PTI
ENVIRONMENTAL SERVICES

15375 SE 30th Place, Suite 250
Bellevue, Washington 98007
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008923

December 12, 1996

Ms. Judith Aitkin
Ms. Elaine Atkinson
Washington State Department of Ecology
3190 160th Avenue SE
Bellevue, Washington 98008-5452

Subject: Results of Sediment Sampling Near the Seawall Repair Project in Evergreen Park
PTI Contract CA5Q-06-05

Dear Ms. Aitkin and Ms. Atkinson:

On behalf of Failure Analysis Associates and the City of Bremerton (the City), PTI Environmental Services (PTI) is submitting this letter report to document the results of sediment sampling performed to support the Evergreen Park seawall restoration project in Bremerton, Washington. Provided as attachments to this letter are:

- Figure 1. Location of Evergreen Park, Bremerton, Washington
- Figure 2. Sediment station location map
- Table 1. Acid/base/neutral (ABN) compound analytical results
- Table 2. Conventional parameter analytical results
- Table 3. Petroleum hydrocarbon compound analytical results
- Copies of laboratory analytical data reports.

INTRODUCTION

Evergreen Park is located in Bremerton, Washington (Figure 1), between 14th Street on the south, Park Drive on the north, Park Avenue to the west, and the Port Washington Narrows to the east (Figure 2). Specifically, the offshore area associated with the seawall in the northeastern corner of the park was addressed in this investigation. The upland portion associated with this corner of the park has confirmed petroleum hydrocarbon compound contamination of subsurface soils. The seawall will be repaired under Phase I of the City's

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INTRODUCTION

Evergreen Park is located in Bremerton, Washington (Figure 1), between 14th Street on the south, Park Drive on the north, Park Avenue to the west, and the Port Washington Narrows to the east (Figure 2). Specifically, the offshore area associated with the seawall in the northeastern corner of the park was addressed in this investigation. The upland portion associated with this corner of the park has confirmed petroleum hydrocarbon compound contamination of subsurface soils. The seawall will be repaired under Phase I of the City's

park redevelopment project. The scope of the repair project includes improving the seawall structure, removing existing concrete debris on the shoreline, and placing stairways to provide egress from the beach. The Washington State Department of Ecology (Ecology) requested that three sediment samples (the minimum number required for designation of a station cluster) be collected along the beach to confirm the absence of contamination in the vicinity of the seawall.

FIELD INVESTIGATION METHODS

On Thursday, October 3, 1996, Greg Bawden and Sherrill Doran of PTI arrived onsite and inspected the seawall area. Three stations were chosen along the beach offshore from the locations of the previous subsurface boreholes. These stations were spaced approximately equidistantly along the seawall. However, as a results of tidal conditions (i.e., low tide was recorded at 6.2 ft below mean lower low water), exposed sediment was accessible only in small areas between the boulders and concrete debris that comprise the seawall. Station locations were moved slightly from the previously selected points to these accessible areas. Actual sample locations were documented by direct measurement (i.e., measuring from known, permanent markers) and are shown in Figure 2. Field personnel noted an eddy that suggested the possible presence of a storm water outfall. The eddy was located approximately 30 ft offshore from the seawall and approximately 10 ft northwest along the shore from station EPSED03.

Three intertidal sediment samples were collected during low tide within 5 ft of the existing seawall. All sediments were sampled in accordance with standard methods used by U.S. EPA (1986). All sampling utensils (i.e., stainless steel scoops and bowls) were rinsed with distilled water, scrubbed with Alconox® detergent, and sequentially rinsed with distilled water, acetone, hexane, and laboratory-grade distilled de-ionized water before sampling. One set of decontaminated bowls and scoops was allocated to each sampling station. Sampling personnel also wore new nitrile gloves at each sampling station.

At each station, three sediment grab samples were collected from the upper 0–10 cm of the sediment surface using stainless steel scoops. After collection, the three grab samples from a given station were composited in a stainless steel bowl to achieve uniform texture and color. Descriptions of the composite sediment were noted in a field logbook. Sediments were fairly uniform coarse sands and gravels with shell fragments and small pieces of debris. No odors or obvious contamination were noted in any of the samples collected. All stations were exposed to asphalt that had sloughed off of the seawall. Although care was taken to discard pieces of asphalt that were large enough to see, some asphalt fragments may have been indistinguishable from coarse sands and gravels. Sediment was transferred from the stainless steel bowl to precleaned glass containers with Teflon®-lined lids. Samples were stored on ice at 4°C and delivered via an overnight delivery service to Columbia Analytical Service laboratory in Kelso, Washington, within 48 hours from sample collection.

All three shallow sediment samples were submitted for analysis of ABN compounds according to Ecology-recommended protocols using EPA Method 8270. Based on confirmed diesel and heavy oil contamination of soil in the adjacent upland portion of the site, samples were also submitted for petroleum quantification using Method WTPH-D extended. Samples were also analyzed for grain size, total organic carbon (TOC), and percent solids. As a result of the relatively low levels of upland contamination and the swift offshore currents, toxicity testing was not considered necessary during this phase of the investigation.

RESULTS

All ABN compounds were undetected at standard method detection limits (MDLs). All ABN results are reported on an organic carbon-normalized basis, and because of the very low organic content of the samples (i.e., 25 to 30 percent TOC), some of the organic carbon-normalized detection limits were slightly above Washington State sediment quality standards (SQS). These standards represent regulatory goals established by WAC 173-204-300 through 173-204-340 that define numerical criteria for sediment contaminant concentrations. SQS represent the lowest concentrations that result in no adverse affects to biological resources in Puget Sound sediments. All ABN analytical results are compared to the SQS in Table 1. Conventional sediment parameters are summarized in Table 2.

At all three stations, diesel-range petroleum hydrocarbon compounds were undetected at an MDL of 25 mg/kg. At stations EPSED01, EPSED02, and EPSED03, petroleum hydrocarbon compounds as heavy oil were detected at 92.2 mg/kg, 180 mg/kg, and 81.3 mg/kg, respectively. Although there are no SQS for petroleum hydrocarbon compounds, all of these concentrations are below the Model Toxics Control Act (MTCA) Method A cleanup standard (200 mg/kg for heavy oil). Petroleum hydrocarbon compound results are compared to MTCA Method A cleanup standards in Table 3.

QUALITY ASSURANCE AND QUALITY CONTROL

The overall quality of the data reported by the laboratory for the analyses requested is acceptable. Data quality was assessed by reviewing the laboratory case narratives, which summarize the results of analytical quality control measurements for each sample delivery group. The performance of the analytical instruments used for the analysis of ABNs, petroleum hydrocarbon compounds and TOC were evaluated in terms of the percent relative standard deviation for initial calibrations and the percent difference for continuing calibrations. Results reported for method blanks (ABNs, petroleum hydrocarbon compounds, and TOC) were reviewed to determine if target analytes reported as detected in the samples were potentially attributed to contamination that may have be introduced at the laboratory. Analytical accuracy was quantified as the recovery of matrix spike and laboratory control sample

(blank spike) analyses for all target analytes except total solids and grain size distribution. Extraction efficiency was quantified as the recovery of surrogate compound recoveries reported for ABN and petroleum hydrocarbon compound analyses. Analytical precision was quantified as the relative percent difference (RPD) between duplicate sample analyses for TOC and total solids analyses and the relative standard deviation between triplicate sample analyses for grain size distribution determinations. Analytical precision for the ABN and petroleum hydrocarbon compound analyses was quantified as the RPD between duplicate matrix spikes.

