Old Mill Marina
Preliminary Assessment/Site Inspection Report
Garibaldi, Oregon

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Region 10

START

Superfund Technical Assessment and Response Team

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OLD MILL MARINA
PRELIMINARY ASSESSMENT/SITE INSPECTION REPORT
GARIBALDI, OREGON

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LIST OF ACRONYMS

Acronym	Definition
%R	percent recovery
AC	adjusted concentration
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLP	Contract Laboratory Program
CLPAS	Contract Laboratory Program Analytical Services
CRQL/CRDL	contract required quantitation limit/contract required detection limit
DQOs	data quality objectives
E & E	Ecology and Environment, Inc.
EPA	United States Environmental Protection Agency
FEMA	Federal Emergency Management Agency
GPS	Global Positioning System
IDW	investigation-derived waste
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MS/DUP	matrix spike/duplicate
MS/MSD	matrix spike/matrix spike duplicate
MSL	mean sea level
NPDES	National Pollutant Discharge Elimination System
OAR	Oregon Administrative Rule
ODEQ	Oregon Department of Environmental Quality
PA	preliminary assessment
PCBs	polychlorinated biphenyls
QA/QC	quality assurance/quality control
RPD	relative percent difference
RV	recreational vehicle
SI	site inspection

LIST OF ACRONYMS (CONTINUED)

Acronym	Definition
SQAP	sampling and quality assurance plan
SQL	sample quantitation limit
START	Superfund Technical Assessment and Response Team
SVOCs	semivolatile organic compounds
TAL	Target Analyte List
TDL	Target Distance Limit
TOC	total organic carbon
TPHs	total petroleum hydrocarbons
UST	underground storage tank
VOCs	volatile organic compounds

OLD MILL MARINA
PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

1. INTRODUCTION

The United States Environmental Protection Agency (EPA) has tasked Ecology and Environment, Inc. (E & E) to provide technical support for the completion of a preliminary assessment/site inspection (PA/SI) at the Old Mill Marina site located in Garibaldi, Oregon. E & E completed the PA/SI activities under Technical Direction Document No. 00-02-0006 issued under EPA, Region 10, Superfund Technical Assessment and Response Team (START) Contract No. 68-W6-0008.

The primary goals for the Old Mill Marina PA/SI activities are to:

- Collect and analyze samples to characterize the potential sources discussed in Section 2.6;
- Determine off-site migration of contaminants;
- Provide the EPA with adequate information to determine whether the site is eligible for placement on the National Priorities List; and
- Document any threat or potential threat to public health or the environment posed by the site.

The PA/SI fieldwork was completed in July 2000 and consisted of sampling and inspection activities at the site during a 10-day field event. This PA/SI report is intended to provide data for the evaluation of suspected contaminated sources and targets. Data generated during this PA/SI will be used to indicate the nature of contamination, the relative hazards posed by sources, and impacts to targets. Completion of this PA/SI included reviewing site information, determining regional characteristics, collecting receptor information within the site's range of influence, conducting a site visit, executing a site-specific sampling plan, and producing this report.

This document includes site background information (Section 2), field sampling activities and analytical protocols (Section 3), quality assurance/quality control (QA/QC) criteria (Section 4), analytical results reporting and background sampling (Section 5), potential sources (Section 6), migration/exposure pathways and targets (Section 7), summary and conclusions (Section 8), and references (Section 9).

2. SITE BACKGROUND

This section describes the site location (Section 2.1), site description (Section 2.2), site ownership history (Section 2.3), site operations and waste characteristics (Section 2.4), site characterization (Section 2.5), and summary of investigation locations (Section 2.6).

2.1 SITE LOCATION

Site Name:	Old Mill Marina
CERCLIS ID No.:	ORSFN1002225
Location:	210 South Third Street Garibaldi, Oregon 97118
Latitude:	45°33'27" N
Longitude:	123°54'38" W
Meridian:	Willamette Base Line, Willamette Meridian
Legal Description:	Section 21, Township 1N, Range 10W
County:	Tillamook County
Site Owner/Operator:	Mr. Benjamin Brantingham President, BLB Corporation President, Old Mill Marina Resort, Inc. 210 South Third Street Garibaldi, Oregon 97118 (503) 322-0324
Site Contacts:	Mr. Kenneth M. Montgomery BLB Corporation Registered Agent 311 B Avenue Lake Oswego, Oregon 97304 (503) 635-9080 Ms. Judy Melcher, Office Manager Old Mill Marina Resort, Inc. 210 South Third Street Garibaldi, Oregon 97118 (503) 322-0324

The Old Mill Marina is a marina and recreational vehicle (RV) park located in the southeastern portion of Garibaldi, Oregon (Figure 2-1). The Old Mill Marina property encompasses 40.79 acres and is located on a broad peninsula that extends into the Miami Cove estuary, where the Miami River flows into Tillamook Bay. The site is bounded on the north by the former Southern Pacific Railroad tracks and Highway 101, on the east by Miami Cove, on the south by Tillamook Bay, and on the west by the Port of Garibaldi. The land surrounding the site is primarily used for commercial (e.g., the Port of Garibaldi, hotels, shops, etc.) and residential purposes.

2.2 SITE DESCRIPTION

The parcel of land that the site is on was created from spoils from on-going dredging in Tillamook Bay prior to 1916 (NWG 1990). The majority of the site was constructed before the 1950s. The site topography is generally flat, although periodic, unpermitted dredging has altered the site topography. Surface elevations throughout much of the site range between 7.5 and 8.5 feet above mean sea level (MSL), referenced to the National Geodetic Vertical Datum (NWG 1990).

Current site features include buildings associated with the RV park that include a swimming pool facility, a restaurant, a tackle shop, an office building/gift shop, a water tower, an RV parking lot, a marina with boat slips, and multiple piles of dredge spoils adjacent to one another. One storm drain was identified by the START, although it is unclear if the drain is currently active and whether there is a National Pollutant Discharge Elimination System (NPDES) permit associated with the drain. Former site features include a power station/boiler house with a 225-foot smoke stack; the Oceanside Company lumber shop and fuel station; the Hammond Tillamook lumber shop; a waste disposal area; a lumber mill building (the Old Mill building) and associated lumber mill features (i.e., an oil shed, a solvent shed, glue and caustic tanks, and wood treatment solution tanks); a glue/solvent/oil storage area; and multiple tanks including one marina underground storage tank (UST), one marina fuel tank, one oil UST, one formaldehyde UST, and one fuel oil tank associated with the Southern Pacific Railroad (Figure 2-2). In December 1999, two of the USTs used for marina fueling operations were removed from the site (Melcher 2000). The START assumes that the others are still on site. In June 2000, the Old Mill Building was demolished by Mr. Brantingham, site owner.

The RV parking area has been filled with dredge spoils to raise the elevation to between 12 and 15 feet above MSL (NWG 1990), and dredge spoils piles up to 30 feet high are present on the south side of the property adjacent to Miami Cove. The elevation of the roadway along the eastern

boundary of the RV parking area is approximately 10 feet above MSL (NWG 1990). Access to the site is unrestricted.

2.3 SITE OWNERSHIP HISTORY

Historical operations at the site began in 1921 with operation of the Whitney Company saw mill. This mill was extensively damaged by fire sometime prior to 1929, when the Hammond-Tillamook Lumber Company purchased the property and replaced the mill (NWG 1990). The Oregon-Washington Plywood Company acquired ownership of the mill in 1946 and constructed the Oceanside Lumber Company Mill and the Wilcox Company sawdust reclaimer (NWG 1990). By 1950, a powerhouse, operated by the Garibaldi Corporation, had been constructed in the northeastern portion of the site (NWG 1990). By 1962, the Oceanside Lumber Company Mill was no longer in operation, though the plywood mill was operated until August 1974 (NWG 1990). In 1990, the Old Mill Marina site was purchased by Mr. Benjamin Brantingham, the current site owner; the site is currently operated as an RV resort and marina.

2.4 SITE OPERATIONS AND WASTE CHARACTERISTICS

The Old Mill Marina Resort has been an RV resort since the early 1990s. Historical site operations include wood treatment, saw mill, and plywood mill operations. Operations associated with the plywood mill occurred from the mid-1940s to 1974. Additionally, a wood treatment facility was operated on site by the marina from about 1978 to 1984, when the operation was discontinued and the equipment was dismantled (NWG 1990). This facility, formerly located in the northeastern corner of the Old Mill building, had been utilized for the surface application of creosote to marine timbers.

In 1984, a second wood treatment facility, which used a zinc naphthenate/diesel solution, was established in the same area of the Old Mill building. This facility had limited production until 1990. Activities within the former Old Mill building included small engine repair and lubrication, fiberglass repair, and welding (NWG 1990). According to historic air photos, the log poles were stored in an area south of the former Old Mill building (Figure 2-2).

The power for the Hammond-Tillamook Lumber Mill and the Oceanside/Oregon-Washington complex of mills was supplied from off-site power lines and on-site burning of wood waste (NWG 1990). The 225-foot-high smoke stack at the northeast corner of the site was the stack for the former boiler house and power station located immediately west of the smoke stack (NWG 1990). Steam from the Hammond-Tillamook boilers powered generators in a separate powerhouse just west of the boiler house

(NWG 1990). Generators and boilers located in the Garibaldi Corporation powerhouse supplied power for the Oregon-Washington mill and other operations at the site from the late 1940s until the early 1970s (NWG 1990). Off-site power for the Oregon-Washington mill was achieved through high-voltage step-down transformers located at the Hammond-Tillamook powerhouse (NWG 1990). Dredge spoils have been placed over the location of the former power station. The origin and thickness of the dredge spoils is undetermined.

Current site activities include RV parking and operation of an RV resort, restaurant, swimming pool, marina, gift shop, and office building.

Contaminated soil sources at the site are suspected to be at the location of the former Old Mill Building; the location of the former power station; the location of the former log pole storage area; the location of the former waste dump area; the area of the former Oceanside gasoline station; and the location of the office building/gift shop. Other suspected sources include on-site dredge spoils, and ponded water at the dredge spoils. Contaminants of concern at the site associated with plywood mill operations include volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and target analyte list (TAL) metals. Contaminants of concern at the site associated with the power station operations include polychlorinated biphenyls (PCBs).

2.5 SITE CHARACTERIZATION

This section describes the previous investigations and the START site visit.

2.5.1 Previous Investigations

Previous site investigations at the Old Mill Marina Resort include:

- *Phase I Study*, Northwest Geological Services, Inc., November 1989; and
- *Assessment of Potential Soil and Groundwater Contamination: Phase II*, Old Mill Marina, Garibaldi, Oregon, prepared for the First Interstate bank of Oregon, Northwest Geological Services, Inc., December 1990.

A copy of the Phase I was not provided for review (ODEQ 1998). In October 1990, the Phase II study of potential soil and groundwater contamination was conducted (NWG 1990). This investigation included the excavation and sampling of soil from 10 test pits. Nineteen subsurface soil samples were taken from the test pits and four soil samples were taken from surface locations near the test pits.

Groundwater samples were taken from eight of the test pits. A surface water sample was collected from a settling pond of dredge spoils located on the west boundary of the site. (NWG 1990)

During the Phase II study, SVOCs were detected in both soil and groundwater. Dichloroethane and trichloroethane were detected at 5.1 micrograms per liter (µg/L) and 19 µg/L, respectively, in groundwater collected at the location of the former glue/solvent/oil storage area south of the Old Mill building (sample location No. TP-12). Formaldehyde, a breakdown product of glue resins, was detected in both soil and groundwater samples collected throughout the site. The highest formaldehyde concentrations, 2.1 milligrams per kilogram (mg/kg) in soil (TP-10) and 0.55 milligram per liter (mg/L) in surface water (collected from a pond located in dredge spoils at the southwest corner of the property), were observed in samples collected from the former waste disposal area which is currently used as an RV parking area. (NWG 1990)

PCBs were detected in a test pit composite sample (TP-5) at a concentration of 0.8 mg/kg in a soil sample collected at the location of the former Oceanside fuel station (roughly 200 feet southwest of the smokestack; Figure 2-2). Samples were not collected in the location of the former power station. PCBs were not detected in the three other samples analyzed. During the 1990 investigation, the extent of PCB contamination was not characterized (NWG 1990).

Total petroleum hydrocarbons (TPHs) were detected in 15 of the 19 soil samples analyzed ranging from 5,800 mg/kg in a composite surface soil sample (TP-9) collected near the former Southern Pacific Railroad fuel oil tank to 3,200 mg/kg in a surface soil sample (SS-3) collected in the vicinity of the marina fuel tank near the Old Mill building. TPHs were also detected in a sediment sample (SS-1) at a concentration of 380 mg/kg collected from the storm drain outlet of the Old Mill building.

TPHs were detected in five of the eight water samples analyzed. Groundwater samples, collected near the former oil UST (TP-5) and near the former glue tank (TP-7), contained TPH concentrations of 54 and 19 mg/L, respectively; however, the nature and extent of TPH contamination was not fully characterized during the 1990 investigation. (NWG 1990)

As a result of the 1990 Phase II study, NGW recommended further investigation of the following areas:

- The bay sediment at the storm drain outfall in the marina moorage area and near the former powerhouse;
- The soil near the former gasoline UST for the Hammond-Tillamook Mill;
- The soil and groundwater near the former Oceanside Lumber shop fuel service station and Hammond-Tillamook lumber shop;

- The soil near the former Oceanside Lumber Company shop; and
- The soil and groundwater in the vicinity of a removed UST (found at TP-12) to confirm that no residual contamination is present.

2.5.2 START Site Visit

The START performed an initial site visit on April 25, 2000. During the site visit, the START observed that the Old Mill building was in a dilapidated condition and may pose a physical danger. Debris and empty 55-gallon drums were present in the Old Mill building and the surrounding area. Several outfalls, draining what appeared to be surface water runoff, were present on the east and southeast boundaries of the site. The power stack was still present in the northeast corner of the property, adjacent to Miami Cove. Further, there were roughly 2,500 cubic yards of dredge spoils mounded at the south boundary of the site. The START observed emergent vegetation along the northeast boundary of the site and crab pots at the boat marina, indicating that wetlands may be present and that crustacean harvesting occurs in the area. The START also met with a former employee, Virgil Loudon, who worked at the site during the 1970s and 1980s. Mr. Loudon described the location of the former disposal area, beneath the current RV parking area; residual transformer oil near the former power station; and historical drainage ditches near the former Old Mill building. (E & E 2000a)

2.6 SUMMARY OF PA/SI INVESTIGATION LOCATIONS

Based on a review of historical and background information and the site reconnaissance visit, areas and features within the site were identified for investigation during the PA/SI as potential Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) hazardous substance sources. In addition, on- and off-site locations were identified as possible receptors of contamination originating from these sources. Those potential sources and receptors are listed below.

Potential Sources

- **Former Old Mill building: Contaminated Soil.** Historical operations in the Old Mill building include wood treatment using preservatives such as creosote and zinc naphthenate mixed with diesel. Additionally, glue was used extensively in plywood mill operations from the mid-1940s to the mid-1970s (NWG 1990). Formaldehyde, a breakdown product of glue, may be present in subsurface soils and groundwater as residual contamination from the plywood mill operations. The total volume of contaminated soil present at the former Old Mill building was assumed by the START to

be 300 by 300 feet and 10 feet deep (approximately 30,000 cubic yards). Contaminants of concern are VOCs, SVOCs, TAL metals, and PCBs.

- **Former Power Station: Contaminated Soil.** Power for the mill was generated from on- and off-site sources. A high-voltage step-down transformer was located at the Hammond-Tillamook powerhouse (NWG 1990). Dredge spoils have been placed over the location of the former power station up to a depth of approximately 10 feet. The total volume of contaminated soil present at the former power station was assumed by the START to be 100 by 100 feet and 10 feet deep (approximately 3,000 cubic yards). Contaminants of concern are VOCs, SVOCs, TAL metals, and PCBs.
- **Former Log Pole Storage Area: Contaminated Soil.** The former pole storage area may be a source of contamination related to wood treatment solutions. The total volume of contaminated soil present at the former log pole storage area was assumed by the START to be at least 1 cubic yard. Contaminants of concern are VOCs, SVOCs, TAL metals, and PCBs.
- **Former Waste Dump Area: Contaminated Soil.** A significant amount of solid waste including sheet metal and other debris was observed at the former waste dump area, located under the current RV parking area. During the 1990 study, the highest levels of formaldehyde detected in soil (2.1 mg/kg) and groundwater (0.55 mg/L) were from the former waste disposal area (NWG 1990). The total volume of contaminated soil present at the former waste dump area was assumed by the START to be 400 by 200 feet and 10 feet deep (approximately 25,000 cubic yards). Contaminants of concern are VOCs, SVOCs, TAL metals, and PCBs.
- **Former Fuel Stations: Contaminated Soil.** Two former fuel stations (Oceanside Gas Station and Oceanside Company Fuel Station) and associated tanks and USTs were historically present on site. The volume of contaminated soil present at the former fuel stations was assumed by the START to total at least 1 cubic yard. Contaminants of concern are VOCs, SVOCs, TAL metals, and PCBs.
- **Dredge Spoils: Contaminated Soil.** Spoils dredged from Miami Cove have been placed on the site. The spoils could potentially contain contaminated sediments. In addition, surface water has ponded in the dredge spoils. These ponds could potentially contain contaminated water. The total volume of contaminated sediment present in the dredge spoils was assumed by the START to be at least 2,500 cubic yards. Contaminants of concern are VOCs, SVOCs, TAL metals, and PCBs.
- **Office Building, Pool, Restaurant, and Railroad Area: Contaminated Soil.** Due to the extensive regrading of the site, particularly at the RV parking area, contaminated soil could be present near the location of the current office building area, which is adjacent to the RV parking area; the pool building; the restaurant; and the railroad. The total volume of contaminated soil present near these areas was assumed by the START to be at least 1 cubic yard. Contaminants of concern are VOCs, SVOCs, TAL metals, and PCBs.
- **Groundwater.** Groundwater underlying the site is potentially contaminated. TPH has been detected in groundwater beneath the site. Groundwater samples were collected to further characterize on-site contamination. Contaminants of concern are VOCs, SVOCs, TAL metals, and PCBs.

Potential Targets

- **Miami Cove Sediments and Surface Water.** Both intertidal (beach) sediments and surface water in Miami Cove are potentially impacted from releases of potential on-site hazardous substances.
- **Miami Cove Wetlands.** Palustrine and riverine wetlands are present within 1 mile of the site, within the 15-mile surface water pathway Target Distance Limit (TDL), and within the 4-mile air pathway TDL. Estuarine wetlands with emergent vegetation are immediately adjacent to the northeast boundary of the site (E & E 2000a).

3. FIELD ACTIVITIES AND ANALYTICAL PROTOCOL

A sampling and quality assurance plan (SQAP) for the Old Mill Marina site was developed by the START prior to field sampling (E & E 2000b). The SQAP was based upon a review of background information, interviews with site representatives, and a site reconnaissance visit by the START in April 2000. The SQAP describes the sampling strategy, sampling methodology, and analytical program to investigate potential hazardous substance sources and potential targets. With few exceptions, the PA/SI field activities were conducted in accordance with the approved SQAP. Deviations from the SQAP were approved by the EPA and are described when applicable in the sampling location discussions in Section 6 (source areas) and Section 7 (target areas).

The PA/SI field sampling event was conducted from July 5 through 10, 2000. Including background samples and excluding quality assurance samples (i.e., rinsate and trip blanks), a total of 108 samples, including 21 sediment samples, six surface water samples, five groundwater samples, and 76 soil samples, were collected from on- and off-site locations. Sample types and the methods of collection are described below. A list of all samples collected for laboratory analysis under the PA/SI is presented in Table 3-1. Photographic documentation of PA/SI field activities is presented in Appendix A. Mark Pugh, Oregon Department of Environmental Quality (ODEQ), was present during field activities from July 5 through 7, 2000. Site observations and environmental concerns were presented by ODEQ in a technical memorandum (ODEQ 2000).

In addition to EPA-assigned regional tracking numbers, sample stations were assigned a four-character alphanumeric field sample code designed to allow easy reference to the sample's origin (for example, MB02, IT01, and WL02). The sample depth is also provided for those sample stations where multiple intervals were sampled. Sediment and water samples were only identified by the station location. The four-character field sample code is used in this report. Sample locations are presented in Figure 3-1. The sample locations in the figures were surveyed with Global Positioning System (GPS) units or were approximated based on field observations.

This section describes sampling methodology (Section 3.1), analytical protocol (Section 3.2), GPS (Section 3.3), and investigation-derived waste (IDW; Section 3.4).

3.1 SAMPLING METHODOLOGY

The standard operating procedures for sample collection presented in the SQAP were followed except where noted. In general, soil and sediment sample materials for all analyses except VOCs were homogenized in dedicated bowls using dedicated spoons prior to containerization. Organic and gravelly materials were removed from samples as much as possible prior to placing the aliquots in pre-labeled sample containers. The aliquot of each sample being collected for VOC analysis was placed directly into sample containers without homogenization. All samples were stored in iced coolers that were maintained continuously under chain of custody.

This section describes collection of surface soil samples, subsurface soil samples, groundwater, surface water, and sediment samples.

3.1.1 Surface Soil Samples

A total of 17 surface soil samples (DS06, LS01, MB01, MB03, MB04, MB06, MB07, PL01, PS01, RR01, RR02, RS01, and WD03 through WD07) were collected from the Old Mill Marina site; one background surface soil sample (BG02) was collected from near the mouth of the Miami River. The surface soil samples were discrete grab samples collected from potential on-site source and target areas. All surface soil samples except MB06 and MB07 were collected from 0 to 6 inches below ground surface (bgs) using dedicated stainless steel spoons and bowls. MB06 and MB07 were collected from 1 to 2 feet bgs and 1 to 1.5 feet bgs, respectively, by using a decontaminated hand auger to dig to the sample depth, then transferring the sample material with a dedicated stainless steel spoon to a dedicated stainless steel bowl. Originally, subsurface soil samples were planned to be collected using the hand auger at locations MB06 and MB07. Because refusal was encountered, surface soil samples were collected at the refusal depth.

3.1.2 Subsurface Soil Samples

A total of 55 subsurface soil samples and three background subsurface soil samples were collected from 20 direct push technology soil borings. All soil samples collected from the homogenized 0-to-4-foot-bgs interval are considered to be subsurface soil samples for this report. Each boring was continuously logged and sampled to the total depth, typically when groundwater was encountered. Soil was sampled from each boring at three intervals (0 to 4 feet bgs, 4 to 8 feet bgs, and 8 to 12 feet bgs) except for the following:

Soil Boring	Deepest Sample (feet bgs)	Sampling Condition
MB08	0-4	Refusal at 4 feet bgs
MB01	0-4	Refusal at 5.5 feet bgs
PS03	4-7	Refusal at 7 feet bgs
PS01	12-16	Deeper water table
DS07	12-16	Deeper water table

After the direct push probe sampler was driven to the designated sample depth, the soil contents of the 4-foot-long, dedicated acetate liner was transferred to a dedicated stainless steel bowl with a dedicated stainless steel spoon. The sample fraction designated for VOC analysis was collected first and was not homogenized. The remaining soil sample was homogenized then placed into the appropriate prelabeled sample containers. The direct-push technology sampler was decontaminated between sample locations. Rinsate samples were collected to ensure decontamination procedures were adequate. After sample collection, the borehole was abandoned according to the requirements described in Oregon Administrative Rule (OAR) 690-240-0135. For each direct-push technology sample, a registered geologist from ODEQ completed and submitted geotechnical hole reports to the State of Oregon Water Resources Department.

3.1.3 Groundwater Samples

Groundwater samples were collected from five boring locations (MB02, MB05, PS01, OB01, and MB09). Groundwater samples were collected using dedicated Teflon tubing with a peristaltic pump. The groundwater samples were collected according to the following steps:

- Advance the groundwater sampling probe point up to 4 feet below the water table, and open the screen or probe point sampling port;
- Run a length of dedicated Teflon tubing through the probe pipe to the screen or sampling port;
- Collect the groundwater sample using a peristaltic pump while ensuring that the tubing remains below the water level and that no bubbles form within the tubing. Prior to collection of the groundwater sample, water will be purged with the peristaltic pump until the produced water becomes visibly clear, if possible; and
- If bubbles form, readjust the tubing and/or make a logbook notation that bubbles were observed.

Upon completion of groundwater sampling, the borehole was abandoned in accordance with requirements described in OAR 690-240-0135. All groundwater sample aliquots requiring preservative were preserved immediately after sample collection.

3.1.4 Surface Water Samples

A total of six surface water samples were collected during the field event. OF01 was collected from the only flowing discharge outfall at the site; WL02 was collected from standing water present in the wetland located east of the site; DS01, DS03, and DS05 were collected from surface water that had ponded on the various dredge spoils; and IT04 was collected from Miami Cove. Surface water sample OF01 was collected by filling a precleaned, sample bottle with the flow directly from the outfall. Surface water sample IT04 was collected by using a Van Dorn water sampler to collect a Miami Cove water column sample then draining the sample through the Van Dorn spigot directly into precleaned, sample bottles. The wetland and dredge spoils surface water samples (WL02, DS01, DS03, and DS05) were collected by directing the ponded water directly into precleaned, prepreserved, sample bottles. All surface water sample aliquots requiring preservative were preserved immediately after sample collection.

3.1.5 Sediment Samples

A total of 21 sediment samples (including one background sample) were collected during the field event. Sediment samples were collected from nine outfall discharge locations on the Miami Cove (OF01 through OF09), from two wetland locations at Miami Cove (WL01 and WL02), three intertidal locations in Miami Cove (IT01 through IT03), four subtidal locations in Miami Cove (IT04 through IT07), two dredge spoil pond locations (DS02 and DS04), and one upstream background location collected just above the Highway 101 bridge (BG01). Intertidal sediment samples collected just above the low tide line were collected at a depth of 0 to 6 inches using dedicated stainless steel spoons and bowls. Sediment samples from the subtidal zone of Miami Cove were collected from the top 6 inches using a non-dedicated stainless steel Van Veen bottom grab sampler. The sample portion was extracted from material not in contact with the sampler using a dedicated stainless steel spoon. For all sediment samples collected, the samples were homogenized thoroughly in a dedicated stainless steel bowl and placed into prelabeled sample containers. Sediment samples OF01 through OF09, BG01, WL01 and IT01, IT02, and IT03 were collected at the time of low tide based on a tide chart. Sediment samples WL02 and IT04 through IT07 were collected during high tide as determined from current tide charts.

3.2 ANALYTICAL PROTOCOL

Analytical methods applied to PA/SI samples include Contract Laboratory Program Analytical Services (CLPAS) OLM04.2 for VOCs and SVOCs; CLPAS OLM04.2 for PCBs; CLPAS ILM04.1 for TAL metals, and EPA SW-846 Method 9060 for total organic carbon (TOC) analyses. All surface soil, subsurface soil, groundwater, and surface water samples were analyzed for VOCs, SVOCs, TAL metals, and PCBs. The sediment samples (except for DS02 and DS04) were analyzed for SVOCs, TAL metals, PCBs, and TOC. The sediment samples collected at DS02 and DS04 were analyzed for VOCs, SVOCs, TAL metals, PCBs, and TOC. These analytical suites were applied to samples based on the sample location and the expected contaminants at that location. Analysis of samples collected during the PA/SI for VOCs, SVOCs, and PCBs were performed by the EPA, Region 10, laboratory located in Manchester, Washington. Analysis of TAL metals were performed by Chemtech Consulting Group, a Contract Laboratory Program (CLP) laboratory subcontracted to the EPA. Analysis of TOC was performed by Analytical Services Center, a commercial laboratory subcontracted by the START and located in Lancaster, New York.

3.3 GLOBAL POSITIONING SYSTEM

Trimble Pathfinder Professional GPS survey units and Corvalis data loggers were used by the START personnel to approximate the station location coordinates of the PA/SI samples as described in the SQAP (E & E 2000b). GPS coordinates for the station locations were plotted onto a sample location map in reference to the smokestack (Figure 3-1). For those stations for which no GPS coordinates were recorded, station locations were approximated based on observations recorded in the field logbook. Recorded GPS coordinates are provided in Appendix B.

3.4 INVESTIGATION-DERIVED WASTE

IDW generated during the PA/SI sampling effort consisted of solid disposable sampling equipment and approximately 85 gallons of decontamination water generated from decontaminating the Van Veen sediment grab sampler, the hand auger, the Van Dorn water sampler, and various direct push technology equipment. The IDW was disposed of as non-hazardous waste on September 26, 2000, by Terra Hydr, Inc., subcontracted by the START. No IDW generated by the START remains at the site.

