Lower Duwamish Waterway
Glacier Bay Source Control Area

Summary of Existing Information and Identification of Data Gaps

Prepared for

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Acronyms and Abbreviations

AML	Alaska Marine Lines
AST	above ground storage tank
BEHP	bis(2-ethylhexyl)phthalate
bgs	below ground surface
BMP	best management practice
BTEX	benzene, toluene, ethylbenzene, and xylenes
CSCSL	Confirmed and Suspected Contaminated Sites List
CSL	Cleanup Screening Level
DMR	discharge monitoring report
DW	dry weight
ECHO	Enforcement and Compliance History Online
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
GIS	Geographic Information Systems
HPAH	high molecular weight polynuclear aromatic hydrocarbon
LDW	Lower Duwamish Waterway
LDWG	Lower Duwamish Waterway Group
LPAH	low molecular weight polynuclear aromatic hydrocarbon
LUST	leaking underground storage tank
MCL	Maximum Contaminant Level
MEK	methyl ethyl ketone
METRO	King County Department of Metropolitan Services
MRI	MRI Corporation
MTCA	Model Toxics Control Act
ND	Not Detected
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge and Elimination System
OC	organic carbon
OVM	organic vapor meter
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
ppm	parts per million
PSA	Puget Soundkeeper Alliance
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
SAIC	Science Applications International Corporation
SIC	Standard Industrial Classification
SKCDPH	Seattle-King County Department of Public Health
SMS	Sediment Management Standards
SPU	Seattle Public Utilities
SQS	Sediment Quality Standard
SVOC	semivolatile organic compound

Acronyms and Abbreviations (Continued)

SWPPP	Storm Water Pollution Prevention Plan
TBT	Tributyltin
TCLP	Toxic Characteristics Leaching Procedure
TEQ	toxic equivalency quotient
TOC	total organic carbon
TOX	total organic halogens
TPH	total petroleum hydrocarbons
TSCA	Toxic Substances Control Act
TSS	total suspended solids
USACE	U.S. Army Corps of Engineers
UST	underground storage tank
VOC	volatile organic compound
WPCC	Washington State Pollution Control Commission
WQC	water quality criteria
WQS	water quality standard

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1.0 Introduction

1.1 Background and Purpose

The Lower Duwamish Waterway (LDW) in Seattle, WA, was added to the U.S. Environmental Protection Agency (EPA) National Priorities List in September 2001 due to chemical contaminants in sediment. The key parties involved in the LDW Superfund site are the Lower Duwamish Waterway Group (LDWG; comprised of the city of Seattle, King County, the Port of Seattle, and The Boeing Company), EPA, and the Washington State Department of Ecology (Ecology). LDWG is conducting a Remedial Investigation/Feasibility Study (RI/FS) for the LDW Superfund site.

Data collected during the Phase I Remedial Investigation (RI) were used to identify locations that could be candidates for early cleanup action. Seven candidate early action sites (or "Tier 1" sites) were identified. Data collected during Phase II of the RI were used to identify additional sites where long-term sediment cleanup actions may be necessary. The Glacier Bay Source Control Area (Glacier Bay) was identified as one of these "Tier 2" sites (Figure 1).

Ecology is the lead agency for source control for the LDW Superfund site. Source control is the process of finding and eliminating or reducing releases of pollutants to waterway sediments, to the extent practicable. The goal of source control is to prevent sediments from being recontaminated after cleanup has been undertaken.

As part of source control efforts for Glacier Bay, Ecology requested Science Applications International Corporation (SAIC) to prepare this *Summary of Existing Information and Identification of Data Gaps* report. This report documents readily available information relevant to sediment recontamination at Glacier Bay, including identification of chemicals of concern, evaluation of potential pathways for release to Glacier Bay sediments, and a description of potential adjacent and upgradient contaminant sources. In addition, this report identifies critical data gaps that will need to be addressed prior to remediation of Glacier Bay sediments.

Data presented in this report are limited to Glacier Bay, adjoining and upgradient properties, and direct discharges. Data have been compared to relevant regulatory criteria and guidelines, as appropriate.

1.2 Report Organization

Section 2 provides background information on Glacier Bay, including location, physical characteristics, chemicals of potential concern, and potential pathways for contaminants to reach Glacier Bay sediments. Section 3 describes potential sources of contaminants, including adjacent properties and upland properties. Section 4 summarizes data gaps that are critical to development of a source control action plan for the site. Section 5 provides a list of documents reviewed during preparation of this report.

Information presented in this report was obtained from the following sources:

- Ecology Northwest Regional Office Central Records
- Washington State Archives
- EPA files
- Seattle Public Utilities (SPU) Business Inspection reports
- Ecology Underground Storage Tank (UST) and Leaking Underground Storage Tank (LUST) lists
- Ecology Facility/Site Database
- Washington Confirmed and Suspected Contaminated Sites List (CSCSL)
- EPA Enforcement and Compliance History Online (ECHO)
- EPA Envirofacts Warehouse
- King County Geographic Information Systems (GIS) Center Parcel Viewer and Property Tax Records
- GIS shape files produced by SPU

2.0 Glacier Bay Source Control Area

The Glacier Bay Source Control Area is located along the western side of the LDW Superfund Site between 1.2 and 1.6 miles from the southern end of Harbor Island (Figure 1). The main properties of interest in this area include: Alaska Marine Lines, Duwamish Shipyard, Inc. (Duwamish Shipyard), Glacier Northwest, Inc. (Glacier Northwest), and the former MRI Corporation, which leased the northern portion of Terminal 115 (Figure 2). The Glacier Bay Source Control Area encompasses Potential Priority Areas 3, 4, and 5, as described in the *Draft Preliminary Screening of Alternatives for the Lower Duwamish Waterway Superfund Site* (RETEC 2006).

2.1 Site Description

General background information on the LDW is provided in the Phase I RI Report (Windward 2003), which describes the history of dredging/filling and industrialization of the Duwamish River and its environs, as well as the physiography, physical characteristics, hydrogeology, and hydrology of the area.

The upland areas adjacent to the LDW have been industrialized for many decades; historical and current commercial and industrial operations in the vicinity of Glacier Bay include cargo handling and storage, vessel repair and maintenance, concrete manufacturing, lumber milling, charcoal production, manufacture of glues and resins, and tin reclamation.

In the late 1800s and early 1900s, extensive topographic modifications were made to the Duwamish River to create a straightened channel; many of the current side slips are remnants of old river meanders. The Glacier Bay triangle appears to be one of these (Booth and Herman 1998). Dredged material was likely used to fill in the area south of Glacier Bay.

Groundwater in the Duwamish Valley alluvium is typically encountered within about 3 meters (10 feet) of the ground surface and under unconfined conditions (Windward 2003). The general direction of groundwater flow is toward the LDW, although the direction may vary locally depending on the nature of the subsurface material, and temporally, based on proximity to the LDW and the influence of tidal action. High tides can cause temporary groundwater flow reversals, generally within 100 to 150 meters (300 to 500 feet) of the LDW (Booth and Herman 1998).

Bottom sediment composition is variable throughout the LDW, ranging from sands to mud. Typically, the sediment consists of slightly sandy silt with varying amounts of organic detritus. Coarser sediments are present in nearshore areas adjacent to storm drain discharges (Weston 1999); finer-grained sediments are typically located in remnant mudflats and along channel side slopes. Sediments within the Glacier Bay triangle consist of over 60 percent fines (dry weight [DW]) and in the range of <1 to 3 percent total organic carbon (TOC) (Windward 2003).

Numerous private outfalls are present along the shoreline in this area. A city of Seattle municipal outfall is located near the southeast corner of the Glacier Northwest property (Figure 2). The extent of the area drained by this outfall is not known.

Several properties are located directly adjacent to the Glacier Bay Source Control Area. From north to south, these properties are: Alaska Marine Lines, Duwamish Shipyard, Glacier Northwest, and the former MRI Corporation (Terminal 115). To the west of these properties is West Marginal Way SW; across this roadway to the west is additional property owned by Alaska Marine Lines as well as green space owned by the City of Seattle Parks Department. To the north of the Source Control Area are Chemithon and Lafarge Corporation, and to the south is Port of Seattle Terminal 115.

Groundwater flow in the vicinity of Glacier Bay is generally toward the Duwamish Waterway. Significant tidal influence on groundwater flow directions has been documented within approximately 100 feet of the shoreline at other locations in the LDW (Hart Crowser 1987).

2.2 Chemicals of Concern in Sediment

Results of sediment sampling in the Glacier Bay Source Control Area are provided in Appendix A; chemical results above Sediment Management Standards (SMS) are summarized in Tables 1 and 2. Sampling locations are shown in Figure 3.

2.2.1 Sediment Investigations

Sediment samples have been collected from the Glacier Bay area as part of the following investigations:

Duwamish Waterway Sediment Characterization Study (NOAA 1998)

One sample (WST354, location 329) was collected near Duwamish Shipyard and analyzed for polychlorinated biphenyls (PCBs). Total PCBs in this sample were 0.7 mg/kg organic carbon (OC).

EPA Site Inspection, Lower Duwamish River (Weston 1999)

Twelve surface sediment samples were collected in the vicinity of the Glacier Bay Source Control Area (Figure 3). Nine of these samples (locations 620, 686, 687, 688, 690, 692, 693, 718, and 725) are included in the data tables in Appendix A. Two of the samples (locations 619 and 689) have been superseded by more recent samples at the same locations; one sample (location 691) is in an area that was dredged in 2005. Samples were analyzed for semivolatile organic compounds (SVOCs), metals, PCBs as Aroclors and congeners, dioxins/furans, and TOC.

LDW Phase II Remedial Investigation, Round 1 and 2 Sediment Sampling (Windward 2005a, 2005b)

Fifteen surface sediment samples were collected during two rounds of sampling for the Phase II RI in 2005. All samples were analyzed for the SMS list of chemicals. A subset of samples was also analyzed for organochlorine pesticides (4 samples), dioxins/furans (5 samples), PCB congeners (2 samples), butyltins (10 samples), and semivolatile organics (11 samples).

LDW Phase II RI Subsurface Sediment Sampling (Windward 2007)

Twenty one sediment samples were collected from five coring locations in 2006 (Figure 3). Samples were analyzed for metals, SVOCs, and PCBs. In addition, a subset of samples was analyzed for butyltins (3 locations) and dioxins/furans (3 locations).

A comparison of sample results to Washington SMS Sediment Quality Standard (SQS) and Cleanup Screening Level (CSL) values is provided in Appendix A, and those chemicals that were detected at concentrations above their respective SQS/CSL values are listed in Tables 1 and 2. For organics, the measured dry weight concentrations were OC normalized to allow comparison to the CSL/SQS.

The following chemicals exceeded SQS levels in surface sediments:

- Metals: arsenic, zinc, copper, mercury, lead
- Polynuclear aromatic hydrocarbons (PAHs): acenaphthene, chrysene, fluoranthene, phenanthrene, total high molecular weight PAH (HPAH)
- Phthalates: bis(2-ethylhexyl)phthalate (BEHP), butyl benzyl phthalate
- Other SVOCs: pentachlorophenol
- PCBs

The following chemicals exceeded SQS levels in subsurface sediments:

- Metals: arsenic, mercury, zinc, copper, lead, antimony
- PAHs: acenaphthene, benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, total benzofluoranthenes, chrysene, dibenzo(a,h)anthracene, dibenzofuran, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, total low molecular weight PAH (LPAH)
- Phthalates: BEHP
- Other semivolatile organics: 1,2-dichlorobenzene, benzyl alcohol, pentachlorophenol
- PCBs

Results for these chemicals are discussed in more detail below.

Metals. In general, the areas adjacent to Duwamish Shipyard had the highest concentrations of metals and the highest SQS exceedances, particularly at sample location SS48. Arsenic at this location was detected at 807 mg/kg dry weight (DW), which exceeded the SQS by a factor of 14. Samples from subsurface sediment locations SC26 and SC28 similarly contained the highest metals concentrations, particularly arsenic (67 to 1,890 mg/kg DW with exceedance factors of 1.2 to 33) and mercury (0.69 to 4.3 mg/kg DW with exceedance factors of 1.7 to 11). Other SQS exceedances for metals were found adjacent to Alaska Marine Lines (arsenic, copper, zinc) and Glacier Northwest (zinc). In general, the greater exceedances are associated with the deeper intervals (5 feet or more in depth) from each core. In addition, elevated levels of inorganic tin (4 to 137 mg/kg) were detected at various locations, with the highest concentration detected at location 690, along the southeastern edge of the Glacier Bay triangle (Figure 3).

PAHs. All SQS exceedances for PAHs were detected in sediment samples collected adjacent to the Duwamish Shipyards property. Exceedances were relatively minor, except for fluoranthene which was detected in surface sediment sample 686 (DR120) at 14 mg/kg DW (504 mg/kg OC) and in subsurface sediment sample SC26 at 10 mg/kg DW (532 mg/kg OC). Both samples exceeded the SQS for fluoranthene by a factor of 3.3. The subsurface sediment sample from SC26 (6 to 8 feet) exceeded the SQS for a majority of the PAH compounds analyzed.

Phthalates. Phthalates were detected at concentrations above the SQS in surface and subsurface sediments near Alaska Marine Lines, Duwamish Shipyards, and Glacier Northwest. Exceedance factors ranged from 1.1 to 4.3, with the highest SQS exceedances at subsurface sample location SC26 (BEHP at 3.8 mg/kg DW, 202 mg/kg OC) and surface sample location 692 (DR 126; butyl benzyl phthalate at 0.46 mg/kg DW, 15 mg/kg OC).

PCBs. PCBs in surface sediments were highest in samples adjacent to Glacier Northwest, with concentrations to 0.81 mg/kg DW and 66 mg/kg OC, which exceeded the SQS value by a factor of 5.5. In subsurface sediments, however, SQS exceedances for PCBs were observed adjacent to Duwamish Shipyards (locations SC26 and SC28, with concentrations to 3.2 mg/kg DW [199 mg/kg OC] and exceedance factors of 1.3 to 17) and Alaska Marine Lines (locations SC24 and SC25, with concentrations to 0.8 mg/kg DW [49 mg/kg OC] and exceedance factors of 1.2 to 4.1).

Other SVOCs. Pentachlorophenol was detected in surface sediment near Glacier Northwest (location SSB4a) at 0.41 mg/kg DW, slightly above the SQS value. Pentachlorophenol in subsurface sediment was detected above SQS values at locations SC26 and SC28, near Duwamish Shipyard (0.41 to 0.8 mg/kg). In addition, 1,2-dichlorobenzene and benzyl alcohol were detected in subsurface sediment adjacent to Duwamish Shipyard at levels above the SQS values.

Organo-tin Compounds. Monobutyltin, dibutyltin, tributyltin, and tetrabutyltin were detected in sediments along the Glacier Bay Source Control Area shoreline. Concentrations of tributyltin ranged from 0.14 to 3.0 mg/kg DW; the highest concentration was detected at location SS46, offshore of Alaska Marine Lines. This was also the highest tributyltin concentration detected anywhere in the LDW (Windward 2005b).

Dioxins/furans. Concentrations of dioxins/furans detected during the Phase II RI were higher in the vicinity of the Glacier Bay Source Control Area than at any other location within the LDW (Windward 2005b). Mammalian dioxin/furan toxic equivalency quotients (TEQs) ranged from 17 to 2,080 ng/kg DW. The highest concentrations of dioxins/furans were detected at location SS56, SS57, and SS58, all adjacent to the Glacier Northwest property.

2.2.2 Contaminants of Concern

Contaminants of concern were identified based on the results of sediment sampling conducted between 1991 and 2007. Chemicals that exceeded the SQS in at least one surface or subsurface sediment sample offshore of the Glacier Bay Source Control Area are considered contaminants of concern. In addition, although no sediment quality standards have been promulgated, dioxins and furans are considered to be contaminants of concern at Glacier Bay due to their presence in high concentrations, particularly within the Glacier Bay triangle (offshore of Glacier Northwest).

In addition, the presence of organo-tin compounds at various locations, particularly offshore of Alaska Marine Lines and Duwamish Shipyard, warrant their inclusion as contaminants of concern.

The following chemicals are considered to be contaminants of concern at Glacier Bay with regard to potential sediment recontamination:

Metals	Organics
Arsenic	Dioxins/furans
Mercury	PCBs
Zinc	Phthalates (BEHP, butyl benzyl phthalate)
Copper	PAHs
Lead	1,2-Dichlorobenzene
Antimony	Pentachlorophenol
Tin	Benzyl alcohol
	Organo-tin compounds

2.3 Potential Pathways to Sediment

Transport pathways that could contribute to the recontamination of Glacier Bay sediments following remedial activities include direct discharges via piped outfalls, bank erosion from adjacent properties, surface runoff (sheet flow) from adjacent properties, groundwater discharge, air deposition, and spills directly to the LDW. These pathways are described below, and are discussed in more specific detail in Section 3.

Outfalls. Numerous piped outfalls are present in the Glacier Bay area, including one municipal outfall and various private outfalls. Contaminants discharged via these outfalls could directly affect slip sediments.

Bank Erosion. Contaminants in soils at the banks of the LDW could be released directly to sediments via erosion. Little information was available on the construction of the banks and the potential for sediment recontamination via this pathway.

Surface Runoff. Current operational practices at nearby properties may contribute to the movement of contaminants to the LDW via runoff.

Groundwater Discharge. Contaminants in soil resulting from spills and releases to adjacent (and possibly upland) properties may be transported to groundwater and subsequently be released to the LDW. Seeps have been observed along the banks of the slip, and arsenic has been detected at concentrations above the marine chronic water quality standard (WQS).

Atmospheric Deposition. Contaminants originating from nearby properties and streets may be transported through the air and deposited at the Glacier Bay Source Control Area or in areas that drain to the LDW. Although chemical deposition from air directly to the LDW probably occurs, this transport mechanism is not likely to result in sediment concentrations above local background levels. This potential pathway is not evaluated further in this report.

Spills. Near-water and over-water activities have the potential to impact adjacent sediments from spills of material containing contaminants of concern.

3.0 Potential Sources of Sediment Recontamination

Potential sources of sediment recontamination include direct discharges via outfalls and direct and/or indirect discharges from four adjacent and several upland properties. Parcel ownership in the vicinity of the Glacier Bay Source Control Area is shown in Figure 4. Potential sources of sediment recontamination are discussed in the following sections, including piped outfalls (Section 3.1), adjacent properties (Sections 3.2 through 3.5), and upland properties (Section 3.6). Aerial photographs of the Glacier Bay Source Control Area for the years 1941, 1946, 1956, 1960, and 1969 are provided in Appendix F.

3.1 Piped Outfalls

One city of Seattle storm drain outfall is located at the southeast corner of the Glacier Bay triangle (Figure 5). Lateral storm drain lines connect several of the surrounding facilities to the main north-south line; however, the extent of the area draining to the Glacier Bay outfall is not known.

Private outfalls exist at Duwamish Shipyard, the Alaska Marine Lines graving dock, and along Glacier Northwest property. An additional private outfall is located near the City storm drain outfall. These are described in more detail in Sections 3.2 through 3.4 below.

No information on inline sediment sampling along the municipal storm drain lines in this area was available.

3.2 Alaska Marine Lines

Alaska Marine Lines (AML) owns several parcels in the Glacier Bay area. Parcel 1924049026 (9026 in Figure 4) is adjacent to the LDW and is discussed below. Parcels 9050, 9093, 9090, 9081, and 9115 are located across West Marginal Way SW, and are discussed in Section 3.6, Upland Properties. AML is the current owner/operator of a containerized freight barge terminal and warehouse located at 5600-5610 West Marginal Way SW. Lynden Incorporated is the parent company of Alaska Marine Lines. Based on a review of site documents, it appears that the various AML properties in this area are jointly managed, with 5615 West Marginal Way SW used as the primary address for all of the parcels.

The property at 5600-5610 West Marginal Way SW is 13.8 acres in size, and was purchased by AML from Wright Schuchart, Inc. in May 1989[1]. AML began operations at this location in December 1993 (AML 2001). The main operations at the facility include loading of barges and transportation/storage of containerized freight cargo. Additionally, site facilities include an onsite fueling station, truck scales, vehicle washing and steam cleaning area, and dry and liquid cargo storage, including storage of dangerous and hazardous wastes. The entire surface of the site is sealed with an impervious surface. In 1999, Alaska Marine Lines expanded the property by purchasing the northwest portion of the Duwamish Shipyard property (Anchor 2006b).

[1] King County GIS Center Parcel Viewer: http://www.metrokc.gov/gis/mapportal/PViewer_main.htm

The site is located near the Duwamish River in an industrial area of Seattle (Figure 2). It is bordered on the north by the LaFarge Corporation and Chemithon Corporation, on the east by the Duwamish Waterway, on the south by Duwamish Shipyard, and on the west by West Marginal Way SW. The shoreline of the AML property is approximately 510 feet in length (City of Seattle 2006a).

The site is underlain by 4 to 5 feet of silty clay, which overlies fine to medium sand (Dames and Moore 1991c). Groundwater is present at approximately 5 feet below ground surface (bgs). Groundwater flows toward the Duwamish and is tidally influenced (Hart Crowser 1994).

According to King County tax records, the parcel contains four structures: a 2,800-square foot maintenance office; a 16,500-square foot reefer repair shop, a 3,600-square foot forklift repair shop; and a 1,560-square foot dispatch and receiving office. All buildings were constructed in 1994.

The site operates under EPA Resource Conservation and Recovery Act (RCRA) ID number WA0000062323, and National Pollutant Discharge Elimination System (NPDES) Industrial Stormwater General Permit Number SO3-001365D.

3.2.1 Current Operations

Alaska Marine Lines operates an intermodal transportation terminal at this location. A site plan is shown in Figure 6. As listed above, activities include barge loading and unloading, containerized cargo storage, fueling of onsite vehicles such as forklifts, vehicle maintenance, and access roads and rail lines for shipping and receiving.

Site Facilities

Site facilities include an onsite fueling station, truck scales, vehicle washing and steam cleaning area, and dry and liquid cargo storage areas, including storage of dangerous and hazardous wastes. A graving dock was formerly located at the southeast corner of the property. The dock was leased to Duwamish Shipyard until its removal in 2007.

The onsite fueling facility is used for "fueling of diesel powered forklifts and cargo tanks from tanker trucks belonging to independent fuel suppliers" (AML 2001).

In 2005, AML filed plans with Ecology and the U.S. Army Corps of Engineers (USACE) to strengthen the existing graving dock gates and fill the 1.34-acre graving dock in order to expand the container storage area. Construction activities were approved by the City of Seattle Department of Planning and Development in March 2006 under application number 3003301 (City of Seattle 2006b). The hydraulic project approval was issued by the Washington Department of Fish and Wildlife in June 2006 (WDFW 2006).

Shoreline modifications were to be completed by February 15, 2007 (Spearman Engineering 2007). Plans included cleaning of the graving dock by pressure washing and mechanical and hand sweeping prior to the fill activities. Washwater from this activity was to be placed in a holding tank at Duwamish Shipyard and processed in accordance with Duwamish Shipyard's

NPDES permit. Sweepings were to be disposed of at an upland site (Spearman Engineering 2006e).

Approximately 42,000 cubic yards of clean structural soil was used to fill the graving dock area in early 2007. The area was paved and includes a stormwater drainage system (Ecology 2006g). According to an amendment to Ecology Administrative Order #3680, AML will replant native vegetation during the first growing season following the completion of the remediation activities (Ecology 2007d).

Materials Used in Operations

The site has the facilities to store the following classes of hazardous materials (AML 2001):

- Flammable liquids
- Flammable compressed gas
- Combustible liquids
- Flammable solids
- Flammable solids – dangerous when wet
- Oxidizing material
- Corrosive material
- Non-flammable compressed gas
- Chlorine, fluorine, sulfur dioxide, and ammonia
- Poisons – Class A
- Poisons – Class B
- Irritation materials
- Radioactive materials
- Explosives – Class A, B, C/blasting agents N.O.S.
- Oxygen, liquid
- Organic peroxides
- ORM – "A", "B", "C", and "D"
- Pyrophoric materials
- Etiologic agent
- Cryogenic materials

The following types of paints may be used at the site:

- Epoxy
- Water and latex base
- Vinyl
- Oil base
- Paint thinners
- Tributyltin (TBT) antifouling

The following used oils are generated at the site:

- Hydraulic oil
- Gear oil
- Engine oil

Other hazardous materials generated at the site include:

- Brake fluid
- Anti-freeze
- Batteries
- Machine tool coolants
- Sandblast grit
- Petroleum products including gasoline, diesel, and kerosene
- Degreasers including solvents, mineral spirits, paint thinners

AML may also store food wastes, vegetable or animal grease, used oil, liquid feedstock or cleaning chemicals, gravel, sand, topsoil, compost, logs, sawdust and wood chips, lumber and other building materials, concrete, and metal products.

Water Discharges

Most site runoff is directed to a sand filter system, including stormwater runoff under the truck scales. The sand filter system discharges to the Duwamish Waterway. A portion of the stormwater from the upland northwest corner of the site is directed to the city of Seattle storm drainage system (Figure 5).

Stormwater runoff from the fueling pad is conveyed to an oil/water separator, after which it is delivered to the sanitary sewer. The conveyance line to the oil/water separator has a valve to allow diversion of clean stormwater to the city storm drain system and shutoff in the event of a significant fuel spill (AML 2001). Similarly, runoff from the truck wash pad is directed through an oil/water separator and to the sanitary sewer system in accordance with a King County Department of Metropolitan Services (METRO) discharge permit. A control valve prevents entry of stormwater into the discharge system when not in use (AML 2001).

In 1993, plans were filed with Ecology to redevelop the site and discharge stormwater through filtration trenches to the Duwamish Waterway (AML 1993). Two stormwater outfalls were to be constructed in the Duwamish Waterway (Ecology 1993m).

In early 2007, as part of filling the graving dock, AML added a stormwater treatment system consisting of two underground vaults; the first includes a hydrodynamic separator device for pre-treatment removal of large size fraction particulates and associated pollutants, and the second downstream vault contains modular pre-packaged canisters with filter media (Ecology 2006g). The underground vaults are situated at the site low point (Spearman Engineering 2006b). Approximately 1.7 acres of existing area were scheduled to be repaved and the existing stormwater treatment sand filter for the repaved area was to be abandoned. The new system will sheet flow across the paved site to the southeastern quadrant of the graving dock (Spearman Engineering 2006b).

According to a 2005 city of Seattle map, there are at least five piped outfalls to the Duwamish Waterway on or near this property (Figure 2).

Ecology summarized its review of AML's 2005 stormwater monitoring data in a Stormwater Compliance Inspection Report dated January 30, 2006 (Ecology 2006d). AML reported monitoring data for first, second, and fourth quarters of 2005. Total zinc concentrations exceeded discharge limits for all reported quarters. Turbidity exceeded discharge limits during the second and fourth quarters. Oil and grease and total suspended solids (TSS) concentrations exceeded discharge limits during the fourth quarter. Ecology directed AML to inspect and clean all catch basins, sand filters, and other stormwater drainage treatment systems and to clean up all areas of the site that had an accumulation of sediment and other material (Ecology 2006d). No follow-up inspection has been conducted.

3.2.2 Past Site Use

The graving dock was constructed for Todd Shipyard and probably built by General Construction Company. Plans for the construction of the graving dock were dated November 26, 1943. Permits suggest the initial graving dock was constructed in October 1945 and expanded to its current (2006) configuration in 1954 (Spearman and Williwaw 2005).

In 1993, the property was re-graded and paved (Spearman Engineering 1993b) and a new barge terminal was constructed, including the portion of the property leased to AML by Duwamish Shipyard (Spearman Engineering 1993c). AML planned to remove a timber wharf and replace it with a concrete wharf (USEPA 1993). The plans were approved by USACE Seattle District (Ecology 1993m), Ecology (Ecology 1993n), and the Washington State Department of Fisheries (WDF 1993b). AML leased a portion of the Duwamish Waterway property and installed a new storm drain system to collect and treat runoff from the leased area and West Marginal Way SW (Duwamish Shipyard 1994b).

In 1999, AML purchased the portion of the Duwamish Shipyard property that had been under lease to AML.

3.2.3 Environmental Investigations and Cleanups

The following investigations have been conducted at the Alaska Marine Lines site:

- Site Assessment for USTs, conducted in 1990 by Dames and Moore for Alaska Marine Lines (Dames and Moore 1991a, 1991b, 1991c)
- Site Assessment Report, prepared in August 1993 by Environmental Services, Ltd. for Duwamish Shipyard (described in Hart Crowser 1994)
- Independent Remedial Action Report, Alaska Marine Lines Parcel, Duwamish Shipyards, prepared in 1993 and 1994 by Hart Crowser for Duwamish Shipyards (Hart Crowser 1994)

These investigations are described below. Analytical results for soil and groundwater samples are provided in Appendix B, and are summarized in Tables 3 and 4. Figures showing the locations of environmental samples are included in Appendix B.

Site Assessment for USTs (Dames and Moore 1991c)

In September 1990, Dames and Moore conducted a soil vapor survey, which indicated the possible release of petroleum hydrocarbons to the subsurface from two USTs and/or the associated piping; however, no soil or groundwater samples were collected to determine if a release occurred. The USTs consisted of one 10,000-gallon diesel UST and one 3,000-gallon gasoline UST. In December 1990, the USTs were removed from the site. Visual inspection of the tanks following removal indicated minor corrosion and pitting, with several small holes penetrating the walls of both USTs. The tanks were removed from the site with the approval of the Seattle Fire Marshall.

Soil excavated from the UST basin appeared to be stained light gray to black and emitted a strong petroleum odor. An organic vapor meter (OVM) was used to monitor the soil, and readings up to 300 parts per million (ppm) were recorded. Petroleum sheen and floating product on groundwater were observed in the excavation. A temporary monitoring well screened from 2 to 12 feet below grade was installed in the excavation.

Three soil samples and one groundwater sample were collected from the excavation. Samples were analyzed for total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene, and total xylenes (BTEX), and leachable lead. Analysis of these samples indicated that the onsite soils and groundwater were contaminated with gasoline- and diesel-range hydrocarbons and BTEX. The lateral and vertical extent of contaminated soil and groundwater were not investigated.

Excavated soil was backfilled and compacted into the excavation and covered with filter fabric followed by 80 cubic yards of crushed rock. Approximately 300 gallons of groundwater were pumped from the excavation and disposed of at a Northwest EnviroService Inc. facility.

The accompanying figures for this report are missing from the report copy reviewed by SAIC. No site maps indicating the locations of the USTs, soil samples, or temporary groundwater monitoring wells were found in the files reviewed by SAIC. It is not clear whether these USTs were situated on this AML property, or on the AML properties across West Marginal Way SW (Section 3.6.2).

Site Assessment Report (Environmental Services, Ltd. 1993; as described in Hart Crowser 1994)

The site assessment took place on a portion of property owned at that time by Duwamish Shipyard and leased to AML. AML subsequently purchased this property in 1999. AML used the leased property for container storage. Site assessment activities included installation of five test pits and five soil borings. Four soil borings were converted to monitoring wells. All samples were analyzed for petroleum hydrocarbons; additionally, the soil samples from two test pits were analyzed for volatile organic carbon (VOC) and SVOC compounds. Gasoline-, diesel- and lube oil-range hydrocarbon concentrations were reported in the soil samples from two test pits and four soil borings. VOCs including methylene chloride, acetone, and BTEX, and SVOCs including naphthalene, 2-methylnaphthalene, acenaphthylene, acenaphthene, dibenzofuran, fluorene, phenanthrene, anthracene, carbazole, fluoranthene, pyrene, benzo(a)anthracene, chrysene, BEHP, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-

cd)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene were reported in the test pit samples.

Groundwater samples were collected from four monitoring wells and one soil boring and analyzed for petroleum hydrocarbons; gasoline-, diesel-, and heavy-oil range hydrocarbons were reported in samples collected from three wells and the soil boring grab sample.

Independent Remedial Action Report (Hart Crowser 1994)

In October 1993, Hart Crowser oversaw excavation of approximately 650 cubic yards of petroleum-contaminated soil identified in the 1993 site assessment. The excavation took place on the portion of the Duwamish Shipyard property leased to AML. Twelve confirmation samples were collected from the bottom and sidewalls of the excavation. Petroleum hydrocarbon concentrations exceeding the Model Toxics Control Act (MTCA) Method A cleanup levels were reported in eight of the 12 confirmation samples. SVOCs were reported above cleanup levels in two soil samples (five samples were analyzed for SVOCs).

In January and February 1994, Hart Crowser performed additional site assessment activities that included the installation of three soil borings on the AML property adjacent to the graving dock (area downgradient from the October 1993 excavation). One soil boring was converted to a groundwater monitoring well. Eight soil samples were collected from the borings. Groundwater sampling was conducted twice, once when the groundwater elevation was relatively low and once when the groundwater elevation was relatively high.

Soil samples were analyzed for diesel- and oil-range hydrocarbons, PAHs, and TOC. Three samples were submitted for soil leachate extract analysis. Analysis of the soil samples indicated that soils were contaminated with diesel- and oil-range hydrocarbons and PAHs. TOC ranged from 0.3 to 2.5 percent. Petroleum hydrocarbons and PAHs were reported in the soil leachate analysis results; however, concentrations did not exceed MTCA Method A (petroleum hydrocarbon) or Method B (PAH) groundwater cleanup levels.

Groundwater samples were analyzed for TSS, diesel- and oil-range hydrocarbons, BTEX, and PAHs. Analysis of the groundwater samples indicated that the groundwater sample collected from well MW-4 (immediately west of the graving dock) was contaminated with diesel-range hydrocarbons and PAHs including naphthalene, acenaphthylene, 1-methylnaphthylene, 2-methylnaphthalene, acenaphthene, fluorene, phenanthrene, anthracene, and pyrene. Concentrations of these analytes were generally lower in the sample collected during the period of relatively high groundwater elevation. The reported concentrations for each analyte were below the respective MTCA cleanup levels.

3.2.4 Potential for Sediment Recontamination

Sediment samples collected in the LDW near the AML site in 2005 contained arsenic, copper, zinc, BEHP, and PCBs at concentrations above the SQS. In addition, high levels of organo-tin compounds were detected in sediment near the site.

Past activities at the AML site have resulted in soil and groundwater contamination. Tables 3 and 4 present a comparison of site soil and groundwater concentrations to screening levels. These screening levels were developed to assist in the identification of upland properties which may pose a potential risk of recontamination of sediments at Slip 4 (SAIC 2006). The screening levels incorporate a number of conservative assumptions, including the absence of contaminant dilution and ample time for contaminant concentrations in soil, sediment, and groundwater to achieve equilibrium. In addition, the screening levels do not address issues of contaminant mass flux from upland to sediments nor do they address the area or volume of sediment that might be affected by upland contaminants. Because of these assumptions and uncertainties, these screening levels are most appropriately used for one-sided comparisons. If contaminant concentrations in upland soil or groundwater are below these screening levels, then it is unlikely that they will lead to exceedance of marine sediment CSLs. However, upland concentrations that exceed these screening levels *may or may not* pose a threat to marine sediments; additional site-specific information must be considered in order to make such an assessment.

Contaminants have been detected in soil at concentrations above soil-to-sediment screening levels. Although petroleum-contaminated soils were excavated in 1993, contaminants remain at levels of potential concern with regard to recontamination of LDW sediments. In particular, PAHs (acenaphthene, benzo[g,h,i]perylene, fluorene, 2-methylnaphthalene, naphthalene, phenanthrene) and dibenzofuran were detected in soils at concentrations above screening levels subsequent to the cleanup action. These residual contaminants may be transported to the LDW by leaching to groundwater and subsequent transport to the waterway or by infiltration into the storm drain system.

Decommissioning the graving dock and elimination of vessel repair activities should significantly reduce the potential for future releases of hazardous and toxic materials to the environment from this facility.

Although operations at other areas of the site, such as fueling, vehicle washing, and cargo storage, may present an ongoing contaminant pathway from storm drains to the outfalls connected to the LDW, the facility operates under an Industrial Stormwater General Permit and conducts quarterly monitoring as required under the permit. AML has been directed to ensure its Storm Water Pollution Prevention Plan (SWPPP) is updated with a best management practice (BMP) for regular maintenance of the sediment removal units and filter cartridge replacement media in the new stormwater drainage system (Spearman Engineering 2006b). AML should continue review of its sample pollutant source-monitoring plan and ensure that effluent samples and results are compliant with the plan and are within NPDES discharge limits.

3.3 Duwamish Shipyard

Duwamish Shipyard, Inc. is the current owner of the property located at 5658 West Marginal Way SW in Seattle. Duwamish Shipyard operated a shipyard at the site from 1941 until April 1, 2007. The facility specialized in repair and maintenance of floating vessels and equipment (Standard Industrial Classification [SIC] code 3731). Services included machine and electrical work, carpentry, steel fabrication, pipe fitting, sandblasting, pressure washing, and painting. The facility included two dry docks and a graving dock; these have not been used since early 2007. The graving dock was leased from AML; it was filled in early 2007 to allow AML to expand their freight terminal operations.

The Larsen family purchased the site in 1939 with the intent to establish a shipyard. The property has remained in the Larsen family's possession. In 1999, a portion the northwest corner of the property was sold to AML, which had leased that portion of the property since 1993 (Duwamish Shipyard 1994b).

The site is located near the Duwamish River in an industrial area of Seattle (Figure 1). It is bordered on the north by Alaska Marine Lines, on the east by the Duwamish Waterway, on the south by Glacier Northwest, Inc., and on the west by West Marginal Way SW.

The site is paved and all site buildings have concrete-floored buildings. The entire site had been paved by 1995 (Hart Crowser 1996b). The site is underlain by silt and sand to 10 feet bgs, the maximum depth explored at the site. Organic silt is present between 9 and 10 feet bgs in many areas of the site (Anchor 2006b). This silt layer may be the same unit that is observed between 8 and 13 feet bgs at the Glacier Northwest site. Groundwater occurs between 3 and 6 feet bgs (Anchor 2006b, Kuroiwa 2000). This shallow groundwater may be a perched zone and does not appear to be tidally influenced.

The King County parcel number is 1924049028 (9028 on Figure 4). The parcel is 4.93 acres in size and is zoned for industrial use. According to tax records, there are four buildings on the site:

- The main building is 6,504 square feet and was built in 1941.
- The Wood & Machine Shop is 3,840 square feet and was built in 1944.
- The Valve Shop is 2,784 square feet and was built in 1941.
- The Machine Shop is 6,600 square feet and was built in 1954.

The site operated under the following permits and registrations:

EPA RCRA ID Number:	WAD009244997
NPDES Permit:	WA0030937
METRO Waste Discharge Permit:	7704-01 (effective 10/16/00)
	7704-02 (effective 10/19/05)
Clean Air Act ID Number:	5303300106

The site is listed on Ecology's CSCSL due to confirmed contamination of soil, sediment, and groundwater and suspected contamination of sediments[2]. The following soil contaminants are identified as confirmed: base-neutral compounds, petroleum products, non-halogenated solvents, and PAHs; priority pollutant metals are identified as "remediated." In groundwater, priority pollutant metals, PCBs, petroleum products, non-halogenated solvents, and PAHs are confirmed. In sediment, metals and PAH contamination are confirmed, while base-neutral compounds, halogenated organics, pesticides, petroleum products, and non-halogenated solvents are suspected. In surface water, petroleum product contamination is suspected.

Sediment contamination at Duwamish Shipyard was identified through the NPDES monitoring program. Contaminants reported in sediment included metals and phthalates (Ecology 1996b).

[2] Department of Ecology – Toxics Cleanup Program, Integrated Site Information System, Confirmed and Suspected Contaminated Sites List, June 7, 2007.

3.3.1 Past Operations

Duwamish Shipyard specialized in repairing and maintaining floating vessels and equipment. Services included machine and electrical work, carpentry, steel fabrication, pipe fitting, sandblasting, pressure washing, and painting. The majority of the vessels serviced were wooden fishing boats until the 1950s. From the 1960s to 2007, most vessels repaired and maintained at Duwamish Shipyard had steel hulls. The facility occasionally serviced vessels with aluminum or fiberglass hulls, but discontinued services for wood hull vessels (Anchor 2006b).

Site Facilities

Site facilities included a paint shop, distillation shed, solvent distribution shed, diesel/pump machine shop, warehouse, hazardous waste storage area, oil storage area, UST, and pump area (removed in 2000). A site map is shown in Figure 7.

The paint shop had no drains in the floor and was located approximately 100 feet from the nearest storm drain.

Paint mixing stations were located on each of the dry docks to contain paints and solvents during handling. Spill containment was achieved using 8-inch tall containment lips and raised grated floors. The distillation shed and solvent distribution shed had 12-inch and 10-inch containment lips, respectively, and raised grated floors to contain spills. The diesel/pump shop had an asphalt floor and was located approximately 10 feet from the nearest storm drain. The warehouse had an asphalt floor. The hazardous waste storage area was approximately 20 feet from the nearest storm drain. It was divided into three bermed areas, each with a volume of approximately 935 gallons. The bermed areas were used for storage of anti-freeze and acids, oily water wastes, and hazardous materials. The oil storage area was 34 feet from the nearest storm drain (Duwamish Shipyard 1997c).

The UST area contained five tanks including three 3,000-gallon USTs used for diesel fuel and gasoline, and one 1,000-gallon UST used for gasoline. These four USTs were removed in 2000 (Duwamish Shipyard 2000b). The capacity of the fifth UST is unknown. It was filled with sand over 20 years ago and likely remains underground (Duwamish Shipyard 1997c). A 1,500-gallon above ground storage tank containing 1,000 gallons of gasoline and 500 gallons of diesel fuel was installed at the site in the 2000s (Duwamish Shipyard 2005). In 2000, four USTs storing gasoline and diesel fuel for Duwamish Shipyard's vehicles and equipment were removed from the site. The former USTs were located in the central area of the property adjacent to the office building (Kuroiwa 2000).

The repair facilities at the site included:

- Dry Dock No. 1, measuring 134 feet long by 56 feet wide and capable of holding 750-ton vessels
- Dry Dock No. 2, measuring 200 feet long by 64 feet wide and capable of holding 1,000-ton vessels
- Marine Railway, measuring 120 feet long by 36 feet wide and capable of holding 350-ton vessels

- Graving Dock, measuring 410 feet long by 138 feet wide; a dry working environment was created by continuously operating sump pumps to remove river water (Hart Crowser 1996a)

The marine railway was used to dock vessels until the late 1950s. Boats were pulled up on the railway and sidetracked onto timbers for hull repair and painting (Anchor 2006b).

The 750-ton steel dry dock (Dry Dock No. 1) was acquired in 1967; the dock was used until the shipyard closed in 2007. A wooden dry dock was acquired in 1969. The wooden dry dock was sold in 1990 and replaced with a 1,000-ton steel dry dock (Dry Dock 2) (Anchor 2006b).

Materials Used and Wastes Generated

- Sandblast grit – 800 to 1,300 tons used annually (Ecology [date unknown], Hart Crowser 1996b)
- Paints, thinners, and related products (Duwamish Shipyard 1997c) – 532,680 pounds used between 1999 and 2003; 13,077 to 18,000 gallons used annually between 1995 and 2001 (Duwamish Shipyard [undated])
- Methyl ethyl ketone (MEK) - 9,961 used between 1995 and 2002 (Duwamish Shipyard [undated])
- Oils and related products (Duwamish Shipyard 1997c)
- Degreaser solvents (Duwamish Shipyard 1997c)
- Zep cleaners (Duwamish Shipyard 1997c)
- Pressure wash/hydroblast water
- Bilge waste
- Various chemicals in 1-gallon or less containers (Duwamish Shipyard 1997c)
- Dangerous and hazardous waste - 10,034 pounds generated between 1992 and 1994 (Hart Crowser 1996a)

Sandblast grit was used in three applications at the site: 70 percent applied to ship hulls, 15 percent to ship holds and superstructures, and 15 percent in the sandblast shed. Spent grit was recovered manually from the dry docks and marine railway prior to launching vessels and swept from the graving dock floor using a Bobcat. The spent grit was later removed from the site and used in cement manufacture (Hart Crowser 1996b).

Best management practices employed to reduce the release of pollutants to the environment included (Hart Crowser 1996b):

- Tarping the dry docks and graving dock during sandblasting operations to contain grit and dust.
- Paving the site.
- Yard sweeping using a small Bobcat and by an outside company; the yard was cleaned on a weekly basis.
- Installing filter inserts in the stormwater catch basins; the inserts were inspected and cleaned monthly.

- Installing an air filter in the paint spray shed to remove particulates.

There were seven major work processes for vessel repair performed at the site (Hart Crowser 1996a). These processes and the potential pollutant releases and contaminants associated with the processes included:

- Vessel engine maintenance
  - Drain engine fluids (lubricants)
  - Clean and degrease parts
  - Replace engine fluids (used or new lubricants)
- Vessel cooling system maintenance
  - Drain cooling system fluids (antifreeze)
  - Clean parts
  - Replace fluids (used or new antifreeze)
- Parts cleaning and degreasing
  - Solvent cleaning system
- Hull preparation
  - Pressure wash and sandblast hull surfaces to be painted
  - Collect pressure washwater and pump to holding tanks
  - Collect spent sandblast grit and move to storage area
- Hull finishing
  - Mix paint
  - Paint prepared surfaces
  - Clean painting equipment
- Miscellaneous hand-painting tasks
  - Mix paint
  - Paint prepared surfaces
  - Clean painting equipment
- Wastewater treatment system
  - Pump wastewater from holding tanks into treatment system
  - Add treatment chemicals
  - Discharge treated wastewater to METRO sewer
  - Remove sludge from treatment system and transport to storage area with spent sandblast grit

Regulatory History

1980s

In March 1985, Duwamish Shipyard filed a revised "Notification of Dangerous Waste Activities" with Ecology. The waste is described as still bottoms from solvent recovery (120 pounds generated annually; Duwamish Shipyard 1985).

In August 1986, Ecology issued a warning to Duwamish Shipyard after one of the dry docks was lowered without proper cleaning to contain sandblast grit (Ecology 1986). Nine samples of the grit were collected by EPA and submitted for laboratory analysis for metals. Barium, cadmium, copper, molybdenum, nickel, strontium, vanadium, and zinc concentrations were reported in the samples, with copper and/or zinc concentrations exceeding the maximum contaminant limit in seven of the nine samples (Laucks 1986). Therefore, the spent sandblast grit was characterized as a dangerous waste and Duwamish Shipyard was required to perform bioassay tests (Ecology 1990b).

In October 1987, Ecology cited Duwamish Shipyard for allowing spent sandblast grit to enter the Duwamish River from the marine railway, and recommended using tarpaulins to contain the grit. An Ecology inspector collected a sample of grit-covered sediments and grit/paint scum. The samples were analyzed for total priority pollutant metals and total recoverable priority pollutant metals. Arsenic, barium, cadmium, lead, silver, and mercury concentrations were reported in the sediment sample. Arsenic, cadmium, chromium, copper, lead, nickel, silver, zinc, selenium, and mercury concentrations were reported in the paint/scum samples (Ecology 1987h, Ecology 1987i, Ecology 1988a). Duwamish Shipyard enclosed the marine railway sandblasting operations with tarpaulins and/or visqueen barriers, enclosed the marine rail floor, constructed a berm at the lower perimeter of the floor, and removed spent sandblast grit and paint detritus each day to reduce and eliminate the release of pollutants (Duwamish Shipyard 1988b). Duwamish Shipyard was fined for the pollution incident (Ecology 1998b, 1988c, 1988d, Duwamish Shipyard 1988a).

Handwritten notes from Ecology indicate that waste oil was spilled onto soil on the site in 1988. Duwamish Shipyard reported that the soil was drummed and sent to a kiln to be burned. Duwamish Shipyard requested that their site status be changed since the cleanup was complete; however, they did not collect any soil or groundwater samples to confirm the cleanup actions (Ecology 1990a).

<u>1990s</u>

In 1990, Duwamish Shipyard's Minor Discharge Authorization No. 245, issued by METRO, expired. METRO elected not to renew the authorization because the facility had not made use of the authorization and had not completed the conditions of the authorization. The authorization apparently allowed Duwamish Shipyard to discharge untreated pressure washwater to the sewer for a treatment study performed by METRO (METRO 1992). Duwamish Shipyard's 1990 METRO Waste Discharge Permit Application indicates a maximum discharge of 3,500 gallons per day of wastewater to the sewer. Duwamish Shipyard described the wastes as high pressure washwater of marine vessels. Three other waste streams were noted: solvents, oils and bilge waters, and sandblast grit; however, Duwamish Shipyard did not intend to discharge these wastes to the sewer (Duwamish Shipyard 1990).

In July 1990, samples of waste sandblast grit collected from several shipyards were analyzed for Toxic Characteristics Leaching Procedure (TCLP) metals, VOCs and SVOCs, including a sample collected from Duwamish Shipyard. VOCs and SVOCs were not detected in the Duwamish Shipyard sample. Barium was the only TCLP metal reported in the facility's waste sandblast grit sample (Duwamish Shipyard 1985).

In March 1992, Duwamish Shipyard submitted a revised "Notification of Dangerous Waste Activities" to Ecology (Duwamish Shipyard 1992). The waste streams listed are:

- Liquid sludge from paint distillation, containing MEK contaminated with lead (700 pounds generated annually).
- Solid sludge from paint distillation, containing MEK contaminated with lead (750 pounds generated annually).
- Paint waste, containing MEK contaminated with lead and recycled on site (1,000 pounds generated annually).
- Waste oil/cutting oil in water (1,000 pounds generated annually).
- Waste diesel fuel (250 pounds generated annually).
- Motor oil with minor contamination and ethylene glycol coolant (500 pounds generated annually).

In February 1993, METRO warned Duwamish Shipyard to obtain a permit to discharge "hydroblast" water to the sanitary sewer, and warned that the wastewater would "undoubtedly require pretreatment in order to meet METRO's discharge limits." METRO advised Duwamish Shipyard that discharge of untreated wastewater to the sewer or the Duwamish River was illegal (METRO 1993a).

Duwamish Shipyard admitted to discharging untreated pressure washwater to the sewer and the Duwamish River during an Ecology site inspection in February 1993 (Ecology 1993d). The Ecology inspection report also notes the presence of oil sheens outside the machine and engine shops, improperly labeled hazardous waste drums, spray paint overspray outside the paint shop, spent sandblast grit tracked outside the designated storage area, and water overflowing from a dust collection system, onto the sandblast grit, and out to the Duwamish (Ecology 1993d). A follow-up letter notes that many of the monthly discharge monitoring reports (DMRs) for 1992 required by the site's NPDES permit were either incomplete or not submitted (Ecology 1993e). Duwamish Shipyard was fined for numerous NPDES permit violations (Ecology 1993f, 1993g, 1993l, 1993p, 1993q; Duwamish Shipyard 1993a, 1993b, 1994c; Environmental Hearings Office 1993, 1994).

A site hazard assessment was reported by Ecology in February 1993; a ranking of "No Further Action" was issued contingent upon the analytical results of soil samples collected outside a temporary shed in January 1993 (Ecology 1993c). SAIC's review of the available files did not locate the results from this sampling.

In June 1993, Ecology performed an NPDES compliance inspection at the shipyard after Ecology and Puget Soundkeeper Alliance (PSA) observed conical piles of spent sandblast grit left on the north dry dock as it was lowered into the water to launch a completed vessel. The inspection report notes that the pre-treatment system for washwater was not yet connected. DSI was rearranging the hazardous waste accumulation areas at the shipyard and Ecology noted several areas of non-compliance (Ecology referred the site to the Hazardous Waste Division, see paragraph below). Spent sandblast grit accumulated in 2-foot deep piles was noted in areas where stormwater would carry the grit to the Duwamish River and on the dry docks where copper could leach from the grit when it came into contact with water. Metal shavings were discovered on the river bank adjacent to the south dry dock. Duwamish Shipyard personnel reported that the shavings were historic and that the company had discontinued dumping materials on the river banks. The skin of the south dry dock was rusted through, allowing spent sandblast grit, pressure washwater, and bilge water to leak from the dry dock and into the Duwamish River. Sediments in the marine railway area were covered with a slight, orange-colored sheen that may have indicated the presence of iron-accumulating bacteria (Ecology 1993i).

In August 1993, METRO issued a minor discharge authorization to Duwamish Shipyard. The discharge limit was 750 gallons per day of treated wastewater generated from pressure washing of vessels (METRO 1993b).

In January 1994, Ecology performed an NPDES compliance inspection at Duwamish Shipyard. The Ecology inspectors noted that many of the non-compliance issues found during the June 1993 inspection had been resolved and the pre-treatment system for washwater had been connected. However, uncovered spent sandblast grit was found adjacent to a storm drain along with milky water discharging to the storm drain from a pipe at the paint shop. The pipe was connected to a sink where employees washed their hands (Ecology 1994a).

In April 1994, Ecology performed a hazardous waste compliance inspection at Duwamish Shipyard. The Ecology inspector found six areas of non-compliance (Ecology 1994g):

- Open dangerous waste containers in the graving dock accumulation area,
- Improper designation of dangerous waste prior to disposal,
- Allowing dangerous wastes to accumulate at the site for more than 90 days,
- Failing to label containers with the accumulation start dates,
- Failing to label containers containing hazardous or dangerous wastes as “Hazardous Waste” or “Dangerous Waste,” and
- Failing to notify Ecology of changes in the facility contact information.

Duwamish Shipyard corrected the non-compliant areas within the allotted time allowed by Ecology (Duwamish Shipyard 1994e).

In August 1994, Duwamish Shipyard submitted a revised “Notification of Dangerous Waste Activities” form to Ecology. The dangerous wastes are described as liquid waste from marine painting and degreasing (850 pounds generated annually) and liquid sludge from paint distillation (450 pounds generated annually; Duwamish Shipyard 1994d).

In September 1994, PSA collected a discharge water sample from pipes at the dry docks near the shipyard. Sandblasting and painting operations were in progress at the time the sample was collected. The sample was analyzed for VOCs, oil and grease, and metals. Analysis of the sample indicated that concentrations of methylene chloride, and oil and grease were below reporting limits. Calcium, potassium, magnesium, sodium, aluminum, and manganese concentrations in the sample were similar to concentrations found in background water samples collected from the Duwamish. Arsenic, barium, chromium, copper, iron, lead, and zinc concentrations were similar to the levels seen in the "collection system" (METRO 1994). SAIC assumes this collection system is part of Duwamish Shipyard's stormwater treatment system.

In September 1994, Ecology performed an NPDES compliance inspection. The Ecology inspector noted that the wastewater treatment system was in place and wastewater was discharged to the METRO sewer. Duwamish Shipyard was in the process of repairing the decking on the southern dry dock and had made significant improvements in cleaning up spent sandblast grit and ensuring hazardous wastes at the site were properly stored with adequate containment (Ecology 1994h).

In March 1995, Ecology informed Duwamish Shipyard that their stormwater discharge reporting for the parameters to be monitored on a semiannual or annual basis was inadequate (Ecology 1995a).

In August 1995, PSA notified Duwamish Shipyard of its intent to file a civil lawsuit against the company for repeated violations of the Clean Water Act, the NPDES permit, and Washington state pollution control laws (Smith 1995). The parties settled out of court. Duwamish Shipyard agreed to take substantial measures to improve environmental operations at the site and provide information about its discharges to the public (PSA 1995, 1996).

In October 1995, Ecology performed an NPDES compliance inspection in conjunction with renewal of the permit. Duwamish Shipyard had made significant changes to its BMPs including weekly cleaning of paved areas, changing the tarping procedure to reduce airborne contaminants, installing catch basin inserts in storm drains, paving several areas of the yard to reduce turbidity in stormwater runoff, installing a roof and asphalt lip at the spent sandblast grit storage area, and working with an outside contractor to improve the stormwater treatment system (Ecology 1995b).

In January 1996, Duwamish Shipyard submitted a dry dock repair schedule. The deck plating on Dry Dock No. 3 had deteriorated, resulting in leakage of washwater into the bilge (Duwamish Shipyard 1996).

In September 1996, Ecology performed an inspection of the site. The Ecology inspector noted the improvements made to Duwamish Shipyard's practices during 1996. These included: moving the hazardous waste storage area and adding fencing to segregate waste types, eliminating the use of chlorinated solvents and using less toxic products, performing pollution prevention training on a trade-by-trade basis, publishing a quarterly newsletter regarding pollution prevention, using two large storage tanks to recycle filtered washwater for cleaning the dry docks, experimenting with high pressure washing techniques to eliminate the need for sandblasting, and covering compressors and using drip pans to collect leaks. Ecology noted that oil and grease concentrations, turbidity, and pH in effluent samples collected from Duwamish Shipyard's outfalls had exceeded the NPDES permit limits 11 times since the new NPDES permit was issued in January 1996 (Ecology 1996e).

In March 1997, Ecology notified Duwamish Shipyard that turbidity in effluent samples collected from the outfalls exceeded discharge limits. The notice of violation was retracted after Duwamish Shipyard showed that turbidity in discharged water was lower than background turbidity (Ecology 1997e, 1997f; Duwamish Shipyard 1997b).

In August 1997, Ecology performed an inspection of the site. The inspector noted that the sandblast grit storage area was full to overflowing and recommended that the grit be stored in a bermed and roofed area to prevent grit from reaching: (1) the stormwater drainage system, (2) a sink discharging to a drainage ditch that flowed to a neighboring property (Duwamish Shipyard had previously reported that this sink was not used), and (3) the area along the bulkhead draining to the Duwamish River. Ecology recommended installing a drainage system to the bulkhead to direct water to the stormwater treatment system. Additionally, Ecology noted that the DMRs showed three oil and grease violations and seven reporting violations (Ecology 1997h).

Following a lawsuit settlement with the PSA, Duwamish Shipyard was required to submit DMRs to PSA. Due to pH limit violations in October 1997, PSA requested that Ecology require Duwamish Shipyard to continue monitoring the outfalls on a monthly basis. Ecology had reduced the discharge monitoring requirements to quarterly in February 1997. Ecology denied PSA's request (PSA 1997a, 1997b; Ecology 1997b, 1997c).

In March 1998, PSA notified Ecology after observing sandblast overspray from operations at Duwamish Shipyard on February 27, 1998. Duwamish Shipyard stated that the accidental overspray resulted from unexpected high winds and that the resulting dust was cleaned from the shipyard the following day (Duwamish Shipyard 1998a, Ecology 1998d, PSA 1998).

In December 1998, Duwamish Shipyard notified Ecology that it would no longer conduct shipyard activities at the marine railway and requested that Outfall 006 be removed from the NPDES permit (Duwamish Shipyard 1998b).

In September 1999, Duwamish Shipyard notified Ecology of an accidental discharge to the LDW of mud from the bottom of a vessel being repaired in the graving dock. Steel was being removed from the vessel at the time of the discharge. When the discharge was noticed, Duwamish Shipyard immediately stopped the discharge and removed the mud from the area (Duwamish Shipyard 1999).

<u>2000s</u>

In October 2000, King County Department of Natural Resources issued Wastewater Discharge Permit No. 7704-01 to Duwamish Shipyard. The permit authorized the facility to discharge 750 gallons per day of industrial wastewater and 186,000 gallons per day of contaminated industrial stormwater to the sanitary sewer (KCDNR 2000a).

In November 2000, PSA filed a complaint with Ecology after observing a plume of dust while Duwamish Shipyard was sandblasting a boat in the graving dock. PSA collected a water sample and submitted it for laboratory analysis of metals. Analysis of the sample indicated elevated concentrations of copper and zinc (KCDNR 2000b; PSA 2000a, 2000b).

In July 2001, PSA filed two complaints with Ecology after observing a plume of dust apparently derived from sandblasting activities at Duwamish Shipyard. The Shipyard reported that sandblasting activities were discontinued after notification of the dust plume. Due to strong winds, the normal containment system of tarpaulins had been compromised. The second dust plume may have been generated from the cement plant (Glacier Northwest) to the south of Duwamish Shipyard. Ecology noted that the primary tarpaulin system was adequate for dust control, but a secondary tarpaulin system contained large gaps. Ecology requested that Duwamish Shipyard submit an incident report (Ecology 2001d).

In April 2002, Duwamish Shipyard was fined by the King County Department of Natural Resources for violating the daily average copper concentration acceptable under METRO Wastewater Discharge Permit No. 7704-01 (KCDNR 2002).

In October 2004, Ecology sent a Notice of Violation to Duwamish Shipyard for three incidents of an "orange plume" discharge from the graving dock. The first incident was the result of a pumping system failure; DSI immediately repaired the pump to prevent future releases. In March 2005, Duwamish Shipyard was fined by Ecology for these three incidents, which violated its NPDES permit and RCW 90.48.080 (Ecology 2004, 2005a, 2005b).

In October 2005, King County Wastewater Treatment Division issued Wastewater Discharge Permit No. 7704-02 to Duwamish Shipyard. The revised permit increased the maximum daily discharge volume to 2,400 gallons per day (KCWTD 2005).

Water Discharges

Wastewater generated from pressure washing of vessels at the dry docks was collected in a sump and pumped on shore to a treatment system prior to discharge to the King County sanitary sewer. The system was installed in the spring of 1998 (Anchor 2006b).

Wastewater generated from pressure washing from the graving dock area was collected in a containment system to prevent wastewater from seeping through the tide gates to the Duwamish (Anchor 2006b).

Surface drainages were not allowed to enter the property (Anchor 2006b). A stormwater system was installed on the site in the 1970s. The system consisted of 10 catch basins fitted with inserts and oil sorbent pillows. From the catch basins, stormwater runoff from the paved parking and active industrial areas was directed to a 10-inch-diameter trunk line. The line discharged to a sump, and stormwater was pumped through a centrifugal separator to remove grit. After grit was removed, the stormwater was discharged to the Duwamish River via Stormwater Outfall 005 (Figure 7). The system was operated under Duwamish Shipyard's individual NPDES permit (Anchor 2006b).

The NPDES permit regulates potential stormwater discharges from operations on the AML graving dock and the two movable dry docks (Anchor 2006b). The NPDES permit, modified on October 10, 2005, covers the following outfalls:

- Stormwater Outfall 005
- Graving Dock Pump Out Water Outfall 003
- Dry Dock Outfalls 001, 003
- Graving Dock Outfall 004

Duwamish Shipyard was required to monitor Stormwater Outfall 005 and Graving Dock Pump Out Water Outfall 003 twice per month for total recoverable copper, lead, and zinc; turbidity and background turbidity; and oil and grease. The remaining outfalls were to be monitored each launch for oil and grease and for visible sheen (Ecology 2005d). A second stormwater outfall was used at the site until an unknown date (Stormwater Outfall 004). The stormwater was subsequently redirected to Stormwater Outfall 005 (Ecology [date unknown]).

Dry dock flood water was generated when work was completed on a vessel and the dry dock was flooded with river water in order to float the vessel back into the river. Duwamish Shipyard was to employ BMPs to ensure that materials accumulated on the floor of the dry dock during service (e.g., spent abrasive grit, oil, paints, solvents) were removed prior to flooding the dry dock (Ecology [date unknown]).

The results of two acute bioassay tests performed on effluent grab samples collected in October 1996 (Parametrix 1996a, 1996b; Ecology 1996f, 1997d) and March 1997 (Parametrix 1997a, Ecology 1997j); graving dock floodwater samples collected in March and October 1997 (Parametrix 1997b, 1997d; Ecology 1997i) and February 1998 (Parametrix 1998, Ecology 1998f); and a dry dock floodwater sample collected in October 1997 (Parametrix 1997c, Ecology 1998b) were reviewed. No toxicity was observed in any of the reports reviewed. Ecology rejected the test results from the October 1997 graving dock floodwater sample because the samples were analyzed outside holding times (Ecology 1998a, 1998c).

3.3.2 Environmental Investigations and Cleanups

The following investigation reports have been prepared for the Duwamish Shipyard site:

- Results of Sampling and Analysis Sediment Monitoring Plan, prepared in August 1993 by Hart Crowser for Duwamish Shipyard, Inc. (Hart Crowser 1993c)
- Site Assessment Report, prepared in August 1993 by Environmental Services, Ltd. for Duwamish Shipyard, Inc. (as described in Hart Crowser 1994)
- Independent Remedial Action Report, Alaska Marine Lines Parcel, Duwamish Shipyards, prepared in 1993 and 1994 by Hart Crowser for Duwamish Shipyards (Hart Crowser 1994)
- Dry Dock and Graving Dock Discharge Metals Report, prepared in 1996 by Hart Crowser for Duwamish Shipyards (Hart Crowser 1996c)
- 1997 Dry Dock and Graving Dock Discharge Metals Report, prepared in 1997 by Hart Crowser for Duwamish Shipyards (Hart Crowser 1998b)
- Independent Remedial Action Report, Underground Storage Tank Closure, prepared in June and August 2000 by RK Kuroiwa for Duwamish Shipyard, Inc. (Kuroiwa 2000)
- Preliminary Investigation Data Report, prepared in September 2006 by Anchor Environmental, LLC for Duwamish Shipyard, Inc. (Anchor 2006b)

These investigations are described below. Analytical results for sediment, soil, catch basin solids, and groundwater samples are listed in Appendix C, and are summarized in Tables 5 through 8. Figures showing the locations of environmental samples are included in Appendix C.

Results of Sampling and Analysis Sediment Monitoring Plan (Hart Crowser 1993c)

Hart Crowser collected four surface sediment samples inside the upstream and downstream property lines, within the marine railway slip, and between the two dry docks. A reference sample was collected upstream of the Duwamish Shipyard. Two acute bioassays and one chronic marine sediment bioassay were performed on the four sediment samples collected within the shipyard property. The sediment samples were analyzed for priority pollutant metals, SVOCs, organo-tin compounds, TOC, and grain size.

Hart Crowser reported that statistically significant mortality was measured in all sediments for the acute 10-day amphipod mortality bioassay and for two samples in the acute larval mortality/abnormality bioassay. Hart Crowser reported statistically non-significant mortality in the chronic 20-day juvenile polychaete bioassay. Ecology did not agree with Hart Crowser's interpretation of the data and found the mortality rates to be significant for all bioassays (Ecology 1994c, 2003a, Ecology [date unknown]).

Analysis of the sediment samples indicated detections of 10 of 14 priority pollutant metals; arsenic, copper, lead, and zinc exceeded the CSL. Arsenic (1,130 mg/kg DW) exceeded the SQS by a factor of 20 and zinc (4,440 mg/kg DW) exceeded the SQS by a factor of 11 in SS-2, near Dry Dock No. 1. PAHs above the SQS were detected in the two samples near Dry Dock No. 1. Phthalates (BEHP and butyl benzyl phthalate) were also detected above the SQS. Butyltins were detected in all sediment samples. TOC ranged from 1.41 to 2.74 percent in the samples. The samples were comprised of sandy clayey silts and clayey silty sands. Samples SS-1 and SS-2, which had SQS exceedances, are near the location of sediment sample LDW-SS48, collected during the LDW Phase II RI (see Section 2.2).

Site Assessment Report (Environmental Services Limited 1993; as described in Hart Crowser 1994)

The site assessment took place on a portion of property owned by Duwamish Shipyard and leased to Alaska Marine Lines. This property was sold to AML in 1999. The results of the investigations are discussed in Section 3.2.3.

Independent Remedial Action Report (Hart Crowser 1994)

In October 1993, Hart Crowser oversaw excavation of approximately 650 cubic yards of petroleum contaminated soil identified in the 1993 site assessment. The excavation took place on the portion of the Duwamish Shipyard property leased to Alaska Marine Lines. This property was sold to AML in 1999. The results of the investigations are discussed in Section 3.2.3.

Dry Dock and Graving Dock Discharge Metals Report (Hart Crowser 1996c)

Hart Crowser conducted monthly sampling of four outfalls associated with Duwamish Shipyard from January to November 1996. Outfalls 001 and 002 were associated with the dry docks and Outfalls 003 and 004 were associated with the graving dock. Samples were analyzed for copper, lead, and zinc (Appendix C). Copper concentrations in the samples consistently exceeded the WQS acute criteria for all sampling locations, including background samples. Zinc concentrations slightly exceeded the WQS criteria in four samples and greatly exceeded WQS criteria in one sample collected at Outfall 003. Lead concentrations were below the WQS criteria for all samples. No effluent limits for copper, lead, or zinc were set in Duwamish Shipyard's NPDES permit.

1997 Dry Dock and Graving Dock Discharge Metals Report (Hart Crowser 1998b)

Hart Crowser conducted monthly sampling of four outfalls associated with the Shipyard from January to November 1997. Outfalls 001 and 002 were associated with the dry docks and Outfalls 003 and 004 were associated with the graving dock. In 1997, Hart Crowser began collecting background river water samples. Samples were analyzed for copper, lead, and zinc (Appendix C). Copper concentrations in the samples consistently exceeded the WQS acute criteria for all sampling locations, including background samples. Lead and zinc concentrations were below the WQS criteria for all samples. No effluent limits for copper, lead, and zinc were set in Duwamish Shipyard's NPDES permit.

Independent Remedial Action Report, Underground Storage Tank Closure (Kuroiwa 2000)

In June 2000, petroleum-contaminated soil was discovered during the removal of two 3,000-gallon unleaded gasoline USTs, one 3,000-gallon diesel UST, and one 1,000-gallon unleaded gasoline UST. The area was over-excavated in August 2000 to remove petroleum-contaminated soil, resulting in an excavation area approximately 30 by 40 feet wide and 7 feet deep. Eighteen confirmation samples were collected from the sidewalls and bottom of the excavation. Soil samples were analyzed for gasoline-, diesel-, and oil-range hydrocarbons, BTEX, and total lead. Gasoline-range hydrocarbons, diesel-range hydrocarbons, and benzene were reported at concentrations above the MTCA Method A cleanup levels in sidewall and bottom samples.

During the initial UST excavation, approximately 60 cubic yards of soil was stockpiled on site. The soil was treated and re-sampled. Analysis of the soil samples indicated that petroleum hydrocarbons, BTEX, and lead concentrations were below MTCA cleanup levels. The stockpiled soil was used as backfill in the UST excavation. Approximately 20 cubic yards of petroleum-contaminated soil generated during the over-excavation activities was removed from the site. Groundwater removed from the open excavation was collected by Duwamish Shipyard for onsite treatment or removed from the site for treatment.

Preliminary Investigation Data Report (Anchor 2006b)

Anchor advanced 12 soil borings and collected 24 soil samples (two from each boring) and 12 groundwater samples (one from each boring). Anchor redeveloped two existing groundwater monitoring wells and collected two groundwater samples (one from each well). Anchor also collected solids samples from the 10 stormwater catch basins and the stormwater system sump.

Contaminants reported above MTCA cleanup levels in soil were gasoline- and diesel-range hydrocarbons, benzene, total arsenic, cadmium, lead, and benzo(a)pyrene (Table 6). Copper, mercury, zinc, PAHs (acenaphthene), and phthalates (BEHP and butyl benzyl phthalate) were reported above the SQS and CSL values in the catch basin sample (Table 7). Arsenic, chromium, lead, benzo(a)pyrene, benzene, and vinyl chloride concentrations reported in groundwater exceeded MTCA cleanup levels. No marine surface water criteria exceedances were noted for the nearshore groundwater samples.

Ecology reviewed the preliminary report and directed Duwamish Shipyard to do the following (Ecology 2007a):

- Clean out catch basins and lines, sample and report results;
- Review existing sampling results and add three monitoring wells with additional soil and groundwater sampling;
- Prepare a work plan for proposed additional sampling, including analyses for tri-butyl tin;
- Prepare a sediment evaluation work plan for nearshore sediment.

3.3.3 Potential for Sediment Recontamination

Sediment samples collected in the LDW near the Duwamish Shipyard site in 2005 contained arsenic, antimony, copper, lead, mercury, zinc, PAHs, BEHP, butyl benzyl phthalate, 1,2-dichlorobenzene, benzyl alcohol, pentachlorophenol, and PCBs at concentrations above the SQS (Section 2.1 and Tables 1 and 2). Arsenic, mercury, and PCBs exceeded the SQS by more than a factor of 10.

