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DEPARTMENT OF
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Grays Harbor Estuary Sediment Evaluation

Chemical Screening and Station Cluster Analysis of Selected Locations

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Chemical Screening and Station Cluster Analysis of Selected Locations

by
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Abstract

Sediment sampling was conducted at 18 locations in Grays Harbor during March 1998 to evaluate contaminant levels in ditches and backwaters near a variety of potential upland sources. Multiple stations were sampled at three of the 18 locations – Grays Harbor Paper Mill, Little Hoquiam Boatyard, and Westhaven Cove – to determine if a sediment station cluster of potential concern (SCPC) was present. A single location was sampled at the remaining 15 locations.

Chemical concentrations were low in most of the areas sampled in Grays Harbor. The majority of problems found for metals and organics appears to be localized around specific sites. The lack of widespread chemical contamination is probably related to relatively few large chemical sources being located in the area, in combination with an active sediment transport regime and good flushing in most parts of the estuary.

Of the three areas that were subjected to a station cluster analysis, one was classified as SCPC by Sediment Management Standards (SMS). Sediments near the Grays Harbor Paper Mill are a potential concern based on concentrations of 4-methylphenol. One additional site (Westhaven Cove), while technically not meeting the definition of a SCPC, had high enough concentrations of bis(2-ethyl hexyl) phthalate at two discontinuous stations to warrant concern. Both of these areas should undergo further evaluation. The third cluster site (Little Hoquiam Boatyard) did not have any chemical violations of the SMS. Six other locations that were screened for chemical contamination at a single site had one or more chemicals that exceeded the SMS.

A variety of large to fine wood debris was noted in sediments throughout the area. Besides organic enrichment of the sediments, it is unclear from the data collected what adverse impacts the presence of large amounts of wood waste is having on the benthic community of Grays Harbor. Biological testing is suggested to determine whether a healthy benthic community is present in areas with large amounts of wood waste.

Recommendations for follow-up actions are provided.

Acknowledgments

A number of individuals made significant contributions to this project. The author is grateful to all and would like to extend special thanks to the following:

- Bernard Strong provided outstanding field support under difficult conditions which made it possible to complete the sampling on schedule
- John Summers and Russ McMillan assisted in collection of the samples.
- Debbie Lacroix, Pam Covey, Randy Knox, Karin Feddersen, Greg Perez, Steve Riemer, and Dickey Huntamer at the Manchester Environmental Laboratory coordinated the analytical procedures for the project.
- Dominick Reale, Russ McMillan, and Art Johnson reviewed the report and made valuable suggestions for improvements.
- Joan LeTourneau edited and formatted the document for publication

Background

Grays Harbor, shown in Figure 1, is located along the central Washington coast. It is a shallow estuary with depths averaging less than 20 feet. At the entrance, depths reach a maximum of 80 feet, while the navigation channel is maintained at 30 feet MLLW by annual dredging of bottom materials. Fresh water is supplied to the estuary via six river systems (Chehalis, Hoquiam, Wishkah, Humptulips, Johns, and Elk) which have a combined drainage basin of approximately 2,550 square miles. The Chehalis River and its tributaries drain approximately 2,000 square miles and supply approximately 80% of the freshwater input into Grays Harbor (Pelletier, 1997).

Previous chemical characterization studies of bottom sediments in the estuary have focused on the main navigation channel (dredging related) and the two major industrial facilities (Weyerhaeuser Paper and Grays Harbor Paper) which discharge to the Chehalis River in the vicinity of Aberdeen.

Project Description

Recently, concern has been raised about the potential for sediment contamination in a number of areas located outside the main river channel in ditches and backwaters that have not been sampled. Typically these areas of concern are located adjacent to smaller facilities with known or suspected on-site contamination problems. In addition, wood waste impacts on sediment quality are a concern, given the extent and history of the wood products industry in Grays Harbor.

In response to these data gaps, Dominick Reale of the Washington State Department of Ecology (Ecology) Southwest Regional Office requested that sediment sampling be conducted at several locations in Grays Harbor to evaluate the potential for contamination in areas that, for the most part, had not undergone previous characterization work. In addition, sampling was included near Weyerhaeuser Paper and Grays Harbor Paper facilities to compare with results of earlier investigations at these locations.

Ecology's Environmental Assessment Program was contracted to conduct this survey. The primary objectives of the study were as follows:

- Screen nearshore sediments adjacent to potential sources to determine if chemical contamination is present and if it warrants further investigation. This decision will be based on comparisons with Ecology's Sediment Management Standards (WAC 173-204)
- At three locations determine if a sediment station cluster of potential concern exists as described in the Sediment Management Standards (WAC 173-204-510)
- Evaluate the wood content of sediments adjacent to potential wood waste sources

Results from this investigation will be used to evaluate the need for further sediment characterization work in Grays Harbor and/or sediment remediation activities. The data generated from this study will be entered into Ecology's EIM (Environmental Information Management) database and SEDQUAL (sediments) database for future reference.

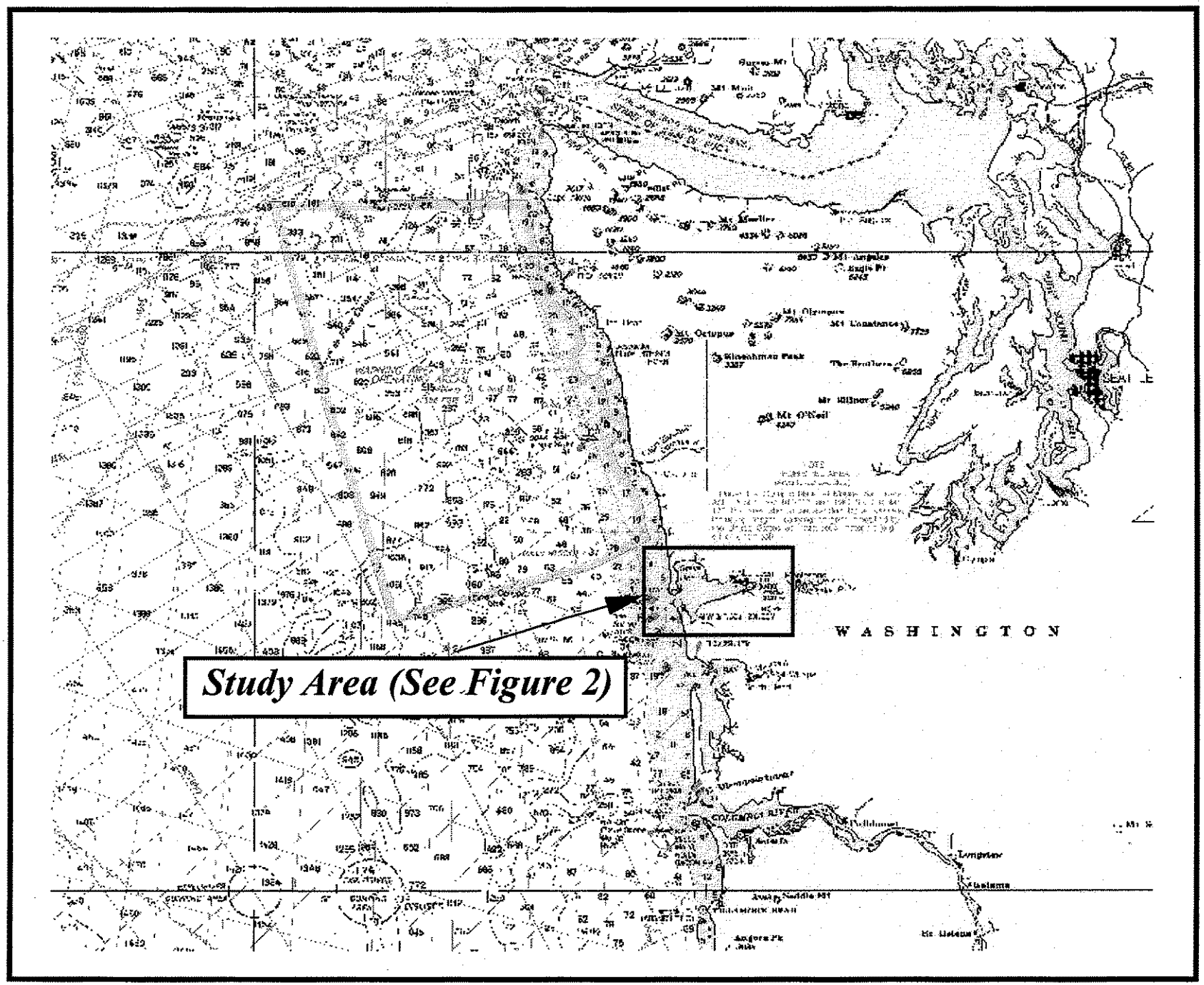

Figure 1: Grays Harbor Study Area.

Methods

Site Selection

Sampling sites were initially selected based on data on potential sources obtained from Ecology's Southwest Regional Office. The list of sites was refined after a reconnaissance survey of the area was conducted in February 1998. Sediment samples were eventually collected from the 18 locations described in Table 1. These sites are shown in Figure 2.

Station positions were located with a differentially corrected Northstar 941XD global positioning system in conjunction with depth readings. Station positions and descriptions are listed in Appendix A, Table A1.

Sample Collection

Where applicable, sampling methods followed Puget Sound Estuary Protocols (PSEP) and requirements of Ecology's Sediment Management Standards (SMS) (PSEP, 1996; Ecology, 1995a,b).

Each sample consisted of a composite of three individual grabs. For each grab, the top 10-cm layer (biologically active zone - Ecology, 1995b) was retained for analysis. In most instances, samples were collected from Ecology's 20' skiff using a 0.1 m^2 stainless steel van Veen grab. A grab was considered acceptable if it was not over-filled with sediment, overlying water was present that was not excessively turbid, the sediment surface was relatively flat, and the desired depth of penetration had been achieved. At sites where waste material was being targeted or it was not possible to navigate the vessel, samples were obtained at low tide using stainless steel spoons. A field log was maintained throughout the sampling. Descriptions of each sample are listed in Appendix A, Table A2.

Processing of samples in the field consisted of first siphoning off overlying water in the grab. The top 10-cm of sediment, not in contact with the sidewalls of the grab, was then removed with stainless steel scoops, placed in a stainless steel bucket, and homogenized by stirring. An exception to this procedure was used for formaldehyde samples, which were transferred directly from each grab into sample containers.

Sub-samples of the homogenized sediment were placed in glass jars (Teflon lid liners) cleaned to EPA QA/QC specifications (EPA, 1990) or placed in Whirl-Pak bags for grain size. Separate 4-oz jars were used for semivolatile organics, metals, butyltins, wood fibers, and excess sample; 2-oz jars were used for TOC. Glass vials with teflon septa designed for volatiles samples were used for formaldehyde samples. A small

Table 1. Summary of Sediment Sampling Locations and Analysis for the Grays Harbor Sediment Evaluation Study.

Site Characterization

Area No.	No. Sites	Description	Analysis	Purpose of Site
1C	3	Little Hoquiam Boatshop	%S, TOC, GS, Metals, Semiv., Butyltins	Evaluate Boatyard runoff impacts on Hoquiam River
2C	3	Grays Harbor Paper	%S, TOC, GS, WF, Metals, Semiv.	Evaluate nearshore sediment quality (verify earlier sampling results)
3C	4	Westhaven Marina (Westport)	%S, TOC, GS, Metals, Semiv., Butyltins	Evaluate sediment quality inside Marina (shipyard, seafood processors, and marina)

Site Screening

Area No.	No. Sites	Description	Analysis	Purpose of Site
1S	1	Weyerhaeuser Paper Rennie Island Outfall	%S, TOC, GS, WF, Metals, Semiv.	Evaluate downstream sediment quality (verify earlier monitoring data)
2S	1	Weyerhaeuser Cosmopolis Log Sort Yard	%S, TOC, GS, WF, Metals, Semiv.	Screen for impacts from sort yard runoff
3S	1	Railroad Bridge Ditch	%S, TOC, GS, WF, Metals, Semiv.	Screen for runoff impacts
4S	1	Hoquiam River Waste Piles	%S, TOC, GS, Metals, Semiv.	Evaluate contaminant levels in waste piles
5S	1	Hoquiam Plywood	%S, TOC, GS, WF, Metals, Semiv.	Screen for impacts from sawmill discharge
6S	1	Hoquiam Sort Yard	%S, TOC, GS, WF, Metals, Semiv.	Screen for impacts from sort yard runoff
7S	1	Weyerhaeuser Sawmill	%S, TOC, GS, WF, Metals, Semiv.	Screen for mill runoff impacts
8S	1	Saginaw Mill	%S, TOC, GS, WF, Metals, Semiv,. Form.	Screen for groundwater discharge impacts from mill waste
9S	1	Slip 1 Fill Main Ditch	%S, TOC, GS, Metals, Semiv.	Screen for fill impacts
10S	1	Slip 1 Fill West Ditch	%S, TOC, GS, Metals, Semiv.	Screen for fill impacts
11S	1	Aberdeen Dock Outfall	%S, TOC, GS, WF, Metals, Semiv.	Screen for runoff impacts
12S	1	Chehalis Bridge Marine Railway	%S, TOC, GS, Metals, Semiv., Butyltins	Screen for historical marine operation impacts
13S	1	T-Dock Railway	%S, TOC, GS, Metals, Semiv., Butyltins	Screen for historical marine operation impacts
14S	1	Chip Facility Ditch	%S, TOC, GS, WF, Metals, Semiv.	Screen for runoff impacts
15S	1	Background	%S, TOC, GS, WF, Metals, Semiv., Butyltins, Form.	Determine background levels of chemicals of concern

%S = Percent Solids
TOC = Total Organic Carbon
GS = Grain Size
WF = Wood Fibers
Metals = Copper, Lead, Mercury, and Zinc
Semiv.= Semivolatile Organics
Butyltins = Mono, di-, and tri-butyltin
Form = Formaldehyde

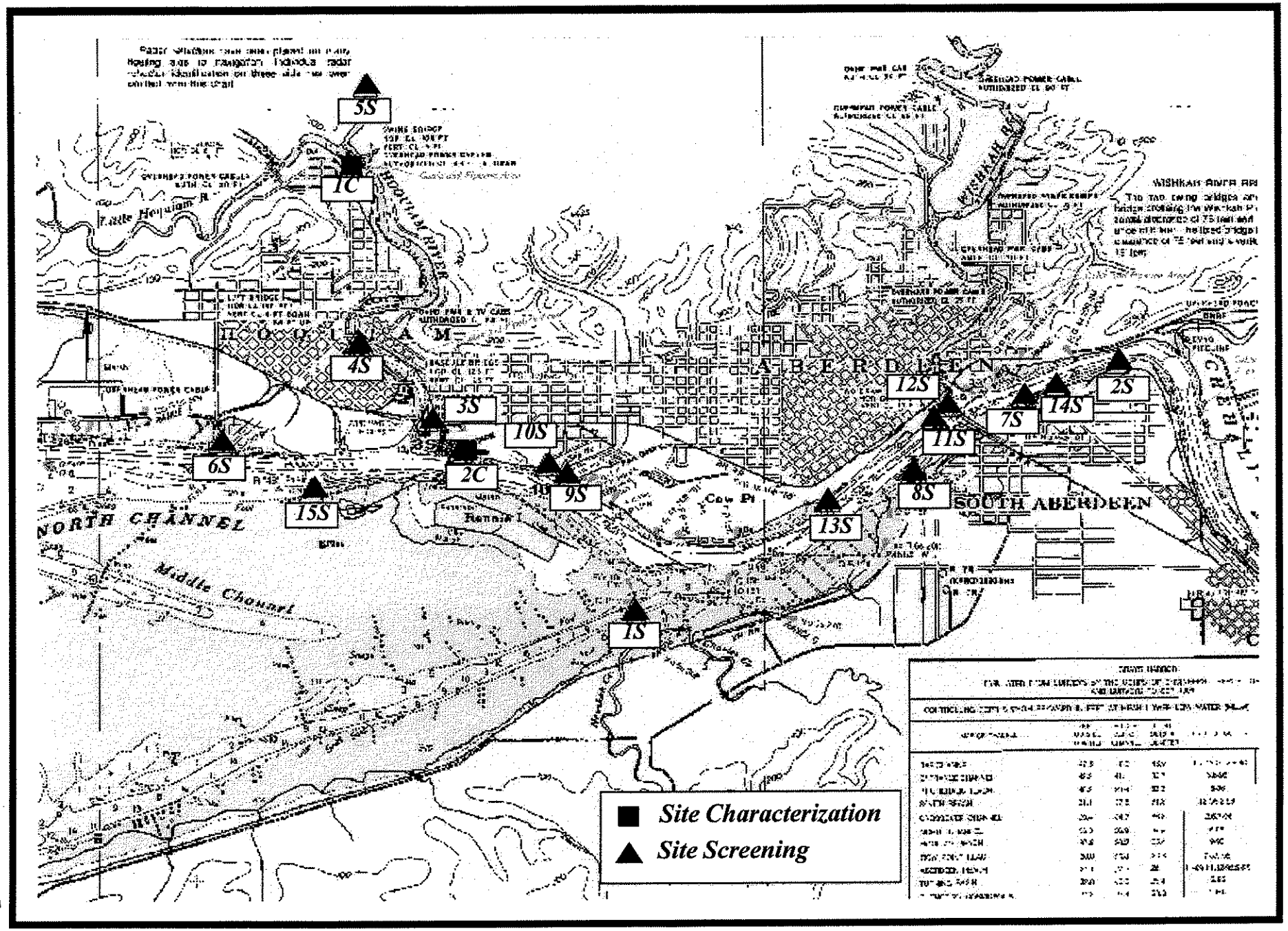

Figure 2: Station Locations in Grays Harbor

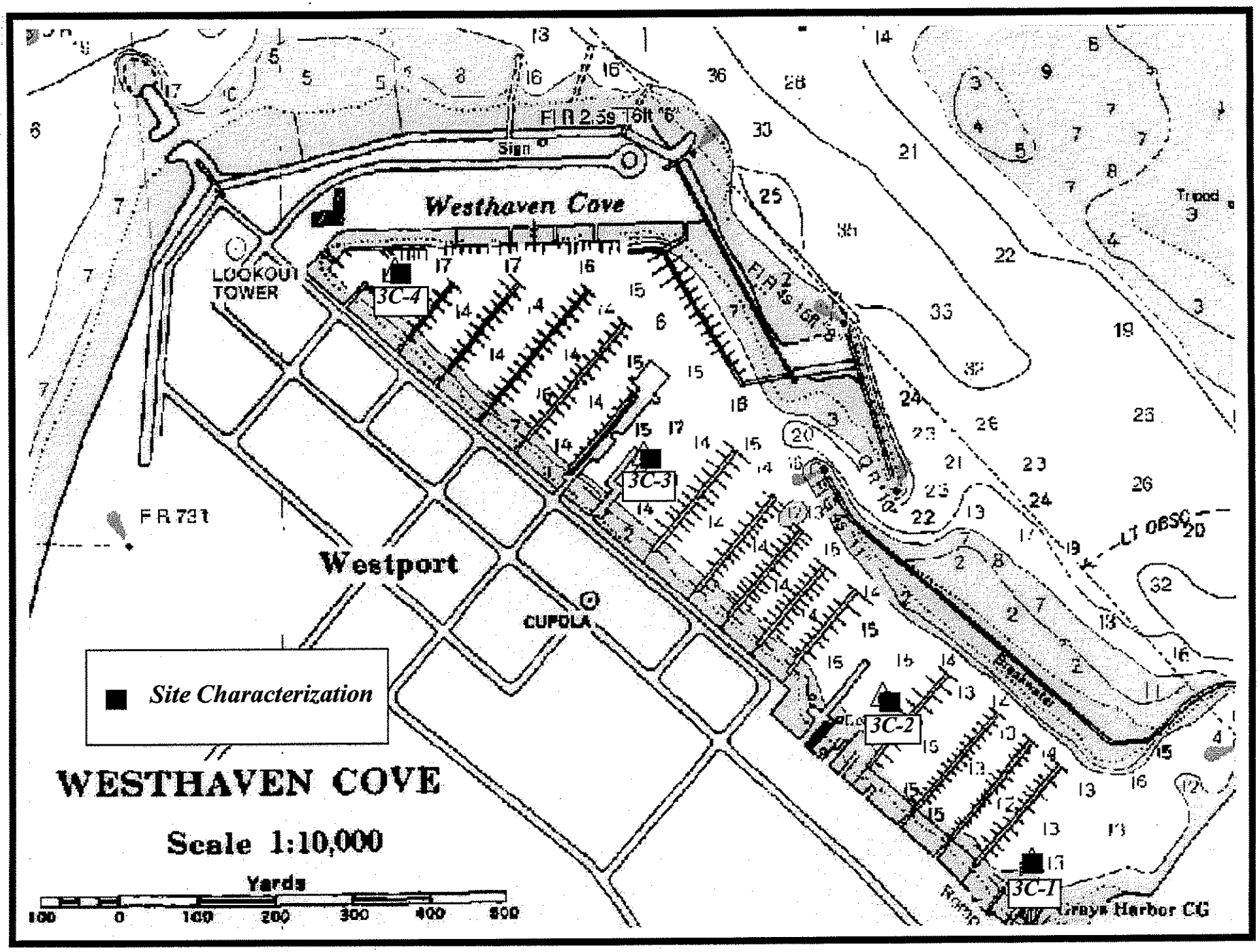

Figure 2 (cont): Station Locations in Westhaven Cove.

amount of Rose Bengal stain was also added to the samples for wood fibers and biological evaluation in the field, to aid in detection of protoplasm or microbiogenic components.

All utensils used to manipulate the samples (stainless steel scoops and buckets) were pre-cleaned by washing with Liquinox® detergent, followed by sequential rinses with tap water, dilute (10%) nitric acid, deionized water, and pesticide-grade acetone. The equipment was then air-dried and wrapped in aluminum foil. The same procedure was used to pre-clean the grab before going into the field. Between stations, cleaning of the grab consisted of thoroughly brushing with on-site water. If oil or visible contamination was encountered, the grab was cleaned between samples with a Liquinox® detergent wash followed by a rinse with on-site water.

All samples were placed on ice in coolers immediately after collection and transported to the Ecology Manchester Environmental Laboratory (MEL) within one-to-two days. Chain-of-custody was maintained throughout the sampling.

Analysis and Data Quality

MEL, or a contract laboratory selected by MEL, conducted all chemical analysis for the project. A summary of the analytical methods and laboratories used for this project are shown in Table 2.

Table 2. Analytical Methods and Laboratories used for the Grays Harbor Sediment Evaluation Study.

Analyte	Method	Reference	Laboratory
Percent Solids	Gravimetric (160.3)	PSEP, 1996	MEL
Total Organic Carbon	Combustion/CO2 Measurement @ 70°C (9060)	PSEP, 1996	MEL
Grain Size	Sieve and Pipette	PSEP, 1996	Rosa Environmental
Wood Fibers	Gravimetric	In-House	Puget Sound Ecosystems
Meiofauna	Visual Count	In-House	Puget Sound Ecosystems
Copper, lead, and zinc	ICP (200.7)	PSEP, 1996	MEL
Mercury	CVAA (245.5)	PSEP, 1996	MEL
Semivolatiles	GC/MS (8270)	PSEP, 1996	MEL
Butyltins	GC/MS-SIM	PSEP, 1996	MEL
Formaldehyde	Purge and Trap GC/MS (8315A)	EPA, 1995	MEL

Quality of the data generated was assessed with the following samples and quality control checks: field and laboratory duplicates, matrix spikes, internal standards, surrogate spikes, method blanks, and laboratory control samples. Staff at MEL performed a detailed quality assurance review of the data package produced. Quality control limits recommended by PSEP were considered in this evaluation. A copy of the case narratives for these reviews is included in Appendix B.

Overall precision (sampling + laboratory analysis) of the dataset was evaluated by calculating the relative percent difference (range in concentrations/mean concentration expressed in percent) between detected values in blind field duplicates (a single sample homogenized and split in the field). These data indicate that overall precision of the dataset was good, with variability of the results being <20% in most instances. Notable exceptions were mercury (46%), 4-methylphenol (37%), and dibutyltin chloride (92%) which had a higher degree of variability associated with the results.

No major analytical problems were encountered in the analysis of samples for the project, with the exceptions noted below. Consequently the data generated are considered acceptable for use with the qualifiers listed in the data tables.

Tributyltins results were qualified as estimates due to low matrix spike recoveries (50%). Monobutyltins were qualified as estimates since it was not possible to calculate spike recoveries due to the low spiking levels relative to the native sample concentrations. In several instances detection limits for di-n-butyl phthalate, 2-methylphenol, 2,4-dimethylphenol, and benzyl alcohol were higher than the associated sediment quality standards (SQS) for these chemicals.

Unless otherwise noted, all concentrations in this document are reported on a *dry weight basis.*

Results

Contaminant Distribution

Most sediments in the study area can be described as having a thin, gray-to-brown. silty surface layer covering anoxic, black, silty sand at depth. The odor of hydrogen sulfide and various sizes of wood debris were commonly encountered in the samples.

The results of physical and chemical analyses of sediments from Grays Harbor are summarized in Appendix C, Table C1. Percent solids ranged from 29.8% to 67.9%. Total organic carbon (TOC) concentrations ranged from 1.2% to 5.1%. The mean TOC content was 2.9%. The highest TOC concentration was present at station 8S near the Saginaw Mill site (5.5%) where a large amount of wood debris was present. Sediments near the Weyerhaeuser Sort Yard also had a relatively high TOC content (5.1%). Grain size distributions are displayed in Figure 3. These data indicated that the majority of samples collected were composed of silt and clay size particles. Exceptions were noted at stations 1C-2, 2C-3, 1S, 12S, 13S, and 15S where the samples were predominately composed of sandy material.

Metals concentrations were low in all sediments analyzed with the following exceptions: Mercury was elevated at two sites near the Grays Harbor Paper Mill (2C-1= 0.48 mg/kg; and 2C-2= 0.78 mg/kg). High copper concentrations were measured on a waste material pile (1800 mg/kg) along the right bank (facing downstream) of the Hoquiam River near the mouth and adjacent to an abandoned marine railway (940 mg/kg) on the right bank of the Chehalis River near the Chehalis River Bridge (12S).

As was the case for metals, concentrations of most organic compounds were low in Grays Harbor sediments. With the exception of polynuclear aromatic hydrocarbons (PAH) and bis(2-ethyl hexyl)phthalate, detected concentrations of semivolatile organics were typically <500 ug/kg. Relative to other locations, PAH concentrations were elevated at the T-dock marine railway (13S), one site near the Grays Harbor Paper Mill (2C-2), and adjacent to the Weyerhaeuser Sawmill (7S). The distribution of low molecular weight PAH (LPAH) and high molecular weight PAH (HPAH) in sediments is displayed in Figure 4. These data are shown on an organic carbon normalized basis to reduce the variability associated with differences in TOC content of the samples. At all sites, the sum of HPAH exceeded the sum of LPAH.

This enrichment of HPAH relative to LPAH is commonly observed in environmental samples since weathering processes such as evaporation, photochemical oxidation, dissolution, and microbial degradation can preferentially remove PAHs with molecular weights less than that of fluoranthene (Merrill and Wade, 1985). The distribution of PAHs observed indicates that the sediments sampled have undergone weathering. This suggests that historical PAH sources are primarily responsible for the contamination observed.

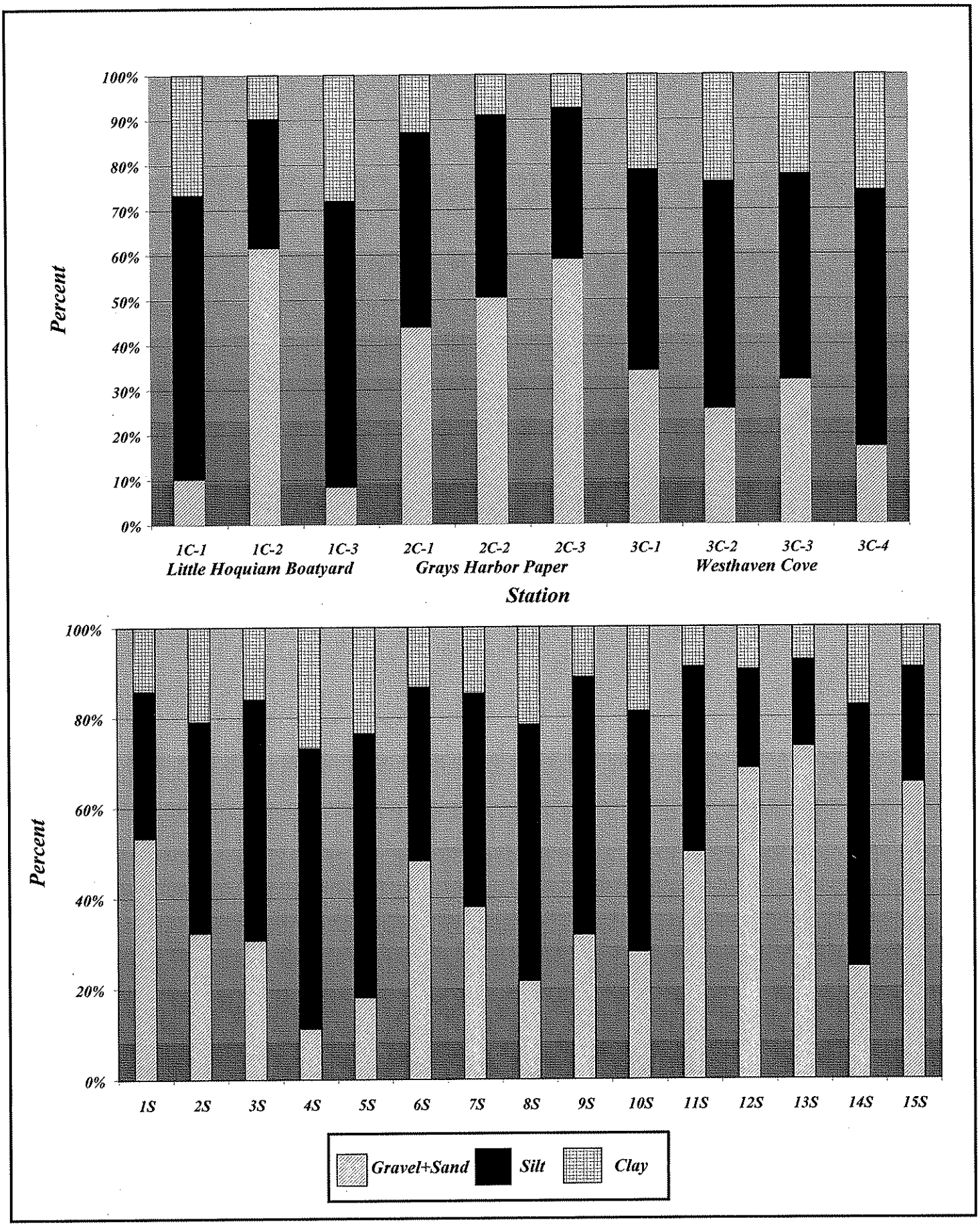

Figure 3: Grain Size Composition of Grays Harbor Sediments

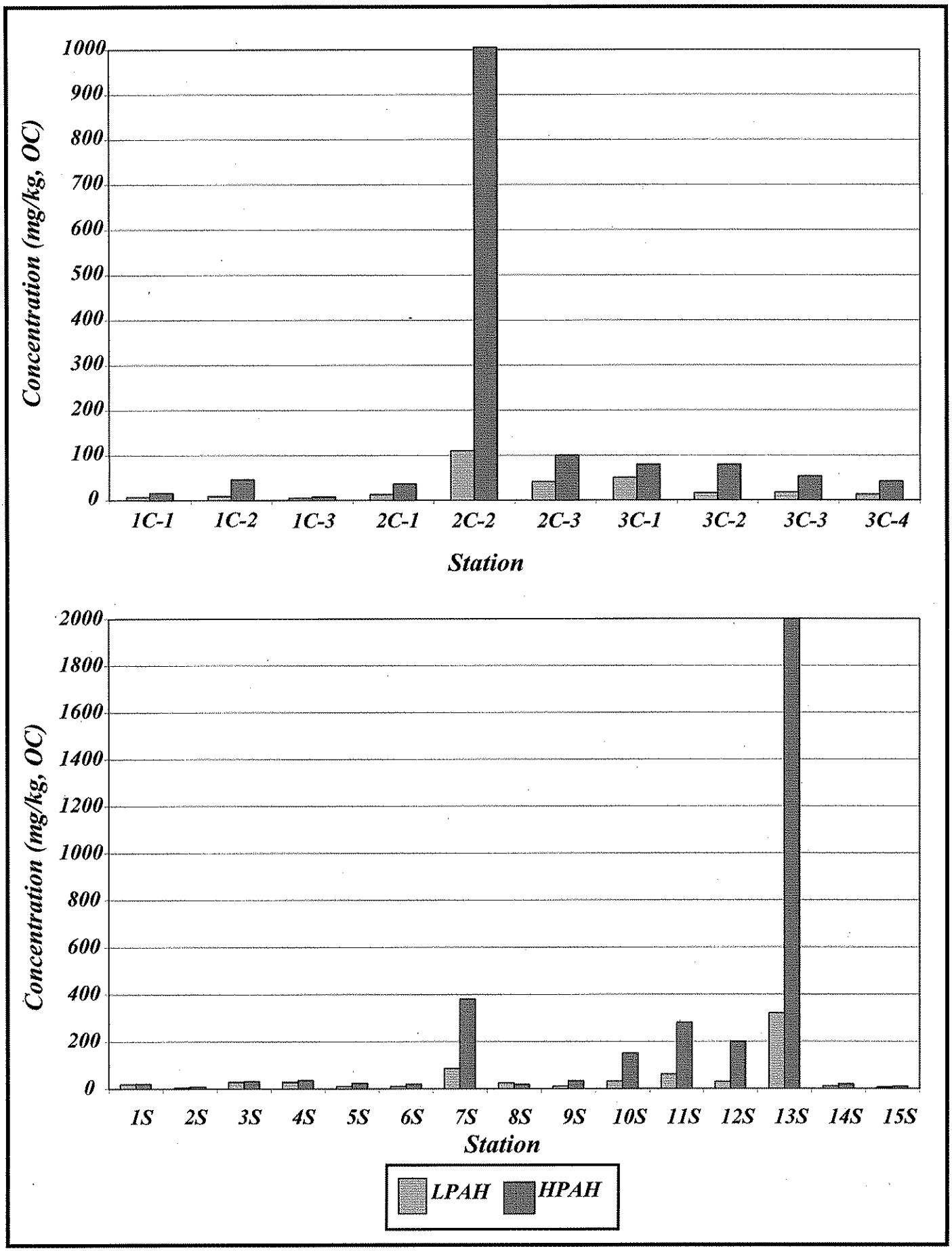

Figure 4: PAH Distribution in Grays Harbor Sediments.

High concentrations of bis(2-ethyl hexyl) phthalate were measured at two sites in Westhaven Cove (3C-1= 64,000 ug/kg; and 3C-4= 21,000 ug/kg). Elevated bis(2-ethyl hexyl) phthalate (2,600 ug/kg) and butyl benzyl phthalate (400 ug/kg) levels were also noted near the Aberdeen Dock Outfall (11S).

Two locations where a large amount of wood debris was observed in the sediment had elevated concentrations of 4-methyl phenol. These sites were located near the Grays Harbor Paper Mill (580–1,900 ug/kg) and the Saginaw Mill (840 ug/kg).

Previous investigation at the abandoned Saginaw Mill site had identified formaldehyde contamination in soil and groundwater (CH2MHill, 1997). Due to concerns that offsite migration of formaldehyde was occurring, this chemical was added to the list of target analytes at station 8S. Formaldehyde was detected at a concentration of 19,000 ug/kg in sediment adjacent to the site. Formaldehyde was also present at the background station (15S) at a concentration of 28,000 ug/kg.

Concentrations of butyltins in the Grays Harbor samples were generally low ranging from 2.2 to 270 ug/kg with a mean of 34 ug/kg. An exception was site 13S (T-dock railway) where elevated levels of monobutyltin chloride (500 ug/kg), dibutyltin chloride (160 ug/kg), and tributyltin chloride (270 ug/kg) were present. Mono- and di-butyltin are released into the environment through multiple sources. Most of the time, their occurrence is related to degradation pathways of TBT. However, there is increasing evidence that MBT and DBT may be released directly into the environment via discharge pipes and sewage treatment discharges (Quevauviller et al., 1991). It is thought that the butyltins leach to the water in pipes (such as PVC) and are later discharged to the environment. In addition MBT and DBT are used as a catalyst in the manufacture of polyurethane foams (EPA, 1996).

Wood Fibers and Meiofauna

To evaluate potential impacts from wood waste in Grays Harbor the amount of fine wood present in the sediments was estimated. The results of wood fibers analysis are summarized in Figure 5. The wood fiber content of Grays Harbor sediments ranged from 28 to 570 mm^3/g sed with an average of 220 mm^3/g sed. The highest levels were measured at station 2C-1 located below the chip hopper at the Grays Harbor Paper Mill (570 mm^3/g sed) and station 8S near the abandoned Saginaw Mill (530 mm^3/g sed). On a weight basis, wood fibers comprised approximately 16% and 15% of the samples, respectively, at these two locations. Field observations at Grays Harbor Paper noted that wood debris was being spilled onto the intertidal area below the chip hopper at the time of sampling. A large amount of wood debris was also noted on the beach adjacent to the Saginaw Mill site. The average wood fiber content of sediments sampled in Grays Harbor was 6.5%.