Table 3-1

SAMPLE COLLECTION AND ANALYTICAL SUMMARY
OLD MILL MARINA AND RESORT SITE INSPECTION
GARIBALDI, OREGON

EPA Regional Tracking Number	CLP Inorganic	Station ID	Matrix	Depth (feet bgs)	Date	Time	VOCs	SVOCs	Metals	PCBs	TOC	Sample Description
00274000	MJ008C	MB01	SB	0-4	7/6/00	9:05	X	X	X	X		Collected at former Old Mill Building.
00274001	MJ008D	MB01	SB	4-5.5	7/6/00	9:25	X	X	X	X		Collected at former Old Mill Building; some oily product; hit refusal at 5.5 feet.
00274002	MJ008E	MB01	SS	0-0.5	7/6/00	10:00	X	X	X	X		Collected at former Old Mill Building; some dark staining.
00274003	MJ008F	MB02	SB	0-4	7/6/00	10:15	X	X	X	X		Collected at former Old Mill Building.
00274004	MJ008G	MB02	SB	4-8	7/6/00	10:30	X	X	X	X		Collected at former Old Mill Building.
00274005	MJ008H	MB02	SB	8-12	7/6/00	10:45	X	X	X	X		Collected at former Old Mill Building.
00274006	MJ008J	MB02	GW	NA	7/6/00	11:15	X	X	X	X		Collected at former Old Mill Building.
00274007	MJ008M	MB03	SB	0-4	7/6/00	13:30	X	X	X	X		Collected at SE corner of former Old Mill Building.
00274008	MJ008N	MB03	SB	4-8	7/6/00	13:40	X	X	X	X		Collected at SE corner of former Old Mill Building.
00274009	MJ008P	MB03	SB	8-12	7/6/00	13:45	X	X	X	X		Collected at SE corner of former Old Mill Building.
00274010	MJ008Q	MB03	SS	0-0.5	7/6/00	13:55	X	X	X	X		Collected at SE corner of former Old Mill Building.
00274011	MJ008R	LS01	SB	0-4	7/6/00	14:30	X	X	X	X		Former log pole storage area.
00274012	MJ008S	LS01	SB	4-8	7/6/00	14:40	X	X	X	X		Former log pole storage area.
00274013	MJ008T	LS01	SB	8-12	7/6/00	14:55	X	X	X	X		Former log pole storage area.
00274014	MJ008W	LS01	SS	0-0.5	7/6/00	15:05	X	X	X	X		Former log pole storage area.
00274015	MJ008X	MB04	SS	0-0.5	7/6/00	15:33	X	X	X	X		Former Old Mill Building.
00274016	MJBR16	MB04	SB	0-4	7/6/00	15:54	X	X	X	X		Former Old Mill Building.
00274017	MJBR17	MB04	SB	4-8	7/6/00	16:05	X	X	X	X		Former Old Mill Building.
00274018	MJBR18	MB04	SB	8-12	7/6/00	16:32	X	X	X	X		Former Old Mill Building.
00274019	MJ008Y	PS02	SB	8-12	7/7/00	12:35	X	X	X	X		Roughly 100 feet west of the smokestack.
00274020	MJ008Z	MB05	SB	0-4	7/6/00	17:50	X	X	X	X		Between center of former Old Mill Building and Miami Cove.
00274021	MJ0090	MB05	SB	4-8	7/6/00	16:00	X	X	X	X		Between center of former Old Mill Building and Miami Cove.
00274022	MJ0091	MB05	SB	8-12	7/6/00	18:10	X	X	X	X		Between center of former Old Mill Building and Miami Cove.
00274023	MJ0092	MB05	GW	NA	7/6/00	18:30	X	X	X	X		Between center of former Old Mill Building and Miami Cove.
00274024	MJ0093	PS01	SB	0-4	7/7/00	9:34	X	X	X	X		Northeast corner of former Power Station.
00274025	MJ0094	PS01	SB	4-8	7/7/00	9:55	X	X	X	X		Northeast corner of former Power Station.
00274026	MJ0095	PS01	SB	8-12	7/7/00	10:05	X	X	X	X		Northeast corner of former Power Station.
00274027	MJ0096	PS02	SB	0-4	7/7/00	12:10	X	X	X	X		Roughly 100 feet west of the smokestack.

Key is at the end of the table.

Table 3-1 (CONTINUED)

SAMPLE COLLECTION AND ANALYTICAL SUMMARY
OLD MILL MARINA AND RESORT SITE INSPECTION
GARIBALDI, OREGON

EPA Regional Tracking Number	CLP Inorganic	Station ID	Matrix	Depth (feet bgs)	Date	Time	VOCs	SVOCs	Metals	PCBs	TOC	Sample Description
00274028	MJ009A	PS02	SB	4-8	7/7/00	12:25	X	X	X	X		Roughly 100 feet west of the smokestack.
00274029	MJ0097	PS01	SB	12-16	7/7/00	10:20	X	X	X	X		Northeast corner of former Power Station.
00274030	MJ0098	PS01	GW	NA	7/7/00	10:35	X	X	X	X		Northeast corner of former Power Station.
00274031	MJ0099	PS01	SS	0-0.5	7/7/00	10:50	X	X	X	X		Northeast corner of former Power Station.
00274032	MJ009B	PS03	SB	0-4	7/7/00	14:20	X	X	X	X		Roughly 50 feet east of the smokestack.
00274033	MJ009C	PS03	SB	4-8	7/7/00	14:33	X	X	X	X		Roughly 50 feet east of the smokestack.
00274034	MJ009D	WD01	SB	8-12	7/700	15:34	X	X	X	X		RV parking area.
00274035	MJ009E	WD01	SB	0-4	7/7/00	15:08	X	X	X	X		RV parking area.
00274036	MJ009F	WD01	SB	4-8	7/7/00	15:20	X	X	X	X		RV parking area.
00274037	MJ009G	WD02	SB	0-4	7/7/00	15:56	X	X	X	X		RV parking area.
00274038	MJ009H	WD02	SB	4-8	7/7/00	16:10	X	X	X	X		RV parking area.
00274039	MJ009J	WD02	SB	8-12	7/7/00	16:25	X	X	X	X		RV parking area.
00274040	MJ009K	PS04	SB	0-4	7/7/00	17:51	X	X	X	X		Former machine/lumber shop.
00274041	MJ009L	PS04	SB	4-8	7/7/00	18:06	X	X	X	X		Former machine/lumber shop.
00274042	MJ009M	PS04	SB	8-12	7/7/00	18:20	X	X	X	X		Former machine/lumber shop.
00274043	MJ008K	DS07	SB	0-4	7/8/00	8:52	X	X	X	X		Dredge spoils.
00274044	MJ008L	DS07	SB	4-8	7/8/00	9:01	X	X	X	X		Dredge spoils.
00274045	MJ009N	DS07	SB	8-12	7/8/00	9:09	X	X	X	X		Dredge spoils.
00274046	MJBN19	DS07	SB	12-16	7/8/00	9:15	X	X	X	X		Dredge spoils.
00274047	MJBN20	PS05	SB	0-4	7/8/00	9:46	X	X	X	X		Roughly 300 feet west of the smokestack.
00274048	MJ009P	PS05	SB	4-8	7/8/00	9:57	X	X	X	X		Roughly 300 feet west of the smokestack.
00274049	MJBN21	PS05	SB	8-12	7/8/00	10:07	X	X	X	X		Roughly 300 feet west of the smokestack.
00274050	MJ009Q	PS06	SB	0-4	7/8/00	10:35	X	X	X	X		Roughly 500 feet southwest of the smokestack.
00274051	MJBN22	PS06	SB	4-8	7/8/00	10:42	X	X	X	X		Roughly 500 feet southwest of the smokestack.
00274052	MJBN23	PS06	SB	8-12	7/8/00	10:52	X	X	X	X		Roughly 500 feet southwest of the smokestack.
00274053	MJBN24	RB02	WT	NA	7/8/00	11:20	X	X	X	X		Rinsate of Geoprobe nondedicated equipment.
00274054	MJBN25	RB03	WT	NA	7/8/00	18:50	X	X	X	X		Rinsate of Geoprobe nondedicated equipment.
00274055	MJBN26	FU01	SB	0-4	7/8/00	12:38	X	X	X	X		Former fuel station area.
00274056	MJBN28	FU01	SB	4-8	7/8/00	12:54	X	X	X	X		Former fuel station area.

Key is at the end of the table.

Table 3-1 (CONTINUED)

SAMPLE COLLECTION AND ANALYTICAL SUMMARY
OLD MILL MARINA AND RESORT SITE INSPECTION
GARIBALDI, OREGON

EPA Regional Tracking Number	CLP Inorganic	Station ID	Matrix	Depth (feet bgs)	Date	Time	VOCs	SVOCs	Metals	PCBs	TOC	Sample Description
00274057	MJBN27	FU01	SB	8-12	7/8/00	13:14	X	X	X	X		Former fuel station area.
00274058	MJBN31	MB08	SB	0-4	7/8/00	14:36	X	X	X	X		Former glue/solvent storage area.
00274059	MJBN29	OB01	SB	0-4	7/8/00	15:51	X	X	X	X		Near office building.
00274060	MJBN30	OB01	SB	4-8	7/8/00	16:14	X	X	X	X		Near office building.
00274061	MJBN32	OB01	SB	8-12	7/8/00	16:27	X	X	X	X		Near office building.
00274062	MJBN34	OB01	GW	NA	7/8/00	16:40	X	X	X	X		Near office building.
00274085	NA	TB01	WT	NA	7/6/00	9:00	X					Trip blank.
00274086	NA	TB02	WT	NA	7/7/00	14:00	X					Trip blank.
00274087	MJ007X	RB01	WT	NA	7/7/00	18:30	X	X	X	X		Rinsate from hand auger.
00274100	MJ007E	OF01	SD	0-0.5	7/6/00	9:14		X	X	X	X	Discharge point sediment at 2-foot-diameter concrete pipe; active; just north of concrete block.
00274101	MJ007F	OF02	SD	0-0.5	7/6/00	10:00		X	X	X	X	Discharge point sediment at 6-inch-diameter PVC pipe (green), just north of resturant.
00274102	MJ007G	OF03	SD	0-0.5	7/6/00	10:15		X	X	X	X	Discharge point sediment at 6-inch-diameter PVC pipe (green), just south of resturant.
00274103	MJ007H	OF04	SD	0-0.5	7/6/00	10:22		X	X	X	X	Discharge point sediment at 2-inch-diameter metal pipe, rusted.
00274104	MJ007J	OF05	SD	0-0.5	7/6/00	10:30		X	X	X	X	Discharge point sediment at 6-inch-diameter blue PVC pipe.
00274105	MJ007K	OF06	SD	0-0.5	7/6/00	10:40		X	X	X	X	Discharge point sediment at two rusted metal pipes (6-and 10-inch diameter).
00274106	MJ007L	OF07	SD	0-0.5	7/6/00	10:54		X	X	X	X	Discharge point sediment at 12-inch rusted metal pipe.
00274107	MJ007M	OF08	SD	0-0.5	7/6/00	11:05		X	X	X	X	Discharge point sediment at 12-inch rusted metal pipe.
00274108	MJ007N	OF09	SD	0-0.5	7/6/00	11:21		X	X	X	X	Discharge point sediment at 6-inch blue PVC pipe just north of water tower.
00274109	MJ007P	BG01	SD	0-0.5	7/7/00	10:45		X	X	X	X	Background sediment, collected just above Highway 101 bridge; MS/MSD.
00274110	MJ007Q	IT01	SD	0-0.5	7/7/00	11:45		X	X	X	X	South point, cove side, by fresh fill and booms.
00274111	MJ007R	IT02	SD	0-0.5	7/7/00	12:00		X	X	X	X	South point, below "outfall," below pond No. 3.
00274112	MJ007S	IT03	SD	0-0.5	7/7/00	12:10		X	X	X	X	South point, roughly 100 feet out on transect.
00274113	MJ001F	WL01	SD	0-0.5	7/8/00	15:42		X	X	X	X	Wetland on north side of Miami Cove.
00274121	MJ0083	OF01	SW	NA	7/6/00	13:45	X	X	X	X		Miami Cove Outfall.

Key is at the end of the table.

Table 3-1 (CONTINUED)

SAMPLE COLLECTION AND ANALYTICAL SUMMARY
OLD MILL MARINA AND RESORT SITE INSPECTION
GARIBALDI, OREGON

EPA Regional Tracking Number	CLP Inorganic	Station ID	Matrix	Depth (feet bgs)	Date	Time	VOCs	SVOCs	Metals	PCBs	TOC	Sample Description
00274122	MJ0084	DS01	SW	NA	7/6/00	15:40	X	X	X	X		Dredge spoil pond No. 1 (southern).
00274123	MJ0086	DS03	SW	NA	7/6/00	16:49	X	X	X	X		Dredge spoil pond No. 2 (near the water tank).
00274124	MJ0088	DS05	SW	NA	7/6/00	17:30	X	X	X	X		Dredge spoil pond No. 3 (lower bench on south side).
00274131	MJ0085	DS02	SD	3-5	7/6/00	15:55	X	X	X	X	X	Dredge spoil pond No. 1 (southern), from dry part of pond bottom.
00274132	MJ0087	DS04	SD	2-2.5	7/6/00	17:38	X	X	X	X	X	Dredge spoil pond No. 3.
00274133	MJ0089	DS06	SS	0-0.5	7/7/00	8:52	X	X	X	X		Dredge spoil, new pile near resturant.
00274134	MJ008A	BG02	SS	0-0.5	7/7/00	10:58	X	X	X	X		Background surface soil, collected just above Highway 101 bridge, MS/MSD.
00274135	MJ007T	MB06	SS	1-2	7/7/00	17:35	X	X	X	X		Hand auger sample in ditch on north side of fomer Old Mill Building.
00274136	MJ007W	MB07	SS	1-1.5	7/7/00	18:12	X	X	X	X		Hand auger sample in ditch on south side of former Old Mill Building.
00274137	MJ007Y	RS01	SS	0-0.5	7/8/00	8:20	X	X	X	X		At entrance to bait shop/resturant.
00274138	MJ007Z	RR01	SS	0-0.5	7/8/00	9:20	X	X	X	X		Near railroad.
00274139	MJ0080	RR02	SS	0-0.5	7/8/00	9:35	X	X	X	X		Near railroad.
00274140	MJ0081	PL01	SS	0-0.5	7/8/00	9:45	X	X	X	X		Northwest corner of pool building.
00274141	MJ0082	WD03	SS	0-0.5	7/8/00	10:28	X	X	X	X		Near rental unit.
00274142	MJ001B	WD04	SS	0-0.5	7/8/00	10:44	X	X	X	X		Near tent campers.
00274143	MJ001C	WD05	SS	0-0.5	7/8/00	11:03	X	X	X	X		Waste dump.
00274144	MJ001D	WD06	SS	0-0.5	7/8/00	11:37	X	X	X	X		Playground.
00274145	MJ001E	WD07	SS	0-0.5	7/8/00	11:58	X	X	X	X		Disposal area at tenting area.
00284200	MJ008B	WL02	SW	NA	7/9/00	9:15	X	X	X	X		Wetlands at confluence of Miami River and Miami Cove.
00284201	MJ001H	IT04	SW	NA	7/9/00	10:25	X	X	X	X		Roughly 100 feet offshore from OF05.
00284202	MJ001J	WL02	SD	0-0.5	7/9/00	9:22		X	X	X	X	Wetlands at confluence of Miami River and Miami Cove.
00284203	MJ001G	IT05	SD	0-0.5	7/9/00	9:37		X	X	X	X	Roughly 100 feet offshore from smokestack.
00284204	MJ001L	IT06	SD	0-0.5	7/9/00	9:52		X	X	X	X	Roughly 100 feet offshore, roughly 100 feet south of smokestack.
00284205	MJ001K	IT04	SD	0-0.5	7/9/00	13:00		X	X	X	X	Roughly 100 feet offshore from OF05.
00284206	MJ001M	IT07	SD	0-0.5	7/9/00	11:30		X	X	X	X	Roughly 100 feet offshore from water tower.

Key is at the end of the table.

Table 3-1 (CONTINUED)

SAMPLE COLLECTION AND ANALYTICAL SUMMARY
OLD MILL MARINA AND RESORT SITE INSPECTION
GARIBALDI, OREGON

EPA Regional Tracking Number	CLP Inorganic	Station ID	Matrix	Depth (feet bgs)	Date	Time	VOCs	SVOCs	Metals	PCBs	TOC	Sample Description
00284207	MJ001P	RB04	WT	NA	7/9/00	12:25	X	X	X	X		Rinsate from Van Veen.
00284208	MJ001Q	RB05	WT	NA	7/9/00	12:45	X	X	X	X		Rinsate from Van Dorn.
00284210	MJBN35	BG03	SB	0-4	7/9/00	14:20	X	X	X	X		Background subsurface soil from Port of Garibaldi property.
00284211	MJBN36	BG03	SB	4-8	7/9/00	14:30	X	X	X	X		Background subsurface soil from Port of Garibaldi property.
00284212	MJ001S	BG03	SB	8-12	7/9/00	14:45	X	X	X	X		Background subsurface soil from Port of Garibaldi property.
00284213	MJ001T	MB09	SB	0-4	7/9/00	15:35	X	X	X	X		Northeast corner of former Old Mill Building.
00284214	MJ001W	MB09	SB	4-8	7/9/00	15:45	X	X	X	X		Northeast corner of former Old Mill Building.
00284215	MJBN16	MB09	SB	8-12	7/9/00	15:55	X	X	X	X		Northeast corner of former Old Mill Building.
00284216	MJBN17	RB06	WT	NA	7/9/00	13:00	X	X	X	X		Rinsate blank from nondedicated Geoprobe equipment.
00284217	MJBN18	MB09	GW	NA	7/9/00	16:05	X	X	X	X		Northeast corner of former Old Mill Building.
00284249	NA	TB03	WT	NA	7/9/00	8:25	X					Trip blank.

Key:

bgs = Below ground surface.
CLP = Contract Laboratory Program.
EPA = United States Environmental Protection Agency.
GW = Groundwater.
ID = Identification.
MS/MSD = Matrix spike/matrix spike duplicate.
NA = Not applicable.
PCBs = Polychlorinated biphenyls.
PVC = Polyvinyl chloride.
RV = Recreational vehicle.
SB = Subsurface soil.
SD = Sediment.
SS = Surface soil.
SVOCs = Semivolatile organic compounds.
SW = Surface water.
TOC = Total organic compound.
VOCs = Volatile organic compounds.
WT = Water.

4. QUALITY ASSURANCE/QUALITY CONTROL

Quality assurance/quality control (QA/QC) data are necessary to determine precision and accuracy and to demonstrate the absence of interferences and/or contamination of sampling equipment, glassware, and reagents. Specific QC requirements for laboratory analyses are incorporated in the *USEPA Contract Laboratory Program Statement of Work for Organic Analyses* (EPA 1999c) and in the *USEPA CLP Statement of Work for Inorganic Analyses* (EPA 2000b). These QC requirements or equivalent requirements were followed for analytical work on the Old Mill Marina PA/SI. This section describes the QA/QC measures taken for the PA/SI and provides an evaluation of the usability of data presented in this report.

All samples were collected following the guidance of the SQAP (E & E 2000b) for the field activities. PCB, SVOC, and VOC analyses were performed at the EPA Manchester Environmental Laboratory, Port Orchard, Washington, following the *USEPA CLP Statement of Work for Organic Analyses* (OLM04.2) and/or EPA SW-846 Methods 8270 (SVOCs) and 8260 (VOCs). TAL metals analyses were performed by Chemtech Consulting Group, Inc., a CLP laboratory located in Englewood, New Jersey, following the *USEPA CLP Statement of Work for Inorganic Analyses* (ILM04.1). TOC analyses were performed by Analytical Services Center, a commercial laboratory located in Lancaster, New York, following the Lloyd Kahn method.

All data from analyses performed at the EPA and CLP laboratories were reviewed and validated by EPA chemists; data from the commercial laboratory were reviewed and validated by START chemists. Data qualifiers were applied as necessary according to the following guidance:

- *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (EPA 1999a); and
- USEPA *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (EPA 1994).

In the absence of other QC guidance, method-specific QC limits were also utilized to apply qualifiers to the data. Copies of the data QA memoranda are provided in Appendix C.

4.1 SATISFACTION OF DATA QUALITY OBJECTIVES

The following EPA (1993) guidance document was used to establish data quality objectives (DQOs) for this SI:

- *Data Quality Objectives Process for Superfund, Interim Final Guidance*, EPA 540-R-93-071.

The EPA task monitor determined that definitive data without error and bias determination would be used for the sampling and analyses conducted during the field activities. The data quality achieved during the field work produced sufficient data that meet the data objectives stated in the SQAP (E & E 2000b).

A detailed discussion of the SI objectives that were accomplished is presented in the following sections.

4.2 QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

QA samples included trip blank and rinsate blank samples. Three trip blanks and six rinsate blanks were submitted for the project. QC samples included a matrix spike/matrix spike duplicate (MS/MSD) for organic samples and a matrix spike/duplicate (MS/DUP) for inorganic samples at a rate of one MS/MSD or MS/DUP per 20 organic or inorganic samples.

4.3 PROJECT-SPECIFIC DATA QUALITY OBJECTIVES

The laboratory data were reviewed to ensure that DQOs for the project were met. The following describes the laboratories' ability to meet project DQOs for precision, accuracy, and completeness and the field team's ability to meet project DQOs for representativeness and comparability. The laboratories and the field team were able to meet DQOs for the project.

4.3.1 Precision

Precision measures the reproducibility of the sampling and analytical methodology. Laboratory and field precision is defined as the relative percent difference (RPD) between duplicate sample analyses. The laboratory duplicate samples or MS/MSD samples measure the precision of the analytical method.

The RPD values were reviewed for all laboratory duplicate samples. Approximately 0.3% of the data were qualified as estimated quantities (J or UJ) based on duplicate outliers. The DQO for precision was met.

4.3.2 Accuracy

Accuracy measures the reproducibility of the sampling and analytical methodology. Laboratory accuracy is defined as the surrogate spike percent recovery (%R) for each VOC, SVOC, or PCB analysis or the matrix spike %Rs. The surrogate %R and matrix spike %R values were reviewed for all appropriate sample analyses. Approximately 1.9% of the data were qualified as estimated quantities (J or UJ) and approximately 0.2% of the data were rejected (R) based on surrogate spike or matrix spike recovery outliers. Overall, the project DQO for accuracy was met.

4.3.3 Completeness

Data completeness is defined as the percentage of usable data (usable data divided by the total possible data). All laboratory data were reviewed for data validation and usability. Less than 0.5% of the data were rejected, therefore the project DQO for completeness of 90% was met.

4.3.4 Representativeness

Data representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or environmental condition. The number and selection of sample stations were determined in the field to account accurately for site variations and sample matrices. Sample depths were added to account for site variations. The DQOs for representativeness were met.

4.3.5 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared to another. Data produced for this site followed applicable field sampling techniques and specific analytical methodology. The DQOs for comparability were met.

4.4 LABORATORY QUALITY ASSURANCE/QUALITY CONTROL PARAMETERS

The laboratory data also were reviewed for holding times, laboratory blank samples, trip blank samples, rinsate samples, and serial dilution samples. These QA/QC parameters are summarized below. In general, the laboratory and field QA/QC parameters were considered acceptable.

4.4.1 Holding Times

All sample analyses met EPA, Region 10, and method-specific holding time criteria.

4.4.2 Laboratory Blanks

All laboratory blanks met the frequency criteria. The following contaminants of concern were detected in the laboratory blanks:

- SVOCs: di-n-butylphthalate.
- TAL Metals: antimony, beryllium, mercury, nickel, silver, sodium, and thallium; and
- VOCs: 2-propanone and naphthalene.

Due to the ubiquitous nature of inorganics and extremely low instrument limits, inorganics are frequently detected in calibration and method blanks. Any associated sample result less than five times the positive laboratory blank concentrations were qualified as not detected (U). Associated sample results were qualified as estimated quantities (J or UJ) if the sample result was less than five times the absolute value of the inorganic negative blank concentrations. See the data QA memoranda (Appendix C) for sample results that were qualified based on laboratory blank contamination.

4.4.3 Trip Blanks

Trip blanks were made on site during the field event and met the frequency criteria. 1,2-Dichloroethane was detected in each of the VOC trip blanks at concentrations ranging between 2.1 and 7.2 µg/L. These results are potentially due to field contamination or the trip blank water source. Associated sample results less than five times the trip blank concentrations were qualified as not detected (U); these results included samples 00274006, 00274023, 00274030, 00274053, 00274054, 00274062, 00274121, 00284208, and 00284216.

4.4.4 Rinsate Blanks

Rinsate blanks met the frequency criteria. 1,2-Dichloroethane was detected in one of the VOC rinsate blanks but was not detected in any of the associated samples; therefore, no qualifiers were applied based on this detection. Several elements were detected in the TAL metals rinsate blank samples. Sample results that were qualified as not detected (U) because they were less than five times the rinsate blank concentrations included the barium result in sample MJBN16 and the barium, copper, and zinc results in sample MJ001H.

4.4.5 Serial Dilution

All TAL metals serial dilution analyses met the frequency criteria. The following analytes exceeded serial dilution QC limits:

- barium, calcium, magnesium, manganese, potassium, and sodium.

Approximately 1.1% of the data were qualified as estimated quantities (J) based on the serial dilution QC outliers.

5. ANALYTICAL RESULTS REPORTING AND BACKGROUND SAMPLES

This section describes the reporting and evaluation methods applied to analytical results presented in Sections 6 and 7 of this report and discusses background locations and sample results. Tables 5-1 and 5-2 summarize sample results from background locations. Table 3-1 lists all samples collected for laboratory analysis.

5.1 ANALYTICAL RESULTS EVALUATION CRITERIA

Analytical results presented in the summary tables in Sections 6 and 7 show all compounds detected above laboratory detection limits in bold type. Analytical results indicating significant concentrations of contaminants in source samples (Section 6) with respect to background concentrations are shown underlined and in bold type. Similarly, analytical results indicating elevated concentrations of contaminants in target samples (Section 7) with respect to background concentrations also are shown underlined and in bold type. For the purposes of this investigation, significant/elevated concentrations are those concentrations that are:

- Equal to or greater than the sample's contract required quantitation limit/contract required detection limit (CRQL/CRDL) or the sample quantitation limit (SQL) when a non-CLP laboratory was used; and
- Equal to or greater than the background sample's CRQL/CRDL or SQL when the background concentration is below detection limits; or
- At least three times greater than the background concentration when the background concentration equals or exceeds the detection limits.

The analytical summary tables present all detected compounds, but only those detected analytes at potential sources or in targets meeting the significant/elevated concentration criteria are discussed in the report text.

For analytical results that are qualified as estimated, the sample concentration was adjusted as described in *Using Qualified Data to Document an Observed Release and Observed Contamination* (EPA 1996) before determining whether the concentration was significant or elevated. The tables in

Sections 6 and 7 provide adjusted concentrations (AC) in parentheses. For target locations, only those analytes that also were significant in a source at the site were evaluated to determine whether their concentrations were elevated. All hazardous substances detected at target locations and meeting evaluation criteria can be used to document an observed release from the site to the target. When samples were diluted for re-analysis at a laboratory, the dilution results were considered for evaluation and are provided in the tables.

The TOC results are not discussed in the report because they were not used to document an observed release from the site to a target. The TOC data is provided in Appendix C.

5.1.1 Sample Results Reporting

When four or more analytes are detected or are significant/elevated for an analytical suite (e.g., VOCs or TAL metals) in Sections 6 and 7, the number of such analytes and the concentration ranges are given. When three or fewer analytes are detected or are significant/elevated for an analytical suite, the specific analyte and its concentration is provided. Based on EPA, Region 10, policy, evaluation of aluminum, calcium, iron, magnesium, potassium, and sodium (common earth crust elements) generally is employed only in water mass tracing, which is beyond the scope of this report. For this reason, these elements will not be discussed in this report.

5.2 BACKGROUND SAMPLES

Background samples were collected for each of the naturally occurring media from which PA/SI samples were collected. Those media are groundwater, surface soil, subsurface soil, surface water, and sediment. Specific background groundwater and surface water samples were not collected; therefore, the groundwater and surface water sample that contained the lowest concentrations in general was selected to be used for comparison purposes. Results for the appropriate background sample(s) are shown in Tables 5-1 and 5-2, and in the first column(s) in the analytical results summary tables in Sections 6 and 7 for comparison against source or target results.

5.2.1 Background Surface Soil

5.2.1.1 Sample Location

One off-site background surface soil sample (BG02) was collected. Sample BG02 was collected from native soil present adjacent to Highway 101, east of the site (Figure 3-1). The background soil type was similar in composition to those of samples collected on site.

5.2.1.2 Sample Results

Inorganics detected in sample BG02 include arsenic, barium, chromium, cobalt, copper, lead, manganese, nickel, vanadium, and zinc. Inorganic concentrations ranged from 2.7 mg/kg of arsenic to 742 mg/kg of manganese.

VOCs, SVOCs, and PCBs were not detected in surface soil sample BG02.