Tables 6 and 8 present a comparison of site soil and groundwater concentrations to MTCA Cleanup Levels and draft sediment screening levels (SAIC 2006)[3]. Arsenic is present in site soils (to 48 mg/kg DW) and groundwater (to 84 µg/L) at concentrations above the MTCA Cleanup Level (Anchor 2006b). Lead also exceeds MTCA Cleanup Levels and sediment screening levels in both soil (to 4,940 mg/kg DW) and groundwater (to 55 ug/L). Benzo(a)pyrene exceeds the sediment screening level in soil (to 7.9 mg/kg DW) and groundwater (to 3.5 ug/L). VOCs (benzene, vinyl chloride) and petroleum hydrocarbons exceed MTCA Cleanup levels in soil and/or groundwater.

PCBs (Aroclor 1260) are present at concentrations to 0.3 mg/kg DW in site soils, although they do not exceed the MTCA Cleanup Level or sediment screening levels, and were not detected in groundwater or in the catch basin solids sample. Mercury was detected in the catch basin solids sample at 1.05 mg/kg DW, above the SQS of 0.41 mg/kg DW. Copper, zinc, PAHs, and phthalates were also detected in catch basin sediments at concentrations above the SQS (Table 7). Therefore, historic soil and groundwater contamination at this site may represent a potential source of sediment recontamination.

Duwamish Shipyard closed on April 1, 2007. Although operations have ceased at the site, decommissioning operations and residual soil and groundwater contamination at the site may continue to pose a risk of sediment recontamination. Potential pathways for discharge from this site include groundwater transport and stormwater discharges. Groundwater beneath the site is contaminated with arsenic, chromium, lead, benzo(a)pyrene, benzene, and vinyl chloride; therefore, the groundwater-to-sediment pathway is of greatest concern at this site.

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[3] These screening levels were developed to assist in the identification of upland properties which may pose a potential risk of recontamination of sediments at Slip 4. The screening levels incorporate a number of conservative assumptions, including the absence of contaminant dilution and ample time for contaminant concentrations in soil, sediment, and groundwater to achieve equilibrium. In addition, the screening levels do not address issues of contaminant mass flux from upland to sediments nor do they address the area or volume of sediment that might be affected by upland contaminants. Because of these assumptions and uncertainties, these screening levels are most appropriately used for one-sided comparisons. If contaminant concentrations in upland soil or groundwater are below these screening levels, then it is unlikely that they will lead to exceedance of marine sediment CSLs. However, upland concentrations that exceed these screening levels *may or may not* pose a threat to marine sediments; additional site-specific information must be considered in order to make such an assessment.

3.4 Glacier Northwest, Inc.

Glacier Northwest, Inc. (Glacier Northwest) is the current owner/operator of a cement terminal located at 5900 West Marginal Way SW in Seattle. The site has been historically referred to by Glacier Northwest as the West Marginal Way Plant and Marginal Way Truck Stop. The property has had many previous owners and tenants, including Carlisle Lumber Company, the U.S. Army, Reichhold Chemical Company, the Port of Seattle, Kaiser Cement Company, Lone Star Northwest, Inc., and Ash Grove Cement West, Inc. In this report, all of these names refer to the site located at 5900 West Marginal Way SW.

The site is located near the Duwamish River in an industrial area of Seattle (Figure 2). The site is bordered on the north by Duwamish Shipyard, on the east by the Lower Duwamish Waterway, on the south by Terminal 115, and on the west by West Marginal Way SW.

The site is covered by approximately 1 foot of crushed gravel over approximately 3 to 5 feet of mixed sand, gravel, and sawdust fill. Alluvial sand and silt underlies the fill to a depth of approximately 8 feet bgs. An organic silt and clay unit is present throughout the site between approximately 8 and 13 feet bgs. Alluvial sand is present beneath the organic silt and clay unit (Hart Crowser 1995).

A perched groundwater unit forms seasonally above the organic silt and clay layer which acts as an aquitard. When present, the perched groundwater is encountered beneath the site between 4 and 13 feet bgs. A deeper groundwater unit is present in the alluvial sand layer beneath the silt/clay aquitard. Groundwater in the deeper zone generally flows to the northeast towards the Duwamish River (Hart Crowser 1995).

The site is located on King County parcel number 1924049029 (labeled 9029 in Figure 4). The area of the site is approximately 18.2 acres. There are two buildings on the site:

- A 17,312-square foot warehouse built in 1967, and
- A 492-square foot truck scale house built in 1967.

The site is listed on Ecology's CSCSL due to the confirmed presence of metals and phenols in surface water, groundwater, and soil, and the suspected presence of halogenated organics in groundwater, phenols in sediment, and petroleum hydrocarbons in all four media[4].

The site has operated under the following permits and registrations:

EPA RCRA ID number (cement terminal):	WAD151474368
EPA RCRA ID number (truck stop):	WAH000007773
NPDES Sand and Gravel General Permit:	WAG-50-0016 (effective May 19, 2000, cancelled December 4, 2001)
NPDES Sand and Gravel General Permit:	WAG-50-3347 (effective December 4, 2001, cancelled January 25, 2006)

[4] Department of Ecology – Toxics Cleanup Program, Integrated Site Information System, Confirmed and Suspected Contaminated Sites List, June 7, 2007.

NPDES Permit WAG-50-0016 covered operation of a ready-mix concrete batch plant as a portable plant (Glacier Northwest 2001). Sand and gravel general permit monitoring reports generated under the permit from April to June 2000, July to September 2000, and July to September 2001 (Glacier Northwest 2000-2001) were reviewed. The pH of stormwater discharged to groundwater was within the permitted limits.

NPDES Permit WAG-50-3347 covered the ready-mix concrete batch plant and allowed discharge of stormwater to the Duwamish River (Ecology 2001c). As early as February 2005, Ecology and Glacier Northwest documents show that the plant was inactive (Ecology 2006c).

A 2001 letter prepared by Glacier Northwest indicates that the NPDES Sand and Gravel Permit WAG-50-00016 allowed for discharge to groundwater via infiltration through the unpaved areas of the site at discharge point S-1 (Glacier Northwest 2001). This letter also proposes discharge of treated stormwater to the Duwamish River at discharge point S-2 (Figure 8).

Process water from a temporary batch plant was collected and channeled into a sump for recycling. If the water could not be recycled, it was removed from the site for disposal (Glacier Northwest 2000). The dates of the batch plant operation could not be determined from SAIC's review of the available files.

In October 2005, Glacier Northwest requested cancellation of its NPDES Sand and Gravel General Permit No. WAG 50-3347. In the letter requesting cancellation of the permit, Glacier Northwest stated that operations at the site ceased "several years ago" and the portable concrete batch plant was removed from the site and returned to its owner (Glacier Northwest 2005).

3.4.1 Current Operations

According to Glacier Northwest's website, Portland Type I, II, and III cement is produced at the terminal.

A 2000 Notice of Intent indicates that the site was used by tenants for construction and lumber yard operations. Other site activities included truck parking, office, shop, and warehouse operations. Over 50 ready-mixed concrete trucks were parked daily at the facility and were maintained in an onsite shop. Glacier Northwest had several silos, a large dock, and railhead for storage and transfer of bulk cement (Glacier Northwest 2000).

3.4.2 Past Site Use

The site was privately owned until 1927 when it was subject to tax foreclosure (Ecology 1990d). King County owned the property from 1930 to 1943. The site was undeveloped and used for timber operations. Fill materials dredged from the Duwamish River were placed at the site in approximately 1940 (Hart Crowser 1995).

Carlisle Lumber Company

Carlisle Lumber Company purchased the site in 1943 and operated a lumber plant (Seattle Army Chemicals Plant 1986, Ecology 1990d). No other information about this operation was available.

U.S. Army

The U.S. Army purchased the facility intact from Carlisle in late 1943. From 1943 to 1947, the site was owned by the U.S. Army. The Army retrofitted the lumber plant and began production of charcoal filters and whetlerite. Whetlerite A is a copper-impregnated carbon that was used in gas mask filters during World Wars I and II (Walk 2003). Tests showed that the copper-impregnated charcoal provided significantly greater protection against phosgene, hydrogen cyanide, and arsine. By the beginning of World War II, whetlerite A was the standard filter material; by 1943, copper, silver, and chromium where added to the carbon (whetlerite ASC), which further improved its performance. In the 1980s, it was determined that whetlerite ASC is a hazardous waste when not disposed of properly, primarily due to the presence of chromium VI (Walk 2003).

Crown-Zellerbach operated the site on behalf of the U.S. Army. Approximately 5 tons of charcoal was produced per day (Seattle Army Chemicals Plant 1986). Silver and possibly arsenic were used in manufacturing operations (Hart Crowser 1995, Parametrix 1985b). Ammonia was an important constituent of the whetlerite production process. Ammonia was stored on site in two 5,115-gallon above ground storage tanks (ASTs). A large septic tank was present at the northeast corner of the facility. Production ceased in 1944 (Seattle Army Chemicals Plant 1986). According to Army records, the facility was managed by the Chemical Warfare Service until 1944 and then leased to Reichhold Chemical, Inc. from 1945 to 1959 or 1960 (USACE 1987). From 1960 to 1964, the plant was inactive, however the U.S. Army retained ownership of the site (Seattle Army Chemicals Plant 1986, Hart Crowser 1995). The property was determined to be excess and sold to the Port of Seattle in 1964 (Seattle Army Chemicals Plant 1986).

Reichhold Chemical, Inc.

Reichhold Chemical, Inc. (Reichhold) leased the site from the U.S. Army from 1947 to 1960. Reichhold produced adhesives and water-soluble glues used in paper making (Reichhold Chemicals 1949), formaldehyde, wood-preserving resins such as phenol formaldehyde, and pentachlorophenol. Hydrochloric acid was produced as a by-product of pentachlorophenol manufacturing (Reichhold Chemicals 1987). Pentachlorophenol production may have been performed at the site for only a short time. Reichhold records dated 1956 indicate plans to move this production to another location (Reichhold Chemicals 1956). Reichhold also produced plastic polymers for the automobile industry (Ecology 1990d). Reichhold moved the operations to Tacoma in 1958, but did not dismantle the plant at this site (Parametrix 1990, Hart Crowser 1995). In 1961, the Washington State Pollution Control Commission (WPCC) reported that Reichhold was using the Seattle site for offices and laboratory procedures only (WPCC 1961).

The production facilities at Reichhold consisted of a formaldehyde plant and kettle room. Chemical products were stored in ten 20,000-gallon cylindrical ASTs.

Reichhold listed the following hazardous substances used in operations at the site (Reichhold Chemicals 1987):

Product	Substances
Adhesives, formaldehyde, phenol-formaldehyde resins	Phenol, formaldehyde, o-cresol
Pentachlorophenol	Chlorine, phenol, pentachlorophenol, hydrochloric acid

Ammonia was also used at the plant, but its use could not be related to a specific product (Reichhold Chemicals 1987). Raw materials used at the site included soya flour, dried horse blood, and urea formaldehyde for the production of plastic polymers used in the automobile industry (Parametrix 1985b).

Reichhold estimated the following production capacities (WPCC 1956a, Reichhold Chemicals 1987).

Product	Quantity	Frequency
Adhesives	Unknown	Unknown
Formaldehyde	52,000 lbs/day	350 days/year
P-F Resins	56,000 lbs/day	270 – 280 days/year
Pentachlorophenol	5,000 lbs/day	350 days/year
Hydrochloric acid	13,000 lbs/day	350 days/year

On December 30, 1947, Duwamish Shipyard filed a complaint with the WPCC which stated that Reichhold had dumped drums of contaminated ammonia and other chemical substances into a drain that led directly to the Duwamish River. The resulting ammonia fumes prevented Duwamish Shipyard employees from working in the area the ammonia was dumped. The formal report implies that this illegal dumping was a regular occurrence (WPCC 1948).

There is conflicting information in the available files regarding handling of waste at the Reichhold site:

- In July 1955, Reichhold proposed construction of one impounding basin to be not less than 50 feet wide, 150 feet long, and 6 feet deep. Adjacent to the proposed impounding basin, Reichhold proposed to construct an adjacent control basin for combined wastewater from the formaldehyde plant and kettle room. The proposed control basin would measure 50 feet by 10 feet with a depth of 10 feet. Wastewater would flow to the Duwamish River from the control basin (Reichhold Chemicals 1955c). The plan was approved by WPCC and Reichhold was directed to construct the impounding basin with concrete walls. WPCC stated that a concrete floor would be installed if it was determined that phenolic compounds or other contaminants leached from the basin to the Duwamish River (Eldridge 1955c). WPCC directed Reichhold to construct a deep water outfall from the control basin and to test the formaldehyde and phenol content of the control basin hourly. If phenol concentrations exceeded 1 ppm, the wastewater was to be pumped to the impounding basin (Eldridge 1955c).

- A 1955 WPCC technical bulletin indicates that a temporary settling basin was installed at the site in 1955 (WPCC 1955a).
- A Reichhold letter dated July 1, 1955, states that a ditch along the south side of the property was filled in and redirected to the impounding basin (note that according to Reichhold Chemicals 1955c, the impounding basin was a proposed site feature and had not yet been constructed) due to the discovery of phenolic material in ditch water (Reichhold Chemicals 1955a).
- A Reichhold letter dated May 15, 1987, indicated that a wastewater treatment system was installed at the site in the 1950s, which consisted of two or more basins. Wastewater was treated with lime or other alkali in the basins. Treated wastewater was discharged to the Duwamish (Reichhold Chemicals 1987).
- Around 1955 or 1956 Reichhold built two lagoons under pressure from WPCC (Ecology 1987g). There is no indication that sludge from the lagoons was removed prior to closure. The lagoons described here may have, in fact, been bermed areas used to dewater dredged soil at Terminal 115 (Ecology 1988e).
- An unlined holding pond for the neutralization of waste hydrochloric acid was reportedly present in the northeast corner of the property; this area was graded over before 1960 (Hart Crowser 1995).
- According to a 1988 Ecology letter, no waste ponds were constructed at the site due to reservations from the U.S. Army (property owner at that time). Instead, two 20,000-gallon wooden tanks were installed. Additionally, a control basin was installed to collect wastewater from the formaldehyde plant and kettle room (Ecology 1988e, Reichhold Chemicals 1955b). The control basin was approximately 40 feet south of the main plant building. A Reichhold letter dated October 1955 confirms that the wooden tanks were installed at the site. The tanks were used to remove and/or dilute phenol in wastewater prior to discharge to the Duwamish River (Reichhold Chemicals 1955b). Reichhold received permission from the USACE to construct a deep water outfall to the Duwamish River (Reichhold Chemicals 1955b). A WPCC letter dated October 24, 1955, states the wooden tanks had a combined capacity of 10,000 gallons (Eldridge 1955d).

A 1956 aerial photograph (Appendix F) clearly shows the impounding basin located in the southeastern portion of the site; the control basin and wooden tanks are not apparent.

Reichhold's WPCC Waste Discharge Permit No. 518 allowed discharge of 510,000 gallons per day of wastewater to the Duwamish River (WPCC 1956b). According to the permit application, 500,000 gallons of the water was cooling water and 10,000 gallons was contaminated water (WPCC 1956b).

No information regarding how stormwater was discharged from the site during Reichhold's tenure was found in the available files. It is assumed that stormwater was discharged directly to the Duwamish River.

The following releases were identified:

- In 1949, kettle washings were discharged with cooling water directly to the Duwamish River (Reichhold Chemicals 1949).

- In 1952, chemical waste was discharged through a ditch leading from the plant to the Duwamish River. A complaint was received on December 22 by a caller who saw many small fingerling fish dying in the ditch (WDF 1952).
- A 1953 WPCC memo reported that the State Game Department often received reports of a green colored effluent from the Reichhold plant, which caused a noticeable discoloration of the Duwamish River. WPCC's files indicated that this effluent caused fish kills at irregular intervals during the previous 6 years (WPCC 1953b).
- A 1953 WPCC memo reported a release of approximately 500 pounds of glue product to the Duwamish from a leaking drum. Waters around the plant were filled with white flocculent material that precipitated from the glue product (WPCC 1953e).
- A 1953 WPCC memo reported a small sump surrounding the phenol-formaldehyde resin reactor. Water in the sump was contaminated by phenol, formaldehyde, resins, urea, and blood. According to Reichhold the sump was regularly pumped and discharged to the Duwamish River without testing of the water. The WPCC memo reported a drain from the formaldehyde holding tank that allowed discharge of the tank's contents directly to the Duwamish. Reichhold reported that the drain was used to dispose of tank washwater (WPCC 1953c).
- A 1953 WPCC letter identified three sources of dangerous waste: the sump beneath the reactors, which received "spills, overflows, floor washings, etc."; contaminated cooling water; and chemical spills, leaking pipes, and valves that drain to the sewer system (WPCC 1953d).
- A 1955 WPCC memo reported a complaint made by the Department of Fisheries of a green colored material being discharged from the sanitary sewage outfall. A downstream sample contained 18,000 ppm total phenols. Fisheries reported 22 dead salmon fingerlings in the area and that within a 30-second time period, six salmon fingerlings swam to the area and died. Barge workers in the area reported over 300 dead fish in a 30-minute period. WPCC reported that Reichhold install lagoons or other control measures to prevent discharge to the river (Nielson 1955, WDF 1955).

Kaiser Cement Company

From 1964 to 1968 or 1969, the site was owned by the Port of Seattle and leased to Kaiser Cement Company. The lease stipulated that Kaiser make significant improvements to the site. The former plant was demolished and the site was leveled in 1965. Duwamish Shipyard may have performed a portion of the demolition work (Kaiser Cement & Gypsum 1965). The cement terminal and dock were constructed during this time (USEPA 1987b, Seattle Army Chemicals Plant 1986, Ecology 1990d, Hart Crowser 1995). From 1965 to 1969, Kaiser installed silo structures for cement storage, truck receiving and loading areas, offices, a marine dock, and a conveyor gallery for trans-shipment of cement materials from barges to the upland storage areas (Ecology 1990d).

Kaiser Cement Company purchased the property in 1968 or 1969 and continued operations of the cement terminal until 1987. The 10 20,000-gallon ASTs used by Reichhold were dismantled by Kaiser in 1969. Kaiser also demolished all buildings related to the U.S. Army's and Reichhold's operations at the site. Prior to 1974, a 0.3-acre pit was constructed in the southeast portion of the site, which was apparently used for waste concrete slurry disposal (Figure 8). By 1974 the entire site was filled and paved over (Harper-Owes 1985). Aerial photographs from 1984 show that an area approximately 5 acres in size was re-graded and filled at the south and southwest portions of the site. Kaiser leased all or portions of the site to a modular construction company and a concrete recycling company. In 1985, the site was a hard surface graveled parking area used for the storage of shipping containers. In 1987, Kaiser Cement Company sold the site to Lone Star Northwest, Inc (Hart Crowser 1995, Parametrix 1985b, Parametrix 1990, Seattle Army Chemicals Plant 1986).

Lone Star Northwest, Inc.

Lone Star leased the cement terminal portion of the site to Ash Grove Cement West, Inc. immediately following the purchase of the property in April 1987 (Lone Star Industries 1987, Lone Star Northwest 1989). Ash Grove reportedly used a 0.2-acre area in the southwest portion of the site for waste concrete slurry disposal and stored waste concrete in the southern portion of the site. Ash Grove filed a Notification of Dangerous Waste Activities form with Ecology and cited the dangerous waste as “rain water runoff” (Ash Grove 1988). Lone Star leased the remainder of the property to a company storing large, mobile containers. The site was used to store construction debris and heavy equipment until June 1990. Prior to 1990 the south and southwest portions of the site were covered with a gravel/rock surface fill (Hart Crowser 1995, Parametrix 1990). In 1991, Ash Grove’s lease expired. Ash Grove canceled the site ID for dangerous waste activities, WAD151474368 (Ash Grove 1991).

In October 1990, Lone Star notified Ecology that elevated levels of pentachlorophenol were discovered in a groundwater sample collected at the property (Lone Star Northwest 1990) during a site characterization study performed by Parametrix, Inc. in May 1990, and confirmed in subsequent sampling performed in June and July 1990 (Ash Grove 1991) (see Section 3.2.3). Lone Star traced the contamination to Reichhold and stated, “It is evident the contamination results from wastewater associated with the manufacture of pentachlorophenol” (Lone Star Northwest 1991).

In March 1994, a concerned citizen reported to Ecology a gray-green milky substance being discharged from a pipe into the Duwamish River. Dead crustaceans and isopods were present in the area. The source of the discharge was traced back to the Glacier Northwest property and was found to be turbid stormwater (Ecology 1994d). Ecology performed a site inspection in response to the citizen’s report.

According to Ecology’s inspection report, the site was used to receive, store, and distribute bulk cement. The facility discharged cement truck washwater (exterior of trucks only) without an NPDES permit and stormwater to the Duwamish River. Ecology advised Lone Star to obtain an NPDES permit for the truck washwater or discharge it to the sanitary sewer. On the day of the inspection, turbid discharge was traced to a neighboring lumber yard also owned by Lone Star. Turbid stormwater was created by truck traffic coming into the lumber yard from an unpaved yard. Traffic over the unpaved yard allowed silt or clay to migrate upwards through the gravel surface and reach stormwater (Ecology 1994e).

In 1995, a Notification of Dangerous Waste Activities was filed with Ecology for the “Lone Star Northwest/Reichhold Chemical MTCA Cleanup” (Lonestar NW/Reichhold Chemical MTCA Cleanup 1995). The EPA ID Number associated with this notification is WAR000006221

(USEPA 1995). A 1998 letter from Lone Star indicates that the cleanup actions would include well installation, ozone sparging, arsenic fixation, and sampling and analysis. These activities were to take place between October 1998 through 2001 (Reichhold Chemicals 1998). In 2002, Glacier Northwest filed a "Dangerous Waste Annual Report Verification Form" with Ecology that changed the name of the site to "Glacier Northwest Reichhold MTCA" (Lonestar NW/Reichhold Chemical MTCA Cleanup 2002). No reports documenting the performance or results of these proposed cleanup actions were found in the available files.

3.4.3 Environmental Investigations and Cleanups

The following investigations have been conducted at the Glacier Northwest site:

- Draft Defense Environmental Restoration Account Inventory Project Report, Seattle Army Chemicals Plant, conducted in 1986 by USACE, Seattle District (Seattle Army Chemicals Plant 1986)
- Kaiser Property Environmental Audit, conducted in 1985 by Parametrix, Inc. for the Port of Seattle (Parametrix 1985b)
- Phase II Site Assessment, conducted in 1990 by Parametrix, Inc. for Lone Star Northwest (Parametrix 1990, ARI 1990)
- Request for Initial Review of Proposed RI/FS for Independent Cleanup Reichhold/Lone Star Site, conducted in 1995 by Hart Crowser for Lone Star Northwest (Hart Crowser 1995)
- Data Report: Survey and Sampling of Lower Duwamish Waterway Seeps, prepared by Windward Environmental, LLC for the Lower Duwamish Waterway Group (Windward 2004)

These investigations are described below. Analytical results for soil, groundwater, and seep samples are provided in Appendix D, and are summarized in Tables 9 through 11. Figures showing the locations of environmental samples are included in Appendix D. No cleanup actions are known to have been conducted at the site. Reichhold did not complete any environmental investigations of the site (Reichhold Chemicals 1987).

An Investigation of Pollution in the Green-Duwamish River, Technical Bulletin No. 20 (WPCC 1955a)

During the summer of 1955, the Department of Fisheries conducted live box experiments in the vicinities of sewer outfalls near the Reichhold plant. Highly toxic conditions were observed on several occasions, which coincided with accidental slug discharges from the plant.

Defense Environmental Restoration Account, Seattle Army Chemicals Plant (Seattle Army Chemicals Plant 1986)

The U.S. Army Corps of Engineers, Seattle District, evaluated the site in 1986 under the Defense Environmental Restoration Program, and concluded that no further action was necessary under this program (USACE 1987).

Final Report, Kaiser Property Environmental Audit (Parametrix 1985b)

Parametrix reviewed existing documents as part of this environmental audit. In a 1984 report prepared by URS Engineers for METRO, it was noted that two groundwater samples collected at the site did not have unusual levels of contaminants (Parametrix 1985b).

Parametrix advanced six soil borings in and around the impoundment operated by Reichhold (note that an Ecology letter dated 4/25/1988 indicates that these borings may actually have been upgradient of the impoundment [Ecology 1988e]), five soil borings in a truck washout area operated by Kaiser, eight soil borings in and around the tank farm area operated by Reichhold, and 10 borings in other areas of the property. Two borings were advanced to 15 feet bgs; all other borings were advanced to 5 feet bgs. Four composite soil samples were generated from 24 samples collected from 12 borings for laboratory analysis. The samples were analyzed for priority pollutant metals, SVOCs, VOCs, pesticides, and PCBs.

Metals, di-n-butyl phthalate, BEHP, aldrin, alpha-BHC, and dieldrin were detected in one or more of the soil samples. No VOCs were detected in the soil samples, although high organic vapor concentrations were detected using monitoring equipment during the field activities. The suspected cause for the high OVM readings was a mixture of carbon dioxide and methane gas released during the decomposition of the sawdust used in fill material at the site.

Phase II Site Assessment (Parametrix 1990)

During a site visit to determine well and test pit locations, Parametrix personnel noted three large, mobile cranes in the western portion of the property. Several creosote-coated logs were present at the base of each crane and oil stains on the ground in the vicinity were noted. Two sheds were present at the eastern edge of the property. The sheds were used to store 55-gallon drums and cans of paints, solvents, and lubricants. Outside the sheds, an empty 250-gallon tank and several empty 55-gallon drums and assorted containers were found. Concrete pads that may have supported transformers were observed near the north entrance and the western border of the site.

In May 1990, Parametrix installed three groundwater monitoring wells (B-1 through B-3) and five 1.5-foot deep soil test pits (TP-1 through TP-3) at the site. The groundwater monitoring wells were installed in the perched groundwater zone and constructed with 2-inch diameter, schedule 40 polyvinyl chloride (PVC) casing with 5 feet of slotted well screen.

Discrete soil samples at 4 and 8 feet bgs from the monitoring well borings and a composite sample of each boring were collected for laboratory analysis. The discrete soil samples were analyzed for TPH and total organic halogens (TOX). The composite samples were analyzed for total metals and TCLP metals. One soil sample was collected at the bottom of each test pit. Samples from test pits TP-1 through TP-3 were analyzed for TPH, TOX, and TCLP metals. Samples from test pits TP-4 and TP-5 were analyzed for TPH and TOX.

Groundwater samples were collected from the wells following development. The groundwater samples were analyzed for VOCs, SVOCs, and dissolved metals. Additional groundwater samples were collected from wells B-2 and B-3 two weeks after well installation and were analyzed for pentachlorophenol.

Arsenic, TPH, and TOX were reported in the soil. TCLP metals results were below the Ecology dangerous waste classification limits.

Pentachlorophenol was detected above Ecology cleanup guidelines in groundwater near the former acid neutralization pond. Arsenic and silver were reported in groundwater above MTCA Cleanup Levels and state and federal Maximum Contaminant Levels (MCLs) in the eastern portion of the site. Phenolic compounds (2-chlorophenol, 2,4-dichlorophenol, and 2,4,6-trichlorophenol) and naphthalene were detected in the groundwater sample collected from well B-2. These compounds are associated with wood preservatives. VOCs were not detected in groundwater at the site.

Request for Initial Review of Proposed RI/FS for Independent Cleanup (Hart Crowser 1995)

In May 1990, Hart Crowser collected three groundwater samples from three seeps identified at the Glacier Northwest property. The seeps appeared to reflect discharges from the perched groundwater zone along the shoreline adjacent to the site. The samples were collected after a relatively low tide event to allow for maximum drainage of seawater from the sampling locations and as late as possible during the rising tide before inundation of the sampling location. Seep samples were analyzed for arsenic, silver, SVOCs, and total petroleum hydrocarbons (SW-01 and SW-02 only). A sufficient sample volume could not be collected from Seep SW-03 to allow for TPH analysis of the sample. Silver, pentachlorophenol, and TPH were not detected in the seep samples and were below ambient surface water quality criteria and MTCA Cleanup Levels. Arsenic concentrations were also below chronic and acute water quality criteria as of 1995; however, the concentrations reported at seeps SW-01 and SW-02 are above current chronic and acute water quality criteria. The copy of the figure showing the locations of the seep sampling points in this report is incomplete; therefore, SAIC cannot determine where the seeps were located on the shoreline.

Hart Crowser also reviewed the soil and groundwater data collected by Parametrix in 1985 and 1990. This review found that site soils did not pose a direct contact hazard and contained relatively low concentrations of leachable contaminants.

Data Report: Survey and Sampling of Lower Duwamish Waterway Seeps (Windward 2004)

Two seeps (Seeps 61 and 62) were identified along the shoreline of the Glacier Northwest property by Windward. The area was characterized as having a higher general seepage level as indicated by numerous rivulets flowing along the shoreline. Seeps 61 and 62 were selected for sampling because the water associated with Seep 61 was discolored and a sulfide odor was observed during the seep reconnaissance survey; dioxins/furans were detected in the sediment near Seep 62. The seep samples were analyzed for metals, mercury, SVOCs, VOCs, PCBs as Aroclors, organochlorine pesticides, TOC, dissolved organic carbon, and TSS. VOCs and SVOCs were not detected in the seep samples. Organochlorine pesticides were not detected in either sample; however, the reporting limits for the sample from Seep 61 were elevated and greater than the marine chronic water quality criteria (WQC) for some pesticides. Arsenic, cadmium, lead, mercury, silver, and zinc concentrations were reported in the seep samples. The arsenic concentrations reported for Seep 61 exceeded the chronic and acute WQC; the marine chronic WQC exceedance factor was 2.0. Copper was not detected in either of the seep samples, however the reporting limits were greater than the chronic and acute WQC.

3.4.4 Potential for Sediment Recontamination

Sediment samples collected in the LDW near the Glacier Northwest site in 2005 and 2007 contained arsenic, zinc, phthalates (butyl benzyl phthalate), and PCBs at concentrations above the SQS. High levels of dioxins and furans were also detected in this area. In addition, a seep sample collected in 2004 contained arsenic above the marine chronic WQS.

Past activities at the Glacier Northwest site have resulted in soil and groundwater contamination. Tables 9 and 10 present a comparison of site soil and groundwater concentrations to screening levels. In 1990, mercury and zinc were detected in soil at the site at concentrations above soil-to-sediment screening levels[5]; in addition, arsenic, chromium, and TPH were present above MTCA Cleanup Levels. In groundwater samples collected in 1990, pentachlorophenol was detected at concentrations up to 3,000 µg/L, which is several orders of magnitude higher than the groundwater-to-sediment screening level and MTCA Cleanup Level. In addition, silver and 2,4-dichlorophenol were present at concentrations above the groundwater-to-sediment screening level, and arsenic and chromium were present above the MTCA Cleanup Level.

Groundwater at the site is shallow, and the area reportedly has a high general seepage level. Therefore, residual contamination in soil and groundwater may be transported to the LDW via groundwater discharge to the waterway. The most recent soil and groundwater data available for this site is from 1990; current soil and groundwater concentrations are unknown.

Little is known about Glacier Northwest's current site activities; however, the site does not have current coverage under an NPDES permit. SAIC assumes Glacier Northwest currently discharges stormwater to the sanitary sewer.

3.5 MRI Corporation

The MRI Corporation (MRI) was a tin reclamation facility located on the northwestern portion of Terminal 115 which operated from 1963 to 1997/1998. M & T Chemicals, later MRI, leased approximately 1.88 acres, including a 9,697-square foot warehouse, from the Port of Seattle at Terminal 115 in 1963. According to a Port of Seattle Marine Facilities site plan dated June 2004, the most recent tenant is Polar Supply. Polar Supply's lease at the property ends on December 31, 2009. Contact information for Polar Supply was not found by SAIC. It is not known if Polar Supply still occupies the site.

The tin reclamation facility had several names:

- 1963 to approximately 1978 – M & T Chemicals
- Approximately 1978 to approximately 1991 – MRI Corporation (affiliated with American Can) (E&E 1988)

[5] See discussion of screening levels in Section 3.2.4.

- Approximately 1991 to 1997 – MRI Division of Proler International Corporation, Proler International, Proler Recycling (these names appear to have been used interchangeably) (METRO 1991d)
- 1997 to 1998 – Schnitzer Steel Industries, Inc.

In this report, all of these names refer to the former tin reclamation facility located at Terminal 115; however, the site is generally referred to as “MRI.” The site is occasionally referred to as “MST Chemicals” in Ecology’s files. This nomenclature appears to have been the result of a clerical error; the business was never known under this name (SKCDPH 1998).

The site is located near the Duwamish River in an industrial area of Seattle (Figure 2). It is bordered on the north by Glacier Northwest, on the east by the Duwamish Waterway, on the south by Highland Park Way SW, and on the west by West Marginal Way SW.

The site is underlain by artificial fill that ranges from 8 to 12 feet in thickness. The artificial fill is underlain by localized alluvial silts and clays 20 to 25 feet in thickness. Depth to groundwater is greater than 15 feet and generally flows toward the Duwamish River. Terminal 115 was developed by filling the site with dredged sediments and imported fill materials. The terminal was completed in 1966 (E&E 1988, Herrera 1994).

M & T Chemicals is listed on the CSCSL for suspected contamination of soil, sediment, and groundwater by metals and corrosive wastes[6]. The only operational permit found on file was METRO Waste Discharge Permit No. 7067.

3.5.1 Past Site Use

The site was used for tin reclamation processes beginning in 1963. Tin was reclaimed from scrap steel and recycled tin cans. From 1991 to 1997, MRI generated an average of 2,200 tons of de-tinned steel and metal ingot per month (METRO 1991d). Beginning in 1997 or 1998, Schnitzer initiated closure of the tin reclamation and recycling operations at the site. The most recent recycling operation involved stripping steel cans and glass sludge (dross) of tin. Reclaimed tin was smelted and sold as ingots.

Raw materials such as large volumes of loose cans and baled steel scrap were temporarily stored at the site. Wastes stored at the site included spent plating solutions and black mud filtrate discharge. The steel was collected and sold for re-use. Black mud was dewatered using a filter press and stockpiled on site. The dewatered black mud was either sold for further tin reclamation or sent to the landfill (SKCDPH 1998).

Site Facilities

Prior to 1991, the paved area of the site was approximately 9,600 square feet. Stormwater falling on the paved area flowed to a sump and then was pumped to the sanitary sewer (METRO 1991d). In 1991 the paved area of the site was expanded to cover approximately 23,900 square feet. Site facilities included 15 storage and processing tanks, a magnetic separator, debris bin,

[6] Department of Ecology – Toxics Cleanup Program, Integrated Site Information System, Confirmed and Suspected Contaminated Sites List (June 7, 2007)

steel shredding machine, can washer, and two 23,000-gallon storage tanks. None of this equipment discharged water to the paved area. Stormwater flowed to a central sump and was pumped to the two 23,000-gallon storage tanks or to the sanitary sewer in case of a heavy rain (METRO 1991d).

A can washer was installed in 1991 and used collected stormwater to remove foodstuffs from tin cans. The system recycled the washwater by filtering the suspended solids and returning the water to the two 23,000-gallon storage tanks (METRO 1991d).

A 1987 Toxic Substances Control Act (TSCA) Site Inspection was conducted to evaluate the possible use of PCBs at the site. The site inspector found no transformers containing PCBs or evidence of PCB use at the site, but noted that the containment for the bulk chemical tank farm was inadequate in the event of a catastrophic spill; additionally, a storm drain was present approximately 50 feet downgradient of the tank farm (Ecology 1987b, 1987c, 1987d, 1987e). Ecology subsequently directed MRI to submit plans to address the containment area by the end of April 1997.

Materials Used in Operations

According to MRI's waste discharge permit application dated 1991, the following chemicals and average quantities were used in the detinning process:

Chemical	Quantity (lbs/year)	Quantity (lbs/day)
Sodium hydroxide	600,000	2,000
Sulfuric acid	140,000	460
Sodium nitrate	540,000	1,800
Sodium hydrosulfide	5,000	50

Sodium hydroxide was stored as a liquid in a steel tank. The containment for this tank consisted of a sloped paved area with a sump with a combined holding capacity greater than 100 percent of the tank volume. The sulfuric acid was stored in an AST within a bermed area with a capacity of greater than 100 percent of the tank volume. The sodium nitrate was stored as a bagged solid in an area that did not drain to the sewer (METRO 1991d). The tank farm was concrete-lined and bermed (SKCDPH 1998). The containment area for these tanks was enlarged following a 1987 TSCA site inspection, which found the previous containment area inadequate in the event of a spill (Ecology 1987e).

Tank Name	Volume (gallons)	Contained Nitrogen (lbs)
#1 Detinning tank	6,400	339
#2 Detinning tank	6,400	310
Wash tank	6,400	47
#1 Settling tank	4,000	212
#2 Settling tank	4,000	212
#3 Settling tank	4,000	50

Tank Name	Volume (gallons)	Contained Nitrogen (lbs)
#1 Wash storage	10,000	72
#2 Wash storage	10,000	11
#3 Wash storage	10,000	2
#4 Wash storage	10,000	<1
#1 Plating solution tank	10,000	530
#2 Plating solution tank	10,000	530
De-tinning solution C-1	10,000	530
De-tinning solution C-2	10,000	530
Spent plating solution	15,000	600
18 Electrowinning tanks	180 each	10 each

According to MRI's permit application, if a spill occurred from any of the above-listed tanks it would drain to either the process sewer, which pumped back to a wash tank, or to the stormwater sump. The stormwater sump was closed with a valve that would prevent discharge of the spilled contents to the storm sewer (METRO 1991d).

Waste Handling

Before 1972, spent plating solution and black mud were discharged to two settling and evaporation lagoons located in the eastern portion of the site (Figure 9). The unlined lagoons were approximately 2,000 to 3,600 square feet in total area and approximately 6 feet deep. Approximately 3,500 gallons of black mud were discharged to the ponds each week. The accumulated mud was periodically excavated and sold for further tin reclamation. In 1972, the lagoons were abandoned when the dewatering filter press was installed at the site. At this time, the lagoons were cleaned out and the excavated mud was sold for further tin reclamation. Documentation that provided the volume of mud sold was not available for review. The lagoons were filled with gravel at a later date (E&E 1988, Harper-Owes 1985, SKCDPH 1998).

From 1962 to 1975, 5,000 pounds of lacquer sludge was produced per year. The lacquer sludge is described as "highly alkaline with vinyls, epoxy's [sic] and trace tin and lead" on a hazardous waste inventory prepared by the MRI plant manager. The lacquer sludge was disposed to municipal landfills. Tin- and lead-bearing sludges are also listed on the hazardous waste inventory (M&T Chemicals 1980).

From 1972 to 1991, the entire eastern area of the site was paved, including the lagoons. Black mud was stockpiled onsite and periodically sold for further tin reclamation, although no mud was sold from 1987 to 1991. Analytical results for waste characterization samples of the black mud indicated that the material could be classified as a nonhazardous waste. The mud was accepted for disposal to a regular landfill (SKCDPH 1998). Spent electrowinning solution was stored in a 15,000-gallon tank. The solution was analyzed for metals and pH before being discharged to the METRO sanitary sewer in 3,200-gallon batches approximately every 5 days (METRO 1991d). Spent electrowinning solution that was outside the METRO discharge limit for pH or metals was neutralized with sulfuric acid or sodium hydrosulfide (METRO 1991d).

Black mud filtrate consisting of paper pulp from can labels, paint from labels, lacquer solids from the interior of cans, residual food stuffs, dirt and debris, tin compounds, aluminum oxide, and other precipitated metals was discharged directly to the METRO sanitary sewer (METRO 1991d).

Wastewater Discharges

Under the METRO permit, water was discharged to the West Point Treatment Plant. In September 1991, METRO approved MRI's request to increase the allowable industrial flow from 4,300 gallons per day to 16,500 gallons per day and allowed discharge of contaminated stormwater to the sanitary sewer (METRO 1991g).

METRO collected samples of wastewater from the MRI facility. The wastewater types included: batch release of spent plating solution; batch release of black mud filtrate; and batch release of contaminated stormwater collected from open paved areas used for scrap storage and processing activities. The sampling point was the sanitary sewer manhole located approximately 5 meters west of the employee parking lot (METRO 1991f).

Analytical results of effluent samples collected by METRO were reviewed for October 1973 (METRO 1973), November 1975 (METRO 1975), April 1977 (METRO 1977c), July 1977 (METRO 1977d), February 1981 (METRO 1981a), March 1981 (METRO 1981b), February 1982 (METRO 1982c), and July 1982 (METRO 1982d). The following non-compliant discharges were noted:

- Zinc concentration in black mud filtrate sample exceeded discharge limits in February 1981.
- Lead concentration in spent electroplating solution sample exceeded discharge limits in February 1982.

Correspondence between METRO and MRI describes the following environmental concerns and directives related to METRO Waste Discharge Permit No. 7067:

- December 1989—Zinc was measured at a concentration of 170 mg/L in an effluent sample collected at the facility; the discharge limit for zinc was 5.0 mg/L. This constituted an illegal discharge to the sanitary sewer system. An informal compliance schedule was incorporated into the METRO permit, which directed MRI to investigate the cause of the discharge violation and take measures to prevent a recurrence; provide the information in a written report; and undertake an industrial effluent monitoring program to include at least one monthly sample of spent plating solution and black mud filtrate analyzed for chrome, lead, and zinc to be documented in a monthly report (METRO 1990a).
- November 1990—Zinc was measured at a concentration of 63 mg/L in an effluent sample collected at the facility; the discharge limit for zinc was 5.0 mg/L. This constituted an illegal discharge to the sanitary sewer system. METRO issued a compliance schedule, which directed MRI to analyze each spent plating solution batch for heavy metals (chromium, lead, and zinc) and pH before discharge and to receive verbal approval from METRO prior to initiating discharge to the sanitary sewer system; characterize the solid scrap metal supply and liquid waste solutions being discharged to the municipal sewer; investigate methods to reduce heavy metals by source control and pretreatment; implement source control and

pretreatment methods; recommend and describe mitigation measures to address worker safety concerns related to discharge of high pH wastewater; and retain the services of a Professional Engineer to implement the requirements of the Compliance Schedule (METRO 1991a).

- June 1991—METRO review of Compliance Schedule Summary Report prepared by Advanced Environmental Technologies found the report to be incomplete, particularly relating to characterization of process water and the mitigation measures for high pH wastewater. METRO requested additional information to confirm the review of two years of spent plating solution and black mud filtrate discharge data and a study including downstream sampling and dilution studies (METRO 1991c).
- September 1991—Zinc concentrations in effluent samples exceeded permit limits. METRO directed MRI to analyze all spent plating batches for zinc, chromium, and lead prior to discharge and to adopt procedures to minimize the amount of solids transferred between processes. METRO also directed MRI to develop written procedures and methods for the addition of chemicals and the transfer of solutions; develop a method to ensure that excess sulfide is present in the zinc separation step and develop a method for the detection of soluble sulfide, a method to ensure that excess soluble sulfides are removed from the wastewater prior to discharge; and establish corrective procedures in the event a batch exceeds discharge limits. MRI was directed to continue neutralizing all industrial wastewater to a pH range between 5.5 and 12.0 (METRO 1991e).
- September 1991—METRO approved changes to MRI's discharge permit. The letter approving this change noted that a new can-washing process would not discharge to the sewer; washwater would be filtered and re-used. Non-hazardous (food by products) and contaminated stormwater from the soon-to-be paved tin can scrap storage yard would be discharged to the sanitary sewer (METRO 1991g).
- November 1991—MRI requested to have the high pH limit on the spent electrowinning discharge removed from the METRO discharge permit. The request was denied by METRO because MRI did not satisfactorily address worker safety concerns connected with the high pH discharge (METRO 1991h).

Stormwater Discharges

Stormwater from roof drains of the warehouse discharged to the Duwamish River via local storm sewers (METRO 1991g). MRI estimated a maximum of 4,000 gallons of stormwater per day were discharged to the Duwamish River (METRO 1991d). All other site wastewater and stormwater was apparently discharged to the METRO sanitary sewer, until 1991 when the new can washer system that used recycled stormwater was installed at the site. After 1991 all stormwater was collected and used in the can washing system (METRO 1991d).

According to a site inspection report for Terminal 115 prepared by Ecology and Environment, surface water from the terminal is collected by storm drains and discharged to the Duwamish River (E&E 1988). Note that this statement was made with regard to the entire 90-acre Terminal 115 property. MRI occupied the northwestern 1.88 acres of Terminal 115.

According to a 2004 Port of Seattle map, there are two outfalls to the Duwamish Waterway at the northeast property boundary that connect to storm drains extending from the former MRI property. A city of Seattle storm drain map (Figure 5) indicates that storm drains from this site discharge to the east-west main storm drain line that flows into the LDW at the southeast edge of the Glacier Bay Source Control Area.

3.5.2 Environmental Investigations and Cleanups

The following investigations have been conducted at the MRI Corporation site:

- Waste Characterization Program, conducted in February 1991 by ENSR Consulting and Engineering for MRI Corporation (ENSR 1991)
- Site Hazard Assessment, conducted in October and November 1997 by the Seattle-King County Department of Public Health (SKCDPH 1998)

These investigations are described below. Analytical results for sediment, soil, and groundwater samples are listed in Appendix E, and are summarized in Table 12. No cleanup actions are known to have been conducted at the site.

Waste Characterization Program (ENSR 1991)

In February 1991, ENSR collected 36 samples of black mud from two stockpiles. The estimated volume of the stockpiles was 200 cubic yards. The stockpiles were divided into six sample lines and six samples were collected from each of the lines using a hand auger. The samples from each line were submitted as a composite sample for laboratory analysis. The samples were analyzed for corrosivity (pH) and RCRA TCLP metals. One composite sample was analyzed for ignitability and reactivity characteristics. No analytes were detected above the maximum concentration limits listed in WAC 173-303-090 (ENSR 1991).

Site Hazard Assessment (SKCDPH 1998)

In November 1997, SKCDPH collected three soil samples from the unpaved railroad spur area. The samples were collected between 5 and 6 inches below ground surface. Chromium (8.4 to 33 mg/kg) and lead (36 to 470 mg/kg) were detected at concentrations above the MTCA Method A cleanup levels. Zinc (76 to 330 mg/kg) and tin (170 to 880 mg/kg) were elevated, but were not at or near the Method B cleanup levels. The site hazard assessment evaluated the risk to human health and the environment for an exposure to groundwater pathway. The assigned hazard level was 5, or lowest risk. Groundwater in this area is not used as a drinking water source.

3.5.3 Potential for Sediment Recontamination

Although past operations at the site, including the presence of unlined lagoons, indicate a potential for contamination of soil and groundwater with metals including tin and zinc, little environmental investigation has been conducted at this site to assess whether contaminants are present. Three soil samples were collected in 1997, which indicated elevated levels of zinc and tin and MTCA exceedances for chromium and lead; however, no site characterization has been performed and no groundwater samples have been collected. Zinc, lead, and tin were identified as contaminants of concern for the Glacier Bay Source Control Area (see Section 2.2.2). Therefore, this site is considered a potential source for recontamination of Glacier Bay sediments.

No information was found in the available files describing the operations performed at the site by the most recent tenant, Polar Supply. Current operations at the site may present a potential contaminant pathway of discharge from the storm drain to the outfalls connected to the Duwamish River.

3.6 Upland Properties

A number of upland properties are located within the Glacier Bay drainage basin. Historical and current operations, environmental investigations and remediation, and the potential for contaminants to reach Glacier Bay sediments are discussed below. The last four digits of the parcel numbers used in the following descriptions are those shown on Figure 4. Very little information about current or historical operations was available.

3.6.1 The Chemithon Corporation

The Chemithon Corporation is located at 5430 West Marginal Way SW. The site is bordered by La Farge Cement Plant on the north and east, Alaska Marine Lines on the south, and West Marginal Way SW on the west.

Chemithon is a manufacturer of synthetic detergents and surfactants, and designs plants and equipment for surfactant manufacture, sales and service. The subject facility is a sulfonation plant and has equipment to collect fly ash. Chemithon performs SO_3 and NO_4 injections at power plants. The facility operates under Industrial General Stormwater Permit Number SO3-000033 and RCRA ID number WAD009244898.

Site Facilities and Operations

A 2006 site plan shows that the site is covered with buildings and asphalt/concrete pavement. There are four manufacturing buildings, a research and development building, and three office buildings on the site. Covered storage areas are present on the north side of the property, including an aluminum SO_2 shed and barrel storage area. A gas pump station is located at the northeast corner of the property. A diesel fuel shed, AST, and a transformer on a concrete pad are present at the southwest corner of the property.

Diesel fuel is stored in a 250-gallon AST. SPU referred the site to the Seattle Fire Department following an April 2006 site inspection, stating that the AST may not meet regulatory requirements (SPU May 2006). The AST is on a concrete pad. An oil/water separator is near the AST (SPU 2006b).

Materials stored outside include containerized products (including katalysator and tolnol containing MEK), used equipment, and equipment and materials awaiting disposal or recycling. The storage areas are paved and covered. Berms or other barriers protect the storage areas from stormwater runoff (SPU 2006a).

According to the SPU April 2006 inspection, the following operations are performed at the site (SPU 2006a):

- Outdoor fueling operations;

- Vehicle, equipment, or building washing or cleaning;
- Truck or rail loading or unloading of liquid or solid materials;
- Liquid storage in stationary aboveground tanks;
- Outside portable container storage of liquids, food wastes, dangerous wastes;
- Parking or storage of vehicles and equipment;
- Outdoor areas are swept weekly;
- Outdoor forklift and equipment pad washing; and
- Stainless steel grinding.

According to handwritten SPU notes, Chemithon is not a source of PAHs or PCBs (SPU 2006c).

Waste Handling

Metal shaving bins are stored inside or outside in covered storage. Used coolants, hydraulic oil, and gear oil are stored in drums (SPU 2006c).

Sorbent materials kept on site include sorbent booms, sorbent pads, and granular sorbents. Drains are covered to contain spills. These materials are reportedly adequate and appropriate for the chemicals stored at the site.

Water Discharges

Forklift and outside equipment pad washwater drain to the sanitary sewer. Wastewater (heating or cooling water with some concentrations of laundry detergent) and small amounts of stormwater drain to the sanitary sewer.

There are 20 stormwater catch basins on the site that are cleaned on an "as needed" basis, but are pumped at least every 2 years. A 2006 SPU site inspection found that the catch basins were over 60 percent full with sediment and plant materials (SPU 2006a, 2006b). Soap was present in the catch basins. All stormwater is directed to a sump and discharges to the sanitary sewer. The system was installed in the early 1970s. An outfall that discharged stormwater from the sump to the Duwamish River has been sealed off. The sump is located at the southeast corner of the property.

In October 2006, Chemithon initiated plans to discharge stormwater runoff to an outfall discharging to the Duwamish River. Chemithon plans to collect four samples of the water for three months to characterize water quality including pH, turbidity, zinc, oil and grease, and TOC. Chemithon planned to clean out the catch basins prior to sampling. Chemithon planned to discuss the sampling results with the King County Wastewater Treatment Division and Ecology prior to modifying the stormwater drainage system (Chemithon 2006b).

SPU collected catch basin sediment samples in May, October, and November 2006 and catch basin sediment samples, a catch basin solid sample, and a water sample in February 2007 from the site (ARI 2006a, 2006b, 2006c and 2007). Several chemicals exceeded screening criteria in the sediment, solid, and water samples including PCBs, methylphenolic compounds, phthalates, PAHs, copper, lead, mercury, zinc, and diesel- and motor-range hydrocarbons. The sample data are summarized in Tables 13 through 15.

3.6.2 Alaska Marine Lines

Alaska Marine Lines owns several parcels on the west side of West Marginal Way SW (Figure 4). From north to south, the parcels owned by Alaska Marine Lines are:

- 9050, 5423 West Marginal Way SW
- 9093, no address
- 9090, no address
- 9081, 5615 West Marginal Way SW (Property 2)
- 9115, 5901 West Marginal Way SW

Parcel 9050

Parcel 9050 is approximately 0.49 acre in area. According to the King County Assessor Property Characteristics report, Alaska Marine Lines purchased the property from Alison T. Seymour, Inc. in June 2004. The property is zoned as commercial/industrial. There are two buildings on the property:

- A chassis repair facility constructed of structural steel; the 9,680-square foot facility was built in 1965; and
- A wood-frame office building; the 1,200-square foot building was built in 1973.

The site is paved and connected to the public sewer system.

Parcels 9093 and 9090

Parcels 9093 and 9090 are adjacent parcels and named the Alaska Marine Lines Truck Lot. Both parcels are zoned as commercial with the present use listed as vacant (industrial) in King County Assessor records. Parcel 9093 is approximately 1.78 acres in area. Parcel 9090 is approximately 0.96 acre in area. The sites are paved and connected to the public sewer system. There are no buildings on either property.

Alaska Marine Lines purchased parcel 9093 in March 1991 from Douglas Management Company. According to King County tax assessor property records, in May 2004 the quit claim deed for parcel 9090 was assigned to Ms. Helen Hullin as part of an estate settlement. The property is apparently leased to Alaska Marine Lines.

Parcel 9081

Alaska Marine Lines is the current owner/operator of a warehouse located at 5615 West Marginal Way SW in Seattle. The property at 5615 West Marginal Way SW was sold to Alaska Marine Lines by Douglas Management Company in March 1991. According to King County tax assessor property records, in May 2004 the property quit claim deed was assigned to Ms. Helen Hullin as part of an estate settlement. The property is apparently leased to Alaska Marine Lines.

The parcel is 1.1 acres, zoned for industrial use, and contains one structure, a 28,368-square foot warehouse built in 1971. The site operates under EPA I.D. number WAD991281809.

Parcel 9115

Parcel 9115 is approximately 1.61 acres in area. In King County Assessor records, Alaska Marine Lines is listed as the taxpayer for the site; however, the most recent property transaction information shows that the property was purchased by Swan Bay Holdings, Inc. from Pacific Lumber & Shipping Company in August 1998.

The site is zoned for commercial use and is presently used for warehouse facilities. The site is paved and connected to the public sewer system. There are six buildings on the property:

- A 7,494-square foot warehouse built in 1969;
- Three open lumber storage buildings built in 1980, 1982, and 1986; the buildings are 5,760, 6,720, and 3,975 square feet, respectively;
- A 1,830-square foot lumber storage building built in 1980; and
- A 2,318-square foot materials storage building.

3.6.3 Wise Property

Parcel 9049 was purchased by the Wises in February 2005. The 0.68-acre site is currently vacant. The site is paved and connected to the public sewer system.

The Chemithon Corporation owned parcel 9049 from April 2002 to February 2005.

3.6.4 Klier DV

Klier DV owns parcel 9008. The 0.62-acre parcel is zoned as commercial and is presently used by Chelan Manufacturing Company/Lock Rite Metals. The property is paved and connected to the public sewer system. There are three buildings on the property:

- A 2,160-square foot warehouse built in 1900; the warehouse was converted from a single family residence;
- A 1,561-square foot lumber storage shed built in 1970; and
- A 3,752-square foot equipment storage shed built in 1970.

3.6.5 Allen Property

The Allens purchased parcel 9089 in 1984 from the Small Business Administration. In King County Assessor records, the property name is listed as Kleen Environmental. The property is zoned as commercial and the present use is heavy industrial. The site is paved and connected to the public sewer system. There is one building on the 0.89-acre parcel, a 6,020-square foot light industrial manufacturing building. The building was constructed in 1951.

3.6.6 City of Seattle Parks Department

City of Seattle Parks Department owns parcels 9046 and 9068. The sites are zoned as commercial and the present use is listed as vacant (industrial) on King County Assessor property records. The city of Seattle purchased the parcels from Nordic Construction, Inc. in October

1996. The sites are connected to the public sewer system. It is not known if the ground surface is paved. Parcel 9046 is 0.45 acre in area and parcel 9068 is 0.07 acre in area.

3.6.7 Sayler Property

King County Assessor records list Mr. Tim Sayler as the taxpayer for parcel 9014; however, the most recent property transaction information shows that the property was purchased by Eagle Rock Real Estate LLC from Mr. Steve Morgan in August 2004. The 0.68-acre site is zoned as commercial and the present use is listed as vacant (industrial) in the King County Assessor property records. It is not known if the ground surface is paved. The site is connected to the public sewer system. Previous owners of this parcel include Lost Creek Investments, LLC and Evergreen Towing, Inc.

4.0 Summary of Data Gaps

Based on the evaluation of existing information described in Section 1.0 through 3.0 of this report, a number of data gaps have been identified. Data needed to assess the potential for sediment recontamination at the Glacier Bay Source Control Area are summarized below.

4.1 Alaska Marine Lines

Past practices at this facility resulted in soil and groundwater contamination. Although petroleum-contaminated soils were excavated in 1993, PAHs and dibenzofuran remained in the soil at levels of potential concern subsequent to the cleanup. The most recent soil and groundwater data were collected from this site in 1994. Additional data is needed to determine whether residual historical contamination poses a risk of sediment recontamination via groundwater transport.

The facility currently operates under an NPDES general industrial stormwater permit. A January 2006 compliance inspection identified several concerns and recommendations; no follow-up inspection has been conducted. Operations at this facility should be monitored to ensure compliance with permit requirements and stormwater BMPs to prevent release of contaminants to the LDW.

4.2 Duwamish Shipyard

A variety of contaminants have recently been detected in soil and groundwater at this facility and in adjacent sediments as a result of historical shipyard operations. These contaminants include arsenic, cadmium, copper, mercury, lead, and PAHs.

Duwamish Shipyard prepared a Preliminary Investigation Data Report in 2006 that summarizes current upland conditions, and received comments from Ecology to address remaining data gaps. These will be addressed in future communications with Ecology, including development of an Agreed Order and an accompanying investigation work plan. As part of the work plan, Ecology has directed Duwamish Shipyards to clean out catch basins and lines, sample and report results, install monitoring wells, and perform additional upland sampling and nearshore sediment evaluation. Data from these activities will be reviewed and an assessment of the potential for sediment recontamination from this property will be documented.

4.3 Glacier Northwest

A variety of contaminants have been detected in soil and groundwater at this site as a result of historical operations. These include: metals, pentachlorophenol, and 2,4-dichlorophenol. The most recent soil and groundwater data for this site were collected in 1990. Current soil and groundwater concentrations are unknown. In addition, high levels of dioxins have been detected in sediments directly offshore of this facility.

Because groundwater at the site is shallow and the area reportedly has a high seepage level, the potential for sediment recontamination via groundwater from this site is of significant concern.

Additional data on contaminant concentrations in soil and groundwater are needed in order to evaluate the potential for groundwater from this site to recontaminate Glacier Bay sediments.

This facility does not have a stormwater discharge permit, and little information about current activities at the site was available. A site inspection should be performed to identify current activities at the site and to determine whether the facility is discharging to the LDW. If so, the facility should be permitted.

4.4 MRI Corporation

Past operations at this site indicate a potential for contamination of soils and groundwater with metals including tin, zinc, lead, and chromium; however, very little environmental sampling data are available. Three soil samples collected in 1997 indicated elevated levels of tin and zinc. Additional groundwater data are needed in order to assess the potential for sediment recontamination via this pathway.

No information was available regarding current activities at this location. A site inspection should be performed to evaluate the potential for current activities to cause sediment recontamination, including whether current operations discharge stormwater to the LDW.

4.5 Upland Sites

The Chemithon Corporation has recently indicated that it plans to discharge stormwater to the LDW. Catch basin samples collected by SPU found several chemicals exceeded screening criteria including PCBs, methylphenolic compounds, phthalates, PAHs, copper, lead, mercury, zinc, and diesel- and motor-range hydrocarbons. Results of follow-up inspections and sampling are needed to allow an assessment of the potential for sediment recontamination from this facility.

Other upland sites may be discharging stormwater to the Glacier Bay Source Control Area. Upland sites that may be discharging stormwater to this area should be inspected to provide information needed to assess the potential for sediment recontamination associated with these upland sites.

4.6 Other Data Gaps

Information on the extent of the stormwater drainage sub-basin that discharges to Glacier Bay is needed to evaluate the potential for upland facilities to contribute to recontamination of LDW sediments after cleanup.

No information was available to determine whether bank erosion is a pathway of concern with regard to sediment recontamination.

5.0 Documents Reviewed

AET (Advanced Environmental Technologies). 1991. Letter from Bob Ely, AET, to George Bloomberg, Port of Seattle, re: MRI Corporation at 6000 W. Marginal Way S.W., Historical Management Practices. June 19, 1991.

AML (Alaska Marine Lines). 1991. Underground Storage Tank Self-Certification of Compliance Form. Prepared by W. Lael Prock, Alaska Marine Lines. May 31, 1991.

AML. 1993. Notice of Intent to Discharge Storm Water Associated with Construction Activity and Industrial Activity. Alaska Marine Lines. July 2, 1993.

AML. 2001. Alaska Marine Lines, Inc. Stormwater Pollution Prevention Plan. Prepared by Alaska Marine Lines, Inc. October 11, 2001.

Anchor (Anchor Environmental). 2006a. Letter from Rebecca Desrosiers, Anchor Environmental, to Russell E. Olsen, Washington State Department of Ecology, re: Response to Ecology Comments, Preliminary Investigation Work Plan, Duwamish Shipyard, Inc. (Site #1429), 5658 West Marginal Way SW, Seattle, Washington, 98106. September 22, 2006.

Anchor. 2006b. Preliminary Investigation Data Report, Duwamish Shipyard, Inc. (Site #1429), Seattle, Washington. Prepared by Anchor Environmental for Duwamish Shipyard, Inc. December 1, 2006.

Anchor. 2006c. Letter from Rebecca Desrosiers, Anchor Environmental, to Russell E. Olsen, Washington State Department of Ecology, re: Duwamish Shipyard, Inc., Preliminary Investigation Data Report (Site #1429). December 22, 2006.

ARI (Analytical Resources Incorporated). 1990. Letter from Michelle J. Turner, Project Coordinator, ARI, to Mr. Jeff Neuner, Parametrix, Inc., re: Project No. 55-1794-03, Lone Star Ind. / ARI Job. No. 6427. Pentachlorophenol results for MW-2 and MW-3. June 13, 1990.

ARI. 2006a. Client Project: Duwamish, ARI Job No. JI31. May 22, 2006.

ARI. 2006b. Client Project: Duwamish, ARI Job No. KA07. November 15, 2006.

ARI. 2006c. Client Project: Duwamish, ARI Job No. KF45. December 6, 2006.

ARI. 2007. Client Project: Duwamish, ARI Job No. KN66. February 14, 2007.

Ash Grove (Ash Grove Cement Company). 1988. Notification of Dangerous Waste Activities, First Notification, Ash Grove Cement Company. Prepared by Stanley Webb, Ash Grove Cement Company. January 6, 1988.

Ash Grove. 1991. Notification of Dangerous Waste Activities, Cancel Site ID, Ash Grove Cement Company. Prepared by Kenneth Rone, Ash Grove Cement Company. August 9, 1991.

Booth and Herman. 1998. Duwamish Coalition: Duwamish basin groundwater pathways conceptual model report. City of Seattle Office of Economic Development and King County Office of Budget and Strategic Planning, Seattle, WA. As cited in Windward 2003.

Chemithon. 2006a. Plot Plan – Stormwater Drainage System. September 13, 2006.

Chemithon. 2006b. Letter from Brian W. MacArthur, Chemithon Vice President of Operations, to Mr. Arnaud Girard, King County Wastewater Treatment Division, re: Letter of September 6, 2006, King County Waste Discharge Permit Application. October 5, 2006.

Chemithon. 2007. Chemithon website. Accessed April 24, 2007 online: www.chemithon.com/corporate.html

City of Seattle. 2006a. City of Seattle Analysis and Decision of the Director of the Department of Planning and Development: Alaska Marine Lines, 5600 West Marginal Way S. Prepared by Art Pederson, Seattle Department of Planning and Development. March 16, 2006.

City of Seattle. 2006b. Shoreline Management Act of 1971 Permit for Shoreline Management Substantial Development, Conditional Use, or Variance. Prepared by Art Pederson, Seattle Department of Planning and Development. March 16, 2006.

Crawford, F.B. 1964. Letter from Fred B. Crawford, Executive Assistant-Operations, to Mr. Ian Watson, Kaiser Engineers, re: Removal of Buildings, 5900 West Marginal Way, Seattle, Washington. November 19, 1964.

Crawford, F.B. 1965. Letter from Fred B. Crawford, Assistant General Manager, to Kaiser Cement & Gypsum Corporation, re: Possibility of the Port constructing the berth along the Duwamish and leasing it to Kaiser Permanente Cement: Kaiser Cement & Gypsum Corporation. October 1, 1965.

Dames and Moore. 1991a. Underground Storage Tank Site Check/Site Assessment Checklist, Alaska Marine Lines, 5615 West Marginal Way SW, Seattle, Washington. Prepared by Mark A. Chandler, Dames and Moore. March 5, 1991.

Dames and Moore. 1991b. Underground Storage Tank, Permanent Closure/Change-In-Service Checklist. Prepared by Mark A. Chandler, Dames and Moore. March 5, 1991.

Dames and Moore. 1991c. Site Assessment for USTs, 5615 West Marginal Way S.W., Seattle, Washington. Prepared by Mark A. Chandler, Dames and Moore for Bill Troy, Alaska Marine Lines, Inc. March 21, 1991.

Duwamish Shipyard. 1985. Notification of Dangerous Waste Activities, Duwamish Shipyard. Prepared by Donald A Meberg, Duwamish Shipyard, Inc. Prepared for Washington State Department of Ecology. March 18, 1985.

Duwamish Shipyard. 1988a. Letter from David M. Larsen, Duwamish Shipyard, Inc., to Washington State Department of Ecology, re: Application for Relief from Penalty No DE 87-N311. February 9, 1988.

Duwamish Shipyard. 1988b. Letter from Donald A Meberg, Duwamish Shipyard, Inc., to Mary A Kautz, Washington State Department of Ecology, re: Notice of Violation No. DE 87-N310. February 29, 1988.

Duwamish Shipyard. 1990. METRO Waste Discharge Permit Application. Prepared by E.R. Graves, Duwamish Shipyard, Inc. Submitted to METRO. July 6, 1990.

Duwamish Shipyard. 1992. Notification of Dangerous Waste Activities, Duwamish Shipyard. Prepared by Donald A Meberg, Duwamish Shipyard, Inc. March 19, 1992.

Duwamish Shipyard. 1993a. Letter from David M. Larsen, Duwamish Shipyard, Inc., to Enforcement Coordinator, Washington State Department of Ecology, re: Application for Relief from Penalty No DE93WQ-N240. August 23, 1993.

Duwamish Shipyard. 1993b. Letter from David M. Larsen, Duwamish Shipyard, Inc., to Pollution Control Hearings Board, re: Notice of Disposition Upon Application for Relief From Penalty No. DE 93WQ-N240. November 16, 1993.

Duwamish Shipyard. 1994a. 1993 Generator Annual Dangerous Waste Report. Prepared by Donald A Meberg, Duwamish Shipyard, Inc. March 1, 1994.

Duwamish Shipyard. 1994b. Letter from Kyle L. McCleary, Duwamish Shipyard, Inc., to Rebecca Vandergriff, Washington State Department of Ecology, re: PCHB No. 93-288. March 2, 1994.

Duwamish Shipyard. 1994c. Letter from Kyle L. McCleary, Duwamish Shipyard, Inc., to Washington State Department of Ecology, re: Drop Appeal. March 17, 1994.

Duwamish Shipyard. 1994d. Notification of Dangerous Waste Activities, Duwamish Shipyard. Prepared by Kyle L. McCleary, Duwamish Shipyard, Inc. August 2, 1994.

Duwamish Shipyard. 1994e. Letter from Kyle L. McCleary, Duwamish Shipyard, Inc., to Robert Stone, Washington State Department of Ecology, re: Hazardous Waste Compliance Report. August 10, 1994.

Duwamish Shipyard. 1994f. Letter from David M. Larsen, Duwamish Shipyard, Inc., to Debbie North, Washington State Department of Ecology, re: Water Quality Inspection Report, September 8, 1994 Site Visit . October 25, 1994.

Duwamish Shipyard. 1996. Letter from David M. Larsen, Duwamish Shipyard, Inc., to John H Glynn, Washington State Department of Ecology, re: Duwamish Shipyard, Inc. Permit No. WA-003093-7. January 25, 1996.

Duwamish Shipyard. 1997a. Letter from Kyle L. McCleary, Duwamish Shipyard, Inc., to Lisa Zinner, Washington State Department of Ecology, re: Testing Frequency, Duwamish Shipyard, Inc. (NPDES #WA-003093-7). January 31, 1997.

Duwamish Shipyard. 1997b. Letter from Kyle L. McCleary, Duwamish Shipyard, Inc., to Kenneth White, Washington State Department of Ecology, re: Quarterly Discharge Monitoring Report dated March 4, 1997. March 6, 1997.

Duwamish Shipyard. 1997c. Spill Prevention, Control and Countermeasures Plan for Duwamish Shipyard, Inc. Prepared by Kyle L. McCleary, Duwamish Shipyard, Inc. July 14, 1997.

Duwamish Shipyard. 1998a. Letter from Kyle L. McCleary, Duwamish Shipyard, Inc., to Lisa Zinner, Washington State Department of Ecology, re: Barge FNT230 was in the graving dock on 2/27/98, sandblasting hull, greater amount of dust than anticipated. April 20, 1998.

Duwamish Shipyard. 1998b. Letter from Kyle L. McCleary, Duwamish Shipyard, Inc., to Lisa Zinner, Washington State Department of Ecology, re: NPDES Permit #WA-003093-7. December 21, 1998.

Duwamish Shipyard. 1999. Letter from Kyle L. McCleary, Duwamish Shipyard, Inc., to John Drabek, Washington State Department of Ecology, re: Mud from Bismark barge inadvertently allowed to reach a drainage trough and released to the Duwamish on 9/9/99. September 20, 1999.

Duwamish Shipyard. 2000a. Underground Storage Tank 30 Day Notice of Intent to Close, Duwamish Shipyard. Prepared by Todd Salamonsen, Quality Tank Service, Inc. May 11, 2000.

Duwamish Shipyard. 2000b. Underground Storage Tank Closure and Site Assessment Notice, Duwamish Shipyard. Prepared by Todd Salamonsen, Quality Tank Service, Inc. August 29, 2000.

Duwamish Shipyard. 2001. Letter from Kyle L. McCleary, Duwamish Shipyard, Inc., to Washington State Department of Ecology, re: NPDES #WA003093-7, Water Compliance Inspection Report dated 8/1/01, Inspection date 7/20/01. August 28, 2001.

Duwamish Shipyard. 2005. Spill Prevention, Control and Countermeasures Plan for Duwamish Shipyard, Inc. Prepared by Kyle L. McCleary, Duwamish Shipyard, Inc. October 19, 2005.

Duwamish Shipyard. Undated. Customer Information on the NPDES Program and Storm Water Pollution Prevention (Pamphlet). Prepared by Duwamish Shipyard, Inc.

Duwamish Shipyard. Undated. Pollution Prevention Plan Base Year 1999.

Duwamish Shipyard. Undated. Worksheet One DSI PPP covering 2001–2002.

Duwamish Shipyard. Undated. Worksheet One DSI PPP covering 2000–2001.

Duwamish Shipyard. Undated. Worksheet One DSI PPP covering 1999–2000.

Ecology (Washington State Department of Ecology). 1986. Letter from Richard Koch, Washington State Department of Ecology, to Donald A Meberg, Duwamish Shipyard, Inc., re: EP TOX test and Ecology's use of the information. July 2, 1986.

Ecology. 1986. Letter from Richard Koch, Washington State Department of Ecology, to Donald A Meberg, Duwamish Shipyard, Inc., re: Follow up to phone conversation with Mark Rockney. August 28, 1986.

Ecology. 1987a. Handwritten notes from Ecology Project Manager. Washington State Department of Ecology.

Ecology. 1987b. TSCA Inspection Report, MRI Corporation. Prepared by Elaine Atkinson, Washington State Department of Ecology. February 26, 1987.

Ecology. 1987c. Telephone report from Elaine Atkinson, Washington State Department of Ecology, to Jack Force, MRI Corporation, re: Secondary containment for tank farm. March 4, 1987.

Ecology. 1987d. Photographs of tank farm at MRI Corporation. Prepared by Elaine Atkinson, Washington State Department of Ecology. March 4, 1987.

