
MW-2	8/15/91	1040	X		1080746				1	418.1

RELINQUISHED BY: *(Signature)*	RECEIVED BY: *(Signature)*	DATE/TIME
RELINQUISHED BY: *(Signature)*	RECEIVED BY: *(Signature)*	DATE/TIME
RELINQUISHED BY: *(Signature)*	RECEIVED BY: *(Signature)*	DATE/TIME
RELINQUISHED BY: *(Signature)* T.J. Clawson	RECEIVED BY MOBILE LAB FOR FIELD ANALYSIS: *(Signature)*	DATE/TIME
DISPATCHED BY: *(Signature)* / DATE/TIME	RECEIVED FOR LABORATORY BY: *(Signature)*	DATE/TIME 8/15 12:40
METHOD OF SHIPMENT:		

Distribution: Original - Accompany Shipment

DISTRIBUTION

E-5122-2

4 Copies

Blackstock Lumber Company, Inc.
1039 Elliott Avenue West
Seattle, Washington 98119

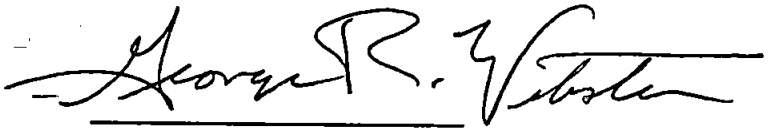
Attention: Mr. Jim Blackstock

1 Copies

Armada/Lagerquist Company
2001 Sixth Avenue, Suite 3202
Seattle, Washington 98121

Attention: Mr. Jim Lagerquist

Reviewed by:



George R. Webster, P. E.
Manager, Environmental Services

MLP/GW/kml
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