5.2.2 Background Subsurface Soil

5.2.2.1 Sample Locations

Background subsurface soil samples were collected from three intervals in soil boring BG03 (Figure 3-1). The background soil types were similar in composition to those of samples collected on site at the following intervals: 0 to 4 feet bgs, 4 to 8 feet bgs, and 8 to 12 feet bgs. Boring BG03 was located on the Port of Garibaldi property adjacent to the Old Mill Marina property, near the Old Mill Marina office. Both the Old Mill Marina site and the Port of Garibaldi property were constructed on fill material dredged from Tillamook Bay. Source and background subsurface soil samples were collected in areas created from fill material and were found to be fairly uniform in composition. All source subsurface samples were compared to the background subsurface soil sample collected from the respective interval except for the samples collected from 12 to 16 feet bgs. These source subsurface soil samples were compared to the background subsurface soil collected from 8 to 12 feet bgs due to the uniformity of the soil composition in the two intervals.

5.2.2.2 Sample Results

VOCs detected in the three sample intervals from BG03 include 2-butanone, 2-propanone, carbon disulfide, and methylene chloride. VOC concentrations ranged from 10.8 micrograms per kilogram (µg/kg) of carbon disulfide (8 to 12 feet bgs) to 170 µg/kg of 2-propanone (0 to 4 feet bgs).

Nine inorganics were detected in the three sample intervals in BG03 including arsenic, chromium, cobalt, copper, lead, manganese, nickel, vanadium, and zinc. Inorganic concentrations ranged from 1.3 mg/kg of lead (0 to 4 feet bgs) to 300 mg/kg of manganese (8 to 12 feet bgs).

PCB-1254 was detected between 4 and 8 feet bgs at 22 µg/kg and between 8 and 12 feet bgs at 28 µg/kg.

Three SVOCs were detected in the three sample intervals from BG03 including 1-phenyl-ethanone (191 µg/kg between 8 and 12 feet bgs), fluoranthene (209 µg/kg between

4 and 8 feet bgs and 398 µg/kg between 8 and 12 feet bgs), and pyrene (218 µg/kg between 4 and 8 feet bgs and 419 µg/kg between 8 and 12 feet bgs).

5.2.3 Background Sediment

5.2.3.1 Sample Location

One background sediment sample (BG01) was collected. Sample BG01 was collected at Miami Cove just above the Highway 101 bridge (Figure 3-1). The background sediment sample type was similar in composition to those collected in Miami Cove.

5.2.3.2 Sample Results

Inorganics detected in BG01 include chromium, cobalt, copper, lead, manganese, nickel, vanadium, and zinc. Inorganic concentrations ranged from 2.4 mg/kg of lead to 526 mg/kg of manganese.

No SVOCs or PCBs were detected.

5.2.4 Background Surface Water

5.2.4.1 Sample Location

One surface water sample (OF01) in general contained the lowest overall concentrations of contaminants and therefore was selected to represent background surface water conditions at Miami Cove. This sample was collected from Miami Cove at the north end of the site (Figure 3-1).

5.2.4.2 Sample Results

No VOCs, SVOCs, or PCBs were detected. Inorganics detected include manganese (727 µg/L adjusted concentration [AC]), and zinc (56.6 mg/kg [AC]).

5.2.5 Background Groundwater

5.2.5.1 Sample Location

One groundwater sample (MB09) in general contained the lowest overall concentrations of contaminants and therefore was selected to represent background groundwater conditions on site. This sample was collected from boring MB09 at approximately 8.5 feet bgs (Figure 3-1).

5.2.5.2 Sample Results

No VOCs, SVOCs, or PCBs were detected. Inorganics detected include chromium, copper, lead, manganese, vanadium, and zinc. Inorganic concentrations ranged from 23 µg/L of chromium to 143 µg/L (AC) of manganese.

Table 5-1

BACKGROUND SOIL AND SEDIMENT ANALYTICAL RESULTS SUMMARY OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION GARIBALDI, OREGON

Regional Tracking Number	00274109	00274134	00284210	00284211	00284212
Sample Location	BG01	BG02	BG03	BG03	BG03
Depth (feet bgs)	0-0.5	0-0.5	0-4	4-8	8-12
Inorganics (mg/kg)					
Aluminum	**40000**	**35000**	**18400**	**13100**	**27800**
Arsenic	2.1 U	**2.7**	**5.5**	**3.5**	**6.2**
Barium	**61 JB** SQL= 75.3 U	**73.5**	**15.6 JB**	**14.1 JB**	**32.4 JB** SQL= 67.1 U
Beryllium	0.07 U	0.41 U	**0.05 JB**	**0.14 JB**	0.07 U
Calcium	**6910**	**7640**	**3050**	**2280**	**5810**
Chromium	**38**	**34.2**	**22.7**	**18**	**35.1**
Cobalt	**37.5**	**37.6**	**17.4**	**11 JB**	**28**
Copper	**65.5**	**61.6**	**27.1**	**17.4**	**54.6**
Iron	**58700**	**60400**	**28800**	**20800**	**45300**
Lead	**2.4**	**7.2**	**1.3**	0.72 U	**5.6**
Magnesium	**17000**	**14500**	**7590**	**5300**	**12900**
Manganese	**526**	**742**	**167**	**112**	**300**
Mercury	**0.18 JB** SQL= 0.18 U	0.07 UJK	0.06 UJK	0.07 UJK	**0.18 JB** SQL= 0.19 U
Nickel	**70.5**	**130**	**33.9**	**21.7**	**48.3**
Potassium	**1150 JB**	**650 JB**	**1390 JH**	**1080 JB**	**2870**
Selenium	1.5 U	1 U	**1.1 JB**	1.1 U	1.3 U
Silver	**1.9 JB**	**2.7 JB**	1.7 U	1.2 U	2.5 U
Sodium	**5210**	**1770 JH**	**1310**	**1250 JB**	**6450**
Vanadium	**133**	**142**	**63.8**	**42**	**103**
Zinc	**109**	**89.1**	**58**	**43.8**	**100**
Pesticides & PCBs (µg/kg)					
PCB-1254	29 U	20 U	17 U	**22**	**28**
SVOCs (µg/kg)					
Benzaldehyde	**70.6 JQ**	**27 JQ**	133 U	175 U	**55.2 JQ**
Benzo(a)anthracene	233 U	164 U	133 U	175 U	**93.8 JQ**
Benzo[b]Fluoranthene	466 U	328 U	266 U	349 U	**118 JQ**
Chrysene	233 U	164 U	133 U	175 U	**138 JQ**
Ethanone, 1-phenyl-	**75.9 JQ**	**127 JQ**	133 U	**71.9 JQ**	**191**
Fluoranthene	233 U	164 U	133 U	**209**	**398**
Phenanthrene	233 U	164 U	133 U	**50.2 JQ**	**104 JQ**
Phenol	233 U	164 U	133 U	175 U	**67.4 JQ**
Pyrene	233 U	164 U	133 U	**218**	**419**
VOCs (µg/kg)					
2-Butanone	NA	44.7 U	37.5 U	**49.2**	**69.9**
2-Propanone	NA	44.7 U	**170**	215 U	319 U
Carbon disulfide	NA	8.9 U	7.5 U	12.1 U	**10.8**
Methylene Chloride	NA	8.9 U	**115**	**18.5**	**64**

Key is at the end of the table.

Note: Bold type indicates sample concentrations above detection limits.

Key:

B	= Associated sample results is greater than instrument detection limit, but less than sample quantitation limit.
bgs	= Below ground surface.
H	= High bias.
J	= The analyte was positively identified. The associated numberical value is an estimate.
K	= Unknown bias.
mg/kg	= Milligrams per kilogram.
µg/kg	= Micrograms per kilogram.
NA	= Not analyzed.
Q	= The result is below the sample quantitation limit.
SQL	= Sample quantitation limit.
U	= The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Table 5-2

BACKGROUND WATER ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00274121**	**00284217**
Sample Location	**OF01**	**MB09**
Inorganics (µg/L)		
Aluminum	**132 JB**	**11100**
Arsenic	5.6 U	**9.8 JB** SQL= 10 U
Barium	**24.7 JB** SQL= 200 U	**49.3 JB** SQL= 200 U
Calcium	**119000 JL**	**21200 JL**
Chromium	1.5 UJK SQL= 2.0 U	**17.9 JL** **(23.3 AC)**
Cobalt	1.7 UJK (2.2 UAC)	**7.5 JB** SQL= 50 U
Copper	**7.7 JB** SQL= 25 U	**56.1**
Iron	**538 JL**	**17200 JL**
Lead	2.6 UJK (3.4 UAC)	**3.2 JL** **(4.2 AC)**
Magnesium	**312000 JL**	**13900 JL**
Manganese	**568 JL** **(727 AC)**	**112 JL** **(143 AC)**
Nickel	1 UJK	**17.7 JB** SQL= 40 U
Potassium	**227000**	**21100**
Selenium	**4 JB**	**4.5 JB** SQL= 5 U
Sodium	**3920000**	**166000**
Vanadium	**3.6 JB** SQL= 50 U	**56.8 JL** **(71 AC)**
Zinc	**43.8 JL** **(56.5 AC)**	**55.8 JL** **(72.0 AC)**

Note: Bold type indicates sample concentrations above the detection limit.

Key:

AC = Adjusted concentration.
B = Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
bgs = Below ground surface.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
L = Low bias.
µg/L = Micrograms per liter.
SQL = Sample quantitation limit.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

6. POTENTIAL SOURCES

This section describes sample locations and analytical results of PA/SI samples obtained from potential sources. The sampling locations, sampling rationale, and analytical results are summarized in the following sections; Tables 6-1 through 6-14 summarize analytes detected at each potential source location investigated. Laboratory data sheets of analytical results for all samples are in Appendix C.

6.1 CONTAMINATED SOIL SOURCES

6.1.1 Former Old Mill Building

The former Old Mill Building covers an estimated 300- by 300-foot area. Former operations in the Old Mill Building include plywood mill operations, wood treatment, and shop equipment repair. The Old Mill Building was demolished in June 2000. The concrete foundation and underground concrete vaults still remain on site. Some visible staining was present in cracks along the concrete foundation.

6.1.1.1 Sample Locations

Surface and subsurface soil samples were collected at nine sample stations (MB01 through MB09) within the vicinity of the former Old Mill Building. Three surface soil samples were collected at sample stations MB01, MB03, and MB04. Two surface soil samples (MB06 and MB07) were collected from drainage ditches located along the southern and northern perimeters of the former Old Mill Building. Eighteen subsurface soil samples were collected with direct push technology at sample stations MB01, MB02, MB03, MB04, MB05, MB08, and MB09. Groundwater samples were collected from two soil borings (MB02 and MB05) within the vicinity of the former Old Mill Building. Sample locations are presented in Figure 3-1.

6.1.1.2 Surface Soil Sample Results

Sample results are summarized in Table 6-1. Methylene chloride was the only VOC detected in the surface soil samples at a significant concentration. Methylene chloride was detected in the surface soil sample collected from MB01 at 30.6 µg/kg, in the surface soil sample from MB03 at 10 µg/kg, in the surface soil sample from MB04 at 16.2 µg/kg, and in the surface soil sample from MB07 at 14.6 µg/kg.

Eight inorganics were detected at significant concentrations including antimony, arsenic, barium, copper, lead, mercury, silver, and zinc. Significant inorganic concentrations ranged from 0.32 mg/kg of mercury in MB01 to 8,819.4 mg/kg (AC) of lead in MB01.

PCB-1254 was detected at significant concentrations in the surface soil sample collected at MB04 at 35 µg/kg.

Seven SVOCs were detected at significant concentrations including bis(2-ethylhexyl)phthalate, chrysene, di-n-butylphthalate, fluoranthene, isophorone, phenanthrene, and pyrene. Significant SVOC concentrations ranged from 168 µg/kg of phenanthrene in MB01 to 1,130 µg/kg of bis(2-ethylhexyl)phthalate in MB01.

6.1.1.3 Subsurface Soil Sample Results

Sample results from samples collected between 0 and 4 feet bgs are summarized in Table 6-2a. 2-butanone was the only VOC detected at a significant concentration at 39.4 µg/kg in soil boring MB08.

Five inorganics were detected at significant concentrations including barium, copper, lead, selenium, and zinc. Significant inorganic concentrations ranged from 1.2 mg/kg of selenium in soil boring MB09 to 474 mg/kg of zinc in soil boring MB03.

No PCBs were detected at significant concentrations in the subsurface soil samples.

Eleven SVOCs were detected at significant concentrations including 9H-carbazole, 9H-fluorene, anthracene, benzo(a)anthracene, bis(2-ethylhexyl)phthalate, chrysene, di-n-butylphthalate, fluoranthene, isophorone, phenanthrene, and pyrene. Significant SVOC concentrations ranged from 159 µg/kg of 9H-fluorene at soil boring MB04 to 1,710 µg/kg of anthracene at soil boring MB04.

Sample results from samples collected from between 4 and 8 feet bgs are summarized in Table 6-2b. Carbon disulfide (19 µg/kg in MB09 and 35.8 µg/kg in MB02) and methylene chloride (135 µg/kg in MB01) were the only VOCs detected in the subsurface soil samples at significant concentrations.

Seven inorganics were detected at significant concentrations including barium, cobalt, lead, manganese, mercury, selenium, and zinc. Significant inorganic concentrations ranged from 0.26 mg/kg of mercury in soil boring MB02 to 345 mg/kg of manganese in soil boring MB05.

No PCBs were detected at significant concentrations in the subsurface soil samples.

Fourteen SVOCs were detected at significant concentrations including 9H-carbazole, 9H-fluorene, acenaphthene, anthracene, benzo(a)anthracene, bis(2-ethylhexyl)phthalate, chrysene, di-n-butylphthalate, dibenzofuran, fluoranthene, naphthalene, 2-methyl-naphthalene, phenanthrene, and

pyrene. Significant SVOC concentrations ranged from 195 µg/kg of benzo(a)anthracene at soil boring MB01 to 3,250 µg/kg of phenanthrene at soil boring MB01.

Sample results from samples collected from between 8 and 12 feet bgs are summarized in Table 6-2c. No VOCs, inorganics, or PCBs were detected at significant concentrations in the subsurface soil samples.

Di-n-butylphthalate was the only SVOC detected at a significant concentration at 241 µg/kg in soil boring MB02.

6.1.1.4 Groundwater Sample Results

Sample results are summarized in Table 6-3. Carbon disulfide was the only VOC detected in the groundwater samples at a significant concentration. Carbon disulfide was detected in the groundwater collected from soil boring MB02 at 5.4 µg/L and from soil boring MB05 at 3.3 µg/L.

Manganese was the only inorganic detected in the groundwater samples at a significant concentration. Manganese was detected in the groundwater collected from soil boring MB05 at 440 µg/L (JL).

No PCBs were detected at significant concentrations in the groundwater samples.

Three SVOCs were detected at significant concentrations including bis(2-ethylhexyl)phthalate at 8.3 µg/L (MB02) and 82.2 µg/L (MB05), butylbenzylphthalate at 0.38 µg/L (MB02), and diethyl phthalate at 0.58 µg/L (MB02).

6.1.2 Former Power Station

The former power station covers an estimated 100- by 100-foot area. The former power station included a stream generator and hog fuel boiler. No visible staining of surface soils was noted. Diesel-like odor was noted in the subsurface soil samples.

6.1.2.1 Sample Locations

One surface soil sample was collected at sample station PS01, where vegetation was visibly stressed. Subsurface soil samples were collected with direct push technology at sample stations PS01 through PS06. A total of 17 subsurface samples were collected from these sampling stations. One groundwater sample was collected from soil boring PS01.

6.1.2.2 Surface Soil Sample Results

Sample results are summarized in Table 6-4. Methylene chloride was the only VOC detected at a significant concentration (20.3 µg/kg) in the surface soil sample collected from PS01. Thallium was the only inorganic detected at a significant concentration (2.6 mg/kg) in the surface soil sample collected at PS01. PCBs were not detected at significant concentrations in the surface soil sample collected at PS01. Di-n-butylphthalate was the only SVOC detected at a significant concentration (306 µg/kg) in the surface soil sample collected at PS01.

6.1.2.3 Subsurface Soil Sample Results

Sample results from samples collected between 0 and 4 feet bgs are summarized in Table 6-5a. Three VOCs were detected at significant concentrations including 2-butanone, 2-propanone, and carbon disulfide. 2-butanone was detected at concentrations ranging from 90.7 µg/kg in PS04 to 169 µg/kg in PS05. 2-propanone was detected at 629 µg/kg (JL) in PS01. Carbon disulfide was detected at concentrations ranging from 15 µg/kg in PS05 to 26.8 µg/kg in PS04.

Eight inorganics were detected at significant concentrations including barium, copper, lead, manganese, mercury, selenium, silver, and zinc. Significant inorganic concentrations ranged from 0.23 mg/kg of mercury in soil boring PS02 to 4,060 mg/kg of lead in soil boring PS04.

The only PCB detected at a significant concentration was PCB-1254 at 30 µg/kg in PS03 and 1,500 µg/kg in PS04.

Nine SVOCs were detected at significant concentrations including benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, di-n-butylphthalate, 1-phenyl-ethanone, fluoranthene, phenanthrene, and pyrene. Significant SVOC concentrations ranged from 141 µg/kg of 1-phenyl-ethanone at soil boring PS01 to 1,380 µg/kg of fluoranthene at soil boring PS02.

Sample results from samples collected between 4 and 8 feet bgs are summarized in Table 6-5b. Six VOCs were detected at significant concentrations including (1-methylethyl)-benzene, 1-methyl-4-(1-methylethyl)-benzene, carbon disulfide, trichloromethane, methylene chloride, and sec-butylbenzene. Significant VOC concentrations ranged from 7.51 µg/kg (AC) of 1-methyl-4-(1-methylethyl)-benzene in PS06 to 59.1 µg/kg of methylene chloride in PS05.

Six inorganics were detected at significant concentrations including barium, cobalt, copper, lead, manganese, and zinc. Significant inorganic concentrations ranged from 16.5 mg/kg of cobalt in soil boring PS01 to 1,740 mg/kg of manganese in soil boring PS03.

The only PCB detected at a significant concentration was PCB-1260 at 1,900 µg/kg in PS06.

Eight SVOCs were detected at significant concentrations including 4-methyphenol, benzaldehyde, bis(2-ethylhexyl)phthalate, di-n-butylphthalate, 1-phenyl-ethanone, naphthalene, 2-methyl-naphthalene, and phenanthrene. Significant SVOC concentrations ranged from 235 µg/kg of naphthalene at soil boring PS03 to 2,080 µg/kg of 1-phenyl-ethanone at soil boring PS06.

Sample results from samples collected from between 8 and 12 feet bgs and the one sample collected from between 12 and 16 feet bgs in soil boring PS01 are summarized in Table 6-5c. Carbon disulfide (39.8 µg/kg in PS06) and n-butylbenzene (37.6 µg/kg in PS02) were the only VOCs detected at significant concentrations in the subsurface soil samples. No inorganics or PCBs were detected at significant concentrations in the subsurface soil samples. Bis(2-ethylhexyl)phthalate (250 µg/kg in PS01 between 8 and 12 feet bgs) and di-n-butylphthalate (779 µg/kg in PS01 between 8 and 12 feet bgs and 303 µg/kg in PS01 between 12 and 16 feet bgs) were the only SVOCs detected at significant concentrations in the subsurface soil samples.

6.1.2.4 Groundwater Sample Results

Sample results are summarized in Table 6-3. No VOCs or PCBs were detected at significant concentrations in the groundwater samples. Manganese was the only inorganic detected in the groundwater sample at a significant concentration. Manganese was detected in the groundwater collected from soil boring PS01 at 2,250 µg/L (JL). Bis(2-ethylhexyl)phthalate was the only SVOC at a significant concentration in PS01 at 92.7 µg/L.

6.1.3 Former Log Pole Storage Area

The former pole storage area covers an estimated 500- by 200-foot area. There was no visible contamination at the former pole storage area. Dredge spoils are currently being placed in the former pole storage area.

6.1.3.1 Sample Locations

One surface and three subsurface soil samples were collected at one boring (LS01) in the former pole storage area. Figure 3-1 presents the sampling location.

6.1.3.2 Surface Soil Sample Results

Sample results are summarized in Table 6-6. Methylene chloride was the only VOC detected at a significant concentration (21.6 µg/kg) in the surface soil sample collected from LS01. No inorganics or

PCBs were detected at significant concentrations in the surface soil sample collected at LS01. Bis(2-ethylhexyl)phthalate and fluoranthene were the only SVOCs detected at significant concentrations (178 and 191 µg/kg, respectively) in the surface soil sample collected at LS01.

6.1.3.3 Subsurface Soil Sample Results

Sample results from the sample collected between 0 and 4 feet bgs are summarized in Table 6-7a. The only VOC detected at a significant concentration was carbon disulfide at 10.5 µg/kg. No inorganics, PCBs, or SVOCs were detected at significant concentrations in the subsurface soil sample collected at LS01.

Sample results from the sample collected between 4 and 8 feet bgs are summarized in Table 6-7b. Cobalt (23.3 mg/kg) and lead (3.7 mg/kg) were the only inorganics detected at a significant concentration. No VOCs, SVOCs, or PCBs were detected at significant concentrations in the surface soil sample collected at LS01.

Sample results from the sample collected from between 8 and 12 feet bgs are summarized in Table 6-7c. No VOCs, inorganics, SVOCs, or PCBs were detected at significant concentrations in the surface soil sample collected at LS01.

6.1.4 Former Waste Dump Area

The former waste dump area covers an estimated 400- by 200-foot area. The former waste dump area is currently the RV parking storage area. There were no signs of visible contamination at the former waste disposal area.

6.1.4.1 Sample Locations

Five surface soil samples (WD03 through WD07) and six subsurface soil samples were collected from two sample locations (WD01 and WD02) within the former waste disposal area. Figure 3-1 presents sampling locations.

6.1.4.2 Surface Soil Sample Results

Sample results are summarized in Table 6-8. Methylene chloride was the only VOC detected at a significant concentration in the surface soil samples collected from the waste dump area ranging from 24.5 µg/kg (WD04) to 31.9 µg/kg (WD06). Three inorganics were detected at significant concentrations including lead (ranging from 3.2 mg/kg in WD06 to 94.9 mg/kg in WD07); mercury (0.3 mg/kg [JL] in

WD03); and selenium (3.3 mg/kg in WD07). No PCBs were detected at significant concentrations. Four SVOCs were detected at significant concentrations including bis(2-ethylhexyl)phthalate, fluoranthene, phenanthrene, and pyrene. SVOC concentrations ranged from 200 µg/kg in WD06 to 318 µg/kg in WD05.

6.1.4.3 Subsurface Soil Sample Results

Sample results from samples collected between 0 and 4 feet bgs are summarized in Table 6-9a. The only VOC detected at a significant concentration was carbon disulfide at 13.7 µg/kg in WD01. The only inorganic detected at a significant concentration was lead at 6.2 mg/kg in WD01. No PCBs or SVOCs were detected at significant concentrations in the subsurface soil samples.

Sample results from samples collected between 4 and 8 feet bgs are summarized in Table 6-9b. Carbon disulfide (64.2 µg/kg in WD01) and methylene chloride (138 µg/kg in WD01) were the only VOCs detected at significant concentrations in the subsurface soil samples.

Five inorganics were detected at significant concentrations including cobalt, copper, lead, nickel, and vanadium. Significant inorganic concentrations ranged from 1.3 mg/kg of lead in soil boring WD02 to 135 mg/kg of vanadium in soil boring WD02.

No PCBs were detected at significant concentrations in the subsurface soil samples.

The only SVOC detected at a significant concentration was 1-phenyl-ethanone at 543 µg/kg in soil boring WD01.

Sample results from samples collected from between 8 and 12 feet bgs are summarized in Table 6-9c. Carbon disulfide (35.6 µg/kg in WD02) and methylene chloride (212 µg/kg in WD02) were the only VOCs detected at significant concentrations in the subsurface soil samples.

Selenium was the only inorganic detected at a significant concentration at 1.8 mg/kg in soil boring WD02. No PCBs were detected at significant concentrations in the subsurface soil samples. Bis(2-ethylhexyl)phthalate (4,160 µg/kg in WD01) was the only SVOC detected at a significant concentration in the subsurface soil samples.

6.1.5 Former Fuel Station

There were several fuel stations historically on site including the Oceanside Company fuel station location in the northeast corner of the site and the Hammond Tillamook fuel station location adjacent to the Oceanside Company fuel station (Figure 2-2).

6.1.5.1 Sample Locations

Three subsurface soil samples were collected in the vicinity of one of the former fuel stations (FU01). The sample location is presented in Figure 3-1.

6.1.5.2 Subsurface Soil Sample Results

Sample results from the sample collected between 0 and 4 feet bgs are summarized in Table 6-10a. No VOCs were detected at a significant concentration. Three inorganics were detected at significant concentrations including barium (49.2 mg/kg), lead (20.6 mg/kg), and manganese (558 mg/kg). No PCBs or SVOCs were detected at significant concentrations in the subsurface soil sample.

Sample results from the sample collected from between 4 and 8 feet bgs are summarized in Table 6-10b. No VOCs were detected at significant concentrations in the subsurface soil sample.

Three inorganics were detected at significant concentrations including cobalt (25.8 mg/kg), lead (8 mg/kg), and nickel (49 mg/kg). No PCBs or SVOCs were detected at significant concentrations in the subsurface soil sample.

Sample results from the sample collected from between 8 and 12 feet bgs are summarized in Table 6-10c. No VOCs, inorganics, PCBs, or SVOCs were detected at significant concentrations in the subsurface soil sample.

6.1.6 Dredge Spoils

Sediment from Miami Cove has been dredged and placed on site. There are several dredge spoil piles on site which are estimated to cover a 500- by 20-foot area.

6.1.6.1 Sample Locations

Three surface samples (DS02, DS04, and DS06) were collected from the dredge spoils. These samples were assumed to be sediment from Miami Cove and were compared to the background sediment for evaluation purposes. Direct push technology was employed in one location on the dredge spoils (DS07) to collect four subsurface soil samples in order to determine if buried waste was a potential source of contamination. These samples were considered to be subsurface soil and were therefore compared to the subsurface soil background sample. Three water samples (DS01, DS03, and DS05) were collected from ponded water that was present in some of the dredge spoils. It was assumed that ponded water was a combination of surface water and groundwater infiltrating to the surface; therefore,

the water sampled from the dredge ponds was compared to the background groundwater sample for evaluation purposes.

6.1.6.2 Sediment Results

Sample results are summarized in Table 6-11. Because the background sediment sample was not analyzed for VOCs, all detected concentrations are considered significant since VOCs are not naturally occurring. Three VOCs were detected at significant concentrations in the dredge spoils sediment samples including 2-butanone, carbon disulfide, and methylene chloride. 2-butanone concentrations were 55.6 µg/kg (DS02) and 62.2 µg/kg (DS06). Carbon disulfide concentrations were 8.8 µg/kg (DS02) and 60.8 µg/kg (DS04). Methylene chloride concentrations ranged from 26.1 µg/kg (DS02) to 49.4 µg/kg (DS06).

Arsenic was the only inorganic detected at a significant concentration ranging from 4.2 mg/kg (AC) in DS04 to 5.6 mg/kg in DS02. No SVOCs or PCBs were detected at significant concentrations.

6.1.6.3 Subsurface Soil Sample Results

Sample results from the sample collected from between 0 and 4 feet bgs are summarized in Table 6-12a. 2-butanone (65.6 µg/kg) and carbon disulfide (16.3 µg/kg) were the only VOCs detected at significant concentrations. Iron (4.4 mg/kg) was the only inorganic detected at a significant concentration. No PCBs or SVOCs were detected at significant concentrations in the subsurface soil sample.

Sample results from the sample collected from between 4 and 8 feet bgs are summarized in Table 6-12b. Carbon disulfide (12.6 µg/kg) was the only VOC detected at a significant concentration in the subsurface soil sample.

Five inorganics were detected at significant concentrations including cobalt (25.1 mg/kg), copper (97.4 mg/kg), lead (21.2 mg/kg), mercury (0.18 mg/kg [JL]) and zinc (191 mg/kg). No PCBs were detected at significant concentrations in the subsurface soil sample. Three SVOCs were detected at significant concentrations including chrysene (260 µg/kg), naphthalene (207 µg/kg), and phenanthrene (495 µg/kg).

Sample results from the sample collected from between 8 and 12 feet bgs and the sample collected from between 12 and 16 feet bgs are summarized in Table 6-12c. Carbon disulfide was the only VOC detected at significant concentrations in the subsurface soil samples at 51.3 µg/kg (8 to 12 feet bgs) and 36.2 µg/kg (12 to 16 feet bgs). Barium (69.3 mg/kg [8 to 12 feet bgs]) and thallium

(4.9 mg/kg [12 to 16 feet bgs]) were the only inorganics detected at significant concentrations in the subsurface soil samples. No PCBs were detected at significant concentrations. Di-n-butylphthalate (987 µg/kg [12 to 16 feet bgs]) was the only SVOC detected at significant concentrations in the subsurface soil samples.