Ecology. 1987e. Letter from Elaine Atkinson. Washington State Department of Ecology, to Jack Force, MRI Corporation, re: Washington State Department of Ecology TSCA Inspection at the MRI Corporation, Seattle, Washington, on February 26,1987. March 12, 1987.

Ecology. 1987f. Letter from Dan Cargill, District Inspector, Elliott Bay Action Team, to Ms. Michele Anderson, U.S. Environmental Protection Agency, re: Reichhold Chemicals, Inc. Seattle Plant. Enclosed file (not present) with site history and operations, discussion of waste lagoon location. March 20, 1987.

Ecology. 1987g. Letter from Dan Cargill, District Inspector, Elliott Bay Action Team, to Mr. John Dohn, City of Seattle, Department of Construction and Land Use, re: Kaiser Cement Short Plat. Brief site history, sampling recommendations prior to construction. April 8, 1987.

Ecology. 1987h. Inspection Report, Duwamish Shipyard, Inc. Prepared by Richard Koch, Washington State Department of Ecology. October 21, 1987.

Ecology. 1987i. Letter from Richard Koch, Washington State Department of Ecology, to Nancy Ellison, Washington State Department of Ecology, re: Recommendation for Notice of Violation No. DE 87-N310 and Penalty No. DE 87-N311. November 4, 1987.

Ecology. 1988a. Notice of Violation No. DE 87-N310. Prepared by Nancy Ellison, Washington State Department of Ecology. January 26, 1988.

Ecology. 1988b. Notice of Penalty Incurred and Due No. DE 87-N311. Prepared by Nancy Ellison, Washington State Department of Ecology. January 26, 1988.

Ecology. 1988c. Letter from Richard Koch, Washington State Department of Ecology, to Nancy Ellison, Washington State Department of Ecology, re: Duwamish Shipyard Request for relief from penalty. February 19, 1988.

Ecology. 1988d. Letter from David M. Larsen, Duwamish Shipyard, Inc., to Nancy Ellison, Washington State Department of Ecology, re: Penalty No. DE 87-N311. April 15, 1988.

Ecology. 1988e. Letter from Dan Cargill, District Inspector, Elliott Bay Action Team, to Ms. Michele Anderson, U.S. Environmental Protection Agency, re: Reichhold Chemical Site. Comments on Port of Seattle and U.S. Army documents. April 25, 1988.

Ecology. 1988f. Ecology Internal Site Tracking Documents. Washington State Department of Ecology. November 30, 1988.

Ecology. 1989. NPDES Permit No WA-003093-7. Prepared by John H. Glynn, Washington State Department of Ecology. August 29, 1989.

Ecology. 1990a. Letter from Louise Bardy, Washington State Department of Ecology, to Donald A. Meberg, Duwamish Shipyard, Inc., re: Duwamish Shipyard, Inc. #N-17-0035-000. May 18, 1990.

Ecology. 1990b. Letter from Julie Selleck, Washington State Department of Ecology, to Ken Casten, Industrial Services, re: TCLP testing of sandblast grit. August 24, 1990.

Ecology. 1990c. Letter from Kevin Fitzpatrick, Washington State Department of Ecology, to Jay Spearman, Spearman Engineering, re: Approval of Sediment Monitoring Plan Submitted Pursuant to NPDES Permit No. WA-003093-7. December 27, 1990.

Ecology. 1990d. Reichhold Chemical/Lone Star Cement - requesting contractor assistance to conduct site hazard assessment to score site by Washington Ranking Method (WARM).

Ecology. 1991. Conversation Record between Louise Bardy, Washington State Department of Ecology, and Bob Ely, MRI Chemicals re: MST Chemicals, Inc., 6020 W. Marginal Wy S, Seattle. June 6, 1991.

Ecology. 1992. National Pollutant Discharge Elimination System and State Waste Discharge Baseline General Permit for Storm Water Discharges Associated With Industrial Activities Permit No. SO3-001365, Alaska Marine Lines. Prepared by Washington State Department of Ecology. November 18, 1992.

Ecology. 1993a. Letter from Bill Kammin, Environmental Lab Director, to Judy Aitken, re: Metals Quality Assurance memo for the Lone Star Concrete Project. December 14, 1993.

Ecology. 1993b. Permit compliance: Sediment monitoring report and DMRs (telephone report). Prepared by Deborah North, Washington State Department of Ecology. January 26, 1993.

Ecology. 1993c. Letter from Michael Gallagher, Washington State Department of Ecology, to Donald A. Meberg, Duwamish Shipyard, Inc., re: Site Hazard Assessment of Duwamish Shipyard. February 5, 1993.

Ecology. 1993d. Water Quality Inspection Report, Duwamish Shipyard, Inc. Prepared by Deborah North, Washington State Department of Ecology. February 9, 1993.

Ecology. 1993e. Letter from Deborah North, Washington State Department of Ecology, to Donald A. Meberg, Duwamish Shipyard, Inc., re: Summary of non-compliance observed on 2/9/93 site inspection. February 25, 1993.

Ecology. 1993f. Letter from Kenneth White, Washington State Department of Ecology, to John Glynn, Washington State Department of Ecology, re: Recommendation for Notice of Violation DE 93WQ-N149 Duwamish Shipyard, Inc., for non-compliance with standards and conditions in National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA-003093-7. March 19, 1993.

Ecology. 1993g. Notice of Violation No. DE 93WQ-N149, Duwamish Shipyard, Inc. Washington State Department of Ecology. April 1, 1993.

Ecology. 1993h. Approval of Sediment Monitoring Plan Submitted Pursuant to NPDES Permit No. WA-003093-7. Prepared by Deborah North, Washington State Department of Ecology. May 14, 1993.

Ecology. 1993i. NPDES Compliance Inspection Report, Duwamish Shipyard. Prepared by Deborah North, Washington State Department of Ecology. June 3, 1993.

Ecology. 1993j. Letter form James D. Krull, Washington State Department of Ecology, to Alaska Marine Lines, re: Coverage Under the Storm Water Baseline General Permit, Permit Number: SO3-001365. July 16, 1993.

Ecology. 1993k. Letter from Deborah North, Washington State Department of Ecology, to Donald A. Meberg, Duwamish Shipyard, Inc., re: Approval of Sediment Monitoring Plan Submitted Pursuant to NPDES Permit No. WA-003093-7. August 2, 1993.

Ecology. 1993l. Notice of Penalty Incurred and Due No. DE 93WQ-N240, Duwamish Shipyard, Inc.. Prepared by Mike Llewelyn, Washington State Department of Ecology. August 10, 1993.

Ecology. 1993m. Letter from Keith E. Phillips, Washington State Department of Ecology, to Tom Mueller, USACE, Seattle District, re: Public Notice No. 93-2-00130, Alaska Marine Lines, Inc. August 27, 1993.

Ecology. 1993n. Letter from Keith E. Phillips, Washington State Department of Ecology, to Alaska Marine Lines, re: Water Quality Certification, Public Notice No. 93-2-00130, Cargo Terminal on the Duwamish River. August 27, 1993.

Ecology. 1993o. Memorandum from Dan Cargill, Washington Department of Ecology, to Robert Kievit, USEPA, re: Aerial Photographic Analysis of Sites List, Reichhold Chemical, TS-AMD-81102. October 12, 1993.

Ecology. 1993p. Letter from Mike Llewelyn, Washington State Department of Ecology, to David M. Larsen, Duwamish Shipyard, Inc., re: Notice of Disposition Upon Application for Relief from Penalty. October 26, 1993.

Ecology. 1993q. Order No. DE 93WQ-N252, Duwamish Shipyard, Inc. Prepared by John H Glyn, Washington State Department of Ecology. November 5, 1993.

Ecology. 1994a. Water Compliance Inspection Report. Prepared by Deborah North, Washington State Department of Ecology. January 27, 1994.

Ecology. 1994b. ERT System - Initial Report/Followup. Prepared by Dorothy Glenn, Washington State Department of Ecology. January 31, 1994.

Ecology. 1994c. Memorandum from Teresa Michelsen, Washington State Department of Ecology, to Rachel Friedman-Thomas, Washington State Department of Ecology, re: Duwamish Shipyard NPDES Sediments Monitoring Report. February 25, 1994.

Ecology. 1994d. ERT System - Initial Report/Followup. Prepared by Joanne Polayes-Wien, Washington State Department of Ecology. March 1, 1994.

Ecology. 1994e. NPDES Compliance Inspection Report, Lone Star Northwest, Inc. Prepared by Lisa Zinner, Washington State Department of Ecology. March 3, 1994.

Ecology. 1994f. Letter from Liza Zinner, Washington State Department of Ecology, to Douglas Twiford, Lone Star Northwest, Inc., re: Inspection. March 8, 1994.

Ecology. 1994g. Letter from Robert Stone, Washington State Department of Ecology, to Kyle McCleary, Duwamish Shipyard, Inc., re: Hazardous Waste Compliance Inspection on April 26, 1994 at Duwamish Shipyard, Inc. (WAD 009244997). July 20, 1994.

Ecology. 1994h. Water Compliance Inspection Report. Prepared by Deborah North, Washington State Department of Ecology. September 8, 1994.

Ecology. 1994i. ERT System, Initial Report/Follow-Up. Prepared by Mary O'Herron, Washington State Department of Ecology. September 23, 1994.

Ecology. 1994j. Site Data Summary, Washington State Department of Ecology, Toxics Cleanup Program. December 29, 1994.

Ecology. 1995a. Letter from Deborah North, Washington State Department of Ecology, to Kyle McCleary, Duwamish Shipyard, Inc., re: Review of DMRs, inadequate monitoring. March 1, 1995.

Ecology. 1995b. Water Compliance Inspection Report. Prepared by Lisa Zinner, Washington State Department of Ecology. October 24, 1995.

Ecology. 1996a. Letter from Washington State Department of Ecology to Alaska Marine Lines, Inc. re: Stormwater Baseline General Permit for Industrial Activity, Permit No. SO3001365. January 24, 1996.

Ecology. 1996b. Sediment Management Standards Contaminated Sediment Site List. Washington State Department of Ecology. May 1, 1996.

Ecology. 1996c. Environmental Report Tracking System, Reichhold/Lonestar. Prepared by Rita Lopez, Washington State Department of Ecology. May 23, 1996.

Ecology. 1996d. Letter from Lisa Zinner, Washington State Department of Ecology, to Kyle McClearly, Duwamish Shipyard, Inc., re: NPDES Permit No. WA-003093-7, Duwamish Shipyard, Inc. August 20, 1996.

Ecology. 1996e. Water Compliance Inspection Report. Prepared by Lisa Zinner, Washington State Department of Ecology. September 5, 1996.

Ecology. 1996f. Regulatory Recommendations, Acute WET Test Report. Prepared by Keith Johnson, Washington State Department of Ecology. November 21, 1996.

Ecology. 1996g. Letter from Lisa Zinner, Washington State Department of Ecology, to Kyle McCleary, Duwamish Shipyard, Inc., re: NPDES Permit No. WA-003093-7, Duwamish Shipyard, Inc., Effluent Mixing Study. December 13, 1996.

Ecology. 1996h. Letter from Lisa Zinner, Washington State Department of Ecology, to Kyle McCleary, Duwamish Shipyard, Inc., re: NPDES Permit No. WA-003093-7, Duwamish Shipyard, Inc., Drydock and Graving Dock Discharge Metals Report. December 31, 1996.

Ecology. 1997a. Email from Greg Pelletier, Washington State Department of Ecology, to Gary Bailey, Washington State Department of Ecology, re: Hart Crowser comments on Duwamish Shipyard mixing zone . January 23, 1997.

Ecology. 1997b. Letter from Lisa Zinner, Washington State Department of Ecology, to Kyle McCleary, Duwamish Shipyard, Inc., re: NPDES Permit No. WA-003093-7, Duwamish Shipyard, Inc. February 5, 1997.

Ecology. 1997c. Letter from Lisa Zinner, Washington State Department of Ecology, to BJ Cummings, Puget Soundkeeper Alliance, re: Duwamish Shipyard Testing Frequency. February 6, 1997.

Ecology. 1997d. Regulatory Recommendations, Acute WET Test Report. Prepared by Keith Johnson, Washington State Department of Ecology. February 12, 1997.

Ecology. 1997e. Letter from Kenneth White, Washington State Department of Ecology, to Kyle McCleary, Duwamish Shipyard, Inc., re: Monthly Discharge Monitoring Report violations prepared and distributed on a Quarterly Basis. March 4, 1997.

Ecology. 1997f. Letter from Lisa Zinner, Washington State Department of Ecology, to Kyle McCleary, Duwamish Shipyard, re: NPDES Permit No. WA-003093-7, Duwamish Shipyard, Inc., Quarterly Discharge Monitoring Report dated March 4, 1997. March 13, 1997.

Ecology. 1997g. Letter from Michael J. Spencer, Washington State Department of Ecology, to Property Manager, Port of Seattle, re: Site Hazard Assessment - MST Chemicals, Inc., Ecology ID No. N-17-0157-000. August 21, 1997.

Ecology. 1997h. Water Compliance Inspection Report. Prepared by Lisa Zinner, Washington State Department of Ecology. August 22, 1997.

Ecology. 1997i. Report for Test AQTX1218 and AQTC1219, Acute WET Test Review. Prepared by Randall Marshall, Washington State Department of Ecology. September 25, 1997.

Ecology. 1997j. Report for Test AQTX1220 and AQTX1221, Acute WET Test Review. Prepared by Randall Marshall, Washington State Department of Ecology. September 25, 1997.

Ecology. 1998a. Report for Test AQTX1499 and AQTX1500, Acute WET Test Review. Prepared by Keith Johnson, Washington State Department of Ecology. February 12, 1998.

Ecology. 1998b. Report for Test AQTX1497 & AQTX1498. Acute WET Test Review. Prepared by Keith Johnson, Washington State Department of Ecology. February 12, 1998.

Ecology. 1998c. Letter from Lisa Zinner, Washington State Department of Ecology, to Kyle McCleary, Duwamish Shipyard, Inc., re: NPDES Permit No. WA-003093-7, Duwamish Shipyard, Inc., Whole Effluent Toxicity Testing. March 3, 1998.

Ecology. 1998d. Letter from Lisa Zinner, Washington State Department of Ecology, to Kyle McCleary, Duwamish Shipyard, re: Notice of Complaint. April 8, 1998.

Ecology. 1998e. Letter from Lisa Zinner, Washington State Department of Ecology, to Kyle McCleary, Duwamish Shipyard, re: NPDES Permit No. WA-003093-7, Duwamish Shipyard, Inc. May 26, 1998.

Ecology. 1998f. Report for Test AQTX1695 and AQTX1696, Acute WET Test Review. Prepared by Randall Marshall, Washington State Department of Ecology. June 18, 1998.

Ecology. 1998g. Letter from Barry Rogowski, Washington State Department of Ecology, to Duwamish Shipyard, Inc., re: Final Warning Letter: December 22, 1998 Underground Storage Tank (UST) Upgrade Deadline and Facility compliance Tags, UST Site Number 1429, King County. November 13, 1998.

Ecology. 1999. Letter from John H. Glynn, Washington State Department of Ecology, to Ned Pettit, Glacier Northwest, re: Approval to remove Outfall 006 from NPDES Permit WA-003093-7. January 4, 1999.

Ecology. 2000a. Letter from John H. Glynn, Washington State Department of Ecology, to Ned Pettit, Glacier Northwest, re: Issuance of General Permit No. WAG 50-0015 for Glacier Northwest Inc. West Marginal Way Plant. May 19, 2000.

Ecology. 2000b. Environmental Report Tracking System Referral, Washington State Department of Ecology. July 12, 2000.

Ecology. 2000c. Industrial Stormwater General Permit SO3-001365, Alaska Marine Lines, Inc. November 18, 2000.

Ecology. 2001a. Extension of NPDES Permit WA-003093-7, Duwamish Shipyard. January 5, 2001.

Ecology. 2001b. Letter from Kevin Fitzpatrick, Washington State Department of Ecology, to Thomas G. Hanson, Glacier Northwest, re: Extension of General Permit No. WAG 50-0016 for Glacier Northwest, Inc., West Marginal Way Plant. May 18, 2001.

Ecology. 2001c. Letter from Kevin Fitzpatrick, Washington State Department of Ecology, to Edward J. Owens, Glacier Northwest, Inc., re: Coverage Under the Sand And Gravel General Permit, West Marginal Way Ready-Mix Plant; WAG 50-3347. June 23, 2001.

Ecology. 2001d. Water Quality Inspection Report, Duwamish Shipyard, Inc. Prepared by Don Knutsen, Washington State Department of Ecology. July 20,2001.

Ecology. 2003a. Memorandum from Sharon R. Brown, Washington State Department of Ecology, to Richard Thomas, Washington State Department of Ecology, re: Duwamish Shipyard NPDES Permit No. WA-003093-7. April 3, 2003.

Ecology. 2003b. NPDES Permit WA-003093-7, Duwamish Shipyard. April 22, 2003.

Ecology. 2003c. Letter from Holly Sullivan, Washington State Department of Ecology, to Thomas G. Hanson, Glacier Northwest, re: Marginal Way Truck Stop and 5902 W Marginal Way SW. May 19, 2003.

Ecology. 2003d. Facility Data, Duwamish Shipyard (internal files). Washington State Department of Ecology. October 31, 2003.

Ecology. 2004. Letter from Kevin Fitzpatrick, Washington State Department of Ecology, to Kyle McCleary, Duwamish Shipyard, re: Notice of Violation No. 1714. October 1, 2004.

Ecology. 2005a. Letter from Kevin Fitzpatrick, Washington State Department of Ecology, to Kyle McCleary, Duwamish Shipyard, re: Notice of Penalty Incurred and Due No 1912. January 25, 2005.

Ecology. 2005b. Letter from Kevin Fitzpatrick, Washington State Department of Ecology, to Kyle McCleary, Duwamish Shipyard, re: Notice of Disposition Upon Application for Relief from Penalty No. 1912. March 16, 2005.

Ecology. 2005c. Letter from Rebekah R. Padgett, Washington State Department of Ecology, to Rod Dewalt, Alaska Marine Lines, re: Joint Aquatic Resources Permit Application (JARPA) for Filling In of Existing Graving Dock Project, Duwamish Waterway, King County, Washington. September 15, 2005.

Ecology. 2005d. National Pollutant Discharge Elimination System Waste Discharge Permit No. WA-003093-7, Duwamish Shipyard, Inc. Washington State Department of Ecology. October 10, 2005.

Ecology. 2006a. Notice of Application for Water Quality Certification and for Certification of Consistency with the Washington Coastal Zone Management Program. Washington State Department of Ecology. January 6, 2006.

Ecology. 2006b. Letter from Rebekah R. Padgett, Washington State Department of Ecology, to Rod Dewalt, Alaska Marine Lines, re: Coastal Zone Management (CZM) Consistency status letter, U.S. Army Corps of Engineers (Corps) Reference #200501087, Filling in Existing Graving Dock, Duwamish Waterway, King County, Washington. January 13, 2006.

Ecology. 2006c. Letter from Kevin Fitzpatrick, Washington State Department of Ecology, to William Parfitt, Jr., Glacier Northwest, re: Cancellation of Sand & Gravel General Permit WAG 50-3347, West Marginal Way Plant. January 25, 2006.

Ecology. 2006d. Stormwater Compliance Inspection Report, Alaska Marine Lines, Seattle. Prepared by Greg Stegman, Washington State Department of Ecology. January 30, 2006.

Ecology. 2006e. Letter from Geoff Talent, Washington State Department of Ecology, Shorelands and Environmental Assistance Program, to Michelle Walker, USACE, Seattle District, re: U.S. Army Corps of Engineers Reference #200501087, Alaska Marine Lines, Inc. February 24, 2006.

Ecology. 2006f. Integrated Site Information System, Duwamish Shipyard Inc, Ecology ID: 2071 (Database printout). Washington State Department of Ecology. June 28, 2006.

Ecology. 2006g. Letter from Geoff Talent, Washington State Department of Ecology, to Rod Dewalt, Alaska Marine Lines, re: Water Quality Certification Order #3680 and Coastal Zone Management Consistency Determination for U.S. Army Corps of Engineers (Corps) Reference #200501087 to Fill a 1.34-Acre Graving Dock, Duwamish Waterway, Seattle, King County, Washington. September 7, 2006.

Ecology. 2007a. Letter from Maura S. O'Brien, Washington State Department of Ecology, to David Larsen, Duwamish Shipyard, Inc., re: Update at Duwamish Shipyard, Inc. located at 5658 West Marginal Way SW, Seattle, WA 98106. January 5, 2007.

Ecology. 2007b. Letter from Geoff Talent, Washington State Department of Ecology, to Rod Dewalt, Alaska Marine Lines, re: Requested Amendment to Administrative Order #3680, Fill of a 1.34-Acre Graving Dock, Duwamish Waterway, Seattle, King County, Washington. January 26, 2007.

Ecology. 2007c. Letter from Russell E. Olsen, Washington State Department of Ecology, to David Larsen, Duwamish Shipyard, Inc., re: Corrective Action Requirements, Site #1429, Duwamish Shipyard located at 5658 West Marginal Way, Seattle, WA 98106. January 30, 2007.

Ecology. 2007d. Amendment to Water Quality Certification for Alaska Marine Lines for fill of a 1.34-acre graving dock. Order #3680 1st Amendment, U.S. Army Corps of Engineers #200501087. January 26, 2007.

Ecology. 1998-1991. Ecology Internal Site Tracking Documents. Washington State Department of Ecology.

Ecology. Date Unknown. Fact Sheet for NPDES Permit WA-003093-7, Duwamish Shipyard, Inc.. Washington State Department of Ecology.

Ecology. Date Unknown. Addendum to the Fact Sheet for Modification to NPDES Permit WA-003093-7, Duwamish Shipyard, Inc. Washington State Department of Ecology.

E&E (Ecology and Environment, Inc.). 1988. Trip Report, Port of Seattle - Terminal 115, Seattle, Washington. Prepared by William Richards, Ecology and Environment, Inc., for John Osborn, U.S. Environmental Protection Agency, Region X. February 24, 1988.

Eldridge. 1955a. Letter from E.F. Eldridge, Director and Chief Engineer, Washington Pollution Control Commission, to Mr. F.J. Shelton, Reichhold Chemical Company, Inc., re: Toxicity Studies: Phenolic Compounds. June 29, 1955.

Eldridge. 1955b. Letter from E.F. Eldridge, Director and Chief Engineer, Washington Pollution Control Commission, to State Department of Fisheries, re: Waste disposal: Reichhold Chemical. July 11, 1955.

Eldridge. 1955c. Letter from E.F. Eldridge, Director and Chief Engineer, Washington Pollution Control Commission, to Reichhold Chemicals, Inc., re: Approval from disposal of waste waters on the basis of meeting certain requirements (original and retyped copies). July 19, 1955.

Eldridge. 1955d. Letter from E.F. Eldridge, Director and Chief Engineer, Washington Pollution Control Commission, to Reichhold Chemicals, Inc., re: Amendment to previous letter granting waste water disposal (original and retyped copies). October 24, 1955.

Eldridge. 1955e. Letter from E.F. Eldridge, Director and Chief Engineer, Washington Pollution Control Commission, to Reichhold Chemicals, Inc., re: Phenol daily limits (original and retyped copies) November 2, 1955.

Environmental Hearings Office. 1993. Letter from Richard C. Kelley, Environmental Hearings Office, to David M. Larsen, Duwamish Shipyard, Inc. and Jay J. Manning, Washington State Department of Ecology, re: PCHB No. 93-288, Duwamish Shipyard, Inc. v. DOE (DE 93WQ-N240). December 3, 1993.

Environmental Hearings Office. 1994. Order of Dismissal in the matter of Duwamish Shipyard, Inc. v. DOE (DE 93WQ-N240). Prepared by Richard C. Kelley, Environmental Hearings Office. March 30, 1994.

ENSR (ENSR Consulting and Engineering). 1991. MRI Corporation, Seattle, Washington, Waste Characterization Program. Prepared by Christopher M. Donovan, ENSR

Consulting and Engineering, for Dennis Caputo, Proler International Corporation. March 14, 1991.

Flood. 1988. Letter from Deborah Flood, U.S. Environmental Protection Agency, Region X, to George Bloomberg, Port of Seattle, re: EPA will defer to state authority wrt Terminal 115. July 15, 1988.

Foster, R.F. 1945. Sources of Pollution in the Duwamish-Green River Drainage Area. Prepared by Richard F. Foster. December 6, 1945.

Glacier Northwest. 2000. Letter from Ned Pettit, Glacier Northwest, to John Drabek, Washington State Department of Ecology, re: Sand and Gravel General Permit Application & Notice of Intent to Begin Operation for an Existing Portable Ready-Mixed Concrete Batch Plant. May 10, 2000.

Glacier Northwest. 2001. Letter from Thomas Hanson, Glacier Northwest, to John Drabek, Washington State Department of Ecology, re: Application for coverage under the general NPDES Permit. April 27, 2001.

Glacier Northwest. 2005. Letter from Ned Pettit, Glacier Northwest, to Donna Ortiz de Anaya, Washington State Department of Ecology, re: Change Request Form (Washington State Department of Ecology 070-32) Glacier Northwest, Inc. - West Marginal Way Plant, Sand and Gravel General Permit WAG 50-3347. October 31, 2005.

Glacier Northwest. 2000-2001. WAG-50-0016 Sand and Gravel General Permit Monitoring Report. Prepared by Darrell Herman, Glacier Northwest.

Harper-Owes. 1985. Duwamish Ground Water Studies, Waste Disposal Practices and Dredge and Fill History. Prepared by Harper-Owes for Sweet Edwards and Associates. March 1, 1985.

Hart Crowser. 1987. Groundwater and Soil Quality Assessment – Phase III. Northwest Cooperage Company, Inc. Seattle, WA. Prepared by Hart Crowser for Northwest Cooperage Company, Inc. December 2, 1987.

Hart Crowser. 1993a. Sediment Monitoring Plan, Duwamish Shipyard, Inc., Seattle, Washington. Prepared by Hart Crowser for Duwamish Shipyard, Inc. April 16, 1993.

Hart Crowser. 1993b. Sediment Monitoring Plan, Duwamish Shipyard, Inc., Seattle, Washington. Prepared by Hart Crowser for Duwamish Shipyard, Inc. July 22, 1993.

Hart Crowser. 1993c. Results of Sampling and Analysis Sediment Monitoring Plan, Duwamish Shipyard, Inc., Seattle, Washington. Prepared by Hart Crowser for Duwamish Shipyard, Inc. November 17, 1993.

Hart Crowser. 1994. Independent Remedial Action Report, Alaska Marine Lines Parcel, Duwamish Shipyards, Seattle, Washington. Prepared by Tina M Stotz, Hart Crowser, for Duwamish Shipyard, Inc. June 29, 1994.

Hart Crowser. 1995. Request for Initial Review of Proposed RI/FS for Independent Cleanup, Reichhold/Lone Star Site, 5900 West Marginal Way, Seattle Washington. Prepared by Hart Crowser. August 3, 1995.

Hart Crowser. 1996a. Pollution Prevention Plan, Duwamish Shipyard, Seattle, Washington. Prepared by Hart Crowser for Duwamish Shipyard, Inc. February 19, 1996.

Hart Crowser. 1996b. Storm Water AKART Evaluation, Duwamish Shipyard, Seattle Washington. Prepared by David A. Heffner, Hart Crowser, for Duwamish Shipyard, Inc. June 26, 1996.

Hart Crowser. 1996c. Dry Dock and Graving Dock Discharge Metals Report, Duwamish Shipyard, Seattle, Washington. Prepared by David A. Heffner, Hart Crowser, for Duwamish Shipyard, Inc. December 24, 1996.

Hart Crowser. 1997a. Letter from Todd Thornburg, Hart Crowser, to Lisa Zinner, Washington State Department of Ecology, re: Development of Ecology Policy on Effluent Mixing Studies, Duwamish Shipyard, Inc. (NPDES Permit No. WA-003093-7). January 14, 1997.

Hart Crowser. 1997b. Final Report, Shipyard AKART Analysis for Treatment of Storm Water. Prepared by Hart Crowser. May 7, 1997.

Hart Crowser. 1998a. Progress Report on Pollution Prevention at Duwamish Shipyard, Inc. (1996 - 1997). Prepared by Hart Crowser for Duwamish Shipyard, Inc. February 9, 1998.

Hart Crowser. 1998b. 1997 Dry Dock and Graving Dock Discharge Metals Report, Duwamish Shipyard, Seattle, WA. Prepared by David A. Heffner, Hart Crowser, for Duwamish Shipyard, Inc. May 15, 1998.

Herrera (Herrera Environmental Consultants). 1994. Draft Environmental Impact Statement, Terminal 115 AM Radio Towers. Prepared by Herrera Environmental Consultants, for Port of Seattle. March 1, 1994.

Kaiser Cement & Gypsum. 1965. Letter from Arnold B. Brown, Jr., Director of Corporate Planning, Kaiser Cement & Gypsum Corporation, to Fred B. Crawford, Port of Seattle, re: demolition of buildings on leased premises (a contract was let to Duwamish Shipyards for a portion of the demolition work). September 30,1965.

Kaiser Cement Corporation. 1987. Letter from R.H. Berby, Director, Government Affairs, to Deborah Flood, USEPA, Region X, re: Site history and recollections of an employee associated with the facilities. May 19, 1987.

KCDNR (King County Department of Natural Resources). 2000a. METRO Wastewater Discharge Permit No. 7704. October 18, 2000.

KCDNR. 2000b. Memorandum from Ben Budka, KCDNR, to Sue Joerger, Puget Soundkeeper Alliance, re: Data from a sample collected on November 3, 2000 on the Duwamish Waterway. December 8, 2000.

KCDNR. 2002. Compliance Order for Discharge Violation, Duwamish Shipyard. Elsie Hulsizer, KCDNR. April 18, 2002.

KCWTD (King County Wastewater Treatment Division). 2005. Waste Discharge Permit No. 7704-002. October 3, 2005.

Kuroiwa, R.K.. 2000. Independent Remedial Action Report, Underground Storage Tank Closure, Duwamish Shipyard, Seattle, WA. Prepared by R.K. Kuroiwa. October 6, 2000.

Laucks. 1986. Report on Slag - Spent Sandblast and Grit. Laucks Testing Laboratories, Inc. June 17, 1986.

Lone Star Industries. 1987. Letter from Kurt V. Blankmeyer, V.P. and Associate General Counsel, to Deborah Flood, USEPA Region X, re: Lone Star Industries, Inc.: 5900 West Marginal Way, Seattle, Washington. June 25, 1987.

Lone Star Northwest. 1989. Letter from Ed Owens, Lone Star Northwest, to Annette Petrie, Washington State Department of Ecology, re: N-17-0146-000. January 11, 1989.

Lone Star Northwest. 1990. Letter from Ed Owens, Lone Star Northwest, to Norm Peck, Washington State Department of Ecology. October 10, 1990.

Lone Star Northwest. 1991. Letter from Ed Owens, Vice President, to Judith Aitken, Washington State Department of Ecology, re: 5900 West Marginal Way S., Seattle - pentachlorophenol contamination and future remediation. June 7, 1991.

Lonestar NW/Reichhold Chemical MTCA Cleanup. 1995. Notification of Dangerous Waste Activities. November 9, 1995.

Lonestar NW/Reichhold Chemical MTCA Cleanup. 2002. Dangerous Waste Annual Report Verification Form. February 26, 2002.

M&T Chemicals, Inc. 1976. Municipality of Metropolitan Seattle, Industrial Waste Discharge Permit Application Form. Prepared by John Cioffi, M&T Chemicals, Inc. April 14, 1976.

M&T Chemicals, Inc. 1980. Biographical Information of Company, M&T Chemicals, Inc.

METRO (Municipality of Metropolitan Seattle). 1973. Letter from Larry L. Peterson, METRO, to Lloyd Forbes, M&T Chemical Company, re: Analytical results for filtrate solution sample from 10/26/73. November 15, 1973.

METRO. 1975. Waste characterization results for samples collected from 11/3 to 11/20 1975 (no cover letter). M&T Chemical Company. November 1, 1975.

METRO. 1977a. Letter from Denise M. Healy, METRO, to Jack Force, M&T Chemical Company, re: Request to take effluent samples. February 2, 1977.

METRO. 1977b. Letter from Denise M. Healy, METRO, to Jack Force, M&T Chemical Company, re: Maximum discharge rates in Section S4-D and E have been raised to 75 and 35 gpm respectively. February 8, 1977.

METRO. 1977c. Letter from Larry Peterson, METRO, to Jack Force, M&T Chemical Company, re: pH and analytical results for spent plating and black mud solutions. July 1, 1977.

METRO. 1977d. Letter from Denise M. Healy, METRO, to Jack Force, M&T Chemical Company, re: pH and heavy metal analyses from a spent electroplating effluent sample. July 7, 1977.

METRO. 1981a. Letter from Denise Healy, METRO, to Jack Force, MRI Corporation, re: pH and heavy metal analyses from a black mud sample collect on 2/11/81. March 18, 1981.

METRO. 1981b. Letter from Denise Healy, METRO, to Jack Force, MRI Corporation, re: pH and heavy metal analyses from effluent sample collected on 03/30/81. April 30, 1981.

METRO. 1982c. Letter from Denise Healy, METRO, to Jack Force, MRI Corporation, re: pH and heavy metal analyses from effluent sample collected on 02/9/82. March 19, 1982.

METRO. 1982d. Letter from Denise Healy, METRO, to Jack Force, MRI Corporation, re: pH and heavy metal analyses from effluent samples collected on 7/19/82 and 7/23/82. September 17, 1982.

METRO. 1985. Waste Discharge Permit No. 7067-R11/84-1, Issuance Date: 3-1-85. MRI Corporation. March 1, 1985.

METRO. 1990a. Letter from Elsie Hulsizer, METRO, to Randy DeWitt, MRI Corporation, re: Informal Compliance Schedule in response to discharge violation. January 12, 1990.

METRO. 1990b. Letter from Bruce R. Burrow, METRO, to Doug Knutsen, Washington State Department of Ecology, re: Draft of Permit No 7067. February 15, 1990.

METRO. 1991a. Letter from Elsie J. Hulsizer, METRO, to Vijay Raghavan, MRI Corporation, re: Final Notice for discharge violations. January 24, 1991.

METRO. 1991b. Letter from Bruce R. Burrow, METRO, to Vijay Raghavan, MRI Corporation, re: Clarification of METRO's expectations regarding the work plan. April 8, 1991.

METRO. 1991c. Letter from Bruce R. Burrow, METRO, to Vijay Raghavan, MRI Corporation, re: Review of Compliance Schedule Summary Report by Advanced Environmental Technologies. June 21, 1991.

METRO. 1991d. Letter from Bruce R. Burrow, METRO, to Doug Knutsen, Washington State Department of Ecology, re: Permit Application for MRI, Division of Proler International Corporation. August 13, 1991.

METRO. 1991e. Letter from Bruce R. Burrow, METRO, to Vijay Raghavan, MRI Corporation, re: Engineering Review of MRI Process Engineering Report. September 6, 1991.

METRO. 1991f. Waste Discharge Permit No. 7067, Issuance Date: 3-2-90, Revised: 9-16-91. MRI Corporation. September 16, 1991.

METRO. 1991g. Letter from Elsie J. Hulsizer, METRO, to Vijay Raghavan, MRI Corporation, re: Revision to METRO Waste Discharge Permit No. 7067. September 16, 1991.

METRO. 1991h. Letter from Bruce R. Burrow, METRO, to Vijay Raghavan, MRI Corporation, re: MRI Request to Discharge High pH Wastewater. November 14, 1991.

METRO. 1991i. Letter from Bruce R. Burrow, METRO, to Vijay Raghavan, MRI Corporation, re: MRI Proposal to Investigate Changes to Self Monitoring Analysis Methods. December 3, 1991.

METRO. 1992. Letter from Christie J. True, METRO, to E.R. Graves, Duwamish Shipyard, Inc., re: Minor Discharge Authorization No. 245 expired on 8/17/90. August 17, 1992.

METRO. 1993a. Letter from Cynthia H. Wellner, METRO, to Donald A. Meberg, Duwamish Shipyard, Inc., re: Need to obtain a waste discharge permit from METRO to discharge hydroblast water to the sanitary sewer. February 11, 1993.

METRO. 1993b. METRO Industrial Waste Discharge Permit No. 439, Duwamish Shipyard. August 19, 1993.

METRO. 1994. Letter from Jim Endres, METRO, to Barbara Cummings, Puget Soundkeeper Alliance, re: Analytical results for water sample collected September 13, 1994. September 29, 1994.

METRO. Date Unknown. Waste Discharge Permit No. 7067-R11/84-1. MRI Corporation.

MRI (MRI Corporation). 1987. Letter from Jack Force, MRI Corporation, to Elaine Atkinson, Washington State Department of Ecology, re: Containment facilities, MRI Corporation Tank Farm. April 6, 1987.

Nielson. 1955. Memorandum from Lyman J. Nielson, WPCC, to file re: fish kill (>300 in 30 minutes)-check of outfalls-phenol discharge-future installation of lagoons or other means of control. June 24, 1955.

NOAA (National Oceanic and Atmospheric Administration). 1993. Letter from Merritt E. Tuttle, U.S. Department of Commerce, NOAA, to Colonel Walter J. Cunningham, USACE, re: 93-2-00130, Alaska Marine Lines, Inc. May 13, 1993.

NOAA. 1998. Duwamish Waterway Sediment Characterization Study Report. National Oceanic and Atmospheric Administration, Seattle, WA. As cited in Windward 2003.

Olsen. 2006. Letter from Russell E. Olsen, Washington State Department of Ecology, to David Larsen, Duwamish Shipyard, Inc., re: Corrective Action Requirements, Site #1429, Duwamish Shipyard located at 5658 West Marginal Way, Seattle, WA 98106 (DRAFT). July 6, 2006.

Parametrix. 1985a. Letter from Stephen C. Perrigo, Parametrix, to John Dohrmann, Port of Seattle, re: Site History Study - Kaiser Cement Company (Attachment A). January 22, 1985.

Parametrix. 1985b. Final Report: Kaiser Property Environmental Audit (Attachment B). Prepared by Parametrix, Inc. for the Port of Seattle. May 21, 1985.

Parametrix. 1990. Phase II Site Assessment - Appendix A (Well Installation Logs) and Appendix B (Analytical Results) only. No text. August 1990.

Parametrix. 1996a. Toxicity Evaluation of an Effluent Sample to *Mysidopsis bahia* and *Menidia beryllina*. Duwamish Shipyard, Inc. October 31, 1996.

Parametrix. 1996b. Toxicity Evaluation of an Effluent Sample to *Mysidopsis bahia* and *Menidia beryllina*. Prepared by Brian Coldrick, Parametrix, Inc. for Duwamish Shipyard, Inc. November 6, 1996.

Parametrix. 1997a. Toxicity Evaluation of an Effluent Sample to *Mysidopsis bahia* and *Menidia beryllina.* Prepared by Brian Coldrick, Parametrix, Inc. for Duwamish Shipyard, Inc. March 19, 1997.

Parametrix. 1997b. Toxicity Evaluation of an Effluent Sample to *Mysidopsis bahia* and *Menidia beryllina*. Prepared by Brian Coldrick, Parametrix, Inc. for Duwamish Shipyard, Inc. April 8, 1997.

Parametrix. 1997c. Toxicity Evaluation of an Effluent Sample to *Mysidopsis bahia* and *Menidia beryllina*. Prepared by Nathaniel Merrill, Parametrix, Inc. for Duwamish Shipyard, Inc. October 20, 1997.

Parametrix. 1997d. Toxicity Evaluation of Graving Dock Floodwater to *Mysidopsis bahia* and *Menidia beryllina.* Prepared by Nathaniel Merrill, Parametrix, Inc. November 12, 1997.

Parametrix. 1998. Toxicity Evaluation of an Effluent Sample to *Mysidopsis bahia* and *Menidia beryllina*. Prepared by Nathaniel Merrill, Parametrix, Inc. for Duwamish Shipyard, Inc. March 2, 1998.

Port of Seattle. 1964. Memorandum from D.E. Dahlgard, Chief Engineer, to Fred Crawford, Executive Assistant-Operations, re: Removal of Buildings - Reichhold Property. November 18, 1964.

Prezant Associates, Inc. 1988. Letter from Bradley Prezant to Ronald DeWitt, Washington State Department of Ecology, re: enclosed copy of test results (performed for Ashgrove Cement) on dredged material from the Duwamish. March 23, 1988.

PSA (Puget Soundkeeper Alliance). 1995. Settlement Agreement between Puget Soundkeeper Alliance and Duwamish Shipyard, Inc. October 27, 1995.

PSA. 1996. Sounder, Newsletter of the Puget Soundkeeper Alliance, Article "Duwamish River Shipyard Cleans Up."

PSA. 1997a. Letter from BJ Cummings, Puget Soundkeeper Alliance, to Lisa Zinner, Washington State Department of Ecology, re: Duwamish Shipyard Testing Frequency. February 3, 1997.

PSA. 1997b. Letter from BJ Cummings, Puget Soundkeeper Alliance, to Lisa Zinner, Washington State Department of Ecology, re: Increase monitoring frequency due to pH violation from Outfall 002. December 9, 1997.

PSA. 1998. Letter from BJ Cummings, Puget Soundkeeper Alliance, to Lisa Zinner, Washington State Department of Ecology, re: Incident report for sandblast overspray at Duwamish Shipyard on 2/27/98. March 17, 1998.

PSA. 2000a. Letter from Derek Wentrof, Puget Soundkeeper Alliance, to John Drabek, Washington State Department of Ecology, re: Nov 3 sandblasting of boat in graving dock at Duwamish Shipyard.

PSA. 2000b. Letter from Derek Wentrof, Puget Soundkeeper Alliance, to John Drabek, Washington State Department of Ecology, re: Nov 3 sandblasting of boat in graving dock at Duwamish Shipyard.

Reichhold Chemicals. 1949. Industrial Waste Survey. December 2, 1949.

Reichhold Chemicals. 1955a. Letter from F.J. Shelton, Director, Technical Department, Pacific Northwest Division, Reichhold Chemicals, to E.F. Eldridge, WPCC, re: possible pollution at Reichhold. July 1, 1955.

Reichhold Chemicals. 1955b. Letter from George L. Hagen, Plant Engineer, Pacific Northwest Division, Reichhold Chemicals, to E.F. Eldridge, WPCC, re: Mr. H.O. Warner's letter of July 18, 1955; Your letter of July 19, 1955 - requesting permission for the disposal of waste waters from plant. October 19,1955.

Reichhold Chemicals. 1955c. Letter from H.O. Warner, Plant Manager, to E.L. Eldridge, WPCC, re: proposal for pollution control - impounding basin construction, waste water discharge and diversion. July 18, 1955.

Reichhold Chemicals. 1955d. Letter from H.O. Warner, Plant Manager, Pacific Northwest Division, to E.F. Eldridge, WPCC, re: progress report regarding the disposal of waste waters from the plant (Reichhold Chemicals, Inc.). September 20, 1955.

Reichhold Chemicals. 1956. Letter from George L. Hagen, Plant Engineer, Pacific Northwest Division, Reichhold Chemicals, to WPCC, re: Progress report on stream pollution control at Seattle Plant. January 16, 1956.

Reichhold Chemicals. 1987. Letter from M.J. Kowalski, Manager-Environmental Compliance, Reichhold Chemicals, to Deborah Flood, USEPA Region X, re: Facility Located at 5900 West Marginal Way Seattle, Washington - response to request for info re: this site. May 15, 1987.

Reichhold Chemicals. 1998. Letter from Alan S. Jeroue, Project Manager, Reichhold Chemicals, and Shawn Lilley, Lone Star Northwest, Inc., to Washington State Department of Ecology, re: Notice of Independent Remedial Action at Lone Star Property, Seattle, Washington. October 2, 1998.

RETEC. 2006. Technical Memorandum: Draft Preliminary Screening of Alternatives for the Lower Duwamish Waterway Superfund Site. Prepared by The RETEC Group, Inc. for the Lower Duwamish Waterway Group. September 27, 2006.

SAIC (Science Applications International Corporation). 2006. Soil and Groundwater Screening Criteria, Source Control Action Plan, Slip 4, Lower Duwamish Waterway. Prepared for Washington State Department of Ecology by SAIC, Bothell, WA. August 2006.

Safety Kleen. 1994. DSI Waste Manifests. February 23, 1994.

Seattle Army Chemicals Plant. 1986. Defense Environmental Restoration Account Inventory Project Report – DRAFT. August 1, 1986.

Shannon & Wilson. 1966. Foundation Investigation, Cement Storage Silo Complex, Seattle, Washington. Prepared by Shannon & Wilson for Kaiser Engineers. February 1, 1966.

SKCDPH (Seattle-King County Department of Public Health). 1998. Site Hazard Assessment - MST Chemicals, Inc. February 17, 1998.

SPU (Seattle Public Utilities). 2006a. Joint Inspection Program, Lower Duwamish Waterway – Chemithon Corporation. April 28, 2006.

SPU. 2006b. Letter from Ellen Stewart, SPU, to Brian W. MacArthur, Chemithon, re: Results from April 28, 2006 stormwater pollution prevention inspection: Corrective action required. May 12, 2006.

SPU. 2006c. Handwritten notes regarding The Chemithon Corporation dated October 3-9, 2006.

Smith. 1995. Letter from Richard A. Smith to David M. Larsen, Duwamish Shipyard, Inc., re: Notice of Intent to File Suit under the Clean Water Act. August 14, 1995.

Spearman Engineering. 1990. Sampling & Analysis Plan for Baseline characterization of Sediments at Duwamish Shipyard, Inc., Seattle, Washington. November 19, 1990.

Spearman Engineering. 1993a. Letter from Jay Spearman to Rick Vining, Washington State Department of Ecology, re: Alaska Marine Lines Plan updates. May 26, 1993.

Spearman Engineering. 1993b. Letter from Jay Spearman to Glen Pieritz, Washington State Department of Ecology, re: NPDES Construction and Industrial Activity applications, redevelopment of AML site (no title). July 2, 1993.

Spearman Engineering. 1993c. Letter from Jay Spearman to Glen Pieritz, Washington State Department of Ecology, re: Two parcels used by AML will be integrated into a single operating facility. July 9, 1993.

Spearman Engineering. 2005. Joint Aquatic Resources Permit Application, Alaska Marine Lines - Filling-In of Existing Graving Dock 5610 W Marginal Way SW, Seattle WA 98106. September 13, 2005.

Spearman Engineering. 2006a. Letter from Al Elliott, Spearman Engineering, to Rebekah R. Padgett, Washington State Department of Ecology, re: Alaska Marine Lines, Filling in existing graving dock, Duwamish Waterway, USACE Reference No. 200501087. July 21, 2006.

Spearman Engineering. 2006b. Memorandum from Jay Spearman re: Storm water system for Alaska Marine Lines Terminal Seattle. July 28, 2006.

Spearman Engineering. 2006c. Email from Jay Spearman to Rebekah R. Padgett, Washington State Department of Ecology, re: AML Storm water treatment and compliance. August 23, 2006.

Spearman Engineering. 2006d. Email from Al Elliott, Spearman Engineering, to Rebekah R. Padgett, Washington State Department of Ecology, re: Alaska Marine Lines. August 24, 2006.

Spearman Engineering. 2006e. Letter from Spearman Engineering to Washington State Department of Ecology, re: Alaska Marine Lines 05-14, Cleaning Procedures Prior to Filling. September 14, 2006.

Spearman Engineering. 2007. Letter from Al Elliott, Spearman Engineering, to Rebekah R. Padgett, Washington State Department of Ecology, re: Alaska Marine Lines, Water Quality Certification - Order #3680, USACE Reference No. 200501087. January 15, 2007.

Spearman and Williwaw. 2005. Biological Evaluation, Alaska Marine Lines, Graving Dock Fill Project, King County, Washington. Spearman Engineering and Williwaw Scientific Support Services. September 1, 2005.

Taylor. 1948. Letter from Jack Taylor, Director, to Arthur J. Larson, Duwamish Shipbuilding Company, re: Investigation into complaint of ammonia pollution (several drums, concentrated) by Reichhold Chemical Co. January 15, 1948.

Unknown. 1953-1956.Reichhold Chemicals - list of spills/discharges, fish kills, correspondence. Handwritten list.

USACE (U.S. Army Corps of Engineers). 1955. Public Notice of the application by Reichhold Chemicals, Inc. for the Dept of the Army permit to install an industrial waste outfall in the Duwamish Waterway. August 16, 1955.

USACE. 1987. Letter from E.T. Bailey, Chief, Hazardous Waste Management Section, to Ms. Deborah Flood, Superfund Program Management Section, USEPA, re: Site history. October 19, 1987.

USACE. 1995. Plans for work to be performed at AML. Prepared by Susan Glenn, USACE, Seattle District. April 11, 1995.

USACE. 2006. Certification Consistency with the Washington State Coastal Zone Management Program. January 6, 2006

USEPA (United States Environmental Protection Agency). 1987a. Letter from Gil Haselberger, USEPA, Region X, to Jack Force, MRI Corporation, re: February 26, 1987 Site Inspection. March 11, 1987.

USEPA. 1987b. Letter from Charles E. Findley, Director, Hazardous Waste Division, USEPA, to Dave Aggerholm, Port of Seattle, re: 104(e) request. December 23, 1987.

USEPA. 1993. Letter from Gary Voerman, USEPA, Region X, to Colonel Walter J. Cunningham, USACE, Seattle District, re: Public Notice No. 93-2-00130 (dated April 21, 1993), Alaska Marine Lines, Inc., Duwamish River, Seattle, Washington. May 19, 1993.

USEPA. 1995 Acknowledgement of Notification of Hazardous Waste Activity (Verification) Lonestar NW/ Reichhold Chem MTCA Cleanup. November 28, 1995.

Walk, R.D. 2003. The History of Military Mask Filters. *Army Chemical Review*. PB 3-03-1. January 2003. http://www.wood.army.mil/chmdsd/pdfs/2003%20Jan/Walk-Mask%20filters-03-01.pdf

WDFW (Washington Department of Fish and Wildlife). 2006. Hydraulic Project Approval. June 5, 2006.

WDF (Washington Department of Fisheries). 1952. Letter from Robert J. Schoettler, Director, to E.F. Eldridge, WPCC, re: Reichhold Chemical Company - 5900 East Marginal Way, Seattle, WA - ditch constructed from plant into Duwamish Waterway for discharging chemical waste, small fish dying in ditch. December 29, 1952.

WDF. 1955. Letter from Donald P. Gooding, Department of Fishers, to E.F. Eldridge, WPCC, re: pollution test using live box of impounded Chinooks - result = continuing kill of downstream migrants. June 24, 1955.

WDF. 1993a. Letter from R. Timothy Flint, Washington Department of Fisheries, to Jay Spearman, Alaska Marine Lines, re: Hydraulic Project Application - Commercial Cargo Terminal - Duwamish Waterway, Tributary to Elliot Bay, Section 19, Township 24 North, Range 04 East, King county, Corps Log No. 93-S0130-01, WRIA 09.0001. June 8, 1993.

WDF. 1993b. Hydraulic Project Permit Approval. Prepared by Gayle Krutman, Washington State Department of Fisheries. Prepared for Jay Spearman, Alaska Marine Lines. June 24, 1993.

Washington Department of Labor and Industries. 1987. Letter from Mac Davis, Washington Department of Labor and Industries, to Dan Cargill, Washington State Department of

Ecology, re: Response to Ecology concerns brought to the attention of the Department of Labor and Industries. May 26, 1987.

Washington Department of Wildlife. 1993. Letter from Ginna Correa, Department of Wildlife, to Tom Griese, Washington State Department of Ecology, re: Response to Corps of Engineers Public Notice - 93-2-00130, Alaska Marine Lines, Inc., Dredge and Fill, Duwamish Waterway, King County. May 27, 1993.

Washington Office of Supervisor of Water Resources. 1955. Notice of Water Right Application No 13595 - Reichhold Chemicals, Inc. September 15, 1955.

Weston (Roy F. Weston, Inc.). 1999. Site inspection report: Lower Duwamish River. RM 2.5-11.5. Volume 1 – Report and appendices. Prepared by Roy F. Weston, Inc. for U.S. Environmental Protection Agency Region 10, Seattle, WA. As cited in Windward 2003.

Windward (Windward Environmental LLC). 2003. Phase 1 Remedial Investigation Report. Final. Prepared by Windward Environmental LLC for the Lower Duwamish Waterway Group. July 3, 2003.

Windward. 2004. Data Report: Survey and Sampling of Lower Duwamish Waterway Seeps. Final. Prepared by Windward Environmental LLC for the Lower Duwamish Waterway Group. November 18, 2004.

Windward. 2005a. Data Report: Round 1 Surface Sediment Sampling for Chemical Analyses and Toxicity Testing. Final. Prepared by Windward Environmental LLC for the Lower Duwamish Waterway Group. October 21, 2005.

Windward. 2005b. Data Report: Round 2 Surface Sediment Sampling for Chemical Analyses and Toxicity Testing. Final. Prepared by Windward Environmental LLC for the Lower Duwamish Waterway Group. December 9, 2005.

Windward. 2007. Data Report: Subsurface Sediment Sampling for Chemical Analyses. Final. Prepared by Windward Environmental LLC and RETEC for the Lower Duwamish Waterway Group. January 29, 2007.

WPCC (Washington Pollution Control Commission). 1948. Memorandum Number 510: Pollution of Duwamish River with Ammonia Effluents from Reichhold Chemical Company, Seattle. January 12, 1948.

WPCC. 1953a. Reichhold Chemicals, 5900 W. Marginal Way, Seattle - formaldehyde lost to drainage ditch. January 8, 1953.

WPCC. 1953b. Memorandum to file from Al Neale, WPCC, re: Reichhold Chemicals, West Marginal Way, Seattle - State Game Dept wants letter or memo on action taken re: fish kills at irregular intervals for the past 6 years downstream from plant. April 29, 1953.

WPCC. 1953c. Memorandum to File from Lyman J. Nielson, WPCC, re: Reichhold Chemicals, 5900 W. Marginal Way, Seattle (city) - fish kills, inspection of plant - sources of toxic waster, waste disposal. May 4, 1953.

WPCC. 1953d. Letter from Kenneth R. Jones, Field Engineer, WPCC, to Harold O. Warner, Plant Manager, Reichhold Chemical Company, Inc., re: waste material = toxic to fish life. Sources of dangerous material are discussed. Suggestions for waste prevention. June 3, 1953.

WPCC. 1953e. Memorandum from Ken Jones, WPCC, to W.W. Bergerson, re: leaky drum of glue product - leaked into drainage ditch and into Duwamish Waterway - about 500 lbs lost, waters around plant filled with white flocculent material, pH changed. August 6, 1953.

WPCC. 1955a. An Investigation of Pollution in the Green - Duwamish River, Technical Bulletin No. 20, Summer, 1955.

WPCC. 1955b. Reichhold Chemical Co. Seattle - outfall/waste disposal requirements. October 11, 1955.

WPCC. 1956a. Waste discharge permit application, Reichhold Chemicals, Inc. April 6, 1956.

WPCC. 1956b. Waste discharge permit and terms, Reichhold Chemicals, Inc. October 18, 1956.

WPCC. 1961. Memorandum to File from Lyman J. Nielson, WPCC, re: Reichhold Chemical Co. Seattle. September 27, 1961.

WR Consulting. 2004. Engineering Design Report for Stormwater Control System for Duwamish Shipyard, Inc. Prepared by John W. Rundall, WR Consulting, Inc., for Duwamish Shipyard, Inc. October 15, 2004.

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Figures

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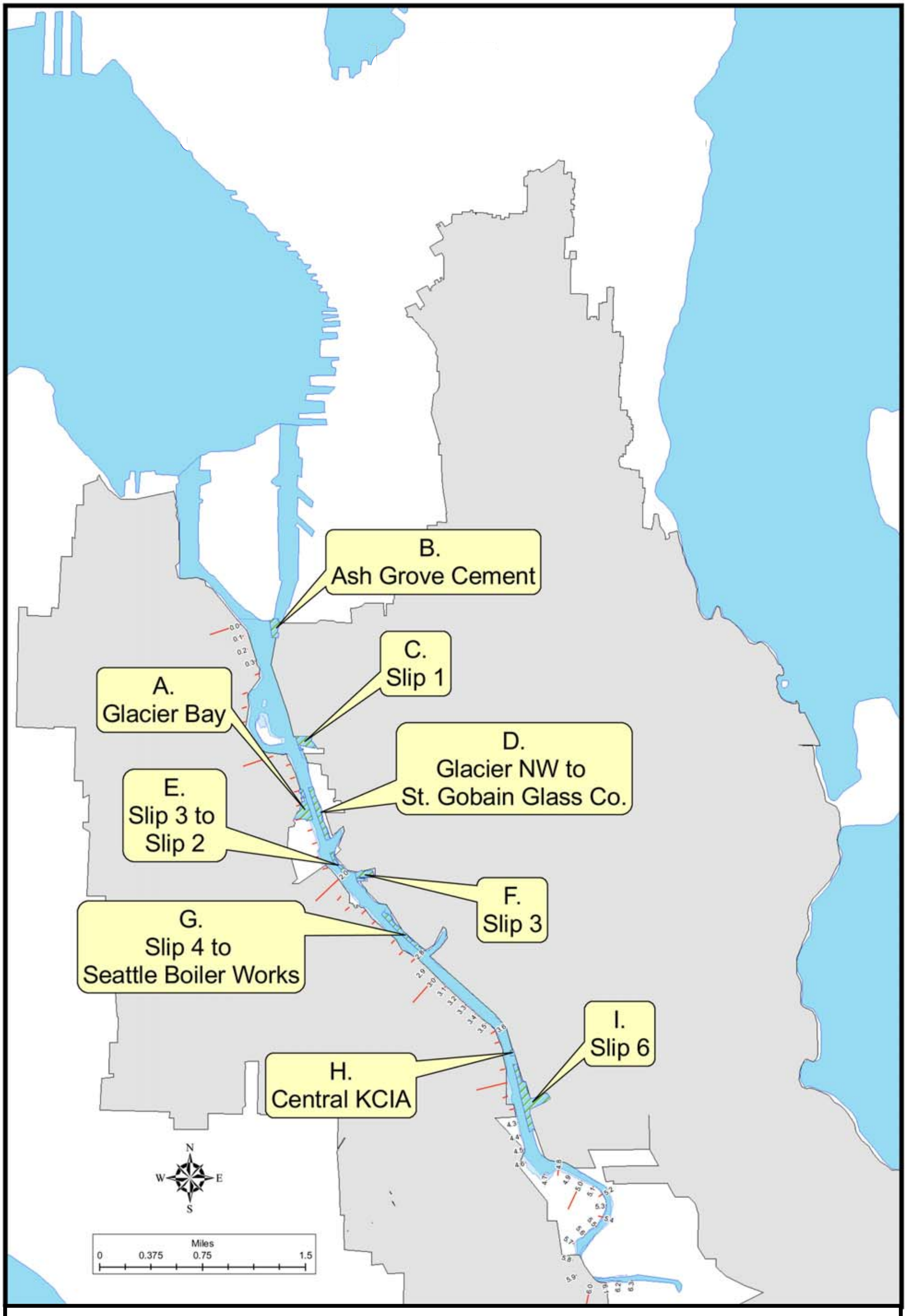

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Figure 1. Lower Duwamish Waterway Tentative Tier 2 Sites

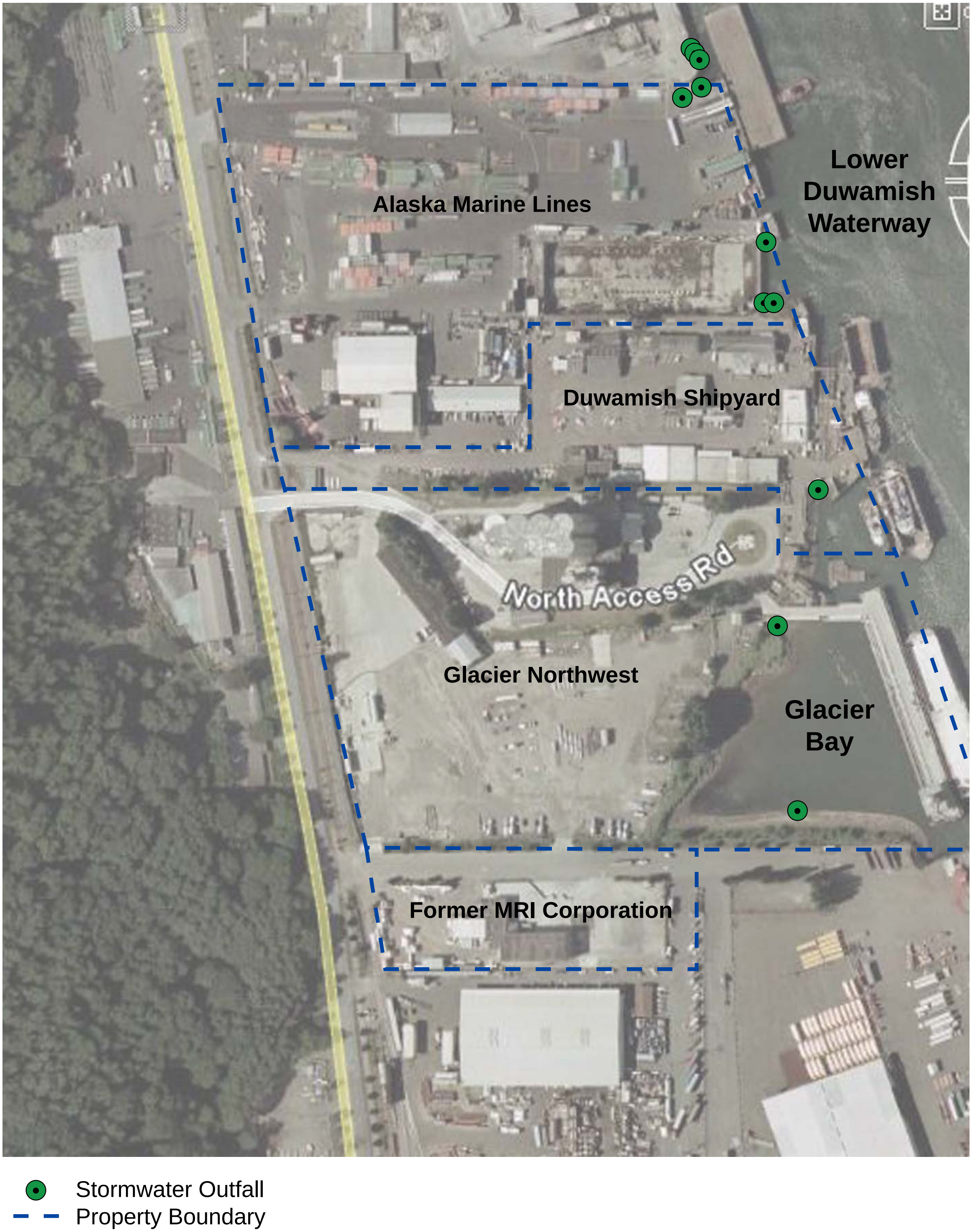

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Figure 2. Glacier Bay Source Control Area

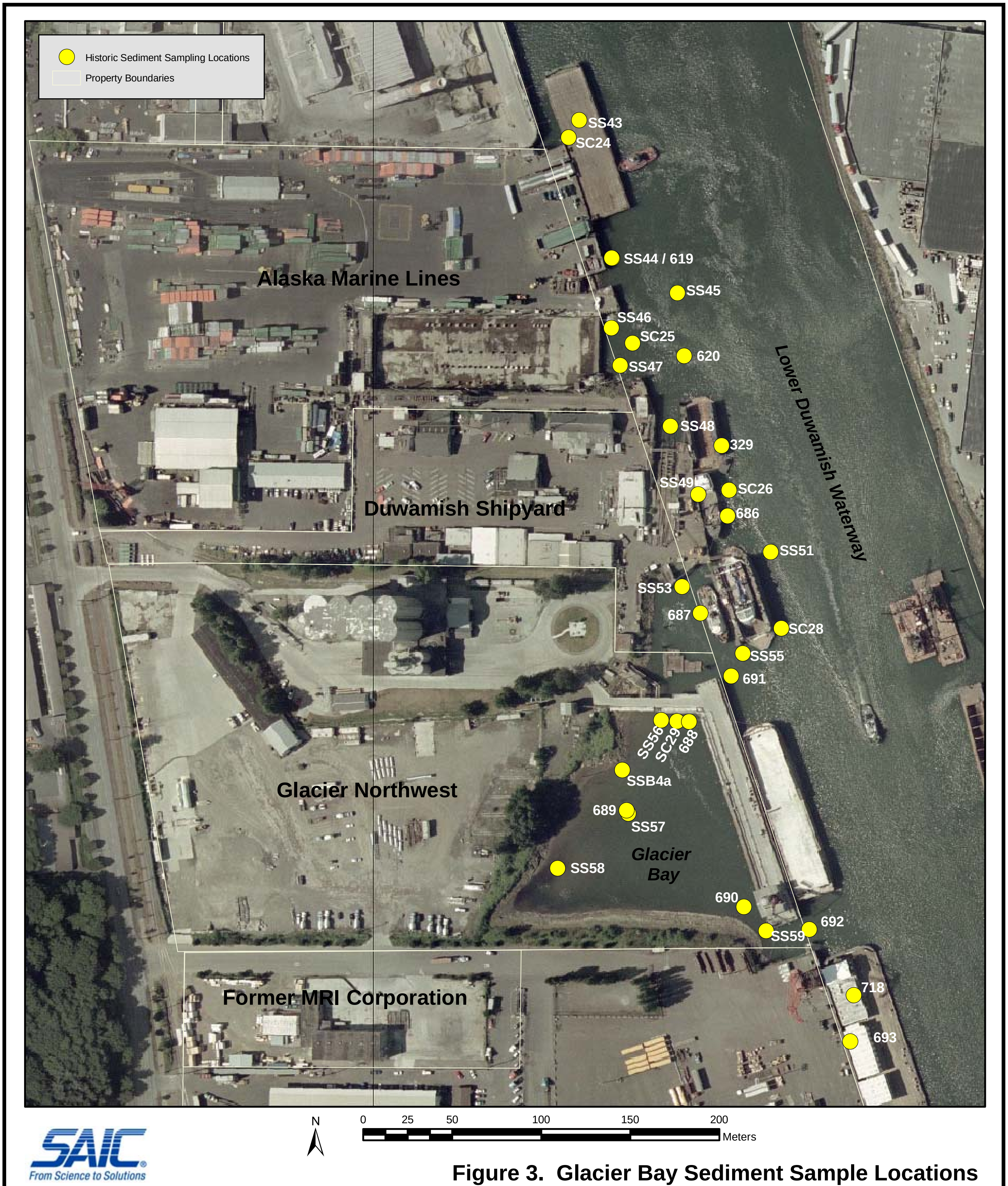

Figure 3. Glacier Bay Sediment Sample Locations

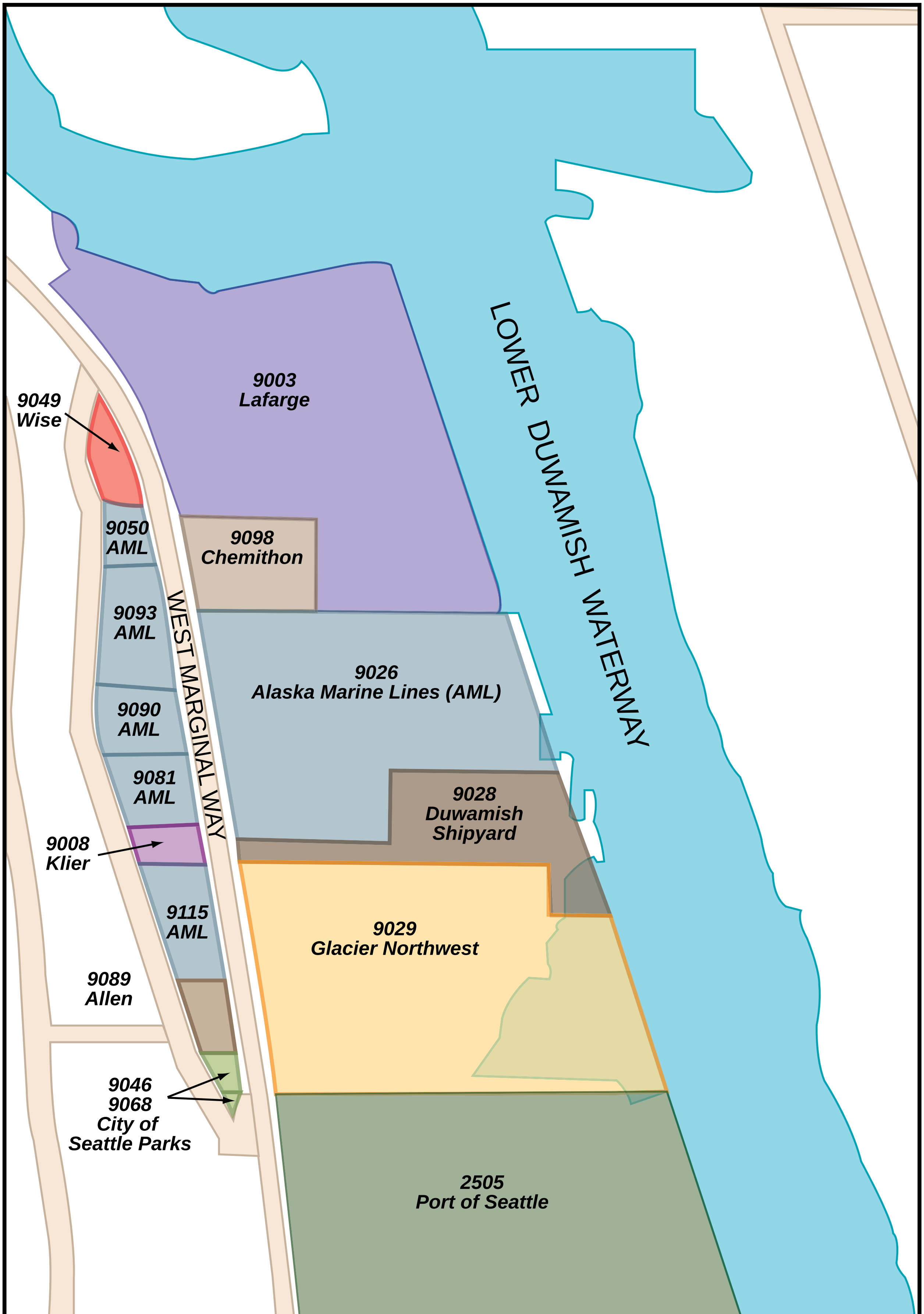

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Figure 4. Parcel Ownership for Glacier Bay Source Control Area

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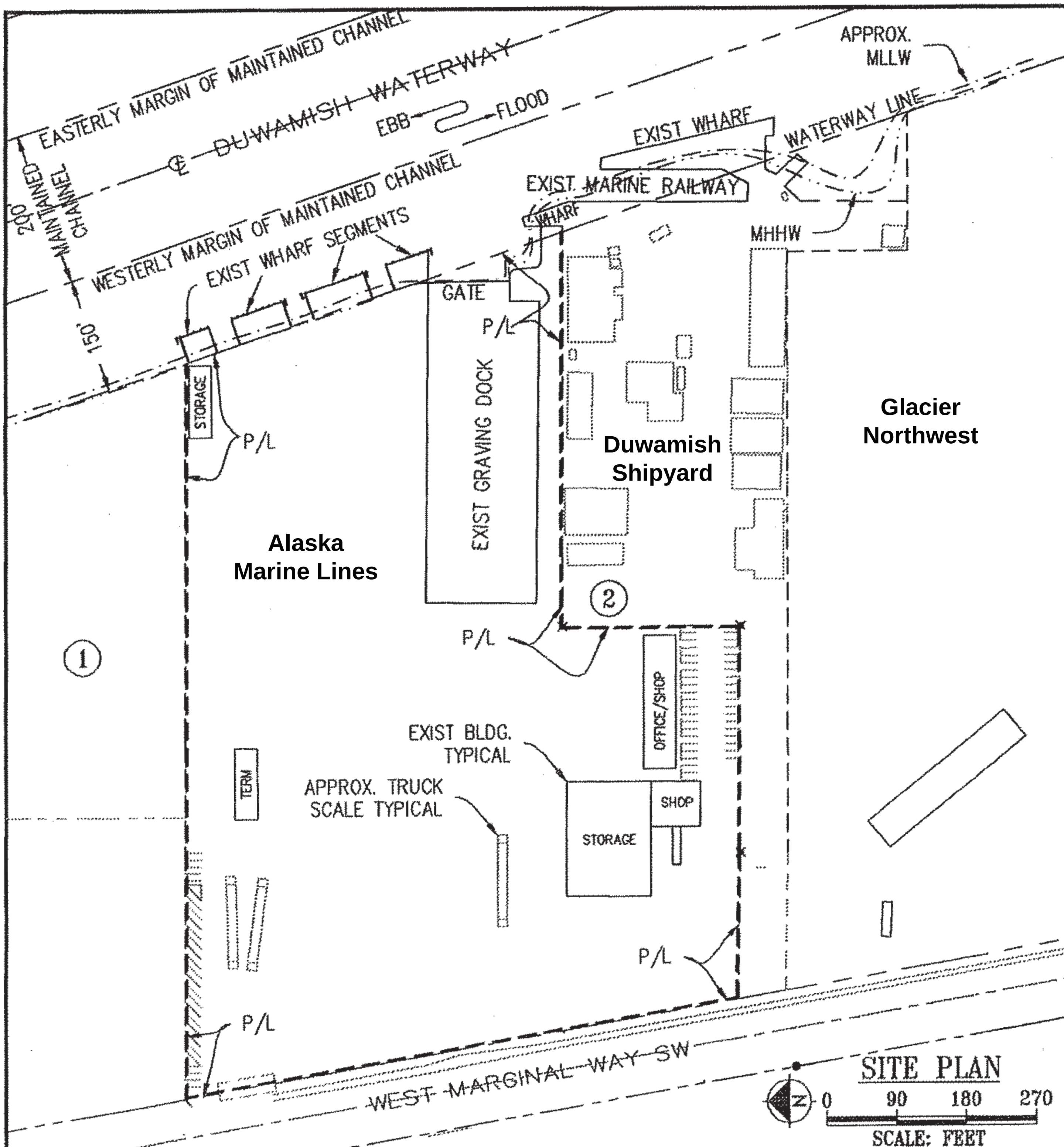
Figure 5. Storm Drain Lines at Glacier Bay Source Control Area

Source: Seattle Public Utilities



APPLICANT: Alaska Marine Lines

PURPOSE: Expand Existing Intermodal Terminal

DATUM: MLLW

APPLICATION #: 200501087

IN: Duwamish Waterway. CITY: Seattle
COUNTY: King STATE: Washington

DATE: 9/12/2005 SHEET 2 OF 4

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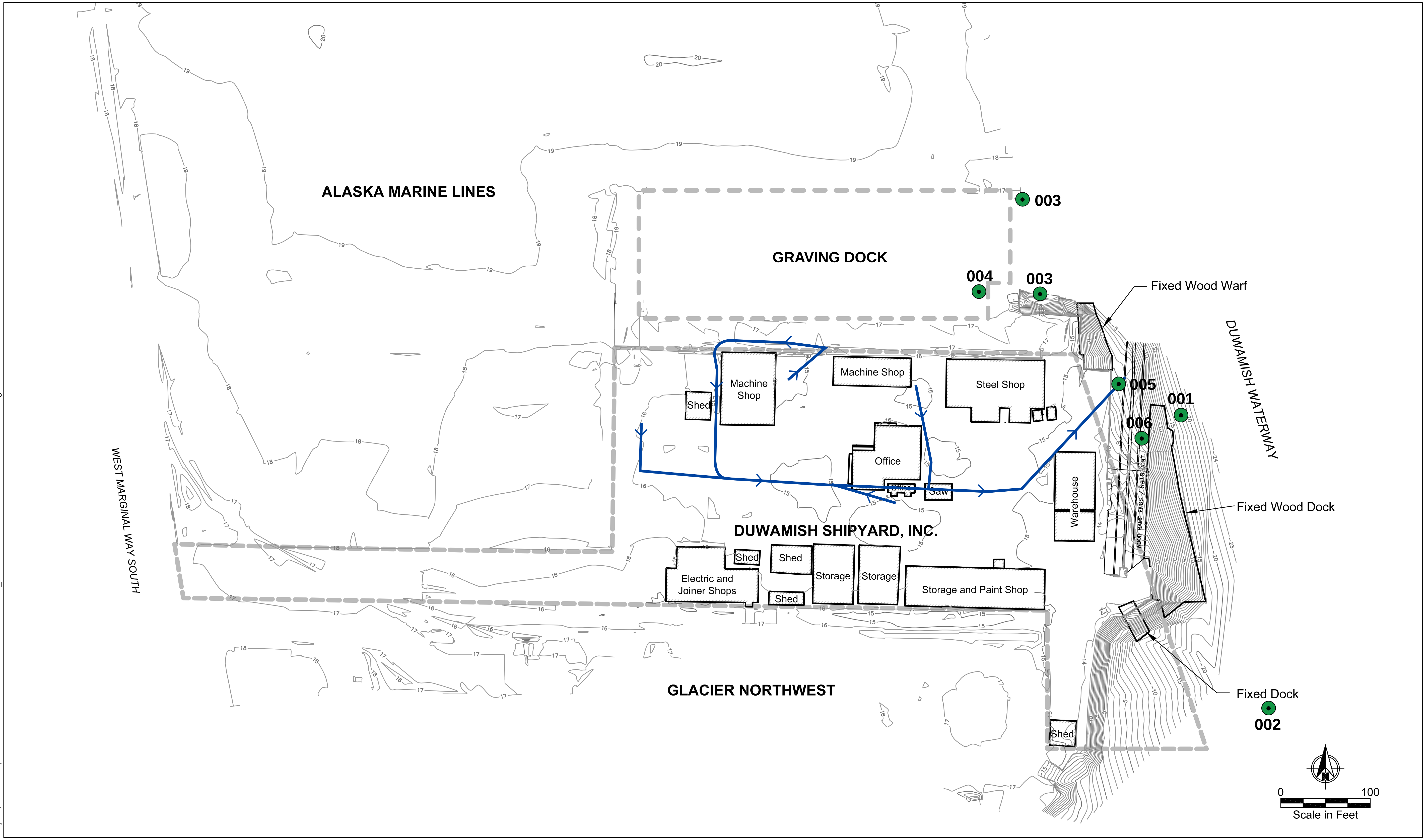
Figure 6. Alaska Marine Lines
Source: Spearman Engineering 2005



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Note: Preparation assistance provided by Anchor Environmental, L.L.C.