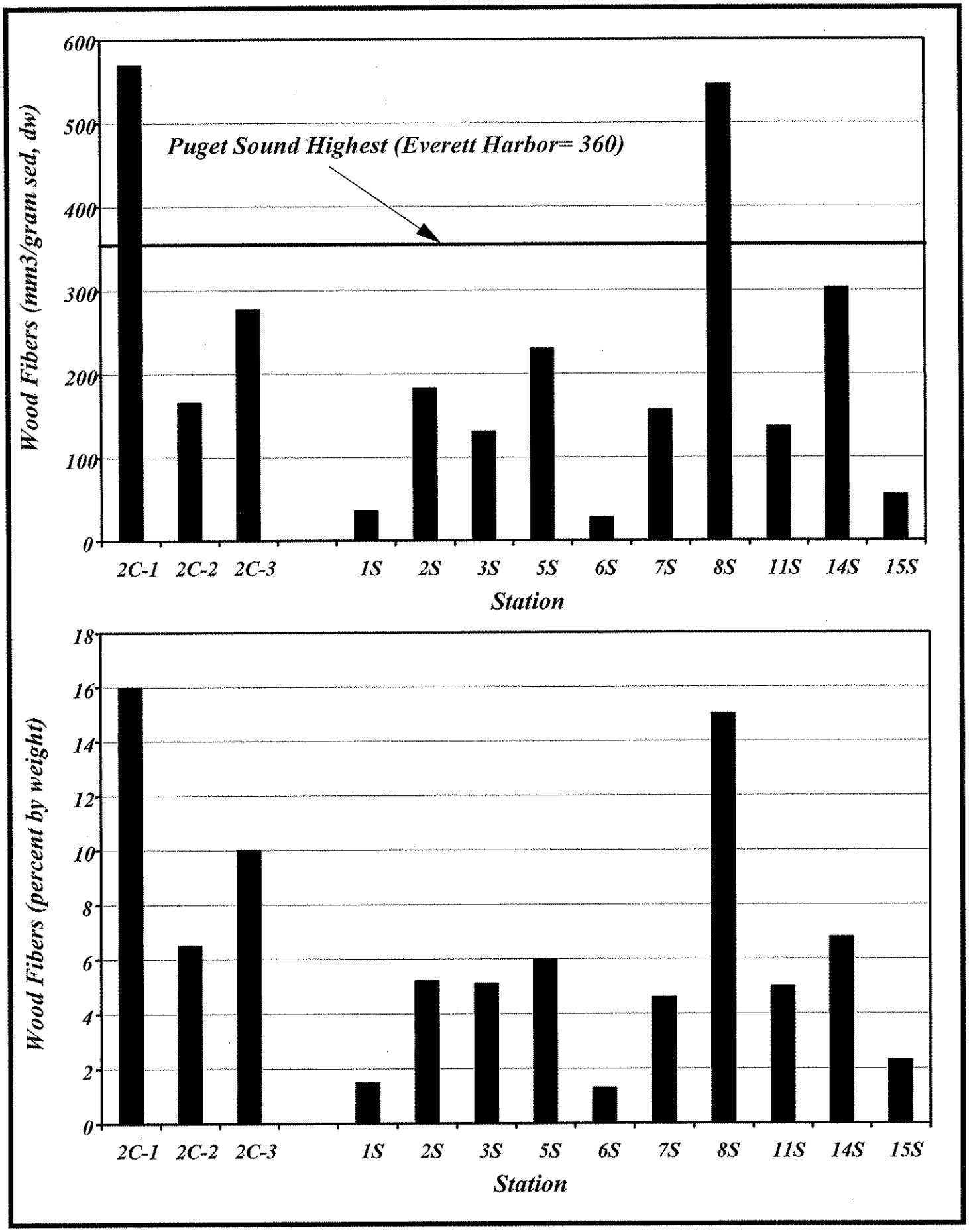

Figure 5: Wood Composition of Grays Harbor Sediments.

For comparison, throughout most of Puget Sound concentrations of fine wood fibers are reported to be typically <10 mm^3/g sed and make up <1.0% of the sediment sample. The highest concentration report for Puget Sound from one investigation that used similar methods was in the Everett area: 360 mm^3/g sed (Harmon, 1998).

In addition to determining the wood fiber content of the samples, a limited screening of meiofauna was conducted. The diatoms and foraminifers identified in the samples are similar to those found on the major river deltas of Puget Sound. Freshwater pennate diatoms were most abundant in the two samples having the highest wood concentrations (2C-1 and 8S). The Saginaw Mill samples appeared to be more diverse then those collected near the Grays Harbor Paper Mill. Pelagic diatoms, represented by the centric diatoms *Coscinodiscus spp.* were present in low numbers, which might suggest high sedimentation rates are occurring in Grays Harbor. Harpacticoid copepods, expected to be abundant this time of year, were also present in low numbers. Harpacticoid copepods are one of several prey items utilized by certain species of juvenile salmonids.

The reader is cautioned about drawing strong conclusions from the meiofauna results, since the sampling procedures used were not optimal for characterization of meiofauna. Most of these organisms tend to be associated with surface sediments (0-2cm). Compositing to a depth of 10cm probably diluted the meiofauna population. Sampling specifically designed to assess biological components needs to be performed to get accurate results. Data for the wood fibers analysis and meiofauna evaluation is included in Appendix B.

Discussion

Comparison with Sediment Standards

In 1991, Ecology adopted the Sediment Management Standards (SMS), WAC 173-204 (Ecology, 1995a). The standards include chemical concentrations criteria, biological effects criteria, and human health criteria which are used to identify sediments that have no adverse affect on biological resources and pose no significant risks to human health. The Sediment Quality Standards (SQS) represent the level below which no adverse effects would be observed in benthic communities. The standards also establish Cleanup Screening Levels (CSL) which represent the upper limit of allowable minor adverse effects on biological resources. Contaminant concentrations above the CSL are a high priority for remediation activities. Results from the Grays Harbor sediment investigation are compared to the SMS in Table 3.

Site Characterization

No chemicals were detected above the SMS in sediment from the Hoquiam River adjacent to the Little Hoquiam boatyard. At the Grays Harbor Paper Mill, six individual chemical criteria were exceeded. Problem chemicals included mercury, fluoranthene, benzo(a)anthracene, chrysene, sum HPAH, and 4-methylphenol. Bis(2-ethyl hexyl) phthalate was the only chemical that exceeded chemical criteria in sediments from Westhaven Cove.

To determine if a sediment station cluster of potential concern (SCPC) exists at a site, a minimum of three sediment stations are selected that 1) are spatially and chemically similar, and 2) have the highest concentration of each chemical or the highest degree of biological effects. The average concentration for the contaminant or biological effect at the three stations is then determined. If the average contaminant concentration or biological effect for any three stations identified exceeds the applicable CSL, then the station cluster is defined as a SCPC (Ecology, 1995a).

Based on the above analysis, sediments adjacent to the Grays Harbor Paper Mill would be classified as a "SCPC" based on concentrations of 4-methylphenol (mean of three= 1100 ug/kg). This designation indicates that this area should be scored as a potential sediment cleanup site and be considered for further characterization sampling. In addition, sediments within Westhaven Cove had high enough levels of bis(2-ethyl hexyl) phthalate at two discontinuous stations (mean of two highest= 1,800 ug/kg) to warrant further investigation.

Site Screening

Of the 14 locations that had a single site screened for chemical contamination, six had one or more chemical concentrations that exceeded the SMS. The greatest number

Table 3: Comparison of Grays Harbor Sediment Results to Sediment Management Standards

Location	Little Hoquiam Boatyard			Grays Harbor Paper			Westhaven Cove				SMS	
Station	1C-1	1C-2	1C-3	2C-1	2C-2	2C-3	3C-1	3C-2	3C-3	3C-4		
Sample No. 14-	8230	8231	8232	8233	8234	8235	8236	8237	8238	8239	SQS	CSL
Conventionals (%)												
Total Organic Carbon	2.9	1.6	3.5	3.6	2.0	2.3	2.4	2.2	2.6	2.4	-	-
Metals (mg/kg,dry)												
Copper	62	83	67	46	68	50	35	42	39	52	390	390
Lead	7.7	9.7	7.2	23	57	31	6.8	6.9	6.6	7.7	450	530
Mercury	0.078	0.062	0.082	**0.48**	**0.78**	0.28	0.07	0.11	0.069	0.077	0.41	0.59
Zinc	83	89	86	68	130	94	76	88	79	90	410	960
Semivolatiles (mg/kg, organic carbon)												
Acenaphthene	0.3 j	0.4 j	0.21 j	1.1	14	4.8	6.7	1.2 j	0.85 j	0.83 j	16	57
Acenaphthylene	0.66 j	2.3 j	0.4 j	0.33 j	4.7	1.9 j	0.58 j	0.82 j	0.81 j	3.2 u	66	66
Naphthalene	2.2 j	1.6 j	1.3 j	2.3	16	8.7	2.5 j	1.5 j	1.7 j	1.6 j	99	170
Fluorene	0.69 j	0.75 j	0.49 j	1.5	12	4.8	6.3	1.9	1.4	1.3 j	23	79
Anthracene	0.69 j	1.4 j	0.37 j	1.6 j	26	5.7	4.2	3.6	1.7 j	2.0 j	220	1200
Phenanthrene	2.7	2.4	1.9	6.7	39	16	28	7.0	11	3.8	100	480
Sum LPAH	7.2 j	8.8 j	4.9 j	13 j	110	41 j	50 j	16 j	17 j	13 j	370	780
Fluoranthene	3.4	6.3	2.7	12	**550**	33	28	25	18	13	160	1200
Benzo(a)anthracene	1.4 j	4.3	0.91 j	2.7	**110**	8.7	5.4	5.4	3.3	3.8	110	270
Chrysene	2.2 j	6.3	1.1 j	3.9	**140**	12	8.3	4.2	5.4	5.0	110	460
Pyrene	3.8	6.9	2.8	11	500	28	24	12	15	13	1000	1400
Benzofluoranthenes	3.0 j	11	2.3 u	4.4 j	100	13	7.9	11 j	7.7	7.9	230	450
Benzo(a)pyrene	0.62 j	6.3	1.1 u	1.3	36	4.8	3.0	3.4	2.6	1.6 u	99	210
Dibenzo(a,h)anthracene	2.9 u	1.9 j	2.3 u	0.67 j	9.0	2.5 u	2.7 u	1.2 j	1.0 j	3.2 u	12	33
Indeno(1,2,3-cd)pyrene	1.0 j	3.6 j	6.0 u	1 j	15	2.9 j	1.7 j	2.3 j	2.4 j	1.5 j	34	88
Benzo(g,h,i)perylene	1.9 uj	3.9 uj	1.5 uj	1.5 uj	18 j	3.3 uj	2.2 uj	3.4 uj	2.7 uj	2.5 uj	31	78
Sum HPAH	16 j	46 j	7.4 j	36 j	**1500** j	100 j	79 j	79 j	53 j	42 j	960	5300
2-Methylnaphthalene	0.52 j	0.58 j	0.37 j	0.81 j	7.0	3.0	1.6	0.88 j	0.85 j	0.79 j	38	64
Dibenzofuran	0.69 j	0.48 j	0.54 j	1.4	9.0	3.9	4.6	1.6 j	1.3 j	1.0 j	15	58
N-nitrosodiphenylamine	2.9 u	3.3 u	1.2 u	1.9 u	2.7 u	2.5 u	2.7 u	2.1 j	1.4 u	3.2 u	11	11
Diethylphthalate	3.8	3.3 u	2.3 u	0.023 j	2.7 u	0.43 j	2.7 u	3.4 u	2.8 u	3.2 uj	61	110
Dimethyl phthalate	0.76 j	3.3 u	0.43 j	1.9 u	2.7 u	2.5 u	0.63 j	1.9 j	2.8 u	1.3 j	53	53
Di-n-butyl phthalate	310 uj	62 uj	49 uj	7.2 uj	8.5 uj	300 u	40 uj	46	120 u	160 uj	220	1700
Bis(2EH)phthalate	4.5	3.3	2.5	1.9 u	5.5	7.0	**2700**	9.6 uj	2.8 u	**880**	47	78
Semivolatiles (ug/kg, dry)												
Phenol	130 uj	52 uj	150 uj	370	290	180 uj	49 uj	70 uj	73 uj	76 uj	420	1200
4-Methylphenol	100	52 j	120	**850**	580	**1900**	65 u	38 j	45 j	48 j	670	670
2,4-Dimethylphenol	85 u	53 u	82 u	69 u	13 j	58 u	65 u	70 u	73 u	76 u	29	29
Pentachlorophenol	210 u	130 u	210 u	110 j	190	100 j	160 u	170 u	180 u	190 u	360	690
Benzyl alcohol	42 u	27 u	23 j	35 u	770 uj	29 u	13 j	12 j	17 j	15 j	57	73

u= Not detected at detection limit shown
uj= Estimated detection limit
j=Estimated concentration
Bold Concentrations exceed criteria
SMS= Ecology Sediment Management Standards (WAC 173-204): SQS= Sediment Quality Standard; CSL= Cleanup Screening Level
Underlined values= Detection limit exceeded associated criteria

Table 3 (cont): Comparison of Grays Harbor Sediment Results to Ecology' Sediment Management Standa

Location	Weyco Paper		Weyco Sort Yard		RR Bridge Ditch		Hoquiam R. Piles		Hoquiam Plywood		Hoquiam Sort Yard		Weyco Sawmill		SMS	
Station	1S		2S		3S		4S		5S		6S		7S			
Sample No. 14-	8241		8242		8243		8244		8245		8246		8247		SQS	CSL
Total Organic Carbon	1.6		5.1		2.6		2.7		4.4		1.4		2.9		-	-
Metals (mg/kg,dry)																
Copper	52		55		82		**1800**	j	69		41		120		390	390
Lead	5.8		7.8		48		73		7.5		4.6		34		450	530
Mercury	0.067		0.074		0.082		0.071		0.077		0.048		0.11		0.41	0.59
Zinc	75		100		110		290		88		72		290		410	960
Semivolatiles (mg/kg, OC)																
Acenaphthene	1.80	j	0.84	u	2.9		1.3	u	2.1	u	0.46	j	7.2		16	57
Acenaphthylene	1.1	j	0.39	j	3.4		2.9		1.1		1.1	j	1.9		66	66
Naphthalene	5.4		1.4	j	11		4.4		4.5		3	j	9		99	170
Fluorene	2		0.72	j	2.4	j	4.4		0.82	j	0.71	j	5.9		23	79
Anthracene	1.7	j	0.31	j	2	j	2.1	j	0.59	j	0.7	j	8.3		220	1200
Phenanthrene	6.9		2		7.7		15		4.3		3.7		55		100	480
Sum LPAH	19	j	4.7	j	29	j	29	j	11	j	10	j	86		370	780
Fluoranthene	8.1		2.5		8.8		8.5		6.8		5.6		79		160	1200
Benzo(a)anthracene	1.8	j	0.61	j	1.7	j	2.3	j	1.8	j	4.1	u	26		110	270
Chrysene	1.9	j	1.2	j	3.1		4.4		2.7		2.5	j	41		110	460
Pyrene	7.5		2.9		8.8		9.6		6.1		6.2		76		1000	1400
Benzofluoranthenes	3.8	u	1.5	j	5.4	j	4.8	j	3.6	j	3.8	j	69		230	450
Benzo(a)pyrene	0.81	j	0.47	j	1.8	j	4.1		1.2	j	2.1	u	31		99	210
Dibenzo(a,h)anthracene	3.8	u	1.7	u	1.3	u	2.7	u	1.1	u	4.1	u	5.9		12	33
Indeno(1,2,3-cd)pyrene	1.1	j	0.57	j	1.7		2	j	1.1		1.1	j	22		34	88
Benzo(g,h,i)perylene	2.4	uj	1.3	uj	2.5	uj	3.4	uj	1.7	uj	2.8	uj	18		31	78
Sum HPAH	21	j	9.8	j	32	j	36	j	23	j	19	j	380		960	5300
1,4-Dichlorobenzene	3.8	u	1.7	u	2.5	u	2.7	u	2.1	u	4.1	u	2.4	u	3.1	9
2-Methylnaphthalene	1.1	j	0.39	j	1.7	j	5.6		0.73	j	0.79	j	3		38	64
Dibenzofuran	1.6	j	0.45	j	2.5		2.1		1.1		0.65	j	7.6		15	58
N-nitrosodiphenylamine	3.8	u	1.7	u	2.5	u	2.7	u	2.1	u	4.1	u	2.4	u	11	11
Diethylphthalate	2.7	j	0.77	j	2.5	u	2.7	u	1.1	uj	4.1	u	1.2	u	61	110
Dimethylphthalate	3.8	u	1.7	u	2.5	u	2.7	u	2.1	u	4.1	u	2.4	u	53	53
Butylbenzylphthalate	3.8	u	1.7	u	1.3	u	2.7	u	1.1	u	4.1	u	1.2	u	4.9	64
Bis(2EH)phthalate	3.8	uj	3.5	uj	2.5	uj	7.4	uj	3.9	uj	5.2		5.9	uj	47	78
Semivolatiles (ug/kg, dry)																
Phenol	60	uj	100	uj	94	uj	160	uj	370		41	uj	67	uj	420	1200
2-Methylphenol	60	u	87	u	66	u	56	j	**79**	j	57	u	70	u	63	63
4-Methylphenol	350		320		240		160		380		44	j	65	j	670	670
2,4-Dimethylphenol	60	u	87	u	33	u	27	j	**46**	j	57	u	35	u	29	29
Pentachlorophenol	150	u	220	u	110	j	180	u	230	u	140	u	130	j	360	690
Benzyl alcohol	8	j	43	u	13	j	17	j	45	j	29	u	26	j	57	73

u=Not detected at detection limit shown
uj= Estimated detection
j= Estimated concentration
Bold Concentrations exceed criteria
SMS= Ecology Sediment Management Standards (WAC 173-204)
SQS= Sediment Quality Standards
CSL= Cleanup Screening Level
Underlined values= Detection limit exceeded associated criteria

Table 3(cont): Comparison of Grays Harbor Sediment Results to Ecology' Sediment Management Standards.

Location	Saginaw Mill		Slip 1 Main		Slip 1 West		Aberdeen Dock		Chehalis Railway		T-Dock Railway		Chip Facility		Background		SMS	
Station	8S		9S		10S		11S		12S		13S		14S		15S			
Sample No. 14-	8248		8250		8251		8252		8253		8254		8255		8256		SQS	CSL
Total Organic Carbon	5.5		4.8		3.6		3.1		2.1		1.2		4.4		1.4		-	-
Metals (mg/kg,dry)																		
Copper	61		62		63		150		**940**		230		64		44		390	390
Lead	14		21		32		65		210		57		11		3.5		450	530
Mercury	0.096		0.1		0.092		0.14		0.06		0.035		0.08		0.049		0.41	0.59
Zinc	84		120		140		150		240		130		97		69		410	960
Semivolatiles (mg/kg, OC)																		
Acenaphthene	1.4	j	2.3	u	1.4	j	2.9		0.95	j	23		0.68	j	3.7	u	16	57
Acenaphthylene	3.3		0.54	j	1.2		1.2		1	j	2.3		1.3		0.61	j	66	66
Naphthalene	11		2		4.7		3.9		3.6		24		3.9		2.1		99	170
Fluorene	1.8		0.75	j	1.8	j	3.9		1.3	j	**26**		0.91	j	0.55	j	23	79
Anthracene	1.2	j	1.2	j	3.1		8.7		2.5	j	33		0.68	j	0.59	j	220	1200
Phenanthrene	6.4		5.6		19		42		21		**210**		3.6		1.9	j	100	480
Sum LPAH	25	j	10	j	31	j	61		30	j	320		11	j	5.8	j	370	780
Fluoranthene	6.5		8.3		31		61		33		**260**		4.5		2.5		160	1200
Benzo(a)anthracene	1.4	u	2.1	j	8.9		22		17		**180**		1.3	j	3.7	u	110	270
Chrysene	1.3	j	3.3		15		29		26		**230**		3		3.7	u	110	460
Pyrene	7.5		9		33		58		31		430		5		3.6	j	1000	1400
Benzofluoranthenes	1.7	j	5	j	25		45		42		**360**		2.7	j	1.6	j	230	450
Benzo(a)pyrene	0.78	j	2.3	j	13		25		20		**210**		1.2	j	0.86	j	99	210
Dibenzo(a,h)anthracene	0.71	u	0.75	j	2		4.8		4.7		**33**		0.91	u	1.9	u	12	33
Indeno(1,2,3-cd)pyrene	0.65	j	1.7		11		18		15		**120**		0.89	j	0.93	j	34	88
Benzo(g,h,i)perylene	1.1	uj	2.7	uj	11		16		15		**110**		1.5	uj	2	uj	31	78
Sum HPAH	18	j	33	j	150		280		200		**2000**		19	j	9.3	j	960	5300
1,4-Dichlorobenzene	1.4	u	2.3	u	0.44	j	0.52	j	0.16	j	3.8	u	1.7	u	3.7	u	3.1	9
2-Methylnaphthalene	1.3	j	0.61	j	1.4	j	1.7	j	1	j	9.2		0.81	j	0.54	j	38	64
Dibenzofuran	1.3		0.73	j	1.4		2.6		1.4		**16**		0.66	j	0.37	j	15	58
N-nitrosodiphenylamine	1.4	u	1.2	u	2.1	u	1.1	u	2.8	u	3.8	u	0.55	j	3.7	u	11	11
Diethylphthalate	0.71	u	1.2	u	1.1	u	0.41	j	1.4	u	1.8	u	0.55	j	0.93	j	61	110
Dimethylphthalate	1.4	u	1.2	j	0.5	j	2.2	u	2.8	u	3.8	u	1.8	u	3.7	u	53	53
Butylbenzylphthalate	0.71	u	1.1	u	3.6		**13**		1.4	u	1.8	u	0.91	u	1.9	u	4.9	64
Bis(2EH)phthalate	2.4	uj	25	uj	50		**84**		8.6	uj	16	uj	9.1	uj	3.7	u	47	78
Semivolatiles (ug/kg, dry)																		
Phenol	170	uj	95		60	uj	72	uj	45	uj	38	uj	150	uj	110	uj	420	1200
2-Methylphenol	78	u	100	u	76	u	68	u	58	u	45	u	80	u	52	u	63	63
4-Methylphenol	**840**		74	j	150		88		70		26	j	410		120		670	670
2,4-Dimethylphenol	18	j	57	u	38	u	34	u	29	u	22	u	40	u	26	u	29	29
Pentachlorophenol	120	j	330		170	j	160	j	140	u	220		200	u	130	u	360	670
Benzyl alcohol	39	u	36	j	24	j	35		9.3	j	13	j	35	j	15	j	57	73

u=Not detected at detection limit shown
uj= Estimated detection
j= Estimated concentration
Bold Concentrations exceed criteria
SMS= Ecology Sediment Management Standards (WAC 173-204)
SQS= Sediment Quality Standards
CSL= Cleanup Screening Level
Underlined values= Detection limit exceeded associated criteria

of individual violations (12) were measured along the T-dock railway (station 13S). A summary of all chemicals exceeding the SMS criteria is presented in Table 4.

The toxicity and bioaccumulation of tributyltin (TBT) is a complex process that is affected by a number of factors, including organic carbon levels in sediment and water, pH, salinity, clay content, and the presence of inorganic constituents such as iron oxides (EPA, 1996). Due to its complex behavior in the aquatic environment, no sediment quality criteria have been promulgated for TBT in marine sediments. In 1988, the PSDDA agencies developed a interim screening level (SL) for use in the PSDDA program based on best available knowledge of the chemical and its properties (Michelsen, et al, 1996). The interim screening level was set at 30 ug/kg (as Sn). This corresponds to a concentration of 73 ugTBT/kg (as TBT-ion). Exceedance of the interim SL triggers a requirement to perform biological effects testing.

Expressed as TBT ion, concentrations in Grays Harbor sediments ranged from 1.9 to 240 ugTBT/kg with a mean of 32 ugTBT/Kg. The only site in Grays Harbor that exceeded the interim SL was station 13S near the abandoned T-dock railway (240 ugTBT/kg). At the reference site TBT levels were 4.5 ugTBT/kg. The data collected indicate that sediments at the T-dock railway should undergo biological effects testing.

In 1996, an interagency work group was formed to review the available information on TBT, with the goal of developing a site-specific cleanup level for Hylebos Waterway in Tacoma and Harbor Island in Elliott Bay, in support of sediment cleanup activities. The cleanup level determined for Hylebos Waterway is based on a interstitial water concentration of 0.7ug TBT/L which is believed to be protective of many organisms from most acute effects from TBT (EPA, 1996). Applying the EPA equilibrium partitioning approach to this interstitial water level yields a bulk sediment cleanup concentration of 17,500 ugTBT(ion)/kg, OC.

Converted to comparable units (ugTBT/kg, OC) TBT levels measured in Grays Harbor sediments ranged from 58 to 20,000 ugTBT/kg, OC. Sediments near the T-dock railway (20,000 ugTBT/kg, OC) were the only site that exceeded the Hylebos Waterway specific cleanup level. The Hylebos Waterway clean-up level is being provided here for informational purposes only. At the present time sediments outside Hylebos Waterway should be evaluated using the PSDDA/SMS interim screening level of 73 ugTBT/kg mentioned above. The use of interstitial water concentrations for evaluating TBT contamination is under consideration for future adoption in both the PSDDA and SMS programs. However, at the present time this alternative has not been implemented.

No sediment standards have been established for formaldehyde in sediments. The Washington State Model Toxics Control Act (MTCA) Method B carcinogenic cleanup standard for formaldehyde in soil is 33,300 ug/kg (MTCA, 1991). This value is based on a human health risk-based model. Formaldehyde concentrations in sediments adjacent to the Saginaw Mill site (19,000 ug/kg) were well below the MTCA cleanup standard and below levels measured at the background site (28,000 ug/kg).

Table 4. Summary of Criteria Violations in Grays Harbor Sediment Samples.

Location	Station	Chemical	Value	SMS SQS	SMS CSL	Exceedance Factor SQS	Exceedance Factor CSL
Site Characterization							
Grays Harbor Paper	2C-1	Mercury	0.48	0.41	0.59	1.2	-
		4-Methylphenol	0.85	0.67	0.67	1.3	1.3
	2C-2	Mercury	0.78	0.41	0.59	1.9	1.3
		Fluoranthene*	550	160	1200	3.4	-
		Benzo(a)Anthracene*	110	110	270	1.0	-
		Chrysene*	140	110	460	1.3	-
		HPAH*	1500 j	960	5300	1.6	-
	2C-3	4-Methylphenol	1.9	0.67	0.67	2.8	2.8
Westhaven Cove	3C-1	Bis(2EH)Phthalate*	2700	47	78	57	35
	3C-4	Bis(2EH)Phthalate*	880	47	78	19	11
Site Screening							
Hoquiam Waste Piles	4S	Copper	1800 j	390	390	4.6	4.6
Hoquiam Plywood	5S	2-Methylphenol	0.079 j	0.063	0.063	1.3	1.3
		2,4-Dimethylphenol	0.046 j	0.029	0.69	1.6	-
Saginaw Mill	8S	4-Methylphenol	0.84	0.67	0.67	1.3	1.3
Aberdeen Dock Outfall	11S	Butylbenzyl Phthalate*	13	4.9	64	2.7	-
		Bis(2EH)Phthalate*	84	47	78	1.8	1.1
Chehalis R. Railway	12S	Copper	940	390	390	2.4	2.4
T-Dock Railway	13S	Fluorene*	26	23	79	1.1	-
		Phenanthrene*	210	100	480	2.1	-
		Fluoranthene*	260	160	1200	1.6	-
		Benzo(a)Anthracene*	180	110	270	1.6	-
		Chrysene*	230	110	460	2.1	-
		Benzofluoranthenes*	360	230	450	1.6	-
		Benzo(a)Pyrene*	210	99	210	2.1	1
		Dibenzo(a,h)Anthracene*	33	12	33	2.8	1
		Indeno(1,2,3-cd)Pyrene*	120	34	88	3.5	1.4
		Benzo(g,h,i)Perylene*	110	31	78	3.5	1.4
		HPAH*	2000	960	5300	2.1	-
		Dibenzofuran*	16	15	58	1.1	-
		Tributyltin[a]	240	73[a]	-	-	-

Units = all units mg/kg, dry unless otherwise noted

*mg/kg, organic carbon

j = Estimated concentration

SMS = Ecology Sediment Management Standards (WAC 173-204)

SQS = Sediment Quality Standards

CSL= Cleanup Screening Level

a = Interium Screening Level above which biological testing is required (ugTBT/kg)

Regulation of Wood Waste

Wood waste is commonly encountered in aquatic environments of the Pacific Northwest due to the prevalence of lumber, pulp, and paper industries. Wood waste can have a variety of physical and chemical adverse impacts on aquatic life, depending on its form. The majority of adverse impacts from wood waste have been linked to decomposition and breakdown processes that cause organic enrichment and release of toxic compounds. Adverse impacts in sediments included such problems as increased biological oxygen demand; production of ammonia, sulfide, and methane; alteration of benthic communities to pollution tolerant species; and release of chemicals which can be toxic to aquatic life. Compounds released from wood waste include phenols, methylated phenols, benzoic acid, benzyl alcohol, terpenes, and tropolones. The severity of wood waste effects in sediments depends directly on its physical form, the degree of flushing, habitat (freshwater or marine), and type of wood from which the waste is derived. Consequently, adverse impacts of wood waste are site-specific and can vary considerably even within a small area (Kendall and Michelsen, 1997).

Because of its potential to cause adverse impacts to aquatic life, Ecology will require wood waste cleanup at sites when it is demonstrated to be harmful. Like other contaminants for which chemical criteria are not available, sediments contaminated with wood waste and chemical byproducts of the breakdown of wood waste will be assessed through the biological testing procedures (bioassay and/or benthic studies) listed in the SMS (Kendall and Michelsen, 1997). The two highest wood fibers concentrations (by weight) in the present study were measured near the Grays Harbor Paper Mill (16%) and the Saginaw Mill (15%). In addition to wood waste, both sites had chemical contamination (4-methylphenol) above the CSL level. The occurrence of 4-methylphenol at these sites could be related to the presence of wood waste.

Given the size of the area impacted at the Grays Harbor Paper Mill and the obvious source of the wood waste two actions seem warranted. Removal of the heaviest wood deposits from the intertidal area and implementation of best management practices (BMPs) to control the release of wood debris from the facility is probably the most cost- effective approach to addressing the problems noted. If BMPs are not effective in eliminating the loss of wood debris to the intertidal area, capital improvements to prevent spillage at the chip hopper should be considered. The alternative to active remediation and implementation of BMPs would be to conduct biological testing in the impacted area to see if adverse biological effects are present.

As a broader issue, biological sampling should be considered for areas in Grays Harbor with a significant amount of wood waste, to determine if healthy benthic communities are present.

Comparison with Other Data on Grays Harbor Sediments

To put the results from the present investigation into perspective data from other sediment investigations in Grays Harbor are summarized in Table 5. In contrast to the areas sampled in the present study (primarily backwaters and intertidal areas), most of the samples in these investigations were collected from the main navigational channel in Grays Harbor and the Chehalis River.

Table 5. Concentrations of Selected Chemicals in Grays Harbor Bottom Sediments from Various Surveys.

Survey	N	TOC (%)	Cu (mg/kg)	Hg (mg/kg)	LPAH (ug/kg)	HPAH (ug/kg)	4-Methylphenol (ug/kg)	Bis(2EH)Phthalate (ug/kg)
Present Study	**26**	**2.6 (1.2-5.5)**	**62 (39-1800)**	**.078 (0.035-0.78)**	**490j (81-3800)**	**1200j (130-29000)**	**130j (26-1900)**	**170j (53-64000)**
Grays Harbor (Johnson and Coots, 1989)	11	1.6	45	.044	130j	750j	100j	95j
Chehalis R. & N.Channel (USACE, 1994)	18	2.2	57	.03	36	63	33u	33u

Values shown are: median and (range)
j = Estimated concentration

Despite spatial differences in the areas sampled, relatively good agreement was seen between median concentrations in all three surveys. Exceptions were noted for LPAH and HPAH between the present study and sampling conducted by the Army Corps of Engineers in 1994. Median values from the present study were approximately an order of magnitude higher compared to the Corps data.

Conclusions

Chemical concentrations were low in most of the areas sampled in Grays Harbor. The majority of problems found for metals and organics appear to be localized around specific sites. The lack of widespread chemical contamination observed is probably related to the presence of relatively few large sources of chemical contaminants in the area, in combination with an active sediment transport regime and good flushing which appears to be present in most areas of the Grays Harbor estuary.

Of the three locations subjected to a station cluster analysis (multiple stations were sampled), the first was classified as a SCPC following procedures outlined in the SMS. Sediments near the Grays Harbor Paper Mill were classified as a SCPC based on concentrations of 4-methylphenol. The second (Westhaven Cove), while technically not meeting the definition of a SCPC, had high enough concentrations of bis(2-ethyl hexyl) phthalate at two discontinuous stations to warrant concern. Both these areas should undergo further evaluation. The third site (Little Hoquiam Boatyard) exhibited no chemical violations of the SMS.

Fourteen other locations were screened for chemical contamination. Six of these locations had one or more chemicals, which exceeded the SMS Cleanup Screening Levels. One site (T-dock railway) had TBT levels above the PSDDA interim screening level which requires biological effects testing to be performed.

A variety of wood debris was noted in sediments throughout the area. Fine wood debris comprised approximately 16% and 15% (weight basis) of the sediments sampled near the Grays Harbor Paper Mill and Saginaw Mill, respectively. Besides organic enrichment of the sediments, it is unclear what adverse impacts large amounts of wood waste are having on the benthic community of Grays Harbor. As an initial step, biological testing is suggested to determine whether a healthy benthic community is present in areas with large amounts of wood waste in Grays Harbor.

Recommendations

Based on the results of this study, the following recommendations are made:

- A sediment station cluster of potential concern was noted near the Grays Harbor Paper Mill, based on concentrations of 4-methylphenol (mean of three highest= 1,100ug/kg). Elevated levels of bis(2-ethyl hexyl) phthalate which were high enough to warrant concern were also noted at two discontinuous stations in Westhaven Cove. Both of these areas should undergo further evaluation to determine the magnitude and spatial extent of contamination.

- The six sites listed in Table 6 should be considered for follow-up action, because all had chemicals present at levels above the Sediment Management Standards Cleanup Screening Levels.

Table 6. Summary of Chemicals Exceeding the Cleanup Screening Levels.

Site	Station	Chemical	Concentration	CSL
Hoquiam Waste Piles	4S	Copper	1800j mg/kg	390
Hoquiam Plywood	5S	2-Methylphenol	0.079j mg/kg	0.063
Saginaw Mill	8S	4-Methylphenol	0.84 mg/kg	0.67
Aberdeen Dock Outfall	11S	Bis(2 ethyl hexyl) phthalate	84 mg/kg, OC	78
Chehalis Marine Railway	12S	Copper	940 mg/kg	390
T-Dock Railway	13S	Benzo(a)pyrene Dibenzo(a,h)anthracene Indeno(1,2,3-cd)pyrene Benzo(g,h,i)perylene	210 mg/kg, OC 33 mg/kg, OC 120 mg/kg, OC 110 mg/kg, OC	210 33 88 78

CSL = Cleanup Screening Level
j = Estimated concentration

- Based on comparison with the PSDDA interim screening level for tributyltin (73ugTBT/Kg) sediments near the abandoned T-dock railway (240 ugTBT/Kg) should undergo biological effects testing. Determination of interstitial water levels of TBT may be more appropriate and is under consideration by the PSDDA/SMS programs as an alternative to biological testing. However, this option has not been implemented.

- Best management practices should be implemented at the Grays Harbor Paper Mill to control the release of wood chips into the aquatic environment adjacent to the mill. In addition, removal of the heaviest wood waste deposits from the intertidal area below the chip hopper should be undertaken.

- Benthic infauna sampling should be conducted in several areas that contain a range of wood waste levels to determine if healthy benthic communities are present in these areas and to evaluate a range of biological effects associated with wood waste.

- Sediment traps could be used as a low-cost technique for monitoring transport of fine wood debris and isolating major sources in the inner harbor.