The control limits for initial and continuing calibration matrix spike recoveries, laboratory control sample recoveries, surrogate compound recoveries, and duplicate and triplicate sample analyses were not exceeded, with three exceptions. The control limit for the percent difference for continuing calibration was not exceeded for di-*n*-butylphthalate; however, no data were qualified for this exceedance because the analyte was not detected in one sample and was restated as undetected in two samples as a result of method blank contamination. The matrix spike duplicate recovery and the RPD between the matrix spike and matrix spike duplicate recovery for pentachlorophenol exceeded the respective control limits. However, no data were qualified on the basis of the matrix spike duplicate recovery and RPD because all other quality control measurements for pentachlorophenol used to determine accuracy (matrix spike, laboratory control sample, and surrogate recoveries) were acceptable.

The only target analytes detected in the method blanks included bis(2-ethylhexyl)phthalate and di-*n*-butylphthalate. Bis(2-ethylhexyl)phthalate was detected in all three samples and di-*n*-butylphthalate was detected in samples EPSED02 and EPSED03. These five results were restated as undetected at the concentrations reported by the laboratory because they were at concentrations of less than five times the concentrations found in the method blank.

The detection of diesel–range petroleum hydrocarbon compounds in sample EPSED02 was assigned an "*O*" qualifier by the laboratory to indicate the sample contained an oil component that partially eluted in the diesel range. The sample chromatograms were compared to standard chromatograms during the quality assurance review. Comparison of the chromatograms indicated that diesel–range petroleum hydrocarbon compounds were not present in sample EPSED02; therefore, this result was restated as undetected at the method reporting limit and assigned a *U* qualifier.

Review of sample and standard chromatograms indicated that oil–range petroleum hydrocarbon compounds were present in samples EPSED01 and EPSED03. Although the laboratory correctly reported results for these compounds as undetected at the method reporting limit, the concentrations of the oil–range petroleum hydrocarbon compounds were above the estimated method detection limit. During the quality assurance review, the undetected results reported by the laboratory for oil–range petroleum hydrocarbon compounds were restated as detected at the concentrations indicated on the instrument quantitation reports and qualified

as estimated (*J*). These results were qualified as estimated because the concentrations are above the estimated method detection limit but below the method reporting limit.

The laboratory quantified the presence of oil–range petroleum hydrocarbon compounds using a 10W-30 motor oil. It was noted in the field sampling notebook that large and small pieces of asphalt were mixed in with the sediment at all sampling locations. Although large pieces of asphalt were discarded during sampling, small pieces of asphalt were unavoidably included with the sediment collected. Asphalt yields a chromatogram very similar to that of oil. Because the samples likely contained small pieces of asphalt, the oil–range petroleum hydrocarbon compound identified in the samples may have been the result of asphalt and not of oil. In addition, if the oil–range petroleum hydrocarbon compounds are attributable to asphalt and not oil, the reported concentrations may be biased either low or high.

CONCLUSIONS

Based on the results of the sediment investigation, the shoreline associated with the seawall area does not appear to have been significantly impacted by upland contamination. There were no ABN compounds detected at concentrations above the SQS. The presence of low levels of oil-range petroleum hydrocarbon compounds may be indicative of asphalt-related interference during sample collection, and the concentrations of these compounds were below MTCA Method A cleanup standards for heavy oil. No further investigation is warranted in this portion of Evergreen Park.

If you have any questions about this investigation or report, please do not hesitate to contact me at (206) 643-9803.

Sincerely,

Shawn R. T. Severn

Shawn R.T. Severn, Ph.D.
Principal Scientist

REFERENCES

U.S. EPA. 1986. General QA/QC considerations for collecting environmental samples in Puget Sound. U.S. Environmental Protection Agency, Region 10, Office of Puget Sound, Puget Sound Estuary Program, Seattle, WA.

Figures

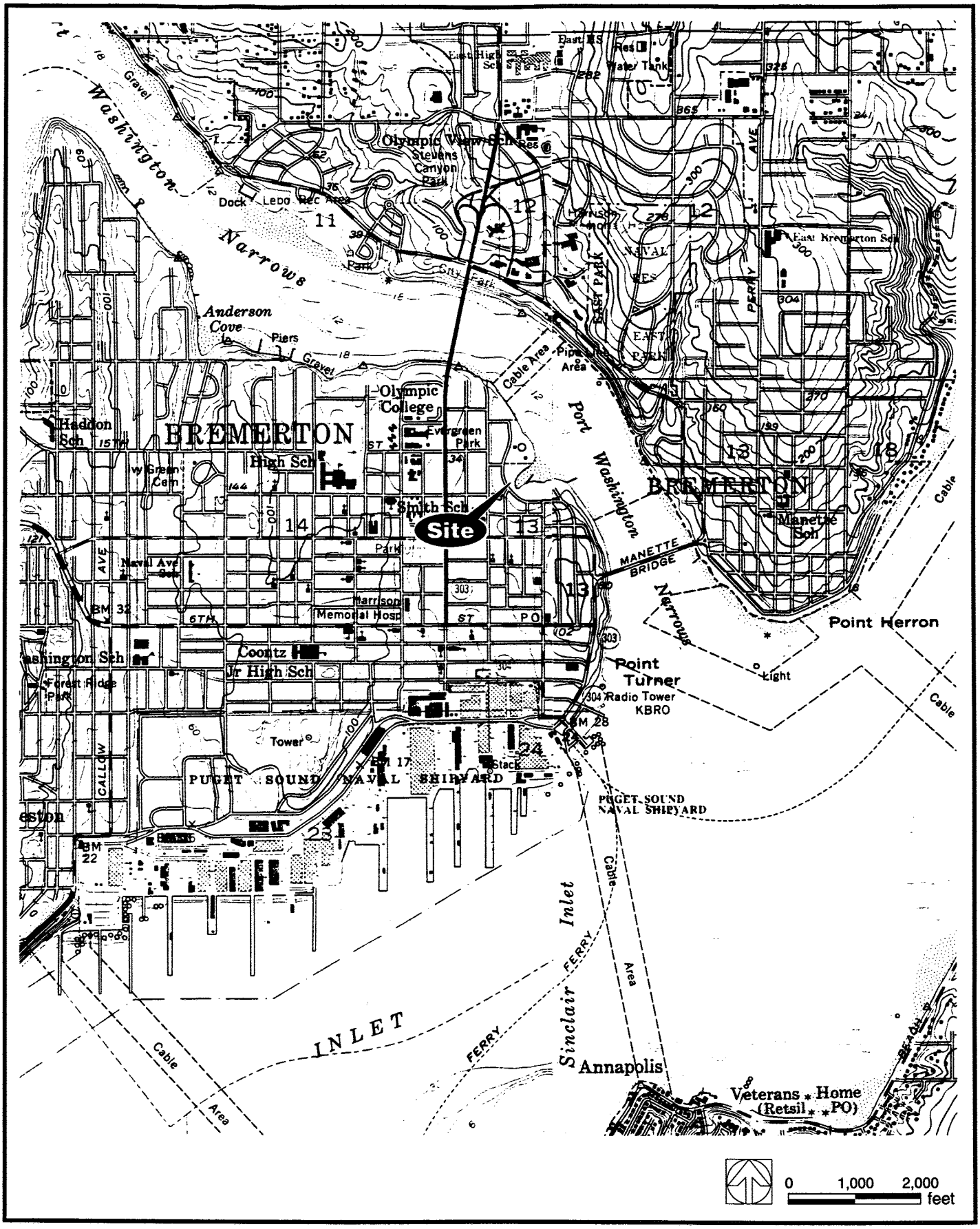

Figure 1. Location of Evergreen Park, Bremerton, Washington.