DUWAMISH SHIPYARD INC.

Subject Property Boundary
Ground Elevation Contour in Feet (in MLLW)
001 NPDES Discharge Sampling Location and Outfall Number
Stormwater Drainage System and Flow Direction

Current Property Boundary
Duwamish Shipyard, Inc.
Seattle, Washington

SAIC From Science to Solutions

Figure 7. Duwamish Shipyard
Source: Anchor Environmental, LLC. 2006

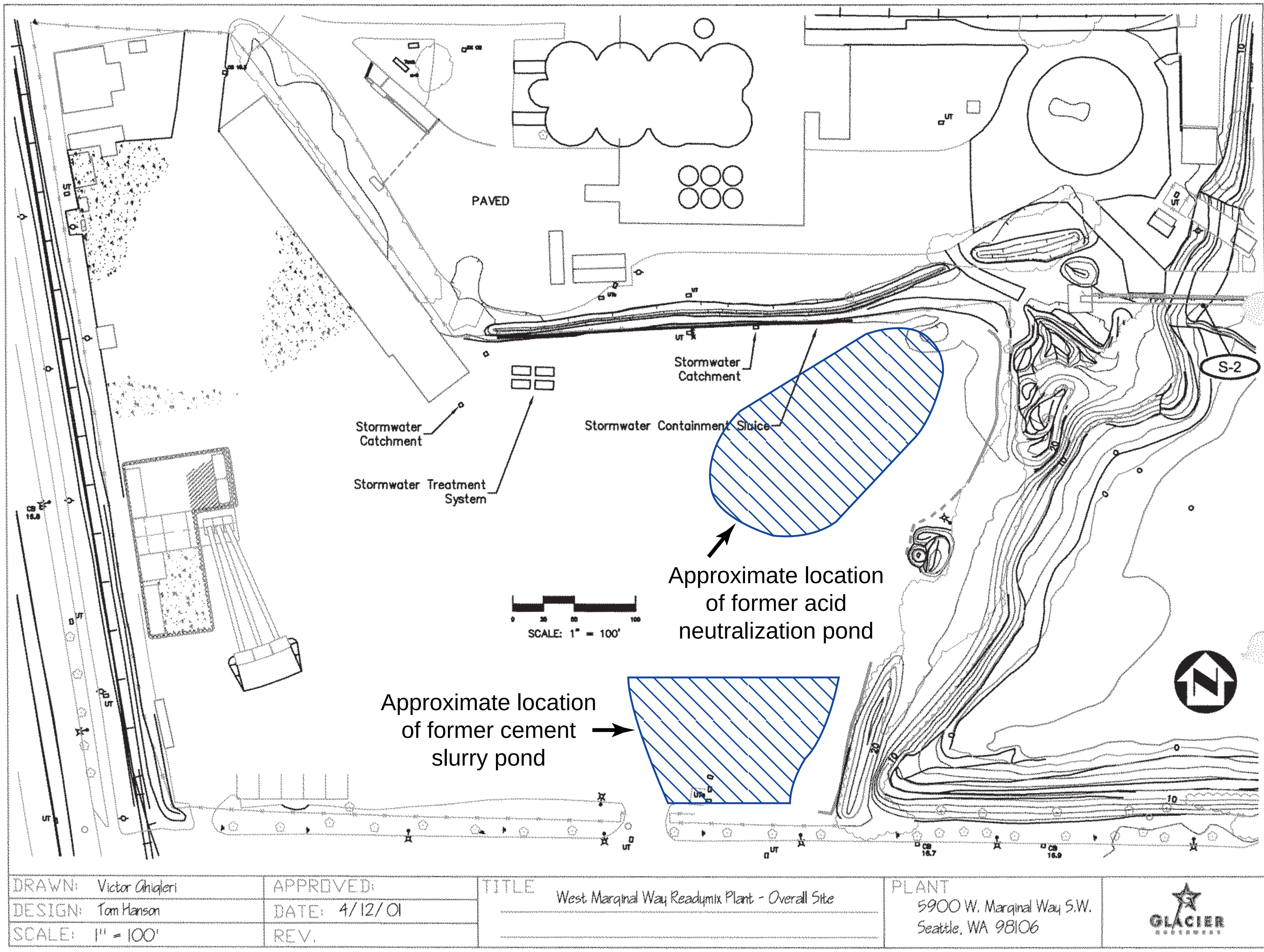

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Figure 8. Glacier Northwest

Source: Glacier Northwest 2001, Parametrix, Inc. 1990

Stormwater Outfall

Not to Scale

Figure 9. MRI Corporation

Source: Ecology & Environment, Inc. 1988, Harbor Engineering Co. 2004

Tables

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Table 1
Chemicals above Screening Levels in Surface Sediment
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)	TOC (%)	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
Metals and trace elements										
LDWG 2005a	**LDW-SS48**	**Arsenic**	**807**		**NA**	**57**	**93**	**mg/kg DW**	**14**	8.7
LDWG 2005a	LDW-SS49	Arsenic	171		NA	57	93	mg/kg DW	3.0	1.8
LDWG 2005b	LDW-SS47	Arsenic	161		NA	57	93	mg/kg DW	2.8	1.7
LDWG 2005a	LDW-SS56	Arsenic	161		NA	57	93	mg/kg DW	2.8	1.7
LDWG 2005b	LDW-SS46	Arsenic	71		NA	57	93	mg/kg DW	1.2	
LDWG 2005a	LDW-SS48	Copper	1,420		NA	390	390	mg/kg DW	3.6	3.6
LDWG 2005b	LDW-SS47	Copper	1,340		NA	390	390	mg/kg DW	3.4	3.4
LDWG 2005b	LDW-SS46	Copper	1,230		NA	390	390	mg/kg DW	3.2	3.2
LDWG 2005a	LDW-SS49	Copper	605		NA	390	390	mg/kg DW	1.6	1.6
LDWG 2005a	LDW-SS48	Lead	780		NA	450	530	mg/kg DW	1.7	1.5
LDWG 2005a	LDW-SS48	Mercury	0.79		NA	0.41	0.59	mg/kg DW	1.9	1.3
LDWG 2005a	LDW-SS48	Zinc	2,830		NA	410	960	mg/kg DW	6.9	2.9
LDWG 2005b	LDW-SS47	Zinc	878		NA	410	960	mg/kg DW	2.1	
LDWG 2005b	LDW-SS46	Zinc	794		NA	410	960	mg/kg DW	1.9	
LDWG 2005a	LDW-SS49	Zinc	768		NA	410	960	mg/kg DW	1.9	
LDWG 2005a	LDW-SS56	Zinc	607		NA	410	960	mg/kg DW	1.5	
PAHs										
LDWG 2005a	LDW-SS48	Acenaphthene	0.23	1.36	17	16	57	mg/kg OC	1.1	
Weston 1999	DR120 (686)	Chrysene	3.3	2.78	119	100	460	mg/kg OC	1.2	
LDWG 2005a	LDW-SS48	Chrysene	1.9	1.36	140	100	460	mg/kg OC	1.4	
Weston 1999	DR120 (686)	Fluoranthene	14	2.78	504	160	1,200	mg/kg OC	3.1	
LDWG 2005a	LDW-SS48	Fluoranthene	2.9	1.36	213	160	1,200	mg/kg OC	1.3	
Weston 1999	DR120 (686)	Phenanthrene	3.9	2.78	140	100	480	mg/kg OC	1.4	
LDWG 2005a	LDW-SS48	Phenanthrene	1.7	1.36	125	100	480	mg/kg OC	1.3	
Weston 1999	DR120 (686)	Total HPAH (calc'd)	29.1	2.78	1,048	960	5,300	mg/kg OC	1.1	
Phthalates										
LDWG 2005b	LDW-SS46	Bis(2-ethylhexyl)phthalate	1.6	2.07	77	47	78	mg/kg OC	1.6	
LDWG 2005a	LDW-SS48	Bis(2-ethylhexyl)phthalate	0.77	1.36	57	47	78	mg/kg OC	1.2	
Weston 1999	DR126 (692)	Butyl benzyl phthalate	0.46	3.09	15	5	64	mg/kg OC	3.0	
LDWG 2005a	LDW-SS48	Butyl benzyl phthalate	0.071	1.36	5.2	4.9	64	mg/kg OC	1.1	

Table 1
Chemicals above Screening Levels in Surface Sediment
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)	TOC (%)	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
Other SVOCs										
LDWG 2005b	LDW-SSB4a	Pentachlorophenol	0.41	1.82	NA	360	690	µg/kg DW	1.1	
PCBs										
LDWG 2005b	LDW-SSB4a	PCBs (total-calc'd)	0.81	1.82	45	12	65	mg/kg OC	3.7	
LDWG 2005a	LDW-SS56	PCBs (total-calc'd)	0.75 J	1.13	66	12	65	mg/kg OC	5.5	
LDWG 2005a	LDW-SS57	PCBs (total-calc'd)	0.75 J	1.73	43	12	65	mg/kg OC	3.6	
LDWG 2005a	LDW-SS58	PCBs (total-calc'd)	0.26 J	1.78	15	12	65	mg/kg OC	1.2	

DW - Dry weight
TOC - Total organic carbon
OC - Organic carbon normalized
SQS - Sediment Quality Standard
CSL - Cleanup Screening Level

NA - Not applicable
PAH - Polynuclear aromatic hydrocarbon
SVOC - Semivolatile organic compound
PCB - polychlorinated biphenyl

Exceedance factors are the ratio of the detected concentration to the CSL or SQS; exceedance factors are shown only if they are greater than 1. Chemicals with exceedance factors greater than 10 are shown in **Bold**

Table 2
Chemicals above Screening Levels in Subsurface Sediment
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC (%)	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
Metals and trace elements											
LDWG 2007	LDW-SC26-6-8	Antimony	280	J		NA	150	200	mg/kg DW	1.9	1.4
LDWG 2007	**LDW-SC26-6-8**	**Arsenic**	**1,890**			**NA**	**57**	**93**	**mg/kg DW**	**33**	**20**
LDWG 2007	**LDW-SC28-5.5-7.5**	**Arsenic**	**760**			**NA**	**57**	**93**	**mg/kg DW**	**13**	8.2
LDWG 2007	LDW-SC25-4-6	Arsenic	250			NA	57	93	mg/kg DW	4.4	2.7
LDWG 2007	LDW-SC25-2-4	Arsenic	170			NA	57	93	mg/kg DW	3.0	1.8
LDWG 2007	LDW-SC28-0-1	Arsenic	114			NA	57	93	mg/kg DW	2.0	1.2
LDWG 2007	LDW-SC25-1-2	Arsenic	91			NA	57	93	mg/kg DW	1.6	
LDWG 2007	LDW-SC26-2-4	Arsenic	67			NA	57	93	mg/kg DW	1.2	
LDWG 2007	LDW-SC26-6-8	Copper	1,950			NA	390	390	mg/kg DW	5.0	5.0
LDWG 2007	LDW-SC28-5.5-7.5	Copper	1,480			NA	390	390	mg/kg DW	3.8	3.8
LDWG 2007	LDW-SC25-4-6	Copper	663			NA	390	390	mg/kg DW	1.7	1.7
LDWG 2007	LDW-SC26-2-4	Copper	544			NA	390	390	mg/kg DW	1.4	1.4
LDWG 2007	LDW-SC25-2-4	Copper	541			NA	390	390	mg/kg DW	1.4	1.4
LDWG 2007	LDW-SC26-6-8	Lead	1,350			NA	450	530	mg/kg DW	3.0	2.5
LDWG 2007	LDW-SC28-5.5-7.5	Lead	583			NA	450	530	mg/kg DW	1.3	1.1
LDWG 2007	**LDW-SC26-6-8**	**Mercury**	**4.34**			**NA**	**0.41**	**0.59**	**mg/kg DW**	**11**	7.4
LDWG 2007	LDW-SC28-5.5-7.5	Mercury	0.72			NA	0.41	0.59	mg/kg DW	1.8	1.2
LDWG 2007	LDW-SC26-2-4	Mercury	0.69	J		NA	0.41	0.59	mg/kg DW	1.7	1.2
LDWG 2007	LDW-SC26-6-8	Zinc	3,700			NA	410	960	mg/kg DW	9.0	3.9
LDWG 2007	LDW-SC28-5.5-7.5	Zinc	1,880			NA	410	960	mg/kg DW	4.6	2.0
LDWG 2007	LDW-SC25-4-6	Zinc	1,420			NA	410	960	mg/kg DW	3.5	1.5
LDWG 2007	LDW-SC25-2-4	Zinc	750			NA	410	960	mg/kg DW	1.8	
LDWG 2007	LDW-SC25-1-2	Zinc	503			NA	410	960	mg/kg DW	1.2	
PAHs											
LDWG 2007	LDW-SC26-6-8	Acenaphthene	0.90		1.88	48	16	57	mg/kg OC	3.0	
LDWG 2007	LDW-SC26-6-8	Benzo(a)anthracene	3.7		1.88	197	110	270	mg/kg OC	1.8	
LDWG 2007	LDW-SC26-6-8	Benzo(a)pyrene	2.8		1.88	149	99	210	mg/kg OC	1.5	
LDWG 2007	LDW-SC26-6-8	Benzo(g,h,i)perylene	1.0		1.88	53	31	78	mg/kg OC	1.7	
LDWG 2007	LDW-SC26-6-8	Benzofluoranthenes (total)	5.2		1.88	277	230	450	mg/kg OC	1.2	
LDWG 2007	LDW-SC26-6-8	Chrysene	3.9		1.88	207	110	460	mg/kg OC	1.9	

Table 2
Chemicals above Screening Levels in Subsurface Sediment
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC (%)	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
LDWG 2007	LDW-SC26-6-8	Dibenzo(a,h)anthracene	0.40	J	1.88	21	12	33	mg/kg OC	1.8	
LDWG 2007	LDW-SC26-6-8	Dibenzofuran	0.36		1.88	19	15	58	mg/kg OC	1.3	
LDWG 2007	LDW-SC26-6-8	Fluoranthene	10		1.88	532	160	1,200	mg/kg OC	3.3	
LDWG 2007	LDW-SC28-5.5-7.5	Fluoranthene	4.1		1.61	255	160	1,200	mg/kg OC	1.6	
LDWG 2007	LDW-SC26-6-8	Indeno(1,2,3-cd)pyrene	1.0		1.88	53	34	88	mg/kg OC	1.6	
LDWG 2007	LDW-SC26-6-8	Phenanthrene	5.6		1.88	298	100	480	mg/kg OC	3.0	
LDWG 2007	LDW-SC28-5.5-7.5	Phenanthrene	1.7		1.61	106	100	480	mg/kg OC	1.1	
LDWG 2007	LDW-SC26-6-8	Total HPAH	38	J	1.88	2,021	960	5,300	mg/kg OC	2.1	
LDWG 2007	LDW-SC26-6-8	Total LPAH	8.5	J	1.88	452	370	780	mg/kg OC	1.2	
Phthalates											
LDWG 2007	LDW-SC26-6-8	Bis(2-ethylhexyl)phthalate	3.8		1.88	202	47	78	mg/kg OC	4.3	2.6
LDWG 2007	LDW-SC28-5.5-7.5	Bis(2-ethylhexyl)phthalate	1.0		1.61	62	47	78	mg/kg OC	1.3	
SVOCs											
LDWG 2007	LDW-SC28-5.5-7.5	1,2-Dichlorobenzene	0.16		1.61	10	2.3	2.3	mg/kg OC	4.3	4.3
LDWG 2007	LDW-SC26-6-8	1,2-Dichlorobenzene	0.073		1.88	3.9	2.3	2.3	mg/kg OC	1.7	1.7
LDWG 2007	LDW-SC28-0-1	Benzyl alcohol	0.11		2.59	NA	57	73	µg/kg DW	1.9	1.5
LDWG 2007	LDW-SC26-6-8	Pentachlorophenol	0.80		1.88	NA	360	690	µg/kg DW	2.2	1.2
LDWG 2007	LDW-SC28-5.5-7.5	Pentachlorophenol	0.41		1.61	NA	360	690	µg/kg DW	1.1	
PCBs											
LDWG 2007	**LDW-SC28-5.5-7.5**	**PCBs (total-calc'd)**	**3.2**		**1.61**	**199**	**12**	**65**	**mg/kg OC**	**16.7**	3.1
LDWG 2007	**LDW-SC26-6-8**	**PCBs (total-calc'd)**	**2.3**		**1.88**	**122**	**12**	**65**	**mg/kg OC**	**10.0**	1.8
LDWG 2007	LDW-SC25-4-6	PCBs (total-calc'd)	0.80	J	1.63	49	12	65	mg/kg OC	4.1	
LDWG 2007	LDW-SC28-12-12.6	PCBs (total-calc'd)	0.54		1.31	41	12	65	mg/kg OC	3.4	
LDWG 2007	LDW-SC25-2-4	PCBs (total-calc'd)	0.43		1.69	25	12	65	mg/kg OC	2.1	
LDWG 2007	LDW-SC25-1-2	PCBs (total-calc'd)	0.36		1.47	24	12	65	mg/kg OC	2.0	
LDWG 2007	LDW-SC26-0-1	PCBs (total-calc'd)	0.28		1.40	20	12	65	mg/kg OC	1.7	
LDWG 2007	LDW-SC28-0-1	PCBs (total-calc'd)	0.44		2.59	17	12	65	mg/kg OC	1.4	
LDWG 2007	LDW-SC28-1-2	PCBs (total-calc'd)	0.36	J	2.07	17	12	65	mg/kg OC	1.4	
LDWG 2007	LDW-SC25-0-1	PCBs (total-calc'd)	0.31		1.94	16	12	65	mg/kg OC	1.3	
LDWG 2007	LDW-SC26-11-12	PCBs (total-calc'd)	0.14		0.91	15	12	65	mg/kg OC	1.3	
LDWG 2007	LDW-SC26-2-4	PCBs (total-calc'd)	0.31		2.08	15	12	65	mg/kg OC	1.3	

Table 2
Chemicals above Screening Levels in Subsurface Sediment
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC (%)	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
LDWG 2007	LDW-SC26-1-2	PCBs (total-calc'd)	0.23		1.99	14	12	65	mg/kg OC	1.3	
LDWG 2007	LDW-SC24-0-1	PCBs (total-calc'd)	0.28		1.99	14	12	65	mg/kg OC	1.2	

DW - Dry weight
TOC - Total organic carbon
OC - Organic carbon normalized
SQS - Sediment Quality Standard
CSL - Cleanup Screening Level

NA - Not applicable
PAH - Polynuclear aromatic hydrocarbon
SVOC - Semivolatile organic compound
PCB - polychlorinated biphenyl

Exceedance factors are the ratio of the detected concentration to the CSL or SQS; exceedance factors are shown only if they are greater than 1. Chemicals with exceedance factors greater than 10 are shown in **Bold.**

Table 3
Chemicals above Screening Levels in Soil
Alaska Marine Lines

Source	Sample Date	Sample Location	Sample Depth (ft)	Chemical	Soil Conc'n (mg/kg DW)		MTCA Cleanup Level[a] (mg/kg DW)	Soil-to-Sediment Screening Level (Based on CSL)[b] (mg/kg DW)	Exceedance Factor
Dames & Moore 1991c	Dec-90	SS-1		Benzene	0.24		0.03	NA	8.0
ESL 1993	**Aug-93**	**TP-3**		**Benzene**	**1.3**		**0.03**	NA	**43**
ESL 1993	Aug-93	TP-3		Ethylbenzene	9		6	NA	1.5
Hart Crowser 1994	**Oct-93**	**NE-W4-0**		**Ethylbenzene**	**350**		**6**	NA	**58**
ESL 1993	Aug-93	TP-3		Xylenes (total)	12		9	NA	1.3
Hart Crowser 1994	**Oct-93**	**NE-W4-0**		**Xylenes (total)**	**1,200**		**9**	NA	**133**
Dames & Moore 1991c	Dec-90	SS-1		Diesel-Range Hydrocarbons	14,000		2,000	NA	7.0
Dames & Moore 1991c	Dec-90	SS-2		Diesel-Range Hydrocarbons	15,000		2,000	NA	7.5
Dames & Moore 1991c	Dec-90	SS-3		Diesel-Range Hydrocarbons	4,400		2,000	NA	2.2
ESL 1993	Aug-93	TP-3		Diesel-Range Hydrocarbons	>50		2,000	NA	
ESL 1993	Aug-93	TP-3		Diesel-Range Hydrocarbons	>50		2,000	NA	
Hart Crowser 1994	Oct-93	NE-W4-0		Diesel-Range Hydrocarbons	12,000		2,000	NA	6.0
Hart Crowser 1994	Oct-93	E-W4-NE30		Diesel-Range Hydrocarbons	17,000		2,000	NA	8.5
Hart Crowser 1994	Jan-94	B1-S2	7-8.5	Diesel-Range Hydrocarbons	3,400		2,000	NA	1.7
Dames & Moore 1991c	**Dec-90**	**SS-1**		**Gasoline-Range Hydrocarbons**	**1,600**		**30**	NA	**53**
Dames & Moore 1991c	**Dec-90**	**SS-2**		**Gasoline-Range Hydrocarbons**	**1,400**		**30**	NA	**47**
Dames & Moore 1991c	**Dec-90**	**SS-3**		**Gasoline-Range Hydrocarbons**	**560**		**30**	NA	**19**
ESL 1993	Aug-93	TP-3		Gasoline-Range Hydrocarbons	>20		30	NA	
ESL 1993	Aug-93	TP-3		Gasoline-Range Hydrocarbons	>20		30	NA	
Hart Crowser 1994	**Oct-93**	**NE-W4-0**		**Gasoline-Range Hydrocarbons**	**570**		**30**	NA	**19**
ESL 1993	Aug-93	TP-3		Heavy-Oil Range Hydrocarbons	>100		2,000	NA	
ESL 1993	Aug-93	TP-3		Heavy-Oil Range Hydrocarbons	>100		2,000	NA	
Hart Crowser 1994	**Oct-93**	**NE-W4-0**		**Total Petroleum Hydrocarbons**	**13,000**		**200**	NA	**65**
Hart Crowser 1994	**Oct-93**	**E-W4-NE30**		**Total Petroleum Hydrocarbons**	**11,000**		**200**	NA	**55**
Hart Crowser 1994	Oct-93	C-B7		Total Petroleum Hydrocarbons	1,100		200	NA	5.5
Hart Crowser 1994	Oct-93	N-W4		Total Petroleum Hydrocarbons	480		200	NA	2.4
ESL 1993	**Aug-93**	**TP-3**		**Acenaphthene**	**21**		NA	**1.2**	**18**
Hart Crowser 1994	Oct-93	NE-W4-0		Acenaphthene	3.2		NA	1.2	2.7

Table 3
Chemicals above Screening Levels in Soil
Alaska Marine Lines

Source	Sample Date	Sample Location	Sample Depth (ft)	Chemical	Soil Conc'n (mg/kg DW)		MTCA Cleanup Level[a] (mg/kg DW)	Soil-to-Sediment Screening Level (Based on CSL)[b] (mg/kg DW)	Exceedance Factor
Hart Crowser 1994	Oct-93	E-W4-NE30		Acenaphthene	4.1		NA	1.2	3.4
Hart Crowser 1994	Oct-93	SP-D1		Acenaphthene	2.1		NA	1.2	1.8
ESL 1993	**Aug-93**	**TP-3**		**Acenaphthylene**	**28**		NA	**1.4**	**20**
ESL 1993	Aug-93	TP-3		Anthracene	130		NA	24	5.4
ESL 1993	**Aug-93**	**TP-3**		**Benzo(a)anthracene**	**19**		**0.14**	5.4	**136**
ESL 1993	**Aug-93**	**TP-3**		**Benzo(b)fluoranthene**	**15**		**0.14**	9.0	**107**
ESL 1993	**Aug-93**	**TP-3**		**Benzo(k)fluoranthene**	**15**		**0.14**	9.0	**107**
ESL 1993	Aug-93	TP-3		Benzo(g,h,i)perylene	11	J	NA	1.6	6.9
Hart Crowser 1994	Jan-94	B1-S2		Benzo(g,h,i)perylene	1.6		NA	1.6	1.0
ESL 1993	**Aug-93**	**TP-3**		**Benzo(a)pyrene**	**18**		**0.14**	4.2	**129**
ESL 1993	Aug-93	TP-3		Chrysene	28		NA	9.2	3.0
ESL 1993	Aug-93	TP-3		Dibenzo(a,h)anthracene	2.6	J	NA	0.66	3.9
ESL 1993	**Aug-93**	**TP-3**		**Dibenzofuran**	**16**		NA	**1.2**	**13**
Hart Crowser 1994	Oct-93	NE-W4-0		Dibenzofuran	2.1		NA	1.2	1.8
Hart Crowser 1994	Oct-93	E-W4-NE30		Dibenzofuran	2.9		NA	1.2	2.4
ESL 1993	**Aug-93**	**TP-3**		**Fluorene**	**58**		NA	**1.6**	**36**
Hart Crowser 1994	Oct-93	NE-W4-0		Fluorene	6.8		NA	1.6	4.3
Hart Crowser 1994	Oct-93	E-W4-NE30		Fluorene	8.9		NA	1.6	5.6
Hart Crowser 1994	Oct-93	SP-D1		Fluorene	2.0		NA	1.6	1.3
Hart Crowser 1994	Jan-94	B1-S2	7-8.5	Fluorene	7.1		NA	1.6	4.4
ESL 1993	Aug-93	TP-3		Indeno(1,2,3-cd)pyrene	9.2	J	NA	1.8	5.1
ESL 1993	**Aug-93**	**TP-3**		**2-Methylnaphthalene**	**250**		NA	**1.4**	**179**
Hart Crowser 1994	Oct-93	NE-W4-0		2-Methylnaphthalene	10		NA	1.4	7.1
Hart Crowser 1994	**Oct-93**	**E-W4-NE30**		**2-Methylnaphthalene**	**30**		NA	**1.4**	**21**
Hart Crowser 1994	Oct-93	SP-D1		2-Methylnaphthalene	3.2		NA	1.4	2.3
ESL 1993	**Aug-93**	**TP-3**		**Naphthalene**	**200**		5	**3.8**	**53**
Hart Crowser 1994	Oct-93	E-W4-NE30		Naphthalene	19		5	3.8	5.0
ESL 1993	**Aug-93**	**TP-3**		**Phenanthrene**	**150**		NA	**9.7**	**15**

Table 3
Chemicals above Screening Levels in Soil
Alaska Marine Lines

Source	Sample Date	Sample Location	Sample Depth (ft)	Chemical	Soil Conc'n (mg/kg DW)		MTCA Cleanup Level[a] (mg/kg DW)	Soil-to-Sediment Screening Level (Based on CSL)[b] (mg/kg DW)	Exceedance Factor
Hart Crowser 1994	Oct-93	NE-W4-0		Phenanthrene	17		NA	9.7	1.8
Hart Crowser 1994	Oct-93	E-W4-NE30		Phenanthrene	24		NA	9.7	2.5
Hart Crowser 1994	Jan-94	B1-S2		Phenanthrene	22		NA	9.7	2.3
ESL 1993	Aug-93	TP-3		Pyrene	38		NA	28	1.4

a - The lower of MTCA Method A or B cleanup levels was selected, from CLARC database
b - Soil to groundwater to sediment screening value for vadose zone soils, based on sediment CSL. From: SAIC 2006

DW - dry weight
CSL - Contaminant Screening Level from Washington Sediment Management Standards
NA - Not available

Notes:

(1) Table presents detected chemicals only
(2) ESL 1993 data is as cited in Hart Crowser 1994. Original ESL report and laboratory data were not available for review.
(3) Exceedance factors are the ratio of the detected concentration to the MTCA Cleanup Level or Soil-to-Sediment Screening Value, whichever is lower. Only samples with exceedance factors greater than or equal to 1 are shown.
(4) Chemicals with exceedance factors greater than 10 are shown in **Bold**

Table 4
Chemicals above Screening Levels in Groundwater
Alaska Marine Lines

Source	Sample Date	Sample Location	Chemical	Groundwater Conc'n (ug/L)	MTCA Cleanup Level[a] (ug/L)	GW-to-Sediment Screening Level[b] (Based on CSL) (ug/L)	Exceedance Factor
Dames & Moore 1991c	**Dec-90**	**H2O-1**	**Benzene**	**330**	**5**	NA	**66**
Dames & Moore 1991c	Dec-90	H2O-1	Diesel-Range Hydrocarbons	4,900	500	NA	9.8
ESL 1993	Aug-93	MW-2	Diesel-Range Hydrocarbons	>50	500	NA	
ESL 1993	Aug-93	MW-2	Diesel-Range Hydrocarbons	>50	500	NA	
ESL 1993	Aug-93	MW-2	Diesel-Range Hydrocarbons	>50	500	NA	
ESL 1993	Aug-93	MW-3	Diesel-Range Hydrocarbons	>50	500	NA	
ESL 1993	Aug-93	MW-3	Diesel-Range Hydrocarbons	>50	500	NA	
ESL 1993	Aug-93	MW-2	Gasoline-Range Hydrocarbons	>20	800	NA	
ESL 1993	Aug-93	MW-3	Gasoline-Range Hydrocarbons	>20	800	NA	
ESL 1993	Aug-93	MW-3	Gasoline-Range Hydrocarbons	980	800	NA	1.2
ESL 1993	Aug-93	MW-2	Heavy-Oil Range Hydrocarbons	>100	500	NA	
ESL 1993	Aug-93	MW-2	Heavy-Oil Range Hydrocarbons	>100	500	NA	
ESL 1993	Aug-93	MW-3	Heavy-Oil Range Hydrocarbons	>100	500	NA	
ESL 1993	Aug-93	MW-3	Heavy-Oil Range Hydrocarbons	>100	500	NA	
ESL 1993	Aug-93	MW-4	Heavy-Oil Range Hydrocarbons	>100	500	NA	
ESL 1993	Aug-93	SB	Heavy-Oil Range Hydrocarbons	>100	500	NA	
Dames & Moore 1991c	Dec-90	H2O-1	Xylenes (total)	1,200	1,000	NA	1.2

a - MTCA cleanup level is the lower of the MTCA Method A and B cleanup levels. Cyanide does not have a MTCA cleanup level, therfore the MCL was used.
b - Groundwater to sediment screening value, based on sediment CSLs. From: SAIC 2006

Notes:
(1) ESL 1993 data is as cited in Hart Crowser 1994. Original ESL report and laboratory data were not available for review.
(2) Exceedance factors are the ratio of the detected concentration to the MTCA Cleanup Level or GW-to-Sediment Screening Value, whichever is lower. Only samples with exceedance factors greater than 1 are shown.
(3) Chemicals with exceedance factors greater than 10 are shown in **Bold**

Table 5
Chemicals above Screening Levels in Sediment Samples
Duwamish Shipyard, Inc.

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC (%)	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
Metals and trace elements											
Hart Crowser 1993c	**SS-2**	**Arsenic**	**1,130**			**NA**	**57**	**93**	**mg/kg DW**	**20**	**12**
Hart Crowser 1993c	SS-4	Arsenic	120			NA	57	93	mg/kg DW	2.1	1.3
Hart Crowser 1993c	SS-3	Arsenic	75			NA	57	93	mg/kg DW	1.3	
Hart Crowser 1993c	SS-2	Copper	1,970	J		NA	390	390	mg/kg DW	5.1	5.1
Hart Crowser 1993c	SS-3	Copper	507	J		NA	390	390	mg/kg DW	1.3	1.3
Hart Crowser 1993c	SS-2	Lead	854	J		NA	450	530	mg/kg DW	1.9	1.6
Hart Crowser 1993c	**SS-2**	**Zinc**	**4,440**			**NA**	**410**	**960**	**mg/kg DW**	**11**	4.6
Hart Crowser 1993c	SS-4	Zinc	526	J		NA	410	960	mg/kg DW	1.3	
Hart Crowser 1993c	SS-3	Zinc	418	J		NA	410	960	mg/kg DW	1.0	
PAHs											
Hart Crowser 1993c	SS-2	Acenaphthene	0.84		2.74	31	16	57	mg/kg OC	1.9	
Hart Crowser 1993c	SS-2	Dibenzofuran	0.66		2.74	24	15	58	mg/kg OC	1.6	
Hart Crowser 1993c	SS-2	Fluoranthene	10		2.74	354	160	1,200	mg/kg OC	2.2	
Hart Crowser 1993c	SS-2	Fluorene	1.2		2.74	44	23	79	mg/kg OC	1.9	
Hart Crowser 1993c	SS-2	Indeno(1,2,3-cd)pyrene	1.1		2.74	40	34	88	mg/kg OC	1.2	
Hart Crowser 1993c	SS-2	Phenanthrene	7.1		2.74	259	100	480	mg/kg OC	2.6	
Hart Crowser 1993c	SS-1	Phenanthrene	1.9		1.90	100	100	480	mg/kg OC	1.0	
Hart Crowser 1993c	SS-2	Total HPAH	27.4	J	2.74	988	960	5,300	mg/kg OC	1.0	
Hart Crowser 1993c	SS-2	Total LPAH	10.8		2.74	394	370	780	mg/kg OC	1.1	
Phthalates											
Hart Crowser 1993c	SS-4	Bis(2-ethylhexyl)phthalate	2.2		1.54	143	47	78	mg/kg OC	3.0	1.8
Hart Crowser 1993c	SS-2	Bis(2-ethylhexyl)phthalate	1.8		2.74	66	47	78	mg/kg OC	1.4	
Hart Crowser 1993c	SS-1	Bis(2-ethylhexyl)phthalate	1.0		1.90	53	47	78	mg/kg OC	1.1	
Hart Crowser 1993c	SS-3	Butyl benzyl phthalate	0.12		2.35	5.1	4.9	64	mg/kg OC	1.0	
Hart Crowser 1993c	SS-1	Butyl benzyl phthalate	0.096		1.90	5.1	4.9	64	mg/kg OC	1.0	

OC - Organic carbon normalized
DW - Dry weight

Exceedance factors are the ratio of the detected concentration to the CSL or SQS; exceedance factors are shown only if they are greater than or equal to 1.
Chemicals with exceedance factors greater than 10 are shown in **Bold**

Table 6
Chemicals above Screening Levels in Soil
Duwamish Shipyard, Inc.

Source	Sample Date	Sample Location	Sample Depth (ft)	Chemical	Soil Conc'n (mg/kg DW)		MTCA Cleanup Level[a] (mg/kg)	Soil-to-Sediment Screening Level (Based on CSL)[b] (mg/kg)	Exceedance Factor
Kuroiwa 2000	**Aug-00**	**B4**		**Benzene**	**3.5**		**0.03**	NA	**117**
Kuroiwa 2000	**Aug-00**	**SS-2**		**Benzene**	**1.6**		**0.03**	NA	**53**
Kuroiwa 2000	**Aug-00**	**B1(2)**		**Benzene**	**0.70**		**0.03**	NA	**23**
Kuroiwa 2000	**Aug-00**	**B3**		**Benzene**	**0.40**		**0.03**	NA	**13**
Kuroiwa 2000	**Aug-00**	**SS-3(2)**		**Benzene**	**0.38**		**0.03**	NA	**13**
Anchor 2006b	Sep-06	DSI06-SO-A	0-3	Benzene	0.26		0.03	NA	8.7
Anchor 2006b	Sep-06	DSI07-SO-A	0-3	Benzene	0.05		0.03	NA	1.7
Kuroiwa 2000	Aug-00	B3(2)		Diesel-Range Hydrocarbons	4,000		2,000	NA	2.0
Anchor 2006b	Sep-06	DSI06-SO-A	0-3	Diesel-Range Hydrocarbons	2,700		2,000	NA	1.4
Anchor 2006b	Sep-06	DSI06-SO-B	4-6	Diesel-Range Hydrocarbons	2,200		2,000	NA	1.1
Kuroiwa 2000	**Aug-00**	**SS-3**		**Gasoline-Range Hydrocarbons**	**3,400**		**30**	NA	**113**
Kuroiwa 2000	**Aug-00**	**B1**		**Gasoline-Range Hydrocarbons**	**3,200**		**30**	NA	**107**
Kuroiwa 2000	**Aug-00**	**SS-2**		**Gasoline-Range Hydrocarbons**	**1,900**		**30**	NA	**63**
Kuroiwa 2000	**Aug-00**	**B4(1)**		**Gasoline-Range Hydrocarbons**	**800**		**30**	NA	**27**
Kuroiwa 2000	**Aug-00**	**SS-3(2)**		**Gasoline-Range Hydrocarbons**	**300**		**30**	NA	**10**
Anchor 2006b	Sep-06	DSI09-SO-B	3-5	Gasoline-Range Hydrocarbons	200		30	NA	6.7
Kuroiwa 2000	Aug-00	B3		Gasoline-Range Hydrocarbons	170		30	NA	5.7
Kuroiwa 2000	Aug-00	SS-1		Gasoline-Range Hydrocarbons	140		30	NA	4.7
Anchor 2006b	Sep-06	DSI06-SO-A	0-3	Gasoline-Range Hydrocarbons	120		30	NA	4.0
Anchor 2006b	Sep-06	DSI03-SO-B	5-6.5	Gasoline-Range Hydrocarbons	110		30	NA	3.7
Anchor 2006b	Sep-06	DSI03-SO-A	0-3	Gasoline-Range Hydrocarbons	92		30	NA	3.1
Kuroiwa 2000	Aug-00	B4		Gasoline-Range Hydrocarbons	88		30	NA	2.9
Kuroiwa 2000	Aug-00	SS-2(2)		Gasoline-Range Hydrocarbons	76		30	NA	2.5
Anchor 2006b	Sep-06	DSI07-SO-A	0-3	Gasoline-Range Hydrocarbons	74		30	NA	2.5
Anchor 2006b	Sep-06	DSI07-SO-B	3-5	Gasoline-Range Hydrocarbons	36		30	NA	1.2
Anchor 2006b	**Sep-06**	**DSI01-SO-A**	**0-3**	**Arsenic**	**48**	**J**	**0.67**	12,000	**72**

Table 6
Chemicals above Screening Levels in Soil
Duwamish Shipyard, Inc.

Source	Sample Date	Sample Location	Sample Depth (ft)	Chemical	Soil Conc'n (mg/kg DW)		MTCA Cleanup Level[a] (mg/kg)	Soil-to-Sediment Screening Level (Based on CSL)[b] (mg/kg)	Exceedance Factor
Anchor 2006b	**Sep-06**	**DSI09-SO-B**	**3-5**	**Arsenic**	**20**		**0.67**	12,000	**30**
Anchor 2006b	**Sep-06**	**DSI12-SO-B**	**3-5**	**Benzo(a)pyrene**	**7.9**		**0.14**	4.2	**56**
Anchor 2006b	**Sep-06**	**DSI12-SO-A**	**0-3**	**Benzo(a)pyrene**	**3.0**		**0.14**	4.2	**21**
Anchor 2006b	Sep-06	DSI09-SO-B	3-5	Cadmium	8.5		2	34	4.3
Anchor 2006b	**Sep-06**	**DSI09-SO-B**	**3-5**	**Lead**	**4,940**		**250**	1,300	**20**

a - The lower of MTCA Method A or B cleanup levels was selected, from CLARC database
b - From: SAIC 2006

DW - dry weight
CSL - Contaminant Screening Level from Washington Sediment Management Standards
NA - Not available

Notes:
(1) Table presents detected chemicals only
(2) Exceedance factors are the ratio of the detected concentration to the MTCA Cleanup Level or Soil-to-Sediment Screening Value, whichever is lower. Only samples with exceedance factors greater than or equal to 1 are shown.
(3) Chemicals with exceedance factors greater than 10 are shown in **Bold**

Table 7
Chemicals above Screening Levels in Catch Basin Solids Sample
Duwamish Shipyard, Inc.

Source	Date Sampled	Sample Location	Chemical	Conc'n		SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]	MTCA Cleanup Level (mg/kg)	MTCA Exceedance Factor
Anchor 2006b	9/29/2006	DSI-22	Copper	2,450		390	390	mg/kg DW	6.3	6.3	3,000	
Anchor 2006b	9/29/2006	DSI-22	Mercury	1.05		0.41	0.59	mg/kg DW	2.6	1.8	24	
Anchor 2006b	9/29/2006	DSI-22	Zinc	2,600		410	960	mg/kg DW	6.3	2.7	24,000	
Anchor 2006b	9/29/2006	DSI-22	Acenaphthene	22.6	J	16	57	mg/kg OC	1.4		NA	
Anchor 2006b	9/29/2006	DSI-22	Bis(2-ethylhexyl)phthalate	488		47	78	mg/kg OC	5.9	3.5	71	
Anchor 2006b	9/29/2006	DSI-22	Butylbenzylphthalate	14.3		4.9	64	mg/kg OC	1.4		16,000	

OC - Organic carbon normalized
DW - Dry weight

a - Exceedance factors are the ratio of the detected concentration to the CSL or SQS; exceedance factors are shown only if they are greater than or equal to 1.

Table 8
Chemicals above Screening Levels in Groundwater
Duwamish Shipyard, Inc.

Source	Sample Date	Sample Location	Chemical	Groundwater Conc'n (ug/L)	MTCA Cleanup Level[a] (ug/L)	GW-to-Sediment Screening Level[b] (Based on CSL) (ug/L)	Exceedance Factor
Anchor 2006b	**Sep-06**	**DSI01-GW**	**Arsenic**	**84.4**	**0.058**	370	**1455**
Anchor 2006b	**Sep-06**	**DSI12-GW**	**Arsenic**	**32.5**	**0.058**	370	**560**
Anchor 2006b	**Sep-06**	**DSI02-GW**	**Arsenic**	**16.4**	**0.058**	370	**283**
Anchor 2006b	**Sep-06**	**DSI08-GW**	**Arsenic**	**11.8**	**0.058**	370	**203**
Anchor 2006b	**Sep-06**	**DSI04-GW**	**Arsenic**	**11.2**	**0.058**	370	**193**
Anchor 2006b	**Sep-06**	**DSI03-GW**	**Arsenic**	**9.5**	**0.058**	370	**164**
Anchor 2006b	**Sep-06**	**DSI07-GW**	**Arsenic**	**9.5**	**0.058**	370	**164**
Anchor 2006b	**Sep-06**	**DSI07-GW**	**Arsenic**	**7.2**	**0.058**	370	**124**
Anchor 2006b	**Sep-06**	**DSI11-GW**	**Arsenic**	**6.7**	**0.058**	370	**116**
Anchor 2006b	Sep-06	MW-5	Chromium	54	50	318	1.1
Anchor 2006b	Sep-06	DSI09-GW	Lead	55	15	13	4.2
Anchor 2006b	Sep-06	DSI12-GW	Lead	27	15	13	2.1
Anchor 2006b	**Sep-06**	**DSI12-GW**	**Benzo(a)pyrene**	**3.5**	**0.1**	**0.27**	**35**
Anchor 2006b	**Sep-06**	**DSI07-GW**	**Benzene**	**210**	**0.8**	NA	**263**
Anchor 2006b	**Sep-06**	**DSI07-GW**	**Benzene**	**180**	**0.8**	NA	**225**
Anchor 2006b	**Sep-06**	**DSI04-GW**	**Vinyl chloride**	**0.6**	**0.029**	NA	**21**
Anchor 2006b	**Sep-06**	**DSI08-GW**	**Vinyl chloride**	**0.4**	**0.029**	NA	**14**
Anchor 2006b	**Sep-06**	**DSI05-GW**	**Vinyl chloride**	**0.3**	**0.029**	NA	**10**

a - MTCA cleanup level is the lower of the MTCA Method A and B cleanup levels. Cyanide does not have a MTCA cleanup level, therfore the MCL was used.
b - Groundwater to sediment screening value, based on sediment CSLs. From: SAIC 2006

Notes:
(1) Exceedance factors are the ratio of the detected concentration to the MTCA Cleanup Level or GW-to-Sediment Screening Value, whichever is lower. Only samples with exceedance factors greater than 1 are shown.
(2) Chemicals with exceedance factors greater than 10 are shown in **Bold**

Table 9
Chemicals above Screening Levels in Soil
Glacier Northwest, Inc.

Source	Sample Date	Sample Location	Sample Depth (ft)	Chemical	Soil Conc'n (mg/kg DW)		MTCA Cleanup Level[a] (mg/kg)	Soil-to-Sediment Screening Level (Based on CSL)[b] (mg/kg)	Exceedance Factor
Parametrix 1985	**Mar-85**	**Composite 1**	**2.5-5.0**	**Arsenic**	**51**		**0.67**	12,000	**76**
Parametrix 1985	**Mar-85**	**Composite 2**	**0-5.0**	**Arsenic**	**26**		**0.67**	12,000	**39**
Parametrix 1985	**Mar-85**	**Composite 3**	**2.5-5.0**	**Arsenic**	**46**		**0.67**	12,000	**69**
Parametrix 1985	**Mar-85**	**Composite 4**	**2.5-5.0**	**Arsenic**	**20**		**0.67**	12,000	**30**
Parametrix 1990	**May-90**	**B-2**	**0-15**	**Arsenic**	**79**		**0.67**	12,000	**118**
Parametrix 1990	**May-90**	**B-3**	**0-15**	**Arsenic**	**150**		**0.67**	12,000	**224**
Parametrix 1990	May-90	B-1	0-20	Chromium	21		19	270	1.1
Parametrix 1990	May-90	B-2	0-15	Chromium	24		19	270	1.3
Parametrix 1990	May-90	B-3	0-15	Chromium	22		19	270	1.2
Parametrix 1985	Mar-85	Composite 4	2.5-5.0	Mercury	0.2		2	0.03	6.7
Parametrix 1990	May-90	B-1	0-20	Mercury	0.26		2	0.03	8.7
Parametrix 1990	May-90	B-2	0-15	Mercury	0.22		2	0.03	7.3
Parametrix 1985	Mar-85	Composite 3	2.5-5.0	Zinc	40.3		24,000	38	1.1
Parametrix 1990	May-90	TP-2	1.5	Total Petroleum Hydrocarbons	240		200	NA	1.2
Parametrix 1990	**May-90**	**TP-3**	**1.5**	**Total Petroleum Hydrocarbons**	**10,000**		**200**	NA	**50**

a - The lower of MTCA Method A or B cleanup levels was selected, from CLARC database
b - Soil to sediment screening level, based on sediment CSLs. From: SAIC 2006

DW - dry weight
CSL - Contaminant Screening Level from Washington Sediment Management Standards
NA - Not available

Notes:
(1) Table presents detected chemicals only
(2) Exceedance factors are the ratio of the detected concentration to the MTCA Cleanup Level or Soil-to-Sediment Screening Value, whichever is lower. Only samples with exceedance factors greater than or equal to 1 are shown.
(3) Chemicals with exceedance factors greater than 10 are shown in **Bold**

Table 10
Chemicals above Screening Levels in Groundwater
Glacier Northwest, Inc.

Source	Sample Date	Sample Location	Chemical	Groundwater Conc'n (ug/L)	MTCA Cleanup Level[a] (ug/L)	GW-to-Sediment Screening Level[b] (Based on CSL) (ug/L)	Exceedance Factor
Parametrix 1990	**May-90**	**B-2**	**Arsenic**	**150**	**0.058**	370	**2586**
Parametrix 1990	**May-90**	**B-3**	**Arsenic**	**330**	**0.058**	370	**5690**
Parametrix 1990	May-90	B-1	Chromium	90	50	318	1.8
Parametrix 1990	**May-90**	**B-1**	**Silver**	**270**	NA	**1.5**	**180**
Parametrix 1990	**May-90**	**B-2**	**Silver**	**430**	NA	**1.5**	**287**
Parametrix 1990	**May-90**	**B-3**	**Silver**	**340**	NA	**1.5**	**227**
Parametrix 1990	May-90	B-2	2,4-Dichlorophenol	51	24	NA	2.1
Parametrix 1990	**May-90**	**B-2**	**Pentachlorophenol**	**3000**	**0.73**	**10**	**4110**
Parametrix 1990	**Jun-90**	**B-2**	**Pentachlorophenol**	**2800**	**0.73**	**10**	**3836**

a - MTCA cleanup level is the lower of the MTCA Method A and B cleanup levels. Cyanide does not have a MTCA cleanup level, therfore the MCL was used.
b - Groundwater to sediment screening level, based on sediment CSLs. From SAIC 2006

Notes:
(1) Exceedance factors are the ratio of the detected concentration to the MTCA Cleanup Level or GW-to-Sediment Screening Value, whichever is lower. Only samples with exceedance factors greater than or equal to 1 are shown.
(2) Chemicals with exceedance factors greater than 10 are shown in **Bold**

Table 11
Chemicals above Screening Levels in Seep Samples
Glacier Northwest, Inc.

Source	Date Sampled	Sample Location	Chemical	Conc'n (ug/L)		Marine Chronic WQS	Marine Acute WQS	Chronic WQS Exceedance Factor	GW-to-Sediment Screening Level (Based on CSL)[a]	Exceedance Factor
Filtered Samples										
Hart Crowser 1990	May-95	SW-01	Arsenic	85		36	69	2.4	370	
Hart Crowser 1990	May-95	SW-02	Arsenic	82		36	69	2.3	370	
Windward 2004	Jul-04	Seep 61	Arsenic	72.4		36	69	2.0	370	

Exceedance factors are the ratio of the detected concentration to the screening level; exceedance factors are shown only if they are greater than or equal to 1.
Chemicals with exceedance factors greater than 10 are shown in **Bold**

WQS - Water Quality Standards
CSL - Sediment Management Standards Cleanup Screening Level

a - Groundwater to sediment screening level, based on sediment CSLs. From SAIC 2006

Table 12
Chemicals above Screening Levels in Soil
MRI Corporation

Source	Sample Date	Sample Location	Sample Depth (ft)	Chemical	Soil Conc'n (mg/kg DW)		MTCA Cleanup Level[a] (mg/kg)	Soil-to-Sediment Screening Level (Based on CSL)[b] (mg/kg)	Exceedance Factor
SKCDPH 1998	Nov-97	MST-1	0-0.5	Chromium	22		19	270	1.2
SKCDPH 1998	Nov-97	MST-2	0-0.5	Chromium	33		19	270	1.7
SKCDPH 1998	Nov-97	MST-1	0-0.5	Lead	470		250	1,300	1.9

a - The lower of MTCA Method A or B cleanup levels was selected, from CLARC database
b - From: SAIC 2006
DW - dry weight
CSL - Contaminant Screening Level from Washington Sediment Management Standards

Notes:
(1) Table presents detected chemicals only
(2) Exceedance factors are the ratio of the detected concentration to the MTCA Cleanup Level or Soil-to-Sediment Screening Value, whichever is lower. Only samples with exceedance factors greater than or equal to 1 are shown.
(3) Chemicals with exceedance factors greater than 10 are shown in **Bold**

Table 13
Chemicals above Screening Levels in Catch Basin Sediment Samples
The Chemithon Corporation

Source	Date Sampled	Sample Location	Chemical	Conc'n (mg/kg DW)	% TOC (DW)	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]	MTCA Cleanup Level (mg/kg)	MTCA Exceedance Factor
ARI 2006b	10/12/2006	CB93	4-Methylphenol	1.7	4.22	NA	0.67	0.67	mg/kg DW	2.5	2.5	NA	
ARI 2006b	10/12/2006	CB95	4-Methylphenol	2.2	13.2	NA	0.67	0.67	mg/kg DW	3.3	3.3	NA	
ARI 2006a	5/5/2006	CB90	*Acenaphthene*	*0.53*	2.03	26	16	57	mg/kg OC	1.6		4,800	
ARI 2006a	**5/5/2006**	**CB90**	**Arsenic**	**40**		NA	57	93	mg/kg DW			**0.67**	**59.70**
ARI 2006b	**10/12/2006**	**CB93**	**Arsenic**	**30**		NA	57	93	mg/kg DW			**0.67**	**44.78**
ARI 2006b	**10/12/2006**	**CB94**	**Arsenic**	**60**		NA	57	93	mg/kg DW	1.1		**0.67**	**89.55**
ARI 2006b	**10/12/2006**	**CB95**	**Arsenic**	**150**		NA	57	93	mg/kg DW	2.6	1.6	**0.67**	**223.88**
ARI 2006c	**11/14/2006**	**CH-N**	**Arsenic**	**20**		NA	57	93	mg/kg DW			**0.67**	**29.85**
ARI 2007	**2/6/2007**	**CB96**	**Arsenic**	**20**		NA	57	93	mg/kg DW			**0.67**	**29.85**
ARI 2007	**2/6/2007**	**CB98**	**Arsenic**	**7**		NA	57	93	mg/kg DW			**0.67**	**10.45**
ARI 2006a	**5/5/2006**	**CB90**	***Benzo(a)anthracene***	***6.3***	2.03	310	110	270	mg/kg OC	2.8	1.1	**0.14**	**45.00**
ARI 2006b	10/12/2006	CB93	Benzo(a)anthracene	0.99	4.22	23	110	270	mg/kg OC			0.14	7.07
ARI 2006b	10/12/2006	CB94	Benzo(a)anthracene	0.52	7.18	7.2	110	270	mg/kg OC			0.14	3.71
ARI 2006b	10/12/2006	CB95	Benzo(a)anthracene	0.82	13.2	6.2	110	270	mg/kg OC			0.14	5.86
ARI 2006c	11/14/2006	CH-E	Benzo(a)anthracene	0.5	3.65	14	110	270	mg/kg OC			0.14	3.57
ARI 2006c	11/14/2006	CH-N	Benzo(a)anthracene	0.58	2.4	24	110	270	mg/kg OC			0.14	4.14
ARI 2007	2/6/2007	CB96	Benzo(a)anthracene	0.8	4.83	17	110	270	mg/kg OC			0.14	5.71
ARI 2006a	**5/5/2006**	**CB90**	***Benzo(a)pyrene***	***5.1***	2.03	251	99	210	mg/kg OC	2.5	1.2	**0.14**	**36.43**
ARI 2006b	10/12/2006	CB93	Benzo(a)pyrene	1	4.22	24	99	210	mg/kg OC			0.14	7.14
ARI 2006b	10/12/2006	CB94	Benzo(a)pyrene	1	7.18	14	99	210	mg/kg OC			0.14	7.14
ARI 2006b	10/12/2006	CB95	Benzo(a)pyrene	1.1	13.2	8.3	99	210	mg/kg OC			0.14	7.86
ARI 2006c	11/14/2006	CH-E	Benzo(a)pyrene	0.64	3.65	18	99	210	mg/kg OC			0.14	4.57
ARI 2006c	11/14/2006	CH-N	Benzo(a)pyrene	0.96	2.4	40	99	210	mg/kg OC			0.14	6.86
ARI 2007	2/6/2007	CB96	Benzo(a)pyrene	0.74	4.83	15	99	210	mg/kg OC			0.14	5.29
ARI 2007	2/6/2007	CB98	Benzo(a)pyrene	0.15	1.78	8.4	99	210	mg/kg OC			0.14	1.07
ARI 2006a	**5/5/2006**	**CB90**	**Benzo(b)fluoranthene**	**4.4**	2.03	217	NA	NA				**0.14**	**31.43**
ARI 2006b	10/12/2006	CB93	Benzo(b)fluoranthene	1.2	4.22	28	NA	NA				0.14	8.57
ARI 2006b	**10/12/2006**	**CB94**	**Benzo(b)fluoranthene**	**1.4**	7.18	19	NA	NA				**0.14**	**10.00**
ARI 2006b	**10/12/2006**	**CB95**	**Benzo(b)fluoranthene**	**1.8**	13.2	14	NA	NA				**0.14**	**12.86**
ARI 2006c	11/14/2006	CH-E	Benzo(b)fluoranthene	0.93	3.65	25	NA	NA				0.14	6.64
ARI 2006c	**11/14/2006**	**CH-N**	**Benzo(b)fluoranthene**	**1.4**	2.4	58	NA	NA				**0.14**	**10.00**
ARI 2007	2/6/2007	CB96	Benzo(b)fluoranthene	0.85	4.83	18	NA	NA				0.14	6.07
ARI 2007	2/6/2007	CB98	Benzo(b)fluoranthene	0.15	1.78	8.4	NA	NA				0.14	1.07
ARI 2006a	5/5/2006	CB90	*Benzo(g,h,i)perylene*	*2.1*	2.03	103	31	78	mg/kg OC	3.3	1.3	NA	
ARI 2006a	**5/5/2006**	**CB90**	***Benzo(k)fluoranthene***	***4.8***	2.03	236	NA	NA				**0.14**	**34**
ARI 2006b	10/12/2006	CB93	Benzo(k)fluoranthene	1.1	4.22	26	NA	NA				0.14	7.9
ARI 2006b	10/12/2006	CB94	Benzo(k)fluoranthene	1	7.18	14	NA	NA				0.14	7.1
ARI 2006b	10/12/2006	CB95	Benzo(k)fluoranthene	1.3	13.2	9.8	NA	NA				0.14	9.3
ARI 2006c	11/14/2006	CH-E	Benzo(k)fluoranthene	0.48	3.65	13	NA	NA				0.14	3.4

Table 13
Chemicals above Screening Levels in Catch Basin Sediment Samples
The Chemithon Corporation

Source	Date Sampled	Sample Location	Chemical	Conc'n (mg/kg DW)	% TOC (DW)	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]	MTCA Cleanup Level (mg/kg)	MTCA Exceedance Factor
ARI 2006c	11/14/2006	CH-N	Benzo(k)fluoranthene	0.74	2.4	31	NA	NA				0.14	5.3
ARI 2007	2/6/2007	CB96	Benzo(k)fluoranthene	0.74	4.83	15	NA	NA				0.14	5.3
ARI 2007	2/6/2007	CB98	Benzo(k)fluoranthene	0.23	1.78	13	NA	NA				0.14	1.6
ARI 2006b	10/12/2006	CB94	Benzoic Acid	4.4	7.18	NA	0.65	0.65	mg/kg DW	6.8	6.8	320,000	
ARI 2006a	5/5/2006	CB90	Benzyl Alcohol	0.36	2.03	NA	0.057	0.073	mg/kg DW	6.3	4.9	24,000	
ARI 2006c	11/14/2006	CH-E	Benzyl Alcohol	0.5	3.65	NA	0.057	0.073	mg/kg DW	8.8	6.8	24,000	
ARI 2006c	11/14/2006	CH-N	Benzyl Alcohol	0.12	2.4	NA	0.057	0.073	mg/kg DW	2.1	1.6	24,000	
ARI 2006a	5/5/2006	CB90	*bis(2-ethylhexyl)phthalate*	*5.7*	2.03	281	47	78	mg/kg OC	6.0	3.6	71	
ARI 2006b	10/12/2006	CB93	bis(2-ethylhexyl)phthalate	5.9	4.22	140	47	78	mg/kg OC	3.0	1.8	71	
ARI 2006b	**10/12/2006**	**CB95**	***bis(2-ethylhexyl)phthalate***	***65***	**13.2**	**492**	**47**	**78**	**mg/kg OC**	**10**	6.3	71	
ARI 2006c	11/14/2006	CH-E	bis(2-ethylhexyl)phthalate	4.4	3.65	121	47	78	mg/kg OC	2.6	1.5	71	
ARI 2006c	11/14/2006	CH-N	bis(2-ethylhexyl)phthalate	4.1	2.4	171	47	78	mg/kg OC	3.6	2.2	71	
ARI 2006c	11/14/2006	RCB100	bis(2-ethylhexyl)phthalate	6.2	2.71	229	47	78	mg/kg OC	4.9	2.9	71	
ARI 2007	2/6/2007	CB96	*bis(2-ethylhexyl)phthalate*	*15*	4.83	311	47	78	mg/kg OC	6.6	4.0	71	
ARI 2007	2/6/2007	CB98	bis(2-ethylhexyl)phthalate	1.1	1.78	62	47	78	mg/kg OC	1.3		71	
ARI 2006a	**5/5/2006**	**CB90**	***Butylbenzylphthalate***	***1.8***	**2.03**	**89**	**4.9**	**64**	**mg/kg OC**	**18**	1.4	**16,000**	
ARI 2006b	10/12/2006	CB93	Butylbenzylphthalate	0.8	4.22	19	4.9	64	mg/kg OC	3.9		16,000	
ARI 2006b	10/12/2006	CB94	Butylbenzylphthalate	1.2	7.18	17	4.9	64	mg/kg OC	3.4		16,000	
ARI 2006b	10/12/2006	CB95	Butylbenzylphthalate	1.7	13.2	13	4.9	64	mg/kg OC	2.6		16,000	
ARI 2006c	**11/14/2006**	**CH-E**	**Butylbenzylphthalate**	**5.2**	**3.65**	**142**	**4.9**	**64**	**mg/kg OC**	**29**	2.2	**16,000**	
ARI 2006c	11/14/2006	CH-N	Butylbenzylphthalate	0.7	2.4	29	4.9	64	mg/kg OC	6.0		16,000	
ARI 2007	2/6/2007	CB96	Butylbenzylphthalate	0.46	4.83	9.5	4.9	64	mg/kg OC	1.9		16,000	
ARI 2007	2/6/2007	CB98	Butylbenzylphthalate	0.22	1.78	12	4.9	64	mg/kg OC	2.5		16,000	
ARI 2006a	**5/5/2006**	**CB90**	***Chrysene***	***7***	2.03	345	110	460	mg/kg OC	3.1		**0.14**	**50**
ARI 2006b	**10/12/2006**	**CB93**	**Chrysene**	**1.6**	4.22	38	110	460	mg/kg OC			**0.14**	**11**
ARI 2006b	**10/12/2006**	**CB94**	**Chrysene**	**1.4**	7.18	19	110	460	mg/kg OC			**0.14**	**10**
ARI 2006b	**10/12/2006**	**CB95**	***Chrysene***	***2.3***	13.2	17	110	460	mg/kg OC			**0.14**	**16**
ARI 2006c	11/14/2006	CH-E	Chrysene	0.78	3.65	21	110	460	mg/kg OC			0.14	5.6
ARI 2006c	11/14/2006	CH-N	Chrysene	0.86	2.4	36	110	460	mg/kg OC			0.14	6.1
ARI 2007	2/6/2007	CB96	*Chrysene*	*1.2*	4.83	25	110	460	mg/kg OC			0.14	8.6
ARI 2007	2/6/2007	CB98	Chrysene	0.24	1.78	13	110	460	mg/kg OC			0.14	1.7
ARI 2006a	5/5/2006	CB90	Copper	1,820		NA	390	390	mg/kg DW	4.7	4.7	3,000	
ARI 2006b	10/12/2006	CB93	Copper	991		NA	390	390	mg/kg DW	2.5	2.5	3,000	
ARI 2006b	10/12/2006	CB94	Copper	1,150		NA	390	390	mg/kg DW	2.9	2.9	3,000	
ARI 2006b	10/12/2006	CB95	Copper	734		NA	390	390	mg/kg DW	1.9	1.9	3,000	
ARI 2006c	11/14/2006	CH-E	Copper	1,040		NA	390	390	mg/kg DW	2.7	2.7	3,000	
ARI 2006c	11/14/2006	CH-N	Copper	696		NA	390	390	mg/kg DW	1.8	1.8	3,000	
ARI 2007	2/6/2007	CB96	Copper	557		NA	390	390	mg/kg DW	1.4	1.4	3,000	
ARI 2006a	5/5/2006	CB90	*Dibenz(a,h)anthracene*	*0.6*	2.03	30	12	33	mg/kg OC	2.5		0.14	4.3

Table 13
Chemicals above Screening Levels in Catch Basin Sediment Samples
The Chemithon Corporation

Source	Date Sampled	Sample Location	Chemical	Conc'n (mg/kg DW)	% TOC (DW)	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]	MTCA Cleanup Level (mg/kg)	MTCA Exceedance Factor
ARI 2006b	10/12/2006	CB93	Dibenz(a,h)anthracene	0.18	4.22	4.3	12	33	mg/kg OC			0.14	1.3
ARI 2006b	10/12/2006	CB94	Diesel-Range Hydrocarbons	5,400		NA	NA	NA				2,000	2.7
ARI 2006b	10/12/2006	CB95	Diesel-Range Hydrocarbons	5,700		NA	NA	NA				2,000	2.9
ARI 2006c	11/14/2006	RCB100	Diesel-Range Hydrocarbons	3,800		NA	NA	NA				2,000	1.9
ARI 2006a	5/5/2006	CB90	*Fluoranthene*	*16*	2.03	788	160	1,200	mg/kg OC	4.9		3,200	
ARI 2006a	**5/5/2006**	**CB90**	***Indeno(1,2,3-cd)pyrene***	***2.2***	2.03	108	34	88	mg/kg OC	3.2	1.2	**0.14**	**16**
ARI 2006b	10/12/2006	CB93	Indeno(1,2,3-cd)pyrene	0.52	4.22	12	34	88	mg/kg OC			0.14	3.7
ARI 2006b	10/12/2006	CB94	Indeno(1,2,3-cd)pyrene	0.95	7.18	13	34	88	mg/kg OC			0.14	6.8
ARI 2006b	10/12/2006	CB95	Indeno(1,2,3-cd)pyrene	0.67	13.2	5.1	34	88	mg/kg OC			0.14	4.8
ARI 2006c	11/14/2006	CH-E	Indeno(1,2,3-cd)pyrene	0.22	3.65	6.0	34	88	mg/kg OC			0.14	1.6
ARI 2006c	11/14/2006	CH-N	Indeno(1,2,3-cd)pyrene	0.41	2.4	17	34	88	mg/kg OC			0.14	2.9
ARI 2007	2/6/2007	CB96	*Indeno(1,2,3-cd)pyrene*	*0.45*	4.83	9.3	34	88	mg/kg OC			0.14	3.2
ARI 2006a	5/5/2006	CB90	Lead	410		NA	450	530	mg/kg DW			250	1.6
ARI 2006b	10/12/2006	CB94	Lead	276		NA	450	530	mg/kg DW			250	1.1
ARI 2006b	10/12/2006	CB95	Lead	352		NA	450	530	mg/kg DW			250	1.4
ARI 2006b	10/12/2006	CB93	Motor Oil-Range Hydrocarbons	2,300		NA	NA	NA				2,000	1.2
ARI 2006b	10/12/2006	CB94	Motor Oil-Range Hydrocarbons	7,500		NA	NA	NA				2,000	3.8
ARI 2006b	10/12/2006	CB95	Motor Oil-Range Hydrocarbons	12,000		NA	NA	NA				2,000	6.0
ARI 2006c	11/14/2006	CH-N	Motor Oil-Range Hydrocarbons	2,100		NA	NA	NA				2,000	1.1
ARI 2006c	11/14/2006	RCB100	Motor Oil-Range Hydrocarbons	9,500		NA	NA	NA				2,000	4.8
ARI 2007	2/6/2007	CB96	Motor Oil-Range Hydrocarbons	5,300		NA	NA	NA				2,000	2.7
ARI 2006a	5/5/2006	CB90	*Phenanthrene*	*7*	2.03	345	100	480	mg/kg OC	3.4		NA	
ARI 2006b	10/12/2006	CB93	Phenol	0.87	4.22	NA	0.42	1.2	mg/kg DW	2.1		48,000	
ARI 2006b	10/12/2006	CB94	Phenol	1.5	7.18	NA	0.42	1.2	mg/kg DW	3.6	1.3	48,000	
ARI 2006b	10/12/2006	CB95	Phenol	1.5	13.2	NA	0.42	1.2	mg/kg DW	3.6	1.3	48,000	
ARI 2006a	5/5/2006	CB90	Zinc	2,550		NA	410	960	mg/kg DW	6.2	2.7	24,000	
ARI 2006b	10/12/2006	CB93	Zinc	1,830		NA	410	960	mg/kg DW	4.5	1.9	24,000	
ARI 2006b	10/12/2006	CB94	Zinc	3,290		NA	410	960	mg/kg DW	8.0	3.4	24,000	
ARI 2006b	10/12/2006	CB95	Zinc	3,030		NA	410	960	mg/kg DW	7.4	3.2	24,000	
ARI 2006c	11/14/2006	CH-E	Zinc	1,380		NA	410	960	mg/kg DW	3.4	1.4	24,000	
ARI 2006c	11/14/2006	CH-N	Zinc	888		NA	410	960	mg/kg DW	2.2		24,000	
ARI 2007	2/6/2007	CB96	Zinc	939		NA	410	960	mg/kg DW	2.3		24,000	

OC - Organic carbon normalized
DW - Dry weight

a - Exceedance factors are the ratio of the detected concentration to the SQS or CSL or MTCA Cleanup Level; exceedance factors are shown only if they are greater than or equal to 1.
Chemicals with exceedance factors greater than 10 are shown in **Bold**
Concentrations shown in italics are results obtained through laboratory dilution of the sample.