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Appendix A

Sampling Site Descriptions

Table A1: Station Locations and Descriptions for Grays Harbor Estuary Sediment Evaluation Study

I. Site Characterization

Station	Latitude Degrees	Latitude Minutes	Latitude Degrees	Latitude Minutes	Depth @ MLLW (ft)	Date	Time	Description
Little Hoquiam Boatshop								
1C-1	46	59.685	123	53.115	10	3/31/98	1430	Center of ramp
1C-2	46	59.689	123	53.115	13	3/31/98	1500	Northend of ramp @ pier face
1C-3	46	59.687	123	53.107	8	3/31/98	1520	North of ramp
Grays Harbor Paper								
2C-1	46	58.136	123	52.274	Intertidal	3/31/98	840	Below Chip Loading
2C-2	46	58.143	123	52.302	Intertidal	3/31/98	845	End of Pier below bld
2C-3	46	58.130	123	52.328	Intertidal	3/31/98	850	East end main dock
Westhaven Cove								
3C-1	46	54.292	124	6.295	14	4/1/98	1045	Offshore of boat ramp
3C-2	46	54.398	124	6.435	17	4/1/98	1130	Near WA. Crab Outfall
3C-3	46	54.553	124	6.660	17	4/1/98	1230	Near Fuel Pier
3C-4	46	54.671	124	6.894	15	4/1/98	1300	Northend of basin

II. Site Screening

Name	Station	Latitude Degrees	Latitude Minutes	Latitude Degrees	Latitude Minutes	Depth @ MLLW (ft)	Date	Time	Description
Weyerhauser Paper Outfall	1S	46	57.304	123	50.981	8	3/30/98	1530	150' downstream from outfall
Weyerhauser Sort Yard	2S	46	58.615	123	47.333	Intertidal	3/31/98	1012	Mouth of main northend ditch
Railroad Bridge Ditch	3S	46	58.321	123	52.555	Intertidal	3/30/98	1049	100' upstream from mouth
Hoquiam R. Waste Piles	4S	46	58.743	123	53.080	Intertidal	3/31/98	800	Pile at northend of dock
Hoquiam Plywood	5S	47	0.134	123	52.995	0	3/31/98	1500	Southend of main bld
Hoquiam Sort Yard	6S	46	58.209	123	54.094	Intertidal	3/30/98	1630	Tideflats near channel junction
Weyerhauser Sawmill	7S	46	58.437	123	48.034	Intertidal	3/31/98	1045	Near outfall
Saginaw Mill Landfill	8S	46	58.041	123	48.860	Intertidal	3/31/98	1200	Eastend of fill along creek
Slip 1 Fill Main Ditch	9S	46	58.043	123	51.496	Intertidal	3/30/98	1000	In ditch above road berm
Slip 1 Fill West Ditch	10S	46	58.077	123	51.650	Intertidal	3/30/98	940	75' above mouth of ditch
Aberdeen Dock Outfall	11S	46	58.318	123	48.710	Intertidal	3/31/98	930	Adjacent to broken pipe
Chehalis Bridge Railway	12S	46	58.384	123	48.614	Intertidal	3/31/98	1130	Base of abandoned railway
T-Dock Railway	13S	46	57.879	123	49.510	Intertidal	3/31/98	1125	Along abandoned railway
Chip Facility Ditch	14S	46	58.493	123	47.781	Intertidal	3/31/98	950	Banks of main ditch
Background	15S	46	57.941	123	53.415	2	3/31/98	1620	East of red daymark 46A

Table A2: Sample Descriptions for Grays Harbor Estuary Sediment Evaluation Study.

I. Site Characterization

Name	Station	Description
Little Hoquiam Boatshop	1C-1	Very soft brown silty mud
" " "	1C-2	Brown to black silty with wood debris and gravel
" " "	1C-3	Brown to black silt with wood debris
Grays Harbor Paper	2C-1	Gray to brown silty with heavy concentrations of wood chips
" " "	2C-2	Gray to brown silty with wood chips and some cobbles
" " "	2C-3	Gray to brown silty with wood chips and some cobbles
Westhaven Cove	3C-1	Gray to black silt with some sand
" " "	3C-2	Gray to black fine silty sand, organically enriched, H_2S odor
" " "	3C-3	Gray to black silty sand, worms present in grab
" " "	3C-4	Very soft gray/brown to black silt, no odor

II. Site Screening

Name	Station	Description
Weyerhauser Paper Outfall	1S	Gray silt over black material, some shell frag. and worm, oil sheen, no odor
Weyerhauser Sort Yard	2S	Gray brown silty mud over black material, H_2S odor
Railroad Bridge Ditch	3S	Brown to black plastic mud, large wood debris
Hoquiam R. Waste Piles	4S	Gray brown mud with some oil sheen
Hoquiam Plywood	5S	Gray brown silty mud with some oil droplets and sheen
Hoquiam Sort Yard	6S	Gray brown silty sand with some organic debris, no odor
Weyerhauser Sawmill	7S	Gray black silty mud
Saginaw Mill Landfill	8S	Gray to black silty mud with large amount of wood debris
Slip 1 Fill Main Ditch	9S	Black to brown silt with some oil sheen
Slip 1 Fill West Ditch	10S	Thin brown surface layer (1cm) overlaying black silty material with some cobble
Aberdeen Dock Outfall	11S	Gray brown silty sand with black material underneath, some H_2S odor
Chehalis Bridge Railway	12S	Gray to black silty mud
T-Dock Railway	13S	Gray to black material sandy at upper intertidal with silt at lower tide level
Chip Facility Ditch	14S	Silty sand with wood debris
Background	15S	Gray brown silty sand with black material underneath

Appendix B

Case Narratives for Laboratory Analyses

Washington State Department of Ecology
Manchester Laboratory

May 12, 1998

TO: Dale Norton

FROM: Debbie Lacroix, Chemist

SUBJECT: General Chemistry Quality Assurance memo for the Grays Harbor Project

SUMMARY

The data generated by the analyses of these samples can be used without qualifications. Percent solids and TOC 104°C sample numbers 98148231, 98148233 and 98148253 have been qualified as estimates.

SAMPLE INFORMATION

The samples from the Grays Harbor project were received by the Manchester Laboratory on 4-2-98 in good condition.

HOLDING TIMES

All analyses were performed within applicable EPA holding times.

ANALYSIS PERFORMANCE

Instrument Calibration

Where applicable, instrument calibration was performed before each analysis and verified by initial and verification standards and blanks. All initial and continuing calibration verification standards were within the relevant control limits. All balances are calibrated yearly with calibration verification occurring monthly.

Procedural Blanks

All procedural blanks showed no analytically significant levels of analytes.

Precision Data

The results of the duplicate and triplicate analysis of samples were used to evaluate the precision on this sample set. The Relative Percent Differences (RPD) and Relative Standard Deviations (RSD) were within their acceptance windows of +/- 20 % .

Laboratory Control Sample (LCS) Analyses

LCS analyses were within their acceptance windows of +/- 20 %. The certified value for the TOC 70°C LCS with field ID's starting with GBR is 3.348%. The certified value for the LCS with field ID's starting with GER is 1.00%.

Other Quality Assurance Issues

Percent solids and TOC 104°C sample numbers 98148231, 98148233 and 98148253 have been qualified as estimates due to non-homogeneity. There were rocks in the samples that made it difficult to take a homogeneous aliquot. Since the TOC 104°C data is calculated using the percent solids data, these samples were also qualified.

Please call Debbie Lacroix at SCAN 871-8812 with any questions or concerns about this project.

cc: Project File

State of Washington Department of Ecology
Manchester Environmental Laboratory
7411 Beach Dr. East Port Orchard WA. 98366

May 13, 1998

Project: Grays Harbor

Samples: 14-8230-48, 8250-56

Laboratory: Rosa Environmental

By: Pam Covey

Case Summary

These samples required twenty-six (26) Grain Size analyses on sediment using Puget Sound Estuary Protocol (PSEP) method. There was one duplicate analysis requested.

The samples were received at the Manchester Environmental Laboratory on April 2, 1998 and transported to Rosa Environmental on April 8, 1998 for Grain Size analyses.

The analyses were reviewed for qualitative and quantitative accuracy, validity and usefulness.

The results are acceptable for use as reported.

WOOD FIBER CONCENTRATIONS IN BOTTOM SEDIMENT ADJACENT TO WOOD PRODUCT FACILITIES OF GRAYS HARBOR

by Robert A. Harman
Puget Sound Ecosystems
April 25, 1998

Data Report to Washington State Department of Ecology
Environmental Investigations and Laboratory Services Program
Toxic Investigations Section

Subcontract under direction of Dale Norton
GRAYS HARBOR SEDIMENT IMPACTS STUDY-
CHEMICAL SCREENING AND SITE CHARACTERIZATION
Quality Assurance Project Plan

WOOD FIBER CONCENTRATIONS IN BOTTOM SEDIMENT ADJACENT TO WOOD PRODUCT FACILITIES OF GRAYS HARBOR

METHODS USED TO EVALUATE THE GRAYS HARBOR SAMPLES

Sediment samples were collected by DOE personnel using a 0.1 m^2 Van Veen Grab Sampler. Samples were stained with Rose Bengal to aid in the detection of protoplasm or live microbiogenic components of the sediment (Foraminifera, ostracods, & harpacticoid copepods). Their analysis was included to infer possible deleterious conditions of the bottom sediment and environmental changes in the rivers.

The refrigerated sediment samples were first shaken to lessen the adhesive nature of the mud components. Samples were then washed through a 250 Tyler Mesh Screen (60 microns) to separate the muds from the sands and gravels. Oven dried muds were weighed. The dried sand-gravel residues were further dry sieved using 2mm and 0.5 mm screens and weighed to provide a gravel, coarse sand and fine sand fraction (Table 1). Total sample size weights varied from 26.12 grams (station 5S) to 82.47 grams (station 15S).

Separation of the wood fiber and microbiogenic sediment components from the dried sand-gravel fractions was achieved using heavy liquid perchloroethylene (density 1.6). The floated debris was then weighed and volumes determined using a 10 ml graduated cylinder or a graduated 25 ml vial. The debris was tapped to concentrate it and reduce the voids. The dried muds had to be pulverized to obtained their volumes. Therefore, the measured volumes of muds, sand & gravel, and wood debris reflected a bulk volume measurement. Wood fibers were identified by their vascular structures. The percent of floated slag material and pumice were considered in the wood volume values.

DIFFERENCES BETWEEN METHODS USED TO CALCULATE WOOD CONCENTRATIONS AND PERCENT WOOD IN BOTTOM SEDIMENT

A comparison of the cumulative frequency curves of the typical sediment analysis by dry weights (Figure 1) do not show similar trends with those using dry volumes (Figure 2A). This in primarily due to the separation of the coarse and fine wood fraction from the rock-mineral sand and gravel residue. However, the sediment analysis by dry volumes had similar increases and decreases in percents compared to the concentration of wood fibers in cubic millimeters per gram sediment (Figures 2B, 3). A comparison with volume concentrations per total weight sediment or using total sediment volume had similar trends (Figure 4). Percents using either volumes or weights of wood and sediment matched these concentrations (Figures 5, 6). Table 2 ranks station samples in order of the highest and lowest wood concentration for the three methods.

COMPARISON OF GRAYS HARBOR WOOD CONCENTRATIONS WITH THOSE OF PUGET SOUND

All samples from the Grays Harbor river sites are high compared to Puget Sound (see enclosed large P.S. chart). Throughout most of Puget Sound wood fiber concentration are less than 10 cubic millimeters per gram sediment and make up less than one percent of the sediment sample . However, these small concentrations are useful to suggest direction of sediment transport from rivers, lumber and pulp mills, log storage areas, abandoned wooden structures, and sewer outfalls. Areas with the highest concentrations, those exceeding 80 cu mm/gram sediment, are typically located next to wood uses or product facilities (Table 3).

The Everett area has the largest wood concentration, greater than 360 cu mm/gram sediment. Here they are dispersed by currents to adjacent areas that result in heavy wood accumulations on beaches as well as the subtidal foreset beds of the Snohomish River Delta. In these areas excess wood debris appears to inhibit burrowing by benthic organisms or inhibits their respiratory or digestive functions. However, to my knowledge, no toxilogical studies have been made using wood to suggest a direct link. In Puget Sound wood concentration having values greater than 160 cu mm/gr sed typically have H2S. None was detected in any samples analyzed suggesting high sedimentation rates.

MICROBIOGENIC SEDIMENT COMPONENTS

Floated samples were unusually large and had to be split to reduce the size of the counted sample. All sample were first split three times and then counted twice on a 60 square microslide (enclosed with returned samples). The remaining split was further split twice and counted and then once again to count the remaining fraction. Thus the split counts were then multiplied by 2, 4, and 8 to obtain the total count (Table 4).

The diatoms and foraminifers identified are similar to those found on the major river deltas of Puget Sound. Fresh water pennate diatoms were most abundant in the two samples having the highest wood concentration, 2C1 and 8S (Figure 7). The pelagic diatoms representing the centric diatoms, Coscinodiscus spp., had low concentrations typical of areas of high sedimentation.

The foraminifers were not adversely impacted, probably reflecting the absence of toxic gases or areas of low pH (Figure 8). Maximum concentrations were found at stations 3S and 8. The Saginaw Mill samples were more diverse than the Grays Harbor Paper Mill samples. It would be interesting to compare the chemical difference between these sites. The lowest concentration in microbiogenic components as well as wood occured at station 1S, probably reflecting higher sedimentation rates.

Signicant was the absence of harpacticoid copepods, food for salmon, that are abundant on most river deltas.

FIGURE 1 SEDIMENT ANALYSIS BY DRY WEIGHTS

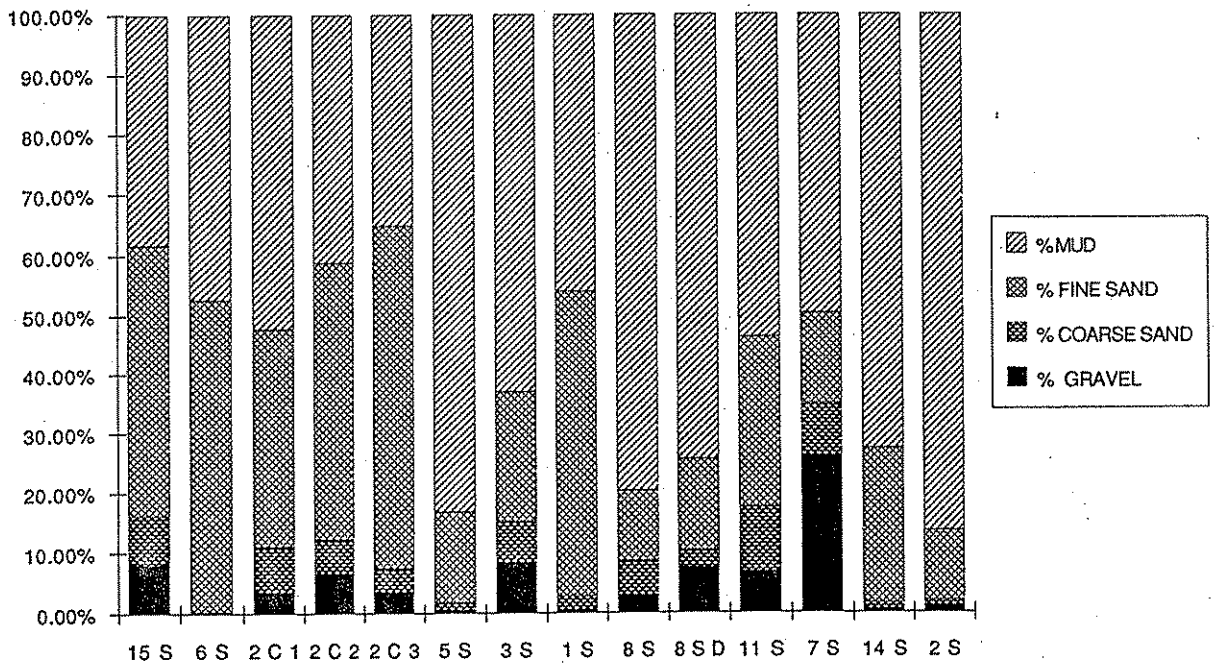


FIGURE 2A SEDIMENT ANALYSIS BY DRY VOLUMES

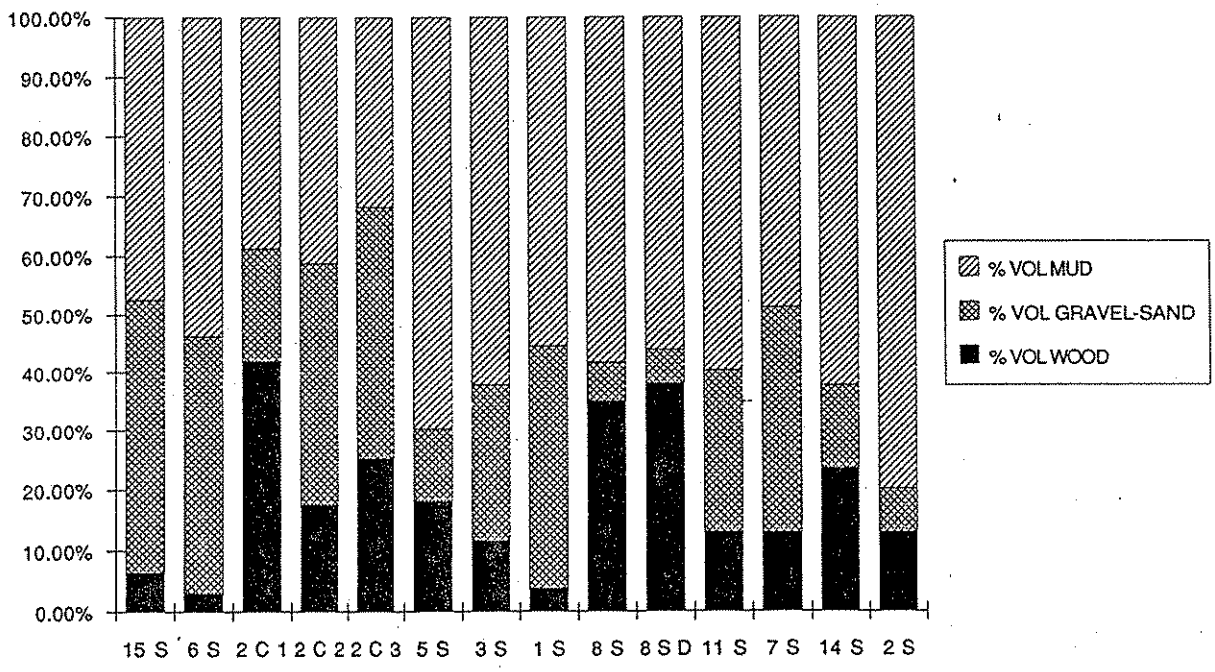


FIGURE 2B SEDIMENT ANALYSIS BY DRY VOLUMES

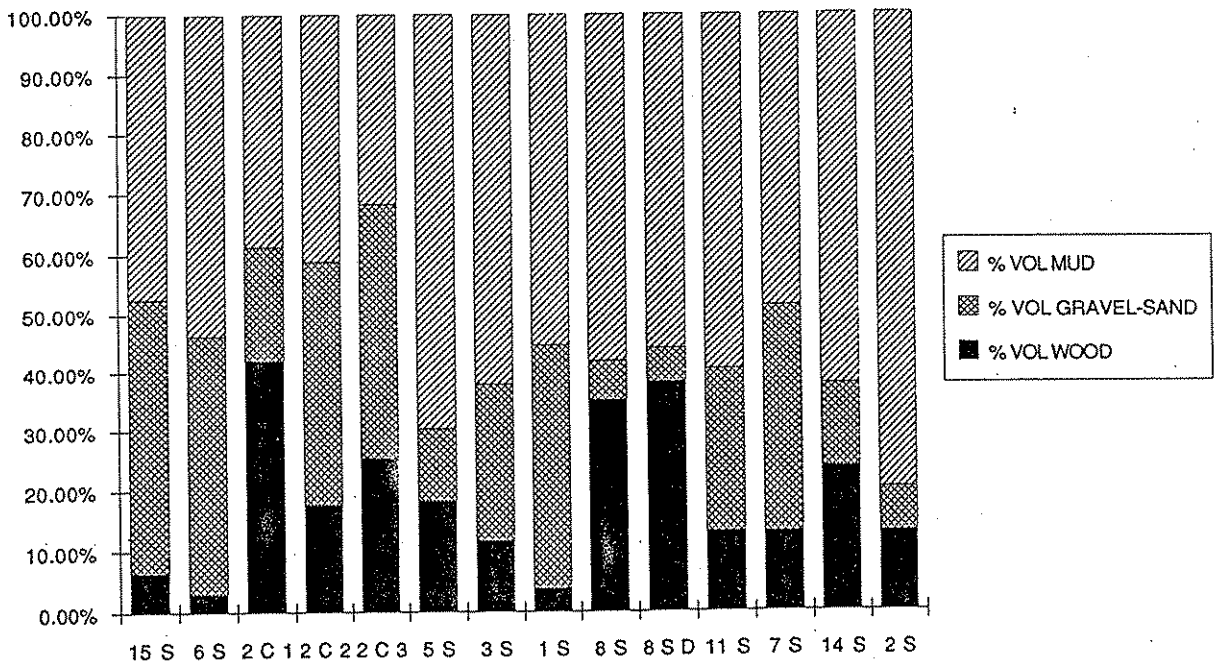


FIGURE 3 CONCENTRATION OF WOOD FIBERS mm^3/gram sediment

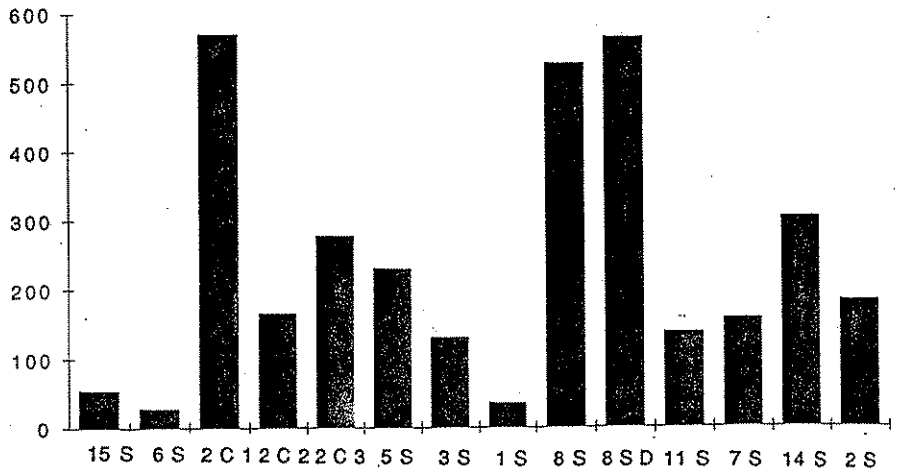


FIGURE 4 VOLUME CONCENTRATIONS (cubic mm) per WEIGHT(gr.) VERSUS VOLUME(ml)

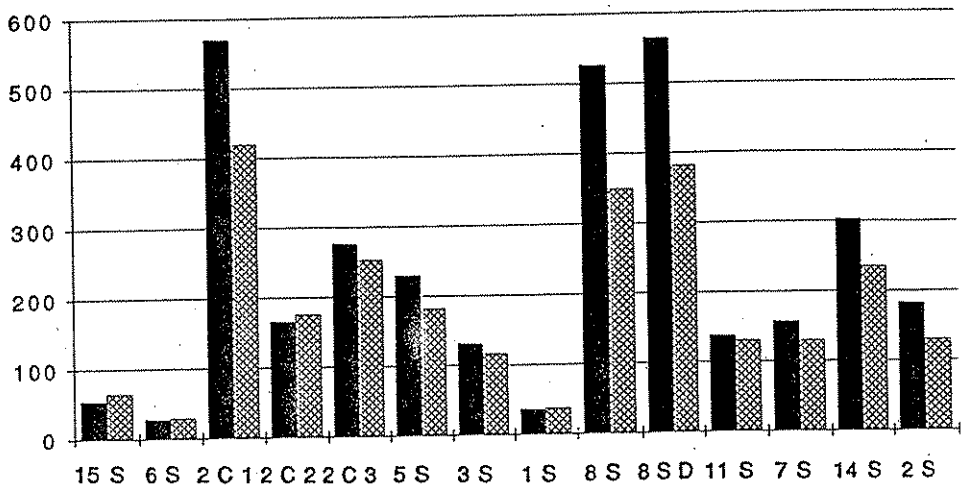


FIGURE 5 PERCENT WOOD BY VOLUME

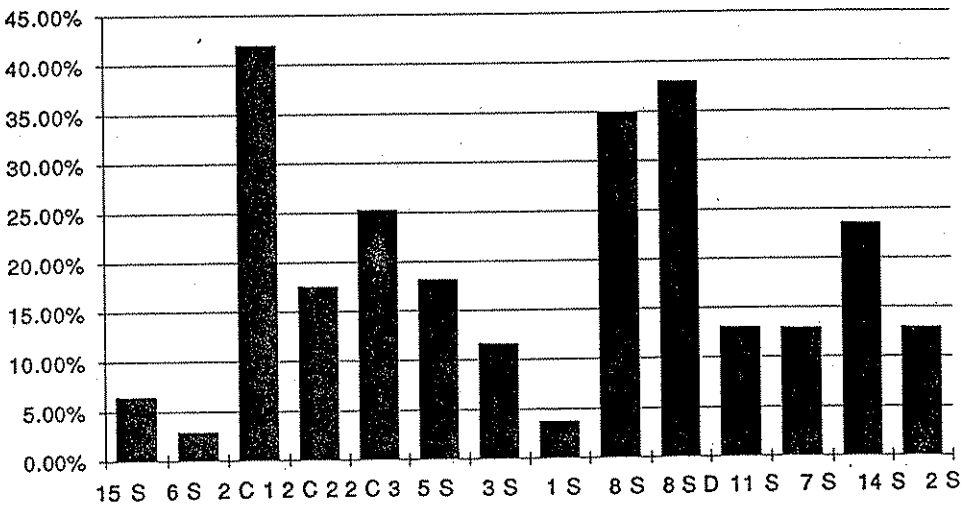


FIGURE 6 PERCENT WOOD BY WEIGHT

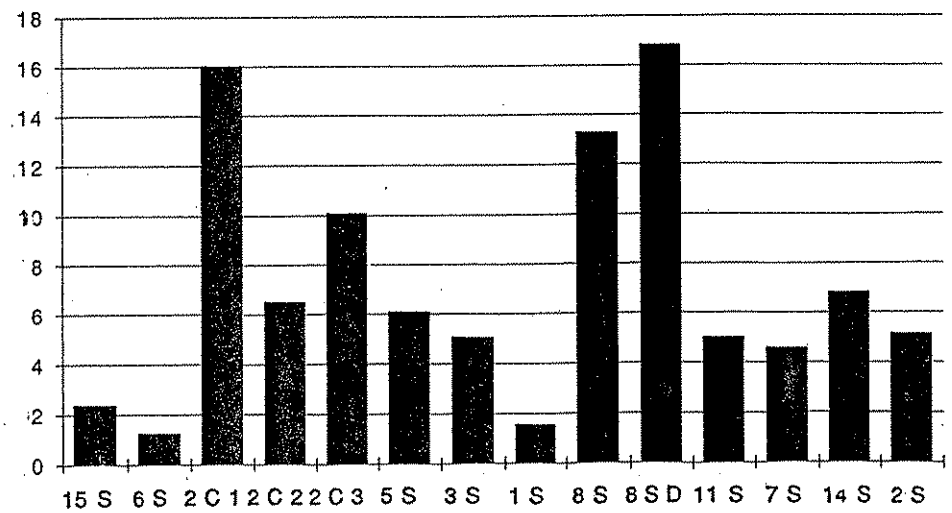


TABLE 1

SEDIMENT DATA BY DRY WEIGHTS

AREA	MOON ISL	HOQ. SORT	GRAYS HARBOR PAPER			HOQ. PLY.	RR BRIDGE	WH PAPER	SAGINAW		ABD. OUTF.	WH SAW	WH CHIP	WH SORT
STATION	15 S	6 S	2 C 1	2 C 2	2 C 3	5 S	3 S	1 S	8 S	8 S D	11S	7 S	14 S	2 S
WT. GRAVEL	6.648	0.064	1.582	4.368	2.062	0.064	4.589	0.225	1.184	3.512	3.537	14.056	0.069	0.41
WT. COARSE SAND	6.684	0.215	3.479	4.183	2.202	0.388	3.642	1.556	2.244	1.34	5.623	4.815	0.547	0.337
WT. FINE SAND	37.553	42.602	16.742	32.317	33.074	3.925	11.856	32.754	4.649	7.089	15.038	8.3	9.904	4.072
WT. MUD	31.583	38.511	23.822	28.489	20.084	21.738	34.197	29.328	31.804	35.056	28.207	26.984	28.078	30.785
WT. TOTAL SEDIMENT	82.468	81.392	45.625	69.357	57.422	26.115	54.284	63.863	39.881	46.997	52.405	54.155	38.598	35.604
WT. WOOD	1.966	1.019	7.318	4.512	5.791	1.593	2.761	1.003	5.303	7.912	2.635	2.491	2.635	1.839
% by weight Wood	2.3	1.3	16	6.5	10	6.0	5.1	1.5	13 15	17	5.0	4.6	6.8	5.2

SEDIMENT DATA BY DRY VOLUMES

AREA	MOON ISL	HOQ. SORT	GRAYS HARBOR PAPER			HOQ. PLY.	RR BRIDGE	WH PAPER	SAGINAW		ABD. OUTF.	WH SAW	WH CHIP	WH SORT
STATION	15 S	6 S	2 C 1	2 C 2	2 C 3	5 S	3 S	1 S	8 S	8 S D	11 S	7 S	14 S	2 S
VOL WOOD ml	4.5	2.25	26	11.5	15.9	6	7.1	2.3	21	26.4	7.2	8.5	11.7	6.5
VOL GRAVEL-SAND ml	32	33	12	27	27	4	16	25	4	4	15	25	7	3.6
VOL MUD ml	33	41	24	27	20	23	38	34	35	39	33	32	31	40
TOTAL VOLUME ml	69.5	76.25	62	65.5	62.9	33	61.1	61.3	60	69.4	55.2	65.5	49.7	50.1

PERCENT SEDIMENT DATA BY DRY WEIGHTS

AREA	MOON ISL	HOQ. SORT	GRAYS HARBOR PAPER			HOQ. PLY.	RR BRIDGE	WH PAPER	SAGINAW		ABD. OUTF.	WH SAW	WH CHIP	WH SORT
STATION	15 S	6 S	2 C 1	2 C 2	2 C 3	5 S	3 S	1 S	8 S	8 S D	11 S	7 S	14 S	2 S
% GRAVEL	8.06%	0.08%	3.47%	6.30%	3.59%	0.25%	8.45%	0.35%	2.97%	7.47%	6.75%	25.96%	0.18%	1.15%
% COARSE SAND	8.10%	0.26%	7.63%	6.03%	3.83%	1.49%	6.71%	2.44%	5.63%	2.85%	10.73%	8.89%	1.42%	0.95%
% FINE SAND	45.54%	52.34%	36.69%	46.60%	57.60%	15.03%	21.84%	51.29%	11.66%	15.08%	28.70%	15.33%	25.66%	11.44%
%MUD	38.30%	47.32%	52.21%	41.08%	34.98%	83.24%	63.00%	45.92%	79.75%	74.59%	53.83%	49.83%	72.74%	86.47%
% TOTAL SEDIMENT	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

PERCENT SEDIMENT DATA BY DRY VOLUMES

AREA	MOON ISL	HOQ. SORT	GRAYS HARBOR PAPER			HOQ. PLY.	RR BRIDGE	WH PAPER	SAGINAW		ABD.OUTF.	WH SAW	WH CHIP	WH SORT
STATION	15 S	6 S	2 C 1	2 C 2	2 C 3	5 S	3 S	1 S	8 S	8 S D	11 S	7 S	14 S	2 S
% VOL WOOD	6.47%	2.95%	41.94%	17.56%	25.28%	18.18%	11.62%	3.75%	35.00%	38.04%	13.04%	12.98%	23.54%	12.97%
% VOL GRAVEL-SAND	46.04%	43.28%	19.35%	41.22%	42.93%	12.12%	26.19%	40.78%	6.67%	5.76%	27.17%	38.17%	14.08%	7.19%
% VOL MUD	47.48%	53.77%	38.71%	41.22%	31.80%	69.70%	62.19%	55.46%	58.33%	56.20%	59.78%	48.85%	62.37%	79.84%
% TOTAL VOLUME	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

WOOD FIBER DATA

AREA	MOON ISL	HOQ. SORT	GRAYS HARBOR PAPER			HOQ. PLY.	RR BRIDGE	WH PAPER	SAGINAW		ABD.OUTF.	WH SAW	WH CHIP	WH SORT
STATION	15 S	6 S	2 C 1	2 C 2	2 C 3	5 S	3 S	1 S	8 S	8 S D	11 S	7 S	14 S	2 S
WT. WOOD FIBER grams	1.966	1.019	7.318	4.512	5.791	1.593	2.761	1.003	5.303	7.912	2.635	2.491	2.635	1.839
VOL WOOD ml	4.5	2.25	26	11.5	15.9	6	7.1	2.3	21	26.5	7.2	8.5	11.7	6.5
CONC mm^3/gram sed	55	28	570	166	277	230	131	36	527	564	137	157	303	183
CONC mm^3/ml sediment	65	30	419	176	253	182	116	38	350	382	130	130	235	130
CONC grams/gr. sedimen	0.02	0.01	0.16	0.07	0.10	0.06	0.05	0.02	0.13	0.17	0.05	0.05	0.07	0.05

TABLE 2

RANKING OF STATIONS IN ORDER OF HIGHEST & LOWEST WOOD CONCENTRATION METHODS				
RANK	AREA-STATION NUMBER	mm^3 wood/gr sed	mm^3 wood/ ml sed	grams wood/ gr sed
1	GRAYS HARBOR PAPER-2C1	570	419	0.16
2	SAGINAW MILL-8SD	564	382	0.17
3	SAGINAW MILL-8S	527	350	0.13
3	GRAYS HARBOR PAPER-2C3	277	253	0.10
4	CHIP FACILITY DITCH-14S	303	235	0.07
5	HOQUIM PLYWOOD-5S	230	182	0.06
6	GRAYS HARBOR PAPER-2C2	166	176	0.07
7	W. COSMOPOLIS LOG SORT-2S	183	130	0.05
8	WEYERHAUSER SAWMILL-7S	157	130	0.05
9	ABERDEEN DOCK OUTFALL-11S	137	130	0.05
10	RAILROAD BRIDGE DITCH-3S	131	116	0.05
11	MOON ISLAND-15S	55	65	0.02
12	W. PAPER RENNIE ISLAND-1S	36	38	0.02
13	HOQUIM SORT YARD-6S	28	30	0.01

TABLE 3

	RANKING OF THE HIGHEST & LOWEST WOOD IMPACTED SITES IN PUGET SOUND		
	SEE CHART OF PUGET SOUND * major concern n= natural nearshore log-wood debris		
RANK	*AREA*	*ANTHROPOGENIC SOURCES*	*NATURAL SOURCES*
1	EVERETT-PORT GARDNER	***LOG PORT-MILLS**	SNOHOMISH RIVER, n
2	BELLINGHAM BAY	*MILL;SEWER OUTFALL	NOOKSACK RIVER, n
3	COMMENCEMENT BAY	*WATERWAYS, *OLD DOCKS, BOAT	PUYALLUP RIVER, n
4	ELLIOTT BAY	WATERWAY ACTIVITY; STORM DRAINS	DUWAMISH RIVER, n
5	SHILSHOLE EMBAYMENT	DREDGE DISPOSAL, OLD SEWER; LOG BOUYS	STORM DRAIN RUNOFF, n
6	BLAKELY HARBOR	OLD MILL DEBRIS	n
7	EAGLE HARBOR	FORMER PILLING STRIPING	n
8	BUDD INLET	*WOOD CHIPS, FORMER LOG STORAGE	n
9	PORT SUSAN	STORM-SEWER OUTFALLS	STILLAGUAMISH RIVER, n
10	SKAGIT RIVER DELTA		SKAGIT RIVER ,n
11	TOTTEN INLET	CLAM FARM WOOD STRUCTURES	n
12	SOUTHERN HOOD CANAL		SKOKOMISH RIVER, n
13	SEQUIM BAY	FORMER LOG STORAGE	n
14	SINCLAIR INLET	SUBMERGED LOGS, SEWER	n
15	PADILLA BAY		JOE LEARY SLOUGH, ELL GRASS, r
16	DYES INLET	SEWER	n
17	YUKON HARBOR	OLD PIER, SEWER	n
18	SARATOGA PASSAGE	RUNOFF IN OAK HARBOR	n
19	CASE INLET		n
20	CARR INLET		n
21	COLVIS PASSAGE		TIDAL CHANNELS DISPERSE WOOD

TABLE 4

MICROBIOGENIC SEDIMENT COUNT DATA

CALCAREOUS FORAMINIFERA

AREA	MOON ISL	HOQ. SORT	GRAYS HARBOR PAPER			HOQ. PLY.	RR BRIDGE	WH PAPER	SAGINAW		ABD.OUTF.	WH SAW	WH CHIP	WH SORT
STATION	15 S	6 S	2 C 1	2 C 2	2 C 3	5 S	3 S	1 S	8 S	8 S D	11 S	7 S	14 S	2 S
Ammonium beccari	8	176		416	104	32	64	8			64	232		
Elphidium selseyensis							32	8				40		
TOTAL CALCAREOUS	8	176	0	416	104	32	96	16	0	0	64	272	0	0

ARENACEOUS FORAMINIFERA

STATION	15 S	6 S	2 C 1	2 C 2	2 C 3	5 S	3 S	1 S	8 S	8 S D	11 S	7 S	14 S	2 S
Trochamminia inflata	96	48		64	264	200	352	1	848	1056	288	128	64	296
T. pacifica								8						
Miliammina fusca	226	1880	744	656	928	248	3344	232	4840	1216	232	1104	264	
Reophax arctica		80				48	512	32	248					
Spiroplectamina biformis							128		104	352				
TOTAL AREANACEOUS	322	2008	744	720	1192	496	4336	273	6040	2624	520	1232	328	296