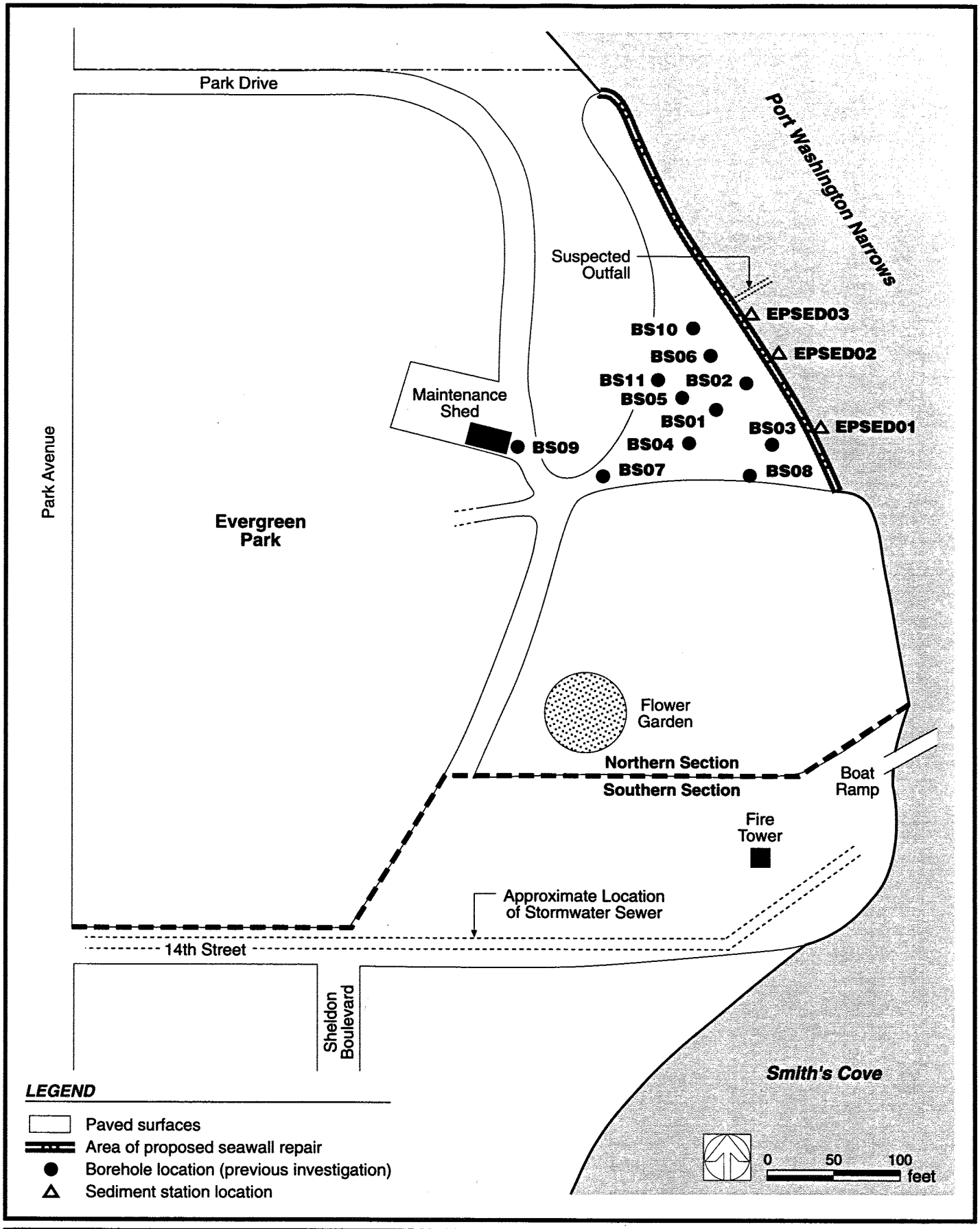

Figure 2. Sediment station location map.

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Tables

TABLE 1. ACID/BASE/NEUTRAL COMPOUND ANALYTICAL RESULTS

Analyte	Station EPSED01	Station EPSED02	Station EPSED03	Sediment Quality Standards
Nonionizable Organic Chemicals (mg/kg organic carbon)				
Total LPAH [a]	20.7 *U*	20.0 *U*	24.0 *U*	370
Naphthalene	3.4 *U*	3.3 *U*	4.0 *U*	99
Acenaphthylene	3.4 *U*	3.3 *U*	4.0 *U*	66
Acenaphthene	3.4 *U*	3.3 *U*	4.0 *U*	16
Fluorene	3.4 *U*	3.3 *U*	4.0 *U*	23
Phenanthrene	3.4 *U*	3.3 *U*	4.0 *U*	100
Anthracene	3.4 *U*	3.3 *U*	4.0 *U*	220
2-Methylnaphthalene	3.4 *U*	3.3 *U*	4.0 *U*	38
Total HPAH [b]	34.5 *U*	33.3 *U*	42.4 *L*	960
Fluoranthene	3.4 *U*	3.3 *U*	4.0 *U*	160
Pyrene	3.4 *U*	3.3 *U*	4.0 *U*	1,000
Benz[a]anthracene	3.4 *U*	3.3 *U*	4.0 *U*	110
Chrysene	3.4 *U*	3.3 *U*	4.0 *U*	110
Total benzofluoranthenes (b + k)	6.9 *U*	6.7 *U*	8.0 *U*	230
Benzo[a]pyrene	3.4 *U*	3.3 *U*	4.0 *U*	99
Indeno[1,2,3-cd]pyrene	3.4 *U*	3.3 *U*	4.0 *U*	34
Dibenz[a,h]anthracene	3.4 *U*	3.3 *U*	4.0 *U*	12
Benzo[ghi]perylene	3.4 *U*	3.3 *U*	6.4	31
1,2-Dichlorobenzene	3.4 *U*	3.3 *U*	4.0 *U*	2.3
1,4-Dichlorobenzene	3.4 *U*	3.3 *U*	4.0 *U*	3.1
1,2,4-Trichlorobenzene	3.4 *U*	3.3 *U*	4.0 *U*	0.81
Hexachlorobenzene	3.4 *U*	3.3 *U*	4.0 *U*	0.38
Dimethyl phthalate	3.4 *U*	3.3 *U*	4.0 *U*	53
Diethyl phthalate	3.4 *U*	3.3 *U*	4.0 *U*	61
Di-*n*-butyl phthalate	3.4 *U*	5.3 *U*	9.6 *U*	220
Butylbenzyl phthalate	3.4 *U*	3.3 *U*	4.0 *U*	4.9
Bis[2-ethylhexyl]phthalate	55.2 *U*	43.3 *U*	72.0 *U*	47
Di-*n*-octyl phthalate	3.4 *U*	3.3 *U*	4.0 *U*	58
Dibenzofuran	3.4 *U*	3.3 *U*	4.0 *U*	15
Hexachlorobutadiene	3.4 *U*	3.3 *U*	4.0 *U*	3.9
N-nitrosodiphenylamine	3.4 *U*	3.3 *U*	4.0 *U*	11
Ionizable Organic Compounds (mg/kg dry weight)				
Phenol	0.010 *U*	0.010 *U*	0.010 *U*	0.42
2-Methylphenol	0.010 *U*	0.010 *U*	0.010 *U*	0.063
4-Methylphenol	0.010 *U*	0.010 *U*	0.010 *U*	0.67
2,4-Dimethylphenol	0.010 *U*	0.010 *U*	0.010 *U*	0.029
Pentachlorophenol	0.050 *U*	0.050 *U*	0.050 *U*	0.36
Benzyl alcohol	0.050 *U*	0.050 *U*	0.050 *U*	0.057
Benzoic acid	0.050 *U*	0.050 *U*	0.050 *U*	0.65

Note: Where chemical criteria in this table respresent the sums of individual compounds (e.g., total LPAHs and total HPAHs), and a chemical analysis identified an undetected value for one or more individual compounds, the detection limit was used for calculating the sum of the respective compounds.