6.1.6.4 Groundwater Sample Results

Sample results are summarized in Table 6-3. 1,2-dichloroethane was the only VOC detected in the groundwater samples at a significant concentration ranging from 3.4 µg/L in DS01 to 5.1 µg/L in DS05. Mercury was the only inorganic detected in the groundwater samples at a significant concentration of 0.24 µg/L (JL) in DS01. No PCBs or SVOCs were detected at significant concentrations in the groundwater samples.

6.1.7 Restaurant, Pool, and Railroad Area

The site has been regraded several times which has potentially moved contaminated soil from sources to other areas on the site including the restaurant, swimming pool, and railroad areas. For reporting purposes, the volume of these areas was assumed to be 1 cubic yard of contaminated soil.

6.1.7.1 Sample Locations

One surface soil sample was collected from the area near the restaurant (RS01), one surface soil sample was collected from the area near the swimming pool facility (PL01), and two surface soil samples were collected from the area near the railroad (RR01 and RR02). Sample locations are presented in Figure 3-1.

6.1.7.2 Surface Soil Sample Results

Sample results are summarized in Table 6-13. Methylene chloride was the only VOC detected in the surface soil samples at a significant concentration ranging from 18.6 µg/kg at RS01 to 23.1 µg/kg at RR01. Four inorganics were detected at significant concentrations including lead (152 mg/kg at RR02), mercury (0.2 mg/kg at RR01 and 0.44 mg/kg in RR02), thallium (2.6 mg/kg at RR01), and zinc (421 mg/kg at RR02). PCB-1254 was detected at a significant concentration in RR02 at 1,200 µg/kg (JL). Three SVOCs were detected at significant concentrations including bis(2-ethylhexyl)phthalate (251 µg/kg in RR02), fluoranthene (194 µg/kg in RR02), and pyrene (164 µg/kg in RR02).

6.1.8 Office Building Area

The site has been regraded several times, which has potentially moved contaminated soil from sources to other areas on the site including the office building area. For reporting purposes, 1 cubic yard of contaminated soil at this location was assumed.

6.1.8.1 Sample Locations

Three subsurface soil samples were collected from soil boring OB01 located approximately 20 feet west of the office building.

6.1.8.2 Subsurface Soil Sample Results

Sample results from the sample collected from between 0 and 4 feet bgs are summarized in Table 6-14a. No VOCs, inorganics, PCBs, or SVOCs were detected at significant concentrations in the subsurface soil sample.

Sample results from the sample collected from between 4 and 8 feet bgs are summarized in Table 6-14b. No VOCs were detected at significant concentrations in the subsurface soil sample.

Lead (2.1 mg/kg) was the only inorganic detected at a significant concentration. No PCBs or SVOCs were detected at significant concentrations in the subsurface soil sample.

Sample results from the sample collected from between 8 and 12 feet bgs are summarized in Table 6-14c. Carbon disulfide (49.5 µg/kg) was the only VOC detected at a significant concentration. No inorganics, PCBs, or SVOCs were detected at significant concentrations in the subsurface soil sample.

Table 6-1

FORMER OLD MILL BUILDING AREA
SURFACE SOIL ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00274134**	**00274002**	**00274010**	**00274015**	**00274135**	**00274136**
Sample Location	**BG02**	**MB01**	**MB03**	**MB04**	**MB06**	**MB07**
Depth (feet bgs)	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**1-2**	**1-1.5**
Description	**BACKGROUND**	**FORMER OLD MILL BUILDING AREA**				
VOCs (µg/kg)						
2-Butanone	44.7 UJK (447 UAC)	8.7 U	7.4 U	7.9 U	**69.4**	23.1 U
Methylene Chloride	8.9 U	**30.6**	**10**	**16.2**	8.3 U	**14.6**
Inorganics (mg/kg)						
Aluminum	**35000**	**20100**	**24100**	**31900**	**27800**	**30300**
Antimony	1.9 U	**16.8**	1.2 U	1.1 U		
Arsenic	**2.7**	**8.4**	**7.2**	**5.9**	**3.2 JH (1.8 AC)**	**3.5**
Barium	**73.5**	**466**	**52.9**	**28.8 JB**	**34.7 JB**	**37.3 JB**
Calcium	**7640**	**21500**	**8330**	**5940**	0.14 U	0.11 U
Chromium	**34.2**	**39.9**	**27.9**	**36.1**	**30.6**	**19.4**
Cobalt	**37.6**	**84.6**	**26.3**	**31.7**	**27.5**	**27.7**
Copper	**61.6**	**1190**	**108**	**71.2**	**74.5**	**57.9**
Iron	**60400**	**137000**	**45700**	**52100**	**44900**	**47200**
Lead	**7.2**	**12700 JK (8819.4 AC)**	**32.2 JK (22.4 AC)**	**9.7**	**17.4**	**10.1**
Magnesium	**14500**	**8000**	**10700**	**13800**	**12200**	**13200**
Manganese	**742**	**418**	**337**	**377**	**302**	**409**
Mercury	0.07 UJK (0.1 UAC)	**0.32**	0.05 U	0.06 UJK (0.03 UAC)	**0.38**	R
Nickel	**130**	**28.6**	**40**	**57.6**	**50.6**	**41.7**
Potassium	**650 JB**	**2900**	**1310**	**1990 JH**	**1830 JH**	**1570 JH**
Silver	**2.7 JB** SOL= 2.7 U	**3.1**	**1.6 JB**	**2.2 JB**	**1.7 JB**	**2.2 JB**
Sodium	**1770 JH**	**2570**	**3900**	**3110 JH**	**3440**	**4380**
Vanadium	**142**	**79.5 JL**	**86.6 JL**	**117**	**99.3**	**90.1**
Zinc	**89.1**	**3280**	**254**	**123**	**148**	**144**
PCBs (µg/kg)						
PCB-1254	20 U	15 U	15 U	**35**	19 U	16 U
SVOCs (µg/kg)						
9H-Carbazole	164 U	**39.7 JQ**	123 U	128 U	149 U	126 U
Acenaphthylene	164 U	**35.9 JQ**	123 U	128 U	149 U	126 U
Anthracene	164 U	**45.5 JQ**	123 U	128 U	149 U	126 U
Benzaldehyde	**27 JQ** SOL= 164 U	**30 JQ**	123 U	128 U	149 U	126 U
Benzo[b]Fluoranthene	328 U	237 U	245 U	**101 JQ**	298 U	126 U
Bis(2-ethylhexyl) phthalate	164 U	**1130**	123 U	**147**	**310**	126 U
Chrysene	164 U	**453**	123 U	**117 JQ**	149 U	126 U
Di-n-Butylphthalate	164 U	**283**	123 U	128 U	149 U	126 U
Ethanone, 1-phenyl-	**127 JQ** SOL= 164 U	**72.6 JQ**	123 U	128 U	**56.2 JQ**	126 U
Fluoranthene	164 U	**209**	**50.2 JQ**	**171**	**90.3 JQ**	126 U
Isophorone	164 U	**351**	123 U	128 U	149 U	126 U
Naphthalene	8.9 UJK (89 UAC)	**63.9 JQ**	123 U	4 UJK (0.4 UAC)	8.3 UJK (0.83 UAC)	126 U
Naphthalene, 2-methyl-	164 U	**40.4 JQ**	123 U	128 U	149 U	126 U
Phenanthrene	164 U	**168**	123 U	**99.7 JQ**	149 U	126 U
Phenol	164 U	**52.7 JQ**	123 U	128 U	149 U	126 U
Pyrene	164 U	**423**	**53.5 JQ**	**172**	**108 JQ**	126 U

Key is on the next page.

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

AC	= Adjusted concentration.
B	= Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
bgs	= Below ground surface.
H	= High bias.
J	= The analyte was positively identified. The associated numerical value is an estimate.
K	= Unknown bias.
L	= Low bias.
µg/kg	= Micrograms per kilogram.
mg/kg	= Milligrams per kilogram.
PCBs	= Polychlorinated biphenyls.
Q	= The result is below the sample quantitation limit.
SQL	= Sample quantitation limit.
SVOCs	= Semivolatile organic compounds.
VOCs	= Volatile organic compounds.
U	= The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Table 6-2a

FORMER OLD MILL BUILDING AREA
SUBSURFACE SOIL (0-4 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	00284210	00274000	00274003	00274007	00274016	00274020	00274058	00284213
Sample Location	BG03	MB01	MB02	MB03	MB04	MB05	MB08	MB09
Depth (feet bgs)	0-4	0-4	0-4	0-4	0-4	0-4	0-4	0-4
Description	BACKGROUND	FORMER OLD MILL BUILDING AREA						
VOCs (µg/kg)								
2-Butanone	37.5 U	8.4 U	8.9 U	7.7 U	8.1 U	8.2 U	**39.4**	25.3 U
2-Propanone	**170**	23.4 U	23.5 U	7.7 U	8.1 U	8.2 U	108 U	117 U
Methylene Chloride	**115**	**46.5**	**15.3**	**18**	**4.1 U**	**12**	**46.7**	**108**
Inorganics (mg/kg)								
Aluminum	**18400**	**18700**	**21200**	**22600**	**24400**	**21000**	**26900**	**23200**
Arsenic	**5.5**	**4.3**	**4 JH (2 AC)**	**5.8**	**4.2**	**3.6**	**3.5**	**4.3**
Barium	**15.6 JB** (SQL= 47.3 U)	**23.3 JB**	**26.6 JB**	**82.4**	**25.1 JB**	**17.7 JB**	**22.3 JB**	**14.5 JB**
Beryllium	**0.05 JB** (SQL= 1.18 U)	0.05 U	0.05 U	0.04 U	0.05 U	**0.26 JB**	0.05 U	**0.59 JB**
Cadmium	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	**0.22 JB**	0.12 U
Calcium	**3050**	**3170**	**10000**	**10300**	**4700**	**5270**	**5400**	**3490**
Chromium	**22.7**	**20**	**21.4**	**30.4**	**25.8**	**19.8**	**29.4**	**25**
Cobalt	**17.4**	**19.7**	**20.5**	**31.1**	**25.1**	**22.7**	**25.9**	**21.1**
Copper	**27.1**	**40**	**39.5**	**181**	**39.3**	**47.5**	**45.1**	**43.1**
Iron	**28800**	**34400**	**35500**	**53900**	**39900**	**38600**	**41100**	**40200**
Lead	**1.3**	**4.3 JK (3.0 AC)**	**8**	**30.3 JK (21.0 AC)**	**6.6 JK (4.6 AC)**	**4.2**	**6.7**	0.6 U
Magnesium	**7590**	**8430**	**9550**	**10500**	**10900**	**10600**	**11700**	**9810**
Manganese	**167**	**215**	**218**	**343**	**295**	**257**	**267**	**233**
Mercury	0.06 UJK (0.1 UAC)	0.06 U	0.06 UJK (0.03 UAC)	0.06 U	0.06 UJK (0.03 UAC)	0.06 UJK (0.03 UAC)	R	0.06 UJK (0.03 UAC)
Nickel	**33.9**	**31.6**	**31.5**	**41.1**	**46.8**	**37.2**	**48.7**	**36.7**
Potassium	**1390 JH**	**1510**	**1150 JH**	**1370**	**1150**	**1390 JH**	**1850 JH**	**1420 JH**
Selenium	**1.1 JB** (SQL= 1.2 U)	0.87 U	0.88 U	0.85 U	0.89 U	0.85 U	0.99 U	**1.2**
Silver	1.7 U	**1.2 JB**	**1.1 JB**	**1.7 JB**	**1.3 JB**	**1.9 JB**	**2 JB**	2 U
Sodium	**1310**	**2660**	**2610**	**2030**	**3710**	**3150 JH**	**2980**	**2440**
Thallium	2.5 UJK (4.7 UAC)	1.7 U	**2.3**	1.7 U	1.8 U	1.7 U	**3**	1.8 UJK (0.96 UAC)
Vanadium	**63.8**	**64.7 JL**	**71.5**	**82.4 JL**	**82.8 JL**	**79.1**	**92.8**	**77.4**
Zinc	**58**	**100**	**118**	**474**	**85.4**	**80.7**	**91.9**	**83.1**
SVOCs (µg/kg)								
9H-Carbazole	133 U	131 U	122 U	122 U	**488**	121 U	130 U	133 U
9H-Fluorene	133 U	131 U	122 U	122 U	**159**	121 U	130 U	133 U
Anthracene	133 U	131 U	122 U	122 U	**1710**	121 U	130 U	133 U
Benzo(a)anthracene	133 U	131 U	122 U	122 U	**236**	121 U	130 U	133 U
Benzo(a)pyrene	266 U	262 U	243 U	**54.7 JQ**	**160 JQ**	242 U	260 U	266 U
Benzo(g,h,i)perylene	666 U	656 U	608 U	**341 JQ**	623 U	605 U	650 U	665 U
Benzo[b]Fluoranthene	266 U	262 U	243 U	245 U	**243 JQ**	242 U	260 U	266 U
Benzo[k]fluoranthene	133 U	131 U	122 U	122 U	**113 JQ**	121 U	130 U	133 U
Bis(2-ethylhexyl) phthalate	133 U	131 U	122 U	**338**	125 U	121 U	130 U	133 U
Chrysene	133 U	131 U	122 U	**83 JQ**	**379**	121 U	130 U	133 U
Di-n-Butylphthalate	133 U	**270**	122 U	**293**	125 U	121 U	130 U	133 U
Dibenzofuran	133 U	131 U	122 U	122 U	**52.9 JQ**	121 U	130 U	133 U
Ethanone, 1-phenyl-	133 U	131 U	**42 JQ**	122 U	125 U	121 U	**130**	**52.7 JQ**
Fluoranthene	133 U	131 U	122 U	**103 JQ**	**359**	121 U	**96.4 JQ**	133 U
Indeno(1,2,3-cd)pyrene	1330 U	1310 U	1220 U	**504 JQ**	1200 U	1210 U	1300 U	1330 U
Isophorone	133 U	131 U	122 U	**1520**	125 U	121 U	130 U	133 U
Naphthalene, 2-methyl-	133 U	131 U	122 U	612 U	**52.6 JQ**	121 U	130 U	133 U
Phenanthrene	133 U	131 U	122 U	**84 JQ**	**277**	121 U	130 U	133 U
Phenol	133 U	131 U	122 U	122 U	125 U	121 U	130 U	**56.1 JQ**
Pyrene	133 U	131 U	122 U	**109 JQ**	**379**	121 U	**117 JQ**	133 U

Key is on the next page.

Note:	Bold type indicates sample concentrations above detection limits. Underlined type indicates sample result is significant as defined in Section 5.
Key:	
AC	= Adjusted concentration.
B	= Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
bgs	= Below ground surface.
H	= High bias.
J	= The analyte was positively identified. The associated numerical value is an estimate.
K	= Unknown bias.
L	= Low bias.
µg/kg	= Micrograms per kilogram.
mg/kg	= Milligrams per kilogram.
Q	= The result is below the sample quantitation limit.
R	= Rejected data.
SQL	= Sample quantitation limit.
SVOCs	= Semivolatile organic compounds.
VOCs	= Volatile organic compounds.
U	= The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Table 6-2b

FORMER OLD MILL BUILDING AREA
SUBSURFACE SOIL (4-8 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284211**	**00274001**	**00274004**	**00274008**	**00274017**	**00274021**	**00284214**
Sample Location	**BG03**	**MB01**	**MB02**	**MB03**	**MB04**	**MB05**	**MB09**
Depth (feet bgs)	**4-8**	**4-5.5**	**4-8**	**4-8**	**4-8**	**4-8**	**4-8**
Description	**BACKGROUND**	**FORMER OLD MILL BUILDING AREA**					
VOCs (µg/kg)							
2-Butanone	**49.2**	38.3	12.1 U	9.5 U	29.1 U	8.1 U	**39**
Benzene, 1,2,4-trimethyl-	6 U	**4.8 JQ**	6.1 U	4.8 U	2.9 U	4 U	2.7 UJK (0.27 UAC)
Carbon disulfide	12.1 U	10.1 U	**35.8**	7.7 U	5.8 U	8.1 U	**19**
Methylene Chloride	**18.5**	**135**	**49.1**	**45**	**25.2**	**4 U**	**54.1**
Inorganics (mg/kg)							
Aluminum	**13100**	**20300**	**21900**	**18200**	**8230**	**24000**	**17300**
Arsenic	**3.5**	**5.7**	**8.9**	**6.1**	**3.5 JH (2.0 AC)**	**4.1**	**4.2**
Barium	**14.1 JB** (SQL= 56.2 U)	**39.4 JB**	**16.6 JB**	**69.3**	**7.2 JB**	**14.9 JB**	**13.4 JB**
Beryllium	**0.14 JB** (SQL= 1.39 U)	0.08 U	0.05 U	0.05 U	0.05 U	**0.72 JB**	0.05 U
Calcium	**2280**	**4340**	**4940**	**4860**	**1800**	**4010**	**3500**
Chromium	**18**	**23.1**	**28.7**	**23.1**	**13.3**	**27**	**25.1**
Cobalt	**11 JB** (SQL= 13.9 U)	**19.9**	**23.5**	**22.1**	**7.9 JB**	**24.5**	**19.6**
Copper	**17.4**	**43**	**30.7**	**28.8**	**11.7**	**35.2**	**26.3**
Iron	**20800**	**38300**	**38600**	**3380**	**14100**	**43000**	**31100**
Lead	0.72 U	**8.3 JK (5.8 AC)**	0.71 UJK (0.49 UAC)	0.69 UJK (0.48 UAC)	0.63 U	**0.59 JB**	0.58 U
Magnesium	**5300**	**9330**	**11500**	**8940**	**3650**	**11500**	**8540**
Manganese	**112**	**236**	**195**	**167**	**74.5**	**345**	**154**
Mercury	0.07 UJK (0.1 UAC)	**0.32**	**0.26**	0.07 U	0.06 UJK (0.03 UAC)	0.06 UJK (0.03 UAC)	0.06 UJK (0.03 UAC)
Nickel	**21.7**	**35.6**	**43.4**	**36.4**	**15.9**	**36.1**	**52.6**
Potassium	**1080 JB**	**1560 JB**	**1850**	**882 JB**	**479 JB**	**1360 JH**	**1200 JH**
Selenium	1.1 U	**2**	1.1 U	1.0 U	0.94 U	0.88 U	0.88 U
Silver	1.2 U	**1.5 JB**	**1.5 JB**	**1.2 JB**	**0.66 JB**	**1.7 JB**	1.6 U
Sodium	**1250 JB**	**2960**	**1900**	**2340**	**1180 JB**	**2420 JH**	**1670**
Vanadium	**42**	**70 JL**	**85 JL**	**73.1 JL**	**26.1**	**95.2**	**60.5**
Zinc	**43.8**	**164**	**78.1**	**65.8**	**36.9**	**109**	**55.1**
PCBs (µg/kg)							
PCB-1254	**22**	18 U	20 U	17 U	17 U	16 U	17 U

Key is at the end of the table.

Table 6-2b (CONTINUED)

FORMER OLD MILL BUILDING AREA
SUBSURFACE SOIL (4-8 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	00284211	00274001	00274004	00274008	00274017	00274021	00284214
Sample Location	BG03	MB01	MB02	MB03	MB04	MB05	MB09
Depth (feet bgs)	4-8	4-5.5	4-8	4-8	4-8	4-8	4-8
Description	BACKGROUND	FORMER OLD MILL BUILDING AREA					
SVOCs (µg/kg)							
1,1'-Biphenyl	175 U	**164**	163 U	134 U	134 U	126 U	133 U
9H-Carbazole	175 U	**463**	163 U	134 U	134 U	126 U	133 U
9H-Fluorene	175 U	**969**	163 U	134 U	134 U	126 U	133 U
Acenaphthene	175 U	**942**	163 U	134 U	134 U	126 U	133 U
Anthracene	175 U	**613**	163 U	134 U	134 U	126 U	133 U
Benzo(a)anthracene	175 U	**195**	163 U	134 U	134 U	126 U	133 U
Benzo(a)pyrene	349 U	**50.1 JQ**	326 U	269 U	269 U	252 U	266 U
Benzo(g,h,i)perylene	873 U	728 U	816 U	672 U	672 U	630 U	666 U
Benzo[b]Fluoranthene	349 U	**97.6 JQ**	326 U	269 U	269 U	252 U	266 U
Benzo[k]fluoranthene	175 U	**48.8 JQ**	163 U	134 U	134 U	126 U	133 U
Bis(2-ethylhexyl) phthalate	175 U	**419**	163 U	134 U	134 U	126 U	133 U
Chrysene	175 U	**214**	163 U	134 U	134 U	126 U	133 U
Di-n-Butylphthalate	175 U	**221**	**225**	**163**	134 U	126 U	133 U
Dibenzofuran	175 U	**703**	163 U	134 U	134 U	126 U	133 U
Ethanone, 1-phenyl-	**71.9 JQ** (SQL= 175 U)	**72.7 JQ**	**69.6 JQ**	134 U	134 U	126 U	133 U
Fluoranthene	**209**	**1290**	163 U	134 U	134 U	126 U	133 U
Naphthalene	175 U	**277**	163 U	134 U	134 U	126 U	5.5 UJK (0.55 AC)
Naphthalene, 2-methyl-	175 U	**294**	163 U	134 U	134 U	126 U	133 U
Phenanthrene	**50.2 JQ** (SQL= 175 U)	**3250**	163 U	134 U	134 U	126 U	133 U
Phenol	175 U	146 U	**47.4 JQ**	134 U	134 U	126 U	133 U
Pyrene	**218**	**1070**	163 U	134 U	134 U	126 U	133 U

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

AC = Adjusted concentration.
B = Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
bgs = Below ground surface.
H = High bias.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
L = Low bias.
µg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
PCBs = Polychlorinated biphenyls.
Q = The result is below the sample quantitation limit.
SQL = Sample quantitation limit.
SVOCs = Semivolatile organic compounds.
VOCs = Volatile organic compounds.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Table 6-2c

FORMER OLD MILL BUILDING AREA
SUBSURFACE SOIL (8-12 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284212**	**00274005**	**00274009**	**00274018**	**00274022**	**00284215**
Sample Location	**BG03**	**MB02**	**MB03**	**MB04**	**MB05**	**MB09**
Depth (feet bgs)	**8-12**	**8-12**	**8-12**	**8-12**	**8-12**	**8-12**
Description	**BACKGROUND**	**FORMER OLD MILL BUILDING AREA**				
VOCs (µg/kg)						
2-Butanone	**69.9**	9.9 U	10.2 U	**32.9**	**22.3**	28.6 U
2-Propanone	319 U	47.1 U	170 U	170 U	**202 JL**	109 U
Carbon disulfide	**10.8**	**12.8**	10.2 U	**16.5**	**20.9**	**29.9**
Methylene Chloride	**64**	**45**	**17.1**	**11.3**	**18.8**	**38**
Inorganics (mg/kg)						
Aluminum	**27800**	**8840**	**7920**	**5830**	**8800**	**14500**
Arsenic	**6.2**	**4.1 JH (2.4 AC)**	**3.3**	**2.7**	**3.5**	**5**
Barium	**32.4 JB** SQL= 67.1 U	**8.2 JB**	**6.7 JB**	**7.2 JB**	**9.2 JB**	**9.8 JB**
Beryllium	0.07 U	0.05 U	0.05 U	0.05 U	0.05 U	**0.39 JB**
Cadmium	**0.19 JB** SQL= 1.68 U	0.13 U	0.12 U	0.13 U	0.12 U	0.13 U
Calcium	**5810**	**1930**	**2090**	**1390**	**2170**	**2740**
Chromium	**35.1**	**12.2**	**12**	**10.1**	**14.7**	**17.2**
Cobalt	**28**	**8.8 JB**	**9.4 JB**	**7 JB**	**9.4 JB**	**14**
Copper	**54.6**	**11**	**12.2**	**7.6**	**13.6**	**21**
Iron	**45300**	**14600**	**14700**	**10800**	**15500**	**24900**
Lead	**5.6**	0.67 U	**0.76 JK (0.53 AC)**	**0.96 JK (0.67 AC)**	0.64 U	0.66 U
Magnesium	**12900**	**3990**	**3650**	**2790**	**4270**	**6400**
Manganese	**300**	**78.2**	**77.2**	**62.2**	**92**	**112**
Mercury	0.09 UJK (0.2 UAC)	0.07 UJK (0.04 UAC)	0.06 U	0.06 UJK (0.03 UAC)	**0.08 JB**	0.07 U
Nickel	**48.3**	**15.2**	**15**	**14.1**	**18.3**	**22.3**
Potassium	**2870 JH**	**691 JB**	**431 JB**	**502 JB**	**792 JB**	**1170 JB**
Selenium	1.3 U	1 U	0.95 U	1 U	0.96 U	0.99 U
Silver	2.5 U	**0.66 JB**	**0.68 JB**	0.46 U	0.81 U	1.5 U
Sodium	**6450**	**1450**	**927 JB**	**795 JB**	**1020 JB**	**1410**
Thallium	2.6 UJK (4.8 UAC)	**2.2 JB**	1.9 U	2 U	1.9 U	2 UJK (1 AC)
Vanadium	**103**	**27.7**	**30.3 JL**	**22.4 JL**	**32.1**	**47**
Zinc	**100**	**32.1**	**28.7**	**26.8**	**33**	**47.5**
PCBs (µg/kg)						
PCB-1254	**28**	15 U	17 U	18 U	17 U	18 U

Key is at the end of the table.

Table 6-2c (CONTINUED)

FORMER OLD MILL BUILDING AREA
SUBSURFACE SOIL (8-12 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284212**	**00274005**	**00274009**	**00274018**	**00274022**	**00284215**
Sample Location	**BG03**	**MB02**	**MB03**	**MB04**	**MB05**	**MB09**
Depth (feet bgs)	**8-12**	**8-12**	**8-12**	**8-12**	**8-12**	**8-12**
Description	**BACKGROUND**	**FORMER OLD MILL BUILDING AREA**				
SVOCs (µg/kg)						
Benzaldehyde	**55.2 JQ** (SQL= 175 U)	124 U	139 U	142 UJK (14.2 UAC)	135 U	140 U
Benzo(a)anthracene	**93.8 JQ** (SQL= 175 U)	124 U	139 U	142 U	135 U	140 U
Benzo[b]Fluoranthene	**118 JQ** (SQL= 350 U)	248 U	279 U	285 U	270 U	281 U
Chrysene	**138 JQ** (SQL= 175 U)	124 U	139 U	142 U	135 U	140 U
Di-n-Butylphthalate	175 U	**241**	139 U	142 U	135 U	140 U
Ethanone, 1-phenyl-	**191**	124 U	139 U	142 U	135 U	140 U
Fluoranthene	**398**	124 U	139 U	142 U	135 U	140 U
Phenanthrene	**104 JQ** (SQL= 175 U)	124 U	139 U	142 U	135 U	140 U
Phenol	**67.4 JQ** (SQL= 175 U)	124 U	139 U	142 U	135 U	140 U
Pyrene	**419**	124 U	139 U	142 U	135 U	140 U

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

AC = Adjusted concentration.
B = Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
bgs = Below ground surface.
H = High bias.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
L = Low bias.
µg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
PCBs = Polychlorinated biphenyls.
Q = The result is below the sample quantitation limit.
SQL = Sample quantitation limit.
SVOCs = Semivolatile organic compounds.
VOCs = Volatile organic compounds.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Table 6-3

GROUNDWATER ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARBALDI, OREGON

Regional Tracking Number	00284217	00274006	00274023	00274030	00274062	00274122	00274123	00274124
Sample Location	MB09	MB02	MB05	PS01	OB01	DS01	DS03	DS05
Description	BACKGROUND	MILL BUILDING		POWER STATION	OFFICE BUILDING	DREDGE SPOILS		
VOCs (µg/L)								
1,2-Dichloroethane	1 U	4 U	4.5 U	6.2 U	4.1 U	**3.4**	**3.7**	**5.1**
Benzene	1 U	1 U	1 U	1 U	**4.3**	1 U	1 U	1 U
Carbon disulfide	2 U	**5.4**	**3.3**	2 U	**3**	2 U	2 U	2 U
Inorganics (µg/L)								
Aluminum	**11100**	**2950**	**7560**	**148 JB**	**299**	**3530**	**2960**	**43.2 JB**
Arsenic	**9.8 JB** SQL= 10 U	5.6 U	5.6 U	5.6 U	5.6 U	5.6 U	5.6 U	5.6 U
Barium	**49.3 JB** SQL= 200 U	**4.9 JB**	**10.6 JB**	**16.3 JB**	**7.5 JB**	**14.1 JB**	**30.9 JB**	**31.4 JB**
Calcium	**21200 JL**	**25000 JL**	**64100 JL**	**145000 JL**	**64300 JL**	**61200 JL**	**139000 JL**	**122000 JL**
Chromium	**17.9 JL (23.3 AC)**	**7.8 JB**	**9.7 JB**	**1.7 JB**	**1.9 JB**	**2.6 JB**	**1.9 JB**	1.5 UJK
Cobalt	**7.5 JB** SQL= 50 U	1.7 UJK (1.3 UAC)	**5.2 JB**	1.7 UJK (1.3 UAC)	1.7 UJK (1.3 UAC)	1.7 UJK (1.3 UAC)	1.7 UJK (1.3 UAC)	1.7 UJK (1.3 UAC)
Copper	**56.1**	**15 JB**	**21.5 JB**	**19.2 JB**	**9.2 JB**	**18.5 JB**	**14.2 JB**	**12 JB**
Iron	**17200 JL**	**12600 JL**	**16800 JL**	**24800 JL**	**41200 JL**	**3730 JL**	**2830 JL**	**441 JL**
Lead	**3.2 JL (4.2 AC)**	2.6 UJK (2 UAC)	2.6 UJK (2 UAC)	2.6 UJK (2 UAC)	2.6 UJK (2 UAC)	2.6 UJK	2.6 UJK	2.6 UJK
Magnesium	**13900 JL**	**21700 JL**	**35400 JL**	**111000 JL**	**61700 JL**	**174000 JL**	**435000 JL**	**315000 JL**
Manganese	**112 JL (143 AC)**	**198 JL**	**440 JL**	**2250 JL**	**1980 JL**	**68.5 JL**	**117 JL**	**114 JL**
Mercury	0.1 UJK (0.15 UAC)	0.1 UJK (0.07 UAC)	0.1 UJK (0.07 UAC)	**0.2 JB**	0.1 UJK (0.07 UAC)	**0.24 JL**	0.1 UJK (0.07 UAC)	0.63 JL (0.42 UAC)
Nickel	**17.7 JB** SQL= 40 U	**7.4 JB**	**13.1 JB**	**4.6 JB**	**7.7 JB**	**4.9 JB**	**3.8 JB**	**1.9 JB**
Potassium	**21100**	**19700**	**26700**	**77700**	**45400**	**139000**	**344000**	**222000**
Selenium	**4.5 JB** SQL= 5 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U
Silver	1.8 U	1.8 U	1.8 U	1.8 U	2 JB	1.8 U	1.8 U	1.8 U
Sodium	**166000**	**192000**	**68700**	**774000**	**199000**	**2590000**	**6350000**	**7240000**
Thallium	7.8 U	7.8 U	7.8 U	7.8 U	7.8 U	7.8 U	**9.2 JB**	7.8 U
Vanadium	**56.8 JL (71 AC)**	**9 JB**	**25.2 JB**	**5.4 JB**	**2.8 JB**	**13.7 JB**	**11.5 JB**	**2.4 JB**
Zinc	**55.8 JL (72.0 AC)**	**35.1 JL**	**46.3 JL**	**18.3 JB**	**27.3 JL**	**21.4 JL**	**17.9 JB**	**14.7 JB**
SVOCs (µg/L)								
Benzaldehyde	0.32 U	**0.3 JQ**	0.35 U	0.34 U	0.34 U	0.34 U	0.35 U	0.36 U
Bis(2-ethylhexyl) phthalate	1.5 U	**8.3**	**82.2**	**92.7**	**11.6**	1.7 U	1.8 U	1.8 U
Butylbenzylphthalate	0.32 U	**0.38**	0.35 U	0.34 U	0.34 U	0.34 U	0.35 U	0.36 U
Diethyl phthalate	0.32 U	**0.58**	0.35 U	0.34 U	0.34 U	0.34 U	0.35 U	0.36 U
Phenol	0.32 U	0.34 U	0.35 U	0.34 U	**0.43**	0.34 U	0.35 U	0.36 U

Key is on the next page.