DIATOMS

STATION	15 S	6 S	2 C 1	2 C 2	2 C 3	5 S	3 S	1 S	8 S	8 S D	11 S	7 S	14 S	2 S
PENNATE DIATOMS	160	3968	11520			448	640	272	13120	352	496	480	1984	128
Cirratulus turgidus	2816	2832	3616	1936	4144	2576	2096	1008	3616	912	2656	4240	3552	2960
MILOSIRANAE GROUP	224	2544	1088	320	720	192	1040	80	448	256	3088	1376	2128	560
Asterostycus spp.	80	320		64	384	336	384	32	384	336	200	256	512	64
Biddulphia-Ischymia Gr	80	192				80	256	64			72			80
Coscinodiscus Group	496	896	976	1136	2368	928	1584	576	576	1072	1920	768	1728	496
TOTAL DIATOMS	3856	10752	17200	3456	7616	4560	6000	2032	18144	2928	8432	7120	9904	4288

MICROBIOGENIC CONCENTRATIONS numbers/gram sediment

CALCAREOUS FORAMINIFERA

AREA	MOON ISL	HOQ. SORT	GRAYS HARBOR PAPER			HOQ. PLY.	RR BRIDGE	WH PAPER	SAGINAW		ABD.OUTF.	WH SAW	WH CHIP	WH SORT
STATION	15 S	6 S	2 C 1	2 C 2	2 C 3	5 S	3 S	1 S	8 S	8 S D	11 S	7 S	14 S	2 S
Ammonium beccari	0.10	2.16	0.00	6.00	1.81	1.23	1.18	0.13	0.00	0.00	1.22	4.28	0.00	0.00
Elphidium selseyensis	0.00	0.00	0.00	0.00	0.00	0.00	0.59	0.13	0.00	0.00	0.00	0.74	0.00	0.00
TOTAL CALCAREOUS	0.10	2.16	0.00	6.00	1.81	1.23	1.77	0.25	0.00	0.00	1.22	5.02	0.00	0.00

ARENACEOUS FORAMINIFERA

STATION	15 S	6 S	2 C 1	2 C 2	2 C 3	5 S	3 S	1 S	8 S	8 S D	11 S	7 S	14 S	2 S
Trochamminia inflata	1.16	0.59	0.00	0.92	4.60	7.66	6.48	0.02	21.26	22.47	5.50	2.36	1.66	8.31
T. pacifica	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00
Miliammina fusca	2.74	23.10	16.31	9.46	16.16	9.50	61.60	3.63	121.36	25.87	4.43	20.39	6.84	0.00
Reophax arctica	0.00	0.98	0.00	0.00	0.00	1.84	9.43	0.50	6.22	0.00	0.00	0.00	0.00	0.00
Spiroplectamina biformi	0.00	0.00	0.00	0.00	0.00	0.00	2.36	0.00	2.61	7.49	0.00	0.00	0.00	0.00
TOTAL AREANACEOUS	3.90	24.67	16.31	10.38	20.76	18.99	79.88	4.27	151.45	55.83	9.92	22.75	8.50	8.31

DIATOMS

STATION	15 S	6 S	2 C 1	2 C 2	2 C 3	5 S	3 S	1 S	8 S	8 S D	11 S	7 S	14 S	2 S
PENNATE DIATOMS	1.94	48.75	252.49	0.00	0.00	17.15	11.79	4.26	328.98	7.49	9.46	8.86	51.40	3.60
Cirratulus turgidus	34.15	34.79	79.25	27.91	72.17	98.64	38.61	15.78	90.67	19.41	50.68	78.29	92.03	83.14
MILOSIRANAE GROUP	2.72	31.26	23.85	4.61	12.54	7.35	19.16	1.25	11.23	5.45	58.93	25.41	55.13	15.73
Asterostycus spp.	0.97	3.93	0.00	0.92	6.69	12.87	7.07	0.50	9.63	7.15	3.82	4.73	13.26	1.80
Biddulphia-Ischymia Gr	0.97	2.36	0.00	0.00	0.00	3.06	4.72	1.00	0.00	0.00	1.37	0.00	0.00	2.25
Coscinodiscus Group	6.01	11.01	21.39	16.38	41.24	35.54	29.18	9.02	14.44	22.81	36.64	14.18	44.77	13.93
TOTAL DIATOMS	46.76	132.10	376.99	49.83	132.63	174.61	110.53	31.82	454.95	62.30	160.90	131.47	256.59	120.44

FIGURE 7 CONCENTRATION OF DIATOMS numbers/ gram sediment

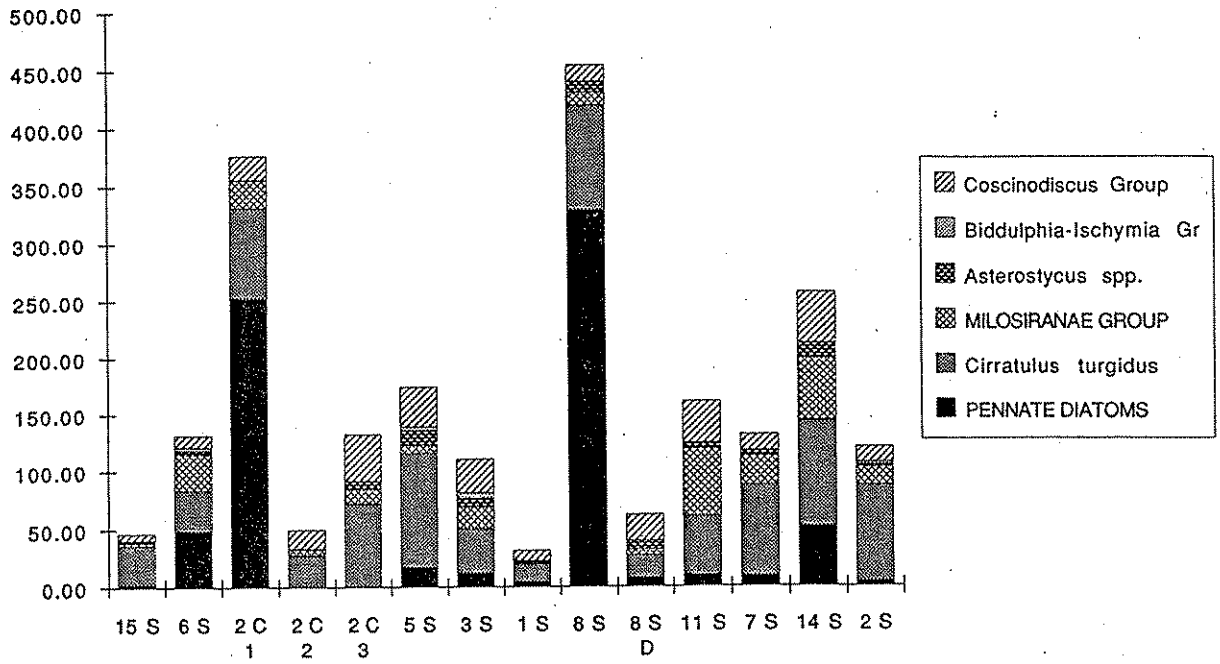
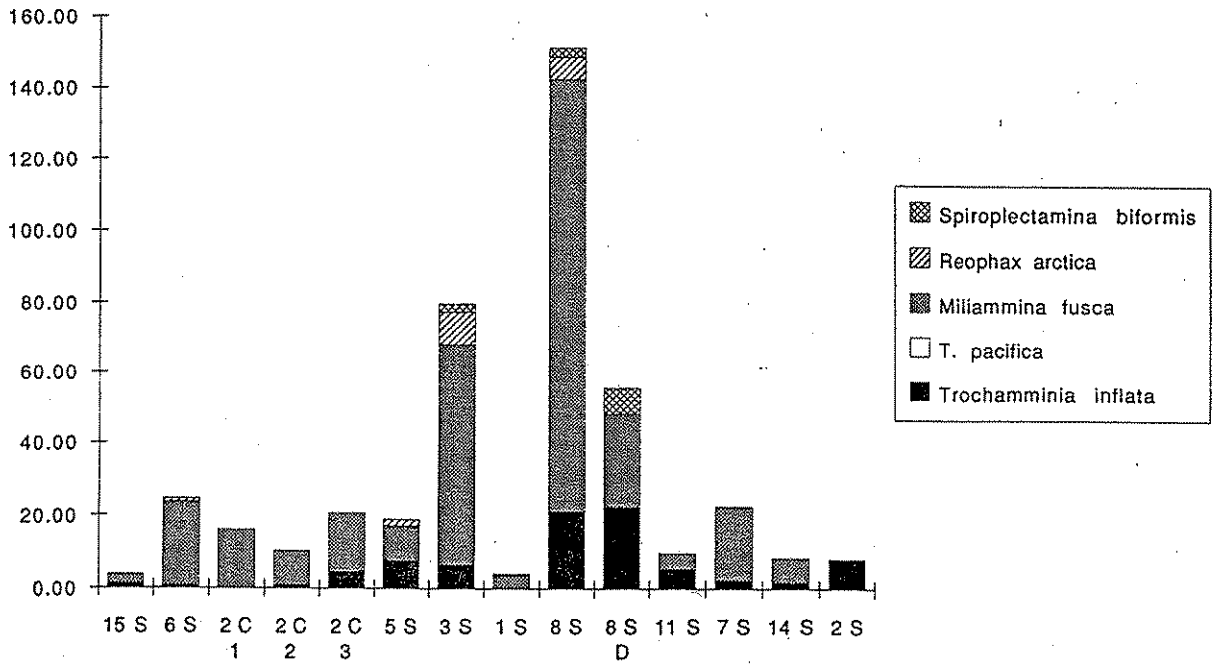


FIGURE 8

CONCENTRATION OF ARENACEOUS FORAMINIFERA numbers/gram sediment



April 27, 1998

To: Dale Norton

From: Randy Knox, Metals Chemist RSK

Subject: Grays Harbor Project.....Sediment

QUALITY ASSURANCE SUMMARY

Data quality for this project met all quality assurance and quality control criteria, with the exception that copper precision for sample 98148244 was outside allowed limits. No other significant quality assurance issues were noted with the data.

SAMPLE INFORMATION

The samples from the Grays Harbor Project were received by the Manchester Laboratory on 04/02/98 in good condition.

HOLDING TIMES

All analyses were performed within the specified method holding times for metals analysis (28 days for mercury, 180 days for all other metals).

INSTRUMENT CALIBRATION

Instrument calibration was performed before each analytical run and checked by initial calibration verification standards and blanks. Continuing calibration standards and blanks were analyzed at a frequency of 10% during the run and again at the end of the analytical run. All initial and continuing calibration verification standards were within the relevant method control limits, with the exception that copper and zinc were at detectable levels in some calibration blanks. The reported detection level for these elements was raised to a value higher than that noted in any of the blanks. Sample copper and zinc levels were greater than ten times the blank levels so data was not qualified for this reason. AA calibration gave a correlation coefficient (r) of 0.995 or greater, also meeting method calibration requirements.

PROCEDURAL BLANKS

The procedural blanks associated with these samples showed no analytically significant levels of analyte, except copper and zinc. The reported detection level for these elements was raised to a value higher than that noted in any of the blanks. Sample copper and zinc levels were greater than ten times the blank levels so data was not qualified for this reason

SPIKED SAMPLES ANALYSIS

Spiked and duplicate spiked sample analyses were performed on this data set. All spike recoveries were within the acceptance limits of +/- 25%.

PRECISION DATA

The results of the spiked and duplicate spiked samples and a duplicate sample were used to evaluate precision on this sample set. The relative percent difference (RPD) for all analytes with the exception of copper on sample, 98148244, was within the 20% acceptance window for duplicate analysis. The copper level determined for this sample showed precision outside the acceptance window and is qualified J, as estimated. Precision for spiked sample pairs is acceptable and is considered representative of the sample group. Since sample 98148244's copper level is much higher than that of the other samples, copper data for it is not considered characteristic of the group. Only the copper data for this sample is qualified.

SERIAL DILUTION

Five times serial dilutions of two samples were analyzed by ICP and the analytical results, corrected for dilution, compared to the original sample analysis. The RPD (relative % difference) for analytes at levels 50X greater than the detection level was acceptable, within ±10%. The RPD for zinc was marginal, 10%, for sample, 98148242. In view of carryover noted, data for this element was not qualified. The RPD for copper serial dilutions were 12% and 15%. Copper data was not qualified since sample levels are less than 50 times the reported detection level.

LABORATORY CONTROL SAMPLE (LCS) ANALYSIS

LCS analyses were within the windows established for each parameter. NIST sample, 1646a, was also analyzed as requested. Recoveries for lead and zinc in 1646a were slightly low- 56% to 72% of reference values. Differences in our values and the reference value likely result from the more exhaustive digestion procedures used in determining the reference values.

Please call Randy Knox at SCAN 360-871-8811 or Jim Ross at SCAN 360-871-8808 to further discuss this project.

RLK:rlk

MANCHESTER ENVIRONMENTAL LABORATORY

7411 Beach Drive E, Port Orchard Washington 98366

CASE NARRATIVE

July 16, 1998

Subject:	Grays Harbor
Samples:	98-148230 to 148256
Case No.	1242-98
Officer:	Dale Norton
By:	Dickey D. Huntamer Organics Analysis Unit

SEMIVOLATILE ORGANICS

ANALYTICAL METHODS:

The semivolatile sediment samples were Soxhlet extracted with acetone following the Manchester modification of the EPA SW 846 8270 procedure with capillary GC/MS analysis of the sample extracts. Normal QA/QC procedures were performed with the analyses.

HOLDING TIMES:

All sample and extraction holding times were within the recommended limits.

BLANKS:

Low levels of some target compounds were detected in the laboratory blanks. The EPA five times rule was applied to all target compounds, which were found in the blank. Compounds that were found in the sample and in the blank were considered real and not the result of contamination if the levels in the sample are greater than or equal to five times the amount of compounds in the associated method blank.

SURROGATES:

The normal surrogate compounds were added to the sample prior to extraction. All surrogate spike recoveries were within acceptable QC limits.

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE:

Recoveries of n-nitrosodimethylamine, aniline, hexachloroethane, 4-chloroaniline, 3-nitroaniline, and 4-nitroaniline were below acceptable limits and the results for these compounds were "J' qualified in the matrix source sample –148244. Hexaclorocyclopentadiene was not recovered and the results in the matrix source sample are flagged "R', rejected.

ANALYTICAL COMMENTS:

No special analytical problems were encountered in the semivolatile analyses. The data is acceptable for use as qualified. At the request of the project officer no additional target analytes or tentatively identified compounds were reported.

DATA QUALIFIER CODES:

U	-	The analyte was not detected at or above the reported value.
J	-	The analyte was positively identified. The associated numerical value is an estimate.
UJ	-	The analyte was not detected at or above the reported estimated result.
REJ	-	The data are unusable for all purposes.
EXP	-	The result is equal to the number before EXP times 10 to the power of the number after EXP. As an example 3EXP6 equals 3×10^6.
NAF	-	Not analyzed for.
N	-	For organic analytes there is evidence the analyte is present in this sample.
NJ	-	There is evidence that the analyte is present. The associated numerical result is an estimate.
E	-	This qualifier is used when the concentration of the associated value exceeds the known calibration range.
bold	-	The analyte was present in the sample. (Visual Aid to locate detected compound on report sheet.)

Grays Harbor BNA 1998.doc

MANCHESTER ENVIRONMENTAL LABORATORY

7411 Beach Drive E, Port Orchard Washington 98366

August 10, 1998

Subject: **Gray's Harbor**

Samples: 98148230 through 98148231, 98148236 through 98148240, 98148253, 98148254, 98148256

Case No. 1242-98

Officer: Dale Norton

By: Karin Feddersen KF
Analytical Management Unit

Organotins

ANALYTICAL METHODS:

The samples were extracted following the methods given in Puget Sound Estuary Program (PSEP) "Recommended Guidelines for Measuring Organic Compounds in Puget Sound Sediment and Tissue Samples" Recommended Methods for Organotin Compounds.

The samples were extracted by tumbling with sodium sulfate and methylene chloride/10% methanol and 0.1% by weight tropolone. After extraction the samples were solvent exchanged to hexane. The organotin compounds were hexylated using the Grignard reaction given in Krone et al (1989) including the silica gel/alumina cleanup.

Analysis was by capillary Gas Chromatography using Single Ion Monitoring (SIM) mode GC/MS. All samples are reported on a dry weight basis.

HOLDING TIMES:

The samples were stored frozen following PSEP Guidelines until extraction. All samples were analyzed within the recommended 40 days from extraction.

BLANKS:

Monobutyltin was detected in the laboratory blanks, most likely due to contaminated Grignard reagent. All Monobutyltin results are qualified as estimates.

SURROGATES:

No surrogate recovery QC limits have been established for this method. Recovery of tripentyl tin ranged from 34% to 109%.

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE:

Sample 98148253 was used for matrix spikes and analyzed with the samples.

Recoveries for Terabutyltin were below 5% in both spikes. Non-detect results for this analyte have been rejected. Detected results may be biased low and have been qualified as estimates.

Tributyltin recoveries were below 50% in both spikes. All results for this analyte are qualified as estimates.

Monobutyltin were detected at a higher native concentration in the sample than in one of the spikes. Recoveries could not be calculated (NC).

Non-homogeneity of the samples most likely contributed to the very different recoveries for these compounds and Monobutyltin. All results are qualified as estimates.

ANALYTICAL COMMENTS:

Use the dilution results from samples 98248093 and 98248095 for Tributyltin, Dibutyltin and Monobutyltin. Use the dilution results from samples 98248094 for Tributyltin and Dibutyltin. Use the original analyses results for Tetrabutyltin.

Sequim Bay Reference Sediments were analyzed with the samples. These are samples which presumably were spiked with 100 ng/gm (100ug/Kg) wet weight of Tributyltin. No value for Tributyltin has been established for the Sequim Bay Reference Sediment so the accuracy of the analysis cannot be precisely determined. However, the values appear to be fairly closely associated with the surrogate recoveries. These samples are identified as OCS8175A1 and OCS8175A2.

OCS8175A1	83	ug/Kg	Tributyltin Chloride
	82	%	Tripentyltin surrogate recovery
OCS8175A2	89	ug/Kg	Tributyltin Chloride
	90	%	Tripentyltin surrogate recovery

(Note that the data sheets report these values as dry weight. The percent solids has been determined to be 60.4% for this material.)

Duplicate samples of PACS-2 were also analyzed with the samples. The value for PACS-2 has been certified as 0.98 +/- 0.13 mg/Kg Tributyltin, and 1.09 +\- 0.15 mg\Kg Dibutyltin, as elemental Tin. These values are approximately equivalent to 2800 ug/Kg as chloride. The values obtained for these samples appear to be fairly closely associated with the surrogate recoveries. These samples are identified as OCS8175A3 and OCS8175A4.

OCS8175A3	2090	ug/Kg	Tributyltin Chloride
	2000	ug/Kg	Dibutyltin Chloride
	72	%	Tripentyltin surrogate recovery
OCS8175A4	1850	ug/Kg	Tributyltin Chloride
	2010	ug/Kg	Dibutyltin Chloride
	65	%	Tripentyltin surrogate recovery

DATA QUALIFIER CODES:

U	-	The analyte was not detected at or above the reported value.
J	-	The analyte was positively identified. The associated numerical value is an estimate.
UJ	-	The analyte was not detected at or above the reported estimated result.
REJ	-	The data are unusable for all purposes.
E	-	This qualifier is used when the concentration of the associated value exceeds the known calibration range.
bold	-	The analyte was present in the sample. (Visual Aid to locate detected compound on report sheet.)

Manchester Environmental Laboratory

7411 Beach Dr E, Port Orchard Washington 98366

CASE NARRATIVE

April 28, 1998

Subject:	Gray's Harbor
Samples:	98148248, 249, 256
Case No.	124298
Officer:	Dale Norton
By:	Greg Perez (from a memo by Steve Riemer (EPA)
	Organics Analysis Unit

FORMALDEHYDE ANALYSIS

SUMMARY:

This method is specific for aldehydes and ketones. Formaldehyde was detected in all samples at a level greater than five times that of the blank. The background sample (98148256) has the highest level. The data is usable as qualified.

ANALYTICAL METHODS:

The samples were analyzed using EPA Method 8315A purge-trap procedure with capillary GC/MS analysis. Normal QA/QC procedures were performed on the sample.

BLANKS:

Low levels of the target compound were detected in the laboratory blanks. If the concentrations of the compounds in the sample are greater than or equal to five times the concentrations of the compounds in the associated method blank, they are considered native to the sample. The level of formaldehyde in the blank was less than 10% of the lowest sample.

SURROGATES:

No surrogates are used in this method.

HOLDING TIMES:

The samples were analyzed within the recommended holding time.

MATRIX SPIKE AND DUPLICATE ANALYSIS:

Matrix spikes recoveries were within acceptable limits. The duplicates agree within 15%.

DATA QUALIFIER CODES:

U - The analyte was not detected at or above the reported value.

J - The analyte was positively identified. The associated numerical value is an estimate.

UJ - The analyte was not detected at or above the reported estimated result.

REJ - The data are unusable for all purposes.

NAF - Not analyzed for.

N - For organic analytes there is evidence the analyte is present in this sample.

NJ - There is evidence that the analyte is present. The associated numerical result is an estimate.

E - This qualifier is used when the concentration of the associated value exceeds the known calibration range.

bold - The analyte was present in the sample. (Visual Aid to locate detected compound on report sheet.)

Appendix C

Summary of Physical/Chemical Analysis of
Grays Harbor Sediments

Table C1: Summary of Analysis of Grays Harbor Sediment Samples

Location	Little Hoquiam Boatyard			Grays Harbor Paper			Westhaven Cove				
Station	1C-1	1C-2	1C-3	2C-1	2C-2	2C-3	3C-1	3C-2	3C-2(dup)	3C-3	3C-4
Sample No. 14-	8230	8231	8232	8233	8234	8235	8236	8237	8240	8238	8239
Conventionals (%)											
Percent Solids	39.2	62.8	39.5	46.9	60.5	57.6	50.1	45.9	45.8	47.4	43.3
Total Organic Carbon	2.9	1.6	3.5	3.6	2.0	2.3	2.4	2.2	2.1	2.6	2.4
Grain Size											
Gravel	0.1	0.2	0.1	3.9	2.7	2.4	0.3	0.1	0.1	0.1	0.1
Sand	10.1	61.4	8.3	40.1	47.8	56.6	33.9	26.4	25	31.9	17.1
Silt	62.9	28.6	63.5	43.1	40.4	33.4	44.5	50.1	50.5	45.6	56.9
Clay	26.8	9.8	28.1	13	9.1	7.6	21.3	23.4	24.4	22.3	26
Metals (mg/kg,dry)											
Copper	62	83	67	46	68	50	35	42	40	39	52
Lead	7.7	9.7	7.2	23	57	31	6.8	6.9	7.4	6.6	7.7
Mercury	0.078	0.062	0.082	0.48	0.78	0.28	0.07	0.11	0.069	0.069	0.077
Zinc	83	89	86	68	130	94	76	88	81	79	90
Semivolatiles (ug,kg, dry)											
Acenaphthene	8.6 j	6.4 j	7.2 j	39	280	110	160	26 j	24 j	22 j	20 j
Acenaphthylene	19 j	36 j	14 j	12 j	94	44 j	14 j	15 j	20 j	21 j	76 u
Naphthalene	63 j	25 j	47 j	81	320	200	61 j	30 j	31 j	45 j	38 j
Fluorene	20 j	12 j	17 j	55	230	110	150	41	38	37	31 j
Anthracene	20 j	22 j	13 j	56 j	510	130	100	76	75	44 j	47 j
Phenanthrene	78	38	67	240	780	360	670	160	140	280	90
Sum LPAH	210 j	140 j	170 j	480 j	2200	950 j	1200 j	350 j	330 j	450 j	300 j
Fluoranthene	100	100	96	440	11000	770	660	510	550	470	300
Benzo(a)anthracene	42 j	69	32 j	97	2200	200	130	100	130	87	91
Chrysene	63 j	100	38 j	140	2700	270	200	190	210	140	120
Pyrene	110	110	98	380	10000	650	570	490	510	390	300
Benzofluoranthenes	87 j	170	82 u	160 j	2000	300	190	210 j	250 j	200	190
Benzo(a)pyrene	18 j	100	41 u	47	720	110	71	67	77	67	38 u
Dibenzo(a,h)anthracene	85 u	30 j	82 u	24 j	180	58 u	65 u	70 u	25 j	26 j	76 u
Indeno(1,2,3-cd)pyrene	29 j	58 j	210 u	36 j	300	67 j	41 j	42 j	55 j	62 j	36 j
Benzo(g,h,i)perylene	54 uj	63 uj	52 uj	55 uj	360 j	75 uj	52 uj	70 uj	75 uj	69 uj	59 uj
Sum HPAH	450 j	740 j	260 j	1300 j	29000 j	2400 j	1900 j	1600 j	1800 j	1400 j	1000 j
1-Methylnaphthalene	11 j	7.7 j	9 j	18 j	79	43 j	25 j	11 j	9.2 j	15 j	11 j
2-Methylnaphthalene	15 j	9.3 j	13 j	29 j	140	69	38	19 j	19 j	22 j	19 j
Dibenzofuran	20 j	7.6 j	19 j	51	180	90	110	32 j	33 j	33 j	25 j
Carbazole	32 j	53 u	82 u	36 j	140	50 j	35 j	24 j	28 j	20 j	19 j
Benzyl alcohol	42 u	27 u	23 j	35 u	770 uj	29 u	13 j	12 j	37 u	17 j	15 j
Retene	220	62	490	120	240	380	66	67 j	59 j	89	56 j
Aniline	42 u	27 u	82 u	170 u	94 u	47 u	32 u	35 u	8.2 j	36 u	76 u
N-nitrosodiphenylamine	85 u	53 u	41 u	69 u	54 u	58 u	65 u	14 j	74 u	37 u	76 u
Phenol	130 uj	52 uj	150 uj	370	290	180 uj	49 uj	70 uj	74 uj	73 uj	76 uj
4-Methylphenol	100	52 j	120	850	580	1900	65 u	38 j	55 j	45 j	48 j
2,4-Dichlorophenol	85 u	53 u	82 u	6.6 j	54 u	58 u	65 u	70 u	74 u	73 u	76 u
2,4-Dimethylphenol	85 u	53 u	82 u	69 u	13 j	58 u	65 u	70 u	74 u	73 u	76 u
Pentachlorophenol	210 u	130 u	210 u	110 j	190	100 j	160 u	170 u	190 u	180 u	190 u
Diethylphthalate	110	53 u	82 u	0.84 j	54 u	10 j	65 u	70 u	74 u	73 u	76 uj
Dimethyl phthalate	22 j	53 u	15 j	69 u	54 u	58 u	15 j	39 j	40 j	73 u	31 j
Di-n-butyl phthalate	9100 uj	990 uj	1700 uj	260 uj	170 uj	6800 u	950 uj	340	1600 uj	3000 u	3800 uj
Bis(2EH)phthalate	130	53	87	69 u	110	160	64000	70 u	330 uj	73 u	21000
Butyltins (ug/kg, dry)											
Monobutyltin Chloride	23 j	52 j	21 j	-	-	-	25 j	30 j	26 j	25 j	27 j
Dibutyltin Chloride	1.2 j	3.7 uj	1.2 j	-	-	-	4 j	6 j	2.2 j	2.2 j	5.3 j
Tributyltin Chloride	4.5 j	15 j	2.3 j	-	-	-	7.4 j	18 j	16 j	7.8 j	18 j

-= Not analyzed
j=Estimated concentration
uj=Estimated detection limit
u=Not detected at detection limit shown

Table C1 (cont.): Summary of Analysis of Grays Harbor Sediment Samples.

Location	Weyco Paper		Weyco Sort Yard		RR Bridge Ditch		Hoquiam R. Piles		Hoquiam Plywood		Hoquiam Sort Yard		Weyco Sawmill		Saginaw Mill	
Station	1S		2S		3S		4S		5S		6S		7S		8S	
Sample No. 14-	8241		8242		8243		8244		8245		8246		8247		8248	
Conventionals (%)																
Percent Solids	55.7		38.4		50.9		47.4		36.3		58.1		47		40.9	
Total Organic Carbon	1.6		5.1		2.6		2.7		4.4		1.4		2.9		5.5	
Grain Size																
Gravel	0.5		21.7		6.7		1.4		0.2		0.8		9.1		2.9	
Sand	52.8		10.6		24		9.8		17.9		47.4		28.9		18.7	
Silt	32.5		46.7		53.3		61.9		58.2		38.4		47.3		56.6	
Clay	14.2		21		16.1		26.9		23.7		13.4		14.7		21.7	
Metals (mg/kg,dry)																
Copper	52		55		82		1800	j	69		41		120		61	
Lead	5.8		7.8		48		73		7.5		4.6		34		14	
Mercury	0.067		0.074		0.082		0.071		0.077		0.048		0.11		0.096	
Zinc	75		100		110		290		88		72		290		84	
Semivolatiles (ug,kg, dry)																
Acenaphthene	29	j	43	u	76		36	u	94	u	6.4	j	210		76	j
Acenaphthylene	18	j	20	j	89		78		47		15	j	55		180	
Naphthalene	86		70	j	280		120		200		42	j	260		610	
Fluorene	32		37	j	62	j	120		36	j	10	j	170		99	
Anthracene	27	j	16	j	51	j	57	j	26	j	9.8	j	240		68	j
Phenanthrene	110		100		200		410		190		52		1600		350	
Sum LPAH	300	j	240	j	760	j	790	j	500	j	140	j	2500		1400	j
Fluoranthene	130		130		230		230		300		79		2300		360	
Benzo(a)anthracene	28	j	31	j	43	j	63	j	81	j	57	u	760		78	u
Chrysene	30	j	60	j	80		120		120		35	j	1200		70	j
Pyrene	120		150		230		260		270		87		2200		410	
Benzofluoranthenes	60	u	79	j	140	j	130	j	160	j	53	j	2000		93	j
Benzo(a)pyrene	13	j	24	j	47	j	110		54	j	29	u	910		43	j
Dibenzo(a,h)anthracene	60	u	87	u	33	u	73	u	47	u	57	u	170		39	u
Indeno(1,2,3-cd)pyrene	18	j	29	j	45		54	j	48		16	j	650		36	j
Benzo(g,h,i)perylene	38	uj	67	uj	66	uj	93	uj	74	uj	39	uj	520		62	uj
Sum HPAH	340	j	500	j	820	j	970	j	1000	j	270	j	11000		1000	j
1,4-Dichlorobenzene	60	u	87	u	66	u	73	u	94	u	57	u	70	u	78	u
1-Methylnaphthalene	11	j	16	j	36		110		23	j	10	j	77		55	
2-Methylnaphthalene	18	j	20	j	46	j	150		32	j	11	j	87		72	j
Dibenzofuran	25	j	23	j	65		57		48		9.1	j	220		71	
Carbazole	60	u	87	u	13	j	73	u	18	j	57	u	190		20	j
Caffeine	30	u	43	u	10	j	180		15	j	29	u	13	j	26	j
Benzyl alcohol	8	j	43	u	13	j	17	j	45	j	29	u	26	j	39	u
Retene	160		250		150		150		370		48	j	82		310	
N-nitrosodiphenylamine	60	u	87	u	66	u	73	u	94	u	57	u	70	u	78	u
Phenol	60	uj	100	uj	94	uj	160	uj	370		41	uj	67	uj	170	uj
2-Methylphenol	60	u	87	u	66	u	56	j	79	j	57	u	70	u	78	u
4-Methylphenol	350		320		240		160		380		44	j	65	j	840	
2,4-Dimethylphenol	60	u	87	u	33	u	27	j	46	j	57	u	35	u	18	j
Pentachlorophenol	150	u	220	u	110	j	180	u	230	u	140	u	130	j	120	j
2,4,5-Trichlorophenol	60	u	87	u	23	j	73	u	47	u	57	u	35	u	18	j
Diethylphthalate	43	j	39	j	66	u	73	u	47	uj	57	u	35	u	39	u
Dimethylphthalate	60	u	87	u	66	u	73	u	94	u	57	u	70	u	78	u
Butylbenzylphthalate	60	u	87	u	33	u	73	u	47	u	57	u	35	u	39	u
Bis(2EH)phthalate	61	uj	180	uj	66	uj	200	uj	170	uj	73		170	uj	130	uj
Carbonyl Compounds (ug/kg, dry)																
Formaldehyde	-		-		-		-		-		-		-		19000	
Butyltins (ug/kg, dry)																
Monobutyltin Chloride	-		-		-		-		-		-		-		-	
Dibutyltin Chloride	-		-		-		-		-		-		-		-	
Tributyltin Chloride	-		-		-		-		-		-		-		-	

-= Not analyzed
j=Estimated concentration
uj=Estimated detection limit
u=Not detected at detection limit shown

Table C1 (cont.): Summary of Analysis of Grays Harbor Sediment Samples.