Table 14
Chemicals in Catch Basin Solid Sample
The Chemithon Corporation

Source	Sample Date	Sample Location	Chemical	Soil Conc'n (mg/kg DW)	MTCA Cleanup Level[a] (mg/kg)	Soil-to-Sediment Screening Level (Based on CSL)[b] (mg/kg DW)	Exceedance Factor
ARI 2007	**2/6/2007**	**CB97**	**2,4-Dimethylphenol**	**6.3**	1,600	**0.002**	**3,150**
ARI 2007	**2/6/2007**	**CB97**	***2-Methylnaphthalene***	***23***	NA	**0.073**	**315**
ARI 2007	**2/6/2007**	**CB97**	**2-Methylphenol**	**0.51**	NA	**0.0052**	**98**
ARI 2007	**2/6/2007**	**CB97**	**4-Methylphenol**	**0.82**	NA	**0.056**	**15**
ARI 2007	2/6/2007	CB97	Acenaphthene	0.27	4,800	0.060	4.5
ARI 2007	**2/6/2007**	**CB97**	**Aroclor 1254**	**3.8**	NA	**0.065**	**58**
ARI 2007	**2/6/2007**	**CB97**	**Aroclor 1260**	**3.2**	NA	**0.065**	**49**
ARI 2007	**2/6/2007**	**CB97**	**Arsenic**	**13**	**0.67**	587	**19**
ARI 2007	2/6/2007	CB97	Benzo(a)anthracene	0.6	0.14	0.27	4.3
ARI 2007	2/6/2007	CB97	Benzo(a)pyrene	0.31	0.14	0.21	2.2
ARI 2007	2/6/2007	CB97	Benzo(b)fluoranthene	0.82	0.14	0.45	5.9
ARI 2007	2/6/2007	CB97	Benzo(g,h,i)perylene	0.21	NA	0.078	2.7
ARI 2007	2/6/2007	CB97	Benzo(k)fluoranthene	0.59	0.14	0.45	4.2
ARI 2007	**2/6/2007**	**CB97**	**bis(2-ethylhexyl)phthalate**	**0.94**	71	**0.078**	**12**
ARI 2007	**2/6/2007**	**CB97**	***Butylbenzylphthalate***	***97***	16,000	**0.066**	**1,470**
ARI 2007	2/6/2007	CB97	Chrysene	1	0.14	0.46	2.2
ARI 2007	2/6/2007	CB97	Copper	139	3,000	39	3.6
ARI 2007	2/6/2007	CB97	*Di-n-butylphthalate*	*2.4*	8,000	2.0	1.2
ARI 2007	2/6/2007	CB97	Fluoranthene	1.8	3,200	1.2	1.5
ARI 2007	2/6/2007	CB97	Fluorene	0.29	3,200	0.081	3.6
ARI 2007	2/6/2007	CB97	Indeno(1,2,3-cd)pyrene	0.19	0.14	0.088	2.2
ARI 2007	**2/6/2007**	**CB97**	**Lead**	**1760**	250	**67**	**26**
ARI 2007	**2/6/2007**	**CB97**	**Mercury**	**9.4**	2	**0.030**	**313**
ARI 2007	2/6/2007	CB97	Naphthalene	0.84	5	0.2	4.2
ARI 2007	2/6/2007	CB97	Phenanthrene	1	NA	0.49	2.0
ARI 2007	2/6/2007	CB97	Phenol	0.24	48,000	0.12	2.0
ARI 2007	2/6/2007	CB97	Pyrene	1.4	2,400	1.4	1.0
ARI 2007	**2/6/2007**	**CB97**	**Zinc**	**771**	24,000	**38**	**20**

a - The lower of MTCA Method A or B cleanup levels was selected, from CLARC database
b - From: SAIC 2006
DW - dry weight
CSL - Contaminant Screening Level from Washington Sediment Management Standards

Notes:
(1) Table presents detected chemicals only
(2) Exceedance factors are the ratio of the detected concentration to the MTCA Cleanup Level or Soil-to-Sediment Screening Value, whichever is lower. Only samples with exceedance factors greater than or equal to 1 are shown.
(3) Chemicals with exceedance factors greater than 10 are shown in **Bold**
(4) Concentrations shown in italics are results obtained through laboratory dilution of the sample.

Table 15
Chemicals above Screening Criteria in Water Sample
The Chemithon Corporation

Source	Date Sampled	Sample Location	Chemical	Conc'n (ug/L)		Marine Chronic WQS	Marine Acute WQS	Chronic WQS Exceedance Factor	GW-to-Sediment Screening Level (Based on CSL)[a]	Exceedance Factor
ARI 2007	2/6/2007	CB99	Bis(2-ethylhexyl)phthalate	1.9		NA	NA		0.47	4.0
ARI 2007	**2/6/2007**	**CB99**	**Copper**	**46**		**3.1**	**4.8**	**15**	**123**	
ARI 2007	**2/6/2007**	**CB99**	**Diesel-Range Hydrocarbons**	**13,000**		**NA**	**NA**		**NA**	
ARI 2007	2/6/2007	CB99	Zinc	155		81	90	1.9	76	2.0

NA - Value not available

Exceedance factors are the ratio of the detected concentration to the CSL or SQS; exceedance factors are shown only if they are greater than or equal to 1.
Chemicals with exceedance factors greater than 10 are shown in **Bold**

a - From SAIC 2006

Appendix A
Sediment Sample Data

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Table A-1
Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2005a	LDW-SS56	1,2,3,4,6,7,8-HpCDD	7.37E-02		1.13					
LDWG 2005a	LDW-SS57	1,2,3,4,6,7,8-HpCDD	1.49E-02		1.73					
LDWG 2005a	LDW-SS58	1,2,3,4,6,7,8-HpCDD	1.13E-02		1.78					
LDWG 2005b	LDW-SS59	1,2,3,4,6,7,8-HpCDD	1.88E-03		2.07					
LDWG 2005a	LDW-SS43	1,2,3,4,6,7,8-HpCDD	6.39E-04		1.67					
LDWG 2005a	LDW-SS56	1,2,3,4,6,7,8-HpCDF	4.03E-02		1.13					
LDWG 2005a	LDW-SS58	1,2,3,4,6,7,8-HpCDF	4.71E-03		1.78					
LDWG 2005a	LDW-SS57	1,2,3,4,6,7,8-HpCDF	4.04E-03		1.73					
LDWG 2005b	LDW-SS59	1,2,3,4,6,7,8-HpCDF	2.88E-04		2.07					
LDWG 2005a	LDW-SS43	1,2,3,4,6,7,8-HpCDF	1.10E-04		1.67					
LDWG 2005a	LDW-SS56	1,2,3,4,7,8,9-HpCDF	3.72E-03		1.13					
LDWG 2005a	LDW-SS58	1,2,3,4,7,8,9-HpCDF	7.56E-04		1.78					
LDWG 2005a	LDW-SS57	1,2,3,4,7,8,9-HpCDF	4.87E-04		1.73					
LDWG 2005b	LDW-SS59	1,2,3,4,7,8,9-HpCDF	2.42E-05	J	2.07					
LDWG 2005a	LDW-SS43	1,2,3,4,7,8,9-HpCDF	9.85E-06	J	1.67					
LDWG 2005a	LDW-SS56	1,2,3,4,7,8-HxCDD	1.24E-04		1.13					
LDWG 2005a	LDW-SS57	1,2,3,4,7,8-HxCDD	3.37E-05	J	1.73					
LDWG 2005a	LDW-SS58	1,2,3,4,7,8-HxCDD	3.16E-05	J	1.78					
LDWG 2005b	LDW-SS59	1,2,3,4,7,8-HxCDD	1.14E-05	J	2.07					
LDWG 2005a	LDW-SS43	1,2,3,4,7,8-HxCDD	2.77E-06	J	1.67					
LDWG 2005a	LDW-SS56	1,2,3,4,7,8-HxCDF	2.53E-03		1.13					
LDWG 2005a	LDW-SS58	1,2,3,4,7,8-HxCDF	1.67E-03		1.78					
LDWG 2005a	LDW-SS57	1,2,3,4,7,8-HxCDF	8.95E-04		1.73					
LDWG 2005b	LDW-SS59	1,2,3,4,7,8-HxCDF	3.05E-05		2.07					
LDWG 2005a	LDW-SS43	1,2,3,4,7,8-HxCDF	1.44E-05	J	1.67					
LDWG 2005a	LDW-SS56	1,2,3,6,7,8-HxCDD	3.40E-03		1.13					
LDWG 2005a	LDW-SS58	1,2,3,6,7,8-HxCDD	4.80E-04		1.78					
LDWG 2005a	LDW-SS57	1,2,3,6,7,8-HxCDD	3.50E-04		1.73					
LDWG 2005b	LDW-SS59	1,2,3,6,7,8-HxCDD	6.53E-05		2.07					
LDWG 2005a	LDW-SS43	1,2,3,6,7,8-HxCDD	1.75E-05		1.67					
LDWG 2005a	LDW-SS56	1,2,3,6,7,8-HxCDF	3.65E-04		1.13					
LDWG 2005a	LDW-SS58	1,2,3,6,7,8-HxCDF	2.84E-04		1.78					
LDWG 2005a	LDW-SS57	1,2,3,6,7,8-HxCDF	1.51E-04		1.73					
LDWG 2005b	LDW-SS59	1,2,3,6,7,8-HxCDF	7.20E-06	J	2.07					
LDWG 2005a	LDW-SS43	1,2,3,6,7,8-HxCDF	3.44E-06	J	1.67					

Table A-1
Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2005a	LDW-SS56	1,2,3,7,8,9-HxCDD	3.15E-04		1.13					
LDWG 2005a	LDW-SS58	1,2,3,7,8,9-HxCDD	9.96E-05		1.78					
LDWG 2005a	LDW-SS57	1,2,3,7,8,9-HxCDD	9.52E-05		1.73					
LDWG 2005b	LDW-SS59	1,2,3,7,8,9-HxCDD	2.64E-05		2.07					
LDWG 2005a	LDW-SS43	1,2,3,7,8,9-HxCDD	1.09E-05	J	1.67					
LDWG 2005a	LDW-SS56	1,2,3,7,8,9-HxCDF	3.38E-05	J	1.13					
LDWG 2005a	LDW-SS58	1,2,3,7,8,9-HxCDF	2.17E-05	J	1.78					
LDWG 2005a	LDW-SS57	1,2,3,7,8,9-HxCDF	1.06E-05	J	1.73					
LDWG 2005b	LDW-SS59	1,2,3,7,8,9-HxCDF	5.68E-07	J	2.07					
LDWG 2005a	LDW-SS43	1,2,3,7,8,9-HxCDF	3.64E-07	J	1.67					
LDWG 2005a	LDW-SS56	1,2,3,7,8-PeCDD	3.45E-05	J	1.13					
LDWG 2005a	LDW-SS58	1,2,3,7,8-PeCDD	1.99E-05	J	1.78					
LDWG 2005a	LDW-SS57	1,2,3,7,8-PeCDD	1.67E-05	J	1.73					
LDWG 2005b	LDW-SS59	1,2,3,7,8-PeCDD	5.24E-06	J	2.07					
LDWG 2005a	LDW-SS43	1,2,3,7,8-PeCDD	1.82E-06	J	1.67					
LDWG 2005a	LDW-SS56	1,2,3,7,8-PeCDF	6.93E-05		1.13					
LDWG 2005a	LDW-SS58	1,2,3,7,8-PeCDF	5.69E-05		1.78					
LDWG 2005a	LDW-SS57	1,2,3,7,8-PeCDF	2.78E-05	J	1.73					
LDWG 2005a	LDW-SS43	1,2,3,7,8-PeCDF	1.22E-06	J	1.67					
LDWG 2005b	LDW-SS59	1,2,3,7,8-PeCDF	1.08E-06	J	2.07					
LDWG 2005a	LDW-SS56	2,3,4,6,7,8-HxCDF	3.02E-04	J	1.13					
LDWG 2005a	LDW-SS58	2,3,4,6,7,8-HxCDF	1.21E-04	J	1.78					
LDWG 2005a	LDW-SS57	2,3,4,6,7,8-HxCDF	6.20E-05	J	1.73					
LDWG 2005b	LDW-SS59	2,3,4,6,7,8-HxCDF	5.38E-06	J	2.07					
LDWG 2005a	LDW-SS43	2,3,4,6,7,8-HxCDF	2.38E-06	J	1.67					
LDWG 2005a	LDW-SS56	2,3,4,7,8-PeCDF	2.30E-04		1.13					
LDWG 2005a	LDW-SS58	2,3,4,7,8-PeCDF	1.81E-04		1.78					
LDWG 2005a	LDW-SS57	2,3,4,7,8-PeCDF	9.59E-05		1.73					
LDWG 2005b	LDW-SS59	2,3,4,7,8-PeCDF	4.71E-06	J	2.07					
LDWG 2005a	LDW-SS43	2,3,4,7,8-PeCDF	2.44E-06	J	1.67					
LDWG 2005a	LDW-SS58	2,3,7,8-TCDD	9.28E-06		1.78					
LDWG 2005a	LDW-SS56	2,3,7,8-TCDD	4.57E-06	J	1.13					
LDWG 2005a	LDW-SS57	2,3,7,8-TCDD	4.17E-06	J	1.73					
LDWG 2005a	LDW-SS43	2,3,7,8-TCDD	5.98E-07	J	1.67					
LDWG 2005a	LDW-SS56	2,3,7,8-TCDF	1.48E-05		1.13					

Table A-1
Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2005a	LDW-SS58	2,3,7,8-TCDF	1.36E-05		1.78					
LDWG 2005a	LDW-SS57	2,3,7,8-TCDF	8.64E-06		1.73					
LDWG 2005b	LDW-SS59	2,3,7,8-TCDF	1.90E-06		2.07					
LDWG 2005a	LDW-SS43	2,3,7,8-TCDF	1.20E-06		1.67					
Weston 1999	DR120 (686)	2-Methylnaphthalene	9.00E-02		2.78	38	64	mg/kg OC	0.1	0.1
LDWG 2005a	LDW-SS48	2-Methylnaphthalene	5.80E-02		1.36	38	64	mg/kg OC	0.1	0.1
LDWG 2005a	LDW-SS55	2-Methylnaphthalene	5.80E-02	J	1.53	38	64	mg/kg OC	0.1	0.1
LDWG 2005b	LDW-SS47	2-Methylnaphthalene	3.30E-02		1.45	38	64	mg/kg OC	0.1	0.04
Weston 1999	DR126 (692)	2-Methylnaphthalene	2.00E-02		3.09	38	64	mg/kg OC	0.02	0.01
LDWG 2005a	LDW-SS48	2-Methylphenol	2.10E-02		1.36	63	63	mg/kg OC	0.0	0.0
LDWG 2005a	LDW-SS48	4-Methylphenol	8.80E-02		1.36	670	670	mg/kg OC	0.01	0.01
LDWG 2005b	LDW-SS47	4-Methylphenol	2.10E-02		1.45	670	670	mg/kg OC	0.002	0.002
LDWG 2005a	LDW-SS48	Acenaphthene	2.30E-01		1.36	16	57	mg/kg OC	1.1	0.3
LDWG 2005a	LDW-SS55	Acenaphthene	2.00E-01		1.53	16	57	mg/kg OC	0.8	0.2
Weston 1999	DR120 (686)	Acenaphthene	1.70E-01		2.78	16	57	mg/kg OC	0.4	0.1
LDWG 2005b	LDW-SS47	Acenaphthene	1.20E-01		1.45	16	57	mg/kg OC	0.5	0.1
LDWG 2005b	LDW-SS46	Acenaphthene	1.10E-01		2.07	16	57	mg/kg OC	0.3	0.1
Weston 1999	DR126 (692)	Acenaphthene	8.00E-02		3.09	16	57	mg/kg OC	0.2	0.05
LDWG 2005a	LDW-SS49	Acenaphthene	5.00E-02	J	2.47	16	57	mg/kg OC	0.1	0.04
Weston 1999	DR159 (725)	Acenaphthene	4.00E-02		2.76	16	57	mg/kg OC	0.1	0.03
Weston 1999	DR124 (690)	Acenaphthene	3.00E-02		2.78	16	57	mg/kg OC	0.1	0.02
Weston 1999	DR127 (693)	Acenaphthene	3.00E-02		2.78	16	57	mg/kg OC	0.1	0.02
Weston 1999	DR054 (620)	Acenaphthene	2.00E-02		2.36	16	57	mg/kg OC	0.1	0.01
Weston 1999	DR121 (687)	Acenaphthene	2.00E-02		2.39	16	57	mg/kg OC	0.1	0.01
Weston 1999	DR122 (688)	Acenaphthene	2.00E-02		2.18	16	57	mg/kg OC	0.1	0.02
LDWG 2005b	LDW-SSB4a	Acenaphthylene	8.10E-02		1.82	66	66	mg/kg OC	0.1	0.1
LDWG 2005a	LDW-SS56	Acenaphthylene	7.70E-02	J	1.13	66	66	mg/kg OC	0.1	0.1
LDWG 2005a	LDW-SS48	Acenaphthylene	5.40E-02		1.36	66	66	mg/kg OC	0.1	0.1
Weston 1999	DR120 (686)	Acenaphthylene	5.00E-02		2.78	66	66	mg/kg OC	0.03	0.03
LDWG 2005b	LDW-SS47	Acenaphthylene	2.80E-02		1.45	66	66	mg/kg OC	0.03	0.03
Weston 1999	DR121 (687)	Aluminum	2.74E+04		2.39					
Weston 1999	DR122 (688)	Aluminum	2.73E+04		2.18					
Weston 1999	DR152 (718)	Aluminum	2.60E+04		2.37					
Weston 1999	DR054 (620)	Aluminum	2.48E+04		2.36					
Weston 1999	DR127 (693)	Aluminum	2.09E+04		2.78					

Table A-1
Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
Weston 1999	DR124 (690)	Aluminum	1.98E+04		2.78					
Weston 1999	DR126 (692)	Aluminum	1.92E+04		3.09					
Weston 1999	DR120 (686)	Aluminum	1.86E+04		2.78					
Weston 1999	DR159 (725)	Aluminum	1.85E+04		2.76					
LDWG 2005a	LDW-SS48	Anthracene	5.30E-01		1.36	220	1200	mg/kg OC	0.2	0.03
Weston 1999	DR120 (686)	Anthracene	4.80E-01		2.78	220	1200	mg/kg OC	0.1	0.01
LDWG 2005b	LDW-SS46	Anthracene	3.10E-01		2.07	220	1200	mg/kg OC	0.1	0.01
LDWG 2005a	LDW-SS44	Anthracene	2.00E-01		1.53	220	1200	mg/kg OC	0.1	0.01
LDWG 2005b	LDW-SS47	Anthracene	2.00E-01		1.45	220	1200	mg/kg OC	0.1	0.01
Weston 1999	DR126 (692)	Anthracene	1.80E-01		3.09	220	1200	mg/kg OC	0.03	0.005
LDWG 2005a	LDW-SS49	Anthracene	1.50E-01		2.47	220	1200	mg/kg OC	0.03	0.01
Weston 1999	DR127 (693)	Anthracene	1.30E-01		2.78	220	1200	mg/kg OC	0.02	0.004
Weston 1999	DR124 (690)	Anthracene	1.20E-01		2.78	220	1200	mg/kg OC	0.02	0.004
Weston 1999	DR054 (620)	Anthracene	1.10E-01		2.36	220	1200	mg/kg OC	0.02	0.004
Weston 1999	DR159 (725)	Anthracene	1.00E-01		2.76	220	1200	mg/kg OC	0.02	0.003
LDWG 2005b	LDW-SS53	Anthracene	9.10E-02		2.64	220	1200	mg/kg OC	0.02	0.003
Weston 1999	DR122 (688)	Anthracene	9.00E-02		2.18	220	1200	mg/kg OC	0.02	0.003
LDWG 2005b	LDW-SS45	Anthracene	8.80E-02		2.81	220	1200	mg/kg OC	0.01	0.003
LDWG 2005a	LDW-SS55	Anthracene	8.70E-02	J	1.53	220	1200	mg/kg OC	0.03	0.005
LDWG 2005b	LDW-SSB4a	Anthracene	8.00E-02		1.82	220	1200	mg/kg OC	0.02	0.004
LDWG 2005b	LDW-SS59	Anthracene	7.50E-02		2.07	220	1200	mg/kg OC	0.02	0.003
Weston 1999	DR121 (687)	Anthracene	7.00E-02		2.39	220	1200	mg/kg OC	0.01	0.002
Weston 1999	DR152 (718)	Anthracene	7.00E-02		2.37	220	1200	mg/kg OC	0.01	0.002
LDWG 2005a	LDW-SS56	Anthracene	5.70E-02	J	1.13	220	1200	mg/kg OC	0.02	0.004
LDWG 2005a	LDW-SS51	Anthracene	3.90E-02		2.13	220	1200	mg/kg OC	0.01	0.002
LDWG 2005a	LDW-SS43	Anthracene	2.20E-02		1.67	220	1200	mg/kg OC	0.01	0.001
Weston 1999	DR122 (688)	Antimony	8.00E+00	J	2.18	150	200	mg/kg DW	0.1	0.0
Weston 1999	DR124 (690)	Antimony	8.00E+00	J	2.78	150	200	mg/kg DW	0.1	0.0
LDWG 2005a	LDW-SS48	Antimony	6.80E+00	J	1.36	150	200	mg/kg DW	0.0	0.0
Weston 1999	DR126 (692)	Antimony	6.00E+00	J	3.09	150	200	mg/kg DW	0.0	0.0
LDWG 2005a	LDW-SS56	Antimony	2.20E+00	J	1.13	150	200	mg/kg DW	0.0	0.0
LDWG 2005b	LDW-SS47	Antimony	1.80E+00	J	1.45	150	200	mg/kg DW	0.0	0.0
LDWG 2005a	LDW-SS49	Antimony	1.80E+00	J	2.47	150	200	mg/kg DW	0.0	0.0
LDWG 2005a	LDW-SS44	Antimony	9.00E-01	J	1.53	150	200	mg/kg DW	0.0	0.0
LDWG 2005b	LDW-SS46	Antimony	7.00E-01	J	2.07	150	200	mg/kg DW	0.0	0.0

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Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2005a	LDW-SS43	Antimony	6.00E-01	J	1.67	150	200	mg/kg DW	0.0	0.0
LDWG 2005b	LDW-SSB4a	Antimony	3.00E-01		1.82	150	200	mg/kg DW	0.0	0.0
LDWG 2005a	LDW-SS51	Aroclor-1242	2.50E-02	J	2.13					
LDWG 2005a	LDW-SS44	Aroclor-1242	2.40E-02	J	1.53					
LDWG 2005a	LDW-SS48	Aroclor-1242	2.10E-02	J	1.36					
LDWG 2005a	LDW-SS57	Aroclor-1248	1.60E-01		1.73					
LDWG 2005b	LDW-SS45	Aroclor-1248	8.90E-02		2.81					
LDWG 2005a	LDW-SS58	Aroclor-1248	8.40E-02		1.78					
LDWG 2005a	LDW-SS56	Aroclor-1254	5.00E-01	J	1.13					
LDWG 2005b	LDW-SSB4a	Aroclor-1254	4.90E-01		1.82					
LDWG 2005a	LDW-SS57	Aroclor-1254	3.50E-01		1.73					
LDWG 2005b	LDW-SS46	Aroclor-1254	1.70E-01		2.07					
LDWG 2005b	LDW-SS53	Aroclor-1254	1.20E-01		2.64					
LDWG 2005a	LDW-SS58	Aroclor-1254	1.20E-01		1.78					
LDWG 2005b	LDW-SS45	Aroclor-1254	1.10E-01		2.81					
Weston 1999	DR120 (686)	Aroclor-1254	9.20E-02		2.78					
Weston 1999	DR127 (693)	Aroclor-1254	9.20E-02		2.78					
Weston 1999	DR124 (690)	Aroclor-1254	9.00E-02		2.78					
Weston 1999	DR126 (692)	Aroclor-1254	7.90E-02		3.09					
LDWG 2005a	LDW-SS51	Aroclor-1254	7.20E-02		2.13					
Weston 1999	DR152 (718)	Aroclor-1254	6.70E-02		2.37					
Weston 1999	DR159 (725)	Aroclor-1254	6.50E-02		2.76					
LDWG 2005a	LDW-SS48	Aroclor-1254	6.10E-02		1.36					
Weston 1999	DR122 (688)	Aroclor-1254	6.00E-02		2.18					
Weston 1999	DR054 (620)	Aroclor-1254	5.00E-02		2.36					
Weston 1999	DR121 (687)	Aroclor-1254	4.60E-02		2.39					
LDWG 2005a	LDW-SS44	Aroclor-1254	4.50E-02		1.53					
LDWG 2005b	LDW-SS47	Aroclor-1254	4.50E-02		1.45					
LDWG 2005a	LDW-SS49	Aroclor-1254	3.90E-02		2.47					
LDWG 2005b	LDW-SS59	Aroclor-1254	2.70E-02		2.07					
LDWG 2005a	LDW-SS55	Aroclor-1254	2.40E-02	J	1.53					
LDWG 2005a	LDW-SS43	Aroclor-1254	1.80E-02	J	1.67					
LDWG 2005b	LDW-SSB4a	Aroclor-1260	3.20E-01		1.82					
LDWG 2005a	LDW-SS56	Aroclor-1260	2.50E-01	J	1.13					
LDWG 2005a	LDW-SS57	Aroclor-1260	2.40E-01		1.73					

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Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
Weston 1999	DR126 (692)	Aroclor-1260	1.02E-01		3.09					
Weston 1999	DR120 (686)	Aroclor-1260	9.60E-02		2.78					
LDWG 2005b	LDW-SS53	Aroclor-1260	9.50E-02		2.64					
LDWG 2005b	LDW-SS45	Aroclor-1260	9.40E-02		2.81					
Weston 1999	DR127 (693)	Aroclor-1260	8.70E-02		2.78					
Weston 1999	DR124 (690)	Aroclor-1260	7.10E-02		2.78					
LDWG 2005b	LDW-SS46	Aroclor-1260	6.80E-02		2.07					
Weston 1999	DR122 (688)	Aroclor-1260	6.30E-02		2.18					
LDWG 2005a	LDW-SS58	Aroclor-1260	5.90E-02		1.78					
LDWG 2005a	LDW-SS51	Aroclor-1260	5.80E-02		2.13					
Weston 1999	DR152 (718)	Aroclor-1260	5.70E-02		2.37					
Weston 1999	DR159 (725)	Aroclor-1260	5.30E-02	J	2.76					
Weston 1999	DR121 (687)	Aroclor-1260	5.20E-02		2.39					
LDWG 2005a	LDW-SS48	Aroclor-1260	4.90E-02		1.36					
Weston 1999	DR054 (620)	Aroclor-1260	4.70E-02		2.36					
LDWG 2005a	LDW-SS44	Aroclor-1260	3.40E-02		1.53					
LDWG 2005a	LDW-SS49	Aroclor-1260	3.10E-02		2.47					
LDWG 2005b	LDW-SS59	Aroclor-1260	2.60E-02		2.07					
LDWG 2005b	LDW-SS47	Aroclor-1260	2.50E-02		1.45					
LDWG 2005a	LDW-SS48	Arsenic	8.07E+02		1.36	57	93	mg/kg DW	14	8.7
LDWG 2005a	LDW-SS49	Arsenic	1.71E+02		2.47	57	93	mg/kg DW	3.0	1.8
LDWG 2005b	LDW-SS47	Arsenic	1.61E+02		1.45	57	93	mg/kg DW	2.8	1.7
LDWG 2005a	LDW-SS56	Arsenic	1.61E+02		1.13	57	93	mg/kg DW	2.8	1.7
LDWG 2005b	LDW-SS46	Arsenic	7.11E+01		2.07	57	93	mg/kg DW	1.2	0.8
LDWG 2005a	LDW-SS44	Arsenic	4.68E+01		1.53	57	93	mg/kg DW	0.8	0.5
LDWG 2005b	LDW-SS53	Arsenic	3.97E+01		2.64	57	93	mg/kg DW	0.7	0.4
LDWG 2005b	LDW-SSB4a	Arsenic	3.81E+01		1.82	57	93	mg/kg DW	0.7	0.4
LDWG 2005a	LDW-SS57	Arsenic	3.54E+01		1.73	57	93	mg/kg DW	0.6	0.4
LDWG 2005a	LDW-SS58	Arsenic	3.39E+01		1.78	57	93	mg/kg DW	0.6	0.4
Weston 1999	DR124 (690)	Arsenic	3.18E+01		2.78	57	93	mg/kg DW	0.6	0.3
LDWG 2005b	LDW-SS45	Arsenic	2.62E+01		2.81	57	93	mg/kg DW	0.5	0.3
Weston 1999	DR054 (620)	Arsenic	2.36E+01		2.36	57	93	mg/kg DW	0.4	0.3
LDWG 2005a	LDW-SS43	Arsenic	2.35E+01		1.67	57	93	mg/kg DW	0.4	0.3
LDWG 2005b	LDW-SS59	Arsenic	2.07E+01		2.07	57	93	mg/kg DW	0.4	0.2
Weston 1999	DR120 (686)	Arsenic	1.85E+01		2.78	57	93	mg/kg DW	0.3	0.2

Table A-1
Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
Weston 1999	DR121 (687)	Arsenic	1.75E+01		2.39	57	93	mg/kg DW	0.3	0.2
LDWG 2005a	LDW-SS55	Arsenic	1.72E+01		1.53	57	93	mg/kg DW	0.3	0.2
LDWG 2005a	LDW-SS51	Arsenic	1.69E+01		2.13	57	93	mg/kg DW	0.3	0.2
Weston 1999	DR122 (688)	Arsenic	1.68E+01		2.18	57	93	mg/kg DW	0.3	0.2
Weston 1999	DR126 (692)	Arsenic	1.34E+01		3.09	57	93	mg/kg DW	0.2	0.1
Weston 1999	DR127 (693)	Arsenic	1.31E+01		2.78	57	93	mg/kg DW	0.2	0.1
Weston 1999	DR152 (718)	Arsenic	1.30E+01		2.37	57	93	mg/kg DW	0.2	0.1
Weston 1999	DR159 (725)	Arsenic	1.18E+01		2.76	57	93	mg/kg DW	0.2	0.1
Weston 1999	DR054 (620)	Barium	1.05E+02		2.36					
Weston 1999	DR121 (687)	Barium	9.70E+01		2.39					
Weston 1999	DR122 (688)	Barium	9.10E+01		2.18					
Weston 1999	DR120 (686)	Barium	8.90E+01		2.78					
Weston 1999	DR124 (690)	Barium	8.90E+01		2.78					
Weston 1999	DR152 (718)	Barium	8.80E+01		2.37					
Weston 1999	DR127 (693)	Barium	8.40E+01		2.78					
Weston 1999	DR126 (692)	Barium	8.00E+01		3.09					
Weston 1999	DR159 (725)	Barium	7.20E+01		2.76					
Weston 1999	DR120 (686)	Benzo(a)anthracene	2.40E+00		2.78	110	270	mg/kg OC	0.8	0.3
LDWG 2005a	LDW-SS48	Benzo(a)anthracene	1.20E+00		1.36	110	270	mg/kg OC	0.8	0.3
LDWG 2005b	LDW-SS53	Benzo(a)anthracene	1.10E+00		2.64	110	270	mg/kg OC	0.4	0.2
LDWG 2005b	LDW-SS46	Benzo(a)anthracene	9.20E-01		2.07	110	270	mg/kg OC	0.4	0.2
LDWG 2005a	LDW-SS44	Benzo(a)anthracene	5.70E-01		1.53	110	270	mg/kg OC	0.3	0.1
Weston 1999	DR126 (692)	Benzo(a)anthracene	4.90E-01		3.09	110	270	mg/kg OC	0.1	0.1
LDWG 2005b	LDW-SS47	Benzo(a)anthracene	4.90E-01		1.45	110	270	mg/kg OC	0.3	0.1
Weston 1999	DR124 (690)	Benzo(a)anthracene	4.80E-01		2.78	110	270	mg/kg OC	0.2	0.1
Weston 1999	DR127 (693)	Benzo(a)anthracene	4.10E-01		2.78	110	270	mg/kg OC	0.1	0.1
Weston 1999	DR122 (688)	Benzo(a)anthracene	3.50E-01		2.18	110	270	mg/kg OC	0.1	0.1
Weston 1999	DR054 (620)	Benzo(a)anthracene	3.30E-01		2.36	110	270	mg/kg OC	0.1	0.1
LDWG 2005a	LDW-SS49	Benzo(a)anthracene	3.20E-01		2.47	110	270	mg/kg OC	0.1	0.05
Weston 1999	DR159 (725)	Benzo(a)anthracene	3.10E-01		2.76	110	270	mg/kg OC	0.1	0.04
LDWG 2005b	LDW-SSB4a	Benzo(a)anthracene	2.70E-01		1.82	110	270	mg/kg OC	0.1	0.1
Weston 1999	DR121 (687)	Benzo(a)anthracene	2.50E-01		2.39	110	270	mg/kg OC	0.1	0.04
LDWG 2005b	LDW-SS45	Benzo(a)anthracene	2.30E-01		2.81	110	270	mg/kg OC	0.1	0.03
LDWG 2005a	LDW-SS56	Benzo(a)anthracene	2.30E-01		1.13	110	270	mg/kg OC	0.2	0.1
Weston 1999	DR152 (718)	Benzo(a)anthracene	2.20E-01		2.37	110	270	mg/kg OC	0.1	0.03

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Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2005b	LDW-SS59	Benzo(a)anthracene	2.00E-01		2.07	110	270	mg/kg OC	0.1	0.04
LDWG 2005a	LDW-SS57	Benzo(a)anthracene	1.90E-01		1.73	110	270	mg/kg OC	0.1	0.04
LDWG 2005a	LDW-SS55	Benzo(a)anthracene	1.60E-01		1.53	110	270	mg/kg OC	0.1	0.04
LDWG 2005a	LDW-SS58	Benzo(a)anthracene	1.50E-01		1.78	110	270	mg/kg OC	0.1	0.03
LDWG 2005a	LDW-SS51	Benzo(a)anthracene	1.30E-01		2.13	110	270	mg/kg OC	0.1	0.02
LDWG 2005a	LDW-SS43	Benzo(a)anthracene	1.20E-01		1.67	110	270	mg/kg OC	0.1	0.03
LDWG 2005b	LDW-SS46	Benzo(a)pyrene	1.10E+00		2.07	99	210	mg/kg OC	0.5	0.3
LDWG 2005a	LDW-SS48	Benzo(a)pyrene	1.00E+00		1.36	99	210	mg/kg OC	0.7	0.4
Weston 1999	DR124 (690)	Benzo(a)pyrene	7.70E-01		2.78	99	210	mg/kg OC	0.3	0.1
Weston 1999	DR120 (686)	Benzo(a)pyrene	6.20E-01		2.78	99	210	mg/kg OC	0.2	0.1
LDWG 2005b	LDW-SS47	Benzo(a)pyrene	4.80E-01		1.45	99	210	mg/kg OC	0.3	0.2
LDWG 2005a	LDW-SS44	Benzo(a)pyrene	4.70E-01		1.53	99	210	mg/kg OC	0.3	0.1
LDWG 2005b	LDW-SSB4a	Benzo(a)pyrene	4.40E-01		1.82	99	210	mg/kg OC	0.2	0.1
Weston 1999	DR126 (692)	Benzo(a)pyrene	4.20E-01		3.09	99	210	mg/kg OC	0.1	0.1
LDWG 2005b	LDW-SS53	Benzo(a)pyrene	4.10E-01		2.64	99	210	mg/kg OC	0.2	0.1
Weston 1999	DR122 (688)	Benzo(a)pyrene	3.60E-01		2.18	99	210	mg/kg OC	0.2	0.1
Weston 1999	DR127 (693)	Benzo(a)pyrene	3.30E-01		2.78	99	210	mg/kg OC	0.1	0.1
LDWG 2005a	LDW-SS56	Benzo(a)pyrene	3.30E-01		1.13	99	210	mg/kg OC	0.3	0.1
Weston 1999	DR054 (620)	Benzo(a)pyrene	2.90E-01		2.36	99	210	mg/kg OC	0.1	0.1
LDWG 2005b	LDW-SS59	Benzo(a)pyrene	2.90E-01		2.07	99	210	mg/kg OC	0.1	0.1
LDWG 2005a	LDW-SS49	Benzo(a)pyrene	2.80E-01		2.47	99	210	mg/kg OC	0.1	0.1
Weston 1999	DR159 (725)	Benzo(a)pyrene	2.50E-01		2.76	99	210	mg/kg OC	0.1	0.04
LDWG 2005b	LDW-SS45	Benzo(a)pyrene	2.40E-01		2.81	99	210	mg/kg OC	0.1	0.04
Weston 1999	DR121 (687)	Benzo(a)pyrene	2.30E-01		2.39	99	210	mg/kg OC	0.1	0.05
LDWG 2005a	LDW-SS57	Benzo(a)pyrene	2.30E-01		1.73	99	210	mg/kg OC	0.1	0.1
Weston 1999	DR152 (718)	Benzo(a)pyrene	2.20E-01		2.37	99	210	mg/kg OC	0.1	0.04
LDWG 2005a	LDW-SS58	Benzo(a)pyrene	1.80E-01		1.78	99	210	mg/kg OC	0.1	0.05
LDWG 2005a	LDW-SS43	Benzo(a)pyrene	1.50E-01		1.67	99	210	mg/kg OC	0.1	0.04
LDWG 2005a	LDW-SS51	Benzo(a)pyrene	1.20E-01		2.13	99	210	mg/kg OC	0.1	0.03
LDWG 2005a	LDW-SS55	Benzo(a)pyrene	1.10E-01		1.53	99	210	mg/kg OC	0.1	0.03
Weston 1999	DR120 (686)	Benzo(b)fluoranthene	2.00E+00		2.78	230	450	mg/kg OC	0.3	0.2
LDWG 2005b	LDW-SS46	Benzo(b)fluoranthene	1.80E+00		2.07	230	450	mg/kg OC	0.4	0.2
Weston 1999	DR124 (690)	Benzo(b)fluoranthene	1.00E+00		2.78	230	450	mg/kg OC	0.2	0.1
LDWG 2005a	LDW-SS48	Benzo(b)fluoranthene	1.00E+00		1.36	230	450	mg/kg OC	0.3	0.2
LDWG 2005b	LDW-SS53	Benzo(b)fluoranthene	7.80E-01		2.64	230	450	mg/kg OC	0.1	0.1

Table A-1
Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
Weston 1999	DR126 (692)	Benzo(b)fluoranthene	6.00E-01		3.09	230	450	mg/kg OC	0.1	0.04
LDWG 2005a	LDW-SS44	Benzo(b)fluoranthene	5.10E-01		1.53	230	450	mg/kg OC	0.1	0.1
Weston 1999	DR127 (693)	Benzo(b)fluoranthene	4.80E-01		2.78	230	450	mg/kg OC	0.1	0.04
Weston 1999	DR122 (688)	Benzo(b)fluoranthene	4.60E-01		2.18	230	450	mg/kg OC	0.1	0.05
LDWG 2005b	LDW-SS47	Benzo(b)fluoranthene	4.60E-01		1.45	230	450	mg/kg OC	0.1	0.1
LDWG 2005b	LDW-SSB4a	Benzo(b)fluoranthene	4.40E-01		1.82	230	450	mg/kg OC	0.1	0.1
LDWG 2005b	LDW-SS59	Benzo(b)fluoranthene	4.20E-01		2.07	230	450	mg/kg OC	0.1	0.05
Weston 1999	DR054 (620)	Benzo(b)fluoranthene	3.60E-01		2.36	230	450	mg/kg OC	0.1	0.03
Weston 1999	DR159 (725)	Benzo(b)fluoranthene	3.30E-01		2.76	230	450	mg/kg OC	0.1	0.03
Weston 1999	DR121 (687)	Benzo(b)fluoranthene	3.20E-01		2.39	230	450	mg/kg OC	0.1	0.03
LDWG 2005b	LDW-SS45	Benzo(b)fluoranthene	3.20E-01		2.81	230	450	mg/kg OC	0.05	0.03
LDWG 2005a	LDW-SS49	Benzo(b)fluoranthene	3.20E-01		2.47	230	450	mg/kg OC	0.1	0.03
Weston 1999	DR152 (718)	Benzo(b)fluoranthene	2.90E-01		2.37	230	450	mg/kg OC	0.1	0.03
LDWG 2005a	LDW-SS56	Benzo(b)fluoranthene	2.80E-01		1.13	230	450	mg/kg OC	0.1	0.1
LDWG 2005a	LDW-SS57	Benzo(b)fluoranthene	2.80E-01		1.73	230	450	mg/kg OC	0.1	0.04
LDWG 2005a	LDW-SS58	Benzo(b)fluoranthene	2.20E-01		1.78	230	450	mg/kg OC	0.1	0.03
LDWG 2005a	LDW-SS55	Benzo(b)fluoranthene	1.90E-01		1.53	230	450	mg/kg OC	0.1	0.03
LDWG 2005a	LDW-SS51	Benzo(b)fluoranthene	1.70E-01		2.13	230	450	mg/kg OC	0.03	0.02
LDWG 2005a	LDW-SS43	Benzo(b)fluoranthene	1.40E-01		1.67	230	450	mg/kg OC	0.04	0.02
Weston 1999	DR124 (690)	Benzo(g,h,i)perylene	6.00E-01		2.78	31	78	mg/kg OC	0.7	0.3
Weston 1999	DR120 (686)	Benzo(g,h,i)perylene	3.80E-01		2.78	31	78	mg/kg OC	0.4	0.2
LDWG 2005b	LDW-SS46	Benzo(g,h,i)perylene	3.20E-01		2.07	31	78	mg/kg OC	0.5	0.2
LDWG 2005a	LDW-SS48	Benzo(g,h,i)perylene	2.90E-01		1.36	31	78	mg/kg OC	0.7	0.3
Weston 1999	DR122 (688)	Benzo(g,h,i)perylene	2.60E-01		2.18	31	78	mg/kg OC	0.4	0.2
Weston 1999	DR126 (692)	Benzo(g,h,i)perylene	2.60E-01		3.09	31	78	mg/kg OC	0.3	0.1
LDWG 2005b	LDW-SS47	Benzo(g,h,i)perylene	2.30E-01		1.45	31	78	mg/kg OC	0.5	0.2
Weston 1999	DR127 (693)	Benzo(g,h,i)perylene	2.10E-01		2.78	31	78	mg/kg OC	0.2	0.1
Weston 1999	DR054 (620)	Benzo(g,h,i)perylene	1.90E-01		2.36	31	78	mg/kg OC	0.3	0.1
LDWG 2005a	LDW-SS44	Benzo(g,h,i)perylene	1.70E-01		1.53	31	78	mg/kg OC	0.4	0.1
Weston 1999	DR121 (687)	Benzo(g,h,i)perylene	1.60E-01		2.39	31	78	mg/kg OC	0.2	0.1
Weston 1999	DR159 (725)	Benzo(g,h,i)perylene	1.60E-01		2.76	31	78	mg/kg OC	0.2	0.1
LDWG 2005a	LDW-SS49	Benzo(g,h,i)perylene	1.50E-01		2.47	31	78	mg/kg OC	0.2	0.1
Weston 1999	DR152 (718)	Benzo(g,h,i)perylene	1.40E-01		2.37	31	78	mg/kg OC	0.2	0.1
LDWG 2005a	LDW-SS56	Benzo(g,h,i)perylene	1.30E-01		1.13	31	78	mg/kg OC	0.4	0.1
LDWG 2005b	LDW-SSB4a	Benzo(g,h,i)perylene	1.30E-01		1.82	31	78	mg/kg OC	0.2	0.1

Table A-1
Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2005b	LDW-SS59	Benzo(g,h,i)perylene	1.10E-01		2.07	31	78	mg/kg OC	0.2	0.1
LDWG 2005b	LDW-SS45	Benzo(g,h,i)perylene	1.00E-01		2.81	31	78	mg/kg OC	0.1	0.05
LDWG 2005a	LDW-SS57	Benzo(g,h,i)perylene	9.90E-02	J	1.73	31	78	mg/kg OC	0.2	0.1
LDWG 2005a	LDW-SS58	Benzo(g,h,i)perylene	8.60E-02	J	1.78	31	78	mg/kg OC	0.2	0.1
LDWG 2005b	LDW-SS53	Benzo(g,h,i)perylene	5.90E-02		2.64	31	78	mg/kg OC	0.1	0.03
LDWG 2005a	LDW-SS43	Benzo(g,h,i)perylene	4.60E-02		1.67	31	78	mg/kg OC	0.1	0.04
LDWG 2005a	LDW-SS51	Benzo(g,h,i)perylene	3.80E-02		2.13	31	78	mg/kg OC	0.1	0.02
LDWG 2005b	LDW-SS46	Benzo(k)fluoranthene	1.20E+00		2.07	230	450	mg/kg OC	0.3	0.1
LDWG 2005a	LDW-SS48	Benzo(k)fluoranthene	9.50E-01		1.36	230	450	mg/kg OC	0.3	0.2
Weston 1999	DR120 (686)	Benzo(k)fluoranthene	8.90E-01		2.78	230	450	mg/kg OC	0.1	0.1
Weston 1999	DR124 (690)	Benzo(k)fluoranthene	7.40E-01		2.78	230	450	mg/kg OC	0.1	0.1
LDWG 2005a	LDW-SS44	Benzo(k)fluoranthene	5.50E-01		1.53	230	450	mg/kg OC	0.2	0.1
LDWG 2005b	LDW-SS47	Benzo(k)fluoranthene	4.60E-01		1.45	230	450	mg/kg OC	0.1	0.1
LDWG 2005b	LDW-SS59	Benzo(k)fluoranthene	4.50E-01		2.07	230	450	mg/kg OC	0.1	0.05
LDWG 2005b	LDW-SSB4a	Benzo(k)fluoranthene	4.00E-01		1.82	230	450	mg/kg OC	0.1	0.05
Weston 1999	DR122 (688)	Benzo(k)fluoranthene	3.90E-01		2.18	230	450	mg/kg OC	0.1	0.04
Weston 1999	DR126 (692)	Benzo(k)fluoranthene	3.70E-01		3.09	230	450	mg/kg OC	0.1	0.03
LDWG 2005b	LDW-SS53	Benzo(k)fluoranthene	3.20E-01		2.64	230	450	mg/kg OC	0.1	0.03
LDWG 2005a	LDW-SS56	Benzo(k)fluoranthene	3.10E-01		1.13	230	450	mg/kg OC	0.1	0.1
Weston 1999	DR054 (620)	Benzo(k)fluoranthene	3.00E-01		2.36	230	450	mg/kg OC	0.1	0.03
Weston 1999	DR127 (693)	Benzo(k)fluoranthene	3.00E-01		2.78	230	450	mg/kg OC	0.05	0.02
LDWG 2005a	LDW-SS57	Benzo(k)fluoranthene	3.00E-01		1.73	230	450	mg/kg OC	0.1	0.04
LDWG 2005b	LDW-SS45	Benzo(k)fluoranthene	2.70E-01		2.81	230	450	mg/kg OC	0.04	0.02
Weston 1999	DR152 (718)	Benzo(k)fluoranthene	2.60E-01		2.37	230	450	mg/kg OC	0.05	0.02
Weston 1999	DR159 (725)	Benzo(k)fluoranthene	2.40E-01		2.76	230	450	mg/kg OC	0.04	0.02
Weston 1999	DR121 (687)	Benzo(k)fluoranthene	2.20E-01		2.39	230	450	mg/kg OC	0.04	0.02
LDWG 2005a	LDW-SS58	Benzo(k)fluoranthene	2.20E-01		1.78	230	450	mg/kg OC	0.1	0.03
LDWG 2005a	LDW-SS49	Benzo(k)fluoranthene	2.00E-01		2.47	230	450	mg/kg OC	0.04	0.02
LDWG 2005a	LDW-SS55	Benzo(k)fluoranthene	1.70E-01		1.53	230	450	mg/kg OC	0.05	0.02
LDWG 2005a	LDW-SS51	Benzo(k)fluoranthene	1.10E-01		2.13	230	450	mg/kg OC	0.02	0.01
LDWG 2005a	LDW-SS43	Benzo(k)fluoranthene	9.90E-02		1.67	230	450	mg/kg OC	0.03	0.01
LDWG 2005b	LDW-SS46	Benzofluoranthenes (total-calc'd)	3.00E+00		2.07	230	450	mg/kg OC	0.6	0.3
Weston 1999	DR120 (686)	Benzofluoranthenes (total-calc'd)	2.89E+00		2.78	230	450	mg/kg OC	0.5	0.2
LDWG 2005a	LDW-SS48	Benzofluoranthenes (total-calc'd)	2.00E+00		1.36	230	450	mg/kg OC	0.6	0.3
Weston 1999	DR124 (690)	Benzofluoranthenes (total-calc'd)	1.74E+00		2.78	230	450	mg/kg OC	0.3	0.1

Table A-1
Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2005b	LDW-SS53	Benzofluoranthenes (total-calc'd)	1.10E+00		2.64	230	450	mg/kg OC	0.2	0.1
LDWG 2005a	LDW-SS44	Benzofluoranthenes (total-calc'd)	1.06E+00		1.53	230	450	mg/kg OC	0.3	0.2
Weston 1999	DR126 (692)	Benzofluoranthenes (total-calc'd)	9.70E-01		3.09	230	450	mg/kg OC	0.1	0.1
LDWG 2005b	LDW-SS47	Benzofluoranthenes (total-calc'd)	9.20E-01		1.45	230	450	mg/kg OC	0.3	0.1
LDWG 2005b	LDW-SS59	Benzofluoranthenes (total-calc'd)	8.70E-01		2.07	230	450	mg/kg OC	0.2	0.1
Weston 1999	DR122 (688)	Benzofluoranthenes (total-calc'd)	8.50E-01		2.18	230	450	mg/kg OC	0.2	0.1
LDWG 2005b	LDW-SSB4a	Benzofluoranthenes (total-calc'd)	8.40E-01		1.82	230	450	mg/kg OC	0.2	0.1
Weston 1999	DR127 (693)	Benzofluoranthenes (total-calc'd)	7.80E-01		2.78	230	450	mg/kg OC	0.1	0.1
Weston 1999	DR054 (620)	Benzofluoranthenes (total-calc'd)	6.60E-01		2.36	230	450	mg/kg OC	0.1	0.1
LDWG 2005b	LDW-SS45	Benzofluoranthenes (total-calc'd)	5.90E-01		2.81	230	450	mg/kg OC	0.1	0.05
LDWG 2005a	LDW-SS56	Benzofluoranthenes (total-calc'd)	5.90E-01		1.13	230	450	mg/kg OC	0.2	0.1
LDWG 2005a	LDW-SS57	Benzofluoranthenes (total-calc'd)	5.80E-01		1.73	230	450	mg/kg OC	0.1	0.1
Weston 1999	DR159 (725)	Benzofluoranthenes (total-calc'd)	5.70E-01		2.76	230	450	mg/kg OC	0.1	0.05
Weston 1999	DR152 (718)	Benzofluoranthenes (total-calc'd)	5.50E-01		2.37	230	450	mg/kg OC	0.1	0.1
Weston 1999	DR121 (687)	Benzofluoranthenes (total-calc'd)	5.40E-01		2.39	230	450	mg/kg OC	0.1	0.1
LDWG 2005a	LDW-SS49	Benzofluoranthenes (total-calc'd)	5.20E-01		2.47	230	450	mg/kg OC	0.1	0.05
LDWG 2005a	LDW-SS58	Benzofluoranthenes (total-calc'd)	4.40E-01		1.78	230	450	mg/kg OC	0.1	0.1
LDWG 2005a	LDW-SS55	Benzofluoranthenes (total-calc'd)	3.60E-01		1.53	230	450	mg/kg OC	0.1	0.1
LDWG 2005a	LDW-SS51	Benzofluoranthenes (total-calc'd)	2.80E-01		2.13	230	450	mg/kg OC	0.1	0.03
LDWG 2005a	LDW-SS43	Benzofluoranthenes (total-calc'd)	2.40E-01		1.67	230	450	mg/kg OC	0.1	0.03
LDWG 2005b	LDW-SS46	Benzoic acid	2.20E-01	J	2.07	650	650	ug/kg DW	0.3	0.3
LDWG 2005b	LDW-SS47	Benzoic acid	2.20E-01	J	1.45	650	650	ug/kg DW	0.3	0.3
Weston 1999	DR054 (620)	Beryllium	4.90E-01		2.36					
Weston 1999	DR122 (688)	Beryllium	4.90E-01	J	2.18					
Weston 1999	DR121 (687)	Beryllium	4.80E-01		2.39					
Weston 1999	DR124 (690)	Beryllium	4.50E-01		2.78					
Weston 1999	DR152 (718)	Beryllium	4.50E-01		2.37					
Weston 1999	DR120 (686)	Beryllium	4.20E-01		2.78					
Weston 1999	DR127 (693)	Beryllium	4.20E-01		2.78					
Weston 1999	DR159 (725)	Beryllium	3.90E-01		2.76					
Weston 1999	DR126 (692)	Beryllium	3.80E-01		3.09					
LDWG 2005b	LDW-SS46	Bis(2-ethylhexyl)phthalate	1.60E+00		2.07	47	78	mg/kg OC	1.6	1.0
Weston 1999	DR124 (690)	Bis(2-ethylhexyl)phthalate	9.40E-01		2.78	47	78	mg/kg OC	0.7	0.4
LDWG 2005a	LDW-SS48	Bis(2-ethylhexyl)phthalate	7.70E-01		1.36	47	78	mg/kg OC	1.2	0.7
Weston 1999	DR126 (692)	Bis(2-ethylhexyl)phthalate	5.90E-01		3.09	47	78	mg/kg OC	0.4	0.2

Table A-1
Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
Weston 1999	DR122 (688)	Bis(2-ethylhexyl)phthalate	5.60E-01		2.18	47	78	mg/kg OC	0.5	0.3
Weston 1999	DR127 (693)	Bis(2-ethylhexyl)phthalate	5.50E-01		2.78	47	78	mg/kg OC	0.4	0.3
LDWG 2005b	LDW-SS59	Bis(2-ethylhexyl)phthalate	5.30E-01		2.07	47	78	mg/kg OC	0.5	0.3
Weston 1999	DR054 (620)	Bis(2-ethylhexyl)phthalate	4.50E-01		2.36	47	78	mg/kg OC	0.4	0.2
Weston 1999	DR152 (718)	Bis(2-ethylhexyl)phthalate	4.50E-01		2.37	47	78	mg/kg OC	0.4	0.2
Weston 1999	DR120 (686)	Bis(2-ethylhexyl)phthalate	4.40E-01		2.78	47	78	mg/kg OC	0.3	0.2
Weston 1999	DR121 (687)	Bis(2-ethylhexyl)phthalate	3.40E-01		2.39	47	78	mg/kg OC	0.3	0.2
LDWG 2005b	LDW-SS45	Bis(2-ethylhexyl)phthalate	3.00E-01		2.81	47	78	mg/kg OC	0.2	0.1
LDWG 2005a	LDW-SS57	Bis(2-ethylhexyl)phthalate	2.90E-01		1.73	47	78	mg/kg OC	0.4	0.2
LDWG 2005a	LDW-SS58	Bis(2-ethylhexyl)phthalate	2.80E-01		1.78	47	78	mg/kg OC	0.3	0.2
LDWG 2005a	LDW-SS56	Bis(2-ethylhexyl)phthalate	2.10E-01		1.13	47	78	mg/kg OC	0.4	0.2
LDWG 2005b	LDW-SS47	Bis(2-ethylhexyl)phthalate	2.00E-01		1.45	47	78	mg/kg OC	0.3	0.2
LDWG 2005b	LDW-SS53	Bis(2-ethylhexyl)phthalate	2.00E-01		2.64	47	78	mg/kg OC	0.2	0.1
LDWG 2005b	LDW-SSB4a	Bis(2-ethylhexyl)phthalate	1.70E-01		1.82	47	78	mg/kg OC	0.2	0.1
LDWG 2005a	LDW-SS49	Bis(2-ethylhexyl)phthalate	1.60E-01		2.47	47	78	mg/kg OC	0.1	0.1
LDWG 2005a	LDW-SS44	Bis(2-ethylhexyl)phthalate	1.20E-01		1.53	47	78	mg/kg OC	0.2	0.1
LDWG 2005a	LDW-SS55	Bis(2-ethylhexyl)phthalate	9.80E-02		1.53	47	78	mg/kg OC	0.1	0.1
LDWG 2005a	LDW-SS43	Bis(2-ethylhexyl)phthalate	8.00E-02		1.67	47	78	mg/kg OC	0.1	0.1
Weston 1999	DR126 (692)	Butyl benzyl phthalate	4.60E-01		3.09	4.9	64	mg/kg OC	3.0	0.2
Weston 1999	DR124 (690)	Butyl benzyl phthalate	1.00E-01		2.78	4.9	64	mg/kg OC	0.7	0.1
LDWG 2005b	LDW-SS59	Butyl benzyl phthalate	8.00E-02		2.07	4.9	64	mg/kg OC	0.8	0.1
LDWG 2005a	LDW-SS48	Butyl benzyl phthalate	7.10E-02		1.36	4.9	64	mg/kg OC	1.1	0.1
Weston 1999	DR122 (688)	Butyl benzyl phthalate	7.00E-02		2.18	4.9	64	mg/kg OC	0.7	0.1
Weston 1999	DR054 (620)	Butyl benzyl phthalate	4.00E-02		2.36	4.9	64	mg/kg OC	0.3	0.03
Weston 1999	DR127 (693)	Butyl benzyl phthalate	4.00E-02		2.78	4.9	64	mg/kg OC	0.3	0.02
Weston 1999	DR152 (718)	Butyl benzyl phthalate	4.00E-02		2.37	4.9	64	mg/kg OC	0.3	0.03
Weston 1999	DR159 (725)	Butyl benzyl phthalate	4.00E-02		2.76	4.9	64	mg/kg OC	0.3	0.02
Weston 1999	DR121 (687)	Butyl benzyl phthalate	3.00E-02		2.39	4.9	64	mg/kg OC	0.3	0.02
LDWG 2005a	LDW-SS51	Butyl benzyl phthalate	2.80E-02		2.13	4.9	64	mg/kg OC	0.3	0.02
LDWG 2005b	LDW-SS53	Butyl benzyl phthalate	2.50E-02		2.64	4.9	64	mg/kg OC	0.2	0.01
LDWG 2005b	LDW-SS47	Butyl benzyl phthalate	2.20E-02		1.45	4.9	64	mg/kg OC	0.3	0.02
LDWG 2005a	LDW-SS48	Cadmium	3.00E+00		1.36	5.1	6.7	mg/kg DW	0.6	0.4
LDWG 2005b	LDW-SS45	Cadmium	1.00E+00		2.81	5.1	6.7	mg/kg DW	0.2	0.1
LDWG 2005a	LDW-SS49	Cadmium	1.00E+00		2.47	5.1	6.7	mg/kg DW	0.2	0.1
LDWG 2005a	LDW-SS58	Cadmium	1.00E+00		1.78	5.1	6.7	mg/kg DW	0.2	0.1

Table A-1
Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2005b	LDW-SS46	Cadmium	8.00E-01		2.07	5.1	6.7	mg/kg DW	0.2	0.1
LDWG 2005a	LDW-SS44	Cadmium	7.00E-01		1.53	5.1	6.7	mg/kg DW	0.1	0.1
LDWG 2005b	LDW-SS53	Cadmium	7.00E-01		2.64	5.1	6.7	mg/kg DW	0.1	0.1
LDWG 2005a	LDW-SS57	Cadmium	7.00E-01		1.73	5.1	6.7	mg/kg DW	0.1	0.1
Weston 1999	DR124 (690)	Cadmium	6.50E-01		2.78	5.1	6.7	mg/kg DW	0.1	0.1
LDWG 2005a	LDW-SS51	Cadmium	6.00E-01		2.13	5.1	6.7	mg/kg DW	0.1	0.1
LDWG 2005a	LDW-SS56	Cadmium	6.00E-01		1.13	5.1	6.7	mg/kg DW	0.1	0.1
Weston 1999	DR120 (686)	Cadmium	5.40E-01		2.78	5.1	6.7	mg/kg DW	0.1	0.1
Weston 1999	DR152 (718)	Cadmium	5.00E-01		2.37	5.1	6.7	mg/kg DW	0.1	0.1
LDWG 2005b	LDW-SS59	Cadmium	5.00E-01		2.07	5.1	6.7	mg/kg DW	0.1	0.1
Weston 1999	DR121 (687)	Cadmium	4.20E-01		2.39	5.1	6.7	mg/kg DW	0.1	0.1
Weston 1999	DR126 (692)	Cadmium	4.10E-01		3.09	5.1	6.7	mg/kg DW	0.1	0.1
Weston 1999	DR127 (693)	Cadmium	4.10E-01		2.78	5.1	6.7	mg/kg DW	0.1	0.1
LDWG 2005a	LDW-SS55	Cadmium	4.00E-01		1.53	5.1	6.7	mg/kg DW	0.1	0.1
Weston 1999	DR054 (620)	Cadmium	3.70E-01		2.36	5.1	6.7	mg/kg DW	0.1	0.1
Weston 1999	DR122 (688)	Cadmium	3.00E-01		2.18	5.1	6.7	mg/kg DW	0.1	0.0
Weston 1999	DR159 (725)	Cadmium	3.00E-01		2.76	5.1	6.7	mg/kg DW	0.1	0.0
LDWG 2005b	LDW-SSB4a	Cadmium	3.00E-01		1.82	5.1	6.7	mg/kg DW	0.1	0.0
Weston 1999	DR120 (686)	Carbazole	3.20E-01		2.78					
LDWG 2005a	LDW-SS48	Carbazole	3.00E-01		1.36					
LDWG 2005b	LDW-SS46	Carbazole	1.80E-01		2.07					
LDWG 2005a	LDW-SS55	Carbazole	1.60E-01		1.53					
LDWG 2005b	LDW-SS47	Carbazole	9.20E-02		1.45					
Weston 1999	DR124 (690)	Carbazole	8.00E-02		2.78					
LDWG 2005a	LDW-SS49	Carbazole	5.30E-02	J	2.47					
Weston 1999	DR126 (692)	Carbazole	5.00E-02		3.09					
Weston 1999	DR159 (725)	Carbazole	5.00E-02		2.76					
Weston 1999	DR122 (688)	Carbazole	4.00E-02		2.18					
Weston 1999	DR127 (693)	Carbazole	4.00E-02		2.78					
LDWG 2005b	LDW-SS59	Carbazole	4.00E-02		2.07					
Weston 1999	DR054 (620)	Carbazole	3.00E-02		2.36					
Weston 1999	DR152 (718)	Carbazole	3.00E-02		2.37					
LDWG 2005b	LDW-SS53	Carbazole	2.60E-02		2.64					
Weston 1999	DR121 (687)	Carbazole	2.00E-02		2.39					
LDWG 2005a	LDW-SS48	Chromium	1.53E+02		1.36	260	270	mg/kg DW	0.6	0.6

Table A-1
Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2005b	LDW-SS46	Chromium	5.60E+01		2.07	260	270	mg/kg DW	0.2	0.2
LDWG 2005b	LDW-SS47	Chromium	5.30E+01		1.45	260	270	mg/kg DW	0.2	0.2
LDWG 2005a	LDW-SS49	Chromium	5.30E+01		2.47	260	270	mg/kg DW	0.2	0.2
LDWG 2005a	LDW-SS58	Chromium	4.50E+01		1.78	260	270	mg/kg DW	0.2	0.2
LDWG 2005b	LDW-SS59	Chromium	4.35E+01		2.07	260	270	mg/kg DW	0.2	0.2
LDWG 2005a	LDW-SS57	Chromium	4.30E+01		1.73	260	270	mg/kg DW	0.2	0.2
LDWG 2005b	LDW-SS53	Chromium	4.20E+01		2.64	260	270	mg/kg DW	0.2	0.2
LDWG 2005a	LDW-SS56	Chromium	4.12E+01		1.13	260	270	mg/kg DW	0.2	0.2
LDWG 2005b	LDW-SS45	Chromium	4.10E+01		2.81	260	270	mg/kg DW	0.2	0.2
Weston 1999	DR121 (687)	Chromium	3.90E+01		2.39	260	270	mg/kg DW	0.2	0.1
Weston 1999	DR124 (690)	Chromium	3.90E+01		2.78	260	270	mg/kg DW	0.2	0.1
Weston 1999	DR122 (688)	Chromium	3.80E+01		2.18	260	270	mg/kg DW	0.1	0.1
LDWG 2005a	LDW-SS51	Chromium	3.80E+01		2.13	260	270	mg/kg DW	0.1	0.1
LDWG 2005b	LDW-SSB4a	Chromium	3.43E+01		1.82	260	270	mg/kg DW	0.1	0.1
Weston 1999	DR054 (620)	Chromium	3.40E+01		2.36	260	270	mg/kg DW	0.1	0.1
Weston 1999	DR152 (718)	Chromium	3.40E+01		2.37	260	270	mg/kg DW	0.1	0.1
LDWG 2005a	LDW-SS44	Chromium	3.32E+01		1.53	260	270	mg/kg DW	0.1	0.1
LDWG 2005a	LDW-SS43	Chromium	3.29E+01		1.67	260	270	mg/kg DW	0.1	0.1
Weston 1999	DR127 (693)	Chromium	3.10E+01		2.78	260	270	mg/kg DW	0.1	0.1
Weston 1999	DR126 (692)	Chromium	3.00E+01		3.09	260	270	mg/kg DW	0.1	0.1
Weston 1999	DR120 (686)	Chromium	2.80E+01		2.78	260	270	mg/kg DW	0.1	0.1
Weston 1999	DR159 (725)	Chromium	2.60E+01		2.76	260	270	mg/kg DW	0.1	0.1
LDWG 2005a	LDW-SS55	Chromium	2.54E+01		1.53	260	270	mg/kg DW	0.1	0.1
Weston 1999	DR120 (686)	Chrysene	3.30E+00		2.78	100	460	mg/kg OC	1.2	0.3
LDWG 2005a	LDW-SS48	Chrysene	1.90E+00		1.36	100	460	mg/kg OC	1.4	0.3
LDWG 2005b	LDW-SS46	Chrysene	1.40E+00		2.07	100	460	mg/kg OC	0.7	0.1
Weston 1999	DR124 (690)	Chrysene	7.90E-01		2.78	100	460	mg/kg OC	0.3	0.1
Weston 1999	DR126 (692)	Chrysene	7.20E-01		3.09	100	460	mg/kg OC	0.2	0.1
LDWG 2005a	LDW-SS44	Chrysene	6.50E-01		1.53	100	460	mg/kg OC	0.4	0.1
Weston 1999	DR127 (693)	Chrysene	6.10E-01		2.78	100	460	mg/kg OC	0.2	0.05
LDWG 2005b	LDW-SS47	Chrysene	5.90E-01		1.45	100	460	mg/kg OC	0.4	0.1
LDWG 2005a	LDW-SS49	Chrysene	5.70E-01		2.47	100	460	mg/kg OC	0.2	0.1
Weston 1999	DR122 (688)	Chrysene	5.50E-01		2.18	100	460	mg/kg OC	0.3	0.1
Weston 1999	DR054 (620)	Chrysene	4.90E-01		2.36	100	460	mg/kg OC	0.2	0.05
LDWG 2005b	LDW-SSB4a	Chrysene	4.70E-01		1.82	100	460	mg/kg OC	0.3	0.1