Outlined results show exceedences of Sediment Quality Standards.

L - this summation included detected and undetected results

U - undetected at the detection limit shown

[a] The LPAH criterion represents the sum of the following low molecular weight polycyclic aromatic hydrocarbon compounds: naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene.

[b] The HPAH criterion represents the sum of the following high molecular weight polycyclic aromatic hydrocarbon compounds: fluoranthene, pyrene, benz[a]anthracene, chrysene, total benzofluoranthenes, benz[a]pyrene, indeno[1,2,3-cd]pyrene, dibenz[a,h]anthracene, and benzo[ghi]perylene.

TABLE 2. CONVENTIONAL PARAMETER ANALYTICAL RESULTS

Analyte	Station		
	EPSED01	EPSED02	EPSED03
Total organic carbon	0.29	0.30	0.25
Total solids	80.9	85.3	81.1
Phi class less (size greater) than -1.00	36.5	22.1	35.2
Phi class -1.00+ to 0.00	5.1	3.9	8.1
Phi class 0.00+ to 1.00	19.3	16.4	19.3
Phi class 1.00+ to 2.00	41.1	47.9	35.5
Phi class 2.00+ to 3.00	3.9	5.5	5.5
Phi class 3.00+ to 4.00	0.25	0.46	0.58
Phi class 4.00+ to 8.00	0.21	0.25	0.31
Phi class greater (size smaller) than 8	0.52	0.63	0.57

Note: All results are reported on a percent dry-weight basis except total solids, which are reported on a percent wet-weight basis.

TABLE 3. PETROLEUM HYDROCARBON COMPOUND ANALYTICAL RESULTS

Analyte	Station EPSED01	Station EPSED02	Station EPSED03	MTCA Method A Soil Cleanup Standard
Petroleum Hydrocarbon Compounds (mg/kg dry weight)				
Diesel-Range	25.0 *U*	25.0 *U*	25.0 *U*	200
Oil-Range	92.2 *J*	180	81.3 *J*	200

Note: *J* - estimated

MTCA - Model Toxics Control Act

U - undetected at the detection limit shown

Attachment A

Laboratory Analytical Reports

1996

Columbia Analytical Services inc.

October 24, 1996 Service Request No.: K9606314

Sherrill Doran
PTI Environmental Services
15375 SE 30th Place, Suite 250
Bellevue, WA 98007

Re: **Evergereen Park/CA5Q-0605**

Dear Sherrill:

Enclosed are the results of the sample(s) submitted to our laboratory on October 7, 1996. Preliminary results were transmitted via facsimile on October 22, 1996. For your reference, these analyses have been assigned our service request number K9606214.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions. My extension is 246.

Respectfully submitted,

Columbia Analytical Services, Inc.

Abbie Spielman
Client Services Manager

AS/sm

COLUMBIA ANALYTICAL SERVICES, Inc.

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
J	Estimated concentration. The value is less than the method reporting limit, but greater than the method detection limit.
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected at or above the MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	PTI Environmental Services, Inc.	**Service Request No.:**	K9606314
Project:	Evergreen park/CA5Q0605	**Date Received:**	10/7/96
Sample Matrix:	Sediment		

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for sample(s) designated for Tier III data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), Matrix/Duplicate Matrix Spike (MS/DMS), Laboratory Control Sample (LCS), Initial Continuing Calibration Verification Standards (ICV/CCV), and Initial Continuing Calibration Blanks (ICB/CCB).

All EPA recommended holding times have been met for analyses in this sample delivery group.

The following difficulties were experienced during analysis of this batch:

The Method Blank for GC/MS SIM contained low levels of several phthalate compounds above the Method Reporting Limit. In accordance with CAS QA/QC policy, all sample results which are less than twenty times the level found in the Method Blank have been flagged. The analyte concentration may be considered an estimate because this analyte was also found in the method blank.

The ending oil CCV for WTPH-D analysis was slightly outside of control limits due to contamination from previous sample. Instrument maintenance was performed and the next CCV met acceptance limits. The quality of the sample data was not adversely affected.

The Duplicate Matrix Spike (MS) recovery of Pentachlorophenol for sample EPSED03 was outside the normal CAS control limits because of suspected matrix interference and due to the non-homogeneous sample matrix. Spike recoveries for this compound were within acceptance limits for the associated Matrix Spike and Laboratory Control Sample, and no further corrective action was taken.

Approved by _____ Date 10/14/96

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	PTI Environmental Services, Inc.	**Service Request:**	K9606314
Project:	Evergreen Park/CA5Q-0605	**Date Collected:**	10/3/96
Sample Matrix:	Sediment	**Date Received:**	10/7/96

Total Solids

Prep Method:	NONE	Units:	PERCENT
Analysis Method:	160.3 Modified	Basis:	NA
Test Notes:			

Sample Name	Lab Code	Date Analyzed	Result	Result Notes
EPSED01	K9606314-001	10/8/96	80.2	
EPSED02	K9606314-002	10/8/96	85.3	
EPSED03	K9606314-003	10/8/96	81.1	

Approved By: _____ Date: 10/10/96

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: PTI Environmental Services. Inc.
Project: Evergreen Park/CA5Q-0605
Sample Matrix: Sediment

Service Request: K9606314
Date Collected: 10/3/96
Date Received: 10/7/96
Date Extracted: NA
Date Analyzed: 10/21/96

Carbon, Total Organic (%)
ASTM Method D4129-82 Modified
Units: Percent
Dry Weight Basis

Sample Name	Lab Code	MRL	Result
EPSED01	K9606314-001	0.05	0.28
EPSED02	K9606314-002	0.05	0.30
EPSED03	K9606314-003	0.05	0.25
Method Blank	K9606314-MB	0.05	ND

Approved By: _____ Date: 10/22/96

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: PTI
Project: Evergreen Park/CA5q-0605
Sample Matrix Sediment

Service Request: K9606314
Date Collected: 10/3/96
Date Received: 10/7/96
Date Analyzed: 10/21/96

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: EPSED01
Lab Code: K9606314-01

Sand Fraction:	Dry Weight (Grams)	83.5196
Sand Fraction:	Weight Recovered (Grams)	83.5900
Sand Fraction:	Percent Recovery	100

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	19.6036	24.3
Very Coarse Sand	-1 to 0 Ø	4.7122	5.85
Coarse Sand	0 to 1 Ø	17.4483	21.7
Medium Sand	1 to 2 Ø	37.8077	46.9
Fine Sand	2 to 3 Ø	3.7803	4.69
Very Fine Sand	3 to 4 Ø	0.2247	0.28
Silt	4 to 8 Ø	0.1750	0.22
Clay	> 8 Ø	0.4850	0.60
	Total	84.2368	105

Approved By: _____ Date: 10/21/96

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	PTI	**Service Request:**	K9606314
Project:	Evergreen Park/CA5q-0605	**Date Collected:**	10/3/96
Sample Matrix	Sediment	**Date Received:**	10/7/96
		Date Analyzed:	10/21/96

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: EPSED01
Lab Code: K9606314-001d

Sand Fraction:	Dry Weight (Grams)	87.1736
Sand Fraction:	Weight Recovered (Grams)	87.1427
Sand Fraction:	Percent Recovery	100

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	36.5334	45.2
Very Coarse Sand	-1 to 0 Ø	3.6549	4.52
Coarse Sand	0 to 1 Ø	14.5512	18.0
Medium Sand	1 to 2 Ø	29.7447	36.8
Fine Sand	2 to 3 Ø	2.4675	3.05
Very Fine Sand	3 to 4 Ø	0.1711	0.21
Silt	4 to 8 Ø	0.1400	0.17
Clay	> 8 Ø	0.3950	0.49
	Total	87.6578	108