Location	Slip 1 Main		Slip 1 West		Aberdeen Dock		Chehalis Railway		T-Dock Railway		Chip Facility		Background	
Station	9S		10S		11S		12S		13S		14S		15S	
Sample No. 14-	8250		8251		8252		8253		8254		8255		8256	
Conventionals (%)														
Percent Solids	29.8		43		47.9		62.3		67.9		42.4		60.9	
Total Organic Carbon	4.8		3.6		3.1		2.1		1.2		4.4		1.4	
Grain Size														
Gravel	1.9		2.3		17.3		21.4		16.7		0.1		13.5	
Sand	29.9		25.7		32.7		47.2		56.8		24.6		51.9	
Silt	57		53.2		40.9		21.8		19.1		57.8		25.4	
Clay	11.2		18.8		9		9.6		7.5		17.5		9.2	
Metals (mg/kg,dry)														
Copper	62		63		150		940		230		64		44	
Lead	21		32		65		210		57		11		3.5	
Mercury	0.1		0.092		0.14		0.06		0.035		0.08		0.049	
Zinc	120		140		150		240		130		97		69	
Semivolatiles (ug,kg, dry)														
Acenaphthene	110	u	51	j	91		20	j	280		30	j	52	u
Acenaphthylene	26	j	44		37		21	j	27		55		8.6	j
Naphthalene	95		170		120		76		290		170		29	
Fluorene	36	j	63	j	120		27	j	310		40	j	7.7	j
Anthracene	56	j	110		270		53	j	400		30	j	8.2	j
Phenanthrene	270		680		1300		440		2500		160		27	j
Sum LPAH	480	j	1100	j	1900		640	j	3800		490	j	81	j
Fluoranthene	400		1100		1900		700		4300		200		35	
Benzo(a)anthracene	100	j	320		690		360		2200		56	j	52	u
Chrysene	160		530		900		540		2800		130		52	u
Pyrene	430		1200		1800		660		5100		220		51	j
Benzofluoranthenes	240	j	910		1400		890		4300		120	j	23	j
Benzo(a)pyrene	110	j	470		780		420		2500		52	j	12	j
Dibenzo(a,h)anthracene	36	j	72		150		98		400		40	u	26	u
Indeno(1,2,3-cd)pyrene	83		400		560		320		1400		39	j	13	j
Benzo(g,h,i)perylene	130	uj	380		510		320		1300		66	uj	28	uj
Sum HPAH	1600	j	5400		8700		4300		24000		820	j	130	j
1,4-Dichlorobenzene	110	u	16	j	16	j	3.4	j	45	u	80	u	52	u
1-Methylnaphthalene	15	j	28	j	35		18	j	87		25	j	5.3	j
2-Methylnaphthalene	29	j	52	j	53	j	22	j	110		36	j	7.6	j
Dibenzofuran	35	j	51		81		29		190		29	j	5.2	j
Carbazole	39	j	110		260		35	j	280		40	u	52	u
Caffeine	21	j	38	u	68	u	58	u	22	u	28	j	26	u
Benzyl alcohol	36	j	24	j	35		9.3	j	13	j	35	j	15	j
Retene	300		180		580		170		49		160		41	j
N-nitrosodiphenylamine	57	u	76	u	34	u	58	u	45	u	24	j	52	u
Phenol	95		60	uj	72	uj	45	uj	38	uj	150	uj	110	uj
2-Methylphenol	100	u	76	u	68	u	58	u	45	u	80	u	52	u
4-Methylphenol	74	j	150		88		70		26	j	410		120	
2,4-Dimethylphenol	57	u	38	u	34	u	29	u	22	u	40	u	26	u
Pentachlorophenol	330		170	j	160	j	140	u	220		200	u	130	u
2,4,5-Trichlorophenol	57	u	38	u	34	u	29	u	22	u	40	u	26	u
Diethylphthalate	57	u	38	u	13	j	29	u	22	u	24	j	13	j
Dimethylphthalate	59	j	18	j	68	u	58	u	45	u	80	u	52	u
Butylbenzylphthalate	57	u	130		400		29	u	22	u	40	u	26	u
Bis(2EH)phthalate	1200	uj	1800		2600		180	uj	190	uj	400	uj	52	u
Carbonyl Compounds (ug/kg, dry)														
Formaldehyde	-		-		-		-		-		-		28000	
Butyltins (ug/kg, dry)														
Monobutyltin Chloride	-		-		-		170	j	500	j	-		12	j
Dibutyltin Chloride	-		-		-		5	j	160	j	-		3.5	uj
Tributyltin Chloride	-		-		-		12	j	270	j	-		2.2	j

-= Not analyzed
j=Estimated concentration
uj=Estimated detection limit
u=Not detected at detection limit shown

Conventionals

Percent Solids
Total Organic Carbon
Grain Size

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Percent Solids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Project Officer: Dale Norton
Date Reported: 06-APR-98

Method: EPA160.3
Matrix: Sediment/Soil
Analyte: Solids

Sample	QC	Field ID	Result	Qualifier	Units	Received	Analyzed
98148230		1C-1	39.2		%	04/02/98	04/03/98
98148230	Duplicate		40.8		%	04/02/98	04/03/98
98148230	Duplicate		37.7		%	04/02/98	04/03/98
98148231		1C-2	62.8	J	%	04/02/98	04/03/98
98148232		1C-3	39.5		%	04/02/98	04/03/98
98148233		2C-1	46.9	J	%	04/02/98	04/03/98
98148234		2C-2	60.5		%	04/02/98	04/03/98
98148235		2C-3	57.6		%	04/02/98	04/03/98
98148236		3C-1	50.1		%	04/02/98	04/03/98
98148237		3C-2	45.9		%	04/02/98	04/03/98
98148238		3C-3	47.4		%	04/02/98	04/03/98
98148239		3C-4	43.3		%	04/02/98	04/03/98
98148240		3C-2D	45.7		%	04/02/98	04/03/98
98148240	Duplicate		45.8		%	04/02/98	04/03/98
98148240	Duplicate		45.8		%	04/02/98	04/03/98
98148241		15-1	55.7		%	04/02/98	04/03/98
98148242		25-1	38.4		%	04/02/98	04/03/98
98148243		35	50.9		%	04/02/98	04/03/98
98148244		45	47.4		%	04/02/98	04/03/98
98148245		55	36.3		%	04/02/98	04/03/98
98148246		65	58.1		%	04/02/98	04/03/98
98148247		75	47.0		%	04/02/98	04/03/98
98148248		85	40.9		%	04/02/98	04/03/98
98148250		95	29.8		%	04/02/98	04/03/98
98148251		105	43.0		%	04/02/98	04/03/98
98148252		115	47.9		%	04/02/98	04/03/98
98148253		125	62.3	J	%	04/02/98	04/03/98
98148254		135	67.9		%	04/02/98	04/03/98
98148255		145	42.4		%	04/02/98	04/03/98
98148256		155	60.9		%	04/02/98	04/03/98

Authorized By: Debbie Lawrence Release Date: 5-12-98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Total Organic Carbon (104 C)

Project Name: Grays Harbor **LIMS Project ID:** 1242-98

Project Officer: Dale Norton
Date Reported: 29-APR-98

Method: PSEP-TOCM
Matrix: Sediment/Soil
Analyte: Total Organic Carbon

Sample	QC	Field ID	Result	Qualifier	Units		Received	Analyzed
98148230		1C-1	2.89		%	Dry Wt.	04/02/98	04/27/98
98148230	Duplicate		2.81		%	Dry Wt.	04/02/98	04/27/98
98148230	Replicate		3.14		%	Dry Wt.	04/02/98	04/27/98
98148231		1C-2	1.68	J	%	Dry Wt.	04/02/98	04/27/98
98148232		1C-3	3.56		%	Dry Wt.	04/02/98	04/27/98
98148233		2C-1	3.66	J	%	Dry Wt.	04/02/98	04/27/98
98148234		2C-2	1.95		%	Dry Wt.	04/02/98	04/27/98
98148235		2C-3	2.31		%	Dry Wt.	04/02/98	04/27/98
98148236		3C-1	2.49		%	Dry Wt.	04/02/98	04/27/98
98148237		3C-2	2.21		%	Dry Wt.	04/02/98	04/27/98
98148238		3C-3	2.68		%	Dry Wt.	04/02/98	04/27/98
98148239		3C-4	2.36		%	Dry Wt.	04/02/98	04/27/98
98148240		3C-2D	2.15		%	Dry Wt.	04/02/98	04/22/98
98148240	Duplicate		2.15		%	Dry Wt.	04/02/98	04/22/98
98148240	Replicate		2.05		%	Dry Wt.	04/02/98	04/22/98
98148241		~~15-1~~ 15	1.60		%	Dry Wt.	04/02/98	04/22/98
98148242		~~25-1~~ 25	5.10		%	Dry Wt.	04/02/98	04/22/98
98148243		35 3S	2.67		%	Dry Wt.	04/02/98	04/22/98
98148244		45 4S	2.70		%	Dry Wt.	04/02/98	04/22/98
98148245		55 5S	4.42		%	Dry Wt.	04/02/98	04/22/98
98148246		65 6S	1.24		%	Dry Wt.	04/02/98	04/22/98
98148247		75 7S	3.20		%	Dry Wt.	04/02/98	04/22/98
98148248		85 8S	5.71		%	Dry Wt.	04/02/98	04/22/98
98148250		95 9S	4.88		%	Dry Wt.	04/02/98	04/22/98
98148251		105 10S	3.84		%	Dry Wt.	04/02/98	04/22/98
98148252		115 11S	3.29		%	Dry Wt.	04/02/98	04/22/98
98148253		125 12S	2.07	J	%	Dry Wt.	04/02/98	04/22/98
98148254		135 13S	1.26		%	Dry Wt.	04/02/98	04/22/98
98148255		145 14S	4.39		%	Dry Wt.	04/02/98	04/22/98
98148256		155 15S	1.38		%	Dry Wt.	04/02/98	04/22/98

Authorized By: Debbie Dawson Release Date: 5-12-98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Total Organic Carbon (70 C)

Project Name: Grays Harbor **LIMS Project ID:** 1242-98

Project Officer: Dale Norton
Date Reported: 27-APR-98

Method: PSEP-TOC
Matrix: Sediment/Soil
Analyte: Total Organic Carbon

Sample	QC	Field ID	Result	Qualifier	Units		Received	Analyzed
98148230		1C-1	2.86		%	Dry Wt.	04/02/98	04/27/98
98148230	Duplicate		2.89		%	Dry Wt.	04/02/98	04/27/98
98148230	Replicate		2.97		%	Dry Wt.	04/02/98	04/27/98
98148231		1C-2	1.57		%	Dry Wt.	04/02/98	04/27/98
98148232		1C-3	3.54		%	Dry Wt.	04/02/98	04/27/98
98148233		2C-1	3.60		%	Dry Wt.	04/02/98	04/27/98
98148234		2C-2	1.95		%	Dry Wt.	04/02/98	04/27/98
98148235		2C-3	2.32		%	Dry Wt.	04/02/98	04/27/98
98148236		3C-1	2.42		%	Dry Wt.	04/02/98	04/27/98
98148237		3C-2	2.16		%	Dry Wt.	04/02/98	04/27/98
98148238		3C-3	2.63		%	Dry Wt.	04/02/98	04/27/98
98148239		3C-4	2.36		%	Dry Wt.	04/02/98	04/27/98
98148240		3C-2D	2.12		%	Dry Wt.	04/02/98	04/22/98
98148240	Duplicate		2.13		%	Dry Wt.	04/02/98	04/22/98
98148240	Replicate		2.02		%	Dry Wt.	04/02/98	04/22/98
98148241		15-1	1.60		%	Dry Wt.	04/02/98	04/22/98
98148242		25-1	5.14		%	Dry Wt.	04/02/98	04/22/98
98148243		35	2.61		%	Dry Wt.	04/02/98	04/22/98
98148244		45	2.67		%	Dry Wt.	04/02/98	04/22/98
98148245		55	4.39		%	Dry Wt.	04/02/98	04/22/98
98148246		65	1.38		%	Dry Wt.	04/02/98	04/22/98
98148247		75	2.92		%	Dry Wt.	04/02/98	04/22/98
98148248		85	5.48		%	Dry Wt.	04/02/98	04/22/98
98148250		95	4.76		%	Dry Wt.	04/02/98	04/22/98
98148251		105	3.59		%	Dry Wt.	04/02/98	04/22/98
98148252		115	3.14		%	Dry Wt.	04/02/98	04/22/98
98148253		125	2.05		%	Dry Wt.	04/02/98	04/22/98
98148254		135	1.21		%	Dry Wt.	04/02/98	04/22/98
98148255		145	4.42		%	Dry Wt.	04/02/98	04/22/98
98148256		155	1.44		%	Dry Wt.	04/02/98	04/22/98
27081039		GBR8112TOCA	3.10		%	Dry Wt.		04/22/98
27081041		GBR8112TOCB	3.38		%	Dry Wt.		04/22/98
27081055		GBR8117TOCA	3.25		%	Dry Wt.		04/27/98
ERA81040		GER8112TOCA	1.03		%	Dry Wt.		04/22/98
ERA81056		GER8117TOCA	1.04		%	Dry Wt.		04/27/98

Authorized By: Debbie Sherrow Release Date: 5-12-98

Table 1. Major Components of Grain Size Distribution by PSEP Methodology

Sample Number	Gravel	Sand	Silt	Clay
14-8230	0.1	10.1	62.9	26.8
14-8231	0.2	61.4	28.6	9.8
14-8232	0.1	8.3	63.5	28.1
14-8233	3.9	40.1	43.1	13.0
14-8234	2.7	47.8	40.4	9.1
14-8235	2.4	56.6	33.4	7.6
14-8236	0.3	33.9	44.5	21.3
14-8237	0.1	26.4	50.1	23.4
14-8238	0.1	31.9	45.6	22.3
14-8239	0.1	17.1	56.9	26.0
14-8240	0.1	25.0	50.5	24.4
14-8241	0.5	52.8	32.5	14.2
14-8242	21.7	10.6	46.7	21.0
14-8243-A	6.5	26.8	51.1	15.7
14-8243-B	6.9	21.1	55.5	16.5
14-8244	1.4	9.8	61.9	26.9
14-8245	0.2	17.9	58.2	23.7
14-8246	0.8	47.4	38.4	13.4
14-8247	9.1	28.9	47.3	14.7
14-8248	2.9	18.7	56.6	21.7
14-8250	1.9	29.9	57.0	11.2
14-8251	2.3	25.7	53.2	18.8
14-8252	17.3	32.7	40.9	9.0
14-8253	21.4	47.2	21.8	9.6
14-8254	16.7	56.8	19.1	7.5
14-8255	0.1	24.6	57.8	17.5
14-8256	13.5	51.9	25.4	9.2

1. Testing performed according to PSEP "Apparent Grain Size Distribution" protocol, with modifications for determination of only the major components

Metals

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Inductively Coupled Plasma

Project Name: Grays Harbor **LIMS Project ID:** 1242-98

Project Officer: Dale Norton **Method:** EPA200.7
Date Reported: 27-APR-98 **Matrix:** Sediment/Soil
Analyte: Copper

Sample	QC	Field ID	Result	Qualifier	Units		Received	Analyzed
98148230		1C-1	61.8		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148231		1C-2	82.6		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148232		1C-3	67.1		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148233		2C-1	46.3		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148234		2C-2	68.1		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148235		2C-3	50.4		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148236		3C-1	34.8		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148237		3C-2	42.4		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148238		3C-3	38.7		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148239		3C-4	51.5		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148240		3C-2D	39.9		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148241		15-1	51.7		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148242		25-1	54.6		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148242	Matrix Spike		96 %				04/02/98	04/17/98
98148242	Matrix Spike		97 %				04/02/98	04/17/98
98148243		35	81.5		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148244		45	1380	J	mg/Kg	Dry Wt.	04/02/98	04/17/98
98148244	Duplicate		2250	J	mg/Kg	Dry Wt.	04/02/98	04/17/98
98148245		55	69.2		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148246		65	40.6		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148247		75	118		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148248		85	61.2		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148250		95	61.5		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148251		105	62.8		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148252		115	149		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148253		125	939		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148254		135	232		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148255		145	63.8		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148256		155	43.8		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148256	Matrix Spike		97 %				04/02/98	04/17/98
98148256	Matrix Spike		93 %				04/02/98	04/17/98
46-81023		M8099SL1	9.9		mg/Kg	Dry Wt.		04/17/98
46-81024		M8103SL2	9.9		mg/Kg	Dry Wt.		04/17/98
BLN81019		M8099SB1	2	U	mg/Kg	Dry Wt.		04/17/98
BLN81020		M8103SB1	2	U	mg/Kg	Dry Wt.		04/17/98
ERA81021		M8099SL2	99 %					04/17/98
ERA81022		M8103SL1	114 %					04/17/98

Authorized By: Randy L Kerr Release Date: 4/27/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Inductively Coupled Plasma

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Project Officer: Dale Norton
Date Reported: 22-APR-98

Method: EPA200.7
Matrix: Sediment/Soil
Analyte: Lead

Sample	QC	Field ID	Result	Qualifier	Units		Received	Analyzed
98148230		1C-1	7.7		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148231		1C-2	9.7		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148232		1C-3	7.2		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148233		2C-1	22.6		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148234		2C-2	56.7		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148235		2C-3	30.8		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148236		3C-1	6.8		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148237		3C-2	6.9		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148238		3C-3	6.6		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148239		3C-4	7.7		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148240		3C-2D	7.4		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148241		15-1	5.8		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148242		25-1	7.8		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148242	Matrix Spike		87 %				04/02/98	04/17/98
98148242	Matrix Spike		90 %				04/02/98	04/17/98
98148243		35	47.5		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148244		45	72.3		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148244	Duplicate		74.1		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148245		55	7.5		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148246		65	4.6		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148247		75	34.2		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148248		85	14		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148250		95	21.1		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148251		105	31.7		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148252		115	65.0		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148253		125	212		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148254		135	57.1		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148255		145	11		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148256		155	3.5		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148256	Matrix Spike		93 %				04/02/98	04/17/98
98148256	Matrix Spike		94 %				04/02/98	04/17/98
46-81023		M8099SL1	6.8		mg/Kg	Dry Wt.		04/17/98
46-81024		M8103SL2	6.5		mg/Kg	Dry Wt.		04/17/98
BLN81019		M8099SB1	2	U	mg/Kg	Dry Wt.		04/17/98
BLN81020		M8103SB1	2	U	mg/Kg	Dry Wt.		04/17/98
ERA81021		M8099SL2	92 %					04/17/98
ERA81022		M8103SL1	104 %					04/17/98

Authorized By: Randy L. Kerr

Release Date: 4/27/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Inductively Coupled Plasma

Project Name: Grays Harbor **LIMS Project ID:** 1242-98

Project Officer: Dale Norton **Method:** EPA200.7
Date Reported: 22-APR-98 **Matrix:** Sediment/Soil
Analyte: Zinc

Sample	QC	Field ID	Result	Qualifier	Units		Received	Analyzed
98148230		1C-1	83.3		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148231		1C-2	88.9		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148232		1C-3	86.3		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148233		2C-1	68.4		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148234		2C-2	125		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148235		2C-3	93.5		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148236		3C-1	75.5		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148237		3C-2	87.7		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148238		3C-3	79.0		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148239		3C-4	90.1		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148240		3C-2D	81.2		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148241		15-1	75.4		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148242		25-1	102		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148242	Matrix Spike		89 %				04/02/98	04/17/98
98148242	Matrix Spike		89 %				04/02/98	04/17/98
98148243		35	114		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148244		45	294		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148244	Duplicate		289		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148245		55	88.2		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148246		65	71.9		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148247		75	285		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148248		85	84.4		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148250		95	122		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148251		105	142		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148252		115	148		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148253		125	241		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148254		135	133		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148255		145	97.3		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148256		155	68.5		mg/Kg	Dry Wt.	04/02/98	04/17/98
98148256	Matrix Spike		94 %				04/02/98	04/17/98
98148256	Matrix Spike		91 %				04/02/98	04/17/98
46-81023		M8099SL1	32.9		mg/Kg	Dry Wt.		04/17/98
46-81024		M8103SL2	35.2		mg/Kg	Dry Wt.		04/17/98
BLN81019		M8099SB1	2	U	mg/Kg	Dry Wt.		04/17/98
BLN81020		M8103SB1	2	U	mg/Kg	Dry Wt.		04/17/98
ERA81021		M8099SL2	90 %					04/17/98
ERA81022		M8103SL1	102 %					04/17/98

Authorized By: Randy L. Knox Release Date: 4/27/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Mercury

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Project Officer: Dale Norton
Date Reported: 23-APR-98

Method: EPA245.5
Matrix: Sediment/Soil
Analyte: Mercury

Sample	QC	Field ID	Result	Qualifier	Units		Received	Analyzed
98148230		1C-1	0.078		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148231		1C-2	0.062		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148231	Duplicate		0.061		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148231	Matrix Spike		97 %				04/02/98	04/22/98
98148231	Matrix Spike		98 %				04/02/98	04/22/98
98148232		1C-3	0.082		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148233		2C-1	0.478		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148234		2C-2	0.782		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148235		2C-3	0.275		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148236		3C-1	0.070		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148237		3C-2	0.112		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148238		3C-3	0.069		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148239		3C-4	0.077		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148240		3C-2D	0.069		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148241		15-1	0.067		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148242		25-1	0.074		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148243		35	0.082		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148244		45	0.071		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148245		55	0.077		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148246		65	0.048		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148247		75	0.109		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148248		85	0.096		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148250		95	0.104		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148250	Duplicate		0.104		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148250	Matrix Spike		99 %				04/02/98	04/22/98
98148250	Matrix Spike		100 %				04/02/98	04/22/98
98148251		105	0.092		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148252		115	0.139		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148253		125	0.060		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148254		135	0.035		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148255		145	0.080		mg/Kg	Dry Wt.	04/02/98	04/22/98
98148256		155	0.049		mg/Kg	Dry Wt.	04/02/98	04/22/98

Authorized By: Randy L Krux

Release Date: 4/27/98

Organics

Semivolatiles
Butyltins
Formaldehyde

Semivolatiles

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor **LIMS Project ID:** 1242-98

Sample: 98148230 **Date Received:** 04/02/98 **Method:** SW8270
Field ID: 1C-1 **Date Prepared:** 04/09/98 **Matrix:** Sediment/Soil
Project Officer: Dale Norton **Date Analyzed:** 05/06/98 **Units:** ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	85	U	**Acenaphthene**	**8.6**	**J**
Pyridine	85	U	2,4-Dinitrophenol	3380	UJ
Aniline	42	U	4-Nitrophenol	212	U
Phenol	130	UJ	**Dibenzofuran**	**20**	**J**
Bis(2-Chloroethyl)Ether	85	U	2,4-Dinitrotoluene	212	U
2-Chlorophenol	85	U	**Diethylphthalate**	**112**	
1,3-Dichlorobenzene	85	U	**Fluorene**	**20**	**J**
1,4-Dichlorobenzene	85	U	4-Chlorophenyl-Phenylether	85	U
1,2-Dichlorobenzene	85	U	4-Nitroaniline	212	U
Benzyl Alcohol	42	U	4,6-Dinitro-2-Methylphenol	846	UJ
2-Methylphenol	85	U	N-Nitrosodiphenylamine	85	U
2,2'-Oxybis[1-chloropropane]	42	U	1,2-Diphenylhydrazine	42	U
N-Nitroso-Di-N-Propylamine	85	U	4-Bromophenyl-Phenylether	85	U
4-Methylphenol	**104**		Hexachlorobenzene	85	U
Hexachloroethane	85	U	Pentachlorophenol	212	U
Nitrobenzene	85	U	**Phenanthrene**	**78**	
Isophorone	85	U	**Anthracene**	**20**	**J**
2-Nitrophenol	212	U	Caffeine	42	U
2,4-Dimethylphenol	85	U	**Carbazole**	**32**	**J**
Bis(2-Chloroethoxy)Methane	85	U	Di-N-Butylphthalate	9070	UJ
Benzoic Acid	1320	UJ	**Fluoranthene**	**103**	
2,4-Dichlorophenol	85	U	Benzidine	423	UJ
1,2,4-Trichlorobenzene	85	U	**Pyrene**	**111**	
Naphthalene	**63**	**J**	**Retene**	**215**	
4-Chloroaniline	42	U	Butylbenzylphthalate	85	U
Hexachlorobutadiene	85	U	**Benzo(a)anthracene**	**42**	**J**
4-Chloro-3-Methylphenol	85	U	3,3'-Dichlorobenzidine	85	U
2-Methylnaphthalene	**15**	**J**	**Chrysene**	**63**	**J**
1-Methylnaphthalene	**11**	**J**	**Bis(2-Ethylhexyl) Phthalate**	**126**	
Hexachlorocyclopentadiene	212	U	Di-N-Octyl Phthalate	212	U
2,4,6-Trichlorophenol	85	U	**Benzo(b)fluoranthene**	**57**	**J**
2,4,5-Trichlorophenol	85	U	**Benzo(k)fluoranthene**	**30**	**J**
2-Chloronaphthalene	42	U	**Benzo(a)pyrene**	**18**	**J**
2-Nitroaniline	212	U	3B-Coprostanol		NAF
Dimethylphthalate	**22**	**J**	**Indeno(1,2,3-cd)pyrene**	**29**	**J**
2,6-Dinitrotoluene	212	U	Dibenzo(a,h)anthracene	85	U
Acenaphthylene	**19**	**J**	Benzo(ghi)perylene	54	UJ
3-Nitroaniline	212	U			

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148230
Field ID: 1C-1
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/06/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	91	%
D5-Phenol	95	%
D4-2-Chlorophenol	91	%
1,2-Dichlorobenzene-D4	48	%
D5-Nitrobenzene	55	%
2-Fluorobiphenyl	84	%
D10-Pyrene	99	%
D14-Terphenyl	97	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor **LIMS Project ID:** 1242-98

Sample: 98148231 **Date Received:** 04/02/98 **Method:** SW8270
Field ID: 1C-2 **Date Prepared:** 04/09/98 **Matrix:** Sediment/Soil
Project Officer: Dale Norton **Date Analyzed:** 05/07/98 **Units:** ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	53	U	**Acenaphthene**	**6.4**	**J**
Pyridine	53	U	2,4-Dinitrophenol	2120	UJ
Aniline	27	U	4-Nitrophenol	132	U
Phenol	52	UJ	**Dibenzofuran**	**7.6**	**J**
Bis(2-Chloroethyl)Ether	53	UJ	2,4-Dinitrotoluene	132	U
2-Chlorophenol	53	U	Diethylphthalate	53	U
1,3-Dichlorobenzene	53	U	**Fluorene**	**12**	**J**
1,4-Dichlorobenzene	53	U	4-Chlorophenyl-Phenylether	53	U
1,2-Dichlorobenzene	53	U	4-Nitroaniline	132	U
Benzyl Alcohol	27	U	4,6-Dinitro-2-Methylphenol	530	UJ
2-Methylphenol	53	U	N-Nitrosodiphenylamine	53	U
2,2'-Oxybis[1-chloropropane]	27	U	1,2-Diphenylhydrazine	27	U
N-Nitroso-Di-N-Propylamine	53	U	4-Bromophenyl-Phenylether	53	U
4-Methylphenol	**52**	**J**	Hexachlorobenzene	53	U
Hexachloroethane	53	U	Pentachlorophenol	132	U
Nitrobenzene	53	U	**Phenanthrene**	**38**	
Isophorone	53	U	**Anthracene**	**22**	**J**
2-Nitrophenol	132	U	Caffeine	27	U
2,4-Dimethylphenol	53	U	Carbazole	53	U
Bis(2-Chloroethoxy)Methane	53	U	Di-N-Butylphthalate	989	UJ
Benzoic Acid	672	UJ	**Fluoranthene**	**100**	
2,4-Dichlorophenol	53	U	Benzidine	265	UJ
1,2,4-Trichlorobenzene	53	U	**Pyrene**	**109**	
Naphthalene	**25**	**J**	**Retene**	**62**	
4-Chloroaniline	27	U	Butylbenzylphthalate	53	U
Hexachlorobutadiene	53	U	**Benzo(a)anthracene**	**69**	
4-Chloro-3-Methylphenol	53	U	3,3'-Dichlorobenzidine	53	U
2-Methylnaphthalene	**9.3**	**J**	**Chrysene**	**103**	
1-Methylnaphthalene	**7.7**	**J**	**Bis(2-Ethylhexyl) Phthalate**	**53**	
Hexachlorocyclopentadiene	132	U	Di-N-Octyl Phthalate	132	U
2,4,6-Trichlorophenol	53	U	**Benzo(b)fluoranthene**	**126**	
2,4,5-Trichlorophenol	53	U	**Benzo(k)fluoranthene**	**45**	**J**
2-Chloronaphthalene	27	U	**Benzo(a)pyrene**	**104**	
2-Nitroaniline	132	U	3B-Coprostanol		NAF
Dimethylphthalate	53	U	**Indeno(1,2,3-cd)pyrene**	**58**	**J**
2,6-Dinitrotoluene	132	U	**Dibenzo(a,h)anthracene**	**30**	**J**
Acenaphthylene	**36**	**J**	Benzo(ghi)perylene	63	UJ
3-Nitroaniline	132	U			

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148231
Field ID: 1C-2
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/07/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	76	%
D5-Phenol	80	%
D4-2-Chlorophenol	77	%
1,2-Dichlorobenzene-D4	41	%
D5-Nitrobenzene	63	%
2-Fluorobiphenyl	73	%
D10-Pyrene	79	%
D14-Terphenyl	80	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor **LIMS Project ID:** 1242-98

Sample: 98148232 **Date Received:** 04/02/98 **Method:** SW8270
Field ID: 1C-3 **Date Prepared:** 04/09/98 **Matrix:** Sediment/Soil
Project Officer: Dale Norton **Date Analyzed:** 05/07/98 **Units:** ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	82	U	**Acenaphthene**	**7.2**	**J**
Pyridine	82	U	2,4-Dinitrophenol	3280	UJ
Aniline	82	U	4-Nitrophenol	205	U
Phenol	154	UJ	**Dibenzofuran**	**19**	**J**
Bis(2-Chloroethyl)Ether	82	UJ	2,4-Dinitrotoluene	205	U
2-Chlorophenol	82	U	Diethylphthalate	82	U
1,3-Dichlorobenzene	82	U	**Fluorene**	**17**	**J**
1,4-Dichlorobenzene	82	U	4-Chlorophenyl-Phenylether	82	U
1,2-Dichlorobenzene	82	U	4-Nitroaniline	205	U
Benzyl Alcohol	**23**	**J**	4,6-Dinitro-2-Methylphenol	821	UJ
2-Methylphenol	82	U	N-Nitrosodiphenylamine	41	U
2,2'-Oxybis[1-chloropropane]	41	U	1,2-Diphenylhydrazine	41	U
N-Nitroso-Di-N-Propylamine	82	U	4-Bromophenyl-Phenylether	82	U
4-Methylphenol	**124**		Hexachlorobenzene	82	U
Hexachloroethane	82	U	Pentachlorophenol	205	U
Nitrobenzene	82	U	**Phenanthrene**	**67**	
Isophorone	82	U	**Anthracene**	**13**	**J**
2-Nitrophenol	205	U	Caffeine	41	U
2,4-Dimethylphenol	82	U	Carbazole	82	U
Bis(2-Chloroethoxy)Methane	82	U	Di-N-Butylphthalate	1690	UJ
Benzoic Acid	821	UJ	**Fluoranthene**	**96**	
2,4-Dichlorophenol	82	U	Benzidine	411	UJ
1,2,4-Trichlorobenzene	82	U	**Pyrene**	**98**	
Naphthalene	**47**	**J**	**Retene**	**488**	
4-Chloroaniline	41	U	Butylbenzylphthalate	82	U
Hexachlorobutadiene	82	U	**Benzo(a)anthracene**	**32**	**J**
4-Chloro-3-Methylphenol	82	U	3,3'-Dichlorobenzidine	82	U
2-Methylnaphthalene	**13**	**J**	**Chrysene**	**38**	**J**
1-Methylnaphthalene	**9**	**J**	**Bis(2-Ethylhexyl) Phthalate**	**87**	
Hexachlorocyclopentadiene	205	U	Di-N-Octyl Phthalate	205	U
2,4,6-Trichlorophenol	82	U	Benzo(b)fluoranthene	82	U
2,4,5-Trichlorophenol	82	U	Benzo(k)fluoranthene	82	U
2-Chloronaphthalene	41	U	Benzo(a)pyrene	41	U
2-Nitroaniline	205	U	3B-Coprostanol		NAF
Dimethylphthalate	**15**	**J**	Indeno(1,2,3-cd)pyrene	205	U
2,6-Dinitrotoluene	205	U	Dibenzo(a,h)anthracene	82	U
Acenaphthylene	**14**	**J**	Benzo(ghi)perylene	52	UJ
3-Nitroaniline	205	U			

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Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148232
Field ID: 1C-3
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/07/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	79	%
D5-Phenol	83	%
D4-2-Chlorophenol	80	%
1,2-Dichlorobenzene-D4	43	%
D5-Nitrobenzene	43	%
2-Fluorobiphenyl	72	%
D10-Pyrene	83	%
D14-Terphenyl	82	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor **LIMS Project ID:** 1242-98

Sample: 98148233 **Date Received:** 04/02/98 **Method:** SW8270
Field ID: 2C-1 **Date Prepared:** 04/09/98 **Matrix:** Sediment/Soil
Project Officer: Dale Norton **Date Analyzed:** 05/06/98 **Units:** ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	69	U	**Acenaphthene**	**39**	
Pyridine	69	U	2,4-Dinitrophenol	2770	UJ
Aniline	173	U	4-Nitrophenol	173	U
Phenol	**371**		**Dibenzofuran**	**51**	
Bis(2-Chloroethyl)Ether	69	U	2,4-Dinitrotoluene	173	U
2-Chlorophenol	69	U	**Diethylphthalate**	**.84**	**J**
1,3-Dichlorobenzene	69	U	**Fluorene**	**55**	
1,4-Dichlorobenzene	69	U	4-Chlorophenyl-Phenylether	69	U
1,2-Dichlorobenzene	69	U	4-Nitroaniline	173	U
Benzyl Alcohol	35	U	4,6-Dinitro-2-Methylphenol	693	UJ
2-Methylphenol	69	U	N-Nitrosodiphenylamine	69	U
2,2'-Oxybis[1-chloropropane]	35	U	1,2-Diphenylhydrazine	35	U
N-Nitroso-Di-N-Propylamine	69	U	4-Bromophenyl-Phenylether	69	U
4-Methylphenol	**850**		Hexachlorobenzene	69	U
Hexachloroethane	69	U	**Pentachlorophenol**	**108**	**J**
Nitrobenzene	69	U	**Phenanthrene**	**235**	
Isophorone	69	U	**Anthracene**	**56**	**J**
2-Nitrophenol	173	U	Caffeine	35	U
2,4-Dimethylphenol	69	U	**Carbazole**	**36**	**J**
Bis(2-Chloroethoxy)Methane	69	U	Di-N-Butylphthalate	264	UJ
Benzoic Acid	1220	UJ	**Fluoranthene**	**441**	
2,4-Dichlorophenol	**6.6**	**J**	Benzidine	346	UJ
1,2,4-Trichlorobenzene	69	U	**Pyrene**	**380**	
Naphthalene	**81**		**Retene**	**115**	
4-Chloroaniline	35	U	Butylbenzylphthalate	69	U
Hexachlorobutadiene	69	U	**Benzo(a)anthracene**	**97**	
4-Chloro-3-Methylphenol	69	U	3,3'-Dichlorobenzidine	69	U
2-Methylnaphthalene	**29**	**J**	**Chrysene**	**139**	
1-Methylnaphthalene	**18**	**J**	Bis(2-Ethylhexyl) Phthalate	69	U
Hexachlorocyclopentadiene	173	U	Di-N-Octyl Phthalate	173	U
2,4,6-Trichlorophenol	69	U	**Benzo(b)fluoranthene**	**113**	
2,4,5-Trichlorophenol	69	U	**Benzo(k)fluoranthene**	**48**	**J**
2-Chloronaphthalene	35	U	**Benzo(a)pyrene**	**47**	
2-Nitroaniline	173	U	3B-Coprostanol		NAF
Dimethylphthalate	69	U	**Indeno(1,2,3-cd)pyrene**	**36**	**J**
2,6-Dinitrotoluene	173	U	**Dibenzo(a,h)anthracene**	**24**	**J**
Acenaphthylene	**12**	**J**	Benzo(ghi)perylene	55	UJ
3-Nitroaniline	173	U			

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Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148233
Field ID: 2C-1
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/06/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	81	%
D5-Phenol	90	%
D4-2-Chlorophenol	83	%
1,2-Dichlorobenzene-D4	32	%
D5-Nitrobenzene	60	%
2-Fluorobiphenyl	76	%
D10-Pyrene	93	%
D14-Terphenyl	92	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148234
Field ID: 2C-2
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/06/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	54	U	**Acenaphthene**	**281**	
Pyridine	54	U	2,4-Dinitrophenol	2140	UJ
Aniline	94	U	4-Nitrophenol	134	U
Phenol	**288**		**Dibenzofuran**	**178**	
Bis(2-Chloroethyl)Ether	54	U	2,4-Dinitrotoluene	134	U
2-Chlorophenol	54	U	Diethylphthalate	54	U
1,3-Dichlorobenzene	54	U	**Fluorene**	**225**	
1,4-Dichlorobenzene	54	U	4-Chlorophenyl-Phenylether	54	U
1,2-Dichlorobenzene	54	U	4-Nitroaniline	134	U
Benzyl Alcohol	27	U	4,6-Dinitro-2-Methylphenol	536	UJ
2-Methylphenol	54	U	N-Nitrosodiphenylamine	54	U
2,2'-Oxybis[1-chloropropane]	27	U	1,2-Diphenylhydrazine	27	U
N-Nitroso-Di-N-Propylamine	54	U	4-Bromophenyl-Phenylether	54	U
4-Methylphenol	**582**		Hexachlorobenzene	54	U
Hexachloroethane	54	U	**Pentachlorophenol**	**192**	
Nitrobenzene	54	U	**Phenanthrene**	**779**	
Isophorone	54	U	**Anthracene**	**514**	
2-Nitrophenol	134	U	Caffeine	27	U
2,4-Dimethylphenol	**13**	**J**	**Carbazole**	**135**	
Bis(2-Chloroethoxy)Methane	54	U	Di-N-Butylphthalate	171	UJ
Benzoic Acid	769	UJ	**Fluoranthene**	**10500**	**E**
2,4-Dichlorophenol	54	U	Benzidine	268	UJ
1,2,4-Trichlorobenzene	54	U	**Pyrene**	**8790**	**E**
Naphthalene	**321**		**Retene**	**242**	
4-Chloroaniline	27	U	**Butylbenzylphthalate**	**28**	**J**
Hexachlorobutadiene	54	U	**Benzo(a)anthracene**	**2570**	**E**
4-Chloro-3-Methylphenol	54	U	3,3'-Dichlorobenzidine	54	U
2-Methylnaphthalene	**138**		**Chrysene**	**2990**	**E**
1-Methylnaphthalene	**79**		**Bis(2-Ethylhexyl) Phthalate**	**111**	
Hexachlorocyclopentadiene	134	U	Di-N-Octyl Phthalate	134	U
2,4,6-Trichlorophenol	54	U	**Benzo(b)fluoranthene**	**1590**	
2,4,5-Trichlorophenol	54	U	**Benzo(k)fluoranthene**	**589**	
2-Chloronaphthalene	27	U	**Benzo(a)pyrene**	**818**	
2-Nitroaniline	134	U	3B-Coprostanol		NAF
Dimethylphthalate	54	U	**Indeno(1,2,3-cd)pyrene**	**304**	
2,6-Dinitrotoluene	134	U	**Dibenzo(a,h)anthracene**	**102**	
Acenaphthylene	**94**		**Benzo(ghi)perylene**	**236**	**J**
3-Nitroaniline	134	U			