Table A-1
Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2005b	LDW-SS53	Chrysene	4.60E-01		2.64	100	460	mg/kg OC	0.2	0.04
LDWG 2005b	LDW-SS59	Chrysene	4.00E-01		2.07	100	460	mg/kg OC	0.2	0.04
Weston 1999	DR159 (725)	Chrysene	3.90E-01		2.76	100	460	mg/kg OC	0.1	0.03
LDWG 2005b	LDW-SS45	Chrysene	3.90E-01		2.81	100	460	mg/kg OC	0.1	0.03
Weston 1999	DR121 (687)	Chrysene	3.60E-01		2.39	100	460	mg/kg OC	0.2	0.03
LDWG 2005a	LDW-SS56	Chrysene	3.60E-01		1.13	100	460	mg/kg OC	0.3	0.1
Weston 1999	DR152 (718)	Chrysene	3.50E-01		2.37	100	460	mg/kg OC	0.1	0.03
LDWG 2005a	LDW-SS57	Chrysene	2.90E-01		1.73	100	460	mg/kg OC	0.2	0.04
LDWG 2005a	LDW-SS58	Chrysene	2.90E-01		1.78	100	460	mg/kg OC	0.2	0.04
LDWG 2005a	LDW-SS51	Chrysene	2.70E-01		2.13	100	460	mg/kg OC	0.1	0.03
LDWG 2005a	LDW-SS55	Chrysene	2.20E-01		1.53	100	460	mg/kg OC	0.1	0.03
LDWG 2005a	LDW-SS43	Chrysene	1.30E-01		1.67	100	460	mg/kg OC	0.1	0.02
LDWG 2005a	LDW-SS48	Cobalt	5.00E+01		1.36					
LDWG 2005b	LDW-SS47	Cobalt	3.00E+01		1.45					
LDWG 2005b	LDW-SS46	Cobalt	2.80E+01		2.07					
LDWG 2005a	LDW-SS49	Cobalt	2.40E+01		2.47					
LDWG 2005a	LDW-SS56	Cobalt	1.87E+01		1.13					
Weston 1999	DR054 (620)	Cobalt	1.20E+01		2.36					
Weston 1999	DR122 (688)	Cobalt	1.20E+01		2.18					
LDWG 2005b	LDW-SS53	Cobalt	1.20E+01		2.64					
LDWG 2005a	LDW-SS58	Cobalt	1.14E+01		1.78					
LDWG 2005a	LDW-SS57	Cobalt	1.13E+01		1.73					
LDWG 2005a	LDW-SS43	Cobalt	1.12E+01		1.67					
LDWG 2005b	LDW-SS45	Cobalt	1.12E+01		2.81					
Weston 1999	DR121 (687)	Cobalt	1.10E+01		2.39					
Weston 1999	DR152 (718)	Cobalt	1.10E+01		2.37					
LDWG 2005b	LDW-SS59	Cobalt	1.10E+01		2.07					
LDWG 2005a	LDW-SS51	Cobalt	1.05E+01		2.13					
Weston 1999	DR120 (686)	Cobalt	1.00E+01		2.78					
Weston 1999	DR124 (690)	Cobalt	1.00E+01		2.78					
Weston 1999	DR127 (693)	Cobalt	1.00E+01		2.78					
LDWG 2005a	LDW-SS44	Cobalt	9.80E+00		1.53					
LDWG 2005a	LDW-SS55	Cobalt	9.70E+00		1.53					
Weston 1999	DR126 (692)	Cobalt	9.00E+00		3.09					
LDWG 2005b	LDW-SSB4a	Cobalt	9.00E+00		1.82					

Table A-1
Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
Weston 1999	DR159 (725)	Cobalt	8.00E+00		2.76					
LDWG 2005a	LDW-SS48	Copper	1.42E+03		1.36	390	390	mg/kg DW	3.6	3.6
LDWG 2005b	LDW-SS47	Copper	1.34E+03		1.45	390	390	mg/kg DW	3.4	3.4
LDWG 2005b	LDW-SS46	Copper	1.23E+03		2.07	390	390	mg/kg DW	3.2	3.2
LDWG 2005a	LDW-SS49	Copper	6.05E+02		2.47	390	390	mg/kg DW	1.6	1.6
LDWG 2005a	LDW-SS56	Copper	3.65E+02		1.13	390	390	mg/kg DW	0.9	0.9
LDWG 2005b	LDW-SSB4a	Copper	2.26E+02	J	1.82	390	390	mg/kg DW	0.6	0.6
LDWG 2005a	LDW-SS44	Copper	2.14E+02		1.53	390	390	mg/kg DW	0.5	0.5
Weston 1999	DR120 (686)	Copper	1.81E+02		2.78	390	390	mg/kg DW	0.5	0.5
LDWG 2005a	LDW-SS57	Copper	1.79E+02		1.73	390	390	mg/kg DW	0.5	0.5
LDWG 2005b	LDW-SS53	Copper	1.63E+02	J	2.64	390	390	mg/kg DW	0.4	0.4
LDWG 2005b	LDW-SS45	Copper	1.55E+02		2.81	390	390	mg/kg DW	0.4	0.4
LDWG 2005a	LDW-SS58	Copper	1.46E+02		1.78	390	390	mg/kg DW	0.4	0.4
Weston 1999	DR054 (620)	Copper	1.40E+02		2.36	390	390	mg/kg DW	0.4	0.4
LDWG 2005a	LDW-SS55	Copper	1.37E+02		1.53	390	390	mg/kg DW	0.4	0.4
LDWG 2005a	LDW-SS51	Copper	1.27E+02		2.13	390	390	mg/kg DW	0.3	0.3
LDWG 2005a	LDW-SS43	Copper	1.21E+02		1.67	390	390	mg/kg DW	0.3	0.3
Weston 1999	DR124 (690)	Copper	1.19E+02		2.78	390	390	mg/kg DW	0.3	0.3
Weston 1999	DR121 (687)	Copper	1.05E+02		2.39	390	390	mg/kg DW	0.3	0.3
LDWG 2005b	LDW-SS59	Copper	1.02E+02	J	2.07	390	390	mg/kg DW	0.3	0.3
Weston 1999	DR122 (688)	Copper	1.00E+02		2.18	390	390	mg/kg DW	0.3	0.3
Weston 1999	DR126 (692)	Copper	8.90E+01		3.09	390	390	mg/kg DW	0.2	0.2
Weston 1999	DR127 (693)	Copper	8.50E+01		2.78	390	390	mg/kg DW	0.2	0.2
Weston 1999	DR152 (718)	Copper	7.30E+01		2.37	390	390	mg/kg DW	0.2	0.2
Weston 1999	DR159 (725)	Copper	5.10E+01		2.76	390	390	mg/kg DW	0.1	0.1
Weston 1999	DR120 (686)	Dibenzo(a,h)anthracene	1.60E-01		2.78	12	33	mg/kg OC	0.5	0.2
LDWG 2005a	LDW-SS48	Dibenzo(a,h)anthracene	1.60E-01		1.36	12	33	mg/kg OC	1.0	0.4
Weston 1999	DR124 (690)	Dibenzo(a,h)anthracene	1.40E-01		2.78	12	33	mg/kg OC	0.4	0.2
Weston 1999	DR122 (688)	Dibenzo(a,h)anthracene	7.00E-02		2.18	12	33	mg/kg OC	0.3	0.1
Weston 1999	DR126 (692)	Dibenzo(a,h)anthracene	7.00E-02		3.09	12	33	mg/kg OC	0.2	0.1
Weston 1999	DR127 (693)	Dibenzo(a,h)anthracene	6.00E-02		2.78	12	33	mg/kg OC	0.2	0.1
LDWG 2005b	LDW-SS46	Dibenzo(a,h)anthracene	5.80E-02	J	2.07	12	33	mg/kg OC	0.2	0.1
Weston 1999	DR054 (620)	Dibenzo(a,h)anthracene	5.00E-02		2.36	12	33	mg/kg OC	0.2	0.1
LDWG 2005b	LDW-SS59	Dibenzo(a,h)anthracene	4.50E-02		2.07	12	33	mg/kg OC	0.2	0.1
Weston 1999	DR121 (687)	Dibenzo(a,h)anthracene	4.00E-02		2.39	12	33	mg/kg OC	0.1	0.1

Table A-1
Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
Weston 1999	DR159 (725)	Dibenzo(a,h)anthracene	4.00E-02		2.76	12	33	mg/kg OC	0.1	0.04
LDWG 2005b	LDW-SS53	Dibenzo(a,h)anthracene	3.40E-02		2.64	12	33	mg/kg OC	0.1	0.04
Weston 1999	DR152 (718)	Dibenzo(a,h)anthracene	3.00E-02		2.37	12	33	mg/kg OC	0.1	0.04
Weston 1999	DR120 (686)	Dibenzofuran	3.20E-01		2.78	15	58	mg/kg OC	0.8	0.2
LDWG 2005a	LDW-SS55	Dibenzofuran	1.40E-01		1.53	15	58	mg/kg OC	0.6	0.2
LDWG 2005a	LDW-SS48	Dibenzofuran	1.00E-01		1.36	15	58	mg/kg OC	0.5	0.1
LDWG 2005b	LDW-SS47	Dibenzofuran	7.80E-02		1.45	15	58	mg/kg OC	0.4	0.1
LDWG 2005b	LDW-SS46	Dibenzofuran	7.10E-02		2.07	15	58	mg/kg OC	0.2	0.1
Weston 1999	DR126 (692)	Dibenzofuran	6.00E-02		3.09	15	58	mg/kg OC	0.1	0.03
Weston 1999	DR159 (725)	Dibenzofuran	4.00E-02		2.76	15	58	mg/kg OC	0.1	0.02
Weston 1999	DR127 (693)	Dibenzofuran	3.00E-02		2.78	15	58	mg/kg OC	0.1	0.02
Weston 1999	DR054 (620)	Dibenzofuran	2.00E-02		2.36	15	58	mg/kg OC	0.1	0.01
Weston 1999	DR121 (687)	Dibenzofuran	2.00E-02		2.39	15	58	mg/kg OC	0.1	0.01
Weston 1999	DR122 (688)	Dibenzofuran	2.00E-02		2.18	15	58	mg/kg OC	0.1	0.02
Weston 1999	DR124 (690)	Dibenzofuran	2.00E-02		2.78	15	58	mg/kg OC	0.05	0.01
LDWG 2005b	LDW-SS46	Dibutyltin as ion	5.60E-01		2.07					
LDWG 2005b	LDW-SS47	Dibutyltin as ion	1.50E-01	J	1.45					
LDWG 2005a	LDW-SS49	Dibutyltin as ion	5.90E-02		2.47					
LDWG 2005b	LDW-SS45	Dibutyltin as ion	3.10E-02		2.81					
Weston 1999	DR121 (687)	Dibutyltin as ion	2.90E-02	J	2.39					
LDWG 2005a	LDW-SS43	Dibutyltin as ion	2.60E-02		1.67					
Weston 1999	DR152 (718)	Dibutyltin as ion	2.40E-02	J	2.37					
LDWG 2005a	LDW-SS56	Dibutyltin as ion	2.30E-02		1.13					
Weston 1999	DR054 (620)	Dibutyltin as ion	2.10E-02	J	2.36					
LDWG 2005a	LDW-SS51	Dibutyltin as ion	7.80E-03		2.13					
LDWG 2005a	LDW-SS58	Dibutyltin as ion	6.90E-03		1.78					
LDWG 2005b	LDW-SS46	Diethyl phthalate	1.60E-02		2.07	61	110	mg/kg OC	0.01	0.01
LDWG 2005b	LDW-SS47	Diethyl phthalate	1.20E-02		1.45	61	110	mg/kg OC	0.01	0.01
LDWG 2005a	LDW-SS43	Diethyl phthalate	6.60E-03		1.67	61	110	mg/kg OC	0.01	0.00
Weston 1999	DR122 (688)	Dimethyl phthalate	2.00E-02		2.18	53	53	mg/kg OC	0.02	0.02
Weston 1999	DR126 (692)	Dimethyl phthalate	2.00E-02		3.09	53	53	mg/kg OC	0.01	0.01
LDWG 2005b	LDW-SS47	Dimethyl phthalate	1.20E-02		1.45	53	53	mg/kg OC	0.02	0.02
LDWG 2005a	LDW-SS43	Dimethyl phthalate	7.30E-03		1.67	53	53	mg/kg OC	0.01	0.01
LDWG 2005a	LDW-SS48	Di-n-butyl phthalate	9.20E-02		1.36	220	1700	mg/kg OC	0.03	0.004
LDWG 2005b	LDW-SS47	Di-n-butyl phthalate	4.30E-02		1.45	220	1700	mg/kg OC	0.01	0.002

Table A-1
Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
Weston 1999	DR159 (725)	Di-n-butyl phthalate	4.00E-02		2.76	220	1700	mg/kg OC	0.01	0.001
Weston 1999	DR120 (686)	Di-n-butyl phthalate	3.00E-02		2.78	220	1700	mg/kg OC	0.005	0.001
Weston 1999	DR124 (690)	Di-n-butyl phthalate	2.00E-02		2.78	220	1700	mg/kg OC	0.003	0.0004
Weston 1999	DR126 (692)	Di-n-butyl phthalate	2.00E-02		3.09	220	1700	mg/kg OC	0.003	0.0004
Weston 1999	DR127 (693)	Di-n-butyl phthalate	2.00E-02		2.78	220	1700	mg/kg OC	0.003	0.0004
LDWG 2005a	LDW-SS56	Dioxin/furan TEQ - Mammal - Half DL	2.08E-03	J	1.13					
LDWG 2005a	LDW-SS58	Dioxin/furan TEQ - Mammal - Half DL	5.76E-04	J	1.78					
LDWG 2005a	LDW-SS57	Dioxin/furan TEQ - Mammal - Half DL	4.44E-04	J	1.73					
LDWG 2005b	LDW-SS59	Dioxin/furan TEQ - Mammal - Half DL	4.66E-05	J	2.07					
LDWG 2005a	LDW-SS43	Dioxin/furan TEQ - Mammal - Half DL	1.73E-05	J	1.67					
Weston 1999	DR120 (686)	Fluoranthene	1.40E+01		2.78	160	1200	mg/kg OC	3.1	0.4
LDWG 2005a	LDW-SS48	Fluoranthene	2.90E+00		1.36	160	1200	mg/kg OC	1.3	0.2
LDWG 2005b	LDW-SS46	Fluoranthene	1.90E+00		2.07	160	1200	mg/kg OC	0.6	0.1
Weston 1999	DR126 (692)	Fluoranthene	1.30E+00		3.09	160	1200	mg/kg OC	0.3	0.04
LDWG 2005b	LDW-SS47	Fluoranthene	1.20E+00		1.45	160	1200	mg/kg OC	0.5	0.1
Weston 1999	DR124 (690)	Fluoranthene	1.10E+00		2.78	160	1200	mg/kg OC	0.2	0.03
Weston 1999	DR127 (693)	Fluoranthene	1.00E+00		2.78	160	1200	mg/kg OC	0.2	0.03
LDWG 2005a	LDW-SS49	Fluoranthene	1.00E+00		2.47	160	1200	mg/kg OC	0.3	0.03
Weston 1999	DR159 (725)	Fluoranthene	9.60E-01		2.76	160	1200	mg/kg OC	0.2	0.03
LDWG 2005a	LDW-SS44	Fluoranthene	9.40E-01		1.53	160	1200	mg/kg OC	0.4	0.1
Weston 1999	DR054 (620)	Fluoranthene	8.90E-01		2.36	160	1200	mg/kg OC	0.2	0.03
Weston 1999	DR122 (688)	Fluoranthene	7.50E-01		2.18	160	1200	mg/kg OC	0.2	0.03
LDWG 2005b	LDW-SS53	Fluoranthene	7.50E-01		2.64	160	1200	mg/kg OC	0.2	0.02
LDWG 2005a	LDW-SS55	Fluoranthene	6.40E-01		1.53	160	1200	mg/kg OC	0.3	0.03
Weston 1999	DR121 (687)	Fluoranthene	6.00E-01		2.39	160	1200	mg/kg OC	0.2	0.02
LDWG 2005b	LDW-SSB4a	Fluoranthene	5.70E-01		1.82	160	1200	mg/kg OC	0.2	0.03
Weston 1999	DR152 (718)	Fluoranthene	5.30E-01		2.37	160	1200	mg/kg OC	0.1	0.02
LDWG 2005b	LDW-SS59	Fluoranthene	5.20E-01		2.07	160	1200	mg/kg OC	0.2	0.02
LDWG 2005b	LDW-SS45	Fluoranthene	5.00E-01		2.81	160	1200	mg/kg OC	0.1	0.01
LDWG 2005a	LDW-SS57	Fluoranthene	4.20E-01		1.73	160	1200	mg/kg OC	0.2	0.02
LDWG 2005a	LDW-SS56	Fluoranthene	4.00E-01		1.13	160	1200	mg/kg OC	0.2	0.03
LDWG 2005a	LDW-SS51	Fluoranthene	3.30E-01		2.13	160	1200	mg/kg OC	0.1	0.01
LDWG 2005a	LDW-SS58	Fluoranthene	3.20E-01		1.78	160	1200	mg/kg OC	0.1	0.01
LDWG 2005a	LDW-SS43	Fluoranthene	1.50E-01		1.67	160	1200	mg/kg OC	0.1	0.01
LDWG 2005a	LDW-SS55	Fluorene	2.40E-01		1.53	23	79	mg/kg OC	0.7	0.2

Table A-1
Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2005a	LDW-SS48	Fluorene	2.30E-01		1.36	23	79	mg/kg OC	0.7	0.2
Weston 1999	DR120 (686)	Fluorene	1.90E-01		2.78	23	79	mg/kg OC	0.3	0.1
LDWG 2005b	LDW-SS47	Fluorene	1.40E-01		1.45	23	79	mg/kg OC	0.4	0.1
LDWG 2005b	LDW-SS46	Fluorene	1.20E-01		2.07	23	79	mg/kg OC	0.3	0.1
Weston 1999	DR126 (692)	Fluorene	8.00E-02		3.09	23	79	mg/kg OC	0.1	0.03
LDWG 2005a	LDW-SS49	Fluorene	6.80E-02	J	2.47	23	79	mg/kg OC	0.1	0.03
LDWG 2005a	LDW-SS44	Fluorene	6.30E-02		1.53	23	79	mg/kg OC	0.2	0.1
Weston 1999	DR127 (693)	Fluorene	6.00E-02		2.78	23	79	mg/kg OC	0.1	0.03
Weston 1999	DR159 (725)	Fluorene	5.00E-02		2.76	23	79	mg/kg OC	0.1	0.02
Weston 1999	DR054 (620)	Fluorene	4.00E-02		2.36	23	79	mg/kg OC	0.1	0.02
Weston 1999	DR122 (688)	Fluorene	4.00E-02		2.18	23	79	mg/kg OC	0.1	0.02
Weston 1999	DR124 (690)	Fluorene	4.00E-02		2.78	23	79	mg/kg OC	0.1	0.02
Weston 1999	DR121 (687)	Fluorene	3.00E-02		2.39	23	79	mg/kg OC	0.1	0.02
Weston 1999	DR152 (718)	Fluorene	3.00E-02		2.37	23	79	mg/kg OC	0.1	0.02
LDWG 2005b	LDW-SS53	Fluorene	2.90E-02		2.64	23	79	mg/kg OC	0.05	0.01
LDWG 2005b	LDW-SSB4a	Hexachlorobenzene	2.10E-03	JN	1.82	0.38	2.3	mg/kg OC	0.3	0.1
Weston 1999	DR124 (690)	Indeno(1,2,3-cd)pyrene	6.80E-01		2.78	34	88	mg/kg OC	0.7	0.3
LDWG 2005b	LDW-SS46	Indeno(1,2,3-cd)pyrene	6.80E-01		2.07	34	88	mg/kg OC	1.0	0.4
Weston 1999	DR120 (686)	Indeno(1,2,3-cd)pyrene	4.70E-01		2.78	34	88	mg/kg OC	0.5	0.2
LDWG 2005a	LDW-SS48	Indeno(1,2,3-cd)pyrene	3.60E-01		1.36	34	88	mg/kg OC	0.8	0.3
LDWG 2005b	LDW-SS59	Indeno(1,2,3-cd)pyrene	3.10E-01		2.07	34	88	mg/kg OC	0.4	0.2
LDWG 2005b	LDW-SS47	Indeno(1,2,3-cd)pyrene	3.00E-01		1.45	34	88	mg/kg OC	0.6	0.2
Weston 1999	DR122 (688)	Indeno(1,2,3-cd)pyrene	2.90E-01		2.18	34	88	mg/kg OC	0.4	0.2
Weston 1999	DR126 (692)	Indeno(1,2,3-cd)pyrene	2.90E-01		3.09	34	88	mg/kg OC	0.3	0.1
Weston 1999	DR127 (693)	Indeno(1,2,3-cd)pyrene	2.40E-01		2.78	34	88	mg/kg OC	0.3	0.1
Weston 1999	DR054 (620)	Indeno(1,2,3-cd)pyrene	2.10E-01		2.36	34	88	mg/kg OC	0.3	0.1
LDWG 2005b	LDW-SS53	Indeno(1,2,3-cd)pyrene	2.00E-01		2.64	34	88	mg/kg OC	0.2	0.1
LDWG 2005b	LDW-SSB4a	Indeno(1,2,3-cd)pyrene	2.00E-01		1.82	34	88	mg/kg OC	0.3	0.1
Weston 1999	DR159 (725)	Indeno(1,2,3-cd)pyrene	1.80E-01		2.76	34	88	mg/kg OC	0.2	0.1
Weston 1999	DR121 (687)	Indeno(1,2,3-cd)pyrene	1.70E-01		2.39	34	88	mg/kg OC	0.2	0.1
LDWG 2005a	LDW-SS44	Indeno(1,2,3-cd)pyrene	1.70E-01		1.53	34	88	mg/kg OC	0.3	0.1
Weston 1999	DR152 (718)	Indeno(1,2,3-cd)pyrene	1.40E-01		2.37	34	88	mg/kg OC	0.2	0.1
LDWG 2005a	LDW-SS49	Indeno(1,2,3-cd)pyrene	1.40E-01		2.47	34	88	mg/kg OC	0.2	0.1
LDWG 2005a	LDW-SS56	Indeno(1,2,3-cd)pyrene	1.30E-01		1.13	34	88	mg/kg OC	0.3	0.1
LDWG 2005b	LDW-SS45	Indeno(1,2,3-cd)pyrene	1.20E-01		2.81	34	88	mg/kg OC	0.1	0.0

Table A-1
Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2005a	LDW-SS43	Indeno(1,2,3-cd)pyrene	1.10E-01		1.67	34	88	mg/kg OC	0.2	0.1
LDWG 2005a	LDW-SS57	Indeno(1,2,3-cd)pyrene	1.00E-01	J	1.73	34	88	mg/kg OC	0.2	0.1
LDWG 2005a	LDW-SS58	Indeno(1,2,3-cd)pyrene	8.00E-02	J	1.78	34	88	mg/kg OC	0.1	0.1
LDWG 2005a	LDW-SS51	Indeno(1,2,3-cd)pyrene	4.60E-02		2.13	34	88	mg/kg OC	0.1	0.02
LDWG 2005a	LDW-SS55	Indeno(1,2,3-cd)pyrene	3.90E-02		1.53	34	88	mg/kg OC	0.1	0.03
Weston 1999	DR121 (687)	Iron	3.78E+04	J	2.39					
Weston 1999	DR122 (688)	Iron	3.72E+04		2.18					
Weston 1999	DR054 (620)	Iron	3.54E+04	J	2.36					
Weston 1999	DR152 (718)	Iron	3.36E+04		2.37					
Weston 1999	DR120 (686)	Iron	3.16E+04	J	2.78					
Weston 1999	DR127 (693)	Iron	3.12E+04	J	2.78					
Weston 1999	DR124 (690)	Iron	3.05E+04		2.78					
Weston 1999	DR126 (692)	Iron	2.92E+04	J	3.09					
Weston 1999	DR159 (725)	Iron	2.83E+04	J	2.76					
LDWG 2005a	LDW-SS48	Lead	7.80E+02		1.36	450	530	mg/kg DW	1.7	1.5
LDWG 2005a	LDW-SS58	Lead	2.87E+02		1.78	450	530	mg/kg DW	0.6	0.5
LDWG 2005a	LDW-SS49	Lead	2.10E+02		2.47	450	530	mg/kg DW	0.5	0.4
LDWG 2005a	LDW-SS56	Lead	1.60E+02		1.13	450	530	mg/kg DW	0.4	0.3
LDWG 2005a	LDW-SS57	Lead	1.38E+02		1.73	450	530	mg/kg DW	0.3	0.3
LDWG 2005b	LDW-SS47	Lead	1.30E+02		1.45	450	530	mg/kg DW	0.3	0.2
LDWG 2005b	LDW-SS46	Lead	1.25E+02		2.07	450	530	mg/kg DW	0.3	0.2
LDWG 2005b	LDW-SS45	Lead	9.80E+01		2.81	450	530	mg/kg DW	0.2	0.2
Weston 1999	DR124 (690)	Lead	8.32E+01		2.78	450	530	mg/kg DW	0.2	0.2
LDWG 2005b	LDW-SSB4a	Lead	7.50E+01		1.82	450	530	mg/kg DW	0.2	0.1
LDWG 2005b	LDW-SS53	Lead	7.40E+01		2.64	450	530	mg/kg DW	0.2	0.1
LDWG 2005a	LDW-SS44	Lead	6.80E+01		1.53	450	530	mg/kg DW	0.2	0.1
LDWG 2005a	LDW-SS51	Lead	6.40E+01		2.13	450	530	mg/kg DW	0.1	0.1
LDWG 2005b	LDW-SS59	Lead	6.00E+01		2.07	450	530	mg/kg DW	0.1	0.1
LDWG 2005a	LDW-SS55	Lead	5.30E+01		1.53	450	530	mg/kg DW	0.1	0.1
Weston 1999	DR120 (686)	Lead	5.29E+01		2.78	450	530	mg/kg DW	0.1	0.1
Weston 1999	DR054 (620)	Lead	4.89E+01		2.36	450	530	mg/kg DW	0.1	0.1
LDWG 2005a	LDW-SS43	Lead	4.80E+01		1.67	450	530	mg/kg DW	0.1	0.1
Weston 1999	DR127 (693)	Lead	4.72E+01		2.78	450	530	mg/kg DW	0.1	0.1
Weston 1999	DR121 (687)	Lead	4.67E+01		2.39	450	530	mg/kg DW	0.1	0.1
Weston 1999	DR122 (688)	Lead	4.67E+01	J	2.18	450	530	mg/kg DW	0.1	0.1

Table A-1
Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
Weston 1999	DR126 (692)	Lead	4.60E+01		3.09	450	530	mg/kg DW	0.1	0.1
Weston 1999	DR152 (718)	Lead	3.81E+01		2.37	450	530	mg/kg DW	0.1	0.1
Weston 1999	DR159 (725)	Lead	3.32E+01		2.76	450	530	mg/kg DW	0.1	0.1
Weston 1999	DR054 (620)	Manganese	4.39E+02		2.36					
Weston 1999	DR121 (687)	Manganese	4.39E+02		2.39					
Weston 1999	DR120 (686)	Manganese	4.18E+02		2.78					
Weston 1999	DR122 (688)	Manganese	3.87E+02		2.18					
Weston 1999	DR124 (690)	Manganese	3.64E+02		2.78					
Weston 1999	DR152 (718)	Manganese	3.54E+02		2.37					
Weston 1999	DR127 (693)	Manganese	3.36E+02		2.78					
Weston 1999	DR126 (692)	Manganese	3.11E+02		3.09					
Weston 1999	DR159 (725)	Manganese	2.99E+02		2.76					
LDWG 2005a	LDW-SS48	Mercury	7.90E-01		1.36	0.41	0.59	mg/kg DW	1.9	1.3
LDWG 2005b	LDW-SS45	Mercury	4.00E-01		2.81	0.41	0.59	mg/kg DW	1.0	0.7
LDWG 2005a	LDW-SS49	Mercury	3.60E-01		2.47	0.41	0.59	mg/kg DW	0.9	0.6
LDWG 2005b	LDW-SS46	Mercury	3.30E-01		2.07	0.41	0.59	mg/kg DW	0.8	0.6
LDWG 2005b	LDW-SS53	Mercury	3.10E-01		2.64	0.41	0.59	mg/kg DW	0.8	0.5
LDWG 2005a	LDW-SS57	Mercury	3.10E-01		1.73	0.41	0.59	mg/kg DW	0.8	0.5
LDWG 2005a	LDW-SS51	Mercury	3.00E-01		2.13	0.41	0.59	mg/kg DW	0.7	0.5
LDWG 2005a	LDW-SS58	Mercury	2.90E-01		1.78	0.41	0.59	mg/kg DW	0.7	0.5
Weston 1999	DR121 (687)	Mercury	2.70E-01		2.39	0.41	0.59	mg/kg DW	0.7	0.5
Weston 1999	DR152 (718)	Mercury	2.50E-01		2.37	0.41	0.59	mg/kg DW	0.6	0.4
Weston 1999	DR126 (692)	Mercury	2.40E-01		3.09	0.41	0.59	mg/kg DW	0.6	0.4
LDWG 2005a	LDW-SS44	Mercury	2.30E-01		1.53	0.41	0.59	mg/kg DW	0.6	0.4
LDWG 2005b	LDW-SSB4a	Mercury	2.30E-01		1.82	0.41	0.59	mg/kg DW	0.6	0.4
Weston 1999	DR120 (686)	Mercury	2.10E-01		2.78	0.41	0.59	mg/kg DW	0.5	0.4
Weston 1999	DR122 (688)	Mercury	2.00E-01		2.18	0.41	0.59	mg/kg DW	0.5	0.3
Weston 1999	DR127 (693)	Mercury	1.90E-01		2.78	0.41	0.59	mg/kg DW	0.5	0.3
LDWG 2005b	LDW-SS59	Mercury	1.90E-01		2.07	0.41	0.59	mg/kg DW	0.5	0.3
Weston 1999	DR054 (620)	Mercury	1.70E-01		2.36	0.41	0.59	mg/kg DW	0.4	0.3
LDWG 2005a	LDW-SS43	Mercury	1.70E-01		1.67	0.41	0.59	mg/kg DW	0.4	0.3
Weston 1999	DR159 (725)	Mercury	1.60E-01		2.76	0.41	0.59	mg/kg DW	0.4	0.3
LDWG 2005a	LDW-SS55	Mercury	1.50E-01		1.53	0.41	0.59	mg/kg DW	0.4	0.3
LDWG 2005a	LDW-SS56	Mercury	1.40E-01		1.13	0.41	0.59	mg/kg DW	0.3	0.2
LDWG 2005b	LDW-SS47	Mercury	9.00E-02		1.45	0.41	0.59	mg/kg DW	0.2	0.2

Table A-1
Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2005a	LDW-SS48	Molybdenum	7.50E+01		1.36					
LDWG 2005a	LDW-SS56	Molybdenum	2.30E+01		1.13					
LDWG 2005b	LDW-SS47	Molybdenum	2.00E+01		1.45					
LDWG 2005a	LDW-SS49	Molybdenum	1.80E+01		2.47					
LDWG 2005b	LDW-SS46	Molybdenum	1.10E+01		2.07					
LDWG 2005b	LDW-SSB4a	Molybdenum	5.70E+00		1.82					
LDWG 2005a	LDW-SS58	Molybdenum	5.50E+00		1.78					
LDWG 2005a	LDW-SS57	Molybdenum	5.00E+00		1.73					
LDWG 2005a	LDW-SS55	Molybdenum	4.70E+00		1.53					
LDWG 2005a	LDW-SS44	Molybdenum	4.50E+00		1.53					
LDWG 2005b	LDW-SS59	Molybdenum	3.10E+00		2.07					
LDWG 2005b	LDW-SS45	Molybdenum	3.00E+00		2.81					
LDWG 2005b	LDW-SS53	Molybdenum	3.00E+00		2.64					
LDWG 2005a	LDW-SS43	Molybdenum	2.00E+00		1.67					
LDWG 2005a	LDW-SS51	Molybdenum	2.00E+00		2.13					
LDWG 2005b	LDW-SS47	Monobutyltin as ion	1.60E-02	J	1.45					
LDWG 2005b	LDW-SS46	Monobutyltin as ion	1.50E-02		2.07					
LDWG 2005a	LDW-SS49	Monobutyltin as ion	8.00E-03	J	2.47					
LDWG 2005a	LDW-SS55	Naphthalene	1.40E-01		1.53	99	170	mg/kg OC	0.1	0.1
LDWG 2005a	LDW-SS48	Naphthalene	1.10E-01		1.36	99	170	mg/kg OC	0.1	0.05
Weston 1999	DR120 (686)	Naphthalene	1.00E-01		2.78	99	170	mg/kg OC	0.04	0.02
LDWG 2005b	LDW-SS46	Naphthalene	9.00E-02		2.07	99	170	mg/kg OC	0.04	0.03
LDWG 2005b	LDW-SS47	Naphthalene	7.10E-02		1.45	99	170	mg/kg OC	0.05	0.03
LDWG 2005b	LDW-SSB4a	Naphthalene	4.50E-02		1.82	99	170	mg/kg OC	0.02	0.01
Weston 1999	DR126 (692)	Naphthalene	2.00E-02		3.09	99	170	mg/kg OC	0.01	0.004
Weston 1999	DR054 (620)	n-Butyltin	4.00E-02	J	2.36					
Weston 1999	DR121 (687)	n-Butyltin	1.90E-02	J	2.39					
Weston 1999	DR152 (718)	n-Butyltin	1.00E-02	J	2.37					
LDWG 2005b	LDW-SS59	Nickel	3.30E+01		2.07	140	370	mg/kg DW	0.2	0.1
Weston 1999	DR124 (690)	Nickel	3.06E+01		2.78	140	370	mg/kg DW	0.2	0.1
LDWG 2005b	LDW-SS47	Nickel	3.00E+01		1.45	140	370	mg/kg DW	0.2	0.1
LDWG 2005a	LDW-SS49	Nickel	3.00E+01		2.47	140	370	mg/kg DW	0.2	0.1
Weston 1999	DR054 (620)	Nickel	2.83E+01		2.36	140	370	mg/kg DW	0.2	0.1
LDWG 2005a	LDW-SS58	Nickel	2.80E+01		1.78	140	370	mg/kg DW	0.2	0.1
Weston 1999	DR122 (688)	Nickel	2.73E+01		2.18	140	370	mg/kg DW	0.2	0.1

Table A-1
Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2005b	LDW-SS46	Nickel	2.70E+01		2.07	140	370	mg/kg DW	0.2	0.1
LDWG 2005a	LDW-SS43	Nickel	2.60E+01		1.67	140	370	mg/kg DW	0.2	0.1
LDWG 2005b	LDW-SS53	Nickel	2.60E+01		2.64	140	370	mg/kg DW	0.2	0.1
Weston 1999	DR152 (718)	Nickel	2.55E+01		2.37	140	370	mg/kg DW	0.2	0.1
LDWG 2005b	LDW-SS45	Nickel	2.50E+01		2.81	140	370	mg/kg DW	0.2	0.1
Weston 1999	DR121 (687)	Nickel	2.44E+01		2.39	140	370	mg/kg DW	0.2	0.1
LDWG 2005a	LDW-SS51	Nickel	2.40E+01		2.13	140	370	mg/kg DW	0.2	0.1
LDWG 2005a	LDW-SS57	Nickel	2.30E+01		1.73	140	370	mg/kg DW	0.2	0.1
Weston 1999	DR120 (686)	Nickel	2.10E+01		2.78	140	370	mg/kg DW	0.2	0.1
LDWG 2005a	LDW-SS44	Nickel	2.10E+01		1.53	140	370	mg/kg DW	0.2	0.1
Weston 1999	DR127 (693)	Nickel	2.02E+01		2.78	140	370	mg/kg DW	0.1	0.1
LDWG 2005a	LDW-SS55	Nickel	2.00E+01		1.53	140	370	mg/kg DW	0.1	0.1
Weston 1999	DR126 (692)	Nickel	1.92E+01		3.09	140	370	mg/kg DW	0.1	0.1
Weston 1999	DR159 (725)	Nickel	1.91E+01		2.76	140	370	mg/kg DW	0.1	0.1
LDWG 2005a	LDW-SS56	Nickel	1.60E+01		1.13	140	370	mg/kg DW	0.1	0.04
LDWG 2005b	LDW-SSB4a	Nickel	1.40E+01		1.82	140	370	mg/kg DW	0.1	0.04
LDWG 2005a	LDW-SS48	Nickel[b,c]	8.20E+01		1.36	140	370	mg/kg DW	0.6	0.2
LDWG 2005b	LDW-SS47	N-Nitrosodiphenylamine	1.50E-02		1.45	11	11	mg/kg OC	0.1	0.1
LDWG 2005a	LDW-SS56	OCDD	2.41E-01		1.13					
LDWG 2005a	LDW-SS57	OCDD	1.72E-01		1.73					
LDWG 2005a	LDW-SS58	OCDD	1.24E-01		1.78					
LDWG 2005b	LDW-SS59	OCDD	1.56E-02		2.07					
LDWG 2005a	LDW-SS43	OCDD	6.62E-03		1.67					
LDWG 2005a	LDW-SS56	OCDF	9.37E-02		1.13					
LDWG 2005a	LDW-SS57	OCDF	1.87E-02		1.73					
LDWG 2005a	LDW-SS58	OCDF	9.63E-03		1.78					
LDWG 2005b	LDW-SS59	OCDF	1.03E-03		2.07					
LDWG 2005a	LDW-SS43	OCDF	3.24E-04		1.67					
LDWG 2005b	LDW-SSB4a	PCBs (total calc'd)	8.10E-01		1.82	12	65	mg/kg OC	3.7	0.7
LDWG 2005a	LDW-SS56	PCBs (total calc'd)	7.50E-01	J	1.13	12	65	mg/kg OC	5.5	1.0
LDWG 2005a	LDW-SS57	PCBs (total calc'd)	7.50E-01		1.73	12	65	mg/kg OC	3.6	0.7
LDWG 2005b	LDW-SS45	PCBs (total calc'd)	2.90E-01		2.81	12	65	mg/kg OC	0.9	0.2
LDWG 2005a	LDW-SS58	PCBs (total calc'd)	2.60E-01		1.78	12	65	mg/kg OC	1.2	0.2
LDWG 2005b	LDW-SS46	PCBs (total calc'd)	2.40E-01		2.07	12	65	mg/kg OC	1.0	0.2
LDWG 2005b	LDW-SS53	PCBs (total calc'd)	2.20E-01		2.64	12	65	mg/kg OC	0.7	0.1

Table A-1
Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2005a	LDW-SS51	PCBs (total calc'd)	1.55E-01	J	2.13	12	65	mg/kg OC	0.6	0.1
LDWG 2005a	LDW-SS48	PCBs (total calc'd)	1.31E-01	J	1.36	12	65	mg/kg OC	0.8	0.1
LDWG 2005a	LDW-SS44	PCBs (total calc'd)	1.03E-01	J	1.53	12	65	mg/kg OC	0.6	0.1
LDWG 2005b	LDW-SS47	PCBs (total calc'd)	7.00E-02		1.45	12	65	mg/kg OC	0.4	0.1
LDWG 2005a	LDW-SS49	PCBs (total calc'd)	7.00E-02		2.47	12	65	mg/kg OC	0.2	0.04
LDWG 2005b	LDW-SS59	PCBs (total calc'd)	5.30E-02		2.07	12	65	mg/kg OC	0.2	0.04
LDWG 2005a	LDW-SS55	PCBs (total calc'd)	2.40E-02	J	1.53	12	65	mg/kg OC	0.1	0.02
LDWG 2005a	LDW-SS43	PCBs (total calc'd)	1.80E-02	J	1.67	12	65	mg/kg OC	0.1	0.02
Weston 1999	DR120 (686)	PCBs (total-calc'd)	1.88E-01		2.78	12	65	mg/kg OC	0.6	0.1
Weston 1999	DR126 (692)	PCBs (total-calc'd)	1.81E-01		3.09	12	65	mg/kg OC	0.5	0.1
Weston 1999	DR127 (693)	PCBs (total-calc'd)	1.79E-01		2.78	12	65	mg/kg OC	0.5	0.1
Weston 1999	DR124 (690)	PCBs (total-calc'd)	1.61E-01		2.78	12	65	mg/kg OC	0.5	0.1
Weston 1999	DR152 (718)	PCBs (total-calc'd)	1.24E-01		2.37	12	65	mg/kg OC	0.4	0.1
Weston 1999	DR122 (688)	PCBs (total-calc'd)	1.23E-01		2.18	12	65	mg/kg OC	0.5	0.1
Weston 1999	DR159 (725)	PCBs (total-calc'd)	1.18E-01	J	2.76	12	65	mg/kg OC	0.4	0.1
Weston 1999	DR121 (687)	PCBs (total-calc'd)	9.80E-02		2.39	12	65	mg/kg OC	0.3	0.1
Weston 1999	DR054 (620)	PCBs (total-calc'd)	9.70E-02		2.36	12	65	mg/kg OC	0.3	0.1
NOAA 1998	WST354 (329)	PCBs (total-calc'd)	7.40E-02		2.24	12	65	mg/kg OC	0.01	0.001
LDWG 2005b	LDW-SSB4a	Pentachlorophenol	4.10E-01		1.82	360	690	ug/kg DW	1.1	0.59
LDWG 2005b	LDW-SS46	Pentachlorophenol	7.60E-02		2.07	360	690	ug/kg DW	0.21	0.11
Weston 1999	DR120 (686)	Phenanthrene	3.90E+00		2.78	100	480	mg/kg OC	1.4	0.3
LDWG 2005a	LDW-SS48	Phenanthrene	1.70E+00		1.36	100	480	mg/kg OC	1.3	0.3
LDWG 2005b	LDW-SS47	Phenanthrene	1.00E+00		1.45	100	480	mg/kg OC	0.7	0.1
LDWG 2005b	LDW-SS46	Phenanthrene	9.10E-01		2.07	100	480	mg/kg OC	0.4	0.1
LDWG 2005a	LDW-SS49	Phenanthrene	4.90E-01		2.47	100	480	mg/kg OC	0.2	0.04
LDWG 2005a	LDW-SS55	Phenanthrene	4.70E-01		1.53	100	480	mg/kg OC	0.3	0.1
Weston 1999	DR126 (692)	Phenanthrene	4.60E-01		3.09	100	480	mg/kg OC	0.1	0.03
LDWG 2005a	LDW-SS44	Phenanthrene	4.50E-01		1.53	100	480	mg/kg OC	0.3	0.1
Weston 1999	DR124 (690)	Phenanthrene	4.30E-01		2.78	100	480	mg/kg OC	0.2	0.03
Weston 1999	DR159 (725)	Phenanthrene	3.90E-01		2.76	100	480	mg/kg OC	0.1	0.03
Weston 1999	DR127 (693)	Phenanthrene	3.10E-01		2.78	100	480	mg/kg OC	0.1	0.02
Weston 1999	DR054 (620)	Phenanthrene	2.40E-01		2.36	100	480	mg/kg OC	0.1	0.02
Weston 1999	DR122 (688)	Phenanthrene	2.40E-01		2.18	100	480	mg/kg OC	0.1	0.02
LDWG 2005b	LDW-SSB4a	Phenanthrene	2.20E-01		1.82	100	480	mg/kg OC	0.1	0.03
LDWG 2005a	LDW-SS57	Phenanthrene	1.90E-01		1.73	100	480	mg/kg OC	0.1	0.02

Table A-1
Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
Weston 1999	DR152 (718)	Phenanthrene	1.80E-01		2.37	100	480	mg/kg OC	0.1	0.02
LDWG 2005b	LDW-SS45	Phenanthrene	1.80E-01		2.81	100	480	mg/kg OC	0.1	0.01
LDWG 2005b	LDW-SS53	Phenanthrene	1.80E-01		2.64	100	480	mg/kg OC	0.1	0.01
Weston 1999	DR121 (687)	Phenanthrene	1.70E-01		2.39	100	480	mg/kg OC	0.1	0.01
LDWG 2005a	LDW-SS58	Phenanthrene	1.70E-01		1.78	100	480	mg/kg OC	0.1	0.02
LDWG 2005b	LDW-SS59	Phenanthrene	1.70E-01		2.07	100	480	mg/kg OC	0.1	0.02
LDWG 2005a	LDW-SS56	Phenanthrene	1.60E-01		1.13	100	480	mg/kg OC	0.1	0.03
LDWG 2005a	LDW-SS51	Phenanthrene	1.10E-01		2.13	100	480	mg/kg OC	0.1	0.01
LDWG 2005a	LDW-SS43	Phenanthrene	6.80E-02		1.67	100	480	mg/kg OC	0.04	0.01
LDWG 2005a	LDW-SS48	Phenol	3.70E-01		1.36	420	1200	ug/kg DW	0.9	0.3
Weston 1999	DR122 (688)	Phenol	3.20E-01		2.18	420	1200	ug/kg DW	0.8	0.3
LDWG 2005a	LDW-SS49	Phenol	2.40E-01		2.47	420	1200	ug/kg DW	0.6	0.2
LDWG 2005b	LDW-SS47	Phenol	2.20E-01		1.45	420	1200	ug/kg DW	0.5	0.2
Weston 1999	DR120 (686)	Phenol	8.00E-02		2.78	420	1200	ug/kg DW	0.2	0.1
Weston 1999	DR054 (620)	Phenol	7.00E-02		2.36	420	1200	ug/kg DW	0.2	0.1
LDWG 2005b	LDW-SS46	Phenol	6.20E-02		2.07	420	1200	ug/kg DW	0.1	0.1
Weston 1999	DR121 (687)	Phenol	3.00E-02		2.39	420	1200	ug/kg DW	0.1	0.03
Weston 1999	DR159 (725)	Phenol	3.00E-02		2.76	420	1200	ug/kg DW	0.1	0.03
Weston 1999	DR126 (692)	Phenol	2.00E-02		3.09	420	1200	ug/kg DW	0.05	0.02
Weston 1999	DR120 (686)	Pyrene	4.90E+00		2.78	1000	1400	mg/kg OC	0.2	0.1
LDWG 2005b	LDW-SS46	Pyrene	2.40E+00		2.07	1000	1400	mg/kg OC	0.1	0.1
LDWG 2005a	LDW-SS48	Pyrene	2.30E+00		1.36	1000	1400	mg/kg OC	0.2	0.1
LDWG 2005a	LDW-SS44	Pyrene	1.10E+00		1.53	1000	1400	mg/kg OC	0.1	0.1
Weston 1999	DR124 (690)	Pyrene	1.00E+00		2.78	1000	1400	mg/kg OC	0.04	0.03
LDWG 2005b	LDW-SS47	Pyrene	9.80E-01		1.45	1000	1400	mg/kg OC	0.1	0.05
Weston 1999	DR126 (692)	Pyrene	8.80E-01		3.09	1000	1400	mg/kg OC	0.03	0.02
Weston 1999	DR159 (725)	Pyrene	7.50E-01		2.76	1000	1400	mg/kg OC	0.03	0.02
Weston 1999	DR127 (693)	Pyrene	7.30E-01		2.78	1000	1400	mg/kg OC	0.03	0.02
LDWG 2005a	LDW-SS49	Pyrene	7.20E-01		2.47	1000	1400	mg/kg OC	0.03	0.02
Weston 1999	DR122 (688)	Pyrene	7.00E-01		2.18	1000	1400	mg/kg OC	0.03	0.02
Weston 1999	DR054 (620)	Pyrene	6.90E-01		2.36	1000	1400	mg/kg OC	0.03	0.02
LDWG 2005a	LDW-SS55	Pyrene	5.90E-01		1.53	1000	1400	mg/kg OC	0.04	0.03
LDWG 2005a	LDW-SS57	Pyrene	5.80E-01		1.73	1000	1400	mg/kg OC	0.03	0.02
Weston 1999	DR152 (718)	Pyrene	5.40E-01		2.37	1000	1400	mg/kg OC	0.02	0.02
LDWG 2005b	LDW-SSB4a	Pyrene	5.40E-01		1.82	1000	1400	mg/kg OC	0.03	0.02

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Surface Sediment Sampling Results
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Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2005a	LDW-SS56	Pyrene	5.30E-01		1.13	1000	1400	mg/kg OC	0.05	0.03
Weston 1999	DR121 (687)	Pyrene	4.60E-01		2.39	1000	1400	mg/kg OC	0.02	0.01
LDWG 2005b	LDW-SS45	Pyrene	4.40E-01		2.81	1000	1400	mg/kg OC	0.02	0.01
LDWG 2005b	LDW-SS53	Pyrene	4.20E-01		2.64	1000	1400	mg/kg OC	0.02	0.01
LDWG 2005a	LDW-SS58	Pyrene	4.00E-01		1.78	1000	1400	mg/kg OC	0.02	0.02
LDWG 2005b	LDW-SS59	Pyrene	3.60E-01		2.07	1000	1400	mg/kg OC	0.02	0.01
LDWG 2005a	LDW-SS51	Pyrene	2.40E-01		2.13	1000	1400	mg/kg OC	0.01	0.01
LDWG 2005a	LDW-SS43	Pyrene	1.80E-01		1.67	1000	1400	mg/kg OC	0.01	0.01
Weston 1999	DR121 (687)	Selenium	1.79E+01	J	2.39					
Weston 1999	DR152 (718)	Selenium	1.60E+01		2.37					
Weston 1999	DR159 (725)	Selenium	6.00E+00		2.76					
Weston 1999	DR120 (686)	Selenium	1.00E+00		2.78					
Weston 1999	DR127 (693)	Selenium	1.00E+00		2.78					
Weston 1999	DR126 (692)	Selenium	8.00E-01	J	3.09					
Weston 1999	DR054 (620)	Selenium	5.00E-01	J	2.36					
LDWG 2005a	LDW-SS58	Silver	1.10E+00		1.78	6.1	6.1	mg/kg DW	0.2	0.2
LDWG 2005a	LDW-SS56	Silver	9.00E-01		1.13	6.1	6.1	mg/kg DW	0.1	0.1
LDWG 2005a	LDW-SS57	Silver	9.00E-01		1.73	6.1	6.1	mg/kg DW	0.1	0.1
LDWG 2005b	LDW-SSB4a	Silver	9.00E-01		1.82	6.1	6.1	mg/kg DW	0.1	0.1
LDWG 2005a	LDW-SS51	Silver	8.00E-01		2.13	6.1	6.1	mg/kg DW	0.1	0.1
LDWG 2005a	LDW-SS55	Silver	6.00E-01		1.53	6.1	6.1	mg/kg DW	0.1	0.1
Weston 1999	DR120 (686)	Silver	3.90E-01		2.78	6.1	6.1	mg/kg DW	0.1	0.1
Weston 1999	DR152 (718)	Silver	3.70E-01		2.37	6.1	6.1	mg/kg DW	0.1	0.1
Weston 1999	DR121 (687)	Silver	3.50E-01		2.39	6.1	6.1	mg/kg DW	0.1	0.1
Weston 1999	DR124 (690)	Silver	3.50E-01	J	2.78	6.1	6.1	mg/kg DW	0.1	0.1
Weston 1999	DR126 (692)	Silver	3.50E-01		3.09	6.1	6.1	mg/kg DW	0.1	0.1
Weston 1999	DR122 (688)	Silver	3.10E-01		2.18	6.1	6.1	mg/kg DW	0.1	0.1
Weston 1999	DR127 (693)	Silver	3.10E-01		2.78	6.1	6.1	mg/kg DW	0.1	0.1
Weston 1999	DR054 (620)	Silver	2.80E-01		2.36	6.1	6.1	mg/kg DW	0.05	0.05
Weston 1999	DR159 (725)	Silver	2.60E-01		2.76	6.1	6.1	mg/kg DW	0.04	0.04
Weston 1999	DR054 (620)	Tetrabutyltin as ion	6.00E-03		2.36					
Weston 1999	DR152 (718)	Tetrabutyltin as ion	5.00E-03	J	2.37					
LDWG 2005b	LDW-SS45	Thallium	5.00E-01		2.81					
LDWG 2005a	LDW-SS48	Thallium	4.00E-01		1.36					
Weston 1999	DR122 (688)	Thallium	2.10E-01	J	2.18					

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Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
Weston 1999	DR152 (718)	Thallium	1.40E-01		2.37					
Weston 1999	DR054 (620)	Thallium	1.30E-01		2.36					
Weston 1999	DR127 (693)	Thallium	1.30E-01		2.78					
Weston 1999	DR120 (686)	Thallium	1.20E-01		2.78					
Weston 1999	DR126 (692)	Thallium	1.20E-01		3.09					
Weston 1999	DR124 (690)	Thallium	1.10E-01		2.78					
Weston 1999	DR121 (687)	Thallium	1.00E-01		2.39					
Weston 1999	DR159 (725)	Thallium	9.00E-02		2.76					
Weston 1999	DR124 (690)	Tin	1.37E+02	J	2.78					
Weston 1999	DR122 (688)	Tin	4.90E+01	J	2.18					
Weston 1999	DR121 (687)	Tin	1.90E+01		2.39					
Weston 1999	DR126 (692)	Tin	1.40E+01		3.09					
Weston 1999	DR127 (693)	Tin	1.10E+01		2.78					
Weston 1999	DR054 (620)	Tin	1.00E+01		2.36					
Weston 1999	DR152 (718)	Tin	1.00E+01		2.37					
Weston 1999	DR120 (686)	Tin	9.00E+00		2.78					
Weston 1999	DR159 (725)	Tin	4.00E+00		2.76					
Weston 1999	DR120 (686)	Total HPAH (calc'd)	2.91E+01		2.78	960	5300	mg/kg OC	1.1	0.2
LDWG 2005a	LDW-SS48	Total HPAH (calc'd)	1.21E+01		1.36	960	5300	mg/kg OC	0.9	0.2
LDWG 2005b	LDW-SS46	Total HPAH (calc'd)	1.18E+01	J	2.07	960	5300	mg/kg OC	0.6	0.1
Weston 1999	DR124 (690)	Total HPAH (calc'd)	7.30E+00		2.78	960	5300	mg/kg OC	0.3	0.05
Weston 1999	DR126 (692)	Total HPAH (calc'd)	5.40E+00		3.09	960	5300	mg/kg OC	0.2	0.03
LDWG 2005b	LDW-SS47	Total HPAH (calc'd)	5.20E+00		1.45	960	5300	mg/kg OC	0.4	0.1
LDWG 2005a	LDW-SS44	Total HPAH (calc'd)	5.10E+00		1.53	960	5300	mg/kg OC	0.3	0.1
LDWG 2005b	LDW-SS53	Total HPAH (calc'd)	4.50E+00		2.64	960	5300	mg/kg OC	0.2	0.03
Weston 1999	DR127 (693)	Total HPAH (calc'd)	4.37E+00		2.78	960	5300	mg/kg OC	0.2	0.03
Weston 1999	DR122 (688)	Total HPAH (calc'd)	4.18E+00		2.18	960	5300	mg/kg OC	0.2	0.04
Weston 1999	DR054 (620)	Total HPAH (calc'd)	3.80E+00		2.36	960	5300	mg/kg OC	0.2	0.03
LDWG 2005a	LDW-SS49	Total HPAH (calc'd)	3.70E+00		2.47	960	5300	mg/kg OC	0.2	0.03
Weston 1999	DR159 (725)	Total HPAH (calc'd)	3.61E+00		2.76	960	5300	mg/kg OC	0.1	0.02
LDWG 2005b	LDW-SSB4a	Total HPAH (calc'd)	3.46E+00		1.82	960	5300	mg/kg OC	0.2	0.04
LDWG 2005b	LDW-SS59	Total HPAH (calc'd)	3.11E+00		2.07	960	5300	mg/kg OC	0.2	0.03
Weston 1999	DR121 (687)	Total HPAH (calc'd)	2.81E+00		2.39	960	5300	mg/kg OC	0.1	0.02
Weston 1999	DR152 (718)	Total HPAH (calc'd)	2.72E+00		2.37	960	5300	mg/kg OC	0.1	0.02
LDWG 2005a	LDW-SS56	Total HPAH (calc'd)	2.70E+00		1.13	960	5300	mg/kg OC	0.2	0.05

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Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2005b	LDW-SS45	Total HPAH (calc'd)	2.61E+00		2.81	960	5300	mg/kg OC	0.1	0.02
LDWG 2005a	LDW-SS57	Total HPAH (calc'd)	2.49E+00	J	1.73	960	5300	mg/kg OC	0.1	0.03
LDWG 2005a	LDW-SS55	Total HPAH (calc'd)	2.12E+00		1.53	960	5300	mg/kg OC	0.1	0.03
LDWG 2005a	LDW-SS58	Total HPAH (calc'd)	1.95E+00	J	1.78	960	5300	mg/kg OC	0.1	0.02
LDWG 2005a	LDW-SS51	Total HPAH (calc'd)	1.45E+00		2.13	960	5300	mg/kg OC	0.1	0.01
LDWG 2005a	LDW-SS43	Total HPAH (calc'd)	1.13E+00		1.67	960	5300	mg/kg OC	0.1	0.01
Weston 1999	DR120 (686)	Total LPAH (calc'd)	4.89E+00		2.78	370	780	mg/kg OC	0.5	0.2
LDWG 2005a	LDW-SS48	Total LPAH (calc'd)	2.90E+00		1.36	370	780	mg/kg OC	0.6	0.3
LDWG 2005b	LDW-SS47	Total LPAH (calc'd)	1.60E+00		1.45	370	780	mg/kg OC	0.3	0.1
LDWG 2005b	LDW-SS46	Total LPAH (calc'd)	1.54E+00		2.07	370	780	mg/kg OC	0.2	0.1
LDWG 2005a	LDW-SS55	Total LPAH (calc'd)	1.14E+00	J	1.53	370	780	mg/kg OC	0.2	0.1
Weston 1999	DR126 (692)	Total LPAH (calc'd)	8.20E-01		3.09	370	780	mg/kg OC	0.1	0.03
LDWG 2005a	LDW-SS49	Total LPAH (calc'd)	7.60E-01	J	2.47	370	780	mg/kg OC	0.1	0.04
LDWG 2005a	LDW-SS44	Total LPAH (calc'd)	7.10E-01		1.53	370	780	mg/kg OC	0.1	0.1
Weston 1999	DR124 (690)	Total LPAH (calc'd)	6.20E-01		2.78	370	780	mg/kg OC	0.1	0.03
Weston 1999	DR159 (725)	Total LPAH (calc'd)	5.80E-01		2.76	370	780	mg/kg OC	0.1	0.03
Weston 1999	DR127 (693)	Total LPAH (calc'd)	5.30E-01		2.78	370	780	mg/kg OC	0.1	0.02
LDWG 2005b	LDW-SSB4a	Total LPAH (calc'd)	4.30E-01		1.82	370	780	mg/kg OC	0.1	0.03
Weston 1999	DR054 (620)	Total LPAH (calc'd)	4.10E-01		2.36	370	780	mg/kg OC	0.0	0.02
Weston 1999	DR122 (688)	Total LPAH (calc'd)	3.90E-01		2.18	370	780	mg/kg OC	0.0	0.02
LDWG 2005b	LDW-SS53	Total LPAH (calc'd)	3.00E-01		2.64	370	780	mg/kg OC	0.0	0.01
Weston 1999	DR121 (687)	Total LPAH (calc'd)	2.90E-01		2.39	370	780	mg/kg OC	0.0	0.02
LDWG 2005a	LDW-SS56	Total LPAH (calc'd)	2.90E-01	J	1.13	370	780	mg/kg OC	0.1	0.03
Weston 1999	DR152 (718)	Total LPAH (calc'd)	2.80E-01		2.37	370	780	mg/kg OC	0.03	0.02
LDWG 2005b	LDW-SS45	Total LPAH (calc'd)	2.70E-01		2.81	370	780	mg/kg OC	0.03	0.01
LDWG 2005b	LDW-SS59	Total LPAH (calc'd)	2.50E-01		2.07	370	780	mg/kg OC	0.03	0.02
LDWG 2005a	LDW-SS57	Total LPAH (calc'd)	1.90E-01		1.73	370	780	mg/kg OC	0.03	0.01
LDWG 2005a	LDW-SS58	Total LPAH (calc'd)	1.70E-01		1.78	370	780	mg/kg OC	0.03	0.01
LDWG 2005a	LDW-SS51	Total LPAH (calc'd)	1.50E-01		2.13	370	780	mg/kg OC	0.02	0.01
LDWG 2005a	LDW-SS43	Total LPAH (calc'd)	9.00E-02		1.67	370	780	mg/kg OC	0.01	0.01
LDWG 2005b	LDW-SS46	Tributyltin as ion	3.00E+00		2.07					
LDWG 2005b	LDW-SS45	Tributyltin as ion	2.60E-01		2.81					
LDWG 2005b	LDW-SS47	Tributyltin as ion	2.30E-01	J	1.45					
Weston 1999	DR054 (620)	Tributyltin as ion	1.90E-01		2.36					
LDWG 2005a	LDW-SS49	Tributyltin as ion	1.40E-01		2.47					

Table A-1
Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
Weston 1999	DR121 (687)	Tributyltin as ion	1.15E-01	J	2.39					
LDWG 2005a	LDW-SS43	Tributyltin as ion	9.90E-02		1.67					
LDWG 2005a	LDW-SS56	Tributyltin as ion	9.60E-02		1.13					
Weston 1999	DR152 (718)	Tributyltin as ion	6.80E-02	J	2.37					
LDWG 2005a	LDW-SS51	Tributyltin as ion	2.80E-02		2.13					
LDWG 2005a	LDW-SS58	Tributyltin as ion	2.80E-02		1.78					
LDWG 2005a	LDW-SS55	Tributyltin as ion	1.60E-02		1.53					
LDWG 2005b	LDW-SS53	Tributyltin as ion	6.30E-03		2.64					
LDWG 2005b	LDW-SS46	Vanadium	8.60E+01		2.07					
Weston 1999	DR121 (687)	Vanadium	8.30E+01		2.39					
LDWG 2005b	LDW-SS53	Vanadium	8.11E+01		2.64					
Weston 1999	DR122 (688)	Vanadium	7.90E+01		2.18					
LDWG 2005a	LDW-SS49	Vanadium	7.90E+01		2.47					
LDWG 2005b	LDW-SS47	Vanadium	7.70E+01		1.45					
LDWG 2005b	LDW-SS45	Vanadium	7.69E+01		2.81					
LDWG 2005a	LDW-SS48	Vanadium	7.60E+01		1.36					
Weston 1999	DR152 (718)	Vanadium	7.50E+01		2.37					
LDWG 2005a	LDW-SS51	Vanadium	7.32E+01		2.13					
LDWG 2005a	LDW-SS57	Vanadium	7.26E+01		1.73					
LDWG 2005a	LDW-SS43	Vanadium	7.22E+01		1.67					
Weston 1999	DR054 (620)	Vanadium	7.00E+01		2.36					
LDWG 2005a	LDW-SS58	Vanadium	6.87E+01		1.78					
LDWG 2005b	LDW-SS59	Vanadium	6.74E+01		2.07					
Weston 1999	DR124 (690)	Vanadium	6.60E+01		2.78					
LDWG 2005a	LDW-SS55	Vanadium	6.35E+01		1.53					
LDWG 2005a	LDW-SS44	Vanadium	6.10E+01		1.53					
Weston 1999	DR127 (693)	Vanadium	6.00E+01		2.78					
LDWG 2005a	LDW-SS56	Vanadium	5.93E+01		1.13					
Weston 1999	DR126 (692)	Vanadium	5.50E+01		3.09					
LDWG 2005b	LDW-SSB4a	Vanadium	5.49E+01		1.82					
Weston 1999	DR120 (686)	Vanadium	5.40E+01		2.78					
Weston 1999	DR159 (725)	Vanadium	5.10E+01		2.76					
LDWG 2005a	LDW-SS48	Zinc	2.83E+03		1.36	410	960	mg/kg DW	6.9	2.9
LDWG 2005b	LDW-SS47	Zinc	8.78E+02		1.45	410	960	mg/kg DW	2.1	0.9
LDWG 2005b	LDW-SS46	Zinc	7.94E+02		2.07	410	960	mg/kg DW	1.9	0.8

Table A-1
Surface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Chemical	Conc'n (mg/kg DW)		TOC %	SQS	CSL	Units	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2005a	LDW-SS49	Zinc	7.68E+02		2.47	410	960	mg/kg DW	1.9	0.8
LDWG 2005a	LDW-SS56	Zinc	6.07E+02		1.13	410	960	mg/kg DW	1.5	0.6
Weston 1999	DR124 (690)	Zinc	2.82E+02		2.78	410	960	mg/kg DW	0.7	0.3
LDWG 2005a	LDW-SS58	Zinc	2.81E+02		1.78	410	960	mg/kg DW	0.7	0.3
LDWG 2005a	LDW-SS57	Zinc	2.62E+02		1.73	410	960	mg/kg DW	0.6	0.3
LDWG 2005b	LDW-SS53	Zinc	2.47E+02	J	2.64	410	960	mg/kg DW	0.6	0.3
LDWG 2005a	LDW-SS44	Zinc	2.42E+02		1.53	410	960	mg/kg DW	0.6	0.3
Weston 1999	DR120 (686)	Zinc	2.35E+02		2.78	410	960	mg/kg DW	0.6	0.2
LDWG 2005b	LDW-SS59	Zinc	2.19E+02	J	2.07	410	960	mg/kg DW	0.5	0.2
LDWG 2005b	LDW-SS45	Zinc	2.17E+02		2.81	410	960	mg/kg DW	0.5	0.2
LDWG 2005b	LDW-SSB4a	Zinc	2.14E+02	J	1.82	410	960	mg/kg DW	0.5	0.2
LDWG 2005a	LDW-SS51	Zinc	1.90E+02		2.13	410	960	mg/kg DW	0.5	0.2
Weston 1999	DR054 (620)	Zinc	1.70E+02		2.36	410	960	mg/kg DW	0.4	0.2
Weston 1999	DR121 (687)	Zinc	1.68E+02		2.39	410	960	mg/kg DW	0.4	0.2
LDWG 2005a	LDW-SS43	Zinc	1.65E+02		1.67	410	960	mg/kg DW	0.4	0.2
Weston 1999	DR122 (688)	Zinc	1.64E+02		2.18	410	960	mg/kg DW	0.4	0.2
LDWG 2005a	LDW-SS55	Zinc	1.51E+02		1.53	410	960	mg/kg DW	0.4	0.2
Weston 1999	DR127 (693)	Zinc	1.38E+02		2.78	410	960	mg/kg DW	0.3	0.1
Weston 1999	DR126 (692)	Zinc	1.35E+02		3.09	410	960	mg/kg DW	0.3	0.1
Weston 1999	DR152 (718)	Zinc	1.21E+02		2.37	410	960	mg/kg DW	0.3	0.1
Weston 1999	DR159 (725)	Zinc	1.04E+02		2.76	410	960	mg/kg DW	0.3	0.1

a - Exceedance factors are the ratio of the detected concentration to the CSL or SQS; an exceedance factor greater than 1 indicates that the measured concentration is higher than the corresponding CSL or SQS.
Table presents detections only.
DW - Dry weight
OC - Organic carbon normalized

Table A-2
Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC26	0 - 1	1,2,3,4,6,7,8-HpCDD	4.86E-04	1.4						
LDWG 2007	LDW-SC26	1 - 2	1,2,3,4,6,7,8-HpCDD	3.93E-04	2.04						
LDWG 2007	LDW-SC26	2 - 4	1,2,3,4,6,7,8-HpCDD	7.32E-04	2.08						
LDWG 2007	LDW-SC26	6 - 8	1,2,3,4,6,7,8-HpCDD	5.93E-03	1.88						
LDWG 2007	LDW-SC28	0 - 1	1,2,3,4,6,7,8-HpCDD	6.38E-04	2.59						
LDWG 2007	LDW-SC28	1 - 2	1,2,3,4,6,7,8-HpCDD	5.13E-04	2.07						
LDWG 2007	LDW-SC28	2 - 4	1,2,3,4,6,7,8-HpCDD	4.96E-04	3.14						
LDWG 2007	LDW-SC29	0 - 1	1,2,3,4,6,7,8-HpCDD	1.27E-03	1.77						
LDWG 2007	LDW-SC29	1 - 2	1,2,3,4,6,7,8-HpCDD	3.11E-05	1.06						
LDWG 2007	LDW-SC29	2 - 3.6	1,2,3,4,6,7,8-HpCDD	2.56E-06	0.48						
LDWG 2007	LDW-SC26	0 - 1	1,2,3,4,6,7,8-HpCDF	1.06E-04	1.4						
LDWG 2007	LDW-SC26	1 - 2	1,2,3,4,6,7,8-HpCDF	6.36E-05	2.04						
LDWG 2007	LDW-SC26	2 - 4	1,2,3,4,6,7,8-HpCDF	1.18E-04	2.08						
LDWG 2007	LDW-SC26	6 - 8	1,2,3,4,6,7,8-HpCDF	8.73E-04	1.88						
LDWG 2007	LDW-SC28	0 - 1	1,2,3,4,6,7,8-HpCDF	1.43E-04	2.59						
LDWG 2007	LDW-SC28	1 - 2	1,2,3,4,6,7,8-HpCDF	7.38E-05	2.07						
LDWG 2007	LDW-SC28	2 - 4	1,2,3,4,6,7,8-HpCDF	8.78E-05	3.14						
LDWG 2007	LDW-SC29	0 - 1	1,2,3,4,6,7,8-HpCDF	5.08E-04	1.77						
LDWG 2007	LDW-SC29	1 - 2	1,2,3,4,6,7,8-HpCDF	1.11E-05	1.06						
LDWG 2007	LDW-SC29	2 - 3.6	1,2,3,4,6,7,8-HpCDF	7.43E-07 J	0.48						
LDWG 2007	LDW-SC26	0 - 1	1,2,3,4,7,8,9-HpCDF	9.01E-06	1.4						
LDWG 2007	LDW-SC26	1 - 2	1,2,3,4,7,8,9-HpCDF	5.67E-06	2.04						
LDWG 2007	LDW-SC26	2 - 4	1,2,3,4,7,8,9-HpCDF	1.10E-05	2.08						
LDWG 2007	LDW-SC26	6 - 8	1,2,3,4,7,8,9-HpCDF	6.34E-05	1.88						
LDWG 2007	LDW-SC28	0 - 1	1,2,3,4,7,8,9-HpCDF	1.21E-05	2.59						
LDWG 2007	LDW-SC28	1 - 2	1,2,3,4,7,8,9-HpCDF	6.35E-06	2.07						
LDWG 2007	LDW-SC28	2 - 4	1,2,3,4,7,8,9-HpCDF	8.85E-06	3.14						
LDWG 2007	LDW-SC29	0 - 1	1,2,3,4,7,8,9-HpCDF	6.62E-05	1.77						
LDWG 2007	LDW-SC29	1 - 2	1,2,3,4,7,8,9-HpCDF	1.47E-06	1.06						
LDWG 2007	LDW-SC26	0 - 1	1,2,3,4,7,8-HxCDD	2.83E-06	1.4						
LDWG 2007	LDW-SC26	1 - 2	1,2,3,4,7,8-HxCDD	2.87E-06	2.04						
LDWG 2007	LDW-SC26	2 - 4	1,2,3,4,7,8-HxCDD	3.90E-06	2.08						
LDWG 2007	LDW-SC26	6 - 8	1,2,3,4,7,8-HxCDD	1.12E-05	1.88						
LDWG 2007	LDW-SC28	0 - 1	1,2,3,4,7,8-HxCDD	3.39E-06	2.59						
LDWG 2007	LDW-SC28	1 - 2	1,2,3,4,7,8-HxCDD	2.51E-06	2.07						