Approved By: _____ Date: 10/21/96

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	PTI	**Service Request:**	K9606314
Project:	Evergreen Park/CA5q-0605	**Date Collected:**	10/3/96
Sample Matrix	Sediment	**Date Received:**	10/7/96
		Date Analyzed:	10/21/96

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: EPSED01
Lab Code: K9606314-001t

Sand Fraction:	Dry Weight (Grams)	86.3286
Sand Fraction:	Weight Recovered (Grams)	86.2365
Sand Fraction:	Percent Recovery	100

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	32.2197	40.1
Very Coarse Sand	-1 to 0 Ø	3.9432	4.91
Coarse Sand	0 to 1 Ø	14.6162	18.2
Medium Sand	1 to 2 Ø	31.9483	39.7
Fine Sand	2 to 3 Ø	3.2903	4.09
Very Fine Sand	3 to 4 Ø	0.2045	0.25
Silt	4 to 8 Ø	0.1900	0.24
Clay	> 8 Ø	0.3800	0.47
	Total	86.7922	108

Approved By: _____ Date: 10/21/96

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	PTI	**Service Request:**	K9606314
Project:	Evergreen Park/CA5q-0605	**Date Collected:**	10/3/96
Sample Matrix	Sediment	**Date Received:**	10/7/96
		Date Analyzed:	10/21/96

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: EPSED02
Lab Code: K9606314-002

Sand Fraction:	Dry Weight (Grams)	82.3031
Sand Fraction:	Weight Recovered (Grams)	82.3084
Sand Fraction:	Percent Recovery	100

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	18.8835	22.1
Very Coarse Sand	-1 to 0 Ø	3.3673	3.94
Coarse Sand	0 to 1 Ø	14.0256	16.4
Medium Sand	1 to 2 Ø	40.8826	47.9
Fine Sand	2 to 3 Ø	4.7265	5.53
Very Fine Sand	3 to 4 Ø	0.3951	0.46
Silt	4 to 8 Ø	0.2150	0.25
Clay	> 8 Ø	0.5400	0.63
	Total	83.0356	97.2

Approved By: Lucy P. Phillips Date: 10/21/96

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	PTI	**Service Request:**	K9606314
Project:	Evergreen Park/CA5q-0605	**Date Collected:**	10/3/96
Sample Matrix	Sediment	**Date Received:**	10/7/96
		Date Analyzed:	10/21/96

Particle Size Determination
Puget Sound Estuary Program Protocol

Sample Name: EPSED03
Lab Code: K9606314-003

Sand Fraction:	Dry Weight (Grams)	84.9048
Sand Fraction:	Weight Recovered (Grams)	85.0711
Sand Fraction:	Percent Recovery	100

Description	Phi Size	Dry Weight (Grams)	Percent of Total Weight Recovered
Gravel	<-1 Ø	28.7203	35.2
Very Coarse Sand	-1 to 0 Ø	6.5989	8.08
Coarse Sand	0 to 1 Ø	15.7535	19.3
Medium Sand	1 to 2 Ø	28.9718	35.5
Fine Sand	2 to 3 Ø	4.5248	5.54
Very Fine Sand	3 to 4 Ø	0.4749	0.58
Silt	4 to 8 Ø	0.2500	0.31
Clay	> 8 Ø	0.4650	0.57
	Total	85.7592	105

Approved By: _____ Date: 10/21/96

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	PTI Environmental Services, Inc.	**Service Request:**	K9606314
Project:	Evergreen Park/CA5Q-0605	**Date Collected:**	10/3/96
Sample Matrix:	Sediment	**Date Received:**	10/7/96
		Date Extracted:	10/17/96
		Date Analyzed:	10/21,22/96

Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D
Units: mg/Kg (ppm)
Dry Weight Basis

Analyte:		**Diesel**	**Oil***
Method Reporting Limit:		25	100
Sample Name	**Lab Code**		
EPSED01	K9606314-001	ND	ND
EPSED02	K9606314-002	~~50(O)~~	180
EPSED03	K9606314-003	ND	ND
Method Blank	K961017-MB	ND	ND

* Quantified using 30-weight motor oil as a standard.
O Quantitated as diesel. The sample contained an oil component that partially eluted in the diesel range.

Approved By: Lorna E. Portwood Date: 10/23/96

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: PTI Environmental Services, Inc.
Project: Evergreen Park/CA5Q-0605
Sample Matrix: Sediment

Service Request: K9606314
Date Collected: 10/3/96
Date Received: 10/7/96
Date Extracted: 10/10/96

Base Neutral/Acid Semivolatile Organic Compounds
EPA 3550A in Conjunction with GC/MS SIM Method
Units: ug/Kg (ppb)

	Sample Name:	**EPSED01**	**EPSED02**	**EPSED03**
	Lab Code:	K9606314-001	K9606314-002	K9606314-003
	Date Analyzed:	10/14/96	10/14/96	10/14/96
Base Neutral Analyte	**MRL**			
1,2-Dichlorobenzene	10	ND	ND	ND
1,4-Dichlorobenzene	10	ND	ND	ND
1,2,4-Trichlorobenzene	10	ND	ND	ND
Naphthalene	10	ND	ND	ND
Hexachlorobutadiene	10	ND	ND	ND
2-Methylnaphthalene	10	ND	ND	ND
Dimethyl Phthalate	10	ND	ND	ND
Acenaphthylene	10	ND	ND	ND
Acenaphthene	10	ND	ND	ND
Dibenzofuran	10	ND	ND	ND
Diethyl Phthalate	10	ND	ND	ND
Fluorene	10	ND	ND	ND
N-Nitrosodiphenylamine	10	ND	ND	ND
Hexachlorobenzene	10	ND	ND	ND
Phenanthrene	10	ND	ND	ND
Anthracene	10	ND	ND	ND
Di-n-butyl Phthalate	10	ND	16 E	24 E
Fluoranthene	10	ND	ND	ND
Pyrene	10	ND	ND	ND
Butyl Benzyl Phthalate	10	ND	ND	ND
Benz(a)anthracene	10	ND	ND	ND
Bis(2-ethylhexyl) Phthalate	10	160 E	130 E	180 E
Chrysene	10	ND	ND	ND
Di-n-octyl Phthalate	10	ND	ND	ND
Benzo(b)fluoranthene	10	ND	ND	ND
Benzo(k)fluoranthene	10	ND	ND	ND

E Estimated concentration; see case narrative.