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148234
Field ID: 2C-2
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/06/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	84	%
D5-Phenol	92	%
D4-2-Chlorophenol	88	%
1,2-Dichlorobenzene-D4	40	%
D5-Nitrobenzene	64	%
2-Fluorobiphenyl	79	%
D10-Pyrene	88	%
D14-Terphenyl	90	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148234 (Dilution - DIL1)
Field ID: 2C-2
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	268	U	**Acenaphthene**	**272**	**J**
Pyridine	268	U	2,4-Dinitrophenol	5360	UJ
Aniline	298	U	4-Nitrophenol	1340	U
Phenol	298	UJ	**Dibenzofuran**	**160**	**J**
Bis(2-Chloroethyl)Ether	536	U	2,4-Dinitrotoluene	536	U
2-Chlorophenol	536	U	Diethylphthalate	268	U
1,3-Dichlorobenzene	536	U	**Fluorene**	**206**	**J**
1,4-Dichlorobenzene	536	U	4-Chlorophenyl-Phenylether	536	U
1,2-Dichlorobenzene	536	U	4-Nitroaniline	536	U
Benzyl Alcohol	268	U	4,6-Dinitro-2-Methylphenol	5360	UJ
2-Methylphenol	536	U	N-Nitrosodiphenylamine	536	U
2,2'-Oxybis[1-chloropropane]	536	U	1,2-Diphenylhydrazine	268	U
N-Nitroso-Di-N-Propylamine	536	U	4-Bromophenyl-Phenylether	536	U
4-Methylphenol	**557**		Hexachlorobenzene	536	U
Hexachloroethane	536	U	Pentachlorophenol	1340	U
Nitrobenzene	536	U	**Phenanthrene**	**711**	
Isophorone	536	U	**Anthracene**	**408**	**J**
2-Nitrophenol	1340	U	Caffeine	268	U
2,4-Dimethylphenol	268	U	**Carbazole**	**127**	**J**
Bis(2-Chloroethoxy)Methane	268	U	Di-N-Butylphthalate	268	UJ
Benzoic Acid	5360	UJ	**Fluoranthene**	**10700**	
2,4-Dichlorophenol	536	U	Benzidine	268	UJ
1,2,4-Trichlorobenzene	536	U	**Pyrene**	**10200**	
Naphthalene	268	U	**Retene**	**378**	**J**
4-Chloroaniline	268	U	Butylbenzylphthalate	268	U
Hexachlorobutadiene	536	U	**Benzo(a)anthracene**	**2220**	
4-Chloro-3-Methylphenol	268	U	3,3'-Dichlorobenzidine	536	U
2-Methylnaphthalene	**112**	**J**	**Chrysene**	**2680**	
1-Methylnaphthalene	**67**	**J**	Bis(2-Ethylhexyl) Phthalate	268	UJ
Hexachlorocyclopentadiene	1340	U	Di-N-Octyl Phthalate	1340	U
2,4,6-Trichlorophenol	268	U	**Benzo(b)fluoranthene**	**1450**	
2,4,5-Trichlorophenol	268	U	**Benzo(k)fluoranthene**	**518**	**J**
2-Chloronaphthalene	536	U	**Benzo(a)pyrene**	**722**	
2-Nitroaniline	268	U	3B-Coprostanol		NAF
Dimethylphthalate	536	U	**Indeno(1,2,3-cd)pyrene**	**299**	
2,6-Dinitrotoluene	1340	U	**Dibenzo(a,h)anthracene**	**175**	**J**
Acenaphthylene	**89**	**J**	**Benzo(ghi)perylene**	**361**	**J**
3-Nitroaniline	536	U			

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148234 (Dilution - DIL1)
Field ID: 2C-2
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	80	%
D5-Phenol	83	%
D4-2-Chlorophenol	81	%
1,2-Dichlorobenzene-D4	33	%
D5-Nitrobenzene	59	%
2-Fluorobiphenyl	70	%
D10-Pyrene	97	%
D14-Terphenyl	90	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148235
Field ID: 2C-3
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/06/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	58	U	**Acenaphthene**	**109**	
Pyridine	58	U	2,4-Dinitrophenol	2300	UJ
Aniline	47	U	4-Nitrophenol	144	U
Phenol	183	UJ	**Dibenzofuran**	**90**	
Bis(2-Chloroethyl)Ether	58	U	2,4-Dinitrotoluene	144	U
2-Chlorophenol	58	U	**Diethylphthalate**	**10**	**J**
1,3-Dichlorobenzene	58	U	**Fluorene**	**114**	
1,4-Dichlorobenzene	58	U	4-Chlorophenyl-Phenylether	58	U
1,2-Dichlorobenzene	58	U	4-Nitroaniline	144	U
Benzyl Alcohol	29	U	4,6-Dinitro-2-Methylphenol	575	UJ
2-Methylphenol	58	U	N-Nitrosodiphenylamine	58	U
2,2'-Oxybis[1-chloropropane]	29	U	1,2-Diphenylhydrazine	29	U
N-Nitroso-Di-N-Propylamine	58	U	4-Bromophenyl-Phenylether	58	U
4-Methylphenol	**1930**		Hexachlorobenzene	58	U
Hexachloroethane	58	U	**Pentachlorophenol**	**104**	**J**
Nitrobenzene	58	U	**Phenanthrene**	**360**	
Isophorone	58	U	**Anthracene**	**126**	
2-Nitrophenol	144	U	Caffeine	29	U
2,4-Dimethylphenol	58	U	**Carbazole**	**50**	**J**
Bis(2-Chloroethoxy)Methane	58	U	Di-N-Butylphthalate	6770	UJ
Benzoic Acid	575	UJ	**Fluoranthene**	**773**	
2,4-Dichlorophenol	58	U	Benzidine	287	UJ
1,2,4-Trichlorobenzene	58	U	**Pyrene**	**653**	
Naphthalene	**199**		**Retene**	**375**	
4-Chloroaniline	29	U	Butylbenzylphthalate	58	U
Hexachlorobutadiene	58	U	**Benzo(a)anthracene**	**201**	
4-Chloro-3-Methylphenol	58	U	3,3'-Dichlorobenzidine	58	U
2-Methylnaphthalene	**69**		**Chrysene**	**272**	
1-Methylnaphthalene	**43**	**J**	**Bis(2-Ethylhexyl) Phthalate**	**156**	
Hexachlorocyclopentadiene	144	U	Di-N-Octyl Phthalate	144	U
2,4,6-Trichlorophenol	58	U	**Benzo(b)fluoranthene**	**208**	
2,4,5-Trichlorophenol	58	U	**Benzo(k)fluoranthene**	**87**	
2-Chloronaphthalene	29	U	**Benzo(a)pyrene**	**107**	
2-Nitroaniline	144	U	3B-Coprostanol		NAF
Dimethylphthalate	58	U	**Indeno(1,2,3-cd)pyrene**	**67**	**J**
2,6-Dinitrotoluene	144	U	Dibenzo(a,h)anthracene	58	U
Acenaphthylene	**44**	**J**	Benzo(ghi)perylene	75	UJ
3-Nitroaniline	144	U			

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148235
Field ID: 2C-3
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/06/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	85	%
D5-Phenol	92	%
D4-2-Chlorophenol	87	%
1,2-Dichlorobenzene-D4	41	%
D5-Nitrobenzene	59	%
2-Fluorobiphenyl	80	%
D10-Pyrene	90	%
D14-Terphenyl	90	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148236
Field ID: 3C-1
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/07/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	65	U	**Acenaphthene**	**161**	
Pyridine	65	U	2,4-Dinitrophenol	2590	UJ
Aniline	32	U	4-Nitrophenol	162	U
Phenol	49	UJ	**Dibenzofuran**	**108**	
Bis(2-Chloroethyl)Ether	65	UJ	2,4-Dinitrotoluene	162	U
2-Chlorophenol	65	U	Diethylphthalate	65	U
1,3-Dichlorobenzene	65	U	**Fluorene**	**150**	
1,4-Dichlorobenzene	65	U	4-Chlorophenyl-Phenylether	65	U
1,2-Dichlorobenzene	65	U	4-Nitroaniline	162	U
Benzyl Alcohol	**13**	**J**	4,6-Dinitro-2-Methylphenol	647	UJ
2-Methylphenol	65	U	N-Nitrosodiphenylamine	65	U
2,2'-Oxybis[1-chloropropane]	32	U	1,2-Diphenylhydrazine	32	U
N-Nitroso-Di-N-Propylamine	65	U	4-Bromophenyl-Phenylether	65	U
4-Methylphenol	65	U	Hexachlorobenzene	65	U
Hexachloroethane	65	U	Pentachlorophenol	162	U
Nitrobenzene	65	U	**Phenanthrene**	**665**	
Isophorone	65	U	**Anthracene**	**104**	
2-Nitrophenol	162	U	Caffeine	32	U
2,4-Dimethylphenol	65	U	**Carbazole**	**35**	**J**
Bis(2-Chloroethoxy)Methane	65	U	Di-N-Butylphthalate	948	UJ
Benzoic Acid	857	UJ	**Fluoranthene**	**659**	
2,4-Dichlorophenol	65	U	Benzidine	324	UJ
1,2,4-Trichlorobenzene	65	U	**Pyrene**	**572**	
Naphthalene	**61**	**J**	**Retene**	**66**	
4-Chloroaniline	32	U	Butylbenzylphthalate	65	U
Hexachlorobutadiene	65	U	**Benzo(a)anthracene**	**126**	
4-Chloro-3-Methylphenol	65	U	3,3'-Dichlorobenzidine	65	U
2-Methylnaphthalene	**38**		**Chrysene**	**196**	
1-Methylnaphthalene	**25**	**J**	**Bis(2-Ethylhexyl) Phthalate**	**68100**	**E**
Hexachlorocyclopentadiene	162	U	Di-N-Octyl Phthalate	162	U
2,4,6-Trichlorophenol	65	U	**Benzo(b)fluoranthene**	**141**	
2,4,5-Trichlorophenol	65	U	**Benzo(k)fluoranthene**	**47**	**J**
2-Chloronaphthalene	32	U	**Benzo(a)pyrene**	**71**	
2-Nitroaniline	162	U	3B-Coprostanol		NAF
Dimethylphthalate	**15**	**J**	**Indeno(1,2,3-cd)pyrene**	**41**	**J**
2,6-Dinitrotoluene	162	U	Dibenzo(a,h)anthracene	65	U
Acenaphthylene	**14**	**J**	Benzo(ghi)perylene	52	UJ
3-Nitroaniline	162	U			

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148236
Field ID: 3C-1
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/07/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	75	%
D5-Phenol	78	%
D4-2-Chlorophenol	76	%
1,2-Dichlorobenzene-D4	35	%
D5-Nitrobenzene	51	%
2-Fluorobiphenyl	70	%
D10-Pyrene	80	%
D14-Terphenyl	80	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor **LIMS Project ID:** 1242-98

Sample: 98148236 (Dilution - DIL1) **Date Received:** 04/02/98 **Method:** SW8270
Field ID: 3C-1 **Date Prepared:** 04/09/98 **Matrix:** Sediment/Soil
Project Officer: Dale Norton **Date Analyzed:** 05/07/98 **Units:** ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	1620	U	Acenaphthene	3240	U
Pyridine	1620	U	2,4-Dinitrophenol	32400	U
Aniline	1620	U	4-Nitrophenol	8090	U
Phenol	1620	U	**Dibenzofuran**	**102**	**J**
Bis(2-Chloroethyl)Ether	3240	U	2,4-Dinitrotoluene	3240	U
2-Chlorophenol	3240	U	Diethylphthalate	1620	U
1,3-Dichlorobenzene	3240	U	Fluorene	3240	U
1,4-Dichlorobenzene	3240	U	4-Chlorophenyl-Phenylether	3240	U
1,2-Dichlorobenzene	3240	U	4-Nitroaniline	3240	U
Benzyl Alcohol	1620	U	4,6-Dinitro-2-Methylphenol	32400	U
2-Methylphenol	3240	U	N-Nitrosodiphenylamine	3240	U
2,2'-Oxybis[1-chloropropane]	3240	U	1,2-Diphenylhydrazine	1620	U
N-Nitroso-Di-N-Propylamine	3240	U	4-Bromophenyl-Phenylether	3240	U
4-Methylphenol	3240	U	Hexachlorobenzene	3240	U
Hexachloroethane	3240	U	Pentachlorophenol	8090	U
Nitrobenzene	3240	U	**Phenanthrene**	**733**	**J**
Isophorone	3240	U	Anthracene	3240	U
2-Nitrophenol	8090	U	Caffeine	1620	U
2,4-Dimethylphenol	1620	U	Carbazole	3240	U
Bis(2-Chloroethoxy)Methane	1620	U	Di-N-Butylphthalate	1620	UJ
Benzoic Acid	32400	U	**Fluoranthene**	**782**	**J**
2,4-Dichlorophenol	3240	U	Benzidine	1620	U
1,2,4-Trichlorobenzene	3240	U	**Pyrene**	**666**	**J**
Naphthalene	1620	U	Retene	3240	U
4-Chloroaniline	1620	U	Butylbenzylphthalate	1620	U
Hexachlorobutadiene	3240	U	Benzo(a)anthracene	3240	U
4-Chloro-3-Methylphenol	1620	U	3,3'-Dichlorobenzidine	3240	U
2-Methylnaphthalene	3240	U	**Chrysene**	**173**	**J**
1-Methylnaphthalene	1620	U	**Bis(2-Ethylhexyl) Phthalate**	**63800**	
Hexachlorocyclopentadiene	8090	U	Di-N-Octyl Phthalate	8090	U
2,4,6-Trichlorophenol	1620	U	Benzo(b)fluoranthene	8090	U
2,4,5-Trichlorophenol	1620	U	Benzo(k)fluoranthene	3240	U
2-Chloronaphthalene	3240	U	Benzo(a)pyrene	3240	U
2-Nitroaniline	1620	U	3B-Coprostanol		NAF
Dimethylphthalate	3240	U	Indeno(1,2,3-cd)pyrene	1620	U
2,6-Dinitrotoluene	8090	U	Dibenzo(a,h)anthracene	1620	U
Acenaphthylene	1620	U	Benzo(ghi)perylene	3240	U
3-Nitroaniline	3240	U			

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor **LIMS Project ID:** 1242-98

Sample: 98148236 (Dilution - DIL1) **Date Received:** 04/02/98 **Method:** SW8270
Field ID: 3C-1 **Date Prepared:** 04/09/98 **Matrix:** Sediment/Soil
Project Officer: Dale Norton **Date Analyzed:** 05/07/98 **Units:** ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	83	%
D5-Phenol	90	%
D4-2-Chlorophenol	79	%
1,2-Dichlorobenzene-D4	44	%
D5-Nitrobenzene	54	%
2-Fluorobiphenyl	67	%
D10-Pyrene	89	%
D14-Terphenyl	83	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148237
Field ID: 3C-2
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/07/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	70	U	**Acenaphthene**	**26**	**J**
Pyridine	70	U	2,4-Dinitrophenol	2780	UJ
Aniline	35	U	4-Nitrophenol	174	U
Phenol	70	UJ	**Dibenzofuran**	**32**	**J**
Bis(2-Chloroethyl)Ether	70	UJ	2,4-Dinitrotoluene	174	U
2-Chlorophenol	70	U	Diethylphthalate	70	U
1,3-Dichlorobenzene	70	U	**Fluorene**	**41**	
1,4-Dichlorobenzene	70	U	4-Chlorophenyl-Phenylether	70	U
1,2-Dichlorobenzene	70	U	4-Nitroaniline	174	U
Benzyl Alcohol	**12**	**J**	4,6-Dinitro-2-Methylphenol	696	UJ
2-Methylphenol	70	U	**N-Nitrosodiphenylamine**	**14**	**J**
2,2'-Oxybis[1-chloropropane]	35	U	1,2-Diphenylhydrazine	35	U
N-Nitroso-Di-N-Propylamine	70	U	4-Bromophenyl-Phenylether	70	U
4-Methylphenol	**38**	**J**	Hexachlorobenzene	70	U
Hexachloroethane	70	U	Pentachlorophenol	174	U
Nitrobenzene	70	U	**Phenanthrene**	**163**	
Isophorone	70	U	**Anthracene**	**76**	
2-Nitrophenol	174	U	Caffeine	35	U
2,4-Dimethylphenol	70	U	**Carbazole**	**24**	**J**
Bis(2-Chloroethoxy)Methane	70	U	**Di-N-Butylphthalate**	**341**	
Benzoic Acid	899	UJ	**Fluoranthene**	**508**	
2,4-Dichlorophenol	70	U	Benzidine	348	UJ
1,2,4-Trichlorobenzene	70	U	**Pyrene**	**486**	
Naphthalene	**30**	**J**	**Retene**	**67**	**J**
4-Chloroaniline	35	U	Butylbenzylphthalate	70	U
Hexachlorobutadiene	70	U	**Benzo(a)anthracene**	**104**	
4-Chloro-3-Methylphenol	70	U	3,3'-Dichlorobenzidine	70	U
2-Methylnaphthalene	**19**	**J**	**Chrysene**	**193**	
1-Methylnaphthalene	**11**	**J**	Bis(2-Ethylhexyl) Phthalate	70	U
Hexachlorocyclopentadiene	174	U	Di-N-Octyl Phthalate	174	U
2,4,6-Trichlorophenol	70	U	**Benzo(b)fluoranthene**	**156**	
2,4,5-Trichlorophenol	70	U	**Benzo(k)fluoranthene**	**54**	**J**
2-Chloronaphthalene	35	U	**Benzo(a)pyrene**	**67**	
2-Nitroaniline	174	U	3B-Coprostanol		NAF
Dimethylphthalate	**39**	**J**	**Indeno(1,2,3-cd)pyrene**	**42**	**J**
2,6-Dinitrotoluene	174	U	Dibenzo(a,h)anthracene	70	U
Acenaphthylene	**15**	**J**	Benzo(ghi)perylene	70	UJ
3-Nitroaniline	174	U			

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor **LIMS Project ID:** 1242-98

Sample: 98148237 **Date Received:** 04/02/98 **Method:** SW8270
Field ID: 3C-2 **Date Prepared:** 04/09/98 **Matrix:** Sediment/Soil
Project Officer: Dale Norton **Date Analyzed:** 05/07/98 **Units:** ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	76	%
D5-Phenol	80	%
D4-2-Chlorophenol	76	%
1,2-Dichlorobenzene-D4	43	%
D5-Nitrobenzene	44	%
2-Fluorobiphenyl	71	%
D10-Pyrene	80	%
D14-Terphenyl	81	%

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor **LIMS Project ID:** 1242-98

Sample: 98148238 **Date Received:** 04/02/98 **Method:** SW8270
Field ID: 3C-3 **Date Prepared:** 04/09/98 **Matrix:** Sediment/Soil
Project Officer: Dale Norton **Date Analyzed:** 05/07/98 **Units:** ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	73	U	**Acenaphthene**	**22**	**J**
Pyridine	73	U	2,4-Dinitrophenol	2910	UJ
Aniline	36	U	4-Nitrophenol	182	U
Phenol	73	UJ	**Dibenzofuran**	**33**	**J**
Bis(2-Chloroethyl)Ether	73	UJ	2,4-Dinitrotoluene	182	U
2-Chlorophenol	73	U	Diethylphthalate	73	U
1,3-Dichlorobenzene	73	U	**Fluorene**	**37**	
1,4-Dichlorobenzene	73	U	4-Chlorophenyl-Phenylether	73	U
1,2-Dichlorobenzene	73	U	4-Nitroaniline	182	U
Benzyl Alcohol	**17**	**J**	4,6-Dinitro-2-Methylphenol	728	UJ
2-Methylphenol	73	U	N-Nitrosodiphenylamine	37	U
2,2'-Oxybis[1-chloropropane]	36	U	1,2-Diphenylhydrazine	36	U
N-Nitroso-Di-N-Propylamine	73	U	4-Bromophenyl-Phenylether	73	U
4-Methylphenol	**45**	**J**	Hexachlorobenzene	73	U
Hexachloroethane	73	U	Pentachlorophenol	182	U
Nitrobenzene	73	U	**Phenanthrene**	**275**	
Isophorone	73	U	**Anthracene**	**44**	**J**
2-Nitrophenol	182	U	Caffeine	36	U
2,4-Dimethylphenol	73	U	**Carbazole**	**20**	**J**
Bis(2-Chloroethoxy)Methane	73	U	Di-N-Butylphthalate	3030	UJ
Benzoic Acid	894	UJ	**Fluoranthene**	**472**	
2,4-Dichlorophenol	73	U	Benzidine	364	UJ
1,2,4-Trichlorobenzene	73	U	**Pyrene**	**386**	
Naphthalene	**45**	**J**	**Retene**	**89**	
4-Chloroaniline	36	U	Butylbenzylphthalate	73	U
Hexachlorobutadiene	73	U	**Benzo(a)anthracene**	**87**	
4-Chloro-3-Methylphenol	73	U	3,3'-Dichlorobenzidine	73	U
2-Methylnaphthalene	**22**	**J**	**Chrysene**	**141**	
1-Methylnaphthalene	**15**	**J**	Bis(2-Ethylhexyl) Phthalate	73	U
Hexachlorocyclopentadiene	182	U	Di-N-Octyl Phthalate	182	U
2,4,6-Trichlorophenol	73	U	**Benzo(b)fluoranthene**	**150**	
2,4,5-Trichlorophenol	73	U	**Benzo(k)fluoranthene**	**51**	**J**
2-Chloronaphthalene	36	U	**Benzo(a)pyrene**	**67**	
2-Nitroaniline	182	U	3B-Coprostanol		NAF
Dimethylphthalate	73	U	**Indeno(1,2,3-cd)pyrene**	**62**	**J**
2,6-Dinitrotoluene	182	U	**Dibenzo(a,h)anthracene**	**26**	**J**
Acenaphthylene	**21**	**J**	Benzo(ghi)perylene	69	UJ
3-Nitroaniline	182	U			

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148238
Field ID: 3C-3
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/07/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	79	%
D5-Phenol	84	%
D4-2-Chlorophenol	80	%
1,2-Dichlorobenzene-D4	41	%
D5-Nitrobenzene	48	%
2-Fluorobiphenyl	71	%
D10-Pyrene	80	%
D14-Terphenyl	83	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor **LIMS Project ID:** 1242-98

Sample: 98148239 **Date Received:** 04/02/98 **Method:** SW8270
Field ID: 3C-4 **Date Prepared:** 04/09/98 **Matrix:** Sediment/Soil
Project Officer: Dale Norton **Date Analyzed:** 05/07/98 **Units:** ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	76	U	**Acenaphthene**	**20**	**J**
Pyridine	76	U	2,4-Dinitrophenol	3060	UJ
Aniline	76	U	4-Nitrophenol	191	U
Phenol	76	UJ	**Dibenzofuran**	**25**	**J**
Bis(2-Chloroethyl)Ether	76	UJ	2,4-Dinitrotoluene	191	U
2-Chlorophenol	76	U	Diethylphthalate	76	U
1,3-Dichlorobenzene	76	U	**Fluorene**	**31**	**J**
1,4-Dichlorobenzene	76	U	4-Chlorophenyl-Phenylether	76	U
1,2-Dichlorobenzene	76	U	4-Nitroaniline	191	U
Benzyl Alcohol	**15**	**J**	4,6-Dinitro-2-Methylphenol	764	UJ
2-Methylphenol	76	U	N-Nitrosodiphenylamine	76	U
2,2'-Oxybis[1-chloropropane]	38	U	1,2-Diphenylhydrazine	38	U
N-Nitroso-Di-N-Propylamine	76	U	4-Bromophenyl-Phenylether	76	U
4-Methylphenol	**48**	**J**	Hexachlorobenzene	76	U
Hexachloroethane	76	U	Pentachlorophenol	191	U
Nitrobenzene	76	U	**Phenanthrene**	**90**	
Isophorone	76	U	**Anthracene**	**47**	**J**
2-Nitrophenol	191	U	Caffeine	38	U
2,4-Dimethylphenol	76	U	**Carbazole**	**19**	**J**
Bis(2-Chloroethoxy)Methane	76	U	Di-N-Butylphthalate	3830	UJ
Benzoic Acid	955	UJ	**Fluoranthene**	**299**	
2,4-Dichlorophenol	76	U	Benzidine	382	UJ
1,2,4-Trichlorobenzene	76	U	**Pyrene**	**302**	
Naphthalene	**38**	**J**	**Retene**	**56**	**J**
4-Chloroaniline	38	U	Butylbenzylphthalate	76	U
Hexachlorobutadiene	76	U	**Benzo(a)anthracene**	**91**	
4-Chloro-3-Methylphenol	76	U	3,3'-Dichlorobenzidine	76	U
2-Methylnaphthalene	**19**	**J**	**Chrysene**	**121**	
1-Methylnaphthalene	**11**	**J**	**Bis(2-Ethylhexyl) Phthalate**	**19700**	**E**
Hexachlorocyclopentadiene	191	U	Di-N-Octyl Phthalate	191	U
2,4,6-Trichlorophenol	76	U	**Benzo(b)fluoranthene**	**143**	
2,4,5-Trichlorophenol	76	U	**Benzo(k)fluoranthene**	**47**	**J**
2-Chloronaphthalene	38	U	Benzo(a)pyrene	38	U
2-Nitroaniline	191	U	3B-Coprostanol		NAF
Dimethylphthalate	**31**	**J**	**Indeno(1,2,3-cd)pyrene**	**36**	**J**
2,6-Dinitrotoluene	191	U	Dibenzo(a,h)anthracene	76	U
Acenaphthylene	76	U	Benzo(ghi)perylene	59	UJ
3-Nitroaniline	191	U			

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148239
Field ID: 3C-4
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/07/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	74	%
D5-Phenol	80	%
D4-2-Chlorophenol	74	%
1,2-Dichlorobenzene-D4	40	%
D5-Nitrobenzene	35	%
2-Fluorobiphenyl	71	%
D10-Pyrene	81	%
D14-Terphenyl	79	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148239 (Dilution - DIL1)
Field ID: 3C-4
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	764	U	Acenaphthene	1530	U
Pyridine	764	U	2,4-Dinitrophenol	15300	UJ
Aniline	764	U	4-Nitrophenol	3820	U
Phenol	764	U	Dibenzofuran	764	U
Bis(2-Chloroethyl)Ether	1530	U	2,4-Dinitrotoluene	1530	U
2-Chlorophenol	1530	U	Diethylphthalate	764	U
1,3-Dichlorobenzene	1530	U	Fluorene	1530	U
1,4-Dichlorobenzene	1530	U	4-Chlorophenyl-Phenylether	1530	U
1,2-Dichlorobenzene	1530	U	4-Nitroaniline	1530	U
Benzyl Alcohol	764	U	4,6-Dinitro-2-Methylphenol	15300	UJ
2-Methylphenol	1530	U	N-Nitrosodiphenylamine	1530	U
2,2'-Oxybis[1-chloropropane]	1530	U	1,2-Diphenylhydrazine	764	U
N-Nitroso-Di-N-Propylamine	1530	U	4-Bromophenyl-Phenylether	1530	U
4-Methylphenol	1530	U	Hexachlorobenzene	1530	U
Hexachloroethane	1530	U	Pentachlorophenol	3820	U
Nitrobenzene	1530	U	Phenanthrene	1530	U
Isophorone	1530	U	Anthracene	1530	U
2-Nitrophenol	3820	U	Caffeine	764	U
2,4-Dimethylphenol	764	U	Carbazole	1530	U
Bis(2-Chloroethoxy)Methane	764	U	Di-N-Butylphthalate	4560	UJ
Benzoic Acid	15300	U	**Fluoranthene**	**329**	**J**
2,4-Dichlorophenol	1530	U	Benzidine	764	UJ
1,2,4-Trichlorobenzene	1530	U	**Pyrene**	**340**	**J**
Naphthalene	764	U	Retene	1530	U
4-Chloroaniline	764	U	Butylbenzylphthalate	764	U
Hexachlorobutadiene	1530	U	Benzo(a)anthracene	764	U
4-Chloro-3-Methylphenol	764	U	3,3'-Dichlorobenzidine	1530	U
2-Methylnaphthalene	1530	U	**Chrysene**	**135**	**J**
1-Methylnaphthalene	764	U	**Bis(2-Ethylhexyl) Phthalate**	**20500**	
Hexachlorocyclopentadiene	3820	U	Di-N-Octyl Phthalate	3820	U
2,4,6-Trichlorophenol	764	U	**Benzo(b)fluoranthene**	**492**	**J**
2,4,5-Trichlorophenol	764	U	**Benzo(k)fluoranthene**	**43**	**J**
2-Chloronaphthalene	1530	U	**Benzo(a)pyrene**	**67**	**J**
2-Nitroaniline	764	U	3B-Coprostanol		NAF
Dimethylphthalate	1530	U	Indeno(1,2,3-cd)pyrene	764	U
2,6-Dinitrotoluene	3820	U	Dibenzo(a,h)anthracene	764	U
Acenaphthylene	764	U	Benzo(ghi)perylene	1530	U
3-Nitroaniline	1530	U			

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148239 (Dilution - DIL1)
Field ID: 3C-4
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	80	%
D5-Phenol	85	%
D4-2-Chlorophenol	78	%
1,2-Dichlorobenzene-D4	42	%
D5-Nitrobenzene	39	%
2-Fluorobiphenyl	75	%
D10-Pyrene	96	%
D14-Terphenyl	91	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor **LIMS Project ID:** 1242-98

Sample: 98148240 **Date Received:** 04/02/98 **Method:** SW8270
Field ID: 3C-2D **Date Prepared:** 04/09/98 **Matrix:** Sediment/Soil
Project Officer: Dale Norton **Date Analyzed:** 05/07/98 **Units:** ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	74	U	**Acenaphthene**	**24**	**J**
Pyridine	74	U	2,4-Dinitrophenol	2950	UJ
Aniline	**8.2**	**J**	4-Nitrophenol	185	U
Phenol	74	UJ	**Dibenzofuran**	**33**	**J**
Bis(2-Chloroethyl)Ether	74	UJ	2,4-Dinitrotoluene	185	U
2-Chlorophenol	74	U	Diethylphthalate	74	U
1,3-Dichlorobenzene	74	U	**Fluorene**	**38**	
1,4-Dichlorobenzene	74	U	4-Chlorophenyl-Phenylether	74	U
1,2-Dichlorobenzene	74	U	4-Nitroaniline	185	U
Benzyl Alcohol	37	U	4,6-Dinitro-2-Methylphenol	738	UJ
2-Methylphenol	74	U	N-Nitrosodiphenylamine	74	U
2,2'-Oxybis[1-chloropropane]	37	U	1,2-Diphenylhydrazine	37	U
N-Nitroso-Di-N-Propylamine	74	U	4-Bromophenyl-Phenylether	74	U
4-Methylphenol	**55**	**J**	Hexachlorobenzene	74	U
Hexachloroethane	74	U	Pentachlorophenol	185	U
Nitrobenzene	74	U	**Phenanthrene**	**138**	
Isophorone	37	U	**Anthracene**	**75**	
2-Nitrophenol	185	U	Caffeine	37	U
2,4-Dimethylphenol	74	U	**Carbazole**	**28**	**J**
Bis(2-Chloroethoxy)Methane	74	U	Di-N-Butylphthalate	1630	UJ
Benzoic Acid	972	UJ	**Fluoranthene**	**550**	
2,4-Dichlorophenol	74	U	Benzidine	369	UJ
1,2,4-Trichlorobenzene	74	U	**Pyrene**	**508**	
Naphthalene	**31**	**J**	**Retene**	**59**	**J**
4-Chloroaniline	37	U	Butylbenzylphthalate	74	U
Hexachlorobutadiene	74	U	**Benzo(a)anthracene**	**131**	
4-Chloro-3-Methylphenol	74	U	3,3'-Dichlorobenzidine	74	U
2-Methylnaphthalene	**19**	**J**	**Chrysene**	**205**	
1-Methylnaphthalene	**9.2**	**J**	Bis(2-Ethylhexyl) Phthalate	332	UJ
Hexachlorocyclopentadiene	185	U	Di-N-Octyl Phthalate	185	U
2,4,6-Trichlorophenol	74	U	**Benzo(b)fluoranthene**	**182**	
2,4,5-Trichlorophenol	74	U	**Benzo(k)fluoranthene**	**63**	**J**
2-Chloronaphthalene	37	U	**Benzo(a)pyrene**	**77**	
2-Nitroaniline	185	U	3B-Coprostanol		NAF
Dimethylphthalate	**40**	**J**	**Indeno(1,2,3-cd)pyrene**	**55**	**J**
2,6-Dinitrotoluene	185	U	**Dibenzo(a,h)anthracene**	**25**	**J**
Acenaphthylene	**20**	**J**	Benzo(ghi)perylene	75	UJ
3-Nitroaniline	185	U			

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Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor **LIMS Project ID:** 1242-98

Sample: 98148240 **Date Received:** 04/02/98 **Method:** SW8270
Field ID: 3C-2D **Date Prepared:** 04/09/98 **Matrix:** Sediment/Soil
Project Officer: Dale Norton **Date Analyzed:** 05/07/98 **Units:** ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	79	%
D5-Phenol	81	%
D4-2-Chlorophenol	79	%
1,2-Dichlorobenzene-D4	43	%
D5-Nitrobenzene	42	%
2-Fluorobiphenyl	73	%
D10-Pyrene	81	%
D14-Terphenyl	82	%

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148241
Field ID: 15-1
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/07/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	60	U	**Acenaphthene**	**29**	**J**
Pyridine	60	U	2,4-Dinitrophenol	2410	UJ
Aniline	60	U	4-Nitrophenol	151	U
Phenol	60	UJ	**Dibenzofuran**	**25**	**J**
Bis(2-Chloroethyl)Ether	60	UJ	2,4-Dinitrotoluene	151	U
2-Chlorophenol	60	U	**Diethylphthalate**	**43**	**J**
1,3-Dichlorobenzene	60	U	**Fluorene**	**32**	
1,4-Dichlorobenzene	60	U	4-Chlorophenyl-Phenylether	60	U
1,2-Dichlorobenzene	60	U	4-Nitroaniline	151	U
Benzyl Alcohol	**8**	**J**	4,6-Dinitro-2-Methylphenol	603	UJ
2-Methylphenol	60	U	N-Nitrosodiphenylamine	60	U
2,2'-Oxybis[1-chloropropane]	30	U	1,2-Diphenylhydrazine	30	U
N-Nitroso-Di-N-Propylamine	60	U	4-Bromophenyl-Phenylether	60	U
4-Methylphenol	**349**		Hexachlorobenzene	60	U
Hexachloroethane	60	U	Pentachlorophenol	151	U
Nitrobenzene	60	U	**Phenanthrene**	**109**	
Isophorone	60	U	**Anthracene**	**27**	**J**
2-Nitrophenol	151	U	Caffeine	30	U
2,4-Dimethylphenol	60	U	Carbazole	60	U
Bis(2-Chloroethoxy)Methane	60	U	Di-N-Butylphthalate	1910	UJ
Benzoic Acid	711	UJ	**Fluoranthene**	**125**	
2,4-Dichlorophenol	60	U	Benzidine	301	UJ
1,2,4-Trichlorobenzene	60	U	**Pyrene**	**115**	
Naphthalene	**86**		**Retene**	**160**	
4-Chloroaniline	30	U	Butylbenzylphthalate	60	U
Hexachlorobutadiene	60	U	**Benzo(a)anthracene**	**28**	**J**
4-Chloro-3-Methylphenol	60	U	3,3'-Dichlorobenzidine	60	U
2-Methylnaphthalene	**18**	**J**	**Chrysene**	**30**	**J**
1-Methylnaphthalene	**11**	**J**	Bis(2-Ethylhexyl) Phthalate	61	UJ
Hexachlorocyclopentadiene	151	U	Di-N-Octyl Phthalate	151	U
2,4,6-Trichlorophenol	60	U	Benzo(b)fluoranthene	60	U
2,4,5-Trichlorophenol	60	U	Benzo(k)fluoranthene	60	U
2-Chloronaphthalene	30	U	**Benzo(a)pyrene**	**13**	**J**
2-Nitroaniline	151	U	3B-Coprostanol		NAF
Dimethylphthalate	60	U	**Indeno(1,2,3-cd)pyrene**	**18**	**J**
2,6-Dinitrotoluene	151	U	Dibenzo(a,h)anthracene	60	U
Acenaphthylene	**18**	**J**	Benzo(ghi)perylene	38	UJ
3-Nitroaniline	151	U			

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148241
Field ID: 15-1
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/07/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	69	%
D5-Phenol	74	%
D4-2-Chlorophenol	72	%
1,2-Dichlorobenzene-D4	29	%
D5-Nitrobenzene	51	%
2-Fluorobiphenyl	64	%
D10-Pyrene	78	%
D14-Terphenyl	79	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148242
Field ID: 25-1
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	87	U	Acenaphthene	43	U
Pyridine	87	U	2,4-Dinitrophenol	3470	UJ
Aniline	87	U	4-Nitrophenol	217	U
Phenol	100	UJ	**Dibenzofuran**	**23**	**J**
Bis(2-Chloroethyl)Ether	87	UJ	2,4-Dinitrotoluene	217	U
2-Chlorophenol	87	U	**Diethylphthalate**	**39**	**J**
1,3-Dichlorobenzene	87	U	**Fluorene**	**37**	**J**
1,4-Dichlorobenzene	87	U	4-Chlorophenyl-Phenylether	87	U
1,2-Dichlorobenzene	87	U	4-Nitroaniline	217	U
Benzyl Alcohol	43	U	4,6-Dinitro-2-Methylphenol	867	UJ
2-Methylphenol	87	U	N-Nitrosodiphenylamine	87	U
2,2'-Oxybis[1-chloropropane]	43	U	1,2-Diphenylhydrazine	43	U
N-Nitroso-Di-N-Propylamine	87	U	4-Bromophenyl-Phenylether	87	U
4-Methylphenol	**317**		Hexachlorobenzene	87	U
Hexachloroethane	87	U	Pentachlorophenol	217	U
Nitrobenzene	87	U	**Phenanthrene**	**100**	
Isophorone	87	U	**Anthracene**	**16**	**J**
2-Nitrophenol	217	U	Caffeine	43	U
2,4-Dimethylphenol	87	U	Carbazole	87	U
Bis(2-Chloroethoxy)Methane	87	U	Di-N-Butylphthalate	5680	UJ
Benzoic Acid	1180	UJ	**Fluoranthene**	**133**	
2,4-Dichlorophenol	87	U	Benzidine	434	UJ
1,2,4-Trichlorobenzene	87	U	**Pyrene**	**148**	
Naphthalene	**70**	**J**	**Retene**	**249**	
4-Chloroaniline	43	U	Butylbenzylphthalate	87	U
Hexachlorobutadiene	87	U	**Benzo(a)anthracene**	**31**	**J**
4-Chloro-3-Methylphenol	87	U	3,3'-Dichlorobenzidine	87	U
2-Methylnaphthalene	**20**	**J**	**Chrysene**	**60**	**J**
1-Methylnaphthalene	**16**	**J**	Bis(2-Ethylhexyl) Phthalate	183	UJ
Hexachlorocyclopentadiene	217	U	Di-N-Octyl Phthalate	217	U
2,4,6-Trichlorophenol	87	U	**Benzo(b)fluoranthene**	**67**	**J**
2,4,5-Trichlorophenol	87	U	**Benzo(k)fluoranthene**	**12**	**J**
2-Chloronaphthalene	43	U	**Benzo(a)pyrene**	**24**	**J**
2-Nitroaniline	217	U	3B-Coprostanol		NAF
Dimethylphthalate	87	U	**Indeno(1,2,3-cd)pyrene**	**29**	**J**
2,6-Dinitrotoluene	217	U	Dibenzo(a,h)anthracene	87	U
Acenaphthylene	**20**	**J**	Benzo(ghi)perylene	67	UJ
3-Nitroaniline	217	U			