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

AC = Adjusted concentration.
B = Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
L = Low bias.
µg/L = Micrograms per liter.
mg/L = Milligrams per liter.
Q = The result is below the sample quantitation limit.
SQL = Sample quantitation limit.
SVOCs = Semivolatile organic compounds.
VOCs = Volatile organic compounds.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Table 6-4

FORMER POWER STATION AREA
SURFACE SOIL ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00274134**	**00274031**
Sample Location	**BG02**	**PS01**
Depth (feet bgs)	**0-0.5**	**0-0.5**
Description	**BACKGROUND**	**FORMER POWER STATION AREA**
VOCs (µg/kg)		
Methylene Chloride	8.9 U	**20.3**
Inorganics (mg/kg)		
Aluminum	**35000**	**29900**
Arsenic	**2.7**	**6.9**
Barium	**73.5**	**32.2 JB**
Calcium	**7640**	**5570**
Chromium	**34.2**	**34.5**
Cobalt	**37.6**	**30.1**
Copper	**61.6**	**77.8**
Iron	**60400**	**49800**
Lead	**7.2**	**14.1**
Magnesium	**14500**	**14000**
Manganese	**742**	**298**
Nickel	**130**	**60.1**
Potassium	**650 JB**	**2290 JH**
Silver	**2.7 JB** SQL= 2.7 U	**2.3**
Sodium	**1770 JH**	**5440 JH**
Thallium	2.1 U	**2.6**
Vanadium	**142**	**109**
Zinc	**89.1**	**160**
SVOCs (µg/kg)		
Benzaldehyde	**27 JQ** SQL= 164 U	144 U
Di-n-Butylphthalate	164 U	**306**
Ethanone, 1-phenyl-	**127 JQ** SQL= 164 U	144 U
Fluoranthene	164 U	**102 JQ**
Phenanthrene	164 U	**69.8 JQ**
Pyrene	164 U	**107 JQ**

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

B = Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
bgs = Below ground surface.
H = High bias.
J = The analyte was positively identified. The associated numerical value is an estimate.
µg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
Q = The result is below the sample quantitation limit.
SQL = Sample quantitation limit.
SVOCs = Semivolatile organic compounds.
VOCs = Volatile organic compounds.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Table 6-5a

FORMER POWER STATION AREA
SUBSURFACE SOIL (0-4 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	00284210	00274024	00274027	00274032	00274040	00274047	00274050
Sample Location	BG03	PS01	PS02	PS03	PS04	PS05	PS06
Depth (feet bgs)	0-4	0-4	0-4	0-4	0-4	0-4	0-4
Description	BACKGROUND	FORMER POWER STATION AREA					
VOCs (µg/kg)							
2-Butanone	37.5 U	115	84.5	21.4 U	90.7	169	27.7 U
2-Propanone	170	629 JL	377 U	287 U	552 U	169 U	27.7 U
Carbon disulfide	7.5 U	26.7	15.6	21.4 U	26.8	15	5.5 U
Methylene Chloride	115	14.2	19.5	63.4	60.4	59	5.5 U
Inorganics (mg/kg)							
Aluminum	18400	25900	30800	27300	23800	31100	27200
Arsenic	5.5	7.2	5.7	4.9	8.7	5.8	6.4
Barium	15.6 JB SQL= 47.3 U	56.4	51 JB	167	281	33.1 JB	33 JB
Beryllium	0.05 JB SQL= 1.18 U	0.94 JB	0.38 U	0.06 U	0.06 U	0.07 U	1.1 JB
Cadmium	0.12 U	0.13 U	0.22 JB	0.14 U	0.15 U	0.26 JB	0.18 JB
Calcium	3050	8150	15000	18300	43900	6020	5110
Chromium	22.7	33.5	44.5	35.9	47.4	35.8	26.6
Cobalt	17.4	23.3	29.2	25.1	28.1	29.3	25.3
Copper	27.1	56.1	71.9	76.6	389	64.1	61.8
Iron	28800	50800	52000	44500	68200	47100	53400
Lead	1.3	11.8	26.3	5.9	4060	18.6	8.9
Magnesium	7590	11200	15100	13000	11200	13400	10600
Manganese	167	313	416	702	527	319	322
Mercury	0.06 UJK (0.1 UAC)	0.07 U	0.23	0.07 UJK (0.04 UAC)	R	R	0.06 UJK (0.03 UAC)
Nickel	33.9	55	69.3	50.3	54.4	53.6	43.2
Potassium	1390 JH	2390 JH	2810 JH	2610 JH	2040 JH	2660 JH	1480 JH
Selenium	1.1 JB SQL= 1.2 U	1 U	1.2 U	1.1 U	1.2 U	1.3 U	1.7
Silver	1.7 U	2.6 JB	2.2 JB	2.3 JB	3.2	2.4 JB	2.5
Sodium	1310	4400 JH	10200 JH	4690 JH	4850	7160	2610
Thallium	2.5 UJK (4.7 UAC)	2.3 JB	2.4 U	2.2 U	2.3 U	4.1	1.8 UJK (0.96 UAC)
Vanadium	63.8	94.4	112	94.6	91.5	113	115
Zinc	58	129	241	129	601	106	233
PCBs (µg/kg)							
PCB-1254	17 U	18 U	22 U	30	1500	24 U	55
SVOCs (µg/kg)							
1,1'-Biphenyl	133 U	140 U	174 U	68.4 JQ	218 U	192 U	129 U
9H-Carbazole	133 U	140 U	77 JQ	206 U	218 U	192 U	129 U
Benzaldehyde	133 U	41.9 JQ	174 U	73.4 JQ	84.4 JQ	75.3 JQ	129 U
Benzo(a)anthracene	133 U	70.6 JQ	130 JQ	206 U	218 U	192 U	129 U
Benzo(a)pyrene	266 U	140 U	349	413 U	435 U	383 U	258 U
Benzo(g,h,i)perylene	666 U	701 U	699 JQ	1030 U	1090 U	959 U	644 U
Benzo[b]Fluoranthene	266 U	105 JQ	762	413 U	435 U	383 U	258 U
Benzo[k]fluoranthene	133 U	140 U	312	206 U	218 U	192 U	129 U
Chrysene	133 U	121 JQ	626	206 U	218 U	192 U	129 U
Di-n-Butylphthalate	133 U	193	175	267	218 U	192 U	129 U
Dibenzofuran	133 U	140 U	174 U	54.7 JQ	218 U	192 U	129 U
Ethanone, 1-phenyl-	133 U	141	174 U	62.6 JQ	80.2 JQ	324	67.2 JQ
Fluoranthene	133 U	283	1380	126 JQ	137 JQ	118 JQ	103 JQ
Indeno(1,2,3-cd)pyrene	1330 U	1400 U	980 JQ	2060 U	2180 U	1920 U	1290 U
Naphthalene	133 U	89.4 JQ	159 JQ	10.7 UJK (1.07 UAC)	8 UJK (0.8 UAC)	14.8 UJK (1.48 UAC)	5.5 UJK (0.55 UAC)
Naphthalene, 2-methyl-	133 U	140 U	44.3 JQ	104 JQ	218 U	192 U	129 U
Phenanthrene	133 U	147	857	138 JQ	80.2 JQ	77.2 JQ	84.7 JQ
Phenol	133 U	140 U	174 U	206 U	218 U	85.8 JQ	43.8 JQ
Pyrene	133 U	291	1150	119 JQ	149 JQ	128 JQ	107 JQ

Key is on the next page.

Note: Bold type indicates sample concentrations above detection limits.

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K = Unknown bias.
L = Low bias.
µg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
PCBs = Polychlorinated biphenyls.
SQL = Sample quantitation limit.
SVOCs = Semivolatile organic compounds.
Q = Result is below the sample quantitation limit.
R = Rejected data.
VOCs = Volatile organic compounds.
U = The analyte was analyzed for but was not detected. The associated result is the sample quantitation limit.

Table 6-5b

FORMER POWER STATION AREA
SUBSURFACE SOIL (4-8 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	00284211	00274025	00274028	00274033	00274041	00274048	00274051
Sample Location	BG03	PS01	PS02	PS03	PS04	PS05	PS06
Depth (feet bgs)	4-8	4-8	4-8	4-8	4-8	4-8	4-8
Description	BACKGROUND	FORMER POWER STATION AREA					
VOCs (µg/kg)							
2-Butanone	**49.2**	**24**	8 U	10.1 UJK (1.01 UAC)	33.3 U	61 U	33.9 U
Benzene, (1-methylethyl)-	6 U	4.6 U	4 U	R	16.6 UJK (1.66 UAC)	30.5 UJK (3.05 UAC)	**104 JH (10.4 AC)**
Benzene, 1,3,5-trimethyl-	6 U	4.6 U	4 U	R	3.3 UJK (0.33 UAC)	6.1 UJK (0.61 UAC)	**40.7 JH (4.07 AC)**
Benzene, 1-methyl-4-(1-methylethyl)-	6 U	4.6 U	4 U	R	4 UJK (0.4 UAC)	7.3 UJK (0.73 UAC)	**75.1 JH (7.51 AC)**
Benzene, propyl-	6 U	4.6 U	4 U	R	3.3 UJK (0.33 UAC)	6.1 UJK (0.61 UAC)	**44.1 JH (4.41 AC)**
Carbon disulfide	12.1 U	**15.6**	4 U	10.1 UJK (1.01 UAC)	**9.5**	12.2 U	6.8 U
Methane, trichloro-	3 U	2.3 U	2 U	2.5 UJK (0.25 UAC)	3.3 U	6.1 U	**19**
Methylene Chloride	**18.5**	4.6 U	4 U	**12.8 JH (1.28 AC)**	**46.4**	**59.1**	**17.2**
sec-Butylbenzene	6 U	4.6 U	4 U	R	3.3 UJK (0.33 UAC)	6.1 UJK (0.61 UAC)	**92.6 JH (9.26 AC)**
Toluene	3 U	2.3 U	2 U	R	3.3 UJK (0.33 UAC)	6.1 UJK (0.61 UAC)	**6.8 JH (0.68 AC)**
Inorganics (mg/kg)							
Aluminum	**13100**	**17900**	**15900**	**23200**	**20900**	**19200**	**17500**
Arsenic	**3.5**	**5.6**	**3.4**	**2.5 JB**	**8.9**	**4.7**	**4**
Barium	**14.1 JB** SQL= 56.2 U	**38.9 JB**	**99.5**	**501**	**42.5 JB**	**79.8**	**75.7**
Beryllium	**0.14 JB** SQL= 1.39 U	0.17 U	0.04 U	**0.44 JB**	0.05 U	0.08 U	**0.71 JB**
Cadmium	0.14 U	0.13 U	0.11 U	**0.35 JB**	0.13 U	0.2 U	0.12 U
Calcium	**2280**	**4170**	**9920**	**56300**	**8630**	**5710**	**3880**
Chromium	**18**	**24.4**	**23.4**	**39.1**	**25.6**	**22.8**	**26.2**
Cobalt	**11 JB** SQL= 13.94	**16.5**	**16.9**	**18.1**	**20.8**	**18.5 JB**	**21.3**
Copper	**17.4**	**32.9**	**36.9**	**156**	**52.6**	**58.9**	**52.4**
Iron	**20800**	**28600**	**28400**	**46300**	**37800**	**30800**	**33000**
Lead	0.72 U	**16.9**	**18.5**	**17.8**	**30.3**	**64.1**	**45.8**
Magnesium	**5300**	**7190**	**7210**	**15200**	**9050**	**7670**	**7160**
Manganese	**112**	**222**	**291**	**1740**	**278**	**269**	**246**
Mercury	0.07 UJK (0.1 UAC)	0.07 U	0.06 U	0.07 UJK (0.04 UAC)	**0.09 JB**	R	0.06 UJK (0.03 UAC)
Nickel	**21.7**	**30**	**33.5**	**52**	**45.9**	**32.6**	**40.2**
Potassium	**1080 JB**	**1520 JH**	**1180 JH**	**7500 JH**	**2160 JH**	**1670 JB**	**1170 JB**
Silver	1.2 U	**1.4 JB**	**1.3 JB**	**2.5 JB**	**1.8 JB**	**1.5 JB**	**1.6 JB**
Sodium	**1250 JB**	**3440 JH**	**2940 JH**	**10600 JH**	**3630**	**5680**	**1510**

Key is at the end of the table.

Table 6-5b (CONTINUED)

FORMER POWER STATION AREA
SUBSURFACE SOIL (4-8 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284211**	**00274025**	**00274028**	**00274033**	**00274041**	**00274048**	**00274051**
Sample Location	**BG03**	**PS01**	**PS02**	**PS03**	**PS04**	**PS05**	**PS06**
Depth (feet bgs)	**4-8**	**4-8**	**4-8**	**4-8**	**4-8**	**4-8**	**4-8**
Description	**BACKGROUND**	**FORMER POWER STATION AREA**					
Inorganics (mg/kg)							
Thallium	3.7 UJK (6.9 UAC)	**2.9**	1.7 U	2.2 U	2 U	**3.3 JB**	**2.1 JB**
Vanadium	**42**	**71.5**	**61.6**	**45.9**	**74.7**	**65.5**	**63.1**
Zinc	**43.8**	**83.5**	**314**	**162**	**91**	**131**	**200**
PCBs (µg/kg)							
PCB-1254	**22**	17 U	15 U	19 U	19 U	22 U	17 U
PCB-1260	22 U	17 U	15 U	19 U	19 U	22 U	**1900**
SVOCs (µg/kg)							
1,1'-Biphenyl	175 U	135 U	121 U	**71.2 JQ**	155 U	174 UJK (17.4 UAC)	**91.6 JQ**
4-Methylphenol	175 U	135 U	121 U	**118 JQ**	155 U	**154 JQ**	**367**
9H-Fluorene	175 U	135 U	121 U	150 UJK (15 UAC)	155 U	174 UJK (17.4 UAC)	**63.4 JQ**
Acenaphthene	175 U	135 U	121 U	150 UJK (32 UAC)	155 U	174 UJK (37.2 UAC)	**87.7 JQ**
Acenaphthylene	175 U	135 U	121 U	150 UJK (15 UAC)	155 U	174 UJK (17.4 UAC)	**148**
Benzaldehyde	175 U	**44.7 JQ**	121 U	**624**	155 U	**162 JQ**	137 U
Benzo(a)pyrene	349 U	270 U	**70 JQ**	300 UJK (30 UAC)	310 U	348 UJK (34.8 UAC)	273 U
Benzo(g,h,i)perylene	873 U	675 U	**402 JQ**	751 UJK (75.1 UAC)	776 U	871 UJK (87.1 UAC)	683 U
Benzo[b]Fluoranthene	349 U	270 U	**116 JQ**	300 UJK (30 UAC)	310 U	348 UJK (34.8 UAC)	273 U
Benzo[k]fluoranthene	175 U	135 U	**58.7 JQ**	150 UJK (15 UAC)	155 U	174 UJK (17.4 UAC)	137 U
Bis(2-ethylhexyl) phthalate	175 U	135 U	121 U	150 UJK (15 UAC)	155 U	174 UJK (17.4 UAC)	**468**
Di-n-Butylphthalate	175 U	135 U	**160**	**292 JL**	155 U	82.2 UJK (8.22 UAC)	137 U
Dibenzofuran	175 U	135 U	121 U	150 UJK (15 UAC)	155 U	174 UJK (17.4 UAC)	**69.6 JQ**
Ethanone, 1-phenyl-	**71.9 JQ** SQL= 175 U	**254**	**88.1 JQ**	**174**	155 U	**222**	**2080**
Fluoranthene	**209**	**111 JQ**	**211**	150 UJK (15 UAC)	**121 JQ**	174 UJK (17.4 UAC)	**356**
Naphthalene	175 U	**79.4 JQ**	**60.6 JQ**	**235 JL**	6.6 UJK (0.66 UAC)	12.2 UJK (1.22 UAC)	6.8 UJK (0.68 UAC)
Naphthalene, 2-methyl-	175 U	135 U	121 U	**79.2 JQ**	155 U	**54.2 JQ**	**1330**
Phenanthrene	**50.2 JQ** SQL= 175 U	**82.7 JQ**	**120 JQ**	150 UJK (15U AC)	**122 JQ**	174 UJK (17.4 UAC)	**488**
Phenol	175 U	**81.6 JQ**	121 U	**141 JQ**	155 U	**72.2 JQ**	137 U
Pyrene	**218**	**125 JQ**	**178**	150 UJK (13 UAC)	**140 JQ**	174 UJK (14.7 UAC)	**540**

Key is on the next page.

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

AC = Adjusted concentration.
B = Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
bgs = Below ground surface.
H = High bias.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
L = Low bias.
µg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
PCBs = Polychlorinated biphenyls.
Q = Result is below the sample quantitation limit.
R = Rejected data.
SQL = Sample quantitation limit.
SVOCs = Semivolatile organic compounds.
VOCs = Volatile organic compounds.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Table 6-5c

FORMER POWER STATION AREA
SUBSURFACE SOIL (8-12 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284212**	**00274026**	**00274029**	**00274019**	**00274042**	**00274049**	**00274052**
Sample Location	**BG03**	**PS01**	**PS01**	**PS02**	**PS04**	**PS05**	**PS06**
Depth (feet bgs)	**8-12**	**8-12**	**12-16**	**8-12**	**8-12**	**8-12**	**8-12**
Description	**BACKGROUND**	**FORMER POWER STATION AREA**					
VOCs (µg/kg)							
2-Butanone	**69.9**	8.9 U	**21.8**	**39.0**	52 U	54.9 U	27.3 U
Benzene, 1-methyl-4-(1-methylethyl)-	4.4 UJK (44 UAC)	4.4 U	4.5 U	**19.7**	R	6.6 UJK (0.66 UAC)	3.3 U
Benzene, propyl-	3.7 UJK (37 UAC)	4.4 U	4.5 U	**2.6 JQ**	R	5.5 UJK (0.55 UAC)	2.7 U
Carbon disulfide	**10.8**	8.9 U	**20.4**	12.1 U	10.4 U	**19.4**	**39.8**
Methylene Chloride	**64**	**11.2**	**19.2**	**22.0**	**56.3**	**51.2**	**27.8**
n-Butylbenzene	3.7 UJK (37 UAC)	4.4 U	4.5 U	**37.6**	R	5.5 UJK (0.55 UAC)	2.7 U
sec-Butylbenzene	3.7 UJK (37 UAC)	4.4 U	4.5 U	**30.0**	R	5.5 UJK (0.55 UAC)	2.7 U
Inorganics (mg/kg)							
Aluminum	**27800**	**17500**	**31100**	**9860**	**5310**	**6080**	**4810**
Arsenic	**6.2**	**2.4**	**4.6**	**2.7 JH (1.55 AC)**	**4.6**	**5.5**	**4.3**
Barium	**32.4 JB** SQL= 67.1 U	**18.7 JB**	**15.3 JB**	**51.6**	**29 JB**	**13 JB**	**8.7 JB**
Beryllium	0.07 U	0.05 U	0.23 U	0.05 U	0.05 U	**0.11 JB**	**0.25 JB**
Cadmium	**0.19 JB** SQL= 1.68 U	0.12 U	0.13 U	0.12 U	0.12 U	0.13 U	0.13 U
Calcium	**5810**	**3860**	**5190**	**2960**	**3100**	**1470**	**963 JB**
Chromium	**35.1**	**21.4**	**35.3**	**14.0**	**9.1**	**11.6**	**10.2**
Cobalt	**28**	**19.8**	**30.8**	**9.7 JB**	**5.5 JB**	**6 JB**	**4 JB**
Copper	**54.6**	**23.8**	**48.8**	**18.0**	**9.1**	**11.5**	**8.2**
Iron	**45300**	**32100**	**46900**	**17700**	**9840**	**12000**	**9190**
Lead	**5.6**	0.6 U	0.66 U	**4.4**	**3.9**	**3**	**1.6**
Magnesium	**12900**	**8110**	**14200**	**3680**	**2180**	**2610**	**1850**
Manganese	**300**	**169**	**250**	**140**	**119**	**67.4**	**48.4**
Nickel	**48.3**	**35.3**	**64.1**	**13.7**	**8.2 JB**	**9.8 JB**	**6.9 JB**
Potassium	**2870 JH**	**1450 JH**	**2170 JH**	**1000 JB**	**589 JB**	**760 JB**	**635 JB**
Silver	2.54 U	1.8 U	**2.1 JB**	**0.76 JB**	**0.69 JB**	**0.72 JB**	**0.58 JB**
Sodium	**6450**	**3300 JH**	**3820 JH**	**2210**	**1290**	**1210 JB**	**528 JB**
Vanadium	**103**	**67.5**	**99.6**	**40.1**	**21**	**33.1**	**20.7**
Zinc	**100**	**61.5**	**81.6**	**162**	**28.9**	**32.9**	**27.1**
PCBs (µg/kg)							
PCB-1254	**28**	17 U	21 U	17 U	17 U	18 U	18 U

Key is at the end of the table.

Table 6-5c (CONTINUED)

FORMER POWER STATION AREA
SUBSURFACE SOIL (8-12 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284212**	**00274026**	**00274029**	**00274019**	**00274042**	**00274049**	**00274052**
Sample Location	**BG03**	**PS01**	**PS01**	**PS02**	**PS04**	**PS05**	**PS06**
Depth (feet bgs)	**8-12**	**8-12**	**12-16**	**8-12**	**8-12**	**8-12**	**8-12**
Description	**BACKGROUND**	**FORMER POWER STATION AREA**					
SVOCs (µg/kg)							
4-Methylphenol	175 U	133 U	168 U	136 U	**117 JQ**	144 U	141 U
9H-Fluorene	175 U	133 U	168 U	**107 JQ**	140 U	144 U	141 U
Benzaldehyde	**55.2 JQ** SQL= 175 U	133 U	168 U	136 U	140 U	144 U	141 U
Benzo(a)anthracene	**93.8 JQ** SQL= 175 U	133 U	168 U	136 U	140 U	144 U	141 U
Benzo[b]Fluoranthene	**118 JQ** SQL= 350 U	267 U	336 U	271 U	279 U	287 U	282 U
Bis(2-ethylhexyl) phthalate	175 U	**250**	168 U	136 U	140 U	144 U	141 U
Chrysene	**138 JQ** SQL= 175 U	133 U	168 U	**85.3 JQ**	140 U	144 U	141 U
Di-n-Butylphthalate	175 U	**779**	**303**	136 U	140 U	144 U	141 U
Ethanone, 1-phenyl-	**191**	**41.2 JQ**	**65 JQ**	136 U	140 U	**51.4 JQ**	141 U
Fluoranthene	**398**	133 U	168 U	**68.0 JQ**	140 U	144 U	141 U
Naphthalene	7.4 UJK (74 UAC)	133 U	168 U	136 U	**81.9 JQ**	11 UJK (1.1 UAC)	141 U
Phenanthrene	**104 JQ** SQL= 175 U	133 U	168 U	136 U	140 U	144 U	141 U
Phenol	**67.4 JQ** SQL= 175 U	133 U	168 U	136 U	140 U	144 U	141 U
Pyrene	**419**	133 U	168 U	**63.6 JQ**	140 U	144 U	141 U

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

AC = Adjusted concentration.
B = Associated sample result is greater than instrument detection limit, but less than SQL.
bgs = Below ground surface.
H = High bias.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
µg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
PCBs = Polychlorinated biphenyls.
Q = Result is below the sample quantitation limit.
R = Rejected data.
SQL = Sample quantitation limit.
SVOCs = Semivolatile organic compounds.
VOCs = Volatile organic compounds.
U = The analyte was analyzed for but was not detected. The result is the SQL.

Table 6-6

FORMER LOG POLE STORAGE AREA
SURFACE SOIL ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00274134**	**00274014**
Sample Location	**BG02**	**LS01**
Depth (feet bgs)	**0-0.5**	**0-0.5**
Description	**BACKGROUND**	**FORMER LOG POLE STORAGE AREA**
VOCs (µg/kg)		
1,2,3-Trichloropropane	4.5 UJK (45 UAC)	**36 JH** **(3.6 AC)**
Ethylbenzene	8.9 UJK (89 UAC)	**3.9 JH** **(0.39 AC)**
Methylene Chloride	8.9 U	**21.6**
o-Xylene	22.4 UJK (224 UAC)	**5.8 JH** **(0.58 AC)**
Toluene	4.5 UJK (45 UAC)	**6.6 JH** **(0.66 AC)**
Inorganics (mg/kg)		
Aluminum	**35000**	**31700**
Arsenic	**2.7**	**5.5**
Barium	**73.5**	**75.7**
Calcium	**7640**	**5230**
Chromium	**34.2**	**34.6**
Cobalt	**37.6**	**29**
Copper	**61.6**	**61.6**
Iron	**60400**	**50500**
Lead	**7.2**	**4.6**
Magnesium	**14500**	**13700**
Manganese	**742**	**294**
Nickel	**130**	**56.2**
Potassium	**650 JB**	**2160 JH**
Selenium	1 U	**0.86 JB**
Silver	**2.7 JB** SQL= 2.7 U	**2.1 JB**
Sodium	**1770 JH**	**3950 JH**
Thallium	2.1 U	**2 JB**
Vanadium	**142**	**117**
Zinc	**89.1**	**101**
SVOCs (µg/kg)		
Benzaldehyde	**27 JQ** SQL= 164 U	122 U
Benzo[b]Fluoranthene	328 U	**60.6 JQ**
Bis(2-ethylhexyl) phthalate	164 U	**178**
Chrysene	164 U	**69.9 JQ**
Ethanone, 1-phenyl-	**127 JQ** SQL= 164 U	122 U
Fluoranthene	164 U	**191**
Phenanthrene	164 U	**124**
Pyrene	164 U	**162**

Key is on the next page.