Approved By: _____ Date: 10/22/96

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: PTI Environmental Services, Inc.
Project: Evergreen Park/CA5Q-0605
Sample Matrix: Sediment

Service Request: K9606314
Date Collected: 10/3/96
Date Received: 10/7/96
Date Extracted: 10/10/96

Base Neutral/Acid Semivolatile Organic Compounds
EPA 3550A in Conjunction with GC/MS SIM Method
Units: ug/Kg (ppb)

	Sample Name:	**EPSED01**	**EPSED02**	**EPSED03**
	Lab Code:	K9606314-001	K9606314-002	K9606314-003
	Date Analyzed:	10/14/96	10/14/96	10/14/96
Base Neutral Analyte	**MRL**			
Benzo(a)pyrene	10	ND	ND	ND
Indeno(1,2,3-cd)pyrene	10	ND	ND	ND
Dibenz(a,h)anthracene	10	ND	ND	ND
Benzo(g,h,i)perylene	10	ND	ND	16

Approved By: _____ Date: 10/22/96

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: PTI Environmental Services, Inc.
Project: Evergreen Park/CA5Q-0605
Sample Matrix: Sediment

Service Request: K9606314
Date Collected: 10/3/96
Date Received: 10/7/96
Date Extracted: 10/10/96

Base Neutral/Acid Semivolatile Organic Compounds
EPA 3550A in Conjunction with GC/MS SIM Method
Units: ug/Kg (ppb)

	Sample Name:	**EPSED01**	**EPSED02**	**EPSED03**
	Lab Code:	K9606314-001	K9606314-002	K9606314-003
	Date Analyzed:	10/14/96	10/14/96	10/14/96
Acid Analyte	**MRL**			
Phenol	10	ND	ND	ND
Benzyl Alcohol	50	ND	ND	ND
2-Methylphenol	10	ND	ND	ND
4-Methylphenol	10	ND	ND	ND
2,4-Dimethylphenol	10	ND	ND	ND
Benzoic Acid	50	ND	ND	ND
Pentachlorophenol	50	ND	ND	ND

Approved By: _____ Date: 10/22/96

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: PTI Environmental Services, Inc.
Project: Evergreen Park/CA5Q-0605
Sample Matrix: Sediment

Service Request: K9606314
Date Collected: NA
Date Received: NA
Date Extracted: 10/10/96

Base Neutral/Acid Semivolatile Organic Compounds
EPA 3550A in Conjunction with GC/MS SIM Method
Units: ug/Kg (ppb)

Sample Name:	**Method Blank**
Lab Code:	K961010-SB2
Date Analyzed:	10/14/96

Base Neutral Analyte	**MRL**	
1,2-Dichlorobenzene	10	ND
1,4-Dichlorobenzene	10	ND
1,2,4-Trichlorobenzene	10	ND
Naphthalene	10	ND
Hexachlorobutadiene	10	ND
2-Methylnaphthalene	10	ND
Dimethyl Phthalate	10	ND
Acenaphthylene	10	ND
Acenaphthene	10	ND
Dibenzofuran	10	ND
Diethyl Phthalate	10	40
Fluorene	10	ND
N-Nitrosodiphenylamine	10	ND
Hexachlorobenzene	10	ND
Phenanthrene	10	ND
Anthracene	10	ND
Di-n-butyl Phthalate	10	13
Fluoranthene	10	ND
Pyrene	10	ND
Butyl Benzyl Phthalate	10	ND
Benz(a)anthracene	10	ND
Bis(2-ethylhexyl) Phthalate	10	236
Chrysene	10	ND
Di-n-octyl Phthalate	10	ND
Benzo(b)fluoranthene	10	ND
Benzo(k)fluoranthene	10	ND

Approved By: _____ Date: 10/22/96

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: PTI Environmental Services, Inc.
Project: Evergreen Park/CA5Q-0605
Sample Matrix: Sediment

Service Request: K9606314
Date Collected: NA
Date Received: NA
Date Extracted: 10/10/96

Base Neutral/Acid Semivolatile Organic Compounds
EPA 3550A in Conjunction with GC/MS SIM Method
Units: ug/Kg (ppb)

	Sample Name:	**Method Blank**
	Lab Code:	K961010-SB2
	Date Analyzed:	10/14/96
Base Neutral Analyte	**MRL**	
Benzo(a)pyrene	10	ND
Indeno(1,2,3-cd)pyrene	10	ND
Dibenz(a,h)anthracene	10	ND
Benzo(g,h,i)perylene	10	ND

Approved By: _____ Date: 10/22/96

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	PTI Environmental Services, Inc.	**Service Request:**	K9606314
Project:	Evergreen Park/CA5Q-0605	**Date Collected:**	NA
Sample Matrix:	Sediment	**Date Received:**	NA
		Date Extracted:	10/10/96

Base Neutral/Acid Semivolatile Organic Compounds
EPA 3550A in Conjunction with GC/MS SIM Method
Units: ug/Kg (ppb)

	Sample Name:	**Method Blank**
	Lab Code:	K961010-SB2
	Date Analyzed:	10/14/96
Acid Analyte	**MRL**	
Phenol	10	ND
Benzyl Alcohol	50	ND
2-Methylphenol	10	ND
4-Methylphenol	10	ND
2,4-Dimethylphenol	10	ND
Benzoic Acid	50	ND
Pentachlorophenol	50	ND

Approved By: _____ Date: 10/22/96

APPENDIX A
LABORATORY QA/QC RESULTS

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: PTI Environmental Services, Inc.
Project: Evergreen Park/CA5Q-0605
Sample Matrix: Sediment

Service Request: K9606314
Date Collected: 10/3/96
Date Received: 10/7/96

Duplicate Summary
Total Solids

Prep Method: NONE
Analysis Method: 160.3 Modified
Test Notes:

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Date Analyzed	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
EPSED01	K9606314-001	10/8/96	80.2	81.6	80.9	2	

Approved By: _____ Date: 10/28/96

Total Solids/060595
06314ICP.AM1 - TS DUP 10/9/96

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: PTI Environmental Services, Inc.
Project: Evergreen Park/CA5Q-0605
Sample Matrix: Sediment

Service Request: K9606314
Date Collected: 10/3/96
Date Received: 10/7/96
Date Analyzed: 10/21/96

Carbon, Total Organic (%)
ASTM Method D4129-82 Modified
Units: Percent
Dry Weight Basis

LABORATORY CONTROL SAMPLE

		True Value	Measured Value	Percent Recovery
Source:	ERA 542 Lot #01125	0.62	0.68	110

CALIBRATION VERIFICATION STANDARD

	True Value	Measured Value	Percent Recovery
CCV 1 Result	20.0	20.8	104
CCV 2 Result	20.0	20.1	100
CCV 3 Result	20.0	20.1	100

LABORATORY BLANK

	MRL	Blank Value
CCB 1 Result	0.05	ND
CCB 2 Result	0.05	ND
CCB 3 Result	0.05	ND

DUPLICATE ANALYSIS

Sample Name	Lab Code	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
EPSED01	K9606314-001D	0.05	0.28	0.29	0.28	4

MATRIX SPIKE ANALYSIS

Sample Name	Lab Code	MRL	Spike Level	Sample Result	Spiked Sample Result	Percent Recovery
EPSED01	K9606314-001MS	0.05	6.00	0.28	6.25	100

Approved By: _____ Date: 10/22/96

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	PTI Environmental Services, Inc.	**Service Request:**	K9606314
Project:	Evergreen Park/CA5Q-0605	**Date Collected:**	10/3/96
Sample Matrix:	Sediment	**Date Received:**	10/7/96
		Date Extracted:	10/17/96
		Date Analyzed:	10/21.22/96

Surrogate Recovery Summary
Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D

Sample Name	Lab Code	Percent Recovery o-Terphenyl
EPSED01	K9606314-001	115
EPSED02	K9606314-002	79
EPSED03	K9606314-003	80
EPSED03	K9606314-003MS	83
EPSED03	K9606314-003DMS	86
Lab Control Sample	K961017-LCS	84
Method Blank	K961017-MB	87

CAS Acceptance Limits: 56-116

Approved By: Lorna E. Portwood Date: 10/23/96

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	PTI Environmental Services, Inc.	**Service Request:**	K9606314
Project:	Evergreen Park/CA5Q-0605	**Date Collected:**	10/3/96
Sample Matrix:	Sediment	**Date Received:**	10/7/96
		Date Extracted:	10/17/96
		Date Analyzed:	10/22/96

Matrix Spike/Duplicate Matrix Spike Summary
Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D
Units: mg/Kg (ppm)
Dry Weight Basis