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148242
Field ID: 25-1
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	74	%
D5-Phenol	79	%
D4-2-Chlorophenol	73	%
1,2-Dichlorobenzene-D4	34	%
D5-Nitrobenzene	40	%
2-Fluorobiphenyl	64	%
D10-Pyrene	84	%
D14-Terphenyl	84	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor **LIMS Project ID:** 1242-98

Sample: 98148243 **Date Received:** 04/02/98 **Method:** SW8270
Field ID: 35 **Date Prepared:** 04/09/98 **Matrix:** Sediment/Soil
Project Officer: Dale Norton **Date Analyzed:** 05/11/98 **Units:** ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	33	U	**Acenaphthene**	**76**	
Pyridine	33	U	2,4-Dinitrophenol	659	UJ
Aniline	66	U	4-Nitrophenol	165	U
Phenol	94	UJ	**Dibenzofuran**	**65**	
Bis(2-Chloroethyl)Ether	66	UJ	2,4-Dinitrotoluene	66	U
2-Chlorophenol	66	U	Diethylphthalate	66	U
1,3-Dichlorobenzene	66	U	**Fluorene**	**62**	**J**
1,4-Dichlorobenzene	66	U	4-Chlorophenyl-Phenylether	66	U
1,2-Dichlorobenzene	66	U	4-Nitroaniline	66	U
Benzyl Alcohol	**13**	**J**	4,6-Dinitro-2-Methylphenol	659	UJ
2-Methylphenol	66	U	N-Nitrosodiphenylamine	66	U
2,2'-Oxybis[1-chloropropane]	66	U	1,2-Diphenylhydrazine	33	U
N-Nitroso-Di-N-Propylamine	66	U	4-Bromophenyl-Phenylether	66	U
4-Methylphenol	**238**		Hexachlorobenzene	66	U
Hexachloroethane	66	U	**Pentachlorophenol**	**106**	**J**
Nitrobenzene	66	U	**Phenanthrene**	**195**	
Isophorone	66	U	**Anthracene**	**51**	**J**
2-Nitrophenol	165	U	**Caffeine**	**10**	**J**
2,4-Dimethylphenol	33	U	**Carbazole**	**13**	**J**
Bis(2-Chloroethoxy)Methane	33	U	Di-N-Butylphthalate	216	UJ
Benzoic Acid	879	UJ	**Fluoranthene**	**232**	
2,4-Dichlorophenol	66	U	Benzidine	33	UJ
1,2,4-Trichlorobenzene	66	U	**Pyrene**	**226**	
Naphthalene	**283**		**Retene**	**153**	
4-Chloroaniline	33	U	Butylbenzylphthalate	33	U
Hexachlorobutadiene	66	U	**Benzo(a)anthracene**	**43**	**J**
4-Chloro-3-Methylphenol	33	U	3,3'-Dichlorobenzidine	66	U
2-Methylnaphthalene	**46**	**J**	**Chrysene**	**80**	
1-Methylnaphthalene	**36**		Bis(2-Ethylhexyl) Phthalate	66	UJ
Hexachlorocyclopentadiene	165	U	Di-N-Octyl Phthalate	165	U
2,4,6-Trichlorophenol	33	U	**Benzo(b)fluoranthene**	**109**	**J**
2,4,5-Trichlorophenol	**23**	**J**	**Benzo(k)fluoranthene**	**30**	**J**
2-Chloronaphthalene	66	U	**Benzo(a)pyrene**	**47**	**J**
2-Nitroaniline	33	U	3B-Coprostanol		NAF
Dimethylphthalate	66	U	**Indeno(1,2,3-cd)pyrene**	**45**	
2,6-Dinitrotoluene	165	U	Dibenzo(a,h)anthracene	33	U
Acenaphthylene	**89**		Benzo(ghi)perylene	66	UJ
3-Nitroaniline	66	U			

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Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148243
Field ID: 35
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	78	%
D5-Phenol	82	%
D4-2-Chlorophenol	77	%
1,2-Dichlorobenzene-D4	41	%
D5-Nitrobenzene	60	%
2-Fluorobiphenyl	70	%
D10-Pyrene	79	%
D14-Terphenyl	78	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148244
Field ID: 45
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/07/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	73	UJ	Acenaphthene	36	U
Pyridine	73	U	2,4-Dinitrophenol	2900	UJ
Aniline	73	UJ	4-Nitrophenol	181	U
Phenol	162	UJ	**Dibenzofuran**	**57**	
Bis(2-Chloroethyl)Ether	73	UJ	2,4-Dinitrotoluene	181	U
2-Chlorophenol	73	U	Diethylphthalate	73	U
1,3-Dichlorobenzene	73	UJ	**Fluorene**	**118**	
1,4-Dichlorobenzene	73	U	4-Chlorophenyl-Phenylether	73	U
1,2-Dichlorobenzene	73	U	4-Nitroaniline	181	UJ
Benzyl Alcohol	**17**	**J**	4,6-Dinitro-2-Methylphenol	725	UJ
2-Methylphenol	**56**	**J**	N-Nitrosodiphenylamine	73	U
2,2'-Oxybis[1-chloropropane]	36	U	1,2-Diphenylhydrazine	36	U
N-Nitroso-Di-N-Propylamine	73	U	4-Bromophenyl-Phenylether	73	U
4-Methylphenol	**162**		Hexachlorobenzene	73	U
Hexachloroethane	73	UJ	Pentachlorophenol	181	U
Nitrobenzene	73	U	**Phenanthrene**	**413**	
Isophorone	73	U	**Anthracene**	**57**	**J**
2-Nitrophenol	181	U	**Caffeine**	**179**	
2,4-Dimethylphenol	**27**	**J**	Carbazole	73	U
Bis(2-Chloroethoxy)Methane	73	U	Di-N-Butylphthalate	10100	UJ
Benzoic Acid	1020	UJ	**Fluoranthene**	**234**	
2,4-Dichlorophenol	73	U	Benzidine	362	UJ
1,2,4-Trichlorobenzene	73	U	**Pyrene**	**264**	
Naphthalene	**120**		**Retene**	**146**	
4-Chloroaniline	36	UJ	Butylbenzylphthalate	73	U
Hexachlorobutadiene	73	U	**Benzo(a)anthracene**	**63**	**J**
4-Chloro-3-Methylphenol	73	U	3,3'-Dichlorobenzidine	73	U
2-Methylnaphthalene	**146**		**Chrysene**	**121**	
1-Methylnaphthalene	**112**		Bis(2-Ethylhexyl) Phthalate	200	UJ
Hexachlorocyclopentadiene		REJ	Di-N-Octyl Phthalate	181	U
2,4,6-Trichlorophenol	73	U	**Benzo(b)fluoranthene**	**96**	
2,4,5-Trichlorophenol	73	U	**Benzo(k)fluoranthene**	**29**	**J**
2-Chloronaphthalene	36	U	**Benzo(a)pyrene**	**106**	
2-Nitroaniline	181	U	3B-Coprostanol		NAF
Dimethylphthalate	73	U	**Indeno(1,2,3-cd)pyrene**	**54**	**J**
2,6-Dinitrotoluene	181	U	Dibenzo(a,h)anthracene	73	U
Acenaphthylene	**78**		Benzo(ghi)perylene	93	UJ
3-Nitroaniline	181	UJ			

Authorized By: _____ Release Date: 7/16/98 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148244
Field ID: 45
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/07/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	74	%
D5-Phenol	80	%
D4-2-Chlorophenol	77	%
1,2-Dichlorobenzene-D4	46	%
D5-Nitrobenzene	54	%
2-Fluorobiphenyl	77	%
D10-Pyrene	79	%
D14-Terphenyl	82	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148244 (Matrix Spike - LMX1)
Field ID: 45
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/07/98

Method: SW8270
Matrix: Sediment/Soil
Units: % Recovery

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	61		Acenaphthene	76	
Pyridine		NAF	2,4-Dinitrophenol	65	
Aniline	2		4-Nitrophenol	83	
Phenol	76		Dibenzofuran	75	
Bis(2-Chloroethyl)Ether	51		2,4-Dinitrotoluene	78	
2-Chlorophenol	81		Diethylphthalate	84	
1,3-Dichlorobenzene	49		Fluorene	77	
1,4-Dichlorobenzene	53		4-Chlorophenyl-Phenylether	83	
1,2-Dichlorobenzene	59		4-Nitroaniline	20	
Benzyl Alcohol	78		4,6-Dinitro-2-Methylphenol	67	
2-Methylphenol	83		N-Nitrosodiphenylamine	82	
2,2'-Oxybis[1-chloropropane]	71		1,2-Diphenylhydrazine	79	
N-Nitroso-Di-N-Propylamine	81		4-Bromophenyl-Phenylether	89	
4-Methylphenol	87		Hexachlorobenzene	92	
Hexachloroethane	19		Pentachlorophenol	84	
Nitrobenzene	73		Phenanthrene	86	
Isophorone	80		Anthracene	84	
2-Nitrophenol	71		Caffeine		NAF
2,4-Dimethylphenol	87		Carbazole		NAF
Bis(2-Chloroethoxy)Methane	78		Di-N-Butylphthalate		NC
Benzoic Acid	122		Fluoranthene	98	
2,4-Dichlorophenol	83		Benzidine		NAF
1,2,4-Trichlorobenzene	73		Pyrene	98	
Naphthalene	74		Retene		NAF
4-Chloroaniline	6		Butylbenzylphthalate	88	
Hexachlorobutadiene	65		Benzo(a)anthracene	86	
4-Chloro-3-Methylphenol	88		3,3'-Dichlorobenzidine		NAF
2-Methylnaphthalene	66		Chrysene	88	
1-Methylnaphthalene		NAF	Bis(2-Ethylhexyl) Phthalate	94	
Hexachlorocyclopentadiene	0		Di-N-Octyl Phthalate	89	
2,4,6-Trichlorophenol	93		Benzo(b)fluoranthene	87	
2,4,5-Trichlorophenol	89		Benzo(k)fluoranthene	93	
2-Chloronaphthalene	85		Benzo(a)pyrene	100	
2-Nitroaniline	80		3B-Coprostanol		NAF
Dimethylphthalate	84		Indeno(1,2,3-cd)pyrene	85	
2,6-Dinitrotoluene	79		Dibenzo(a,h)anthracene	85	
Acenaphthylene	83		Benzo(ghi)perylene	85	
3-Nitroaniline	18				

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148244 (Matrix Spike - LMX1)
Field ID: 45
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/07/98

Method: SW8270
Matrix: Sediment/Soil
Units: % Recovery

Surrogate Recoveries

2-Fluorophenol	77	%
D5-Phenol	81	%
D4-2-Chlorophenol	76	%
1,2-Dichlorobenzene-D4	51	%
D5-Nitrobenzene	60	%
2-Fluorobiphenyl	77	%
D10-Pyrene	81	%
D14-Terphenyl	83	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148244 (Matrix Spike - LMX2)
Field ID: 45
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/07/98

Method: SW8270
Matrix: Sediment/Soil
Units: % Recovery

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	50		Acenaphthene	82	
Pyridine		NAF	2,4-Dinitrophenol	64	
Aniline	3		4-Nitrophenol	90	
Phenol	83		Dibenzofuran	79	
Bis(2-Chloroethyl)Ether	51		2,4-Dinitrotoluene	81	
2-Chlorophenol	87		Diethylphthalate	92	
1,3-Dichlorobenzene	47		Fluorene	85	
1,4-Dichlorobenzene	51		4-Chlorophenyl-Phenylether	89	
1,2-Dichlorobenzene	57		4-Nitroaniline	17	
Benzyl Alcohol	82		4,6-Dinitro-2-Methylphenol	63	
2-Methylphenol	89		N-Nitrosodiphenylamine	90	
2,2'-Oxybis[1-chloropropane]	73		1,2-Diphenylhydrazine	86	
N-Nitroso-Di-N-Propylamine	87		4-Bromophenyl-Phenylether	100	
4-Methylphenol	95		Hexachlorobenzene	101	
Hexachloroethane	21		Pentachlorophenol	87	
Nitrobenzene	75		Phenanthrene	84	
Isophorone	85		Anthracene	85	
2-Nitrophenol	74		Caffeine		NAF
2,4-Dimethylphenol	80		Carbazole		NAF
Bis(2-Chloroethoxy)Methane	82		Di-N-Butylphthalate		NC
Benzoic Acid	121		Fluoranthene	83	
2,4-Dichlorophenol	86		Benzidine		NAF
1,2,4-Trichlorobenzene	75		Pyrene	90	
Naphthalene	76		Retene		NAF
4-Chloroaniline	6		Butylbenzylphthalate	94	
Hexachlorobutadiene	64		Benzo(a)anthracene	84	
4-Chloro-3-Methylphenol	91		3,3'-Dichlorobenzidine		NAF
2-Methylnaphthalene	66		Chrysene	87	
1-Methylnaphthalene		NAF	Bis(2-Ethylhexyl) Phthalate	102	
Hexachlorocyclopentadiene	0		Di-N-Octyl Phthalate	91	
2,4,6-Trichlorophenol	98		Benzo(b)fluoranthene	85	
2,4,5-Trichlorophenol	96		Benzo(k)fluoranthene	88	
2-Chloronaphthalene	91		Benzo(a)pyrene	103	
2-Nitroaniline	83		3B-Coprostanol		NAF
Dimethylphthalate	89		Indeno(1,2,3-cd)pyrene	99	
2,6-Dinitrotoluene	86		Dibenzo(a,h)anthracene	91	
Acenaphthylene	85		Benzo(ghi)perylene	81	
3-Nitroaniline	13				

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148244 (Matrix Spike - LMX2)
Field ID: 45
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/07/98

Method: SW8270
Matrix: Sediment/Soil
Units: % Recovery

Surrogate Recoveries

2-Fluorophenol	82	%
D5-Phenol	90	%
D4-2-Chlorophenol	81	%
1,2-Dichlorobenzene-D4	46	%
D5-Nitrobenzene	61	%
2-Fluorobiphenyl	81	%
D10-Pyrene	83	%
D14-Terphenyl	87	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148245
Field ID: 55
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	47	U	Acenaphthene	94	U
Pyridine	47	U	2,4-Dinitrophenol	936	UJ
Aniline	94	U	4-Nitrophenol	234	U
Phenol	**372**		**Dibenzofuran**	**48**	
Bis(2-Chloroethyl)Ether	94	UJ	2,4-Dinitrotoluene	94	U
2-Chlorophenol	94	U	Diethylphthalate	47	UJ
1,3-Dichlorobenzene	94	U	**Fluorene**	**36**	**J**
1,4-Dichlorobenzene	94	U	4-Chlorophenyl-Phenylether	94	U
1,2-Dichlorobenzene	94	U	4-Nitroaniline	94	U
Benzyl Alcohol	**45**	**J**	4,6-Dinitro-2-Methylphenol	936	UJ
2-Methylphenol	**79**	**J**	N-Nitrosodiphenylamine	94	U
2,2'-Oxybis[1-chloropropane]	94	U	1,2-Diphenylhydrazine	47	U
N-Nitroso-Di-N-Propylamine	94	U	4-Bromophenyl-Phenylether	94	U
4-Methylphenol	**383**		Hexachlorobenzene	94	U
Hexachloroethane	94	U	Pentachlorophenol	234	U
Nitrobenzene	94	U	**Phenanthrene**	**192**	
Isophorone	94	U	**Anthracene**	**26**	**J**
2-Nitrophenol	234	U	**Caffeine**	**15**	**J**
2,4-Dimethylphenol	**46**	**J**	**Carbazole**	**18**	**J**
Bis(2-Chloroethoxy)Methane	47	U	Di-N-Butylphthalate	5000	UJ
Benzoic Acid	1390	UJ	**Fluoranthene**	**303**	
2,4-Dichlorophenol	94	U	Benzidine	47	UJ
1,2,4-Trichlorobenzene	94	U	**Pyrene**	**270**	
Naphthalene	**204**		**Retene**	**367**	
4-Chloroaniline	47	U	Butylbenzylphthalate	47	U
Hexachlorobutadiene	94	U	**Benzo(a)anthracene**	**81**	**J**
4-Chloro-3-Methylphenol	47	U	3,3'-Dichlorobenzidine	94	U
2-Methylnaphthalene	**32**	**J**	**Chrysene**	**120**	
1-Methylnaphthalene	**23**	**J**	Bis(2-Ethylhexyl) Phthalate	167	UJ
Hexachlorocyclopentadiene	234	U	Di-N-Octyl Phthalate	234	U
2,4,6-Trichlorophenol	47	U	**Benzo(b)fluoranthene**	**107**	**J**
2,4,5-Trichlorophenol	47	U	**Benzo(k)fluoranthene**	**52**	**J**
2-Chloronaphthalene	94	U	**Benzo(a)pyrene**	**54**	**J**
2-Nitroaniline	47	U	3B-Coprostanol		NAF
Dimethylphthalate	94	U	**Indeno(1,2,3-cd)pyrene**	**48**	
2,6-Dinitrotoluene	234	U	Dibenzo(a,h)anthracene	47	U
Acenaphthylene	**47**		Benzo(ghi)perylene	74	UJ
3-Nitroaniline	94	U			

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148245
Field ID: 55
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	77	%
D5-Phenol	83	%
D4-2-Chlorophenol	78	%
1,2-Dichlorobenzene-D4	46	%
D5-Nitrobenzene	40	%
2-Fluorobiphenyl	73	%
D10-Pyrene	84	%
D14-Terphenyl	84	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148246
Field ID: 65
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/06/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	57	U	**Acenaphthene**	**6.4**	**J**
Pyridine	57	U	2,4-Dinitrophenol	2300	UJ
Aniline	57	U	4-Nitrophenol	144	U
Phenol	41	UJ	**Dibenzofuran**	**9.1**	**J**
Bis(2-Chloroethyl)Ether	57	U	2,4-Dinitrotoluene	144	U
2-Chlorophenol	57	U	Diethylphthalate	57	U
1,3-Dichlorobenzene	57	U	**Fluorene**	**10**	**J**
1,4-Dichlorobenzene	57	U	4-Chlorophenyl-Phenylether	57	U
1,2-Dichlorobenzene	57	U	4-Nitroaniline	144	U
Benzyl Alcohol	29	U	4,6-Dinitro-2-Methylphenol	574	UJ
2-Methylphenol	57	U	N-Nitrosodiphenylamine	57	U
2,2'-Oxybis[1-chloropropane]	29	U	1,2-Diphenylhydrazine	29	U
N-Nitroso-Di-N-Propylamine	57	U	4-Bromophenyl-Phenylether	57	U
4-Methylphenol	**44**	**J**	Hexachlorobenzene	57	U
Hexachloroethane	57	U	Pentachlorophenol	144	U
Nitrobenzene	57	U	**Phenanthrene**	**52**	
Isophorone	57	U	**Anthracene**	**9.8**	**J**
2-Nitrophenol	144	U	Caffeine	29	U
2,4-Dimethylphenol	57	U	Carbazole	57	U
Bis(2-Chloroethoxy)Methane	57	U	Di-N-Butylphthalate	1820	UJ
Benzoic Acid	740	UJ	**Fluoranthene**	**79**	
2,4-Dichlorophenol	57	U	Benzidine	287	UJ
1,2,4-Trichlorobenzene	57	U	**Pyrene**	**87**	
Naphthalene	**42**	**J**	**Retene**	**48**	**J**
4-Chloroaniline	29	U	Butylbenzylphthalate	57	U
Hexachlorobutadiene	57	U	Benzo(a)anthracene	57	U
4-Chloro-3-Methylphenol	57	U	3,3'-Dichlorobenzidine	57	U
2-Methylnaphthalene	**11**	**J**	**Chrysene**	**35**	**J**
1-Methylnaphthalene	**10**	**J**	**Bis(2-Ethylhexyl) Phthalate**	**73**	
Hexachlorocyclopentadiene	144	U	Di-N-Octyl Phthalate	144	U
2,4,6-Trichlorophenol	57	U	**Benzo(b)fluoranthene**	**43**	**J**
2,4,5-Trichlorophenol	57	U	**Benzo(k)fluoranthene**	**10**	**J**
2-Chloronaphthalene	29	U	Benzo(a)pyrene	29	U
2-Nitroaniline	144	U	3B-Coprostanol		NAF
Dimethylphthalate	57	U	**Indeno(1,2,3-cd)pyrene**	**16**	**J**
2,6-Dinitrotoluene	144	U	Dibenzo(a,h)anthracene	57	U
Acenaphthylene	**15**	**J**	Benzo(ghi)perylene	39	UJ
3-Nitroaniline	144	U			

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148246
Field ID: 65
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/06/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	86	%
D5-Phenol	93	%
D4-2-Chlorophenol	85	%
1,2-Dichlorobenzene-D4	35	%
D5-Nitrobenzene	66	%
2-Fluorobiphenyl	79	%
D10-Pyrene	95	%
D14-Terphenyl	94	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148247
Field ID: 75
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	35	U	**Acenaphthene**	**205**	
Pyridine	35	U	2,4-Dinitrophenol	703	UJ
Aniline	93	U	4-Nitrophenol	176	U
Phenol	67	UJ	**Dibenzofuran**	**220**	
Bis(2-Chloroethyl)Ether	70	UJ	2,4-Dinitrotoluene	70	U
2-Chlorophenol	70	U	Diethylphthalate	35	U
1,3-Dichlorobenzene	70	U	**Fluorene**	**169**	
1,4-Dichlorobenzene	70	U	4-Chlorophenyl-Phenylether	70	U
1,2-Dichlorobenzene	70	U	4-Nitroaniline	70	U
Benzyl Alcohol	**26**	**J**	4,6-Dinitro-2-Methylphenol	703	UJ
2-Methylphenol	70	U	N-Nitrosodiphenylamine	70	U
2,2'-Oxybis[1-chloropropane]	70	U	1,2-Diphenylhydrazine	35	U
N-Nitroso-Di-N-Propylamine	70	U	4-Bromophenyl-Phenylether	70	U
4-Methylphenol	**65**	**J**	Hexachlorobenzene	70	U
Hexachloroethane	70	U	**Pentachlorophenol**	**128**	**J**
Nitrobenzene	70	U	**Phenanthrene**	**1590**	
Isophorone	70	U	**Anthracene**	**241**	
2-Nitrophenol	176	U	**Caffeine**	**13**	**J**
2,4-Dimethylphenol	35	U	**Carbazole**	**188**	
Bis(2-Chloroethoxy)Methane	35	U	Di-N-Butylphthalate	4750	UJ
Benzoic Acid	1010	UJ	**Fluoranthene**	**2320**	
2,4-Dichlorophenol	70	U	Benzidine	35	UJ
1,2,4-Trichlorobenzene	70	U	**Pyrene**	**2170**	
Naphthalene	**256**		**Retene**	**82**	
4-Chloroaniline	35	U	Butylbenzylphthalate	35	U
Hexachlorobutadiene	70	U	**Benzo(a)anthracene**	**758**	
4-Chloro-3-Methylphenol	35	U	3,3'-Dichlorobenzidine	70	U
2-Methylnaphthalene	**87**		**Chrysene**	**1240**	
1-Methylnaphthalene	**77**		Bis(2-Ethylhexyl) Phthalate	170	UJ
Hexachlorocyclopentadiene	176	U	Di-N-Octyl Phthalate	176	U
2,4,6-Trichlorophenol	35	U	**Benzo(b)fluoranthene**	**1390**	
2,4,5-Trichlorophenol	35	U	**Benzo(k)fluoranthene**	**596**	
2-Chloronaphthalene	70	U	**Benzo(a)pyrene**	**910**	
2-Nitroaniline	35	U	3B-Coprostanol		NAF
Dimethylphthalate	70	U	**Indeno(1,2,3-cd)pyrene**	**652**	
2,6-Dinitrotoluene	176	U	**Dibenzo(a,h)anthracene**	**173**	
Acenaphthylene	**55**		**Benzo(ghi)perylene**	**517**	
3-Nitroaniline	70	U			

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148247
Field ID: 75
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	80	%
D5-Phenol	85	%
D4-2-Chlorophenol	81	%
1,2-Dichlorobenzene-D4	46	%
D5-Nitrobenzene	56	%
2-Fluorobiphenyl	73	%
D10-Pyrene	82	%
D14-Terphenyl	81	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148248
Field ID: 85
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	39	U	**Acenaphthene**	**76**	**J**
Pyridine	39	U	2,4-Dinitrophenol	782	UJ
Aniline	78	U	4-Nitrophenol	196	U
Phenol	165	UJ	**Dibenzofuran**	**71**	
Bis(2-Chloroethyl)Ether	78	UJ	2,4-Dinitrotoluene	78	U
2-Chlorophenol	78	U	Diethylphthalate	39	U
1,3-Dichlorobenzene	78	U	**Fluorene**	**99**	
1,4-Dichlorobenzene	78	U	4-Chlorophenyl-Phenylether	78	U
1,2-Dichlorobenzene	78	U	4-Nitroaniline	78	U
Benzyl Alcohol	39	U	4,6-Dinitro-2-Methylphenol	782	UJ
2-Methylphenol	78	U	N-Nitrosodiphenylamine	78	U
2,2'-Oxybis[1-chloropropane]	78	U	1,2-Diphenylhydrazine	39	U
N-Nitroso-Di-N-Propylamine	78	U	4-Bromophenyl-Phenylether	78	U
4-Methylphenol	**837**		Hexachlorobenzene	78	U
Hexachloroethane	78	U	**Pentachlorophenol**	**122**	**J**
Nitrobenzene	78	U	**Phenanthrene**	**350**	
Isophorone	78	U	**Anthracene**	**68**	**J**
2-Nitrophenol	196	U	**Caffeine**	**26**	**J**
2,4-Dimethylphenol	**18**	**J**	**Carbazole**	**20**	**J**
Bis(2-Chloroethoxy)Methane	39	U	Di-N-Butylphthalate	2560	UJ
Benzoic Acid	1100	UJ	**Fluoranthene**	**361**	
2,4-Dichlorophenol	78	U	Benzidine	39	UJ
1,2,4-Trichlorobenzene	78	U	**Pyrene**	**410**	
Naphthalene	**607**		**Retene**	**313**	
4-Chloroaniline	39	U	Butylbenzylphthalate	39	U
Hexachlorobutadiene	78	U	Benzo(a)anthracene	78	U
4-Chloro-3-Methylphenol	39	U	3,3'-Dichlorobenzidine	78	U
2-Methylnaphthalene	**72**	**J**	**Chrysene**	**70**	**J**
1-Methylnaphthalene	**55**		Bis(2-Ethylhexyl) Phthalate	131	UJ
Hexachlorocyclopentadiene	196	U	Di-N-Octyl Phthalate	196	U
2,4,6-Trichlorophenol	39	U	**Benzo(b)fluoranthene**	**73**	**J**
2,4,5-Trichlorophenol	**18**	**J**	**Benzo(k)fluoranthene**	**20**	**J**
2-Chloronaphthalene	78	U	**Benzo(a)pyrene**	**43**	**J**
2-Nitroaniline	39	U	3B-Coprostanol		NAF
Dimethylphthalate	78	U	**Indeno(1,2,3-cd)pyrene**	**36**	**J**
2,6-Dinitrotoluene	196	U	Dibenzo(a,h)anthracene	39	U
Acenaphthylene	**184**		Benzo(ghi)perylene	62	UJ
3-Nitroaniline	78	U			

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148248
Field ID: 85
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	80	%
D5-Phenol	84	%
D4-2-Chlorophenol	79	%
1,2-Dichlorobenzene-D4	39	%
D5-Nitrobenzene	57	%
2-Fluorobiphenyl	73	%
D10-Pyrene	82	%
D14-Terphenyl	83	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148250
Field ID: 95
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	57	U	Acenaphthene	113	U
Pyridine	57	U	2,4-Dinitrophenol	1130	UJ
Aniline	57	U	4-Nitrophenol	283	U
Phenol	**95**		**Dibenzofuran**	**35**	**J**
Bis(2-Chloroethyl)Ether	113	UJ	2,4-Dinitrotoluene	113	U
2-Chlorophenol	113	U	Diethylphthalate	57	U
1,3-Dichlorobenzene	113	U	**Fluorene**	**36**	**J**
1,4-Dichlorobenzene	113	U	4-Chlorophenyl-Phenylether	113	U
1,2-Dichlorobenzene	113	U	4-Nitroaniline	113	U
Benzyl Alcohol	**36**	**J**	4,6-Dinitro-2-Methylphenol	1130	UJ
2-Methylphenol	113	U	N-Nitrosodiphenylamine	57	U
2,2'-Oxybis[1-chloropropane]	113	U	1,2-Diphenylhydrazine	57	U
N-Nitroso-Di-N-Propylamine	113	U	4-Bromophenyl-Phenylether	113	U
4-Methylphenol	**74**	**J**	Hexachlorobenzene	113	U
Hexachloroethane	113	U	**Pentachlorophenol**	**327**	
Nitrobenzene	113	U	**Phenanthrene**	**272**	
Isophorone	113	U	**Anthracene**	**56**	**J**
2-Nitrophenol	283	U	**Caffeine**	**21**	**J**
2,4-Dimethylphenol	57	U	**Carbazole**	**39**	**J**
Bis(2-Chloroethoxy)Methane	57	U	Di-N-Butylphthalate	3890	UJ
Benzoic Acid	1390	UJ	**Fluoranthene**	**402**	
2,4-Dichlorophenol	113	U	Benzidine	57	UJ
1,2,4-Trichlorobenzene	113	U	**Pyrene**	**425**	
Naphthalene	**95**		**Retene**	**302**	
4-Chloroaniline	57	U	Butylbenzylphthalate	57	U
Hexachlorobutadiene	113	U	**Benzo(a)anthracene**	**103**	**J**
4-Chloro-3-Methylphenol	57	U	3,3'-Dichlorobenzidine	113	U
2-Methylnaphthalene	**29**	**J**	**Chrysene**	**164**	
1-Methylnaphthalene	**15**	**J**	Bis(2-Ethylhexyl) Phthalate	1230	UJ
Hexachlorocyclopentadiene	283	U	Di-N-Octyl Phthalate	283	U
2,4,6-Trichlorophenol	57	U	**Benzo(b)fluoranthene**	**176**	**J**
2,4,5-Trichlorophenol	57	U	**Benzo(k)fluoranthene**	**63**	**J**
2-Chloronaphthalene	113	U	**Benzo(a)pyrene**	**106**	**J**
2-Nitroaniline	57	U	3B-Coprostanol		NAF
Dimethylphthalate	**59**	**J**	**Indeno(1,2,3-cd)pyrene**	**83**	
2,6-Dinitrotoluene	283	U	**Dibenzo(a,h)anthracene**	**36**	**J**
Acenaphthylene	**26**	**J**	Benzo(ghi)perylene	128	UJ
3-Nitroaniline	113	U			

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148250
Field ID: 95
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	72	%
D5-Phenol	80	%
D4-2-Chlorophenol	72	%
1,2-Dichlorobenzene-D4	44	%
D5-Nitrobenzene	39	%
2-Fluorobiphenyl	69	%
D10-Pyrene	77	%
D14-Terphenyl	78	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148251
Field ID: 105
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	38	U	**Acenaphthene**	**51**	**J**
Pyridine	38	U	2,4-Dinitrophenol	755	UJ
Aniline	76	U	4-Nitrophenol	189	U
Phenol	60	UJ	**Dibenzofuran**	**51**	
Bis(2-Chloroethyl)Ether	76	UJ	2,4-Dinitrotoluene	76	U
2-Chlorophenol	76	U	Diethylphthalate	38	U
1,3-Dichlorobenzene	76	U	**Fluorene**	**63**	**J**
1,4-Dichlorobenzene	**16**	**J**	4-Chlorophenyl-Phenylether	76	U
1,2-Dichlorobenzene	76	U	4-Nitroaniline	76	U
Benzyl Alcohol	**24**	**J**	4,6-Dinitro-2-Methylphenol	755	UJ
2-Methylphenol	76	U	N-Nitrosodiphenylamine	76	U
2,2'-Oxybis[1-chloropropane]	76	U	1,2-Diphenylhydrazine	38	U
N-Nitroso-Di-N-Propylamine	76	U	4-Bromophenyl-Phenylether	76	U
4-Methylphenol	**146**		Hexachlorobenzene	76	U
Hexachloroethane	76	U	**Pentachlorophenol**	**168**	**J**
Nitrobenzene	76	U	**Phenanthrene**	**684**	
Isophorone	76	U	**Anthracene**	**108**	
2-Nitrophenol	189	U	Caffeine	38	U
2,4-Dimethylphenol	38	U	**Carbazole**	**109**	
Bis(2-Chloroethoxy)Methane	38	U	Di-N-Butylphthalate	3430	UJ
Benzoic Acid	1140	UJ	**Fluoranthene**	**1120**	
2,4-Dichlorophenol	76	U	Benzidine	38	UJ
1,2,4-Trichlorobenzene	76	U	**Pyrene**	**1160**	
Naphthalene	**167**		**Retene**	**179**	
4-Chloroaniline	38	U	**Butylbenzylphthalate**	**126**	
Hexachlorobutadiene	76	U	**Benzo(a)anthracene**	**322**	
4-Chloro-3-Methylphenol	38	U	3,3'-Dichlorobenzidine	76	U
2-Methylnaphthalene	**52**	**J**	**Chrysene**	**526**	
1-Methylnaphthalene	**28**	**J**	**Bis(2-Ethylhexyl) Phthalate**	**1830**	
Hexachlorocyclopentadiene	189	U	Di-N-Octyl Phthalate	189	U
2,4,6-Trichlorophenol	38	U	**Benzo(b)fluoranthene**	**652**	
2,4,5-Trichlorophenol	38	U	**Benzo(k)fluoranthene**	**256**	
2-Chloronaphthalene	76	U	**Benzo(a)pyrene**	**470**	
2-Nitroaniline	38	U	3B-Coprostanol		NAF
Dimethylphthalate	**18**	**J**	**Indeno(1,2,3-cd)pyrene**	**398**	
2,6-Dinitrotoluene	189	U	**Dibenzo(a,h)anthracene**	**72**	
Acenaphthylene	**44**		**Benzo(ghi)perylene**	**377**	
3-Nitroaniline	76	U			

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148251
Field ID: 105
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	74	%
D5-Phenol	81	%
D4-2-Chlorophenol	76	%
1,2-Dichlorobenzene-D4	42	%
D5-Nitrobenzene	37	%
2-Fluorobiphenyl	68	%
D10-Pyrene	78	%
D14-Terphenyl	78	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148252
Field ID: 115
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	34	U	**Acenaphthene**	**91**	
Pyridine	34	U	2,4-Dinitrophenol	682	UJ
Aniline	68	U	4-Nitrophenol	170	U
Phenol	72	UJ	**Dibenzofuran**	**81**	
Bis(2-Chloroethyl)Ether	68	UJ	2,4-Dinitrotoluene	68	U
2-Chlorophenol	68	U	**Diethylphthalate**	**13**	J
1,3-Dichlorobenzene	68	U	**Fluorene**	**122**	
1,4-Dichlorobenzene	**16**	J	4-Chlorophenyl-Phenylether	68	U
1,2-Dichlorobenzene	68	U	4-Nitroaniline	68	U
Benzyl Alcohol	**35**		4,6-Dinitro-2-Methylphenol	682	UJ
2-Methylphenol	68	U	N-Nitrosodiphenylamine	34	U
2,2'-Oxybis[1-chloropropane]	68	U	1,2-Diphenylhydrazine	34	U
N-Nitroso-Di-N-Propylamine	68	U	4-Bromophenyl-Phenylether	68	U
4-Methylphenol	**88**		Hexachlorobenzene	68	U
Hexachloroethane	68	U	**Pentachlorophenol**	**157**	J
Nitrobenzene	68	U	**Phenanthrene**	**1250**	
Isophorone	68	U	**Anthracene**	**268**	
2-Nitrophenol	170	U	Caffeine	68	U
2,4-Dimethylphenol	34	U	**Carbazole**	**264**	
Bis(2-Chloroethoxy)Methane	34	U	Di-N-Butylphthalate	3960	UJ
Benzoic Acid	985	UJ	**Fluoranthene**	**1900**	
2,4-Dichlorophenol	68	U	Benzidine	34	UJ
1,2,4-Trichlorobenzene	68	U	**Pyrene**	**1800**	
Naphthalene	**118**		**Retene**	**580**	
4-Chloroaniline	34	U	**Butylbenzylphthalate**	**399**	
Hexachlorobutadiene	68	U	**Benzo(a)anthracene**	**689**	
4-Chloro-3-Methylphenol	34	U	3,3'-Dichlorobenzidine	68	U
2-Methylnaphthalene	**53**	J	**Chrysene**	**899**	
1-Methylnaphthalene	**35**		**Bis(2-Ethylhexyl) Phthalate**	**2600**	
Hexachlorocyclopentadiene	170	U	Di-N-Octyl Phthalate	170	U
2,4,6-Trichlorophenol	34	U	**Benzo(b)fluoranthene**	**1020**	
2,4,5-Trichlorophenol	34	U	**Benzo(k)fluoranthene**	**378**	
2-Chloronaphthalene	68	U	**Benzo(a)pyrene**	**780**	
2-Nitroaniline	34	U	3B-Coprostanol		NAF
Dimethylphthalate	68	U	**Indeno(1,2,3-cd)pyrene**	**558**	
2,6-Dinitrotoluene	170	U	**Dibenzo(a,h)anthracene**	**146**	
Acenaphthylene	**37**		**Benzo(ghi)perylene**	**505**	
3-Nitroaniline	68	U			