Table A-2
Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC28	2 - 4	1,2,3,4,7,8-HxCDD	2.70E-06	3.14						
LDWG 2007	LDW-SC29	0 - 1	1,2,3,4,7,8-HxCDD	1.40E-06	1.77						
LDWG 2007	LDW-SC26	0 - 1	1,2,3,4,7,8-HxCDF	1.17E-05	1.4						
LDWG 2007	LDW-SC26	1 - 2	1,2,3,4,7,8-HxCDF	9.12E-06	2.04						
LDWG 2007	LDW-SC26	2 - 4	1,2,3,4,7,8-HxCDF	1.59E-05	2.08						
LDWG 2007	LDW-SC26	6 - 8	1,2,3,4,7,8-HxCDF	4.06E-05	1.88						
LDWG 2007	LDW-SC28	0 - 1	1,2,3,4,7,8-HxCDF	1.41E-05	2.59						
LDWG 2007	LDW-SC28	1 - 2	1,2,3,4,7,8-HxCDF	1.05E-05	2.07						
LDWG 2007	LDW-SC28	2 - 4	1,2,3,4,7,8-HxCDF	2.66E-05	3.14						
LDWG 2007	LDW-SC29	0 - 1	1,2,3,4,7,8-HxCDF	1.52E-04	1.77						
LDWG 2007	LDW-SC29	1 - 2	1,2,3,4,7,8-HxCDF	1.48E-06	1.06						
LDWG 2007	LDW-SC29	2 - 3.6	1,2,3,4,7,8-HxCDF	1.76E-07 J	0.48						
LDWG 2007	LDW-SC26	0 - 1	1,2,3,6,7,8-HxCDD	1.69E-05	1.4						
LDWG 2007	LDW-SC26	1 - 2	1,2,3,6,7,8-HxCDD	1.41E-05	2.04						
LDWG 2007	LDW-SC26	2 - 4	1,2,3,6,7,8-HxCDD	2.44E-05	2.08						
LDWG 2007	LDW-SC26	6 - 8	1,2,3,6,7,8-HxCDD	1.84E-04	1.88						
LDWG 2007	LDW-SC28	0 - 1	1,2,3,6,7,8-HxCDD	2.18E-05	2.59						
LDWG 2007	LDW-SC28	1 - 2	1,2,3,6,7,8-HxCDD	1.75E-05	2.07						
LDWG 2007	LDW-SC28	2 - 4	1,2,3,6,7,8-HxCDD	1.87E-05	3.14						
LDWG 2007	LDW-SC29	0 - 1	1,2,3,6,7,8-HxCDD	4.45E-05	1.77						
LDWG 2007	LDW-SC29	1 - 2	1,2,3,6,7,8-HxCDD	8.91E-07	1.06						
LDWG 2007	LDW-SC29	2 - 3.6	1,2,3,6,7,8-HxCDD	1.03E-07 J	0.48						
LDWG 2007	LDW-SC26	0 - 1	1,2,3,6,7,8-HxCDF	3.56E-06	1.4						
LDWG 2007	LDW-SC26	1 - 2	1,2,3,6,7,8-HxCDF	2.99E-06	2.04						
LDWG 2007	LDW-SC26	2 - 4	1,2,3,6,7,8-HxCDF	4.50E-06	2.08						
LDWG 2007	LDW-SC26	6 - 8	1,2,3,6,7,8-HxCDF	1.27E-05	1.88						
LDWG 2007	LDW-SC28	0 - 1	1,2,3,6,7,8-HxCDF	3.84E-06	2.59						
LDWG 2007	LDW-SC28	1 - 2	1,2,3,6,7,8-HxCDF	3.03E-06	2.07						
LDWG 2007	LDW-SC28	2 - 4	1,2,3,6,7,8-HxCDF	5.78E-06	3.14						
LDWG 2007	LDW-SC29	0 - 1	1,2,3,6,7,8-HxCDF	2.43E-05	1.77						
LDWG 2007	LDW-SC29	1 - 2	1,2,3,6,7,8-HxCDF	3.11E-07 J	1.06						
LDWG 2007	LDW-SC26	0 - 1	1,2,3,7,8,9-HxCDD	1.05E-05	1.4						
LDWG 2007	LDW-SC26	1 - 2	1,2,3,7,8,9-HxCDD	9.44E-06	2.04						
LDWG 2007	LDW-SC26	2 - 4	1,2,3,7,8,9-HxCDD	1.35E-05	2.08						
LDWG 2007	LDW-SC26	6 - 8	1,2,3,7,8,9-HxCDD	5.23E-05	1.88						

Table A-2
Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC28	0 - 1	1,2,3,7,8,9-HxCDD	1.14E-05	2.59						
LDWG 2007	LDW-SC28	1 - 2	1,2,3,7,8,9-HxCDD	9.85E-06	2.07						
LDWG 2007	LDW-SC28	2 - 4	1,2,3,7,8,9-HxCDD	1.01E-05	3.14						
LDWG 2007	LDW-SC29	0 - 1	1,2,3,7,8,9-HxCDD	6.98E-06	1.77						
LDWG 2007	LDW-SC29	1 - 2	1,2,3,7,8,9-HxCDD	3.31E-07 J	1.06						
LDWG 2007	LDW-SC26	0 - 1	1,2,3,7,8,9-HxCDF	2.26E-07 J	1.4						
LDWG 2007	LDW-SC26	1 - 2	1,2,3,7,8,9-HxCDF	2.83E-07 J	2.04						
LDWG 2007	LDW-SC26	2 - 4	1,2,3,7,8,9-HxCDF	3.61E-07 J	2.08						
LDWG 2007	LDW-SC26	6 - 8	1,2,3,7,8,9-HxCDF	9.83E-07 J	1.88						
LDWG 2007	LDW-SC28	0 - 1	1,2,3,7,8,9-HxCDF	4.36E-07 J	2.59						
LDWG 2007	LDW-SC28	2 - 4	1,2,3,7,8,9-HxCDF	4.13E-07 J	3.14						
LDWG 2007	LDW-SC29	0 - 1	1,2,3,7,8,9-HxCDF	2.36E-06	1.77						
LDWG 2007	LDW-SC26	0 - 1	1,2,3,7,8-PeCDD	1.90E-06	1.4						
LDWG 2007	LDW-SC26	1 - 2	1,2,3,7,8-PeCDD	1.77E-06	2.04						
LDWG 2007	LDW-SC26	2 - 4	1,2,3,7,8-PeCDD	2.69E-06	2.08						
LDWG 2007	LDW-SC26	6 - 8	1,2,3,7,8-PeCDD	1.05E-05	1.88						
LDWG 2007	LDW-SC28	0 - 1	1,2,3,7,8-PeCDD	2.05E-06	2.59						
LDWG 2007	LDW-SC28	1 - 2	1,2,3,7,8-PeCDD	1.71E-06	2.07						
LDWG 2007	LDW-SC28	2 - 4	1,2,3,7,8-PeCDD	1.81E-06	3.14						
LDWG 2007	LDW-SC29	0 - 1	1,2,3,7,8-PeCDD	8.83E-07 J	1.77						
LDWG 2007	LDW-SC29	1 - 2	1,2,3,7,8-PeCDD	6.40E-08 J	1.06						
LDWG 2007	LDW-SC26	0 - 1	1,2,3,7,8-PeCDF	1.51E-06	1.4						
LDWG 2007	LDW-SC26	1 - 2	1,2,3,7,8-PeCDF	1.32E-06	2.04						
LDWG 2007	LDW-SC26	2 - 4	1,2,3,7,8-PeCDF	1.73E-06	2.08						
LDWG 2007	LDW-SC26	6 - 8	1,2,3,7,8-PeCDF	3.24E-06	1.88						
LDWG 2007	LDW-SC28	0 - 1	1,2,3,7,8-PeCDF	1.37E-06	2.59						
LDWG 2007	LDW-SC28	1 - 2	1,2,3,7,8-PeCDF	1.16E-06	2.07						
LDWG 2007	LDW-SC28	2 - 4	1,2,3,7,8-PeCDF	1.56E-06	3.14						
LDWG 2007	LDW-SC29	0 - 1	1,2,3,7,8-PeCDF	5.82E-06	1.77						
LDWG 2007	LDW-SC29	1 - 2	1,2,3,7,8-PeCDF	9.30E-08 J	1.06						
LDWG 2007	LDW-SC26	6 - 8	1,2,4-Trichlorobenzene	9.80E-03	1.88	0.81	1.8	mg/kg OC	5.21E-01	0.64	0.29
LDWG 2007	LDW-SC28	6 - 7.5	1,2,4-Trichlorobenzene	1.10E-02	1.61	0.81	1.8	mg/kg OC	6.83E-01	0.84	0.38
LDWG 2007	LDW-SC25	2 - 4	1,2-Dichlorobenzene	7.80E-03	1.69	2.3	2.3	mg/kg OC	4.62E-01	0.20	0.20
LDWG 2007	LDW-SC26	2 - 4	1,2-Dichlorobenzene	9.00E-03	2.08	2.3	2.3	mg/kg OC	4.33E-01	0.19	0.19
LDWG 2007	LDW-SC26	6 - 8	1,2-Dichlorobenzene	7.30E-02	1.88	2.3	2.3	mg/kg OC	3.88E+00	1.7	1.7

Table A-2
Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC28	6 - 7.5	1,2-Dichlorobenzene	1.60E-01	1.61	2.3	2.3	mg/kg OC	9.94E+00	4.3	4.3
LDWG 2007	LDW-SC28	6 - 7.5	1,3-Dichlorobenzene[b]	7.20E-03	1.61	170		ug/kg DW		0.04	
LDWG 2007	LDW-SC25	2 - 4	1,4-Dichlorobenzene	4.20E-03 J	1.69	3.1	9	mg/kg OC	2.49E-01	0.08	0.03
LDWG 2007	LDW-SC26	0 - 1	1,4-Dichlorobenzene	3.60E-03 J	1.4	3.1	9	mg/kg OC	2.57E-01	0.08	0.03
LDWG 2007	LDW-SC26	2 - 4	1,4-Dichlorobenzene	4.80E-03 J	2.08	3.1	9	mg/kg OC	2.31E-01	0.07	0.03
LDWG 2007	LDW-SC26	6 - 8	1,4-Dichlorobenzene	1.10E-02	1.88	3.1	9	mg/kg OC	5.85E-01	0.19	0.07
LDWG 2007	LDW-SC28	0 - 1	1,4-Dichlorobenzene	3.60E-03 J	2.59	3.1	9	mg/kg OC	1.39E-01	0.04	0.02
LDWG 2007	LDW-SC28	6 - 7.5	1,4-Dichlorobenzene	2.40E-02	1.61	3.1	9	mg/kg OC	1.49E+00	0.48	0.17
LDWG 2007	LDW-SC26	6 - 8	1-Methylnaphthalene	8.40E-02	1.88						
LDWG 2007	LDW-SC26	0 - 1	2,3,4,6,7,8-HxCDF	2.62E-06	1.4						
LDWG 2007	LDW-SC26	1 - 2	2,3,4,6,7,8-HxCDF	2.23E-06	2.04						
LDWG 2007	LDW-SC26	2 - 4	2,3,4,6,7,8-HxCDF	3.51E-06	2.08						
LDWG 2007	LDW-SC26	6 - 8	2,3,4,6,7,8-HxCDF	9.77E-06	1.88						
LDWG 2007	LDW-SC28	0 - 1	2,3,4,6,7,8-HxCDF	3.01E-06	2.59						
LDWG 2007	LDW-SC28	1 - 2	2,3,4,6,7,8-HxCDF	2.12E-06	2.07						
LDWG 2007	LDW-SC28	2 - 4	2,3,4,6,7,8-HxCDF	3.10E-06	3.14						
LDWG 2007	LDW-SC29	0 - 1	2,3,4,6,7,8-HxCDF	9.55E-06	1.77						
LDWG 2007	LDW-SC29	1 - 2	2,3,4,6,7,8-HxCDF	1.94E-07 J	1.06						
LDWG 2007	LDW-SC26	0 - 1	2,3,4,7,8-PeCDF	3.46E-06	1.4						
LDWG 2007	LDW-SC26	1 - 2	2,3,4,7,8-PeCDF	2.67E-06	2.04						
LDWG 2007	LDW-SC26	2 - 4	2,3,4,7,8-PeCDF	3.94E-06	2.08						
LDWG 2007	LDW-SC26	6 - 8	2,3,4,7,8-PeCDF	5.92E-06	1.88						
LDWG 2007	LDW-SC28	0 - 1	2,3,4,7,8-PeCDF	3.68E-06	2.59						
LDWG 2007	LDW-SC28	1 - 2	2,3,4,7,8-PeCDF	2.47E-06	2.07						
LDWG 2007	LDW-SC28	2 - 4	2,3,4,7,8-PeCDF	5.25E-06	3.14						
LDWG 2007	LDW-SC29	0 - 1	2,3,4,7,8-PeCDF	2.13E-05	1.77						
LDWG 2007	LDW-SC29	1 - 2	2,3,4,7,8-PeCDF	2.84E-07 J	1.06						
LDWG 2007	LDW-SC29	2 - 3.6	2,3,4,7,8-PeCDF	6.70E-08 J	0.48						
LDWG 2007	LDW-SC26	0 - 1	2,3,7,8-TCDD	4.85E-07	1.4						
LDWG 2007	LDW-SC26	1 - 2	2,3,7,8-TCDD	5.24E-07	2.04						
LDWG 2007	LDW-SC26	2 - 4	2,3,7,8-TCDD	8.29E-07	2.08						
LDWG 2007	LDW-SC26	6 - 8	2,3,7,8-TCDD	3.36E-06	1.88						
LDWG 2007	LDW-SC28	0 - 1	2,3,7,8-TCDD	6.36E-07	2.59						
LDWG 2007	LDW-SC28	1 - 2	2,3,7,8-TCDD	5.24E-07	2.07						
LDWG 2007	LDW-SC28	2 - 4	2,3,7,8-TCDD	5.51E-07	3.14						

Table A-2
Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC29	0 - 1	2,3,7,8-TCDD	3.25E-07	1.77						
LDWG 2007	LDW-SC26	0 - 1	2,3,7,8-TCDF	1.60E-06	1.4						
LDWG 2007	LDW-SC26	1 - 2	2,3,7,8-TCDF	1.16E-06	2.04						
LDWG 2007	LDW-SC26	2 - 4	2,3,7,8-TCDF	1.66E-06	2.08						
LDWG 2007	LDW-SC26	6 - 8	2,3,7,8-TCDF	3.32E-06	1.88						
LDWG 2007	LDW-SC28	0 - 1	2,3,7,8-TCDF	1.80E-06	2.59						
LDWG 2007	LDW-SC28	1 - 2	2,3,7,8-TCDF	1.26E-06	2.07						
LDWG 2007	LDW-SC28	2 - 4	2,3,7,8-TCDF	1.31E-06	3.14						
LDWG 2007	LDW-SC29	1 - 2	2,3,7,8-TCDF	7.40E-08 J	1.06						
LDWG 2007	LDW-SC25	2 - 4	2,4-Dimethylphenol	7.80E-03	1.69	29	29	ug/kg DW		0.27	0.27
LDWG 2007	LDW-SC26	6 - 8	2,4-Dimethylphenol	2.40E-02 J	1.88	29	29	ug/kg DW		0.83	0.83
LDWG 2007	LDW-SC28	6 - 7.5	2,4-Dimethylphenol	8.50E-03 J	1.61	29	29	ug/kg DW		0.29	0.29
LDWG 2007	LDW-SC28	12 - 13	2,4-Dimethylphenol	4.30E-03 J	1.31	29	29	ug/kg DW		0.15	0.15
LDWG 2007	LDW-SC26	6 - 8	2-Methylnaphthalene	1.10E-01	1.88	38	64	mg/kg OC	5.85E+00	0.15	0.09
LDWG 2007	LDW-SC25	0 - 1	2-Methylphenol	4.10E-03 J	1.94	63	63	ug/kg DW		0.07	0.07
LDWG 2007	LDW-SC25	2 - 4	2-Methylphenol	8.40E-03 J	1.69	63	63	ug/kg DW		0.13	0.13
LDWG 2007	LDW-SC26	6 - 8	2-Methylphenol	1.20E-02	1.88	63	63	ug/kg DW		0.19	0.19
LDWG 2007	LDW-SC28	2 - 4	2-Methylphenol	4.20E-03 J	3.14	63	63	ug/kg DW		0.07	0.07
LDWG 2007	LDW-SC28	6 - 7.5	2-Methylphenol	6.60E-03	1.61	63	63	ug/kg DW		0.10	0.10
LDWG 2007	LDW-SC26	6 - 8	4-Methylphenol	4.80E-02 J	1.88	670	670	ug/kg DW		0.07	0.07
LDWG 2007	LDW-SC28	6 - 7.5	4-Methylphenol	3.70E-02 J	1.61	670	670	ug/kg DW		0.06	0.06
LDWG 2007	LDW-SC25	0 - 1	Acenaphthene	3.80E-02 J	1.94	16	57	mg/kg OC	1.96E+00	0.12	0.03
LDWG 2007	LDW-SC25	1 - 2	Acenaphthene	3.50E-02 J	1.47	16	57	mg/kg OC	2.38E+00	0.15	0.04
LDWG 2007	LDW-SC25	2 - 4	Acenaphthene	1.20E-01	1.69	16	57	mg/kg OC	7.10E+00	0.44	0.12
LDWG 2007	LDW-SC26	6 - 8	Acenaphthene	9.00E-01	1.88	16	57	mg/kg OC	4.79E+01	3.0	0.84
LDWG 2007	LDW-SC28	6 - 7.5	Acenaphthene	2.20E-01	1.61	16	57	mg/kg OC	1.37E+01	0.85	0.24
LDWG 2007	LDW-SC28	12 - 13	Acenaphthene	3.20E-02 J	1.31	16	57	mg/kg OC	2.44E+00	0.15	0.04
LDWG 2007	LDW-SC25	1 - 2	Acenaphthylene	3.10E-02 J	1.47	66	66	mg/kg OC	2.11E+00	0.03	0.03
LDWG 2007	LDW-SC26	6 - 8	Acenaphthylene	6.30E-02 J	1.88	66	66	mg/kg OC	3.35E+00	0.05	0.05
LDWG 2007	LDW-SC29	1 - 2	Acenaphthylene	1.10E-02 J	1.06	66	66	mg/kg OC	1.04E+00	0.02	0.02
LDWG 2007	LDW-SC24	0 - 1	Anthracene	8.10E-02	1.99	220	1,200	mg/kg OC	4.07E+00	0.02	0.003
LDWG 2007	LDW-SC24	1 - 2	Anthracene	1.60E-02 J	0.304	220	1,200	mg/kg OC	5.26E+00	0.02	0.004
LDWG 2007	LDW-SC25	0 - 1	Anthracene	1.70E-01	1.94	220	1,200	mg/kg OC	8.76E+00	0.04	0.01
LDWG 2007	LDW-SC25	1 - 2	Anthracene	1.50E-01	1.47	220	1,200	mg/kg OC	1.02E+01	0.05	0.01
LDWG 2007	LDW-SC25	2 - 4	Anthracene	2.20E-01	1.69	220	1,200	mg/kg OC	1.30E+01	0.06	0.01

Table A-2
Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC26	0 - 1	Anthracene	7.90E-02 J	1.4	220	1,200	mg/kg OC	5.64E+00	0.03	0.005
LDWG 2007	LDW-SC26	1 - 2	Anthracene	5.10E-02 J	2.04	220	1,200	mg/kg OC	2.50E+00	0.01	0.002
LDWG 2007	LDW-SC26	2 - 4	Anthracene	7.40E-02 J	2.08	220	1,200	mg/kg OC	3.56E+00	0.02	0.003
LDWG 2007	LDW-SC26	6 - 8	Anthracene	1.30E+00	1.88	220	1,200	mg/kg OC	6.91E+01	0.31	0.06
LDWG 2007	LDW-SC28	0 - 1	Anthracene	1.00E-01	2.59	220	1,200	mg/kg OC	3.86E+00	0.02	0.003
LDWG 2007	LDW-SC28	1 - 2	Anthracene	4.80E-02 J	2.07	220	1,200	mg/kg OC	2.32E+00	0.01	0.002
LDWG 2007	LDW-SC28	2 - 4	Anthracene	4.70E-02 J	3.14	220	1,200	mg/kg OC	1.50E+00	0.01	0.001
LDWG 2007	LDW-SC28	6 - 7.5	Anthracene	4.50E-01	1.61	220	1,200	mg/kg OC	2.80E+01	0.13	0.02
LDWG 2007	LDW-SC28	12 - 13	Anthracene	3.20E-02 J	1.31	220	1,200	mg/kg OC	2.44E+00	0.01	0.002
LDWG 2007	LDW-SC29	1 - 2	Anthracene	2.60E-02	1.06	220	1,200	mg/kg OC	2.45E+00	0.01	0.002
LDWG 2007	LDW-SC25	1 - 2	Antimony[b,c]	1.60E+01 J	1.47	150	200	mg/kg DW		0.11	0.08
LDWG 2007	LDW-SC25	2 - 4	Antimony	3.00E+01 J	1.69	150	200	mg/kg DW		0.20	0.15
LDWG 2007	LDW-SC25	4 - 6	Antimony	3.00E+01 J	1.63	150	200	mg/kg DW		0.20	0.15
LDWG 2007	LDW-SC26	2 - 4	Antimony	1.00E+01 J	2.08	150	200	mg/kg DW		0.07	0.05
LDWG 2007	LDW-SC26	6 - 8	Antimony	2.80E+02 J	1.88	150	200	mg/kg DW		1.9	1.4
LDWG 2007	LDW-SC28	0 - 1	Antimony	2.50E+01 J	2.59	150	200	mg/kg DW		0.17	0.13
LDWG 2007	LDW-SC28	2 - 4	Antimony	1.00E+01 J	3.14	150	200	mg/kg DW		0.07	0.05
LDWG 2007	LDW-SC28	6 - 7.5	Antimony	1.30E+02 J	1.61	150	200	mg/kg DW		0.87	0.65
LDWG 2007	LDW-SC25	4 - 6	Aroclor-1242	7.80E-02 J	1.63						
LDWG 2007	LDW-SC26	6 - 8	Aroclor-1242	3.70E-01	1.88						
LDWG 2007	LDW-SC26	11 - 12	Aroclor-1242	3.10E-02	0.912						
LDWG 2007	LDW-SC24	0 - 1	Aroclor-1248	4.70E-02	1.99						
LDWG 2007	LDW-SC24	1 - 2	Aroclor-1248	6.10E-03	0.304						
LDWG 2007	LDW-SC25	0 - 1	Aroclor-1248	5.50E-02	1.94						
LDWG 2007	LDW-SC25	1 - 2	Aroclor-1248	6.40E-02	1.47						
LDWG 2007	LDW-SC25	2 - 4	Aroclor-1248	8.20E-02	1.69						
LDWG 2007	LDW-SC26	0 - 1	Aroclor-1248	6.00E-02	1.4						
LDWG 2007	LDW-SC26	1 - 2	Aroclor-1248	4.80E-02	2.04						
LDWG 2007	LDW-SC26	2 - 4	Aroclor-1248	6.00E-02	2.08						
LDWG 2007	LDW-SC28	0 - 1	Aroclor-1248	9.90E-02	2.59						
LDWG 2007	LDW-SC28	1 - 2	Aroclor-1248	6.50E-02 J	2.07						
LDWG 2007	LDW-SC28	2 - 4	Aroclor-1248	5.50E-02	3.14						
LDWG 2007	LDW-SC28	12 - 13	Aroclor-1248	1.90E-01	1.31						
LDWG 2007	LDW-SC29	0 - 1	Aroclor-1248	8.60E-03 J	1.77						
LDWG 2007	LDW-SC24	0 - 1	Aroclor-1254	1.20E-01	1.99						

Table A-2
Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC24	1 - 2	Aroclor-1254	1.90E-02	0.304						
LDWG 2007	LDW-SC25	0 - 1	Aroclor-1254	1.40E-01	1.94						
LDWG 2007	LDW-SC25	1 - 2	Aroclor-1254	1.70E-01	1.47						
LDWG 2007	LDW-SC25	2 - 4	Aroclor-1254	2.00E-01	1.69						
LDWG 2007	LDW-SC25	4 - 6	Aroclor-1254	4.70E-01	1.63						
LDWG 2007	LDW-SC26	0 - 1	Aroclor-1254	1.10E-01	1.4						
LDWG 2007	LDW-SC26	1 - 2	Aroclor-1254	8.10E-02	2.04						
LDWG 2007	LDW-SC26	2 - 4	Aroclor-1254	1.40E-01	2.08						
LDWG 2007	LDW-SC26	6 - 8	Aroclor-1254	1.30E+00	1.88						
LDWG 2007	LDW-SC26	11 - 12	Aroclor-1254	6.70E-02	0.912						
LDWG 2007	LDW-SC28	0 - 1	Aroclor-1254	1.80E-01	2.59						
LDWG 2007	LDW-SC28	1 - 2	Aroclor-1254	1.10E-01	2.07						
LDWG 2007	LDW-SC28	2 - 4	Aroclor-1254	1.10E-01	3.14						
LDWG 2007	LDW-SC28	6 - 7.5	Aroclor-1254	2.60E+00	1.61						
LDWG 2007	LDW-SC28	12 - 13	Aroclor-1254	2.20E-01	1.31						
LDWG 2007	LDW-SC29	0 - 1	Aroclor-1254	1.20E-02	1.77						
LDWG 2007	LDW-SC24	0 - 1	Aroclor-1260	1.10E-01	1.99						
LDWG 2007	LDW-SC24	1 - 2	Aroclor-1260	1.10E-02	0.304						
LDWG 2007	LDW-SC25	0 - 1	Aroclor-1260	1.10E-01	1.94						
LDWG 2007	LDW-SC25	1 - 2	Aroclor-1260	1.30E-01	1.47						
LDWG 2007	LDW-SC25	2 - 4	Aroclor-1260	1.50E-01	1.69						
LDWG 2007	LDW-SC25	4 - 6	Aroclor-1260	2.50E-01	1.63						
LDWG 2007	LDW-SC26	0 - 1	Aroclor-1260	1.10E-01	1.4						
LDWG 2007	LDW-SC26	1 - 2	Aroclor-1260	9.70E-02	2.04						
LDWG 2007	LDW-SC26	2 - 4	Aroclor-1260	1.10E-01	2.08						
LDWG 2007	LDW-SC26	6 - 8	Aroclor-1260	6.10E-01	1.88						
LDWG 2007	LDW-SC26	11 - 12	Aroclor-1260	4.20E-02	0.912						
LDWG 2007	LDW-SC28	0 - 1	Aroclor-1260	1.60E-01	2.59						
LDWG 2007	LDW-SC28	1 - 2	Aroclor-1260	1.80E-01	2.07						
LDWG 2007	LDW-SC28	2 - 4	Aroclor-1260	1.20E-01	3.14						
LDWG 2007	LDW-SC28	6 - 7.5	Aroclor-1260	6.10E-01	1.61						
LDWG 2007	LDW-SC28	12 - 13	Aroclor-1260	1.30E-01	1.31						
LDWG 2007	LDW-SC29	0 - 1	Aroclor-1260	1.20E-02 J	1.77						
LDWG 2007	LDW-SC24	0 - 1	Arsenic	3.00E+01	1.99	57	93	mg/kg DW		0.53	0.32
LDWG 2007	LDW-SC24	1 - 2	Arsenic	1.10E+01	0.304	57	93	mg/kg DW		0.19	0.12

Table A-2
Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC25	0 - 1	Arsenic	5.00E+01	1.94	57	93	mg/kg DW		0.88	0.54
LDWG 2007	LDW-SC25	1 - 2	Arsenic	9.10E+01	1.47	57	93	mg/kg DW		1.6	0.98
LDWG 2007	LDW-SC25	2 - 4	Arsenic	1.70E+02	1.69	57	93	mg/kg DW		3.0	1.8
LDWG 2007	LDW-SC25	4 - 6	Arsenic	2.50E+02	1.63	57	93	mg/kg DW		4.4	2.7
LDWG 2007	LDW-SC25	8 - 9.1	Arsenic	8.00E+00	0.11	57	93	mg/kg DW		0.14	0.09
LDWG 2007	LDW-SC26	0 - 1	Arsenic	4.00E+01	1.4	57	93	mg/kg DW		0.70	0.43
LDWG 2007	LDW-SC26	1 - 2	Arsenic	3.60E+01	2.04	57	93	mg/kg DW		0.63	0.39
LDWG 2007	LDW-SC26	2 - 4	Arsenic	6.70E+01	2.08	57	93	mg/kg DW		1.2	0.72
LDWG 2007	LDW-SC26	6 - 8	Arsenic	1.89E+03	1.88	57	93	mg/kg DW		33.2	20.3
LDWG 2007	LDW-SC28	0 - 1	Arsenic	1.14E+02	2.59	57	93	mg/kg DW		2.0	1.2
LDWG 2007	LDW-SC28	1 - 2	Arsenic	1.80E+01	2.07	57	93	mg/kg DW		0.32	0.19
LDWG 2007	LDW-SC28	2 - 4	Arsenic	3.00E+01	3.14	57	93	mg/kg DW		0.53	0.32
LDWG 2007	LDW-SC28	6 - 7.5	Arsenic	7.60E+02	1.61	57	93	mg/kg DW		13	8.2
LDWG 2007	LDW-SC28	12 - 13	Arsenic	1.70E+01	1.31	57	93	mg/kg DW		0.30	0.18
LDWG 2007	LDW-SC29	0 - 1	Arsenic	1.40E+01	1.77	57	93	mg/kg DW		0.25	0.15
LDWG 2007	LDW-SC29	1 - 2	Arsenic	1.10E+01	1.06	57	93	mg/kg DW		0.19	0.12
LDWG 2007	LDW-SC24	0 - 1	Benzo(a)anthracene	2.20E-01	1.99	110	270	mg/kg OC	1.11E+01	0.10	0.04
LDWG 2007	LDW-SC24	1 - 2	Benzo(a)anthracene	5.00E-02	0.304	110	270	mg/kg OC	1.64E+01	0.15	0.06
LDWG 2007	LDW-SC25	0 - 1	Benzo(a)anthracene	5.00E-01	1.94	110	270	mg/kg OC	2.58E+01	0.23	0.10
LDWG 2007	LDW-SC25	1 - 2	Benzo(a)anthracene	6.30E-01	1.47	110	270	mg/kg OC	4.29E+01	0.39	0.16
LDWG 2007	LDW-SC25	2 - 4	Benzo(a)anthracene	6.60E-01	1.69	110	270	mg/kg OC	3.91E+01	0.36	0.14
LDWG 2007	LDW-SC26	0 - 1	Benzo(a)anthracene	2.60E-01	1.4	110	270	mg/kg OC	1.86E+01	0.17	0.07
LDWG 2007	LDW-SC26	1 - 2	Benzo(a)anthracene	1.70E-01	2.04	110	270	mg/kg OC	8.33E+00	0.08	0.03
LDWG 2007	LDW-SC26	2 - 4	Benzo(a)anthracene	3.10E-01	2.08	110	270	mg/kg OC	1.49E+01	0.14	0.06
LDWG 2007	LDW-SC26	6 - 8	Benzo(a)anthracene	3.70E+00	1.88	110	270	mg/kg OC	1.97E+02	1.8	0.73
LDWG 2007	LDW-SC28	0 - 1	Benzo(a)anthracene	3.20E-01	2.59	110	270	mg/kg OC	1.24E+01	0.11	0.05
LDWG 2007	LDW-SC28	1 - 2	Benzo(a)anthracene	1.60E-01	2.07	110	270	mg/kg OC	7.73E+00	0.07	0.03
LDWG 2007	LDW-SC28	2 - 4	Benzo(a)anthracene	1.40E-01	3.14	110	270	mg/kg OC	4.46E+00	0.04	0.02
LDWG 2007	LDW-SC28	6 - 7.5	Benzo(a)anthracene	1.30E+00	1.61	110	270	mg/kg OC	8.07E+01	0.73	0.30
LDWG 2007	LDW-SC28	12 - 13	Benzo(a)anthracene	1.10E-01	1.31	110	270	mg/kg OC	8.40E+00	0.08	0.03
LDWG 2007	LDW-SC29	0 - 1	Benzo(a)anthracene	3.20E-02 J	1.77	110	270	mg/kg OC	1.81E+00	0.02	0.01
LDWG 2007	LDW-SC29	1 - 2	Benzo(a)anthracene	1.10E-01	1.06	110	270	mg/kg OC	1.04E+01	0.09	0.04
LDWG 2007	LDW-SC24	0 - 1	Benzo(a)pyrene	3.50E-01	1.99	99	210	mg/kg OC	1.76E+01	0.18	0.08
LDWG 2007	LDW-SC24	1 - 2	Benzo(a)pyrene	5.60E-02	0.304	99	210	mg/kg OC	1.84E+01	0.19	0.09
LDWG 2007	LDW-SC24	2 - 4	Benzo(a)pyrene	1.30E-02 J	0.435	99	210	mg/kg OC	2.99E+00	0.03	0.01

Table A-2
Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC25	0 - 1	Benzo(a)pyrene	5.00E-01	1.94	99	210	mg/kg OC	2.58E+01	0.26	0.12
LDWG 2007	LDW-SC25	1 - 2	Benzo(a)pyrene	5.90E-01	1.47	99	210	mg/kg OC	4.01E+01	0.41	0.19
LDWG 2007	LDW-SC25	2 - 4	Benzo(a)pyrene	7.00E-01	1.69	99	210	mg/kg OC	4.14E+01	0.42	0.20
LDWG 2007	LDW-SC26	0 - 1	Benzo(a)pyrene	3.40E-01	1.4	99	210	mg/kg OC	2.43E+01	0.25	0.12
LDWG 2007	LDW-SC26	1 - 2	Benzo(a)pyrene	2.60E-01	2.04	99	210	mg/kg OC	1.27E+01	0.13	0.06
LDWG 2007	LDW-SC26	2 - 4	Benzo(a)pyrene	4.00E-01	2.08	99	210	mg/kg OC	1.92E+01	0.19	0.09
LDWG 2007	LDW-SC26	6 - 8	Benzo(a)pyrene	2.80E+00	1.88	99	210	mg/kg OC	1.49E+02	1.5	0.71
LDWG 2007	LDW-SC28	0 - 1	Benzo(a)pyrene	2.70E-01	2.59	99	210	mg/kg OC	1.04E+01	0.11	0.05
LDWG 2007	LDW-SC28	1 - 2	Benzo(a)pyrene	1.50E-01	2.07	99	210	mg/kg OC	7.25E+00	0.07	0.03
LDWG 2007	LDW-SC28	2 - 4	Benzo(a)pyrene	1.70E-01	3.14	99	210	mg/kg OC	5.41E+00	0.05	0.03
LDWG 2007	LDW-SC28	6 - 7.5	Benzo(a)pyrene	9.50E-01	1.61	99	210	mg/kg OC	5.90E+01	0.60	0.28
LDWG 2007	LDW-SC28	12 - 13	Benzo(a)pyrene	1.20E-01	1.31	99	210	mg/kg OC	9.16E+00	0.09	0.04
LDWG 2007	LDW-SC29	0 - 1	Benzo(a)pyrene	3.20E-02 J	1.77	99	210	mg/kg OC	1.81E+00	0.02	0.01
LDWG 2007	LDW-SC29	1 - 2	Benzo(a)pyrene	1.10E-01	1.06	99	210	mg/kg OC	1.04E+01	0.10	0.05
LDWG 2007	LDW-SC24	0 - 1	Benzo(b)fluoranthene	5.20E-01	1.99	230	450	mg/kg OC	2.61E+01	0.11	0.06
LDWG 2007	LDW-SC24	1 - 2	Benzo(b)fluoranthene	7.50E-02	0.304	230	450	mg/kg OC	2.47E+01	0.11	0.05
LDWG 2007	LDW-SC24	2 - 4	Benzo(b)fluoranthene	1.80E-02 J	0.435	230	450	mg/kg OC	4.14E+00	0.02	0.01
LDWG 2007	LDW-SC25	0 - 1	Benzo(b)fluoranthene	7.20E-01	1.94	230	450	mg/kg OC	3.71E+01	0.16	0.08
LDWG 2007	LDW-SC25	1 - 2	Benzo(b)fluoranthene	8.50E-01	1.47	230	450	mg/kg OC	5.78E+01	0.25	0.13
LDWG 2007	LDW-SC25	2 - 4	Benzo(b)fluoranthene	8.40E-01	1.69	230	450	mg/kg OC	4.97E+01	0.22	0.11
LDWG 2007	LDW-SC26	0 - 1	Benzo(b)fluoranthene	4.70E-01	1.4	230	450	mg/kg OC	3.36E+01	0.15	0.07
LDWG 2007	LDW-SC26	1 - 2	Benzo(b)fluoranthene	3.40E-01	2.04	230	450	mg/kg OC	1.67E+01	0.07	0.04
LDWG 2007	LDW-SC26	2 - 4	Benzo(b)fluoranthene	4.80E-01	2.08	230	450	mg/kg OC	2.31E+01	0.10	0.05
LDWG 2007	LDW-SC26	6 - 8	Benzo(b)fluoranthene	3.50E+00	1.88	230	450	mg/kg OC	1.86E+02	0.81	0.41
LDWG 2007	LDW-SC28	0 - 1	Benzo(b)fluoranthene	4.70E-01	2.59	230	450	mg/kg OC	1.81E+01	0.08	0.04
LDWG 2007	LDW-SC28	1 - 2	Benzo(b)fluoranthene	2.50E-01	2.07	230	450	mg/kg OC	1.21E+01	0.05	0.03
LDWG 2007	LDW-SC28	2 - 4	Benzo(b)fluoranthene	2.50E-01	3.14	230	450	mg/kg OC	7.96E+00	0.03	0.02
LDWG 2007	LDW-SC28	6 - 7.5	Benzo(b)fluoranthene	1.00E+00	1.61	230	450	mg/kg OC	6.21E+01	0.27	0.14
LDWG 2007	LDW-SC28	12 - 13	Benzo(b)fluoranthene	9.80E-02	1.31	230	450	mg/kg OC	7.48E+00	0.03	0.02
LDWG 2007	LDW-SC29	0 - 1	Benzo(b)fluoranthene	5.80E-02 J	1.77	230	450	mg/kg OC	3.28E+00	0.01	0.01
LDWG 2007	LDW-SC29	1 - 2	Benzo(b)fluoranthene	1.00E-01	1.06	230	450	mg/kg OC	9.43E+00	0.04	0.02
LDWG 2007	LDW-SC24	0 - 1	Benzo(g,h,i)perylene	7.80E-02	1.99	31	78	mg/kg OC	3.92E+00	0.13	0.05
LDWG 2007	LDW-SC24	1 - 2	Benzo(g,h,i)perylene	1.20E-02 J	0.304	31	78	mg/kg OC	3.95E+00	0.13	0.05
LDWG 2007	LDW-SC25	0 - 1	Benzo(g,h,i)perylene	1.30E-01	1.94	31	78	mg/kg OC	6.70E+00	0.22	0.09
LDWG 2007	LDW-SC25	1 - 2	Benzo(g,h,i)perylene	1.40E-01	1.47	31	78	mg/kg OC	9.52E+00	0.31	0.12

Table A-2
Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC25	2 - 4	Benzo(g,h,i)perylene	1.60E-01	1.69	31	78	mg/kg OC	9.47E+00	0.31	0.12
LDWG 2007	LDW-SC26	0 - 1	Benzo(g,h,i)perylene	8.10E-02 J	1.4	31	78	mg/kg OC	5.79E+00	0.19	0.07
LDWG 2007	LDW-SC26	1 - 2	Benzo(g,h,i)perylene	8.20E-02	2.04	31	78	mg/kg OC	4.02E+00	0.13	0.05
LDWG 2007	LDW-SC26	2 - 4	Benzo(g,h,i)perylene	1.20E-01	2.08	31	78	mg/kg OC	5.77E+00	0.19	0.07
LDWG 2007	LDW-SC26	6 - 8	Benzo(g,h,i)perylene	1.00E+00	1.88	31	78	mg/kg OC	5.32E+01	1.7	0.68
LDWG 2007	LDW-SC28	0 - 1	Benzo(g,h,i)perylene	1.20E-01	2.59	31	78	mg/kg OC	4.63E+00	0.15	0.06
LDWG 2007	LDW-SC28	1 - 2	Benzo(g,h,i)perylene	8.30E-02	2.07	31	78	mg/kg OC	4.01E+00	0.13	0.05
LDWG 2007	LDW-SC28	2 - 4	Benzo(g,h,i)perylene	7.40E-02	3.14	31	78	mg/kg OC	2.36E+00	0.08	0.03
LDWG 2007	LDW-SC28	6 - 7.5	Benzo(g,h,i)perylene	4.40E-01	1.61	31	78	mg/kg OC	2.73E+01	0.88	0.35
LDWG 2007	LDW-SC28	12 - 13	Benzo(g,h,i)perylene	6.10E-02 J	1.31	31	78	mg/kg OC	4.66E+00	0.15	0.06
LDWG 2007	LDW-SC29	1 - 2	Benzo(g,h,i)perylene	2.60E-02	1.06	31	78	mg/kg OC	2.45E+00	0.08	0.03
LDWG 2007	LDW-SC24	0 - 1	Benzo(k)fluoranthene	4.90E-01	1.99	230	450	mg/kg OC	2.46E+01	0.11	0.05
LDWG 2007	LDW-SC24	1 - 2	Benzo(k)fluoranthene	8.20E-02	0.304	230	450	mg/kg OC	2.70E+01	0.12	0.06
LDWG 2007	LDW-SC24	2 - 4	Benzo(k)fluoranthene	1.80E-02 J	0.435	230	450	mg/kg OC	4.14E+00	0.02	0.01
LDWG 2007	LDW-SC25	0 - 1	Benzo(k)fluoranthene	5.30E-01	1.94	230	450	mg/kg OC	2.73E+01	0.12	0.06
LDWG 2007	LDW-SC25	1 - 2	Benzo(k)fluoranthene	7.20E-01	1.47	230	450	mg/kg OC	4.90E+01	0.21	0.11
LDWG 2007	LDW-SC25	2 - 4	Benzo(k)fluoranthene	7.80E-01	1.69	230	450	mg/kg OC	4.62E+01	0.20	0.10
LDWG 2007	LDW-SC26	0 - 1	Benzo(k)fluoranthene	4.30E-01	1.4	230	450	mg/kg OC	3.07E+01	0.13	0.07
LDWG 2007	LDW-SC26	1 - 2	Benzo(k)fluoranthene	3.20E-01	2.04	230	450	mg/kg OC	1.57E+01	0.07	0.03
LDWG 2007	LDW-SC26	2 - 4	Benzo(k)fluoranthene	4.60E-01	2.08	230	450	mg/kg OC	2.21E+01	0.10	0.05
LDWG 2007	LDW-SC26	6 - 8	Benzo(k)fluoranthene	1.70E+00	1.88	230	450	mg/kg OC	9.04E+01	0.39	0.20
LDWG 2007	LDW-SC28	0 - 1	Benzo(k)fluoranthene	3.40E-01	2.59	230	450	mg/kg OC	1.31E+01	0.06	0.03
LDWG 2007	LDW-SC28	1 - 2	Benzo(k)fluoranthene	1.50E-01	2.07	230	450	mg/kg OC	7.25E+00	0.03	0.02
LDWG 2007	LDW-SC28	2 - 4	Benzo(k)fluoranthene	2.10E-01	3.14	230	450	mg/kg OC	6.69E+00	0.03	0.01
LDWG 2007	LDW-SC28	6 - 7.5	Benzo(k)fluoranthene	8.30E-01	1.61	230	450	mg/kg OC	5.16E+01	0.22	0.11
LDWG 2007	LDW-SC28	12 - 13	Benzo(k)fluoranthene	1.40E-01	1.31	230	450	mg/kg OC	1.07E+01	0.05	0.02
LDWG 2007	LDW-SC29	0 - 1	Benzo(k)fluoranthene	4.30E-02 J	1.77	230	450	mg/kg OC	2.43E+00	0.01	0.01
LDWG 2007	LDW-SC29	1 - 2	Benzo(k)fluoranthene	1.30E-01	1.06	230	450	mg/kg OC	1.23E+01	0.05	0.03
LDWG 2007	LDW-SC24	0 - 1	Benzofluoranthenes (total-calc'd)	1.01E+00	1.99	230	450	mg/kg OC	5.08E+01	0.22	0.11
LDWG 2007	LDW-SC24	1 - 2	Benzofluoranthenes (total-calc'd)	1.57E-01	0.304	230	450	mg/kg OC	5.16E+01	0.22	0.11
LDWG 2007	LDW-SC24	2 - 4	Benzofluoranthenes (total-calc'd)	3.60E-02 J	0.435	230	450	mg/kg OC	8.28E+00	0.04	0.02
LDWG 2007	LDW-SC25	0 - 1	Benzofluoranthenes (total-calc'd)	1.25E+00	1.94	230	450	mg/kg OC	6.44E+01	0.28	0.14
LDWG 2007	LDW-SC25	1 - 2	Benzofluoranthenes (total-calc'd)	1.57E+00	1.47	230	450	mg/kg OC	1.07E+02	0.46	0.24
LDWG 2007	LDW-SC25	2 - 4	Benzofluoranthenes (total-calc'd)	1.62E+00	1.69	230	450	mg/kg OC	9.59E+01	0.42	0.21
LDWG 2007	LDW-SC26	0 - 1	Benzofluoranthenes (total-calc'd)	9.00E-01	1.4	230	450	mg/kg OC	6.43E+01	0.28	0.14

Table A-2
Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC26	1 - 2	Benzofluoranthenes (total-calc'd)	6.60E-01	2.04	230	450	mg/kg OC	3.24E+01	0.14	0.07
LDWG 2007	LDW-SC26	2 - 4	Benzofluoranthenes (total-calc'd)	9.40E-01	2.08	230	450	mg/kg OC	4.52E+01	0.20	0.10
LDWG 2007	LDW-SC26	6 - 8	Benzofluoranthenes (total-calc'd)	5.20E+00	1.88	230	450	mg/kg OC	2.77E+02	1.2	0.61
LDWG 2007	LDW-SC28	0 - 1	Benzofluoranthenes (total-calc'd)	8.10E-01	2.59	230	450	mg/kg OC	3.13E+01	0.14	0.07
LDWG 2007	LDW-SC28	1 - 2	Benzofluoranthenes (total-calc'd)	4.00E-01	2.07	230	450	mg/kg OC	1.93E+01	0.08	0.04
LDWG 2007	LDW-SC28	2 - 4	Benzofluoranthenes (total-calc'd)	4.60E-01	3.14	230	450	mg/kg OC	1.46E+01	0.06	0.03
LDWG 2007	LDW-SC28	6 - 7.5	Benzofluoranthenes (total-calc'd)	1.80E+00	1.61	230	450	mg/kg OC	1.12E+02	0.49	0.25
LDWG 2007	LDW-SC28	12 - 13	Benzofluoranthenes (total-calc'd)	2.40E-01	1.31	230	450	mg/kg OC	1.83E+01	0.08	0.04
LDWG 2007	LDW-SC29	0 - 1	Benzofluoranthenes (total-calc'd)	1.01E-01 J	1.77	230	450	mg/kg OC	5.71E+00	0.02	0.01
LDWG 2007	LDW-SC29	1 - 2	Benzofluoranthenes (total-calc'd)	2.30E-01	1.06	230	450	mg/kg OC	2.17E+01	0.09	0.05
LDWG 2007	LDW-SC24	0 - 1	Benzoic acid	8.80E-02 J	1.99	650	650	ug/kg DW		0.14	0.14
LDWG 2007	LDW-SC24	1 - 2	Benzoic acid	4.80E-02 J	0.304	650	650	ug/kg DW		0.07	0.07
LDWG 2007	LDW-SC26	0 - 1	Benzoic acid	1.60E-01	1.4	650	650	ug/kg DW		0.25	0.25
LDWG 2007	LDW-SC26	1 - 2	Benzoic acid	1.00E-01	2.04	650	650	ug/kg DW		0.15	0.15
LDWG 2007	LDW-SC26	2 - 4	Benzoic acid	8.00E-02	2.08	650	650	ug/kg DW		0.12	0.12
LDWG 2007	LDW-SC28	0 - 1	Benzoic acid	2.00E-01 J	2.59	650	650	ug/kg DW		0.31	0.31
LDWG 2007	LDW-SC28	1 - 2	Benzoic acid	9.80E-02 J	2.07	650	650	ug/kg DW		0.15	0.15
LDWG 2007	LDW-SC28	2 - 4	Benzoic acid	8.50E-02 J	3.14	650	650	ug/kg DW		0.13	0.13
LDWG 2007	LDW-SC28	6 - 7.5	Benzoic acid	3.20E-01 J	1.61	650	650	ug/kg DW		0.49	0.49
LDWG 2007	LDW-SC29	0 - 1	Benzoic acid	7.30E-02 J	1.77	650	650	ug/kg DW		0.11	0.11
LDWG 2007	LDW-SC29	1 - 2	Benzoic acid	6.40E-02 J	1.06	650	650	ug/kg DW		0.10	0.10
LDWG 2007	LDW-SC29	2 - 3.6	Benzoic acid	6.80E-02 J	0.48	650	650	ug/kg DW		0.10	0.10
LDWG 2007	LDW-SC25	0 - 1	Benzyl alcohol	2.60E-02 J	1.94	57	73	ug/kg DW		0.46	0.36
LDWG 2007	LDW-SC25	1 - 2	Benzyl alcohol	1.90E-02 J	1.47	57	73	ug/kg DW		0.33	0.26
LDWG 2007	LDW-SC25	2 - 4	Benzyl alcohol	2.00E-02 J	1.69	57	73	ug/kg DW		0.35	0.27
LDWG 2007	LDW-SC28	0 - 1	Benzyl alcohol	1.10E-01	2.59	57	73	ug/kg DW		1.9	1.5
LDWG 2007	LDW-SC24	0 - 1	Bis(2-ethylhexyl)phthalate	3.90E-01	1.99	47	78	mg/kg OC	1.96E+01	0.42	0.25
LDWG 2007	LDW-SC24	1 - 2	Bis(2-ethylhexyl)phthalate	1.50E-02 J	0.304	47	78	mg/kg OC	4.93E+00	0.10	0.06
LDWG 2007	LDW-SC24	2 - 4	Bis(2-ethylhexyl)phthalate	1.60E-02 J	0.435	47	78	mg/kg OC	3.68E+00	0.08	0.05
LDWG 2007	LDW-SC25	0 - 1	Bis(2-ethylhexyl)phthalate	3.50E-01	1.94	47	78	mg/kg OC	1.80E+01	0.38	0.23
LDWG 2007	LDW-SC25	1 - 2	Bis(2-ethylhexyl)phthalate	3.20E-01	1.47	47	78	mg/kg OC	2.18E+01	0.46	0.28
LDWG 2007	LDW-SC25	2 - 4	Bis(2-ethylhexyl)phthalate	7.40E-01	1.69	47	78	mg/kg OC	4.38E+01	0.93	0.56
LDWG 2007	LDW-SC26	0 - 1	Bis(2-ethylhexyl)phthalate	3.30E-01	1.4	47	78	mg/kg OC	2.36E+01	0.50	0.30
LDWG 2007	LDW-SC26	1 - 2	Bis(2-ethylhexyl)phthalate	3.20E-01	2.04	47	78	mg/kg OC	1.57E+01	0.33	0.20
LDWG 2007	LDW-SC26	2 - 4	Bis(2-ethylhexyl)phthalate	5.90E-01	2.08	47	78	mg/kg OC	2.84E+01	0.60	0.36

Table A-2
Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC26	6 - 8	Bis(2-ethylhexyl)phthalate	3.80E+00	1.88	47	78	mg/kg OC	2.02E+02	4.3	2.6
LDWG 2007	LDW-SC28	6 - 7.5	Bis(2-ethylhexyl)phthalate	1.00E+00	1.61	47	78	mg/kg OC	6.21E+01	1.3	0.80
LDWG 2007	LDW-SC28	12 - 13	Bis(2-ethylhexyl)phthalate	9.60E-02	1.31	47	78	mg/kg OC	7.33E+00	0.16	0.09
LDWG 2007	LDW-SC29	0 - 1	Bis(2-ethylhexyl)phthalate	4.00E-02 J	1.77	47	78	mg/kg OC	2.26E+00	0.05	0.03
LDWG 2007	LDW-SC24	0 - 1	Butyl benzyl phthalate	2.30E-02	1.99	4.9	64	mg/kg OC	1.16E+00	0.24	0.02
LDWG 2007	LDW-SC25	0 - 1	Butyl benzyl phthalate	2.70E-02	1.94	4.9	64	mg/kg OC	1.39E+00	0.28	0.02
LDWG 2007	LDW-SC25	1 - 2	Butyl benzyl phthalate	3.20E-02	1.47	4.9	64	mg/kg OC	2.18E+00	0.44	0.03
LDWG 2007	LDW-SC25	2 - 4	Butyl benzyl phthalate	6.20E-02	1.69	4.9	64	mg/kg OC	3.67E+00	0.75	0.06
LDWG 2007	LDW-SC26	0 - 1	Butyl benzyl phthalate	4.80E-02	1.4	4.9	64	mg/kg OC	3.43E+00	0.70	0.05
LDWG 2007	LDW-SC26	1 - 2	Butyl benzyl phthalate	3.60E-02	2.04	4.9	64	mg/kg OC	1.76E+00	0.36	0.03
LDWG 2007	LDW-SC26	2 - 4	Butyl benzyl phthalate	4.10E-02	2.08	4.9	64	mg/kg OC	1.97E+00	0.40	0.03
LDWG 2007	LDW-SC26	6 - 8	Butyl benzyl phthalate	3.00E-02 J	1.88	4.9	64	mg/kg OC	1.60E+00	0.33	0.02
LDWG 2007	LDW-SC28	0 - 1	Butyl benzyl phthalate	3.40E-02	2.59	4.9	64	mg/kg OC	1.31E+00	0.27	0.02
LDWG 2007	LDW-SC28	1 - 2	Butyl benzyl phthalate	2.70E-02	2.07	4.9	64	mg/kg OC	1.30E+00	0.27	0.02
LDWG 2007	LDW-SC28	2 - 4	Butyl benzyl phthalate	2.60E-02	3.14	4.9	64	mg/kg OC	8.28E-01	0.17	0.01
LDWG 2007	LDW-SC28	6 - 7.5	Butyl benzyl phthalate	2.80E-02	1.61	4.9	64	mg/kg OC	1.74E+00	0.35	0.03
LDWG 2007	LDW-SC29	0 - 1	Butyl benzyl phthalate	5.90E-03	1.77	4.9	64	mg/kg OC	3.33E-01	0.07	0.01
LDWG 2007	LDW-SC24	0 - 1	Cadmium	4.00E-01	1.99	5.1	6.7	mg/kg DW		0.08	0.06
LDWG 2007	LDW-SC25	0 - 1	Cadmium	4.00E-01	1.94	5.1	6.7	mg/kg DW		0.08	0.06
LDWG 2007	LDW-SC25	1 - 2	Cadmium	5.00E-01	1.47	5.1	6.7	mg/kg DW		0.10	0.07
LDWG 2007	LDW-SC25	4 - 6	Cadmium	1.50E+00	1.63	5.1	6.7	mg/kg DW		0.29	0.22
LDWG 2007	LDW-SC26	0 - 1	Cadmium	5.00E-01	1.4	5.1	6.7	mg/kg DW		0.10	0.07
LDWG 2007	LDW-SC26	1 - 2	Cadmium	5.00E-01	2.04	5.1	6.7	mg/kg DW		0.10	0.07
LDWG 2007	LDW-SC26	2 - 4	Cadmium	6.00E-01	2.08	5.1	6.7	mg/kg DW		0.12	0.09
LDWG 2007	LDW-SC26	6 - 8	Cadmium	4.00E+00	1.88	5.1	6.7	mg/kg DW		0.78	0.60
LDWG 2007	LDW-SC28	0 - 1	Cadmium	6.00E-01	2.59	5.1	6.7	mg/kg DW		0.12	0.09
LDWG 2007	LDW-SC28	1 - 2	Cadmium	6.00E-01	2.07	5.1	6.7	mg/kg DW		0.12	0.09
LDWG 2007	LDW-SC28	6 - 7.5	Cadmium	1.40E+00	1.61	5.1	6.7	mg/kg DW		0.27	0.21
LDWG 2007	LDW-SC28	12 - 13	Cadmium	6.00E-01	1.31	5.1	6.7	mg/kg DW		0.12	0.09
LDWG 2007	LDW-SC24	0 - 1	Chromium	3.41E+01	1.99	260	270	mg/kg DW		0.13	0.13
LDWG 2007	LDW-SC24	1 - 2	Chromium	1.37E+01	0.304	260	270	mg/kg DW		0.05	0.05
LDWG 2007	LDW-SC24	2 - 4	Chromium	1.11E+01	0.435	260	270	mg/kg DW		0.04	0.04
LDWG 2007	LDW-SC25	0 - 1	Chromium	4.20E+01	1.94	260	270	mg/kg DW		0.16	0.16
LDWG 2007	LDW-SC25	1 - 2	Chromium	4.47E+01	1.47	260	270	mg/kg DW		0.17	0.17
LDWG 2007	LDW-SC25	2 - 4	Chromium	4.50E+01	1.69	260	270	mg/kg DW		0.17	0.17

Table A-2
Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC25	4 - 6	Chromium	5.50E+01	1.63	260	270	mg/kg DW		0.21	0.20
LDWG 2007	LDW-SC25	8 - 9.1	Chromium	8.30E+00	0.11	260	270	mg/kg DW		0.03	0.03
LDWG 2007	LDW-SC26	0 - 1	Chromium	3.70E+01	1.4	260	270	mg/kg DW		0.14	0.14
LDWG 2007	LDW-SC26	1 - 2	Chromium	6.17E+01	2.04	260	270	mg/kg DW		0.24	0.23
LDWG 2007	LDW-SC26	2 - 4	Chromium	3.87E+01	2.08	260	270	mg/kg DW		0.15	0.14
LDWG 2007	LDW-SC26	6 - 8	Chromium	1.60E+02	1.88	260	270	mg/kg DW		0.62	0.59
LDWG 2007	LDW-SC26	11 - 12	Chromium	1.40E+01	0.912	260	270	mg/kg DW		0.05	0.05
LDWG 2007	LDW-SC28	0 - 1	Chromium	3.70E+01	2.59	260	270	mg/kg DW		0.14	0.14
LDWG 2007	LDW-SC28	1 - 2	Chromium	3.24E+01	2.07	260	270	mg/kg DW		0.12	0.12
LDWG 2007	LDW-SC28	2 - 4	Chromium	3.30E+01	3.14	260	270	mg/kg DW		0.13	0.12
LDWG 2007	LDW-SC28	6 - 7.5	Chromium	6.50E+01	1.61	260	270	mg/kg DW		0.25	0.24
LDWG 2007	LDW-SC28	12 - 13	Chromium	2.80E+01	1.31	260	270	mg/kg DW		0.11	0.10
LDWG 2007	LDW-SC29	0 - 1	Chromium	2.08E+01	1.77	260	270	mg/kg DW		0.08	0.08
LDWG 2007	LDW-SC29	1 - 2	Chromium	1.45E+01	1.06	260	270	mg/kg DW		0.06	0.05
LDWG 2007	LDW-SC29	2 - 3.6	Chromium	1.06E+01	0.48	260	270	mg/kg DW		0.04	0.04
LDWG 2007	LDW-SC24	0 - 1	Chrysene	3.60E-01	1.99	110	460	mg/kg OC	1.81E+01	0.16	0.04
LDWG 2007	LDW-SC24	1 - 2	Chrysene	5.90E-02	0.304	110	460	mg/kg OC	1.94E+01	0.18	0.04
LDWG 2007	LDW-SC25	0 - 1	Chrysene	9.20E-01	1.94	110	460	mg/kg OC	4.74E+01	0.43	0.10
LDWG 2007	LDW-SC25	1 - 2	Chrysene	9.90E-01	1.47	110	460	mg/kg OC	6.73E+01	0.61	0.15
LDWG 2007	LDW-SC25	2 - 4	Chrysene	9.10E-01	1.69	110	460	mg/kg OC	5.38E+01	0.49	0.12
LDWG 2007	LDW-SC26	0 - 1	Chrysene	3.90E-01	1.4	110	460	mg/kg OC	2.79E+01	0.25	0.06
LDWG 2007	LDW-SC26	1 - 2	Chrysene	2.80E-01	2.04	110	460	mg/kg OC	1.37E+01	0.12	0.03
LDWG 2007	LDW-SC26	2 - 4	Chrysene	4.20E-01	2.08	110	460	mg/kg OC	2.02E+01	0.18	0.04
LDWG 2007	LDW-SC26	6 - 8	Chrysene	3.90E+00	1.88	110	460	mg/kg OC	2.07E+02	1.9	0.45
LDWG 2007	LDW-SC28	0 - 1	Chrysene	6.90E-01	2.59	110	460	mg/kg OC	2.66E+01	0.24	0.06
LDWG 2007	LDW-SC28	1 - 2	Chrysene	2.50E-01	2.07	110	460	mg/kg OC	1.21E+01	0.11	0.03
LDWG 2007	LDW-SC28	2 - 4	Chrysene	2.70E-01	3.14	110	460	mg/kg OC	8.60E+00	0.08	0.02
LDWG 2007	LDW-SC28	6 - 7.5	Chrysene	1.40E+00	1.61	110	460	mg/kg OC	8.70E+01	0.79	0.19
LDWG 2007	LDW-SC28	12 - 13	Chrysene	1.10E-01	1.31	110	460	mg/kg OC	8.40E+00	0.08	0.02
LDWG 2007	LDW-SC29	0 - 1	Chrysene	4.20E-02 J	1.77	110	460	mg/kg OC	2.37E+00	0.02	0.01
LDWG 2007	LDW-SC29	1 - 2	Chrysene	1.30E-01	1.06	110	460	mg/kg OC	1.23E+01	0.11	0.03
LDWG 2007	LDW-SC24	0 - 1	Cobalt	1.10E+01	1.99						
LDWG 2007	LDW-SC24	1 - 2	Cobalt	5.10E+00	0.304						
LDWG 2007	LDW-SC24	2 - 4	Cobalt	4.30E+00	0.435						
LDWG 2007	LDW-SC25	0 - 1	Cobalt	1.16E+01	1.94						

Table A-2
Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC25	1 - 2	Cobalt	1.45E+01	1.47						
LDWG 2007	LDW-SC25	2 - 4	Cobalt	2.00E+01	1.69						
LDWG 2007	LDW-SC25	4 - 6	Cobalt	2.20E+01	1.63						
LDWG 2007	LDW-SC25	8 - 9.1	Cobalt	3.30E+00	0.11						
LDWG 2007	LDW-SC26	0 - 1	Cobalt	1.12E+01	1.4						
LDWG 2007	LDW-SC26	1 - 2	Cobalt	1.19E+01	2.04						
LDWG 2007	LDW-SC26	2 - 4	Cobalt	1.58E+01	2.08						
LDWG 2007	LDW-SC26	6 - 8	Cobalt	1.06E+02	1.88						
LDWG 2007	LDW-SC26	11 - 12	Cobalt	4.80E+00	0.912						
LDWG 2007	LDW-SC28	0 - 1	Cobalt	1.37E+01	2.59						
LDWG 2007	LDW-SC28	1 - 2	Cobalt	9.40E+00	2.07						
LDWG 2007	LDW-SC28	2 - 4	Cobalt	1.14E+01	3.14						
LDWG 2007	LDW-SC28	6 - 7.5	Cobalt	5.00E+01	1.61						
LDWG 2007	LDW-SC28	12 - 13	Cobalt	7.60E+00	1.31						
LDWG 2007	LDW-SC29	0 - 1	Cobalt	7.00E+00	1.77						
LDWG 2007	LDW-SC29	1 - 2	Cobalt	6.60E+00	1.06						
LDWG 2007	LDW-SC29	2 - 3.6	Cobalt	5.50E+00	0.48						
LDWG 2007	LDW-SC24	0 - 1	Copper	1.42E+02	1.99	390	390	mg/kg DW		0.36	0.36
LDWG 2007	LDW-SC24	1 - 2	Copper	4.00E+01	0.304	390	390	mg/kg DW		0.10	0.10
LDWG 2007	LDW-SC24	2 - 4	Copper	1.54E+01	0.435	390	390	mg/kg DW		0.04	0.04
LDWG 2007	LDW-SC25	0 - 1	Copper	3.27E+02	1.94	390	390	mg/kg DW		0.84	0.84
LDWG 2007	LDW-SC25	1 - 2	Copper	3.39E+02	1.47	390	390	mg/kg DW		0.87	0.87
LDWG 2007	LDW-SC25	2 - 4	Copper	5.41E+02	1.69	390	390	mg/kg DW		1.4	1.4
LDWG 2007	LDW-SC25	4 - 6	Copper	6.63E+02	1.63	390	390	mg/kg DW		1.7	1.7
LDWG 2007	LDW-SC25	8 - 9.1	Copper	7.50E+00	0.11	390	390	mg/kg DW		0.02	0.02
LDWG 2007	LDW-SC26	0 - 1	Copper	1.46E+02	1.4	390	390	mg/kg DW		0.37	0.37
LDWG 2007	LDW-SC26	1 - 2	Copper	1.73E+02	2.04	390	390	mg/kg DW		0.44	0.44
LDWG 2007	LDW-SC26	2 - 4	Copper	5.44E+02	2.08	390	390	mg/kg DW		1.4	1.4
LDWG 2007	LDW-SC26	6 - 8	Copper	1.95E+03	1.88	390	390	mg/kg DW		5.0	5.0
LDWG 2007	LDW-SC26	11 - 12	Copper	2.30E+01	0.912	390	390	mg/kg DW		0.06	0.06
LDWG 2007	LDW-SC28	0 - 1	Copper	2.12E+02	2.59	390	390	mg/kg DW		0.54	0.54
LDWG 2007	LDW-SC28	1 - 2	Copper	1.73E+02	2.07	390	390	mg/kg DW		0.44	0.44
LDWG 2007	LDW-SC28	2 - 4	Copper	1.97E+02	3.14	390	390	mg/kg DW		0.51	0.51
LDWG 2007	LDW-SC28	6 - 7.5	Copper	1.48E+03	1.61	390	390	mg/kg DW		3.8	3.8
LDWG 2007	LDW-SC28	12 - 13	Copper	6.85E+01	1.31	390	390	mg/kg DW		0.18	0.18

Table A-2
Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC29	0 - 1	Copper	5.11E+01	1.77	390	390	mg/kg DW		0.13	0.13
LDWG 2007	LDW-SC29	1 - 2	Copper	2.05E+01	1.06	390	390	mg/kg DW		0.05	0.05
LDWG 2007	LDW-SC29	2 - 3.6	Copper	1.13E+01	0.48	390	390	mg/kg DW		0.03	0.03
LDWG 2007	LDW-SC25	1 - 2	Dibenzo(a,h)anthracene	4.80E-02 J	1.47	12	33	mg/kg OC	3.27E+00	0.27	0.10
LDWG 2007	LDW-SC25	2 - 4	Dibenzo(a,h)anthracene	5.30E-02 J	1.69	12	33	mg/kg OC	3.14E+00	0.26	0.10
LDWG 2007	LDW-SC26	6 - 8	Dibenzo(a,h)anthracene	4.00E-01 J	1.88	12	33	mg/kg OC	2.13E+01	1.8	0.64
LDWG 2007	LDW-SC28	0 - 1	Dibenzo(a,h)anthracene	3.40E-02 J	2.59	12	33	mg/kg OC	1.31E+00	0.11	0.04
LDWG 2007	LDW-SC28	1 - 2	Dibenzo(a,h)anthracene	4.20E-02 J	2.07	12	33	mg/kg OC	2.03E+00	0.17	0.06
LDWG 2007	LDW-SC28	2 - 4	Dibenzo(a,h)anthracene	3.80E-02 J	3.14	12	33	mg/kg OC	1.21E+00	0.10	0.04
LDWG 2007	LDW-SC28	6 - 7.5	Dibenzo(a,h)anthracene	2.00E-01	1.61	12	33	mg/kg OC	1.24E+01	1.0	0.38
LDWG 2007	LDW-SC28	12 - 13	Dibenzo(a,h)anthracene	4.30E-02	1.31	12	33	mg/kg OC	3.28E+00	0.27	0.10
LDWG 2007	LDW-SC29	1 - 2	Dibenzo(a,h)anthracene	1.10E-02 J	1.06	12	33	mg/kg OC	1.04E+00	0.09	0.03
LDWG 2007	LDW-SC25	2 - 4	Dibenzofuran	5.60E-02 J	1.69	15	58	mg/kg OC	3.31E+00	0.22	0.06
LDWG 2007	LDW-SC26	6 - 8	Dibenzofuran	3.60E-01	1.88	15	58	mg/kg OC	1.91E+01	1.3	0.33
LDWG 2007	LDW-SC28	6 - 7.5	Dibenzofuran	8.00E-02	1.61	15	58	mg/kg OC	4.97E+00	0.33	0.09
LDWG 2007	LDW-SC25	0 - 1	Dibutyltin as ion	7.20E-02	1.94						
LDWG 2007	LDW-SC25	1 - 2	Dibutyltin as ion	6.40E-02	1.47						
LDWG 2007	LDW-SC25	2 - 4	Dibutyltin as ion	1.50E-01	1.69						
LDWG 2007	LDW-SC25	4 - 6	Dibutyltin as ion	9.20E-02	1.63						
LDWG 2007	LDW-SC26	0 - 1	Dibutyltin as ion	1.60E-02	1.4						
LDWG 2007	LDW-SC26	1 - 2	Dibutyltin as ion	2.40E-02	2.04						
LDWG 2007	LDW-SC26	2 - 4	Dibutyltin as ion	8.70E-02	2.08						
LDWG 2007	LDW-SC26	6 - 8	Dibutyltin as ion	5.20E-01	1.88						
LDWG 2007	LDW-SC28	0 - 1	Dibutyltin as ion	2.50E-02 J	2.59						
LDWG 2007	LDW-SC28	1 - 2	Dibutyltin as ion	1.50E-02	2.07						
LDWG 2007	LDW-SC28	2 - 4	Dibutyltin as ion	2.50E-02	3.14						
LDWG 2007	LDW-SC28	6 - 7.5	Dibutyltin as ion	9.60E-01	1.61						
LDWG 2007	LDW-SC26	6 - 8	Dimethyl phthalate	2.00E-02	1.88	53	53	mg/kg OC	1.06E+00	0.02	0.02
LDWG 2007	LDW-SC28	6 - 7.5	Dimethyl phthalate	1.60E-02	1.61	53	53	mg/kg OC	9.94E-01	0.02	0.02
LDWG 2007	LDW-SC24	1 - 2	Di-n-butyl phthalate	1.30E-02 J	0.304	220	1,700	mg/kg OC	4.28E+00	0.02	0.003
LDWG 2007	LDW-SC24	2 - 4	Di-n-butyl phthalate	1.40E-02 J	0.435	220	1,700	mg/kg OC	3.22E+00	0.01	0.002
LDWG 2007	LDW-SC28	12 - 13	Di-n-butyl phthalate	3.10E-02 J	1.31	220	1,700	mg/kg OC	2.37E+00	0.01	0.001
LDWG 2007	LDW-SC29	0 - 1	Di-n-butyl phthalate	6.20E-02	1.77	220	1,700	mg/kg OC	3.50E+00	0.02	0.002
LDWG 2007	LDW-SC29	1 - 2	Di-n-butyl phthalate	2.80E-02	1.06	220	1,700	mg/kg OC	2.64E+00	0.01	0.002
LDWG 2007	LDW-SC29	2 - 3.6	Di-n-butyl phthalate	2.20E-02	0.48	220	1,700	mg/kg OC	4.58E+00	0.02	0.003

Table A-2
Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC26	6 - 8	Di-n-octyl phthalate	5.70E-02 J	1.88	58	4,500	mg/kg OC	3.03E+00	0.05	0.001
LDWG 2007	LDW-SC28	6 - 7.5	Di-n-octyl phthalate	5.60E-02 J	1.61	58	4,500	mg/kg OC	3.48E+00	0.06	0.001
LDWG 2007	LDW-SC26	0 - 1	Dioxin/furan TEQ - Mammal WHO 1998 - Half DL	1.57E-05 J							
LDWG 2007	LDW-SC26	1 - 2	Dioxin/furan TEQ - Mammal WHO 1998 - Half DL	1.29E-05 J							
LDWG 2007	LDW-SC26	2 - 4	Dioxin/furan TEQ - Mammal WHO 1998 - Half DL	2.17E-05 J							
LDWG 2007	LDW-SC26	6 - 8	Dioxin/furan TEQ - Mammal WHO 1998 - Half DL	1.24E-04 J							
LDWG 2007	LDW-SC28	0 - 1	Dioxin/furan TEQ - Mammal WHO 1998 - Half DL	1.92E-05 J							
LDWG 2007	LDW-SC28	1 - 2	Dioxin/furan TEQ - Mammal WHO 1998 - Half DL	1.46E-05							
LDWG 2007	LDW-SC28	2 - 4	Dioxin/furan TEQ - Mammal WHO 1998 - Half DL	1.84E-05 J							
LDWG 2007	LDW-SC29	0 - 1	Dioxin/furan TEQ - Mammal WHO 1998 - Half DL	5.60E-05 J							
LDWG 2007	LDW-SC29	1 - 2	Dioxin/furan TEQ - Mammal WHO 1998 - Half DL	1.04E-06 J							
LDWG 2007	LDW-SC29	2 - 3.6	Dioxin/furan TEQ - Mammal WHO 1998 - Half DL	1.57E-07 J							
LDWG 2007	LDW-SC26	0 - 1	Dioxin/furan TEQ - Mammal WHO 2005 - Half DL	1.59E-05 J							
LDWG 2007	LDW-SC26	1 - 2	Dioxin/furan TEQ - Mammal WHO 2005 - Half DL	1.31E-05 J							
LDWG 2007	LDW-SC26	2 - 4	Dioxin/furan TEQ - Mammal WHO 2005 - Half DL	2.24E-05 J							
LDWG 2007	LDW-SC26	6 - 8	Dioxin/furan TEQ - Mammal WHO 2005 - Half DL	1.36E-04 J							
LDWG 2007	LDW-SC28	0 - 1	Dioxin/furan TEQ - Mammal WHO 2005 - Half DL	1.99E-05 J							
LDWG 2007	LDW-SC28	1 - 2	Dioxin/furan TEQ - Mammal WHO 2005 - Half DL	1.48E-05							