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

AC = Adjusted concentration.
B = Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
bgs = Below ground surface.
H = High bias.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
µg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
Q = The result is below the sample quantitation limit.
SQL = Sample quantitation limit.
SVOCs = Semivolatile organic compounds.
VOCs = Volatile organic compounds.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Table 6-7a

FORMER LOG POLE STORAGE AREA
SUBSURFACE SOIL (0-4 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284210**	**00274011**
Sample Location	**BG03**	**LS01**
Depth (feet bgs)	**0-4**	**0-4**
Description	**BACKGROUND**	**FORMER LOG POLE STORAGE AREA**
VOCs (µg/kg)		
2-Propanone	**170**	28.5 UJK (2.85 UAC)
Carbon disulfide	7.5 U	**10.5**
Methylene Chloride	**115**	**32.4**
Inorganics (mg/kg)		
Aluminum	**18400**	**31600**
Arsenic	**5.5**	**5.1**
Barium	**15.6 JB** SQL= 47.3 U	**21.3 JB**
Beryllium	**0.05 JB** SQL= 1.18 U	0.27 U
Calcium	**3050**	**5500**
Chromium	**22.7**	**30.9**
Cobalt	**17.4**	**30.7**
Copper	**27.1**	**54.9**
Iron	**28800**	**50500**
Lead	**1.3**	**2**
Magnesium	**7590**	**14500**
Manganese	**167**	**334**
Nickel	**33.9**	**57.9**
Potassium	**1390 JH**	**2300 JH**
Selenium	**1.1 JB** SQL= 1.2 U	0.95 U
Silver	1.7 U	**2.3 JB**
Sodium	**1310**	**5970 JH**
Vanadium	**63.8**	**108**
Zinc	**58**	**88.4**
SVOCs (µg/kg)		
Fluoranthene	133 U	**48 JQ**
Pyrene	133 U	**54.2 JQ**

Key is on the next page.

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

AC	= Adjusted concentration.
B	= Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
bgs	= Below ground surface.
H	= High bias.
J	= The analyte was positively identified. The associated numerical value is an estimate.
K	= Unknown bias.
µg/kg	= Micrograms per kilogram.
mg/kg	= Milligrams per kilogram.
Q	= The result is below the sample quantitation limit.
SQL	= Sample quantitation limit.
SVOCs	= Semivolatile organic compounds.
VOCs	= Volatile organic compounds.
U	= The analyte was analyzed for, but was not detected. The associated numerical value is the SQL.

Table 6-7b

FORMER LOG POLE STORAGE AREA
SUBSURFACE SOIL (4-8 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284211**	**00274012**
Sample Location	**BG03**	**LS01**
Depth (feet bgs)	**4-8**	**4-8**
Description	**BACKGROUND**	**FORMER LOG POLE STORAGE AREA**
VOCs (µg/kg)		
2-Butanone	**49.2**	9.4 U
Methylene Chloride	**18.5**	**54.6**
Inorganics (mg/kg)		
Aluminum	**13100**	**23200**
Arsenic	**3.5**	**3.7**
Barium	**14.1 JB** SQL= 56.2 U	**17 JB**
Beryllium	**0.14 JB** SQL= 1.39 U	0.05 U
Calcium	**2280**	**4830**
Chromium	**18**	**24.6**
Cobalt	**11 JB** SQL= 13.94 U	**23.3**
Copper	**17.4**	**44.1**
Iron	**20800**	**38700**
Lead	0.72 U	**3.7**
Magnesium	**5300**	**9330**
Manganese	**112**	**249**
Nickel	**21.7**	**37.3**
Potassium	**1080 JB**	**1000 JB**
Silver	1.2 U	**1.9 JB**
Sodium	**1250 JB**	**3530 JH**
Vanadium	**42**	**86.5**
Zinc	**43.8**	**103**
PCBs (µg/kg)		
PCB-1254	**22**	16 U
SVOCs (µg/kg)		
Ethanone, 1-phenyl-	**71.9 JQ** SQL= 175 U	**120 JQ**
Fluoranthene	**209**	132 U
Phenanthrene	**50.2 JQ** SQL= 175 U	132 U
Pyrene	**218**	132 U

Key is on the next page.

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

B	= Associated sample result is greater than instrument detection limit, but less than SQL.
bgs	= Below ground surface.
H	= High bias.
J	= The analyte was positively identified. The associated numerical value is an estimate.
µg/kg	= Micrograms per kilogram.
mg/kg	= Milligrams per kilogram.
PCBs	= Polychlorinated biphenyls.
Q	= The result is below the sample quantitation limit.
SQL	= Sample quantitation limit.
SVOCs	= Semivolatile organic compounds.
VOCs	= Volatile organic compounds.
U	= The analyte was analyzed for, but was not detected. The associated numerical value is the SQL.

Table 6-7c

FORMER LOG POLE STORAGE AREA
SUBSURFACE SOIL (8-12 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284212**	**00274013**
Sample Location	**BG03**	**LS01**
Depth (feet bgs)	**8-12**	**8-12**
Description	**BACKGROUND**	**FORMER LOG POLE STORAGE AREA**
VOCs (µg/kg)		
2-Butanone	**69.9**	8.3 U
Carbon disulfide	**10.8**	8.3 U
Methylene Chloride	**64**	**15.5**
Inorganics (mg/kg)		
Aluminum	**27800**	**8190**
Arsenic	**6.2**	**2.8**
Barium	**32.4 JB** SQL= 67.1 U	**11.2 JB**
Calcium	**5810**	**1670**
Chromium	**35.1**	**12.9**
Cobalt	**28**	**9.5 JB**
Copper	**54.6**	**13.5**
Iron	**45300**	**13300**
Lead	**5.6**	0.63 U
Magnesium	**12900**	**3550**
Manganese	**300**	**75.4**
Nickel	**48.3**	**14.8**
Potassium	**2870**	**611 JB**
Silver	2.5 U	**0.75 JB**
Sodium	**6450**	**1090 JB**
Vanadium	**103**	**30.4**
Zinc	**100**	**36.1**
PCBs (µg/kg)		
PCB-1254	**28**	17 U
SVOCs (µg/kg)		
Benzaldehyde	**55.2 JQ** SQL= 175 U	133 U
Benzo(a)anthracene	**93.8 JQ** SQL= 175 U	133 U
Benzo[b]Fluoranthene	**118 JQ** SQL= 350 U	266 U
Chrysene	**138 JQ** SQL= 175	133 U
Ethanone, 1-phenyl-	**191**	133 U
Fluoranthene	**398**	133 U
Phenanthrene	**104 JQ** SQL= 175 U	133 U
Phenol	**67.4 JQ** SQL= 175 U	133 U
Pyrene	**419**	133 U

Key is on the next page.

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

B	= Associated sample result is greater than instrument detection limit, but less than SQL.
bgs	= Below ground surface.
J	= The analyte was positively identified. The associated numerical value is an estimate.
µg/kg	= Micrograms per kilogram.
mg/kg	= Milligrams per kilogram.
PCBs	= Polychlorinated biphenyls.
Q	= The result is below the sample quantitation limit.
SQL	= Sample quantitation limit.
SVOCs	= Semivolatile organic compounds.
VOCs	= Volatile organic compounds.
U	= The analyte was analyzed for, but was not detected. The associated numerical value is the SQL.

Table 6-8

FORMER WASTE DUMP AREA
SURFACE SOIL ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00274134**	**00274141**	**00274142**	**00274143**	**00274144**	**00274145**
Sample Location	**BG02**	**WD03**	**WD04**	**WD05**	**WD06**	**WD07**
Depth (feet bgs)	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**
Description	**BACKGROUND**	**FORMER WASTE DUMP AREA**				
VOCs (µg/kg)						
Methylene Chloride	8.9 U	**30.2**	**24.5**	4.7 U	**31.9**	6 U
Inorganics (mg/kg)						
Aluminum	**35000**	**26300**	**31200**	**31700**	**33000**	**34200**
Arsenic	**2.7**	**4.9**	**4.8 JH (2.8 AC)**	**3.3 JH (1.9 AC)**	**4.4 JH (2.5 AC)**	**4.9**
Barium	**73.5**	**14.3 JB**	**23.8 JB**	**17.8 JB**	**25.7 JB**	**96.7**
Beryllium	0.41 U	**0.41 JB**	**0.18 JB**	0.05 U	0.04 U	0.05 U
Calcium	**7640**	**4390**	**5390**	**5230**	**5000**	**4930**
Chromium	**34.2**	**26.5**	**31.9**	**33.1**	**33.8**	**16.2**
Cobalt	**37.6**	**26.2**	**30.8**	**31.7**	**32.3**	**24.9**
Copper	**61.6**	**48.2**	**59.2**	**50.8**	**54.6**	**45.2**
Iron	**60400**	**47600**	**53100**	**52700**	**52300**	**58500**
Lead	**7.2**	**3.7**	**10.7**	**47.6**	**3.2**	**94.9**
Magnesium	**14500**	**12100**	**14500**	**15500**	**14400**	**5540**
Manganese	**742**	**275**	**313**	**315**	**343**	**1090**
Mercury	0.07 UJK (0.1 UAC)	**0.3 JL**	0.06 U	0.06 U	0.064	**0.11 JB**
Nickel	**130**	**48.2**	**57.8**	**63.3**	**60.9**	**15.6**
Potassium	**650 JB**	**1790 JH**	**1870 JH**	**1280 JH**	**1910 JH**	**1110 JB**
Selenium	1 U	0.86 U	0.9 U	0.94 U	0.85 U	**3.3**
Silver	**2.7 JB** SQL= 2.7 U	**2.1 JB**	**1.7 JB**	**1.4 JB**	**1.7 JB**	**2.5 JB**
Sodium	**1770 JH**	**2350**	**2790**	**3070**	**2580**	**427 JB**
Vanadium	**142**	**86.3**	**111**	**109**	**110**	**104**
Zinc	**89.1**	**85.6**	**102**	**106**	**94.8**	**236**
PCBs (µg/kg)						
PCB-1254	20 U	16 U	16 U	16 U	16 U	**20 JK (2 AC)**
SVOCs (µg/kg)						
Benzaldehyde	**27 JQ** SQL= 164 U	128 U	126 U	132 U	124 U	154 U
Benzo[b]Fluoranthene	328 U	255 U	252 U	264 U	**117 JQ**	307 U
Bis(2-ethylhexyl) phthalate	164 U	128 U	126 U	**318**	**216**	154 U
Chrysene	164 U	128 U	126 U	132 U	**109 JQ**	154 U
Ethanone, 1-phenyl-	**127 JQ** SQL= 164 U	128 U	126 U	132 U	124 U	**61.2 JQ**
Fluoranthene	164 U	**75.6 JQ**	**88.4 JQ**	132 U	**243**	**120 JQ**
Phenanthrene	164 U	128 U	**52.2 JQ**	132 U	**200**	**80.6 JQ**
Phenol	164 U	128 U	126 U	**33.1 JQ**	124 U	154 U
Pyrene	164 U	**77 JQ**	**102 JQ**	132 U	**221**	154 U

Key is on the next page.

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

AC = Adjusted concentration.
B = Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
bgs = Below ground surface.
H = High bias.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
L = Low bias.
µg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
PCBs = Polychlorinated biphenyls.
Q = The result is below the sample quantitation limit.
SQL = Sample quantitation limit.
SVOCs = Semivolatile organic compounds.
VOCs = Volatile organic compounds.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Table 6-9a

FORMER WASTE DUMP AREA
SUBSURFACE SOIL (0-4 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284210**	**00274035**	**00274037**
Sample Location	**BG03**	**WD01**	**WD02**
Depth (feet bgs)	**0-4**	**0-4**	**0-4**
Description	**BACKGROUND**	**FORMER WASTE DUMP AREA**	
VOCs (µg/kg)			
2-Butanone	37.5 U	**34.2**	17.3 U
2-Propanone	**170**	293 U	63.8 U
Carbon disulfide	7.5 U	**13.7**	3.5 U
Methylene Chloride	**115**	**32.3**	**12**
Inorganics (mg/kg)			
Aluminum	**18400**	**23600**	**25100**
Arsenic	**5.5**	**3.6 JB**	**4.3 JH (2.5 AC)**
Barium	**15.6 JB** SQL= 47.3 U	**27.7 JB**	**26.4 JB**
Beryllium	**0.05 JB** SQL= 1.18 U	0.07 U	0.05 U
Calcium	**3050**	**6700**	**4500**
Chromium	**22.7**	**25.8**	**24.6**
Cobalt	**17.4**	**27.1**	**27.3**
Copper	**27.1**	**85.5**	**48.3**
Iron	**28800**	**45700**	**45800**
Lead	**1.3**	**6.2**	**2.6**
Magnesium	**7590**	**10600**	**11000**
Manganese	**167**	**415**	**374**
Mercury	0.06 UJK (0.1 UAC)	0.09 UJK (0.05 UAC)	**0.07 JB**
Nickel	**33.9**	**37**	**46.5**
Potassium	**1390 JH**	**1800 JB**	**1760 JH**
Selenium	**1.1 JB** SQL= 1.2 U	1.4 U	0.92 U
Silver	1.7 U	**1.5 JB**	**1.7 JB**
Sodium	**1310**	**8120**	**3510**
Vanadium	**63.8**	**118**	**104**
Zinc	**58**	**109**	**81.6**
SVOCs (µg/kg)			
Ethanone, 1-phenyl-	133 U	**52.7 JQ**	139 U

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

AC = Adjusted concentration.
B = Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
bgs = Below ground surface.
H = High bias.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
µg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
Q = The result is below the sample quantitation limit.
SQL = Sample quantitation limit.
SVOCs = Semivolatile organic compounds.
VOCs = Volatile organic compounds.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Table 6-9b

FORMER WASTE DUMP AREA
SUBSURFACE SOIL (4-8 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284211**	**00274036**	**00274038**
Sample Location	**BG03**	**WD01**	**WD02**
Depth (feet bgs)	**4-8**	**4-8**	**4-8**
Description	**BACKGROUND**	**FORMER WASTE DUMP AREA**	
VOCs (µg/kg)			
2-Butanone	**49.2**	**69.1**	45.3 U
Carbon disulfide	12.1 U	**64.2**	9.1 U
Methylene Chloride	**18.5**	**138**	**34**
Inorganics (mg/kg)			
Aluminum	**13100**	**26300**	**40000**
Arsenic	**3.5**	**4.4 JH (2.5 AC)**	**5.7 JH (3.3 AC)**
Barium	**14.1 JB** SQL= 56.2 U	**16.5 JB**	**33.4 JB**
Beryllium	**0.14 JB** SQL= 1.39 U	0.06 U	**0.49 JB**
Calcium	**2280**	**3390**	**5800**
Chromium	**18**	**29.4**	**38.6**
Cobalt	**11 JB** SQL= 13.9 U	**25.4**	**36.5**
Copper	**17.4**	**37.7**	**60**
Iron	**20800**	**36200**	**62400**
Lead	0.72 U	**0.77 JB**	**1.3**
Magnesium	**5300**	**11000**	**18600**
Manganese	**112**	**186**	**333**
Mercury	0.07 UJK (0.1 UAC)	**0.10 JB**	0.09 U
Nickel	**21.7**	**50.9**	**74.1**
Potassium	**1080 JB**	**1540 JH**	**2610 JH**
Silver	1.2 U	**1.3 JB**	**2.6 JB**
Sodium	**1250 JB**	**4980**	**6720**
Vanadium	**42**	**78.3**	**135**
Zinc	**43.8**	**73**	**92.5**

Key is at the end of the table.

Table 6-9b (CONTINUED)

FORMER WASTE DUMP AREA
SUBSURFACE SOIL (4-8 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284211**	**00274036**	**00274038**
Sample Location	**BG03**	**WD01**	**WD02**
Depth (feet bgs)	**4-8**	**4-8**	**4-8**
Description	**BACKGROUND**	**FORMER WASTE DUMP AREA**	
PCBs (µg/kg)			
PCB-1254	**22**	29 U	18 U
SVOCs (µg/kg)			
Benzaldehyde	175 U	**110 JQ**	144 U
Ethanone, 1-phenyl-	**71.9 JQ** SQL= 175 U	**<u>543</u>**	**161**
Fluoranthene	**209**	**165 JQ**	144 U
Phenanthrene	**50.2 JQ** SQL= 175 U	**109 JQ**	144 U
Phenol	175 U	**144 JQ**	144 U
Pyrene	**218**	**170 JQ**	144 U

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

AC = Adjusted concentration.
B = Associated sample result is greater than instrument detection limit, but less than the SQL.
bgs = Below ground surface.
H = High bias.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
µg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
PCBs = Polychlorinated biphenyls.
Q = The result is below the sample quantitation limit.
SQL = Sample quantitation limit.
SVOCs = Semivolatile organic compounds.
VOCs = Volatile organic compounds.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the SQL.

Table 6-9c

FORMER WASTE DUMP AREA
SUBSURFACE SOIL (8-12 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284212**	**00274034**	**00274039**
Sample Location	**BG03**	**WD01**	**WD02**
Depth (feet bgs)	**8-12**	**8-12**	**8-12**
Description	**BACKGROUND**	**FORMER WASTE DUMP AREA**	
VOCs (µg/kg)			
2-Butanone	**69.9**	11.3 U	**137**
Carbon disulfide	**10.8**	11.3 U	**35.6**
Methylene Chloride	**64**	**33.1**	**212**
Inorganics (mg/kg)			
Aluminum	**27800**	**32000**	**15400**
Arsenic	**6.2**	**4.3 JH (2.5 AC)**	**5.8 JH (3.3 AC)**
Barium	**32.4 JB** SQL= 67.1 U	**29.7 JB**	**14.8 JB**
Beryllium	0.07 U	**0.7 JB**	**0.19 JB**
Calcium	**5810**	**6530**	**3360**
Chromium	**35.1**	**30.7**	**19.9**
Cobalt	**28**	**36**	**14.5 JB**
Copper	**54.6**	**91.7**	**20.7**
Iron	**45300**	**58500**	**25000**
Lead	**5.6**	0.72 U	**1.3**
Magnesium	**12900**	**13900**	**6860**
Manganese	**300**	**496**	**149**
Mercury	0.09 UJK (0.2 UAC)	0.07 UJK (0.04 UAC)	**0.19**
Nickel	**48.3**	**57.7**	**28.8**
Potassium	**2870 JH**	**2240 JH**	**1280 JB**
Selenium	1.3 U	1.1 U	**1.8**
Silver	2.5 U	**2.1 JB**	**0.98 JB**
Sodium	**6450**	**7320**	**2490**
Vanadium	**103**	**138**	**47.1**
Zinc	**100**	**97.8**	**50.6**

Key is at the end of the table.

Table 6-9c (CONTINUED)

FORMER WASTE DUMP AREA
SUBSURFACE SOIL (8-12 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284212**	**00274034**	**00274039**
Sample Location	**BG03**	**WD01**	**WD02**
Depth (feet bgs)	**8-12**	**8-12**	**8-12**
Description	**BACKGROUND**	**FORMER WASTE DUMP AREA**	
PCBs (µg/kg)			
PCB-1254	**28**	19 U	25 U
SVOCs (µg/kg)			
Benzaldehyde	**55.2 JQ** SQL= 175 U	150 U	**76.1 JQ**
Benzo(a)anthracene	**93.8 JQ** SQL= 175 U	150 U	204 U
Benzo[b]Fluoranthene	**118 JQ** SQL= 350 U	299 U	407 U
Bis(2-ethylhexyl) phthalate	175 U	**4160**	204 U
Chrysene	**138 JQ** SQL= 175 U	150 U	204 U
Ethanone, 1-phenyl-	**191**	**76.2 JQ**	**111 JQ**
Fluoranthene	**398**	150 U	**164 JQ**
Phenanthrene	**104 JQ** SQL= 175 U	150 U	204 U
Phenol	**67.4 JQ** SQL= 175 U	150 U	204 U
Pyrene	**419**	150 U	**145 JQ**

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

AC = Adjusted concentration.
B = Associated sample result is greater than instrument detection limit, but less than SQL.
bgs = Below ground surface.
H = High bias.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
µg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
PCBs = Polychlorinated biphenyls.
Q = The result is below the sample quantitation limit.
SQL = Sample quantitation limit.
SVOCs = Semivolatile organic compounds.
VOCs = Volatile organic compounds.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the SQL.

Table 6-10a

FORMER FUEL STATION AREA
SUBSURFACE SOIL (0-4 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284210**	**00274055**
Sample Location	**BG03**	**FU01**
Depth (feet bgs)	**0-4**	**0-4**
Description	**BACKGROUND**	**FORMER FUEL STATION AREA**
VOCs (µg/kg)		
2-Propanone	**170**	26.6 U
Methylene Chloride	**115**	5.3 U
Inorganics (mg/kg)		
Aluminum	**18400**	**19300**
Arsenic	**5.5**	**4.5**
Barium	**15.6 JB** SQL= 47.3 U	**49.2**
Beryllium	**0.05 JB** SQL= 1.18 U	**0.24 JB**
Cadmium	0.12 U	**0.46 JB**
Calcium	**3050**	**21900**
Chromium	**22.7**	**28.2**
Cobalt	**17.4**	**24.6**
Copper	**27.1**	**49.8**
Iron	**28800**	**42700**
Lead	**1.3**	**20.6**
Magnesium	**7590**	**8640**
Manganese	**167**	**558**
Nickel	**33.9**	**36**
Potassium	**1390 JH**	**968 JB**
Selenium	**1.1 JB** SQL= 1.2 U	0.94 U
Silver	1.7 U	**2.3 JB**
Sodium	**1310**	**1050 JB**
Thallium	2.5 UJK (4.7 UAC)	**3.3**
Vanadium	**63.8**	**98.4**
Zinc	**58**	**158**
SVOCs (µg/kg)		
Fluoranthene	133 U	**78.1 JQ**
Phenanthrene	133 U	**63.8 JQ**
Pyrene	133 U	**71.1 JQ**

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

AC = Adjusted concentration.
B = Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
bgs = Below ground surface.
H = High bias.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
µg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
Q = The result is below the sample quantitation limit.
SQL = Sample quantitation limit.
SVOCs = Semivolatile organic compounds.
VOCs = Volatile organic compounds.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Table 6-10b

FORMER FUEL STATION AREA
SUBSURFACE SOIL (4-8 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284211**	**00274056**
Sample Location	**BG03**	**FU01**
Depth (feet bgs)	**4-8**	**4-8**
Description	**BACKGROUND**	**FORMER FUEL STATION AREA**
VOCs (µg/kg)		
2-Butanone	**49.2**	**43.1**
Methylene Chloride	**18.5**	**26**
Inorganics (mg/kg)		
Aluminum	**13100**	**24700**
Arsenic	**3.5**	**6.4**
Barium	**14.1 JB** SQL= 56.2 U	**20.5 JB**
Beryllium	**0.14 JB** SQL= 1.39 U	**0.07 JB**
Calcium	**2280**	**4330**
Chromium	**18**	**30.2**
Cobalt	**11 JB** SQL= 13.9 U	**25.8**
Copper	**17.4**	**36.5**
Iron	**20800**	**39800**
Lead	0.72 U	**8**
Magnesium	**5300**	**11200**
Manganese	**112**	**199**
Nickel	**21.7**	**49**
Potassium	**1080 JB**	**1830 JH**
Silver	1.2 U	**2.1 JB**
Sodium	**1250 JB**	**3010**
Vanadium	**42**	**91.2**
Zinc	**43.8**	**86.8**
PCBs (µg/kg)		
PCB-1254	**22**	19 U
SVOCs (µg/kg)		
Ethanone, 1-phenyl-	**71.9 JQ** SQL= 175 U	153 U
Fluoranthene	**209**	153 U
Naphthalene	175 U	**69.2 JQ**
Phenanthrene	**50.2 JQ** SQL= 175 U	**80.8 JQ**
Pyrene	**218**	**118 JQ**

Key is on the next page.

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

B = Associated sample result is greater than instrument detection limit, but less than SQL.
bgs = Below ground surface.
H = High bias.
J = The analyte was positively identified. The associated numerical value is an estimate.
µg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
PCBs = Polychlorinated biphenyls.
Q = The result is below the sample quantitation limit.
SQL = Sample quantitation limit.
SVOCs = Semivolatile organic compounds.
VOCs = Volatile organic compounds.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the SQL.

Table 6-10c

FORMER FUEL STATION AREA
SUBSURFACE SOIL (8-12 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284212**	**00274057**
Sample Location	**BG03**	**FU01**
Depth (feet bgs)	**8-12**	**8-12**
Description	**BACKGROUND**	**FORMER FUEL STATION AREA**
VOCs (µg/kg)		
2-Butanone	**69.9**	**29**
Carbon disulfide	**10.8**	5.6 U
Methylene Chloride	**64**	**35.4**
Inorganics (mg/kg)		
Aluminum	**27800**	**5210**
Arsenic	**6.2**	**3.5**
Barium	**32.4 JB** SQL= 67.1 U	**7.5 JB**
Beryllium	0.07 U	**0.25 JB**
Cadmium	**0.19 JB** SQL = 1.68 U	0.12 U
Calcium	**5810**	**977 JB**
Chromium	**35.1**	**9.4**
Cobalt	**28**	**4.8 JB**
Copper	**54.6**	**9.6**
Iron	**45300**	**11000**
Lead	**5.6**	**1**
Magnesium	**12900**	**2180**
Manganese	**300**	**58.8**
Nickel	**48.3**	**7.7 JB**
Potassium	**2870**	**545 JB**
Silver	2.5 U	**0.74 JB**
Sodium	**6450**	**375 JB**
Vanadium	**103**	**22.2**
Zinc	**100**	**32.7**
PCBs (µg/kg)		
PCB-1254	**28**	17 U
SVOCs (µg/kg)		
Benzaldehyde	**55.2 JQ** SQL= 175 U	135 U
Benzo(a)anthracene	**93.8 JQ** SQL= 175 U	135 U
Benzo[b]Fluoranthene	**118 JQ** SQL= 350 U	270 U
Chrysene	**138 JQ** SQL= 175 U	135 U
Ethanone, 1-phenyl-	**191**	135 U
Fluoranthene	**398**	135 U
Phenanthrene	**104 JQ** SQL= 175 U	135 U
Phenol	**67.4 JQ** SQL= 175 U	135 U
Pyrene	**419**	135 U

Key is on the next page.

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

B	= Associated sample result is greater than instrument detection limit, but less than SQL.
bgs	= Below ground surface.
J	= The analyte was positively identified. The associated numerical value is an estimate.
µg/kg	= Micrograms per kilogram.
mg/kg	= Milligrams per kilogram.
PCBs	= Polychlorinated biphenyls.
Q	= The result is below the sample quantitation limit.
SQL	= Sample quantitation limit.
SVOCs	= Semivolatile organic compounds.
VOCs	= Volatile organic compounds.
U	= The analyte was analyzed for, but was not detected. The associated numerical value is the SQL.

Table 6-11

DREDGE SPOILS
SEDIMENT ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00274109**	**00274131**	**00274132**	**00274133**
Sample Location	**BG01**	**DS02**	**DS04**	**DS06**
Depth (feet bgs)	**0-0.5**	**3-5**	**2-2.5**	**0-0.5**
Description	**BACKGROUND**	**DREDGE SPOILS**		
VOCs (µg/kg)				
2-Butanone	NA	**55.6**	46 U	**62.2**
Carbon disulfide	NA	**8.8**	**60.8**	9.7 U
Methylene Chloride	NA	**26.1**	**39.8**	**49.4**
Inorganics (mg/kg)				
Aluminum	**40000**	**32200**	**32100**	**32500**
Arsenic	2.1 U	**5.6**	**7.3 JH (4.2 AC)**	**4.7**
Barium	**61 JB** SQL= 75.3 U	**25.2 JB**	**24.4 JB**	**31 JB**
Calcium	**6910**	**6200**	**4850**	**5780**
Chromium	**38**	**38.2**	**37.4**	**37.1**
Cobalt	**37.5**	**32.5**	**26.5**	**31.3**
Copper	**65.5**	**62.1**	**59.1**	**64.7**
Iron	**58700**	**50200**	**52300**	**52000**
Lead	**2.4**	**3.2 JK (2.2 AC)**	**4**	**3.8**
Magnesium	**17000**	**15200**	**13300**	**15100**
Manganese	**526**	**352**	**246**	**299**
Mercury	**0.18 JB** SQL= 0.19 U	0.1 UJK (0.05 UAC)	0.1 UJK (0.05 UAC)	0.09 UJK (0.05 UAC)
Nickel	**70.5**	**59.4**	**51.1**	**61.9**
Potassium	**1150 JB**	**2820**	**2180 JH**	**2940 JH**
Silver	**1.9 JB** SQL= 3.8 U	**2 JB**	**1.8 JB**	**2.4 JB**
Sodium	**5210**	**12300**	**8070**	**12600 JH**
Vanadium	**133**	**124 JL**	**117**	**119**
Zinc	**109**	**101**	**101**	**94**
SVOCs (µg/kg)				
4-Methylphenol	233 U	**191 JQ**	209 U	215 U
Benzaldehyde	**70.6 JQ** SQL= 233 U	**108 JQ**	**59.1 JQ**	**75.8 JQ**
Chrysene	233 U	**135 JQ**	209 U	215 U
Ethanone, 1-phenyl-	**75.9 JQ** SQL= 233 U	**60.3 JQ**	209 U	**114 JQ**
Fluoranthene	233 U	**171 JQ**	**136 JQ**	**118 JQ**
Naphthalene	233 U	**134 JQ**	209 U	**87.5 JQ**
Phenanthrene	233 U	**84.1 JQ**	**64.8 JQ**	**82.4 JQ**
Phenol	233 U	**74.4 JQ**	209 U	215 U
Pyrene	233 U	**202 JQ**	**127 JQ**	**135 JQ**

Key is on the next page.