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148252
Field ID: 115
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	77	%
D5-Phenol	84	%
D4-2-Chlorophenol	78	%
1,2-Dichlorobenzene-D4	37	%
D5-Nitrobenzene	46	%
2-Fluorobiphenyl	71	%
D10-Pyrene	79	%
D14-Terphenyl	78	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148253
Field ID: 125
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	29	U	**Acenaphthene**	**20**	**J**
Pyridine	29	U	2,4-Dinitrophenol	577	UJ
Aniline	58	U	4-Nitrophenol	144	U
Phenol	45	UJ	**Dibenzofuran**	**29**	
Bis(2-Chloroethyl)Ether	58	UJ	2,4-Dinitrotoluene	58	U
2-Chlorophenol	58	U	Diethylphthalate	29	U
1,3-Dichlorobenzene	58	U	**Fluorene**	**27**	**J**
1,4-Dichlorobenzene	**3.4**	**J**	4-Chlorophenyl-Phenylether	58	U
1,2-Dichlorobenzene	58	U	4-Nitroaniline	58	U
Benzyl Alcohol	**9.3**	**J**	4,6-Dinitro-2-Methylphenol	577	UJ
2-Methylphenol	58	U	N-Nitrosodiphenylamine	58	U
2,2'-Oxybis[1-chloropropane]	58	U	1,2-Diphenylhydrazine	29	U
N-Nitroso-Di-N-Propylamine	58	U	4-Bromophenyl-Phenylether	58	U
4-Methylphenol	**70**		Hexachlorobenzene	58	U
Hexachloroethane	58	U	Pentachlorophenol	144	U
Nitrobenzene	58	U	**Phenanthrene**	**441**	
Isophorone	58	U	**Anthracene**	**53**	**J**
2-Nitrophenol	144	U	Caffeine	58	U
2,4-Dimethylphenol	29	U	**Carbazole**	**35**	**J**
Bis(2-Chloroethoxy)Methane	29	U	Di-N-Butylphthalate	1410	UJ
Benzoic Acid	**770**		**Fluoranthene**	**702**	
2,4-Dichlorophenol	58	U	Benzidine	29	UJ
1,2,4-Trichlorobenzene	58	U	**Pyrene**	**653**	
Naphthalene	**76**		**Retene**	**172**	
4-Chloroaniline	29	U	Butylbenzylphthalate	29	U
Hexachlorobutadiene	58	U	**Benzo(a)anthracene**	**359**	
4-Chloro-3-Methylphenol	29	U	3,3'-Dichlorobenzidine	58	U
2-Methylnaphthalene	**22**	**J**	**Chrysene**	**537**	
1-Methylnaphthalene	**18**	**J**	Bis(2-Ethylhexyl) Phthalate	182	UJ
Hexachlorocyclopentadiene	144	U	Di-N-Octyl Phthalate	144	U
2,4,6-Trichlorophenol	29	U	**Benzo(b)fluoranthene**	**661**	
2,4,5-Trichlorophenol	29	U	**Benzo(k)fluoranthene**	**229**	
2-Chloronaphthalene	58	U	**Benzo(a)pyrene**	**416**	
2-Nitroaniline	29	U	3B-Coprostanol		NAF
Dimethylphthalate	58	U	**Indeno(1,2,3-cd)pyrene**	**323**	
2,6-Dinitrotoluene	144	U	**Dibenzo(a,h)anthracene**	**98**	
Acenaphthylene	**21**	**J**	**Benzo(ghi)perylene**	**321**	
3-Nitroaniline	58	U			

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148253
Field ID: 125
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	79	%
D5-Phenol	85	%
D4-2-Chlorophenol	80	%
1,2-Dichlorobenzene-D4	41	%
D5-Nitrobenzene	61	%
2-Fluorobiphenyl	69	%
D10-Pyrene	78	%
D14-Terphenyl	79	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148254
Field ID: 135
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	22	U	**Acenaphthene**	**279**	
Pyridine	22	U	2,4-Dinitrophenol	445	UJ
Aniline	45	U	4-Nitrophenol	111	U
Phenol	38	UJ	**Dibenzofuran**	**187**	
Bis(2-Chloroethyl)Ether	45	UJ	2,4-Dinitrotoluene	45	U
2-Chlorophenol	45	U	Diethylphthalate	22	U
1,3-Dichlorobenzene	45	U	**Fluorene**	**307**	
1,4-Dichlorobenzene	45	U	4-Chlorophenyl-Phenylether	45	U
1,2-Dichlorobenzene	45	U	4-Nitroaniline	45	U
Benzyl Alcohol	**13**	**J**	4,6-Dinitro-2-Methylphenol	445	UJ
2-Methylphenol	45	U	N-Nitrosodiphenylamine	45	U
2,2'-Oxybis[1-chloropropane]	45	U	1,2-Diphenylhydrazine	22	U
N-Nitroso-Di-N-Propylamine	45	U	4-Bromophenyl-Phenylether	45	U
4-Methylphenol	**26**	**J**	Hexachlorobenzene	45	U
Hexachloroethane	45	U	**Pentachlorophenol**	**218**	
Nitrobenzene	45	U	**Phenanthrene**	**2370**	**E**
Isophorone	45	U	**Anthracene**	**394**	
2-Nitrophenol	111	U	Caffeine	22	U
2,4-Dimethylphenol	22	U	**Carbazole**	**284**	
Bis(2-Chloroethoxy)Methane	22	U	Di-N-Butylphthalate	63	UJ
Benzoic Acid	580	UJ	**Fluoranthene**	**3990**	**E**
2,4-Dichlorophenol	45	U	Benzidine	22	UJ
1,2,4-Trichlorobenzene	45	U	**Pyrene**	**3960**	**E**
Naphthalene	**287**		**Retene**	**49**	
4-Chloroaniline	22	U	Butylbenzylphthalate	22	U
Hexachlorobutadiene	45	U	**Benzo(a)anthracene**	**2120**	**E**
4-Chloro-3-Methylphenol	22	U	3,3'-Dichlorobenzidine	45	U
2-Methylnaphthalene	**113**		**Chrysene**	**2740**	**E**
1-Methylnaphthalene	**87**		Bis(2-Ethylhexyl) Phthalate	186	UJ
Hexachlorocyclopentadiene	111	U	Di-N-Octyl Phthalate	111	U
2,4,6-Trichlorophenol	22	U	**Benzo(b)fluoranthene**	**3190**	**E**
2,4,5-Trichlorophenol	22	U	**Benzo(k)fluoranthene**	**1170**	
2-Chloronaphthalene	45	U	**Benzo(a)pyrene**	**2460**	**E**
2-Nitroaniline	22	U	3B-Coprostanol		NAF
Dimethylphthalate	45	U	**Indeno(1,2,3-cd)pyrene**	**1360**	
2,6-Dinitrotoluene	111	U	**Dibenzo(a,h)anthracene**	**403**	
Acenaphthylene	**27**		**Benzo(ghi)perylene**	**1320**	
3-Nitroaniline	45	U			

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148254
Field ID: 135
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	78	%
D5-Phenol	82	%
D4-2-Chlorophenol	78	%
1,2-Dichlorobenzene-D4	47	%
D5-Nitrobenzene	52	%
2-Fluorobiphenyl	70	%
D10-Pyrene	77	%
D14-Terphenyl	78	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148254 (Dilution - DIL1)
Field ID: 135
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	111	U	**Acenaphthene**	**280**	
Pyridine	111	U	2,4-Dinitrophenol	2220	UJ
Aniline	111	U	4-Nitrophenol	556	U
Phenol	111	UJ	**Dibenzofuran**	**194**	
Bis(2-Chloroethyl)Ether	222	UJ	2,4-Dinitrotoluene	222	U
2-Chlorophenol	222	U	Diethylphthalate	111	U
1,3-Dichlorobenzene	222	U	**Fluorene**	**299**	
1,4-Dichlorobenzene	222	U	4-Chlorophenyl-Phenylether	222	U
1,2-Dichlorobenzene	222	U	4-Nitroaniline	222	U
Benzyl Alcohol	111	U	4,6-Dinitro-2-Methylphenol	2220	UJ
2-Methylphenol	222	U	N-Nitrosodiphenylamine	222	U
2,2'-Oxybis[1-chloropropane]	222	U	1,2-Diphenylhydrazine	111	U
N-Nitroso-Di-N-Propylamine	222	U	4-Bromophenyl-Phenylether	222	U
4-Methylphenol	222	U	Hexachlorobenzene	222	U
Hexachloroethane	222	U	Pentachlorophenol	556	U
Nitrobenzene	222	U	**Phenanthrene**	**2520**	
Isophorone	222	U	**Anthracene**	**377**	
2-Nitrophenol	556	U	Caffeine	222	U
2,4-Dimethylphenol	111	U	**Carbazole**	**285**	
Bis(2-Chloroethoxy)Methane	111	U	Di-N-Butylphthalate	556	UJ
Benzoic Acid	556	UJ	**Fluoranthene**	**4310**	
2,4-Dichlorophenol	222	U	Benzidine	111	UJ
1,2,4-Trichlorobenzene	222	U	**Pyrene**	**5070**	
Naphthalene	**296**		**Retene**	**72**	J
4-Chloroaniline	111	U	Butylbenzylphthalate	111	U
Hexachlorobutadiene	222	U	**Benzo(a)anthracene**	**2160**	
4-Chloro-3-Methylphenol	111	U	3,3'-Dichlorobenzidine	222	U
2-Methylnaphthalene	**117**	J	**Chrysene**	**2770**	
1-Methylnaphthalene	**80**	J	Bis(2-Ethylhexyl) Phthalate	222	UJ
Hexachlorocyclopentadiene	556	U	Di-N-Octyl Phthalate	556	U
2,4,6-Trichlorophenol	111	U	**Benzo(b)fluoranthene**	**3140**	
2,4,5-Trichlorophenol	111	U	**Benzo(k)fluoranthene**	**1180**	
2-Chloronaphthalene	222	U	**Benzo(a)pyrene**	**2490**	
2-Nitroaniline	111	U	3B-Coprostanol		NAF
Dimethylphthalate	222	U	**Indeno(1,2,3-cd)pyrene**	**1490**	
2,6-Dinitrotoluene	556	U	**Dibenzo(a,h)anthracene**	**450**	
Acenaphthylene	111	U	**Benzo(ghi)perylene**	**1310**	
3-Nitroaniline	222	U			

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148254 (Dilution - DIL1)
Field ID: 135
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	87	%
D5-Phenol	92	%
D4-2-Chlorophenol	79	%
1,2-Dichlorobenzene-D4	48	%
D5-Nitrobenzene	57	%
2-Fluorobiphenyl	74	%
D10-Pyrene	92	%
D14-Terphenyl	91	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148255
Field ID: 145
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	40	U	**Acenaphthene**	**30**	**J**
Pyridine	40	U	2,4-Dinitrophenol	797	UJ
Aniline	80	U	4-Nitrophenol	199	U
Phenol	150	UJ	**Dibenzofuran**	**29**	**J**
Bis(2-Chloroethyl)Ether	80	UJ	2,4-Dinitrotoluene	80	U
2-Chlorophenol	80	U	**Diethylphthalate**	**24**	**J**
1,3-Dichlorobenzene	80	U	**Fluorene**	**40**	**J**
1,4-Dichlorobenzene	80	U	4-Chlorophenyl-Phenylether	80	U
1,2-Dichlorobenzene	80	U	4-Nitroaniline	80	U
Benzyl Alcohol	**35**	**J**	4,6-Dinitro-2-Methylphenol	797	UJ
2-Methylphenol	80	U	**N-Nitrosodiphenylamine**	**24**	**J**
2,2'-Oxybis[1-chloropropane]	80	U	1,2-Diphenylhydrazine	40	U
N-Nitroso-Di-N-Propylamine	80	U	4-Bromophenyl-Phenylether	80	U
4-Methylphenol	**412**		Hexachlorobenzene	80	U
Hexachloroethane	80	U	Pentachlorophenol	199	U
Nitrobenzene	80	U	**Phenanthrene**	**162**	
Isophorone	80	U	**Anthracene**	**30**	**J**
2-Nitrophenol	199	U	**Caffeine**	**28**	**J**
2,4-Dimethylphenol	40	U	Carbazole	40	U
Bis(2-Chloroethoxy)Methane	40	U	Di-N-Butylphthalate	364	UJ
Benzoic Acid	1060	UJ	**Fluoranthene**	**198**	
2,4-Dichlorophenol	80	U	Benzidine	40	UJ
1,2,4-Trichlorobenzene	80	U	**Pyrene**	**220**	
Naphthalene	**169**		**Retene**	**164**	
4-Chloroaniline	40	U	Butylbenzylphthalate	40	U
Hexachlorobutadiene	80	U	**Benzo(a)anthracene**	**56**	**J**
4-Chloro-3-Methylphenol	40	U	3,3'-Dichlorobenzidine	80	U
2-Methylnaphthalene	**36**	**J**	**Chrysene**	**134**	
1-Methylnaphthalene	**25**	**J**	Bis(2-Ethylhexyl) Phthalate	377	UJ
Hexachlorocyclopentadiene	199	U	Di-N-Octyl Phthalate	199	U
2,4,6-Trichlorophenol	40	U	**Benzo(b)fluoranthene**	**97**	**J**
2,4,5-Trichlorophenol	40	U	**Benzo(k)fluoranthene**	**27**	**J**
2-Chloronaphthalene	80	U	**Benzo(a)pyrene**	**52**	**J**
2-Nitroaniline	40	U	3B-Coprostanol		NAF
Dimethylphthalate	80	U	**Indeno(1,2,3-cd)pyrene**	**39**	**J**
2,6-Dinitrotoluene	199	U	Dibenzo(a,h)anthracene	40	U
Acenaphthylene	**55**		Benzo(ghi)perylene	66	UJ
3-Nitroaniline	80	U			

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148255
Field ID: 145
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	74	%
D5-Phenol	78	%
D4-2-Chlorophenol	73	%
1,2-Dichlorobenzene-D4	40	%
D5-Nitrobenzene	41	%
2-Fluorobiphenyl	68	%
D10-Pyrene	74	%
D14-Terphenyl	72	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor **LIMS Project ID:** 1242-98

Sample: 98148256 **Date Received:** 04/02/98 **Method:** SW8270
Field ID: 155 **Date Prepared:** 04/09/98 **Matrix:** Sediment/Soil
Project Officer: Dale Norton **Date Analyzed:** 05/11/98 **Units:** ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	26	U	Acenaphthene	52	U
Pyridine	26	U	2,4-Dinitrophenol	515	UJ
Aniline	56	U	4-Nitrophenol	129	U
Phenol	109	UJ	**Dibenzofuran**	**5.2**	**J**
Bis(2-Chloroethyl)Ether	52	UJ	2,4-Dinitrotoluene	52	U
2-Chlorophenol	52	U	**Diethylphthalate**	**13**	**J**
1,3-Dichlorobenzene	52	U	**Fluorene**	**7.7**	**J**
1,4-Dichlorobenzene	52	U	4-Chlorophenyl-Phenylether	52	U
1,2-Dichlorobenzene	52	U	4-Nitroaniline	52	U
Benzyl Alcohol	**15**	**J**	4,6-Dinitro-2-Methylphenol	515	UJ
2-Methylphenol	52	U	N-Nitrosodiphenylamine	52	U
2,2'-Oxybis[1-chloropropane]	52	U	1,2-Diphenylhydrazine	26	U
N-Nitroso-Di-N-Propylamine	52	U	4-Bromophenyl-Phenylether	52	U
4-Methylphenol	**116**		Hexachlorobenzene	52	U
Hexachloroethane	52	U	Pentachlorophenol	129	U
Nitrobenzene	52	U	**Phenanthrene**	**27**	**J**
Isophorone	52	U	**Anthracene**	**8.2**	**J**
2-Nitrophenol	129	U	Caffeine	26	U
2,4-Dimethylphenol	26	U	Carbazole	52	U
Bis(2-Chloroethoxy)Methane	26	U	Di-N-Butylphthalate	700	UJ
Benzoic Acid	616	UJ	**Fluoranthene**	**35**	
2,4-Dichlorophenol	52	U	Benzidine	26	UJ
1,2,4-Trichlorobenzene	52	U	**Pyrene**	**51**	**J**
Naphthalene	**29**		**Retene**	**41**	**J**
4-Chloroaniline	26	U	Butylbenzylphthalate	26	U
Hexachlorobutadiene	52	U	Benzo(a)anthracene	52	U
4-Chloro-3-Methylphenol	26	U	3,3'-Dichlorobenzidine	52	U
2-Methylnaphthalene	**7.6**	**J**	Chrysene	52	U
1-Methylnaphthalene	**5.3**	**J**	Bis(2-Ethylhexyl) Phthalate	52	U
Hexachlorocyclopentadiene	129	U	Di-N-Octyl Phthalate	129	U
2,4,6-Trichlorophenol	26	U	**Benzo(b)fluoranthene**	**23**	**J**
2,4,5-Trichlorophenol	26	U	Benzo(k)fluoranthene	52	U
2-Chloronaphthalene	52	U	**Benzo(a)pyrene**	**12**	**J**
2-Nitroaniline	26	U	3B-Coprostanol		NAF
Dimethylphthalate	52	U	**Indeno(1,2,3-cd)pyrene**	**13**	**J**
2,6-Dinitrotoluene	129	U	Dibenzo(a,h)anthracene	26	U
Acenaphthylene	**8.6**	**J**	Benzo(ghi)perylene	28	UJ
3-Nitroaniline	52	U			

Authorized By: _____ Release Date: 7/16/98 Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148256
Field ID: 155
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 04/09/98
Date Analyzed: 05/11/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	79	%
D5-Phenol	83	%
D4-2-Chlorophenol	78	%
1,2-Dichlorobenzene-D4	45	%
D5-Nitrobenzene	59	%
2-Fluorobiphenyl	69	%
D10-Pyrene	80	%
D14-Terphenyl	79	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: OBS8099A2
Blank ID: BLNK
Project Officer: Dale Norton

Date Prepared: 04/09/98
Date Analyzed: 05/06/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	69	U	Acenaphthene	35	U
Pyridine	69	U	2,4-Dinitrophenol	2770	UJ
Aniline	35	U	4-Nitrophenol	173	U
Phenol	**54**	**J**	Dibenzofuran	35	U
Bis(2-Chloroethyl)Ether	69	U	2,4-Dinitrotoluene	173	U
2-Chlorophenol	69	U	Diethylphthalate	69	U
1,3-Dichlorobenzene	69	U	Fluorene	35	U
1,4-Dichlorobenzene	69	U	4-Chlorophenyl-Phenylether	69	U
1,2-Dichlorobenzene	69	U	4-Nitroaniline	173	U
Benzyl Alcohol	35	U	4,6-Dinitro-2-Methylphenol	693	UJ
2-Methylphenol	69	U	N-Nitrosodiphenylamine	69	U
2,2'-Oxybis[1-chloropropane]	35	U	1,2-Diphenylhydrazine	35	U
N-Nitroso-Di-N-Propylamine	69	U	4-Bromophenyl-Phenylether	69	U
4-Methylphenol	69	U	Hexachlorobenzene	69	U
Hexachloroethane	69	U	Pentachlorophenol	173	U
Nitrobenzene	69	U	**Phenanthrene**	**4.1**	**J**
Isophorone	69	U	Anthracene	69	U
2-Nitrophenol	173	U	Caffeine	35	U
2,4-Dimethylphenol	69	U	Carbazole	69	U
Bis(2-Chloroethoxy)Methane	69	U	**Di-N-Butylphthalate**	**5270**	**E**
Benzoic Acid	**790**	**J**	Fluoranthene	35	U
2,4-Dichlorophenol	69	U	Benzidine	347	UJ
1,2,4-Trichlorobenzene	69	U	Pyrene	69	U
Naphthalene	69	U	Retene	69	U
4-Chloroaniline	35	U	Butylbenzylphthalate	69	U
Hexachlorobutadiene	69	U	Benzo(a)anthracene	69	U
4-Chloro-3-Methylphenol	69	U	3,3'-Dichlorobenzidine	69	U
2-Methylnaphthalene	35	U	Chrysene	69	U
1-Methylnaphthalene	69	U	Bis(2-Ethylhexyl) Phthalate	69	U
Hexachlorocyclopentadiene	173	U	Di-N-Octyl Phthalate	173	U
2,4,6-Trichlorophenol	69	U	Benzo(b)fluoranthene	69	U
2,4,5-Trichlorophenol	69	U	Benzo(k)fluoranthene	69	U
2-Chloronaphthalene	35	U	Benzo(a)pyrene	35	U
2-Nitroaniline	173	U	3B-Coprostanol		NAF
Dimethylphthalate	69	U	Indeno(1,2,3-cd)pyrene	173	U
2,6-Dinitrotoluene	173	U	Dibenzo(a,h)anthracene	69	U
Acenaphthylene	69	U	**Benzo(ghi)perylene**	**41**	**J**
3-Nitroaniline	173	U			

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: OBS8099A2
Blank ID: BLNK
Project Officer: Dale Norton

Date Prepared: 04/09/98
Date Analyzed: 05/06/98

Method: SW8270
Matrix: Sediment/Soil
Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	82	%
D5-Phenol	90	%
D4-2-Chlorophenol	84	%
1,2-Dichlorobenzene-D4	82	%
D5-Nitrobenzene	82	%
2-Fluorobiphenyl	83	%
D10-Pyrene	96	%
D14-Terphenyl	97	%

Authorized By: _____ Release Date: 7/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: OBS8099A1

Method: SW8270

Date Prepared: 04/09/98

Matrix: Sediment/Soil

Project Officer: Dale Norton

Date Analyzed: 05/07/98

Units: ug/Kg dw

Analyte	Result	Qualifier	Analyte	Result	Qualifier
N-Nitrosodimethylamine	69	U	Acenaphthene	35	U
Pyridine	69	U	2,4-Dinitrophenol	2770	U
Aniline	35	U	4-Nitrophenol	173	U
Phenol	**36**	**J**	Dibenzofuran	35	U
Bis(2-Chloroethyl)Ether	69	UJ	2,4-Dinitrotoluene	173	U
2-Chlorophenol	69	U	**Diethylphthalate**	**2.4**	**J**
1,3-Dichlorobenzene	69	U	Fluorene	35	U
1,4-Dichlorobenzene	69	U	4-Chlorophenyl-Phenylether	69	U
1,2-Dichlorobenzene	69	U	4-Nitroaniline	173	U
Benzyl Alcohol	35	U	4,6-Dinitro-2-Methylphenol	693	U
2-Methylphenol	69	U	N-Nitrosodiphenylamine	69	U
2,2'-Oxybis[1-chloropropane]	35	U	1,2-Diphenylhydrazine	35	U
N-Nitroso-Di-N-Propylamine	69	U	4-Bromophenyl-Phenylether	69	U
4-Methylphenol	**4.9**	**J**	Hexachlorobenzene	69	U
Hexachloroethane	69	U	Pentachlorophenol	173	U
Nitrobenzene	69	U	**Phenanthrene**	**2.4**	**J**
Isophorone	69	U	Anthracene	69	U
2-Nitrophenol	173	U	Caffeine	35	U
2,4-Dimethylphenol	69	U	Carbazole	69	U
Bis(2-Chloroethoxy)Methane	69	U	**Di-N-Butylphthalate**	**12500**	**E**
Benzoic Acid	693	UJ	Fluoranthene	35	U
2,4-Dichlorophenol	69	U	Benzidine	347	UJ
1,2,4-Trichlorobenzene	69	U	Pyrene	69	U
Naphthalene	69	U	Retene	69	U
4-Chloroaniline	35	U	**Butylbenzylphthalate**	**4.8**	**J**
Hexachlorobutadiene	69	U	Benzo(a)anthracene	69	U
4-Chloro-3-Methylphenol	69	U	3,3'-Dichlorobenzidine	69	U
2-Methylnaphthalene	35	U	Chrysene	69	U
1-Methylnaphthalene	69	U	**Bis(2-Ethylhexyl) Phthalate**	**46**	**J**
Hexachlorocyclopentadiene	173	U	Di-N-Octyl Phthalate	173	U
2,4,6-Trichlorophenol	69	U	Benzo(b)fluoranthene	69	U
2,4,5-Trichlorophenol	69	U	Benzo(k)fluoranthene	69	U
2-Chloronaphthalene	35	U	Benzo(a)pyrene	35	U
2-Nitroaniline	173	U	3B-Coprostanol		NAF
Dimethylphthalate	69	U	Indeno(1,2,3-cd)pyrene	173	U
2,6-Dinitrotoluene	173	U	Dibenzo(a,h)anthracene	69	U
Acenaphthylene	69	U	Benzo(ghi)perylene	347	U
3-Nitroaniline	173	U			

Authorized By: _____ Release Date: 9/16/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: OBS8099A1

Method: SW8270

Date Prepared: 04/09/98

Matrix: Sediment/Soil

Project Officer: Dale Norton

Date Analyzed: 05/07/98

Units: ug/Kg dw

Surrogate Recoveries

2-Fluorophenol	70	%
D5-Phenol	76	%
D4-2-Chlorophenol	72	%
1,2-Dichlorobenzene-D4	65	%
D5-Nitrobenzene	71	%
2-Fluorobiphenyl	71	%
D10-Pyrene	84	%
D14-Terphenyl	81	%

Authorized By: _____ Release Date: 7/16/98

Butyltins

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Tri-butyl Tin

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148230
Field ID: 1C-1
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 06/24/98
Date Analyzed: 07/22/98

Method: NOAA-TBT
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier
Tetrabutyltin Chloride		REJ
Tributyltin Chloride	**4.5**	**J**
Dibutyltin Chloride	**1.2**	**J**
Monobutyltin Chloride	**23**	**J**

Surrogate Recoveries

Tripentyltin Chloride	**78**	**%**

Authorized By: _____ Release Date: 8/10/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Tri-butyl Tin

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148231
Field ID: 1C-2
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 06/24/98
Date Analyzed: 07/22/98

Method: NOAA-TBT
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier
Tetrabutyltin Chloride		REJ
Tributyltin Chloride	**15**	**J**
Dibutyltin Chloride	3.7	UJ
Monobutyltin Chloride	**52**	**J**

Surrogate Recoveries

Tripentyltin Chloride	**86**	**%**

Authorized By: _____ Release Date: 8/10/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Tri-butyl Tin

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148232
Field ID: 1C-3
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 06/24/98
Date Analyzed: 07/22/98

Method: NOAA-TBT
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier
Tetrabutyltin Chloride		REJ
Tributyltin Chloride	**2.3**	**J**
Dibutyltin Chloride	**1.2**	**J**
Monobutyltin Chloride	**21**	**J**

Surrogate Recoveries

Tripentyltin Chloride	**34**	**%**

Authorized By: _____ Release Date: 8/10/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Tri-butyl Tin

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148236
Field ID: 3C-1
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 06/24/98
Date Analyzed: 07/22/98

Method: NOAA-TBT
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier
Tetrabutyltin Chloride		REJ
Tributyltin Chloride	**7.4**	**J**
Dibutyltin Chloride	**4**	**J**
Monobutyltin Chloride	**25**	**J**

Surrogate Recoveries

Tripentyltin Chloride	**84**	**%**

Authorized By: _____ Release Date: 8/10/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Tri-butyl Tin

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148237
Field ID: 3C-2
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 06/24/98
Date Analyzed: 07/22/98

Method: NOAA-TBT
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier
Tetrabutyltin Chloride		REJ
Tributyltin Chloride	**18**	**J**
Dibutyltin Chloride	**6**	**J**
Monobutyltin Chloride	**30**	**J**

Surrogate Recoveries

Tripentyltin Chloride	**83**	**%**

Authorized By: _____ Release Date: 8/10/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Tri-butyl Tin

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148238
Field ID: 3C-3
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 06/24/98
Date Analyzed: 07/22/98

Method: NOAA-TBT
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier
Tetrabutyltin Chloride		REJ
Tributyltin Chloride	**7.8**	**J**
Dibutyltin Chloride	**2.2**	**J**
Monobutyltin Chloride	**25**	**J**

Surrogate Recoveries

Tripentyltin Chloride	**76**	**%**

Authorized By: _____ Release Date: 8/10/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Tri-butyl Tin

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148239
Field ID: 3C-4
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 06/24/98
Date Analyzed: 07/22/98

Method: NOAA-TBT
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier
Tetrabutyltin Chloride		REJ
Tributyltin Chloride	**18**	**J**
Dibutyltin Chloride	**5.3**	**J**
Monobutyltin Chloride	**27**	**J**

Surrogate Recoveries

Tripentyltin Chloride	**84**	**%**

Authorized By: _____ Release Date: 8/10/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Tri-butyl Tin

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148240
Field ID: 3C-2D
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 06/24/98
Date Analyzed: 07/22/98

Method: NOAA-TBT
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier
Tetrabutyltin Chloride		REJ
Tributyltin Chloride	**16**	**J**
Dibutyltin Chloride	**2.2**	**J**
Monobutyltin Chloride	**26**	**J**

Surrogate Recoveries

Tripentyltin Chloride	**83**	**%**

Authorized By: _____ Release Date: 8/10/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Tri-butyl Tin

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148253
Field ID: 125
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 06/24/98
Date Analyzed: 07/22/98

Method: NOAA-TBT
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier
Tetrabutyltin Chloride		REJ
Tributyltin Chloride	**12**	**J**
Dibutyltin Chloride	**5**	**J**
Monobutyltin Chloride	**172**	**J**

Surrogate Recoveries

Tripentyltin Chloride	**75**	**%**

Authorized By: _____ Release Date: 8/10/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Tri-butyl Tin

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148253 (Matrix Spike - LMX1)
Field ID: 125
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 06/24/98
Date Analyzed: 07/22/98

Method: NOAA-TBT
Matrix: Sediment/Soil
Units: % Recovery

Analyte	Result	Qualifier
Tetrabutyltin Chloride	**2**	
Tributyltin Chloride	**38**	
Dibutyltin Chloride	**56**	
Monobutyltin Chloride		NC

Surrogate Recoveries

Tripentyltin Chloride	**60**	**%**

Authorized By: _____ Release Date: 8/10/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Tri-butyl Tin

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148253 (Matrix Spike - LMX2)
Field ID: 125
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 06/24/98
Date Analyzed: 07/22/98

Method: NOAA-TBT
Matrix: Sediment/Soil
Units: % Recovery

Analyte	Result	Qualifier
Tetrabutyltin Chloride	**0**	
Tributyltin Chloride	**20**	
Dibutyltin Chloride	**59**	
Monobutyltin Chloride		NC

Surrogate Recoveries

Tripentyltin Chloride	**53**	**%**

Authorized By: _____ Release Date: 8/10/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Tri-butyl Tin

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148254
Field ID: 135
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 06/24/98
Date Analyzed: 07/22/98

Method: NOAA-TBT
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier
Tetrabutyltin Chloride	2.1	J
Tributyltin Chloride	252	E
Dibutyltin Chloride	150	J
Monobutyltin Chloride	506	E

Surrogate Recoveries

Tripentyltin Chloride	82	%

Authorized By: _____ Release Date: 8/10/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Tri-butyl Tin

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: 98148254 (Dilution - DIL1)
Field ID: 135
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 06/24/98
Date Analyzed: 07/22/98

Method: NOAA-TBT
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier
Tetrabutyltin Chloride		REJ
Tributyltin Chloride	**267**	**J**
Dibutyltin Chloride	**157**	**J**
Monobutyltin Chloride	**504**	**J**

Surrogate Recoveries

Tripentyltin Chloride	**75**	**%**

Authorized By: _____ Release Date: 8/10/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Tri-butyl Tin

Project Name: **Grays Harbor** **LIMS Project ID:** 1242-98

Sample: 98148256
Field ID: 155
Project Officer: Dale Norton

Date Received: 04/02/98
Date Prepared: 06/24/98
Date Analyzed: 07/22/98

Method: NOAA-TBT
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier
Tetrabutyltin Chloride		REJ
Tributyltin Chloride	**2.2**	**J**
Dibutyltin Chloride	3.5	UJ
Monobutyltin Chloride	**12**	**J**

Surrogate Recoveries

Tripentyltin Chloride	**74**	**%**

Authorized By: _____ Release Date: 8/10/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Tri-butyl Tin

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: OBS8175A1
Blank ID: BLNK
Project Officer: Dale Norton

Date Prepared: 06/24/98
Date Analyzed: 07/22/98

Method: NOAA-TBT
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier
Tetrabutyltin Chloride	7	U
Tributyltin Chloride	7	U
Dibutyltin Chloride	7.2	U
Monobutyltin Chloride	**17**	

Surrogate Recoveries

Tripentyltin Chloride	**94**	**%**

Authorized By: _____ Release Date: 8/10/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Tri-butyl Tin

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: OBS8175A2
Blank ID: BLNK
Project Officer: Dale Norton

Date Prepared: 06/24/98
Date Analyzed: 07/22/98

Method: NOAA-TBT
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier
Tetrabutyltin Chloride	7	U
Tributyltin Chloride	7	U
Dibutyltin Chloride	7.2	U
Monobutyltin Chloride	**12**	**J**

Surrogate Recoveries

Tripentyltin Chloride	**109**	**%**

Authorized By: _____ Release Date: 8/10/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Tri-butyl Tin

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: OCS8175A1
Blank ID: SBRM
Project Officer: Dale Norton

Date Prepared: 06/24/98
Date Analyzed: 07/23/98

Method: NOAA-TBT
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier
Tetrabutyltin Chloride		REJ
Tributyltin Chloride	**137**	**J**
Dibutyltin Chloride	**5.7**	**J**
Monobutyltin Chloride	**51**	**J**

Surrogate Recoveries

Tripentyltin Chloride	**82**	**%**

Authorized By: _____ Release Date: 8/10/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Tri-butyl Tin

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: OCS8175A2
Blank ID: SBRM
Project Officer: Dale Norton

Date Prepared: 06/24/98
Date Analyzed: 07/23/98

Method: NOAA-TBT
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier
Tetrabutyltin Chloride		REJ
Tributyltin Chloride	**147**	**J**
Dibutyltin Chloride	**5**	**J**
Monobutyltin Chloride	**50**	**J**

Surrogate Recoveries

Tripentyltin Chloride	**90**	**%**

Authorized By: _____ Release Date: 8/10/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Tri-butyl Tin

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: OCS8175A3
Blank ID: PCS2
Project Officer: Dale Norton

Date Prepared: 06/24/98
Date Analyzed: 07/23/98

Method: NOAA-TBT
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier
Tetrabutyltin Chloride		REJ
Tributyltin Chloride	**2090**	**J**
Dibutyltin Chloride	**2000**	**J**
Monobutyltin Chloride	**1700**	**J**

Surrogate Recoveries

Tripentyltin Chloride	**72**	**%**

Authorized By: _____ Release Date: 8/10/98

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Tri-butyl Tin

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Sample: OCS8175A4
Blank ID: PCS2
Project Officer: Dale Norton

Date Prepared: 06/24/98
Date Analyzed: 07/23/98

Method: NOAA-TBT
Matrix: Sediment/Soil
Units: ug/Kg dw

Analyte	Result	Qualifier
Tetrabutyltin Chloride		REJ
Tributyltin Chloride	**1850**	**J**
Dibutyltin Chloride	**2010**	**J**
Monobutyltin Chloride	**2300**	**J**

Surrogate Recoveries

Tripentyltin Chloride	**65**	**%**

Authorized By: _____ Release Date: 8/10/98

Formaldehyde

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Carbonyl Compounds

Project Name: Grays Harbor

LIMS Project ID: 1242-98

Project Officer: Dale Norton
Date Reported: 28-APR-98

Method: SW8315A
Matrix: Sediment/Soil
Analyte: Formaldehyde

Sample	QC	Field ID	Result	Qualifier	Units		Received	Analyzed
98148248		85	**19.6**		mg/Kg	Dry Wt.	04/02/98	04/04/98
98148249		85D	**17.6**		mg/Kg	Dry Wt.	04/02/98	04/04/98
98148256		155	**27.7**		mg/Kg	Dry Wt.	04/02/98	04/04/98
98148256	Matrix Spike		**144 %**				04/02/98	04/04/98
98148256	Matrix Spike		**115 %**				04/02/98	04/04/98
BLN81066		OBS8092A1	**1.5**		mg/Kg	Dry Wt.		04/04/98

Authorized By: _____ Release Date: 4/28/98