Sample Name: EPSED03
Lab Code: K9606314-003

	Spike Level		Sample	Spike Result		Percent Recovery		CAS Acceptance	Relative Percent	CAS RPI Acceptanc
Analyte	MS	DMS	**Result**	MS	DMS	MS	DMS	Limits	**Difference**	**Limit**
Diesel	190	200	ND	176	177	93	89	19-145	5	40

Approved By: Laura E. Portwood Date: 10/23/96

DMS1SRPD/120594
06314PHC.SS1 - TPHsDMS 10/23/96

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	PTI Environmental Services, Inc.	**Service Request:**	K9606314
Project:	Evergreen Park/CA5Q-0605	**Date Collected:**	NA
LCS Matrix:	Sediment	**Date Received:**	NA
		Date Extracted:	10/17/96
		Date Analyzed:	10/21/96

Laboratory Control Sample Summary
Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D
Units: mg/Kg (ppm)

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Diesel	150	128	85	60-120

Approved By: Lorna E. Portwood Date: 10/23/96

LCS:102194

06314PHC.SSI - TPHsLCS 10/23/96

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: PTI Environmental Services, Inc.
Project: Evergreen Park/CA5Q-0605

Service Request: K9606314
Date Analyzed: 10/21/96

Continuing Calibration Verification (CCV) Summary
Total Petroleum Hydrocarbons as Diesel and Oil

Sample Name: CCV1
Lab Code: 1021F005,7
Test Notes:

Units: mg/L (ppm)
Basis: NA

Analyte	Analysis Method	True Value	Result	Percent Recovery	Result Notes
Diesel	WTPH-D	1000	1020	102	
Oil	WTPH-D	500	442	88	

Approved By: Lorin E. Portwood Date: 10/23/96

LCS/52595

06314PHC.VN1 - CCV1 10 23 96

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: PTI Environmental Services, Inc. **Service Request:** K9606314
Project: Evergreen Park/CA5Q-0605 **Date Analyzed:** 10/21/96

Continuing Calibration Verification (CCV) Summary
Total Petroleum Hydrocarbons as Diesel and Oil

Sample Name: CCV2 Units: mg/L (ppm)
Lab Code: 1021F031 Basis: NA
Test Notes:

Analyte	Analysis Method	True Value	Result	Percent Recovery	Result Notes
Diesel	WTPH-D	1000	972	97	

Approved By: Lorna E. Rockwood Date: 10/23/96

LCS/52595

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: PTI Environmental Services, Inc.
Project: Evergreen Park/CA5Q-0605

Service Request: K9606314
Date Analyzed: 10/21/96

Continuing Calibration Verification (CCV) Summary
Total Petroleum Hydrocarbons as Diesel and Oil

Sample Name: CCV3
Lab Code: 1021F055
Test Notes:

Units: mg/L (ppm)
Basis: NA

Analyte	Analysis Method	True Value	Result	Percent Recovery	Result Notes
Diesel	WTPH-D	1000	1000	100	

Approved By: Loren E. Bosthead Date: 10/23/96

LCS/52595

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: PTI Environmental Services, Inc.
Project: Evergreen Park/CA5Q-0605

Service Request: K9606314
Date Analyzed: 10/22/96

Continuing Calibration Verification (CCV) Summary
Total Petroleum Hydrocarbons as Diesel and Oil

Sample Name: CCV4
Lab Code: 1021F079
Test Notes:

Units: mg/L (ppm)
Basis: NA

Analyte	Analysis Method	True Value	Result	Percent Recovery	Result Notes
Diesel	WTPH-D	1000	1020	102	

Approved By: Lorna E. Dartwood Date: 10/23/96

LCS 52555

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: PTI Environmental Services, Inc.
Project: Evergreen Park/CA5Q-0605

Service Request: K9606314
Date Analyzed: 10/22/96

Continuing Calibration Verification (CCV) Summary
Total Petroleum Hydrocarbons as Diesel and Oil

Sample Name: CCV5
Lab Code: 1021F103
Test Notes:

Units: mg/L (ppm)
Basis: NA

Analyte	Analysis Method	True Value	Result	Percent Recovery	Result Notes
Diesel	WTPH-D	1000	998	100	

Approved By: Lawn E. Portwood Date: 10/23/96

LCS 52595

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: PTI Environmental Services, Inc. **Service Request:** K9606314
Project: Evergreen Park/CA5Q-0605 **Date Analyzed:** 10/22/96

Continuing Calibration Verification (CCV) Summary
Total Petroleum Hydrocarbons as Diesel and Oil

Sample Name: CCV6 Units: mg/L (ppm)
Lab Code: 1021F115,119 Basis: NA
Test Notes:

Analyte	Analysis Method	True Value	Result	Percent Recovery	Result Notes
Diesel	WTPH-D	1000	969	97	
Oil	WTPH-D	500	391	78(A)	

A Outside acceptance limits: see case narrative.

Approved By: Lorna E Portwood Date: 10/23/96

LCS/52595

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: PTI Environmental Services, Inc.
Project: Evergreen Park/CA5Q-0605

Service Request: K9606314
Date Analyzed: 10/21/96

Continuing Calibration Blank (CCB) Summary
Total Petroleum Hydrocarbons as Diesel and Oil

Sample Name: CCB1
Lab Code: 1021F009
Test Notes:

Units: mg/L (ppm)
Basis: NA

Analyte	Analysis Method	MRL	Result	Result Notes
Diesel	WTPH-D	25	ND	
Oil	WTPH-D	100	ND	

Approved By: Lonna E. Portwood Date: 10/23/96

LCS/52595

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: PTI Environmental Services, Inc.
Project: Evergreen Park/CA5Q-0605

Service Request: K9606314
Date Analyzed: 10/21/96

Continuing Calibration Blank (CCB) Summary
Total Petroleum Hydrocarbons as Diesel and Oil

Sample Name: CCB2
Lab Code: 1021F033
Test Notes:

Units: mg/L (ppm)
Basis: NA

Analyte	Analysis Method	MRL	Result	Result Notes
Diesel	WTPH-D	25	ND	
Oil	WTPH-D	100	ND	

Approved By: Lorna E. Portwood Date: 10/23/96

LCS/52595

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: PTI Environmental Services, Inc. **Service Request:** K9606314
Project: Evergreen Park/CA5Q-0605 **Date Analyzed:** 10/21/96

Continuing Calibration Blank (CCB) Summary
Total Petroleum Hydrocarbons as Diesel and Oil

Sample Name: CCB3 Units: mg/L (ppm)
Lab Code: 1021F057 Basis: NA
Test Notes:

Analyte	Analysis Method	MRL	Result	Result Notes
Diesel	WTPH-D	25	ND	
Oil	WTPH-D	100	ND	

Approved By: Loren E. Pentwood Date: 10/23/96

LCS/52595

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: PTI Environmental Services, Inc.
Project: Evergreen Park/CA5Q-0605

Service Request: K9606314
Date Analyzed: 10/22/96

Continuing Calibration Blank (CCB) Summary
Total Petroleum Hydrocarbons as Diesel and Oil

Sample Name: CCB4
Lab Code: 1021F081
Test Notes:

Units: mg/L (ppm)
Basis: NA

Analyte	**Analysis Method**	**MRL**	**Result**	**Result Notes**
Diesel	WTPH-D	25	ND	
Oil	WTPH-D	100	ND	

Approved By: Loren E Portwood Date: 10/23/96

1.CS/52595

06314PHC.VN1 - CCB (4) 10/23/96

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: PTI Environmental Services, Inc. **Service Request:** K9606314
Project: Evergreen Park/CA5Q-0605 **Date Analyzed:** 10/22/96

Continuing Calibration Blank (CCB) Summary
Total Petroleum Hydrocarbons as Diesel and Oil

Sample Name: CCB5 Units: mg/L (ppm)
Lab Code: 1021F105 Basis: NA
Test Notes:

Analyte	Analysis Method	MRL	Result	Result Notes
Diesel	WTPH-D	25	ND	
Oil	WTPH-D	100	ND	

Approved By: Lorm E. Portwood Date: 10/23/96

LCS/52595

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	PTI Environmental Services, Inc.	**Service Request:**	K9606314
Project:	Evergreen Park/CA5Q-0605	**Date Analyzed:**	10/22/96

Continuing Calibration Blank (CCB) Summary
Total Petroleum Hydrocarbons as Diesel and Oil

Sample Name:	CCB6	Units:	mg/L (ppm)
Lab Code:	1021F117	Basis:	NA
Test Notes:			

Analyte	Analysis Method	MRL	Result	Result Notes
Diesel	WTPH-D	25	ND	
Oil	WTPH-D	100	ND	

Approved By: Lorrie E. Portwood Date: 10/23/96

LCS 52595

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: PTI Environmental Services, Inc.
Project: Evergreen Park/CA5Q-0605
Sample Matrix: Sediment

Service Request: K9606314
Date Collected: 10/3/96
Date Received: 10/7/96
Date Extracted: 10/10/96
Date Analyzed: 10/13-14/96

Surrogate Recovery Summary
Base Neutral/Acid Semivolatile Organic Compounds
EPA 3550A in Conjunction with GC/MS SIM Method

Sample Name	Lab Code	Percent Recovery 2FP	PHL	TBP	NBZ	FBP	TPH
EPSED01	K9606314-001	56	61	51	67	48	54
EPSED02	K9606314-002	55	59	45	69	48	46
EPSED03	K9606314-003	57	57	60	75	54	54
EPSED03	K9606314-003MS	69	68	76	85	59	58
EPSED03	K9606314-003DMS	59	71	60	78	52	50
Lab Control Sample	K961010-SL2	70	81	56	84	66	65
Method Blank	K961010-SB2	77	86	56	87	68	72
CAS Acceptance Limits:		5-106	5-96	5-110	5-134	5-120	15-145

2FP	2-Fluorophenol
PHL	Phenol-d6
TBP	2,4,6-Tribromophenol
NBZ	Nitrobenzene-d5
FBP	2-Fluorobiphenyl
TPH	p-Terphenyl-d14

Approved By: _____ Date: 10/22/96

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: PTI Environmental Services, Inc.
Project: Evergreen Park/CA5Q-0605
Sample Matrix: Sediment

Service Request: K9606314
Date Collected: 10/3/96
Date Received: 10/7/96
Date Extracted: 10/10/96
Date Analyzed: 10/14/96

Matrix Spike/Duplicate Matrix Spike Summary
Base Neutral/Acid Semivolatile Organic Compounds
EPA 3550A in Conjunction with GC/MS SIM Method
Units: ug/Kg (ppb)

Sample Name: EPSED03
Lab Code: K9606314-003

Analyte	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Advisory Limits	Relative Percent Difference
Phenol	690	660	ND	455	432	66	65	21-100	2
2-Chlorophenol	690	660	ND	457	383	66	58	20-105	13
1,4-Dichlorobenzene	460	440	ND	182	179	40	41	23-102	3
N-Nitrosodi-n-propylamine	460	440	ND	425	359	92	82	30-111	12
1,2,4-Trichlorobenzene	460	440	ND	229	207	50	47	27-109	6
4-Chloro-3-methylphenol	690	660	ND	569	484	82	73	23-108	12
Acenaphthene	460	440	ND	318	265	69	60	43-117	14
4-Nitrophenol	690	660	ND	548	407	79	62	22-113	25
2,4-Dinitrotoluene	460	440	ND	331	258	72	59	32-108	20
Pentachlorophenol	690	660	ND	287	87	42	13 A	18-112	105
Pyrene	460	440	ND	517	244	112	55	24-143	68

A Outside acceptance limits; see case narrative.

Approved By: _____ Date: 10/22/96

DMS1S/120594
06314SVM.JS1 - 3DMS 10/22/96

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	PTI Environmental Services, Inc.	**Service Request:**	K9606314
Project:	Evergreen Park/CA5Q-0605	**Date Collected:**	NA
LCS Matrix:	Sediment	**Date Received:**	NA
		Date Extracted:	10/10/96
		Date Analyzed:	10/13/96

Laboratory Control Sample Summary
Base Neutral/Acid Semivolatile Organic Compounds
EPA 3550A in Conjunction with GC/MS SIM Method
Units: ug/Kg (ppb)

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Advisory Limits
Phenol	730	564	77	32-96
2-Chlorophenol	730	487	67	34-102
1,4-Dichlorobenzene	490	276	56	39-98
N-Nitrosodi-n-propylamine	490	422	86	39-104
1,2,4-Trichlorobenzene	490	286	58	43-99
4-Chloro-3-methylphenol	730	572	78	36-102
Acenaphthene	490	347	71	44-112
4-Nitrophenol	730	486	67	23-113
2,4-Dinitrotoluene	490	353	72	39-106
Pentachlorophenol	730	311	43	31-113
Pyrene	490	367	75	44-126

Approved By: _____ Date: 10/24/96

APPENDIX B
CHAIN OF CUSTODY

PTI ENVIRONMENTAL SERVICES

CHAIN OF CUSTODY RECORD/ SAMPLE ANALYSIS REQUEST FORM

K6314

2669

Project: (Name and Number) Evergreen Park - CASQ-0605

Samplers: (Signature) Sherrill Doran / C Bauer

Sampling Contact: Sherrill Doran
Phone: 206 | 643-9803
Ship Samples to: CAS
1317 S. 13th Ave.
Kelso, WA 98626
Attn: Abbie Spielman
360 | 577-7222

Sample No.	Tag No.	Date	Time	Sample Matrix: Groundwater	Soil	Surface Water	Sediment	Other	Other	Concentration (L M H)	Composite or Grab	Analyses Requested: ABN | PSEP	TPH-Extended	TOC	% Solids	Grain size		Extra Container	Archive	Remarks
EPSED01	99742	10/3/96	1635				X			L	C	✓	✓	✓	✓					500 mL; no pres.
↓	99743	↓	↓				↓			↓	↓					✓				500 mL; no pres.
	99744																	✓	✓	grain size duplicate - 500mL.
↓	99745	↓	↓															✓	✓	grain size triplicate - 500 mL.
EPSED02	99746		1645									✓	✓	✓	✓					500 mL; no pres.
↓	99747	↓	↓													✓				500 mL; no pres.
EPSED03	99748		1705									✓	✓	✓	✓					500 mL; no pres.
	99749															✓				500 mL; no pres.
	99750																	✓	✓	MS duplicate; 500 mL, no pres.
	99751																	✓	✓	MS triplicate; 500 mL, no pres.
	99752																	✓	✓	MSD duplicate; 500 mL, no pres.
↓	99753	↓	↓				↓			↓	↓							✓	✓	MSD triplicate; 500 mL, no pres.

Method of Shipment: Fed Ex Overnight

Condition of Samples Upon Receipt: _____

Custody Seal Intact: Yes ☐ No ☐ None ☐ Broken by: _____

Relinquished by: Sherrill Doran (Signature) — Received by: Fed Ex Overnight (Signature) — Date/Time 10/4/96 1645

Relinquished by: _____ (Signature) — Received by: _____ (Signature) — Date/Time _____

Relinquished by: _____ (Signature) — Received by Mobile Lab for Field Analysis: _____ (Signature) — Date/Time _____

Received for Lab by: Lori K. Hall (Signature) CAS, K — Date/Time 100796 0900

Distribution: Original and One Copy - Accompany Shipment; One Copy - Project File

FF Rev 1.91