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

AC = Adjusted concentration.
B = Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
bgs = Below ground surface.
H = High bias.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
L = Low bias.
µg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
NA = Not analyzed.
Q = The result is below the sample quantitation limit.
SQL = Sample quantitation limit.
SVOCs = Semivolatile organic compounds.
VOCs = Volatile organic compounds.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Table 6-12a

DREDGE SPOILS
SUBSURFACE SOIL (0-4 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284210**	**00274043**
Sample Location	**BG03**	**DS07**
Depth (feet bgs)	**0-4**	**0-4**
Description	**BACKGROUND**	**DREDGE SPOILS**
VOCs (µg/kg)		
2-Butanone	37.5 U	**65.6**
2-Propanone	**170**	30.2 U
Carbon disulfide	7.5 U	**16.3**
Methylene Chloride	**115**	**25.1**
Inorganics (mg/kg)		
Aluminum	**18400**	**36300**
Arsenic	**5.5**	**6.2**
Barium	**15.6 JB** SQL= 47.3 U	**31.6 JB**
Beryllium	**0.05 JB** SQL= 1.18 U	0.06 U
Cadmium	0.12 U	**0.35 JB**
Calcium	**3050**	**5770**
Chromium	**22.7**	**41.3**
Cobalt	**17.4**	**34.4**
Copper	**27.1**	**59.9**
Iron	**28800**	**53400**
Lead	**1.3**	**4.4**
Magnesium	**7590**	**15300**
Manganese	**167**	**345**
Nickel	**33.9**	**64**
Potassium	**1390 JH**	**2630 JH**
Selenium	**1.1 JB** SQL= 1.2 U	1.2 U
Silver	1.7 U	**2.7 JB**
Sodium	**1310**	**6220**
Thallium	2.5 UJK (4.7 UAC)	**3.4**
Vanadium	**63.8**	**122**
Zinc	**58**	**111**
SVOCs (µg/kg)		
Ethanone, 1-phenyl-	133 U	**127 JQ**
Fluoranthene	133 U	**91.5 JQ**
Phenanthrene	133 U	**53.7 JQ**
Pyrene	133 U	**86.1 JQ**

Key is on the next page.

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

AC = Adjusted concentration.
B = Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
bgs = Below ground surface.
H = High bias.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
µg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
Q = The result is below the sample quantitation limit.
SQL = Sample quantitation limit.
SVOCs = Semivolatile organic compounds.
VOCs = Volatile organic compounds.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Table 6-12b

DREDGE SPOILS
SUBSURFACE SOIL (4-8 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284211**	**00274044**
Sample Location	**BG03**	**DS07**
Depth (feet bgs)	**4-8**	**4-8**
Description	**BACKGROUND**	**DREDGE SPOILS**
VOCs (µg/kg)		
2-Butanone	**49.2**	**75.9**
Carbon disulfide	12.1 U	**12.6**
Methylene Chloride	**18.5**	**26.1**
Inorganics (mg/kg)		
Aluminum	**13100**	**28500**
Arsenic	**3.5**	**5.6**
Barium	**14.1 JB** SQL= 56.2 U	**27.7 JB**
Beryllium	**0.14 JB** SQL= 1.39 U	0.06 U
Calcium	**2280**	**5060**
Chromium	**18**	**34**
Cobalt	**11 JB** SQL= 13.9 U	**25.1**
Copper	**17.4**	**97.4**
Iron	**20800**	**45900**
Lead	0.72 U	**21.2**
Magnesium	**5300**	**12000**
Manganese	**112**	**287**
Mercury	0.07 UJK (0.1 UAC)	**0.18 JL**
Nickel	**21.7**	**51.9**
Potassium	**1080 JB**	**1860 JH**
Silver	1.2 U	**2.1 JB**
Sodium	**1250 JB**	**3160**
Vanadium	**42**	**103**
Zinc	**43.8**	**191**
PCBs (µg/kg)		
PCB-1254	**22**	20 U

Key is at the end of the table.

Table 6-12b (CONTINUED)

DREDGE SPOILS
SUBSURFACE SOIL (4-8 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284211**	**00274044**
Sample Location	**BG03**	**DS07**
Depth (feet bgs)	**4-8**	**4-8**
Description	**BACKGROUND**	**DREDGE SPOILS**
SVOCs (µg/kg)		
Benzaldehyde	175 U	**61.6 JQ**
Benzo(a)anthracene	175 U	**173**
Benzo(a)pyrene	349 U	**154 JQ**
Benzo(b)Fluoranthene	349 U	**231 JQ**
Chrysene	175 U	**260**
Dibenzofuran	175 U	**41.2 JQ**
Ethanone, 1-phenyl-	**71.9 JQ** SQL= 71.9 U	**144 JQ**
Fluoranthene	**209**	**554**
Naphthalene	175 U	**207**
Naphthalene, 2-methyl-	175 U	**153 JQ**
Phenanthrene	**50.2 JQ** SQL= 50.2 U	**495**
Pyrene	**218**	**540**

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

AC = Adjusted concentration.
B = Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
bgs = Below ground surface.
H = High bias.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
L = Low bias.
µg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
PCBs = Polychlorinated biphenyls.
Q = The result is below the sample quantitation limit.
SQL = Sample quantitation limit.
SVOCs = Semivolatile organic compounds.
VOCs = Volatile organic compounds.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Table 6-12c

DREDGE SPOILS
SUBSURFACE SOIL (8-16 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284212**	**00274045**	**00274046**
Sample Location	**BG03**	**DS07**	**DS07**
Depth (feet bgs)	**8-12**	**8-12**	**12-16**
Description	**BACKGROUND**	**DREDGE SPOILS**	
VOCs (µg/kg)			
2-Butanone	**69.9**	**140**	**103**
Carbon disulfide	**10.8**	**51.3**	**36.2**
Methylene Chloride	**64**	**57.9**	6.5 U
Inorganics (mg/kg)			
Aluminum	**27800**	**18200**	**24000**
Arsenic	**6.2**	**6.1**	**4.5**
Barium	**34.2 JB** SQL = 67.1 U	**69.3**	**21.2 JB**
Cadmium	**0.19 JB** SQL = 1.68 U	0.13 U	0.15 U
Calcium	**5810**	**4860**	**4130**
Chromium	**35.1**	**23.1**	**28.6**
Cobalt	**28.0**	**22.1**	**21.9**
Copper	**54.6**	**28.8**	**37.9**
Iron	**45300**	**33800**	**35500**
Lead	**5.6**	0.69 UJK (0.48 UAC)	**2**
Magnesium	**12900**	**8940**	**10200**
Manganese	**300**	**167**	**254**
Nickel	**48.3**	**36.4**	**39.7**
Potassium	**2870 JH**	**882 JB**	**1950 JH**
Silver	2.5 U	**1.2 JB**	**2.1 JB**
Sodium	**6450**	**2340**	**5520**
Thallium	2.6 UJK (4.8 UAC)	2.1 U	**4.9**
Vanadium	**103**	**73.1 JL**	**86.1**
Zinc	**100**	**65.8**	**72.7**
PCBs (µg/kg)			
PCB-1254	**28**	25 U	21 U

Key is at the end of the table.

Table 6-12c (CONTINUED)

DREDGE SPOILS
SUBSURFACE SOIL (8-16 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284212**	**00274045**	**00274046**
Sample Location	**BG03**	**DS07**	**DS07**
Depth (feet bgs)	**8-12**	**8-12**	**12-16**
Description	**BACKGROUND**	**DREDGE SPOILS**	
SVOCs (µg/kg)			
Benzaldehyde	**55.2 JQ** SQL= 55.2 U	**94.4 JQ**	171 U
Benzo(a)anthracene	**93.8 JQ** SQL= 93.8 U	204 U	171 U
Benzo[b]Fluoranthene	**118 JQ** SQL= 118 U	408 U	342 U
Chrysene	**138 JQ** SQL= 138 U	204 U	171 U
Di-n-Butylphthalate	175 U	204 U	**987**
Ethanone, 1-phenyl-	**191**	**106 JQ**	171 U
Fluoranthene	**398**	**205**	171 U
Pentachlorophenol	876 U	**1140**	856 U
Phenanthrene	**104 JQ** SQL= 104 U	**125 JQ**	171 U
Phenol	**67.4 JQ** SQL= 67.4 U	204 U	171 U
Pyrene	**419**	**179 JQ**	171 U

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

AC = Adjusted concentration.
B = Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
bgs = Below ground surface.
H = High bias.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
L = Low bias.
µg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
PCBs = Polychlorinated biphenyls.
Q = The result is below the sample quantitation limit.
SQL = Sample quantitation limit.
SVOCs = Semivolatile organic compounds.
VOCs = Volatile organic compounds.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Table 6-13

RESTAURANT, POOL, AND RAILROAD AREA
SURFACE SOIL ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00274134**	**00274137**	**00274140**	**00274138**	**00274139**
Sample Location	**BG02**	**RS01**	**PL01**	**RR01**	**RR02**
Depth (feet bgs)	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**
Description	**BACKGROUND**	**RESTAURANT**	**POOL**	**RAILROAD**	
VOCs (µg/kg)					
Methylene Chloride	8.9 U	**18.6**	**19.9**	**23.1**	5.2 U
Inorganics (mg/kg)					
Aluminum	**35000**	**31300**	**36400**	**8380**	**23000**
Arsenic	**2.7**	**5.2**	**4.3**	**3.5 JH (2.0115 AC)**	**6 JH (3.4483 AC)**
Barium	**73.5**	**18.3 JB**	**17.7 JB**	**12 JB**	**67.7**
Beryllium	0.41 U	**0.24 JB**	0.05 U	0.04 U	**0.11 JB**
Cadmium	0.13 U	**0.24 JB**	0.12 U	0.1 U	0.12 U
Calcium	**7640**	**5380**	**6470**	**1800**	**7790**
Chromium	**34.2**	**32.8**	**30.5**	**11.8**	**31**
Cobalt	**37.6**	**29.5**	**34.5**	**8.5 JB**	**23.9**
Copper	**61.6**	**51.3**	**58.5**	**14.6**	**171**
Iron	**60400**	**49600**	**56100**	**15300**	**41500**
Lead	**7.2**	**1.7**	0.61 U	**6.2**	**152**
Magnesium	**14500**	**14500**	**16500**	**3720**	**9490**
Manganese	**742**	**264**	**407**	**122**	**374**
Mercury	0.07 UJK (0.1 UAC)	R	R	**0.2**	**0.44**
Nickel	**130**	**62**	**68.6**	**15.1**	**39.3**
Potassium	**650 JB**	**1990 JH**	**2050 JH**	**623 JB**	**1230 JH**
Silver	**2.7 JB** SQL= 2.7 U	**2.4**	**2.4**	**0.65 JB**	**1.5 JB**
Sodium	**1770 JH**	**2420**	**2190**	**657 JB**	**1460**
Thallium	2.1 U	1.9 U	1.8 U	**2.6**	1.9 UJK (1.016 UAC)
Vanadium	**142**	**101**	**107**	**32.4**	**84.3**
Zinc	**89.1**	**91.7**	**107**	**42.5**	**421**
PCBs (µg/kg)					
PCB-1254	20 U	16 U	17 U	15 U	**1200 JL**
SVOCs (µg/kg)					
Benzaldehyde	**27 JQ** SQL= 164 U	130 U	138 U	118 U	**35.8 JQ**
Benzo[b]Fluoranthene	328 U	130 U	275 U	236 U	**148 JQ**
Bis(2-ethylhexyl) phthalate	164 U	130 U	138 U	118 U	**251**
Chrysene	164 U	130 U	138 U	118 U	**130 JQ**
Ethanone, 1-phenyl-	**127 JQ** SQL= 164 U	130 U	**42.3 JQ**	**32 JQ**	**54.3 JQ**
Fluoranthene	164 U	130 U	138 U	118 U	**194**
Phenanthrene	164 U	130 U	138 U	118 U	**112 JQ**
Pyrene	164 U	130 U	138 U	118 U	**164**

Key is on the next page.

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

AC = Adjusted concentration.
B = Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
bgs = Below ground surface.
H = High bias.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
L = Low bias.
µg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
PCBs = Polychlorinated biphenyls.
Q = The result is below the sample quantitation limit.
R = Rejected data.
SQL = Sample quantitation limit.
SVOCs = Semivolatile organic compounds.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.
VOCs = Volatile organic compounds.

Table 6-14a

OFFICE BUILDING AREA
SUBSURFACE SOIL (0-4 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284210**	**00274059**
Sample Location	**BG03SB**	**OB01SB**
Depth (feet bgs)	**0-4**	**0-4**
Description	**BACKGROUND**	**OFFICE BUILDING AREA**
VOCs (µg/kg)		
2-Propanone	**170**	119 U
Methylene Chloride	**115**	**22.5**
Inorganics (mg/kg)		
Aluminum	**18400**	**24400**
Arsenic	**5.5**	**4**
Barium	**15.6 JB** SQL= 47.3 U	**17.5 JB**
Beryllium	**0.05 JB** SQL= 1.18 U	0.05 U
Cadmium	0.12 U	**0.14 JB**
Calcium	**3050**	**5020**
Chromium	**22.7**	**22.3**
Cobalt	**17.4**	**26.4**
Copper	**27.1**	**39**
Iron	**28800**	**40100**
Lead	**1.3**	0.61 U
Magnesium	**7590**	**12100**
Manganese	**167**	**301**
Mercury	0.06 UJK (0.1 UAC)	**0.1 JB**
Nickel	**33.9**	**44**
Potassium	**1390 JH**	**1560 JH**
Selenium	**1.1 JB** SQL= 1.2 U	0.92 U
Silver	1.7 U	**2.1 JB**
Sodium	**1310**	**3060**
Vanadium	**63.8**	**92.1**
Zinc	**58**	**67.5**

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

AC = Adjusted concentration.
B = Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
bgs = Below ground surface.
H = High bias.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
µg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
SQL = Sample quantitation limit.
VOCs = Volatile organic compounds.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the SQL.

Table 6-14b

OFFICE BUILDING AREA
SUBSURFACE SOIL (4-8 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284211**	**00274060**
Sample Location	**BG03SB**	**OB01SB**
Depth (feet bgs)	**4-8**	**4-8**
Description	**BACKGROUND**	**OFFICE BUILDING AREA**
VOCs (µg/kg)		
2-Butanone	**49.2**	**157 JH** **(15.7 AC)**
Carbon disulfide	12.1 U	**14.5 JH** **(1.45 AC)**
Methylene Chloride	**18.5**	**47.8**
Inorganics (mg/kg)		
Aluminum	**13100**	**21500**
Arsenic	**3.5**	**5.4**
Barium	**14.1 JB** SQL= 56.2 U	**19.1 JB**
Beryllium	**0.14 JB** SQL= 1.39 U	0.05 U
Calcium	**2280**	**2820**
Chromium	**18**	**26.9**
Cobalt	**11 JB** SQL= 13.9 U	**23.7**
Copper	**17.4**	**27.8**
Iron	**20800**	**32500**
Lead	0.72 U	**2.1**
Magnesium	**5300**	**8880**
Manganese	**112**	**167**
Mercury	0.07 UJK (0.1 UAC)	**0.11 JB**
Nickel	**21.7**	**42.9**
Potassium	**1080 JB**	**1350 JH**
Silver	1.2 U	**1.8 JB**
Sodium	**1250 JB**	**3470**
Vanadium	**42**	**69.2**
Zinc	**43.8**	**67.4**
PCBs (µg/kg)		
PCB-1254	**22**	20 U
SVOCs (µg/kg)		
Ethanone, 1-phenyl-	**71.9 JQ** SQL= 175 U	**50.2 JQ**
Fluoranthene	**209**	157 U
Phenanthrene	**50.2 JQ** SQL= 175 U	157 U
Pyrene	**218**	157 U

Key is on the next page.

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

AC	= Adjusted concentration.
B	= Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
bgs	= Below ground surface.
H	= High bias.
J	= The analyte was positively identified. The associated numerical value is an estimate.
K	= Unknown bias.
µg/kg	= Micrograms per kilogram.
mg/kg	= Milligrams per kilogram.
PCBs	= Polychlorinated biphenyls.
Q	= Result is below the sample quantitation limit.
SQL	= Sample quantitation limit.
SVOCs	= Semivolatile organic compounds.
VOCs	= Volatile organic compounds.
U	= The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Table 6-14c

OFFICE BUILDING AREA
SUBSURFACE SOIL (8-12 FEET BGS) ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284212**	**00274061**
Sample Location	**BG03SB**	**OB01SB**
Depth (feet bgs)	**8-12**	**8-12**
Description	**BACKGROUND**	**OFFICE BUILDING AREA**
VOCs (µg/kg)		
2-Butanone	**69.9**	33.7 U
Carbon disulfide	**10.8**	**49.5**
Methylene Chloride	**64**	**22.3**
Inorganics (mg/kg)		
Aluminum	**27800**	**8590**
Arsenic	**6.2**	**4.3**
Barium	**34.2 JB** SQL= 67.1 U	**10.2 JB**
Beryllium	0.07 U	**0.13 JB**
Cadmium	**0.19 JB** SQL= 1.68 U	0.13 U
Calcium	**5810**	**1840**
Chromium	**35.1**	**13.3**
Cobalt	**28.0**	**8.4 JB**
Copper	**54.6**	**11.7**
Iron	**45300**	**14200**
Lead	**5.6**	0.68 U
Magnesium	**12900**	**3890**
Manganese	**300**	**92.3**
Nickel	**48.3**	**16.4**
Potassium	**2870 JH**	**796 JB**
Silver	2.5 U	**0.81 JB**
Sodium	**6450**	**986 JB**
Vanadium	**103**	**28.2**
Zinc	**100**	**37.4**

Key is at the end of the table.

Table 6-14c (CONTINUED)

OFFICE BUILDING AREA
SUBSURFACE SOIL ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00284212**	**00274061**
Sample Location	**BG03SB**	**OB01SB**
Depth (feet bgs)	**8-12**	**8-12**
Description	**BACKGROUND**	**OFFICE BUILDING AREA**
PCBs (µg/kg)		
PCB-1254	**28**	18 U
SVOCs (µg/kg)		
Benzaldehyde	**55.2 JQ** SQL= 175 U	141 U
Benzo[b]Fluoranthene	**118 JQ** SQL= 350 U	282 U
Chrysene	**138 JQ** SQL= 175 U	141 U
Ethanone, 1-phenyl-	**191**	141 U
Fluoranthene	**398**	141 U
Phenanthrene	**104 JQ** SQL= 175 U	141 U
Phenol	**67.4 JQ** SQL= 175 U	141 U
Pyrene	**419**	141 U

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

AC = Adjusted concentration.
B = Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
bgs = Below ground surface.
H = High bias.
J = The analyte was positively identified. The associated numerical value is an estimate.
µg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
PCBs = Polychlorinated biphenyls.
Q = Result is below sample quantitation limit
SQL = Sample quantitation limit.
SVOCs = Semivolatile organic compounds.
VOCs = Volatile organic compounds.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

7. MIGRATION/EXPOSURE PATHWAYS AND TARGETS

The following sections describe migration/exposure pathways and potential targets within the site's range of influence (Figures 7-1 and 7-2). Analytical data QA forms from laboratory analyses are in Appendix C. This section discusses the groundwater migration pathway (7.1), surface water migration pathway (Section 7.2), soil exposure pathway (Section 7.3), and air migration pathway (Section 7.4).

7.1 GROUNDWATER MIGRATION PATHWAY

This section presents the pathway description and targets for the groundwater migration pathway.

7.1.1 Geology and Hydrogeology

The majority of the peninsula on which the site lies was created from sediment fill material. The site soil is typically bay sediment from the historical dredge operations. The site soil consists of dark grey to black, organic-rich, fine sandy silt (NWG 1990). Some silty clay and fine-to-medium sand and gravel may be present in portions of the site dredge material (NWG 1990). Silty sand was predominantly present, with some gravel, sandy silt and poor- to well-graded sand, in borehole intervals collected from 0 to 16 feet bgs by the START during the SI field event. The extreme northern portion of the site may be underlain by a thin layer of marine terrace deposits that rest on the Oligocene- to Miocene-age rocks (NWG 1990). Marine terrace deposits along the coast consist of relatively permeable, unconsolidated sand, silt, and gravel which receive large quantities of water during the rainy season (Schlicker et al. 1972).

Water wells tapping the siltstone and claystone marine terrace deposits have relatively low yields, generally not more than 3 to 5 gallons per minute. In fractured zones of these sedimentary deposits, a moderate yield can be obtained. Water accepted by the permeable sandstones of the upper Miocene sandstone is commonly restricted in its downward movement by interbeds of claystone and sandstone. On the coast, groundwater is present locally under perched conditions within the alluvial terraces (Schlicker et al. 1972).

In the October 1990 Phase II study, groundwater was encountered in test pits at 4.1 to 14.5 feet bgs (NWG 1990). During the SI field event in July 2000, groundwater was encountered

at 7 to 12 feet bgs. Due to the permeable nature of the surficial dredge spoils of the site, groundwater infiltration is expected to be high relative to surface water runoff or evaporation losses of precipitation. Based on the available information on water elevations and tidal fluctuations, NWG (1990) determined that groundwater generally flows from the site to Tillamook Bay and Miami Cove, though groundwater flow could reverse with tidal fluctuations. The START determined that there is not enough site-specific information on the hydrogeologic units underlying the Old Mill Marina site in order to describe the aquifer system and the aquifer(s) of concern. Although the hydrogeology of the site is unknown, groundwater could potentially be migrating to the surface water in Miami Cove.

The climate is moist, marine, and temperate and is greatly moderated by ocean influences. The rainfall average for the area is approximately 90 inches per year (WRCC 2000b). Eighty percent of the rainfall is distributed through the months of October through March (Schlicker et al. 1972).

7.1.2 Targets

Two public groundwater supply wells, operated by the City of Garibaldi, are located within 4 miles of the site (EPA 2000a). It is assumed by the START that these wells draw from the same aquifer. The population within the city limits of Garibaldi and some residences between Garibaldi and the well location use these public groundwater supply wells as a water source (Bettis 2000). The City of Garibaldi has a groundwater right to withdraw up to 840,000 gallons per day from its two municipal wells located approximately 1.7 miles northeast from the site in the Miami River floodplain (Beaman 2000). No domestic well log records exist for wells within the city limits, located within approximately 0.5 mile from the site (OWRD 2000). It was estimated from a search of Oregon Water Resources Department well logs (OWRD 2000) that approximately 22 domestic wells are located within the 4-mile TDL.

The START estimates that the closest domestic well to the Old Mill Marina site is located in SE¼ NE¼, Section 22, Township 1N, Range 10W approximately 2 miles from the site. This domestic well was completed at a depth of 140 feet bgs. The site is not located within 1 mile of any Sole Source Aquifer area (EPA 2000a). Groundwater is not used in irrigation of food or forage crops, for commercial livestock watering, as an ingredient in commercial food preparation, for commercial aquaculture, or for major or designated recreation. There are no public standby wells within 4 miles of the site. The drinking water population served by groundwater sources within each distance ring is provided in Table 7-1.

7.2 SURFACE WATER MIGRATION PATHWAY

This section presents the pathway description, targets, sample locations, and sample results for the surface water migration pathway.

7.2.1 Pathway Description

The Old Mill Marina is located on a broad peninsula that extends into the Miami Cove estuary where the Miami River flows into Tillamook Bay. Stormwater from the entire site, including potential source areas, mainly consists of sheet runoff which drains either directly to Miami Cove or through a series of drainage ditches into Miami Cove (Figure 2-2; E & E 2000a). Tillamook Bay connects to the Pacific Ocean roughly 1.5 miles from the site. Due to tidal influence, the TDL begins 1 mile upstream on the Miami River and extends to 15 miles downstream from the most downstream probable point of entry (Figure 7-2). The overland distance from on-site sources at the location of the former Old Mill building and the former power station is approximately 100 feet. In addition, the straightline distance from sources at the site to the nearest surface water body is approximately 100 feet.

The Tillamook Bay watershed is made up of five river basins, including the Miami, Kilchis, Wilson, Trask, and Tillamook, which drain into the bay. The Miami River drains into the Miami Cove (Figure 7-2). Tidal influence occurs up to 1 mile upstream on the Miami River (Griffin 2000). A reverse gradient in flow occurs only during low-flow and high tide events and up to within approximately 100 yards of the Highway 101 bridge above the Miami River (Griffin 2000). During high tide and winter storms, it is possible for sediments adjacent to the Old Mill Marina site to be transported above intertidal areas within the south side of Miami Cove (Figure 7-2; Griffin 2000). The two-year, 24-hour rainfall event for the area is 3.5 inches (WRCC 2000a).

There are several stormwater drains on the eastern end of site which discharge to Miami Cove. There is no record of a NPDES permit for the Old Mill Marina Resort (EPA 2000a). Since the end of mill operations, part of the on-site historical drainage system has been filled in with dredge spoils.

The eastern and southern ends of the site are located approximately 5 feet above the high water line (E & E 2000a). The total drainage area of the site is 40.79 acres (NWG 1990). Surface water runoff from areas north of the site apparently drains into a ditch, adjacent to the Southern Pacific Railroad tracks, which then drains into Miami Cove. Flood risks at the site are predominantly minimal and have been given a Federal Emergency Management Agency (FEMA) designation of C, which represents minimal risk (Phips 2000). Site property immediately adjacent to the beach has been given a FEMA V-2 risk designation, which indicates flood risk is probable from a 100-year flood event (Phips 2000). The

on-site surficial soil consisted of primarily silty sands and sandy silt. The on-site surficial soil type ranged between course-textured soils with high infiltration rates to medium-textured soils with moderate infiltration rates.

7.2.2 Targets

Commercial shellfish harvesting, though prohibited in Miami Cove due to concerns regarding bacteria, is conditionally approved for other areas within Tillamook Bay, between roughly 1 to 2 miles from the site (TBNEP 1994). The Oregon Department of Fish and Wildlife has tabulated the sport fishing harvest for the Miami River for 1997. Sport fish catch data for the Miami River in 1997 include 83 fall chinook (ODFW 2000). Sport fish catch is reported in number of fish, not poundage. Chinook generally weight up to 30 pounds (StreamNet 2000). As determined by the START from sport fish catch data, approximately 2,490 pounds of chinook were caught in the Miami River in fall 1997. Commercial fish and shellfish landed at Garibaldi is summarized in Table 7-2.

One anadromous fish species, the Oregon Coast coho salmon (*Oncorynchus kisutch*), that is listed as threatened under the Endangered Species Act is present in the site vicinity (NMFS 2000). Adverse health effects from recreational and commercial fish and shellfish harvesting may occur from consumption of potentially contaminated fish and shellfish within the site vicinity. Commercial shellfish harvesting, though prohibited in Miami Cove, is conditionally approved for other areas within Tillamook Bay, approximately 1 mile from the site. Recreational shellfish and crab harvesting, as well as recreational and commercial fishing, occur within the 15-mile TDL.

There are no surface water intakes within the 15-mile TDL (OWRD 2000). The majority of the surface water within the 15-mile TDL is brackish and is not suitable for drinking water; irrigation; or stock, commercial, or industrial use.

The Oregon Islands National Wildlife Refuge is located approximately 3 miles from the site. Tillamook Bay was designated as an estuary of national significance and included in the EPA National Estuary Program in October 1992. Federal species of concern present within a the 15-mile TDL include the green sturgeon (*Acipenser medirostris*). The bald eagle (*Haliateetus leucocephalus*), a Federal listed threatened species, has also been observed within a 2-mile radius of the site (ONHP 2000).

Miami Cove wetlands immediately adjacent to the site are classified as unconsolidated bottom estuarine system wetlands (DOI 1995). During the initial site visit, the START noted emergent vegetation in the intertidal region along the northeast boundary of the site. A wetland specialist, present during the PA/SI field activities, determined that emergent hydrophytes are present in Miami Cove

adjacent to the former power station. Since emergent hydrophytes were determined to be present in these areas, these intertidal estuarine wetlands meet the 40 CFR 230.3 definition of a wetland (EPA 1992). Palustrine and riverine wetlands are present along the banks of the Miami River within the 15-mile TDL. The START estimated from National Wetland Inventory maps that there are 2 miles of wetland frontage within the 15-mile TDL.

7.2.3 Sample Locations

Nine surface sediment samples were collected in Miami Cove at discharge points of outfalls located on eastern portion of the site perimeter (OF01 through OF09). Two wetland sediment samples were collected: one at a wetland on the northern perimeter of Miami Cove (WL01) and the other at the confluence of the Miami River and Miami Cove (WL02). Seven surface sediment samples were collected approximately 100 feet offshore from the eastern portion of the site perimeter (IT01 through IT07). Two surface water samples were collected: one at the confluence of the Miami River and Miami Cove (WL02) and the other approximately 100 feet offshore from the eastern perimeter of the site (IT04).

7.2.4 Miami Cove Outfall Sediment Sample Results

Sample results are summarized in Table 7-3. Five inorganics were detected at elevated concentrations including arsenic, barium, lead, mercury, and selenium. Elevated inorganic concentrations ranged from 0.6 mg/kg of mercury in OF02 to 101 mg/kg of barium in OF01.

Eleven SVOCs were detected at elevated concentrations including 9H-carbozole, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, fluoranthene, phenanthrene, and pyrene. SVOC concentrations ranged from 242 µg/kg of bis(2-ethylhexyl)phthalate in OF05 to 5,690 µg/kg of pyrene in OF06.

No PCBs were detected at elevated concentrations.

7.2.5 Miami Cove Wetland Sample Results

Sample results are summarized in Table 7-4. Four inorganics were detected at elevated concentrations including arsenic, barium, beryllium, and selenium. Elevated inorganic concentrations ranged from 1.9 mg/kg of selenium in WL01 to 132 mg/kg of barium in WL02.

No SVOCs or PCBs were detected at elevated concentrations.

7.2.6 Intertidal Sediment Sample Results

Sample results are summarized in Table 7-5. Two inorganics were detected at elevated concentrations including arsenic (ranging from 2.5 mg/kg [AC] in IT02 to 6.2 mg/kg in IT01), and selenium (1.9 mg/kg in IT05).

No SVOCs or PCBs were detected at elevated concentrations.

7.2.7 Surface Water Sample Results

Sample results are summarized in Table 7-6. Copper was the only inorganic detected at an elevated concentration of 26.8 mg/L in IT04.

No SVOCs or PCBs were detected at elevated concentrations.

7.3 SOIL EXPOSURE PATHWAY

There are roughly 1,200 people camping on site at any given time (Melcher 2000). There are no permanent residents on site, as the site property owner is not licenced to host any permanent residents. The Old Mill Marina Resort hosts only seasonal resort residents who may stay for up to a month during the year (Melcher 2000). The site is frequented by passers-by, including visitors to the on-site gift shop, bait shop, and marina. No fence is installed around the property or around any on-site features. The Garibaldi Grade School, with approximately 250 students, is located approximately 0.5 mile northwest of the site. There are no schools or day-care facilities within 200 feet of a source of potential contamination at the site. The closest residence is located approximately 500 feet north of the site, north of Highway 101. The number of workers on site varies with the season, and the START estimates this number to be between five and 20. A workplace is within 200 feet of a source. No commercial agriculture, silviculture, or livestock production or grazing occur on an area of contamination on the site. There are no sensitive, terrestrial environments on site.

Table 7-7 provides population figures for people residing within 1 mile of the site.

7.4 AIR MIGRATION PATHWAY

There are no major or designated recreation areas, commercial agriculture areas, or commercial silviculture areas within 0.5 mile of the site. The Tillamook Bay National Estuary is located within 0.5 mile of the site. Federal species of concern listed within a 2-mile radius of the site include the northern red-legged frog (*Rana aurora aurora*) and the white-footed vole (*Arborimus albipes*; ONHP 2000). The green sturgeon (*Acipenser medirostris*), a Federal species of concern, and the bald

eagle (*Haliateetus leucocephalus*), a Federal listed threatened species, have been observed within a 2-mile radius of the site (ONHP 2000). The population and wetland acreage for each distance ring within a 4-mile radius are provided in Table 7-8. No air samples were collected during the SI field event in July 2000.

Table 7-1

GROUNDWATER DRINKING POPULATION WITHIN A 4-MILE RADIUS
OLD MILL MARINA
GARIBALDI, OREGON

DISTANCE (MILES)	WELL IDENTIFICATION	WELL POPULATION*	TOTAL POPULATION PER DISTANCE RING
0 to 0.25	0	0	0
0.25 to 0.5	0	0	0
0.5 to 1	0	0	0
1 to 2	Municipal (1)	1,080	1,085
	Domestic (2)	5	
2 to 3	Domestic (9)	21	21
3 to 4	Domestic (11)	25	25
Total			1,131

Source: EPA 2000a; OWRD 2000; USCB 1990.

* Domestic well populations were estimated based on the average number of persons per household of 2.3 for the City of Garibaldi (USCB 1990).

Table 7-2

MONTHLY LANDINGS OF COMMERCIAL FISH AND SHELLFISH AT GARIBALDI, OREGON, 1999
OLD MILL MARINA
GARIBALDI, OREGON

SPECIES	POUNDS LANDED
Fish	
Cabezon	681
Flounder, arrowtooth	2,168
Flounder, starry	2,901
Greenling sp.	7
Halibut, Pacific	21,984
Lingcod	6,931
Lord, red Irish	2
Pacific Ocean perch	2
Nominal POP	3,944
Rockfish, black	22,615
Rockfish, canary	2,553
Rockfish, widow	195
Rockfish, yellowtail	7,457
Rockfish, other sp.	1,665
Sablefish	3,727
Salmon, chinook	36,226
Salmon, pink	21
Sanddab, Pacific	4,356
Shark, spiny dogfish	13
Skates and rays	824
Sole, curlfin (turbot)	175
Sole, Dover	52,897
Sole, English	2,406
Sole, petrale	14,200
Sole, rex	341
Sole, rock	212
Sole, sand	17,007
Sturgeon, white	38
Surfperch sp.	7
Tuna, albacore	149,139

Key is at the end of the table.

Table 7-2 (CONTINUED)

MONTHLY LANDINGS OF COMMERCIAL FISH AND SHELLFISH AT GARIBALDI, OREGON IN 1999
OLD MILL MARINA
GARIBALDI, OREGON

SPECIES	POUNDS LANDED
Crustaceans	
Crab, Dungeness, bay	12
Crab, Dungeness, ocean	535,803
Shrimp, ghost	1,194
Shrimp, mud	32
Shrimp, pink	798,149
Mollusks	
Clams, butter	37,972
Clams, cockle	33,762
Clams, gaper	3,474
Clams, littleneck	1,557
Snails and chitons	1
Other invertebrates	
Sea anemone	4
Total	**1,766,654**

Source: ODFW 2000.

Table 7-3

MIAMI COVE OUTFALL
SEDIMENT ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	00274109	00274100	00274101	00274102	00274103	00274104	00274105	00274106	00274107	00274108
Sample Location	BG01	OF01	OF02	OF03	OF04	OF05	OF06	OF07	OF08	OF09
Depth (feet bgs)	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Description	BACKGROUND	MIAMI COVE OUTFALLS								
Inorganics (mg/kg)										
Aluminum	40000	20700	28600	30600	27500	29500	23100	29500	25200	23500
Arsenic	2.1 U	4.8	7.3	7	6.7	2.4 U	4.3	5.6	7.4	4.6
Barium	61 JB SQL= 75.3 U	101	18.9 JB	23.2 JB	20.4 JB	26.9 JB	16.9 JB	26.9 JB	21.3 JB	24.6 JB
Calcium	6910	7010	5900	5670	5190	5570	4720	5570	4490	4600
Chromium	38	22.5	31.1	35	32.8	32.5	28.1	32.5	32.9	31.2
Cobalt	37.5	20	31.4	30.9	27.6	29.6	24.8	29.6	25.1	25.4
Copper	65.5	76.5	58.8	66.3	59.4	61.3	46.5	61.3	58.8	69.3
Iron	58700	36900	53000	48100	44200	46400	41600	46400	53600	43700
Lead	2.4	6.9 JK (4.8 UAC)	2.3 JK (1.6 UAC)	4.9 JK (3.4 UAC)	5.3 JK (3.7 UAC)	4.0 JK (3.0 AC)	24 JK (17 UAC)	4 JK (3 UAC)	8.9 JK (6.2 UAC)	7.6 JK (5.3 UAC)
Magnesium	17000	10700	14700	14600	13300	13800	11100	13800	12400	11600
Manganese	526	505	505	283	279	274	265	274	324	273
Mercury	0.18 JB SQL= 0.19 U	0.07 U	0.6	0.11 U	0.12 U	0.11 U	0.08 U	0.11 U	0.09 U	0.13 JB
Nickel	70.5	35.7	50.9	54.2	49.4	50.2	42.7	50.2	43.6	46.4
Potassium	1150 JB	3280	3000	2930	2640	2820	2170	2820	2410	2170
Selenium	1.5 U	1.1 U	1.8 JB	2.3	1.8 U	2.2	1.2 U	2.2	1.4 U	1.2 U
Silver	1.9 JB SQL= 3.8 U	1.3 JB	2 JB	2.2 JB	1.8 JB	2.1 JB	1.3 JB	2.1 JB	1.9 JB	1.6 JB
Sodium	5210	10200	12300	14200	14900	13900	8850	13900	10600	7820
Thallium	2.9 UJK (5.4 UAC)	3.2	3.2 U	3.2 U	3.6 U	3.4 U	2.5 U	3.4 U	2.7 U	2.4 U
Vanadium	133	72.9 JL	123 JL	115 JL	105 JL	110 JL	84.8 JL	110 JL	103 JL	86.9 JL
Zinc	109	107	124	106	108	111	137	111	153	179

Key is at the end of the table.

Table 7-3 (CONTINUED)

MIAMI COVE OUTFALL
SEDIMENT ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00274109**	**00274100**	**00274101**	**00274102**	**00274103**	**00274104**	**00274105**	**00274106**	**00274107**	**00274108**
Sample Location	**BG01**	**OF01**	**OF02**	**OF03**	**OF04**	**OF05**	**OF06**	**OF07**	**OF08**	**OF09**
Depth (feet bgs)	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**
Description	**BACKGROUND**	**MIAMI COVE OUTFALLS**								
SVOCs (µg/kg)										
4-Methylphenol	233 U	140 U	**186 JQ**	205 U	241 U	231 U	163 U	137 U	**127 JQ**	**108 JQ**
9H-Carbazole	233 U	140 U	212 U	205 U	241 U	231 U	**255**	**148**	193 U	174 U
9H-Fluorene	233 U	140 U	212 U	205 U	241 U	231 U	**91.4 JQ**	**200**	**68.8 JQ**	174 U
Acenaphthene	233 U	140 U	212 U	205 U	241 U	231 U	**53.9 JQ**	**44.7 JQ**	193 U	174 U
Anthracene	233 U	140 U	212 U	205 U	241 U	231 U	**339**	**768**	**73.3 JQ**	174 U
Benzaldehyde	**70.6 JQ** SQL= 233 U	140 U	**60.9 JQ**	205 U	**65.9 JQ**	**89.4 JQ**	163 U	137 U	**61.8 JQ**	174 U
Benzo(a)anthracene	233 U	140 U	212 U	**189 JQ**	241 U	231 U	**1520**	**388**	**376**	**268**
Benzo(a)pyrene	466 U	281 U	212 U	**99.2 JQ**	482 U	463 U	**1180**	**91.6 JQ**	**195 JQ**	**151 JQ**
Benzo(g,h,i)perylene	1160 U	703 U	1060 U	1030 U	1200 U	1160 U	**785 JQ**	684 U	966 U	871 U
Benzo[b]Fluoranthene	466 U	281 U	212 U	**239 JQ**	482 U	**159 JQ**	**1930**	**177 JQ**	**554**	**282 JQ**
Benzo[k]fluoranthene	233 U	140 U	212 U	**87.5 JQ**	241 U	231 U	**928**	137 U	**213**	174 U
Bis(2-ethylhexyl) phthalate	233 U	**259**	212 U	205 U	241 U	**242**	**205**	137 U	193 U	174 U
Chrysene	233 U	140 U	212 U	**276**	**168 JQ**	231 U	**2910**	**394**	**664**	**381**
Dibenzofuran	233 U	140 U	212 U	**54.4 JQ**	241 U	231 U	163 U	**52.2 JQ**	193 U	174 U
Ethanone, 1-phenyl-	**75.9 JQ** SQL= 233 U	**69.3 JQ**	212 U	205 U	**91.3 JQ**	**71.8 JQ**	**76.1 JQ**	**68.6 JQ**	**51.7 JQ**	**172 JQ**
Fluoranthene	233 U	**146**	**495**	**741**	**372**	**386**	**5540**	**2320**	**2840**	**184**
Indeno(1,2,3-cd)pyrene	2330 U	1400 U	2120 U	2050 U	2410 U	2310 U	**1070 JQ**	1370 U	1930 U	740 U
Naphthalene	233 U	140 U	**208 JQ**	205 U	241 U	231 U	163 U	137 U	193 U	174 U
Phenanthrene	233 U	**161**	**163 JQ**	**252**	**108 JQ**	**93.2 JQ**	**1790**	**2080**	**781**	**50.4 JQ**
Phenol	233 U	140 U	212 U	205 U	241 U	231 U	163 U	137 U	193 U	**74.7 JQ**
Pyrene	233 U	**137 JQ**	**456**	**658**	**350**	**338**	**5690**	**1540**	**2360**	**295**

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is elevated as defined in Section 5.

Key:

AC = Adjusted concentration.
B = Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
bgs = Below ground surface.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
L = Low bias.
µg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
Q = The result is below the sample quantitation limit.
SQL = Sample quantitation limit.
SVOCs = Semivolatile organic compounds.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Table 7-4

MIAMI COVE WETLANDS
SEDIMENT ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00274109**	**00274113**	**00284202**
Sample Location	**BG01**	**WL01**	**WL02**
Depth (feet bgs)	**0-0.5**	**0-0.5**	**0-0.5**
Description	**BACKGROUND**	**MIAMI COVE WETLANDS**	
Inorganics (mg/kg)			
Aluminum	**40000**	**25500**	**25600**
Arsenic	2.1 U	**4.9**	**7.0**
Barium	**61 JB** SQL= 75.3 U	**15.1 JB**	**132**
Beryllium	0.07 U	0.06 U	**2.3**
Calcium	**6910**	**3680**	**1640**
Chromium	**38**	**28.2**	**17.4**
Cobalt	**37.5**	**24**	**14.5 JB**
Copper	**65.5**	**37.9**	**30.8**
Iron	**58700**	**37000**	**36000**
Lead	**2.4**	**6.2**	**4.6**
Magnesium	**17000**	**11700**	**6100**
Manganese	**526**	**182**	**532**
Mercury	**0.18 JB** SQL= 0.19 U	0.08 UJK (0.04 UAC)	0.08 UJK (0.04 UAC)
Nickel	**70.5**	**48.1**	**20.3**
Potassium	**1150 JB**	**2110 JH**	**1670 JH**
Selenium	1.5 U	**1.9**	**1.2 U**
Silver	**1.9 JB** SQL= 3.8 U	**2.2 JB**	**2.0 U**
Sodium	**5210**	**7970**	**6150**
Vanadium	**133**	**88.9**	**58.8**
Zinc	**109**	**102**	**83.5**
SVOCs (µg/kg)			
Benzaldehyde	**70.6 JQ** SQL= 233 U	**44.3 JQ**	151 UJK (15.1U AC)
Ethanone, 1-phenyl-	**75.9 JQ** SQL= 233 U	170 U	**75.7 JQ**
Fluoranthene	233 U	**61.9 JQ**	151 U
Naphthalene	233 U	**147 JQ**	151 U
Phenanthrene	233 U	**55.5 JQ**	151 U
Pyrene	233 U	**79.6 JQ**	151 U

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is elevated as defined in Section 5.

Key:

AC = Adjusted concentration.
B = Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
bgs = Below ground surface.
H = High bias.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
µg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
Q = The result is below the sample quantitation limit.
SQL = Sample quantitation limit.
SVOCs = Semivolatile organic compounds.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Table 7-5

INTERTIDAL SEDIMENT ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	00274109	00274110	00274111	00274112	00284205	00284203	00284204	00284206
Sample Location	BG01	IT01	IT02	IT03	IT04	IT05	IT06	IT07
Depth (feet bgs)	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Descirption	BACKGROUND	INTERTIDAL SEDIMENT						
Inorganics (mg/kg)								
Aluminum	**40000**	**36700**	**22500**	**25100**	**34300**	**35000**	**31000**	**29600**
Arsenic	2.1 U	**6.2**	**4.4 JH (2.5 AC)**	**5.9 JH (3.4 AC)**	**6.7**	**6.1**	**4.2**	**5.7**
Barium	**61 JB** SQL= 75.3 U	**29.3 JB**	**19.4 JB**	**20.0 JB**	**29.8 JB**	**19.2 JB**	**13.2 JB**	**25.8 JB**
Beryllium	0.07 U	0.08 U	0.07 U	0.06 U	0.1 U	0.07 U	**0.19 JB**	0.1 U
Calcium	**6910**	**6520**	**4740**	**3170**	**6480**	**5470**	**4500**	**6110**
Chromium	**38**	**41.8**	**27.8**	**29.3**	**39.7**	**36.2**	**33.5**	**35**
Cobalt	**37.5**	**35.4**	**21.4**	**20.9**	**31.9**	**33.4**	**29.7**	**28.2**
Copper	**65.5**	**73.5**	**45.7**	**47.8**	**65.7**	**54.1**	**44.8**	**61**
Iron	**58700**	**60800**	**35600**	**41900**	**52300**	**50200**	**46000**	**46400**
Lead	**2.4**	**3**	**2.3**	**3.5**	**2.3**	0.95 U	**1.3**	**1.6**
Magnesium	**17000**	**17200**	**11200**	**10100**	**16000 JL**	**15600**	**15300**	**15000**
Manganese	**526**	**357**	**236**	**223**	**362**	**311**	**238**	**345**
Mercury	**0.18 JB** SQL= 0.18 U	0.1 UJK (0.05 UAC)	0.09 UJK (0.05 UAC)	0.07 UJK (0.04 UAC)	0.13 UJK	0.09 UJK (0.05 UAC)	0.08 UJK (0.04 UAC)	0.12 U
Nickel	**70.5**	**65.2**	**40.4**	**39.6**	**57.6**	**63.8**	**58.8**	**50.4**
Potassium	**1150 JB**	**3420 JH**	**2380 JH**	**1850 JH**	**3610 JH**	**2780 JH**	**2700 JH**	**3520 JH**
Selenium	1.5 U	1.6 U	1.4 U	1.1 U	1.2 U	**1.9**	1.2 U	**2.1 JB**
Silver	**1.9 JB**	**3.3 JB**	**1.4 JB**	**1.4 JB**	2.6 U	3 U	2.6 U	2.8 U
Sodium	**5210**	**15400 JH**	**13400**	**7330**	**18300**	**13200**	**10400**	**20200**
Vanadium	**133**	**137**	**81.8**	**91.0**	**128**	**121**	**97.2**	**112**
Zinc	**109**	**121**	**77.7**	**89.1**	**114**	**104**	**95.1**	**96.6**
SVOCs (µg/kg)								
Benzaldehyde	**70.6 JQ** SQL= 233 U	196 U	170 U	158 U	**93.7 JQ**	**46.8 JQ**	**44.3 JQ**	**100 JQ**
Ethanone, 1-phenyl-	**75.9 JQ** SQL= 233 U	196 U	170 U	**147 JQ**	**93.7 JQ**	**174 JQ**	**87.2 JQ**	263 U
Fluoranthene	233 U	**111 JQ**	**86.2 JQ**	158 U	**83.3 JQ**	**87.5 JQ**	**122 JQ**	**131 JQ**
Naphthalene	233 U	196 U	**70.6 JQ**	158 U	258 U	**81.6 JQ**	**82.8 JQ**	263 U
Phenanthrene	233 U	196 U	170 U	158 U	258 U	200 U	**72 JQ**	263 U
Phenol	233 U	196 U	170 U	**49.3 JQ**	258 U	200 U	154 U	263 U
Pyrene	233 U	**106 JQ**	**88.2 JQ**	158 U	**89.7 JQ**	**97.2 JQ**	**97.3 JQ**	**111 JQ**

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is elevated as defined in Section 5.

Key:

AC = Adjusted concentration.
B = Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
bgs = Below ground surface.
H = High bias.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
L = Low bias.
µg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
Q = The result is below the sample quantitation limit.
SQL = Sample quantitation limit.
SVOCs = Semivolatile organic compounds.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Table 7-6

SURFACE WATER ANALYTICAL RESULTS SUMMARY
OLD MILL MARINA PRELIMINARY ASSESSMENT/SITE INSPECTION
GARIBALDI, OREGON

Regional Tracking Number	**00274121**	**00284200**	**00284201**
Sample Location	**OF01**	**WL02**	**IT04**
Description	**OUTFALL (BACKGROUND)**	**MIAMI RIVER**	**INTERTIDAL**
VOCs (µg/L)			
1,2-Dichloroethane	1 U	**3.2**	**6.4**
Inorganics (µg/L)			
Aluminum	**132 JB**	**169 JB**	**956**
Arsenic	5.6 U	5.6 U	5.6 U
Barium	**24.7 JB** SQL= 200 U	**10.6 JB**	**8.3 JB**
Calcium	**119000 JL**	**155000 JL**	**168000 JL**
Chromium	1.5 UJK SQL= 2.0 U	1.5 UJK (1.2 UAC)	**1.8 JB**
Cobalt	1.7 UJK (2.2 UAC)	1.7 UJK (1.3 UAC)	1.7 UJK
Copper	**7.7 JB** SQL= 25 U	**7.5 JB**	**26.8**
Iron	**538 JL**	**211 JL**	**914 JL**
Lead	2.6 UJK (3.4 UAC)	2.6 UJK (2.0 UAC)	2.6 UJK
Magnesium	**312000 JL**	**485000 JL**	**530000 JL**
Manganese	**568 JL (727 AC)**	**29.4 JL**	**31 JL**
Mercury	0.1 UJK	0.1 UJK	**0.12 JB**
Nickel	1 UJK	1 UJK	**1.2 JB**
Potassium	**227000**	**398000**	**516000**
Sodium	**3920000**	**6970000**	**8610000**
Thallium	7.8 U	**8 JB**	7.8 U
Vanadium	**3.6 JB** SQL= 50 U	**6.7 JB**	**9.2 JB**
Zinc	**43.8 JL (56.5 AC)**	**13.3 JB**	**22.5 JK (15 AC)**
SVOCs (µg/L)			
Benzaldehyde	0.34 U	0.33 U	0.36 U
Ethanone, 1-phenyl-	0.34 U	0.33 U	0.36 U
Fluoranthene	0.34 U	0.33 U	0.36 U
Pyrene	0.34 U	0.33 U	0.36 U

Note: Bold type indicates sample concentrations above detection limits.
Underlined type indicates sample result is significant as defined in Section 5.

Key:

AC = Adjusted concentration.
B = Associated sample result is greater than instrument detection limit, but less than sample quantitation limit.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
L = Low bias.
µg/L = Micrograms per liter.
SQL = Sample quantitation limit.
SVOCs = Semivolatile organic compounds.
VOCs = Volatile organic compounds.
U = The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Table 7-7

RESIDENT POPULATIONS WITHIN A 1-MILE RADIUS
OLD MILL MARINA
GARIBALDI, OREGON

DISTANCE RING	POPULATION
On site	0
0 to 0.25 mile	179
0.25 to 0.5 mile	506
0.5 to 1 mile	198
Total	883

Source: EPA 2000a.

Table 7-8

POPULATIONS AND WETLAND ACREAGE WITHIN A 4-MILE RADIUS
OLD MILL MARINA
GARIBALDI, OREGON

DISTANCE (MILES)	RESIDENTS	WETLAND ACREAGE
On a source	0	0
0 to 0.25	179	0
0.25 to 0.5	506	0
0.5 to 1	198	45.9
1 to 2	141	93*
2 to 3	754	214*
3 to 4	1148	518*
Total	2926	870.9

Source: EPA 2000a; DOI 1995.

* Wetland acreage was estimated because digitized National Wetland Inventory data was unavailable.

8. SUMMARY AND CONCLUSIONS

In July 2000, the START conducted PA/SI sampling activities at the Old Mill Marina site located in Garibaldi, Oregon. The site is currently used as an RV resort and boat marina. Historical operations conducted at the site included wood treatment of marine lumber, plywood mill operations, and a power station.

The PA/SI involved the collection of samples from potentially hazardous substance sources on site and from target areas potentially impacted through contaminant migration. A total of 117 samples were collected for the PA/SI, including background and QA samples. Samples were collected from multiple on-site locations and from the intertidal zone of Miami Cove near the site. Samples were collected from on-site soil, groundwater, dredge spoil sediments and surface water, and Miami Cove surface water and sediments.

8.1 SOURCES

Potential source areas were identified for sampling based on the suspected presence of hazardous substances or contaminants. Potential on-site sources identified during the sampling event include the former mill building; former power station; log pole storage area; former waste dump area; former fuel station; dredge spoils; and office building, pool, restaurant, and railroad area. 2-butanone, methylene chloride, 2-propanone, and carbon disulfide are common laboratory contaminants that could not be conclusively attributed to the site; therefore, these VOCs were not considered in evaluating the site.

Of the soil samples collected from the Old Mill building, the surface soil sample collected from MB01 had the most inorganics and SVOCs detected at significant concentrations. In general, in the subsurface soil samples, the most significant concentrations of inorganics and SVOCs were present between 4 and 5.5 feet bgs in soil boring MB01. When the results were compared to the EPA, Region 9, Preliminary Remedial Goals (PRG; EPA 1999b) for cleanup of residential soils, only the surface soil sample at sample location MB01 exceeded the PRG for benzo(a)pyrene.

Of the soil samples collected from the former power station area, the surface soil sample collected from PS01 contained significant concentrations of one inorganic element and of one SVOC. In general, in the subsurface soil samples, the most significant concentrations of inorganics were present

between 0 and 4 feet bgs in soil boring PS04. The most significant concentrations of VOCs, PCBs, and SVOCs were present between 4 and 8 feet bgs in PS06. The surface soil sample from soil boring PS04 contained a concentration of PCB-1254 that exceeded the PRG; the subsurface sample collected from between 4 and 8 feet bgs in soil boring PS06 contained a concentration of PCB-1260 that exceeded the PRG; and surface and subsurface soil collected from soil boring PS02 contained concentrations of benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene that exceeded PRGs.

The one soil boring in the former log pole storage area indicated that the most significant concentrations of inorganics were present between 4 and 8 feet bgs and the most significant concentrations of SVOCs were present in the surface soil sample.

Of the soil samples collected from the former waste dump area, the surface soil sample collected from WD06 contained the most significant concentrations of SVOCs. In general, the most significant concentrations of inorganics were present between 4 and 8 feet bgs in soil boring WD02.

The one soil boring in the former fuel station area indicated that both the surface soil sample and soil between 4 and 8 feet bgs contain significant concentrations of inorganics.

Arsenic was the only element present at significant levels in the surface soil samples taken from the dredge spoils. The one soil boring from the dredge spoils indicated that the most significant concentrations of inorganics and SVOCs are present between 4 and 8 feet bgs. The subsurface soil sample collected from between 4 and 8 feet bgs in soil boring DS07 contained a concentration of benzo(a)pyrene that exceeded the PRG.

Of the surface soil samples collected at other areas on site, the railroad area contains the most significant inorganics and SVOCs. These elements may be contributed to railroad activity. The surface soil sample collected from RR02 contained concentrations of PCB-1254 that exceeded the PRGs.

8.2 TARGETS

Of the analytes detected at significant concentrations in source samples, 11 SVOCs and six inorganic elements were detected at elevated concentrations in sediment and surface water samples collected from Miami Cove. Sediments collected from sample locations OF03, OF06, OF07, OF08, and OF09 contained concentrations of benzo(a)pyrene that exceeded the PRGs. In addition, the sediment collected from OF06 contained concentrations of benzo(b)fluoranthene and indeno(1,2,3-cd)pyrene that exceeded PRGs.

8.3 CONCLUSIONS

Results of the PA/SI indicate that the Old Mill Marina site is a source of hazardous substance contamination, including VOCs, SVOCs, inorganics, and PCBs. The PA/SI documented that inorganics and SVOCs have been released from the site to Miami Cove. This contamination could potentially impact the sport and commercial fisheries, as well as sensitive environments in the area.

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APPENDIX A
PHOTOGRAPHIC DOCUMENTATION

APPENDIX B
GPS DATA

APPENDIX C

DATA VALIDATION MEMORANDA AND ANALYTICAL RESULTS