Table A-2
Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC28	2 - 4	Dioxin/furan TEQ - Mammal WHO 2005 - Half DL	1.85E-05 J							
LDWG 2007	LDW-SC29	0 - 1	Dioxin/furan TEQ - Mammal WHO 2005 - Half DL	5.41E-05 J							
LDWG 2007	LDW-SC29	1 - 2	Dioxin/furan TEQ - Mammal WHO 2005 - Half DL	1.03E-06 J							
LDWG 2007	LDW-SC29	2 - 3.6	Dioxin/furan TEQ - Mammal WHO 2005 - Half DL	1.47E-07 J							
LDWG 2007	LDW-SC24	0 - 1	Fluoranthene	4.70E-01	1.99	160	1,200	mg/kg OC	2.36E+01	0.15	0.02
LDWG 2007	LDW-SC24	1 - 2	Fluoranthene	1.40E-01	0.304	160	1,200	mg/kg OC	4.61E+01	0.29	0.04
LDWG 2007	LDW-SC25	0 - 1	Fluoranthene	9.10E-01	1.94	160	1,200	mg/kg OC	4.69E+01	0.29	0.04
LDWG 2007	LDW-SC25	1 - 2	Fluoranthene	1.40E+00	1.47	160	1,200	mg/kg OC	9.52E+01	0.60	0.08
LDWG 2007	LDW-SC25	2 - 4	Fluoranthene	2.10E+00	1.69	160	1,200	mg/kg OC	1.24E+02	0.78	0.10
LDWG 2007	LDW-SC26	0 - 1	Fluoranthene	5.00E-01	1.4	160	1,200	mg/kg OC	3.57E+01	0.22	0.03
LDWG 2007	LDW-SC26	1 - 2	Fluoranthene	3.70E-01	2.04	160	1,200	mg/kg OC	1.81E+01	0.11	0.02
LDWG 2007	LDW-SC26	2 - 4	Fluoranthene	7.50E-01	2.08	160	1,200	mg/kg OC	3.61E+01	0.23	0.03
LDWG 2007	LDW-SC26	6 - 8	Fluoranthene	1.00E+01	1.88	160	1,200	mg/kg OC	5.32E+02	3.3	0.44
LDWG 2007	LDW-SC28	0 - 1	Fluoranthene	9.50E-01	2.59	160	1,200	mg/kg OC	3.67E+01	0.23	0.03
LDWG 2007	LDW-SC28	1 - 2	Fluoranthene	1.30E-01	2.07	160	1,200	mg/kg OC	6.28E+00	0.04	0.01
LDWG 2007	LDW-SC28	2 - 4	Fluoranthene	1.20E-01	3.14	160	1,200	mg/kg OC	3.82E+00	0.02	0.003
LDWG 2007	LDW-SC28	6 - 7.5	Fluoranthene	4.10E+00	1.61	160	1,200	mg/kg OC	2.55E+02	1.6	0.21
LDWG 2007	LDW-SC28	12 - 13	Fluoranthene	3.10E-01	1.31	160	1,200	mg/kg OC	2.37E+01	0.15	0.02
LDWG 2007	LDW-SC29	0 - 1	Fluoranthene	4.20E-02 J	1.77	160	1,200	mg/kg OC	2.37E+00	0.01	0.00
LDWG 2007	LDW-SC29	1 - 2	Fluoranthene	2.00E-01	1.06	160	1,200	mg/kg OC	1.89E+01	0.12	0.02
LDWG 2007	LDW-SC25	0 - 1	Fluorene	5.20E-02 J	1.94	23	79	mg/kg OC	2.68E+00	0.12	0.03
LDWG 2007	LDW-SC25	1 - 2	Fluorene	3.70E-02 J	1.47	23	79	mg/kg OC	2.52E+00	0.11	0.03
LDWG 2007	LDW-SC25	2 - 4	Fluorene	7.60E-02	1.69	23	79	mg/kg OC	4.50E+00	0.20	0.06
LDWG 2007	LDW-SC26	6 - 8	Fluorene	4.20E-01	1.88	23	79	mg/kg OC	2.23E+01	0.97	0.28
LDWG 2007	LDW-SC28	0 - 1	Fluorene	4.00E-02 J	2.59	23	79	mg/kg OC	1.54E+00	0.07	0.02
LDWG 2007	LDW-SC28	6 - 7.5	Fluorene	1.60E-01	1.61	23	79	mg/kg OC	9.94E+00	0.43	0.13
LDWG 2007	LDW-SC29	0 - 1	Hexachlorobenzene	5.90E-03	1.77	0.38	2	mg/kg OC	3.33E-01	0.88	0.14
LDWG 2007	LDW-SC24	0 - 1	Indeno(1,2,3-cd)pyrene	9.90E-02	1.99	34	88	mg/kg OC	4.97E+00	0.15	0.06
LDWG 2007	LDW-SC24	1 - 2	Indeno(1,2,3-cd)pyrene	1.30E-02 J	0.304	34	88	mg/kg OC	4.28E+00	0.13	0.05
LDWG 2007	LDW-SC25	0 - 1	Indeno(1,2,3-cd)pyrene	1.80E-01	1.94	34	88	mg/kg OC	9.28E+00	0.27	0.11
LDWG 2007	LDW-SC25	1 - 2	Indeno(1,2,3-cd)pyrene	2.00E-01	1.47	34	88	mg/kg OC	1.36E+01	0.40	0.15

Table A-2
Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC25	2 - 4	Indeno(1,2,3-cd)pyrene	2.10E-01	1.69	34	88	mg/kg OC	1.24E+01	0.37	0.14
LDWG 2007	LDW-SC26	0 - 1	Indeno(1,2,3-cd)pyrene	1.10E-01	1.4	34	88	mg/kg OC	7.86E+00	0.23	0.09
LDWG 2007	LDW-SC26	1 - 2	Indeno(1,2,3-cd)pyrene	1.10E-01	2.04	34	88	mg/kg OC	5.39E+00	0.16	0.06
LDWG 2007	LDW-SC26	2 - 4	Indeno(1,2,3-cd)pyrene	1.60E-01	2.08	34	88	mg/kg OC	7.69E+00	0.23	0.09
LDWG 2007	LDW-SC26	6 - 8	Indeno(1,2,3-cd)pyrene	1.00E+00	1.88	34	88	mg/kg OC	5.32E+01	1.6	0.60
LDWG 2007	LDW-SC28	0 - 1	Indeno(1,2,3-cd)pyrene	1.30E-01	2.59	34	88	mg/kg OC	5.02E+00	0.15	0.06
LDWG 2007	LDW-SC28	1 - 2	Indeno(1,2,3-cd)pyrene	8.90E-02	2.07	34	88	mg/kg OC	4.30E+00	0.13	0.05
LDWG 2007	LDW-SC28	2 - 4	Indeno(1,2,3-cd)pyrene	8.50E-02	3.14	34	88	mg/kg OC	2.71E+00	0.08	0.03
LDWG 2007	LDW-SC28	6 - 7.5	Indeno(1,2,3-cd)pyrene	4.00E-01	1.61	34	88	mg/kg OC	2.48E+01	0.73	0.28
LDWG 2007	LDW-SC28	12 - 13	Indeno(1,2,3-cd)pyrene	6.90E-02	1.31	34	88	mg/kg OC	5.27E+00	0.15	0.06
LDWG 2007	LDW-SC29	1 - 2	Indeno(1,2,3-cd)pyrene	2.90E-02	1.06	34	88	mg/kg OC	2.74E+00	0.08	0.03
LDWG 2007	LDW-SC24	0 - 1	Lead	6.90E+01	1.99	450	530	mg/kg DW		0.15	0.13
LDWG 2007	LDW-SC24	1 - 2	Lead	8.00E+00	0.304	450	530	mg/kg DW		0.02	0.02
LDWG 2007	LDW-SC25	0 - 1	Lead	7.60E+01	1.94	450	530	mg/kg DW		0.17	0.14
LDWG 2007	LDW-SC25	1 - 2	Lead	9.80E+01	1.47	450	530	mg/kg DW		0.22	0.18
LDWG 2007	LDW-SC25	2 - 4	Lead	1.73E+02	1.69	450	530	mg/kg DW		0.38	0.33
LDWG 2007	LDW-SC25	4 - 6	Lead	3.10E+02	1.63	450	530	mg/kg DW		0.69	0.58
LDWG 2007	LDW-SC26	0 - 1	Lead	5.80E+01 J	1.4	450	530	mg/kg DW		0.13	0.11
LDWG 2007	LDW-SC26	1 - 2	Lead	5.70E+01 J	2.04	450	530	mg/kg DW		0.13	0.11
LDWG 2007	LDW-SC26	2 - 4	Lead	9.10E+01 J	2.08	450	530	mg/kg DW		0.20	0.17
LDWG 2007	LDW-SC26	6 - 8	Lead	1.35E+03	1.88	450	530	mg/kg DW		3.0	2.5
LDWG 2007	LDW-SC26	11 - 12	Lead	9.00E+00	0.912	450	530	mg/kg DW		0.02	0.02
LDWG 2007	LDW-SC28	0 - 1	Lead	1.14E+02	2.59	450	530	mg/kg DW		0.25	0.22
LDWG 2007	LDW-SC28	1 - 2	Lead	4.00E+01	2.07	450	530	mg/kg DW		0.09	0.08
LDWG 2007	LDW-SC28	2 - 4	Lead	6.50E+01	3.14	450	530	mg/kg DW		0.14	0.12
LDWG 2007	LDW-SC28	6 - 7.5	Lead	5.83E+02	1.61	450	530	mg/kg DW		1.3	1.1
LDWG 2007	LDW-SC28	12 - 13	Lead	3.70E+01	1.31	450	530	mg/kg DW		0.08	0.07
LDWG 2007	LDW-SC29	0 - 1	Lead	1.80E+01	1.77	450	530	mg/kg DW		0.04	0.03
LDWG 2007	LDW-SC29	1 - 2	Lead	6.00E+00	1.06	450	530	mg/kg DW		0.01	0.01
LDWG 2007	LDW-SC29	2 - 3.6	Lead	4.00E+00	0.48	450	530	mg/kg DW		0.01	0.01
LDWG 2007	LDW-SC24	0 - 1	Mercury	2.60E-01	1.99	0.41	0.59	mg/kg DW		0.63	0.44
LDWG 2007	LDW-SC25	0 - 1	Mercury	2.70E-01	1.94	0.41	0.59	mg/kg DW		0.66	0.46
LDWG 2007	LDW-SC25	1 - 2	Mercury	3.00E-01	1.47	0.41	0.59	mg/kg DW		0.73	0.51
LDWG 2007	LDW-SC25	2 - 4	Mercury	4.00E-01	1.69	0.41	0.59	mg/kg DW		0.98	0.68
LDWG 2007	LDW-SC26	0 - 1	Mercury	2.80E-01 J	1.4	0.41	0.59	mg/kg DW		0.68	0.47

Table A-2
Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC26	1 - 2	Mercury	2.80E-01 J	2.04	0.41	0.59	mg/kg DW		0.68	0.47
LDWG 2007	LDW-SC26	2 - 4	Mercury	6.90E-01 J	2.08	0.41	0.59	mg/kg DW		1.7	1.2
LDWG 2007	LDW-SC26	6 - 8	Mercury	4.34E+00	1.88	0.41	0.59	mg/kg DW		11	7.4
LDWG 2007	LDW-SC28	0 - 1	Mercury	3.70E-01	2.59	0.41	0.59	mg/kg DW		0.90	0.63
LDWG 2007	LDW-SC28	1 - 2	Mercury	2.00E-01	2.07	0.41	0.59	mg/kg DW		0.49	0.34
LDWG 2007	LDW-SC28	2 - 4	Mercury	2.40E-01	3.14	0.41	0.59	mg/kg DW		0.59	0.41
LDWG 2007	LDW-SC28	6 - 7.5	Mercury	7.20E-01	1.61	0.41	0.59	mg/kg DW		1.8	1.2
LDWG 2007	LDW-SC28	12 - 13	Mercury	3.00E-01	1.31	0.41	0.59	mg/kg DW		0.73	0.51
LDWG 2007	LDW-SC29	0 - 1	Mercury	1.20E-01	1.77	0.41	0.59	mg/kg DW		0.29	0.20
LDWG 2007	LDW-SC24	0 - 1	Molybdenum	2.60E+00	1.99						
LDWG 2007	LDW-SC25	0 - 1	Molybdenum	4.00E+00	1.94						
LDWG 2007	LDW-SC25	1 - 2	Molybdenum	6.50E+00	1.47						
LDWG 2007	LDW-SC25	2 - 4	Molybdenum	1.00E+01	1.69						
LDWG 2007	LDW-SC25	4 - 6	Molybdenum	1.60E+01	1.63						
LDWG 2007	LDW-SC25	8 - 9.1	Molybdenum	7.00E-01	0.11						
LDWG 2007	LDW-SC26	0 - 1	Molybdenum	3.00E+00	1.4						
LDWG 2007	LDW-SC26	1 - 2	Molybdenum	3.10E+00	2.04						
LDWG 2007	LDW-SC26	2 - 4	Molybdenum	5.90E+00	2.08						
LDWG 2007	LDW-SC26	6 - 8	Molybdenum	1.66E+02	1.88						
LDWG 2007	LDW-SC26	11 - 12	Molybdenum	1.20E+00	0.912						
LDWG 2007	LDW-SC28	0 - 1	Molybdenum	9.90E+00 J	2.59						
LDWG 2007	LDW-SC28	1 - 2	Molybdenum	1.00E+00 J	2.07						
LDWG 2007	LDW-SC28	2 - 4	Molybdenum	2.00E+00 J	3.14						
LDWG 2007	LDW-SC28	6 - 7.5	Molybdenum	6.10E+01	1.61						
LDWG 2007	LDW-SC28	12 - 13	Molybdenum	9.90E+00	1.31						
LDWG 2007	LDW-SC29	0 - 1	Molybdenum	1.20E+00	1.77						
LDWG 2007	LDW-SC29	1 - 2	Molybdenum	1.70E+00	1.06						
LDWG 2007	LDW-SC25	0 - 1	Monobutyltin as ion	1.20E-02	1.94						
LDWG 2007	LDW-SC25	1 - 2	Monobutyltin as ion	1.30E-02	1.47						
LDWG 2007	LDW-SC25	2 - 4	Monobutyltin as ion	1.80E-02	1.69						
LDWG 2007	LDW-SC26	1 - 2	Monobutyltin as ion	4.50E-03	2.04						
LDWG 2007	LDW-SC26	2 - 4	Monobutyltin as ion	6.00E-03	2.08						
LDWG 2007	LDW-SC26	6 - 8	Monobutyltin as ion	9.10E-03	1.88						
LDWG 2007	LDW-SC28	6 - 7.5	Monobutyltin as ion	4.60E-02	1.61						
LDWG 2007	LDW-SC25	2 - 4	Naphthalene	4.10E-02 J	1.69	99	170	mg/kg OC	2.43E+00	0.02	0.01

Table A-2
Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC26	6 - 8	Naphthalene	2.20E-01	1.88	99	170	mg/kg OC	1.17E+01	0.12	0.07
LDWG 2007	LDW-SC28	6 - 7.5	Naphthalene	4.50E-02 J	1.61	99	170	mg/kg OC	2.80E+00	0.03	0.02
LDWG 2007	LDW-SC28	12 - 13	Naphthalene	8.00E-02	1.31	99	170	mg/kg OC	6.11E+00	0.06	0.04
LDWG 2007	LDW-SC24	0 - 1	Nickel[b,c]	2.40E+01	1.99	140	370	mg/kg DW		0.17	0.06
LDWG 2007	LDW-SC24	1 - 2	Nickel	9.00E+00	0.304	140	370	mg/kg DW		0.06	0.02
LDWG 2007	LDW-SC24	2 - 4	Nickel	7.00E+00	0.435	140	370	mg/kg DW		0.05	0.02
LDWG 2007	LDW-SC25	0 - 1	Nickel	2.40E+01	1.94	140	370	mg/kg DW		0.17	0.06
LDWG 2007	LDW-SC25	1 - 2	Nickel	2.60E+01	1.47	140	370	mg/kg DW		0.19	0.07
LDWG 2007	LDW-SC25	2 - 4	Nickel	2.70E+01	1.69	140	370	mg/kg DW		0.19	0.07
LDWG 2007	LDW-SC25	4 - 6	Nickel	2.80E+01	1.63	140	370	mg/kg DW		0.20	0.08
LDWG 2007	LDW-SC25	8 - 9.1	Nickel	5.00E+00	0.11	140	370	mg/kg DW		0.04	0.01
LDWG 2007	LDW-SC26	0 - 1	Nickel	2.70E+01	1.4	140	370	mg/kg DW		0.19	0.07
LDWG 2007	LDW-SC26	1 - 2	Nickel	3.20E+01	2.04	140	370	mg/kg DW		0.23	0.09
LDWG 2007	LDW-SC26	2 - 4	Nickel	2.60E+01	2.08	140	370	mg/kg DW		0.19	0.07
LDWG 2007	LDW-SC26	6 - 8	Nickel	6.00E+01	1.88	140	370	mg/kg DW		0.43	0.16
LDWG 2007	LDW-SC26	11 - 12	Nickel	1.20E+01	0.912	140	370	mg/kg DW		0.09	0.03
LDWG 2007	LDW-SC28	0 - 1	Nickel	2.30E+01	2.59	140	370	mg/kg DW		0.16	0.06
LDWG 2007	LDW-SC28	1 - 2	Nickel	2.30E+01	2.07	140	370	mg/kg DW		0.16	0.06
LDWG 2007	LDW-SC28	2 - 4	Nickel	2.50E+01	3.14	140	370	mg/kg DW		0.18	0.07
LDWG 2007	LDW-SC28	6 - 7.5	Nickel	3.70E+01	1.61	140	370	mg/kg DW		0.26	0.10
LDWG 2007	LDW-SC28	12 - 13	Nickel	1.70E+01	1.31	140	370	mg/kg DW		0.12	0.05
LDWG 2007	LDW-SC29	0 - 1	Nickel	1.50E+01	1.77	140	370	mg/kg DW		0.11	0.04
LDWG 2007	LDW-SC29	1 - 2	Nickel	1.20E+01	1.06	140	370	mg/kg DW		0.09	0.03
LDWG 2007	LDW-SC29	2 - 3.6	Nickel	9.00E+00	0.48	140	370	mg/kg DW		0.06	0.02
LDWG 2007	LDW-SC26	0 - 1	OCDD	4.54E-03	1.4						
LDWG 2007	LDW-SC26	1 - 2	OCDD	3.45E-03	2.04						
LDWG 2007	LDW-SC26	2 - 4	OCDD	7.14E-03	2.08						
LDWG 2007	LDW-SC26	6 - 8	OCDD	6.20E-02	1.88						
LDWG 2007	LDW-SC28	0 - 1	OCDD	6.77E-03	2.59						
LDWG 2007	LDW-SC28	1 - 2	OCDD	3.71E-03	2.07						
LDWG 2007	LDW-SC28	2 - 4	OCDD	5.48E-03	3.14						
LDWG 2007	LDW-SC29	0 - 1	OCDD	1.07E-02	1.77						
LDWG 2007	LDW-SC29	1 - 2	OCDD	2.07E-04	1.06						
LDWG 2007	LDW-SC29	2 - 3.6	OCDD	2.09E-05	0.48						
LDWG 2007	LDW-SC26	0 - 1	OCDF	3.47E-04	1.4						

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Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC26	1 - 2	OCDF	1.76E-04	2.04						
LDWG 2007	LDW-SC26	2 - 4	OCDF	3.93E-04	2.08						
LDWG 2007	LDW-SC26	6 - 8	OCDF	4.42E-03	1.88						
LDWG 2007	LDW-SC28	0 - 1	OCDF	5.17E-04	2.59						
LDWG 2007	LDW-SC28	1 - 2	OCDF	2.37E-04	2.07						
LDWG 2007	LDW-SC28	2 - 4	OCDF	2.19E-04	3.14						
LDWG 2007	LDW-SC29	0 - 1	OCDF	1.64E-03	1.77						
LDWG 2007	LDW-SC29	1 - 2	OCDF	6.55E-05	1.06						
LDWG 2007	LDW-SC29	2 - 3.6	OCDF	2.08E-06	0.48						
LDWG 2007	LDW-SC24	0 - 1	PCBs (total calc'd)	2.80E-01	1.99	12	65	mg/kg OC	1.41E+01	1.2	0.22
LDWG 2007	LDW-SC24	1 - 2	PCBs (total calc'd)	3.60E-02	0.304	12	65	mg/kg OC	1.18E+01	0.99	0.18
LDWG 2007	LDW-SC25	0 - 1	PCBs (total calc'd)	3.10E-01	1.94	12	65	mg/kg OC	1.60E+01	1.3	0.25
LDWG 2007	LDW-SC25	1 - 2	PCBs (total calc'd)	3.60E-01	1.47	12	65	mg/kg OC	2.45E+01	2.0	0.38
LDWG 2007	LDW-SC25	2 - 4	PCBs (total calc'd)	4.30E-01	1.69	12	65	mg/kg OC	2.54E+01	2.1	0.39
LDWG 2007	LDW-SC25	4 - 6	PCBs (total calc'd)	8.00E-01 J	1.63	12	65	mg/kg OC	4.91E+01	4.1	0.76
LDWG 2007	LDW-SC26	0 - 1	PCBs (total calc'd)	2.80E-01	1.4	12	65	mg/kg OC	2.00E+01	1.7	0.31
LDWG 2007	LDW-SC26	1 - 2	PCBs (total calc'd)	2.26E-01	2.04	12	65	mg/kg OC	1.11E+01	0.92	0.17
LDWG 2007	LDW-SC26	2 - 4	PCBs (total calc'd)	3.10E-01	2.08	12	65	mg/kg OC	1.49E+01	1.2	0.23
LDWG 2007	LDW-SC26	6 - 8	PCBs (total calc'd)	2.30E+00	1.88	12	65	mg/kg OC	1.22E+02	10	1.9
LDWG 2007	LDW-SC26	11 - 12	PCBs (total calc'd)	1.40E-01	0.912	12	65	mg/kg OC	1.54E+01	1.3	0.24
LDWG 2007	LDW-SC28	0 - 1	PCBs (total calc'd)	4.40E-01	2.59	12	65	mg/kg OC	1.70E+01	1.4	0.26
LDWG 2007	LDW-SC28	1 - 2	PCBs (total calc'd)	3.60E-01 J	2.07	12	65	mg/kg OC	1.74E+01	1.4	0.27
LDWG 2007	LDW-SC28	2 - 4	PCBs (total calc'd)	2.90E-01	3.14	12	65	mg/kg OC	9.24E+00	0.77	0.14
LDWG 2007	LDW-SC28	6 - 7.5	PCBs (total calc'd)	3.20E+00	1.61	12	65	mg/kg OC	1.99E+02	17	3.1
LDWG 2007	LDW-SC28	12 - 13	PCBs (total calc'd)	5.40E-01	1.31	12	65	mg/kg OC	4.12E+01	3.4	0.63
LDWG 2007	LDW-SC29	0 - 1	PCBs (total calc'd)	3.30E-02 J	1.77	12	65	mg/kg OC	1.86E+00	0.16	0.03
LDWG 2007	LDW-SC24	0 - 1	Pentachlorophenol	2.40E-02 J	1.99	360	690	ug/kg DW		0.07	0.03
LDWG 2007	LDW-SC25	0 - 1	Pentachlorophenol	2.00E-02 J	1.94	360	690	ug/kg DW		0.06	0.03
LDWG 2007	LDW-SC25	1 - 2	Pentachlorophenol	2.10E-02 J	1.47	360	690	ug/kg DW		0.06	0.03
LDWG 2007	LDW-SC25	2 - 4	Pentachlorophenol	3.70E-02 J	1.69	360	690	ug/kg DW		0.10	0.05
LDWG 2007	LDW-SC26	0 - 1	Pentachlorophenol	2.00E-02 J	1.4	360	690	ug/kg DW		0.06	0.03
LDWG 2007	LDW-SC26	2 - 4	Pentachlorophenol	2.40E-02 J	2.08	360	690	ug/kg DW		0.07	0.03
LDWG 2007	LDW-SC26	6 - 8	Pentachlorophenol	8.00E-01	1.88	360	690	ug/kg DW		2.2	1.2
LDWG 2007	LDW-SC28	0 - 1	Pentachlorophenol	3.20E-02	2.59	360	690	ug/kg DW		0.09	0.05
LDWG 2007	LDW-SC28	6 - 7.5	Pentachlorophenol	4.10E-01	1.61	360	690	ug/kg DW		1.1	0.59

Table A-2
Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC24	0 - 1	Phenanthrene	1.50E-01	1.99	100	480	mg/kg OC	7.54E+00	0.08	0.02
LDWG 2007	LDW-SC24	1 - 2	Phenanthrene	3.00E-02	0.304	100	480	mg/kg OC	9.87E+00	0.10	0.02
LDWG 2007	LDW-SC25	0 - 1	Phenanthrene	4.10E-01	1.94	100	480	mg/kg OC	2.11E+01	0.21	0.04
LDWG 2007	LDW-SC25	1 - 2	Phenanthrene	3.40E-01	1.47	100	480	mg/kg OC	2.31E+01	0.23	0.05
LDWG 2007	LDW-SC25	2 - 4	Phenanthrene	5.30E-01	1.69	100	480	mg/kg OC	3.14E+01	0.31	0.07
LDWG 2007	LDW-SC26	0 - 1	Phenanthrene	1.90E-01	1.4	100	480	mg/kg OC	1.36E+01	0.14	0.03
LDWG 2007	LDW-SC26	1 - 2	Phenanthrene	1.10E-01	2.04	100	480	mg/kg OC	5.39E+00	0.05	0.01
LDWG 2007	LDW-SC26	2 - 4	Phenanthrene	2.40E-01	2.08	100	480	mg/kg OC	1.15E+01	0.12	0.02
LDWG 2007	LDW-SC26	6 - 8	Phenanthrene	5.60E+00	1.88	100	480	mg/kg OC	2.98E+02	3.0	0.62
LDWG 2007	LDW-SC28	0 - 1	Phenanthrene	3.00E-01	2.59	100	480	mg/kg OC	1.16E+01	0.12	0.02
LDWG 2007	LDW-SC28	1 - 2	Phenanthrene	1.20E-01	2.07	100	480	mg/kg OC	5.80E+00	0.06	0.01
LDWG 2007	LDW-SC28	2 - 4	Phenanthrene	1.20E-01	3.14	100	480	mg/kg OC	3.82E+00	0.04	0.01
LDWG 2007	LDW-SC28	6 - 7.5	Phenanthrene	1.70E+00	1.61	100	480	mg/kg OC	1.06E+02	1.1	0.22
LDWG 2007	LDW-SC28	12 - 13	Phenanthrene	9.20E-02	1.31	100	480	mg/kg OC	7.02E+00	0.07	0.01
LDWG 2007	LDW-SC29	1 - 2	Phenanthrene	8.20E-02	1.06	100	480	mg/kg OC	7.74E+00	0.08	0.02
LDWG 2007	LDW-SC28	0 - 1	Phenol	2.10E-01	2.59	420	1,200	ug/kg DW		0.50	0.18
LDWG 2007	LDW-SC28	1 - 2	Phenol	1.50E-01	2.07	420	1,200	ug/kg DW		0.36	0.13
LDWG 2007	LDW-SC28	2 - 4	Phenol	1.10E-01	3.14	420	1,200	ug/kg DW		0.26	0.09
LDWG 2007	LDW-SC24	0 - 1	Pyrene	6.70E-01	1.99	1,000	1,400	mg/kg OC	3.37E+01	0.03	0.02
LDWG 2007	LDW-SC24	1 - 2	Pyrene	2.30E-01	0.304	1,000	1,400	mg/kg OC	7.57E+01	0.08	0.05
LDWG 2007	LDW-SC24	2 - 4	Pyrene	1.90E-02 J	0.435	1,000	1,400	mg/kg OC	4.37E+00	0.004	0.003
LDWG 2007	LDW-SC25	0 - 1	Pyrene	9.20E-01	1.94	1,000	1,400	mg/kg OC	4.74E+01	0.05	0.03
LDWG 2007	LDW-SC25	1 - 2	Pyrene	1.80E+00	1.47	1,000	1,400	mg/kg OC	1.22E+02	0.12	0.09
LDWG 2007	LDW-SC25	2 - 4	Pyrene	1.60E+00	1.69	1,000	1,400	mg/kg OC	9.47E+01	0.09	0.07
LDWG 2007	LDW-SC26	0 - 1	Pyrene	4.60E-01	1.4	1,000	1,400	mg/kg OC	3.29E+01	0.03	0.02
LDWG 2007	LDW-SC26	1 - 2	Pyrene	4.00E-01	2.04	1,000	1,400	mg/kg OC	1.96E+01	0.02	0.01
LDWG 2007	LDW-SC26	2 - 4	Pyrene	8.80E-01	2.08	1,000	1,400	mg/kg OC	4.23E+01	0.04	0.03
LDWG 2007	LDW-SC26	6 - 8	Pyrene	9.70E+00	1.88	1,000	1,400	mg/kg OC	5.16E+02	0.52	0.37
LDWG 2007	LDW-SC28	0 - 1	Pyrene	9.60E-01	2.59	1,000	1,400	mg/kg OC	3.71E+01	0.04	0.03
LDWG 2007	LDW-SC28	1 - 2	Pyrene	3.60E-01 J	2.07	1,000	1,400	mg/kg OC	1.74E+01	0.02	0.01
LDWG 2007	LDW-SC28	2 - 4	Pyrene	4.10E-01 J	3.14	1,000	1,400	mg/kg OC	1.31E+01	0.01	0.01
LDWG 2007	LDW-SC28	6 - 7.5	Pyrene	3.60E+00	1.61	1,000	1,400	mg/kg OC	2.24E+02	0.22	0.16
LDWG 2007	LDW-SC28	12 - 13	Pyrene	3.00E-01	1.31	1,000	1,400	mg/kg OC	2.29E+01	0.02	0.02
LDWG 2007	LDW-SC29	0 - 1	Pyrene	9.20E-02 J	1.77	1,000	1,400	mg/kg OC	5.20E+00	0.01	0.004
LDWG 2007	LDW-SC29	1 - 2	Pyrene	3.10E-01 J	1.06	1,000	1,400	mg/kg OC	2.92E+01	0.03	0.02

Table A-2
Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC29	2 - 3.6	Pyrene	9.90E-03 J	0.48	1,000	1,400	mg/kg OC	2.06E+00	0.002	0.001
LDWG 2007	LDW-SC26	2 - 4	Silver	8.00E-01	2.08	6.1	6.1	mg/kg DW		0.13	0.13
LDWG 2007	LDW-SC26	6 - 8	Silver	3.00E+00	1.88	6.1	6.1	mg/kg DW		0.49	0.49
LDWG 2007	LDW-SC28	6 - 7.5	Silver	2.00E+00	1.61	6.1	6.1	mg/kg DW		0.33	0.33
LDWG 2007	LDW-SC28	12 - 13	Silver	5.00E-01	1.31	6.1	6.1	mg/kg DW		0.08	0.08
LDWG 2007	LDW-SC24	0 - 1	Total HPAH (calc'd)	3.26E+00	1.99	960	5,300	mg/kg OC	1.64E+02	0.17	0.03
LDWG 2007	LDW-SC24	1 - 2	Total HPAH (calc'd)	7.20E-01 J	0.304	960	5,300	mg/kg OC	2.37E+02	0.25	0.04
LDWG 2007	LDW-SC24	2 - 4	Total HPAH (calc'd)	6.80E-02 J	0.435	960	5,300	mg/kg OC	1.56E+01	0.02	0.003
LDWG 2007	LDW-SC25	0 - 1	Total HPAH (calc'd)	5.31E+00	1.94	960	5,300	mg/kg OC	2.74E+02	0.29	0.05
LDWG 2007	LDW-SC25	1 - 2	Total HPAH (calc'd)	7.40E+00 J	1.47	960	5,300	mg/kg OC	5.03E+02	0.52	0.09
LDWG 2007	LDW-SC25	2 - 4	Total HPAH (calc'd)	8.00E+00 J	1.69	960	5,300	mg/kg OC	4.73E+02	0.49	0.09
LDWG 2007	LDW-SC26	0 - 1	Total HPAH (calc'd)	3.04E+00 J	1.4	960	5,300	mg/kg OC	2.17E+02	0.23	0.04
LDWG 2007	LDW-SC26	1 - 2	Total HPAH (calc'd)	2.33E+00	2.04	960	5,300	mg/kg OC	1.14E+02	0.12	0.02
LDWG 2007	LDW-SC26	2 - 4	Total HPAH (calc'd)	3.98E+00	2.08	960	5,300	mg/kg OC	1.91E+02	0.20	0.04
LDWG 2007	LDW-SC26	6 - 8	Total HPAH (calc'd)	3.80E+01 J	1.88	960	5,300	mg/kg OC	2.02E+03	2.1	0.38
LDWG 2007	LDW-SC28	0 - 1	Total HPAH (calc'd)	4.28E+00 J	2.59	960	5,300	mg/kg OC	1.65E+02	0.17	0.03
LDWG 2007	LDW-SC28	1 - 2	Total HPAH (calc'd)	1.66E+00 J	2.07	960	5,300	mg/kg OC	8.02E+01	0.08	0.02
LDWG 2007	LDW-SC28	2 - 4	Total HPAH (calc'd)	1.77E+00 J	3.14	960	5,300	mg/kg OC	5.64E+01	0.06	0.01
LDWG 2007	LDW-SC28	6 - 7.5	Total HPAH (calc'd)	1.42E+01	1.61	960	5,300	mg/kg OC	8.82E+02	0.92	0.17
LDWG 2007	LDW-SC28	12 - 13	Total HPAH (calc'd)	1.36E+00 J	1.31	960	5,300	mg/kg OC	1.04E+02	0.11	0.02
LDWG 2007	LDW-SC29	0 - 1	Total HPAH (calc'd)	3.41E-01 J	1.77	960	5,300	mg/kg OC	1.93E+01	0.02	0.004
LDWG 2007	LDW-SC29	1 - 2	Total HPAH (calc'd)	1.16E+00 J	1.06	960	5,300	mg/kg OC	1.09E+02	0.11	0.02
LDWG 2007	LDW-SC29	2 - 3.6	Total HPAH (calc'd)	9.90E-03 J	0.48	960	5,300	mg/kg OC	2.06E+00	0.002	0.000
LDWG 2007	LDW-SC24	0 - 1	Total LPAH (calc'd)	2.30E-01	1.99	370	780	mg/kg OC	1.16E+01	0.03	0.01
LDWG 2007	LDW-SC24	1 - 2	Total LPAH (calc'd)	4.60E-02 J	0.304	370	780	mg/kg OC	1.51E+01	0.04	0.02
LDWG 2007	LDW-SC25	0 - 1	Total LPAH (calc'd)	6.70E-01 J	1.94	370	780	mg/kg OC	3.45E+01	0.09	0.04
LDWG 2007	LDW-SC25	1 - 2	Total LPAH (calc'd)	5.90E-01 J	1.47	370	780	mg/kg OC	4.01E+01	0.11	0.05
LDWG 2007	LDW-SC25	2 - 4	Total LPAH (calc'd)	9.90E-01 J	1.69	370	780	mg/kg OC	5.86E+01	0.16	0.08
LDWG 2007	LDW-SC26	0 - 1	Total LPAH (calc'd)	2.70E-01 J	1.4	370	780	mg/kg OC	1.93E+01	0.05	0.02
LDWG 2007	LDW-SC26	1 - 2	Total LPAH (calc'd)	1.60E-01 J	2.04	370	780	mg/kg OC	7.84E+00	0.02	0.01
LDWG 2007	LDW-SC26	2 - 4	Total LPAH (calc'd)	3.10E-01 J	2.08	370	780	mg/kg OC	1.49E+01	0.04	0.02
LDWG 2007	LDW-SC26	6 - 8	Total LPAH (calc'd)	8.50E+00 J	1.88	370	780	mg/kg OC	4.52E+02	1.2	0.58
LDWG 2007	LDW-SC28	0 - 1	Total LPAH (calc'd)	4.40E-01 J	2.59	370	780	mg/kg OC	1.70E+01	0.05	0.02
LDWG 2007	LDW-SC28	1 - 2	Total LPAH (calc'd)	1.70E-01 J	2.07	370	780	mg/kg OC	8.21E+00	0.02	0.01
LDWG 2007	LDW-SC28	2 - 4	Total LPAH (calc'd)	1.70E-01 J	3.14	370	780	mg/kg OC	5.41E+00	0.01	0.01

Table A-2
Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC28	6 - 7.5	Total LPAH (calc'd)	2.60E+00 J	1.61	370	780	mg/kg OC	1.61E+02	0.44	0.21
LDWG 2007	LDW-SC28	12 - 13	Total LPAH (calc'd)	2.36E-01 J	1.31	370	780	mg/kg OC	1.80E+01	0.05	0.02
LDWG 2007	LDW-SC29	1 - 2	Total LPAH (calc'd)	1.19E-01 J	1.06	370	780	mg/kg OC	1.12E+01	0.03	0.01
LDWG 2007	LDW-SC25	0 - 1	Tributyltin as ion	2.20E-01	1.94						
LDWG 2007	LDW-SC25	1 - 2	Tributyltin as ion	3.50E-01	1.47						
LDWG 2007	LDW-SC25	2 - 4	Tributyltin as ion	7.20E-01	1.69						
LDWG 2007	LDW-SC25	4 - 6	Tributyltin as ion	1.00E+00	1.63						
LDWG 2007	LDW-SC26	0 - 1	Tributyltin as ion	1.30E-01	1.4						
LDWG 2007	LDW-SC26	1 - 2	Tributyltin as ion	1.30E-01	2.04						
LDWG 2007	LDW-SC26	2 - 4	Tributyltin as ion	5.90E-01	2.08						
LDWG 2007	LDW-SC26	6 - 8	Tributyltin as ion	6.20E+00	1.88						
LDWG 2007	LDW-SC28	0 - 1	Tributyltin as ion	1.60E-01	2.59						
LDWG 2007	LDW-SC28	1 - 2	Tributyltin as ion	5.50E-02	2.07						
LDWG 2007	LDW-SC28	2 - 4	Tributyltin as ion	1.20E-01	3.14						
LDWG 2007	LDW-SC28	6 - 7.5	Tributyltin as ion	3.40E+00	1.61						
LDWG 2007	LDW-SC28	12 - 13	Tributyltin as ion	4.80E-03	1.31						
LDWG 2007	LDW-SC24	0 - 1	Vanadium	7.12E+01	1.99						
LDWG 2007	LDW-SC24	1 - 2	Vanadium	4.64E+01	0.304						
LDWG 2007	LDW-SC24	2 - 4	Vanadium	4.10E+01	0.435						
LDWG 2007	LDW-SC25	0 - 1	Vanadium	7.31E+01	1.94						
LDWG 2007	LDW-SC25	1 - 2	Vanadium	7.51E+01	1.47						
LDWG 2007	LDW-SC25	2 - 4	Vanadium	7.90E+01	1.69						
LDWG 2007	LDW-SC25	4 - 6	Vanadium	8.90E+01	1.63						
LDWG 2007	LDW-SC25	8 - 9.1	Vanadium	3.75E+01	0.11						
LDWG 2007	LDW-SC26	0 - 1	Vanadium	7.89E+01	1.4						
LDWG 2007	LDW-SC26	1 - 2	Vanadium	7.85E+01	2.04						
LDWG 2007	LDW-SC26	2 - 4	Vanadium	8.01E+01	2.08						
LDWG 2007	LDW-SC26	6 - 8	Vanadium	6.70E+01	1.88						
LDWG 2007	LDW-SC26	11 - 12	Vanadium	4.77E+01	0.912						
LDWG 2007	LDW-SC28	0 - 1	Vanadium	6.75E+01	2.59						
LDWG 2007	LDW-SC28	1 - 2	Vanadium	6.89E+01	2.07						
LDWG 2007	LDW-SC28	2 - 4	Vanadium	7.11E+01	3.14						
LDWG 2007	LDW-SC28	6 - 7.5	Vanadium	9.20E+01	1.61						
LDWG 2007	LDW-SC28	12 - 13	Vanadium	5.92E+01	1.31						
LDWG 2007	LDW-SC29	0 - 1	Vanadium	5.65E+01	1.77						

Table A-2
Subsurface Sediment Sampling Results
Glacier Bay Source Control Area

Source	Sample Location	Sample Depth (feet)	Chemical	Conc'n (mg/kg DW)	TOC %	SQS	CSL	Units	Conc'n (mg/kg OC)	SQS Exceedance Factor[a]	CSL Exceedance Factor[a]
LDWG 2007	LDW-SC29	1 - 2	Vanadium	5.27E+01	1.06						
LDWG 2007	LDW-SC29	2 - 3.6	Vanadium	4.46E+01	0.48						
LDWG 2007	LDW-SC24	0 - 1	Zinc	1.95E+02	1.99	410	960	mg/kg DW		0.48	0.20
LDWG 2007	LDW-SC24	1 - 2	Zinc	3.83E+01	0.304	410	960	mg/kg DW		0.09	0.04
LDWG 2007	LDW-SC24	2 - 4	Zinc	2.26E+01	0.435	410	960	mg/kg DW		0.06	0.02
LDWG 2007	LDW-SC25	0 - 1	Zinc	2.63E+02	1.94	410	960	mg/kg DW		0.64	0.27
LDWG 2007	LDW-SC25	1 - 2	Zinc	5.03E+02	1.47	410	960	mg/kg DW		1.2	0.52
LDWG 2007	LDW-SC25	2 - 4	Zinc	7.50E+02	1.69	410	960	mg/kg DW		1.8	0.78
LDWG 2007	LDW-SC25	4 - 6	Zinc	1.42E+03	1.63	410	960	mg/kg DW		3.5	1.5
LDWG 2007	LDW-SC25	8 - 9.1	Zinc	1.76E+01	0.11	410	960	mg/kg DW		0.04	0.02
LDWG 2007	LDW-SC26	0 - 1	Zinc	1.98E+02	1.4	410	960	mg/kg DW		0.48	0.21
LDWG 2007	LDW-SC26	1 - 2	Zinc	1.91E+02	2.04	410	960	mg/kg DW		0.47	0.20
LDWG 2007	LDW-SC26	2 - 4	Zinc	3.19E+02	2.08	410	960	mg/kg DW		0.78	0.33
LDWG 2007	LDW-SC26	6 - 8	Zinc	3.70E+03	1.88	410	960	mg/kg DW		9.0	3.9
LDWG 2007	LDW-SC26	11 - 12	Zinc	4.31E+01	0.912	410	960	mg/kg DW		0.11	0.04
LDWG 2007	LDW-SC28	0 - 1	Zinc	4.05E+02	2.59	410	960	mg/kg DW		0.99	0.42
LDWG 2007	LDW-SC28	1 - 2	Zinc	2.03E+02	2.07	410	960	mg/kg DW		0.50	0.21
LDWG 2007	LDW-SC28	2 - 4	Zinc	2.44E+02	3.14	410	960	mg/kg DW		0.60	0.25
LDWG 2007	LDW-SC28	6 - 7.5	Zinc	1.88E+03	1.61	410	960	mg/kg DW		4.6	2.0
LDWG 2007	LDW-SC28	12 - 13	Zinc	9.75E+01	1.31	410	960	mg/kg DW		0.24	0.10
LDWG 2007	LDW-SC29	0 - 1	Zinc	7.79E+01	1.77	410	960	mg/kg DW		0.19	0.08
LDWG 2007	LDW-SC29	1 - 2	Zinc	3.84E+01	1.06	410	960	mg/kg DW		0.09	0.04
LDWG 2007	LDW-SC29	2 - 3.6	Zinc	3.12E+01	0.48	410	960	mg/kg DW		0.08	0.03

a - Exceedance factors are the ratio of the detected concentration to the CSL or SQS; an exceedance factor greater than 1 indicates that the measured concentration is higher than the corresponding CSL or SQS.
Table presents detections only.
DW - Dry weight
OC - Organic carbon normalized

Appendix B
Alaska Marine Lines Historical Data

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SITE ASSESSMENT FOR USTs
5615 WEST MARGINAL WAY S.W.
SEATTLE, WASHINGTON

For

ALASKA MARINE LINES
JOB NO. 21048-001-005
March 21, 1991

DAMES & MOORE

Table 1
Dames & Moore Sample Results
Alaska Marine Lines

Soil Results (ppm)

D&M Sample I.D. No.	Volatile Organics				TPH		TCLP (Extractable)
	Benzene	Ethylbenzene	Toluene	Xylene	Gasoline	Diesel	Lead
SS-1	0.24	3.2	1.3	8.4	1,600	14,000	<0.1
SS-2	0.025	0.65	0.23	3.5	1,400	15,000	<0.1
SS-3	0.025	1.1	0.46	2.7	560	4,400	<0.1

Proposed Cleanup Levels Contained in MTCA[1]

Residential	0.5	20	40	20	100	200	250
Industrial	0.5	20	40	20	100	200	1,000

Groundwater Results (ppb)

D&M Sample I.D. No.	Volatile Organics				TPH		TCLP (Extractable)
	Benzene	Ethylbenzene	Toluene	Xylene	Gasoline	Diesel	Lead
H2O-1	330	420	110	1,200	<1	4,900	0.19

Proposed Cleanup Levels Contained in MTCA[1]

Residential & Industrial	5.0	20	40	20	1,000	1,000	5.0

[1] - MTCA Model Toxics Control Act

TPH - Total Petroleum Hydrocarbons

HARTCROWSER

Earth and Environmental Technologies

Independent Remedial Action Report
Alaska Marine Lines Parcel
Duwamish Shipyards
Seattle, Washington

Prepared for
Duwamish Shipyards, Inc.

June 29, 1994
J-3763-04

Table 1A - Pre-Remediation Data Collected by ESL - Petroleum Hydrocarbons in Soil

Sample ID:	TP-1	TP-2	TP-3	TP-3	TP-4	TP-5
Sample No.:	8269303	8269304	8269305	8279302	8279303	8279305
Sampling Date:	8/26/93	8/26/93	8/26/93	8/27/93	8/27/93	8/27/93
Method/Analyte						
Total Petroleum Hydrocarbons in mg/kg						
Gasoline Range Hydrocarbons	20.0 U	20 U	> 20.0	> 20.0	20 U	20 U
Diesel Range Hydrocarbons	> 50.0	50 U	> 50.0	> 50.0	50 U	50 U
Lube Oil and Related Products	> 100	100 U	> 100	> 100	100 U	100 U
Conventionals						
Total Solids in Percent	70.9		89.4			

Sample ID:	MW-2	MW-2	MW-2	SB	MW-3	MW-3	MW-3	MW-4	MW-4
Sample No.:	865214387	865214388	865214390	643955217	543786217	543786219	543786220	874236900	874236902
Sampling Date:	8/28/93	8/28/93	8/28/93	8/28/93	8/28/93	8/28/93	8/28/93	8/28/93	8/28/93
Method/Analyte									
Total Petroleum Hydrocarbons in mg/kg									
Gasoline Range Hydrocarbons	20.0 U	> 20.0	20.0 U	20.0 U	20.0 U	> 20.0	20.0 U	20.0 U	20.0 U
Diesel Range Hydrocarbons	> 50.0	> 50.0	> 50.0	50.0 U	> 50.0	> 50.0	50.0 U	50.0 U	50.0 U
Lube Oil and Related Products	> 100	> 100	100 U	> 100	> 100	> 100	100 U	> 100	100 U

Notes: U Not detected at the indicated detection limit.

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Table 1B - Pre-Remediation Data Collected by ESL - Petroleum Hydrocarbons Detected in Soil

	Sample ID:	TP-1		TP-3	
	Sample No:	8269303		8269305	
	Sampling Date:	8/26/93		8/27/93	
Method/Analyte					
Volatiles in mg/kg (EPA Method 8240)					
	Methylene chloride	0.004		ND	
	Acetone	0.018	B	0.66	B
	2-Butanone	ND		0.7	B
	Benzene	ND		1.3	
	Toluene	ND		4.3	
	Ethylbenzene	0.004		9	
	Total Xylene	0.005		12	
Semivolatiles in mg/kg (EPA Method 8270)					
	Naphthalene	ND		200	
	2-Methylnaphthalene	ND		250	
	Acenaphthylene	ND		28	
	Acenapthene	0.3		21	
	Dibenzofuran	ND		16	
	Fluorene	0.45		58	
	Phenanthrene	0.76		150	
	Anthracene	0.22		130	
	Carbazole	ND		55	
	Fluoranthene	0.074		21	
	Pyrene	0.25		38	
*	Benzo(a)anthracene	0.19		19	
*	Chrysene	0.19		28	
	Bis(2-ethylhexyl)phthalate	0.041	JB	ND	
*	Benzo(b)fluoranthene	0.059	T	15	T
*	Benzo(k)fluoranthene	0.059	T	15	T
*	Benzo(a)pyrene	0.076		18	
*	Indeno(1,2,3-cd)pyrene	0.012	J	9.2	J
*	Dibenzo(a,h)anthracene	ND		2.6	J
	Benzo(g,h,i)perylene	0.028	J	11	J

Notes:
- U Not detected at the indicated detection limit.
- B Detected in the method blank associated with the sample.
- J Estimated value.
- T The flagged values represent the sum of two co-eluting compounds.
- * cPAH

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Table 1C - Pre-Remediation Data Collected by ESL - Petroleum Hydrocarbons in Groundwater

Sample ID:	MW-1	MW-2	MW-3	MW-4
Sampling Date:	8/30/93	8/30/93	8/30/93	8/30/93
Method/Analyte				
Total Petroleum Hydrocarbons in mg/L				
Gasoline Range Hydrocarbons	0.20 U	0.20 U	0.20 U	0.20 U
Diesel Range Hydrocarbons	0.50 U	0.50 U	0.98	1.0
Lube Oil and Related Products	1.0 U	1.0 U	1.0 U	1.0 U

Notes:

U Not detected at the indicated detection limit.

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Table 2 - MTCA Cleanup Levels for Soil and Groundwater

	Soil in mg/kg Industrial Site Method A	Method C	Groundwater in µg/L Method B
Fuel Analysis			
Gasoline	100	-	-
Diesel	200	-	-
Oil	200	-	-
Volatile Organics			
Benzene	-	4,525	71
Ethylbenzene	-	350,000	6,900
Toluene	-	700,000	48,500
Xylene	-	7,000,000	500,000
Semivolatiles			
Naphthalene	-	14,000	988
1-Methylnaphthalene	-	-	-
2-Methylnaphthalene	-	-	-
Acenaphthylene	-	-	-
Acenapthene	-	210,000	643
Dibenzofuran	-	-	-
Fluorene	-	140,000	3,457
Phenanthrene	-	-	-
Anthracene	-	1,050,000	25,926
Fluoranthene	-	140,000	90
Pyrene	-	105,000	2,593
* Benzo(a)anthracene	-	-	0.031
* Chrysene	-	-	0.031
* Benzo(b)fluoranthene	-	-	0.031
* Benzo(k)fluoranthene	-	-	0.031
* Benzo(a)pyrene	-	18.0	0.031
* Indeno(1,2,3-cd)pyrene	-	-	0.031
* Dibenzo(a,h)anthracene	-	-	0.031
Benzo(g,h,i)perylene	-	-	0.031
Total cPAHs	20.0	-	0.1

- Not applicable or no data available to establish a cleanup level.
* cPAH

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Table 3 - Results of Soil Excavation Verification and Soil Stockpile Designation Sampling and Analysis - Petroleum Hydrocarbons

Method/Analyte	NE-B7-0	NE-W4-0	SE-B7-0	E-W4-NE30	SP-D1	SP-D2	SE-W4	S-W4-SE20	MTCA Industrial Cleanup Level
	Concentration in mg/kg								
Petroleum Hydrocarbons									
WTPH-HCID (1)	NA	NA	NA	NA	2,250	850	NA	NA	--
WTPH-D (2)	140	12,000	18	17,000	NA	NA	94	10 U	200
WTPH-G (1)	NA	570	10 U	NA	NA	NA	NA	10 U	100
Diesel (C12-C24) (1)	NA	NA	NA	NA	NA	NA	NA	NA	200
Oil (C24-C36) (1)	NA	NA	NA	NA	NA	NA	NA	NA	200
WTPH-418.1 Modified (2)	110	13,000	100 U	11,000	NA	NA	120	100 U	200
BTEX (EPA Method 8020) (1)									
Benzene	NA	50 U	50 U	NA	NA	NA	NA	50 U	4,525
Toluene	NA	50 U	50 U	NA	NA	NA	NA	50 U	350,000
Ethylbenzene	NA	350	50 U	NA	NA	NA	NA	50 U	700,000
Xylenes	NA	1,200	50 U	NA	NA	NA	NA	50 U	>1 M

Table 3 - Results of Soil Excavation Verification and Soil Stockpile Designation Sampling and Analysis - Petroleum Hydrocarbons

Method/Analyte	W-W4-SW30	SW-W4-0	NW-W4-0	W-B7-SW-10	C-B7	N-W4	SP-C1	SP-C2	MTCA Industrial Cleanup Level
	Concentration in mg/kg								
Petroleum Hydrocarbons									
WTPH-HCID (1)	NA	NA	NA	NA	NA	NA	760	NA	-
WTPH-D (2)	10 U	10 U	10 U	10 U	NA	NA	NA	NA	200
WTPH-G (1)	10 U	NA	10 U	NA	NA	NA	NA	NA	100
Diesel (C12-C24) (1)	NA	NA	NA	NA	68	20 U	NA	NA	200
Oil (C24-C36) (1)	NA	NA	NA	NA	68	50 U	NA	NA	200
WTPH-418.1 Modified (2)	100 U	100 U	100 U	100 U	1,100	480	NA	NA	200
BTEX (EPA Method 8020) (1)									
Benzene	50 U	NA	50 U	NA	NA	NA	NA	NA	4,525
Toluene	50 U	NA	50 U	NA	NA	NA	NA	NA	350,000
Ethylbenzene	50 U	NA	50 U	NA	NA	NA	NA	NA	700,000
Xylenes	50 U	NA	50 U	NA	NA	NA	NA	NA	>1 M

Note:
U Not detected at the detection limit.
NA Not Analyzed
(1) Analyzed by Hart Crowser
(2) Analyzed by North Creek Analytical
- Not applicable or no data available to establish a cleanup level.
M Million

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Table 4 - Results of Soil Excavation Verifcation and Soil Stockpile Designation Sampling and Analysis - Semivolatiles Sheet 1 of 2

	NE-W4-0	SE-B7-0	E-W4-NE30	SP-D1	S-W4-SE20	W-W4-SW30	NW-W4-0	MTCA Industrial Cleanup Level
Method (1)		Concentration in mg/kg						
N-Nitroso-Dimethylamine	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
Phenol	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
Aniline	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
Bis(2-Chloroethyl) ether	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
2-Chlorophenol	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
1,3-Dichlorobenzene	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
1,4-Dichlorobenzene	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
Benzyl Alcohol	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
1,2-Dichlorobenzene	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
2-Methylphenol	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
Bis(2-chloroisopropyl) ether	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
4-Methylphenol	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
N-Nitroso-di-n-propylamine	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
Hexachloroethane	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
Nitrobenzene	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
Isophorone	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
2-Nitrophenol	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
2,4-Dimethylphenol	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
Benzoic acid	4.60 U	1.1 U	5.5 U	1 U	1.1 U	1.3 U	0.88 U	-
Bis(2-Chloroethoxy) methane	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
2,4-Dichlorophenol	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
1,2,4-Trichlorobenzene	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
Naphthalene	1.40	0.22 U	19	3.3	0.22 U	0.25 U	0.17 U	14,000
4-Chloroaniline	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
Hexachlorbutadiene	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
4-Chloro-3-Methylphenol	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
2-Methylnaphthalene	10.00	0.22 U	30	3.2	0.22 U	0.25 U	0.17 U	NDA
Hexachlorocyclopentadiene	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
2,4,6-Trichlorophenol	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
2,4,5-Trichlorophenol	4.60 U	1.1 U	5.5 U	1 U	1.1 U	1.3 U	0.88 U	-
2-Chloronaphthalene	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
2-Nitroaniline	4.60 U	1.1 U	5.5 U	1 U	1.1 U	1.3 U	0.88 U	-
Dimethylphthalate	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
Acenaphthylene	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
3-Nitroaniline	4.60 U	1.1 U	5.5 U	1 U	1.1 U	1.3 U	0.88 U	-
Acenaphthene	3.20	0.22 U	4.1	2.1	0.22 U	0.25 U	0.17 U	210,000
2,4-Dinitrophenol	4.60 U	1.1 U	5.5 U	1 U	1.1 U	1.3 U	0.88 U	-
4-Nitrophenol	4.60 U	1.1 U	5.5 U	1 U	1.1 U	1.3 U	0.88 U	-
Dibenzofuran	2.1	0.22 U	2.9	1.1	0.22 U	0.25 U	0.17 U	NDA
2,4-Dinitrotoluene	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
2,6-Dinitrotoluene	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
Diethylphthalate	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
4-Chlorophenyl-phenylether	0.90 U	0.22 U	1.1 U	0.2 U	0.22 U	0.25 U	0.17 U	-
Fluorene	6.80	0.22 U	8.9	2	0.22 U	0.25 U	0.17 U	140,000
4-Nitroaniline	4.60 U	1.1 U	5.5 U	1 U	1.1 U	1.3 U	0.88 U	-

Table 4 – Results of Soil Excavation Verifcation and Soil Stockpile Designation Sampling and Analysis – Semivolatiles Sheet 2 of 2

	NE-W4-0		SE-B7-0		E-W4-NE30		SP-D1		S-W4-SE20		W-W4-SW30		NW-W4-0		MTCA Industrial Cleanup Level
Method (1)			Concentration in mg/kg												
4,6-Dinitro-2-Methylphenol	4.60	U	1.1	U	5.5	U	1	U	1.1	U	1.3	U	0.88	U	-
N-Nitroso-diphenylamine	0.90	U	0.22	U	1.1	U	0.2	U	0.22	U	0.25	U	0.17	U	-
4-Bromophenyl phenyl ether	0.90	U	0.22	U	1.1	U	0.2	U	0.22	U	0.25	U	0.17	U	-
Hexachlorobenzene	0.90	U	0.22	U	1.1	U	0.2	U	0.22	U	0.25	U	0.17	U	-
Pentachlorophenol	0.90	U	0.22	U	1.1	U	0.2	U	0.22	U	0.25	U	0.17	U	-
Phenanthrene	17.00		0.22	U	24		4.9		0.22	U	0.25	U	0.17	U	NDA
Anthracene	5.20		0.22	U	9.3		1.2		0.22	U	0.25	U	0.17	U	1,050,000
Di-N-Butylphthalate	0.90	U	0.22	U	1.1	U	0.2	U	0.22	U	0.25	U	0.17	U	-
Fluoranthene	1.40		0.22	U	3		2.3		0.22	U	0.25	U	0.17	U	140,000
Benzidine	0.90	U	2.2	U	11	U	0.2	U	2.2	U	2.5	U	1.7	U	-
Pyrene	4.50		0.22	U	7.7		2.2		0.22	U	0.25	U	0.17	U	105,000
Buthylbenzylphthalate	0.90	U	0.22	U	1.1	U	0.2	U	0.22	U	0.25	U	0.17	U	-
3,3'-Dichlorobenzidine	1.80	U	0.45	U	2.2	U	0.41	U	0.44	U	0.51	U	0.35	U	-
* Benzo(A)Anthracene	1.60		0.22	U	3		0.67		0.22	U	0.25	U	0.17	U	NDA
Bis(2-Ethylhexyl)Phthalate	0.90	U	0.22	U	1.1	U	0.35		0.22	U	0.25	U	0.17	U	9,370
* Chrysene	2.50		0.22	U	4.3		0.76		0.22	U	0.25	U	0.17	U	NDA
Di-N-Octylphthalate	0.90	U	0.22	U	1.1	U	0.2	U	0.22	U	0.25	U	0.17	U	-
* Benzo(B)Fluoranthene	0.90	U	0.22	U	1	J	0.24		0.22	U	0.25	U	0.17	U	NDA
* Benzo(K)Fluoranthene	0.90	U	0.22	U	1.1	U	0.24		0.22	U	0.25	U	0.17	U	NDA
* Benzo(A)Pyrene	1.00		0.22	U	2		0.32		0.22	U	0.25	U	0.17	U	18.0
* Indeno(1,2,3-CD)Pyrene	0.90	U	0.22	U	1.1	U	0.2	U	0.22	U	0.25	U	0.17	U	NDA
* Dibenz(A,H)Anthracene	0.90	U	0.22	U	1.1	U	0.2	U	0.22	U	0.25	U	0.17	U	NDA
Benzo(G,H,I)Perylene	0.90	U	0.22	U	0.8	J	0.2	U	0.22	U	0.25	U	0.17	U	-
Total cPAHs	5.1		ND		9.3		2.23		ND		ND		ND		20

Note: U Not detected at the detection limit.
J Compound detected below the reporting limit.
(1) Method 8270
– Constituent not detected – no cleanup level included.
NDA No data available to establish a cleanup level.
* cPAH
ND Not detected above the analytical detection limit.

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Table 5 - Results of Soil Boring Sampling and Analysis - Petroleum Hydrocarbons and PAHs

Method/Analyte	MW5-S1	MW5-S5	B1-S2	B1-S4	B1-S5	B2-S1	B2-S3	B2-S5	MTCA Soil Cleanup Level
Depth in Feet	5 - 6.5	15 - 16.5	7 - 8.5	12 - 13.5	15 - 16.5	5 - 6.5	10 - 11.5	15 - 16.5	
PID Screen in HNU Units	0	0	18	5	0	0	0	0	
	Concentration in mg/kg								
Petroleum Hydrocarbons (WTPH-D ext)									
Diesel (C12-C24)	12 U	13 U	3400	430	14 U	33	14 U	16 U	200
Oil (C24-C36)	49 U	50 U	510 U	100	57 U	79	56 U	63 U	200
Total Organic Carbon (%)	0.14	0.18	0.13	0.51	1.9	2.5	0.39	2.0	-
Polynuclear Aromatic Hydrocarbons (EPA 8310)									
Naphthalene	0.10 U	0.10 U	2.1 U	0.12 U	0.12 U	0.11 U	0.54	0.13 U	14,000
Acenaphthylene	0.21 U	0.21 U	4.4 U	0.24 U	0.24 U	0.22 U	0.24 U	0.27 U	-
1-Methylnaphthalene	0.21 U	0.21 U	31	0.69	0.24 U	0.22 U	0.24 U	0.27 U	NDA
2-Methylnaphthalene	0.26	0.21 U	4.4 U	0.24 U	0.24 U	0.22 U	0.28	0.27 U	NDA
Acenaphthene	0.21 U	0.21 U	4.4 U	0.24 U	0.24 U	0.22 U	0.24 U	0.27 U	210,000
Fluorene	0.14	0.021 U	7.1	0.20	0.024 U	0.022 U	0.083	0.027 U	140,000
Phenanthrene	0.87	0.012	22	0.46	0.067	0.029	0.032	0.013 U	NDA
Anthracene	0.16	0.010 U	6.1	0.16	0.012 U	0.011 U	0.012 U	0.013 U	1,050,000
Fluoranthene	1.3	0.021 U	0.44 U	0.024 U	0.024 U	0.079	0.025	0.027 U	140,000
Pyrene	0.61	0.021 U	5.4	0.024 U	0.024 U	0.057	0.024 U	0.027 U	105,000
* Benzo (a) anthracene	0.36	0.021 U	2.7	0.024 U	0.024 U	0.027	0.024 U	0.027 U	NDA
* Chrysene	0.34	0.021 U	5.0	0.024 U	0.024 U	0.030	0.024 U	0.027 U	NDA
* Benzo (b) fluoranthene	0.26	0.021 U	0.44 U	0.024 U	0.024 U	0.022 U	0.024 U	0.027 U	NDA
* Benzo (k) fluoranthene	0.16	0.021 U	0.44 U	0.024 U	0.024 U	0.022 U	0.024 U	0.027 U	NDA
* Benzo (a) pyrene	0.31	0.021 U	0.73	0.031	0.024 U	0.026	0.024 U	0.027 U	18.0
* Dibenzo(a,h)anthracene	0.042 U	0.043 U	0.87 U	0.047 U	0.049 U	0.044 U	0.047 U	0.053 U	NDA
Benzo (g,h,i) perylene	0.19	0.021 U	1.6	0.024 U	0.024 U	0.022 U	0.024 U	0.027 U	NDA
* Indeno (1,2,3-cd) pyrene	0.20	0.021 U	0.44 U	0.024 U	0.024 U	0.022 U	0.024 U	0.027 U	NDA
Total cPAH	1.63	ND	8.43	0.031	ND	0.083	ND	ND	20

Notes: U - Not detected at detection limit
NDA No data available to calculate a cleanup level.
* cPAH
ND Not detected above the analytical detection limit.

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Table 6 - Results of Soil and Soil-Leachate Sampling and Analysis - Petroleum Hydrocarbons and PAHs

Method/Analyte	B1-S2		B2-S1		MTCA Cleanup Levels	
					Industrial	Groundwater
	Soil	Leachate	Soil	Leachate	Soil	Method B(1)
Petroleum Hydrocarbons (WTPH-D ext) Soil concentration in mg/kg Leachate concentration in mg/L						
Diesel (C12-C24)	3400	2.2	33	0.25 U	200	1.0
Oil (>C24)	510 U	0.75 U	79	0.75 U	200	1.0
Polynuclear Aromatic Hydrocarbons (EPA 8310) Soil concentration in mg/kg Leachate concentration in µg/L						
Naphthalene	2.1 U	1.7 U	0.11 U	1.7 U	14,000	988
Acenaphthylene	4.4 U	3.3 U	0.22 U	3.3 U	-	-
1-Methylnaphthalene	31	37	0.22 U	1.7 U	-	NDA
2-Methylnaphthalene	4.4 U	3.2	0.22 U	1.7 U	-	NDA
Acenaphthene	4.4 U	3.3	0.22 U	1.7 U	210,000	643
Fluorene	7.1	6.9	0.022 U	0.33 U	140,000	3457
Phenanthrene	22	9.0	0.029	0.17 U	-	NDA
Anthracene	6.1	2.8	0.011 U	0.17 U	1,050,000	25926
Fluoranthene	0.44 U	0.33 U	0.079	0.33 U	140,000	90
Pyrene	5.4	1.4	0.057	0.33 U	105,000	2593
* Benzo (a) anthracene	2.7	0.33 U	0.027	0.33 U	-	0.031
* Chrysene	5.0	0.33 U	0.030	0.33 U	-	0.031
* Benzo (b) fluoranthene	0.44 U	0.33 U	0.022 U	0.33 U	-	0.031
* Benzo (k) fluoranthene	0.44 U	0.33 U	0.022 U	0.33 U	-	0.031
* Benzo (a) pyrene	0.73	0.33 U	0.026	0.33 U	18.0	0.031
* Dibenzo(a,h)anthracen	0.87 U	0.67 U	0.044 U	0.67 U	-	0.031
Benzo (g,h,i) perylene	1.6	0.33 U	0.022 U	0.33 U	-	0.031
* Indeno (1,2,3-cd) pyr	0.44 U	0.33 U	0.022 U	0.33 U	-	0.031
Total cPAH	8.43	ND	0.083	ND		0.1

U Not detected at the detection limit.
- Constituent not detected - no cleanup level included.
(1) Based on protection of surface water, except for TPH.
NDA No data available to establish a cleanup level.
* cPAH
ND Not detected above the analytical detection limit.

C:\JOBS\3763\376304T5.WK1/KML

Table 7 - Results of Groundwater Sampling and Analysis -
Petroleum Hydrocarbons and BTEX

	MW-1		MW-2		MW-4		MW-5		MTCA Cleanup Level(1)
	02/08/94	02/14/94	02/08/94	02/14/94	02/08/94	02/14/94	02/08/94	02/14/94	
Relative Water Level	low	high	low	high	low	high	high	low	
Field Parameters									
Temperature (C°)	10	7	10	7	9	6	11	11	< 21°C
pH	7.2	7.2	7.2	7.6	7.5	7.4	7.2	7.1	6.5-8.5
Conductivity (umhos)	740	550	740	110	370	190	1610	1450	NDA
Total Dissolved Solids in	4000	340	380	77	110	130	1100	1100	NDA
Petroleum Hydrocarbons (WTPH-D ext) in mg/L									
Diesel (C12-C24)	0.25 U	0.25 U	0.32	0.39	0.66	0.37	0.25 U	0.25 U	1.0
Oil (C24-C36)	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	1.0
BTEX (EPA 8010) in μg/L									
Benzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	71
Toluene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	48,500
Ethylbenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	6,900
Xylene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	500,000

Table 7 - Results of Groundwater Sampling and Analysis - PAHs

	MW-1		MW-2		MW-4		MW-5		MTCA
	02/08/94	02/14/94	02/08/94	02/14/94	02/08/94	02/14/94	02/08/94	02/14/94	Cleanup
Relative Water Level	low	high	low	high	low	high	high	low	Level(1)
Polynuclear Aromatic Hydrocarbons (EPA 8310) in $\mu g/L$									
Naphthalene	0.49 U	0.48 U	0.49 U	0.48 U	8.9	0.97	0.49 U	0.48 U	988
Acenaphthylene	0.98 U	0.96 U	0.97 U	0.96 U	3.4	1.4	0.97 U	0.96 U	NDA
1-Methylnaphthalene	0.49 U	0.48 U	0.49 U	0.48 U	1.8	0.55	0.49 U	0.48 U	NDA
2-Methylnaphthalene	0.49 U	0.48 U	0.49 U	0.48 U	4.8	4.1	0.49 U	0.48 U	NDA
Acenaphthene	0.90	0.88	0.49 U	0.48 U	4.2	2.8	0.49 U	0.48 U	643
Fluorene	0.098 U	0.096 U	0.097 U	0.096 U	4.8	3.3	0.097 U	0.096 U	3,457
Phenanthrene	0.049 U	0.11	0.049 U	0.048 U	1.7	1.2	0.049 U	0.048 U	NDA
Anthracene	0.049 U	0.048 U	0.049 U	0.048 U	0.20	0.15	0.049 U	0.048 U	25,926
Fluoranthene	0.098 U	0.096 U	0.097 U	0.096 U	0.097 U	0.096 U	0.097 U	0.096 U	90
Pyrene	0.098 U	0.096 U	0.097 U	0.096 U	0.097 U	0.13	0.097 U	0.096 U	2,593
* Benzo (a) anthracene	0.098 U	0.096 U	0.097 U	0.096 U	0.097 U	0.096 U	0.097 U	0.096 U	0.031
* Chrysene	0.098 U	0.096 U	0.097 U	0.096 U	0.097 U	0.096 U	0.097 U	0.096 U	0.031
* Benzo (b) fluoranthene	0.098 U	0.096 U	0.097 U	0.096 U	0.097 U	0.096 U	0.097 U	0.096 U	0.031
* Benzo (k) fluoranthene	0.098 U	0.096 U	0.097 U	0.096 U	0.097 U	0.096 U	0.097 U	0.096 U	0.031
* Benzo (a) pyrene	0.098 U	0.096 U	0.097 U	0.096 U	0.097 U	0.096 U	0.097 U	0.096 U	0.031
* Dibenzo(a,h)anthracene	0.2 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.031
Benzo (g,h,i) perylene	0.098 U	0.096 U	0.097 U	0.096 U	0.097 U	0.096 U	0.097 U	0.096 U	0.031
* Indeno (1,2,3-cd) pyrene	0.098 U	0.096 U	0.097 U	0.096 U	0.097 U	0.096 U	0.097 U	0.096 U	0.031
Total cPAH	ND	ND	ND	ND	ND	ND	ND	ND	0.1

U Not detected at the detection limit.

- Constituent not detected - no cleanup level included.

(1) Based on protection of surface water.

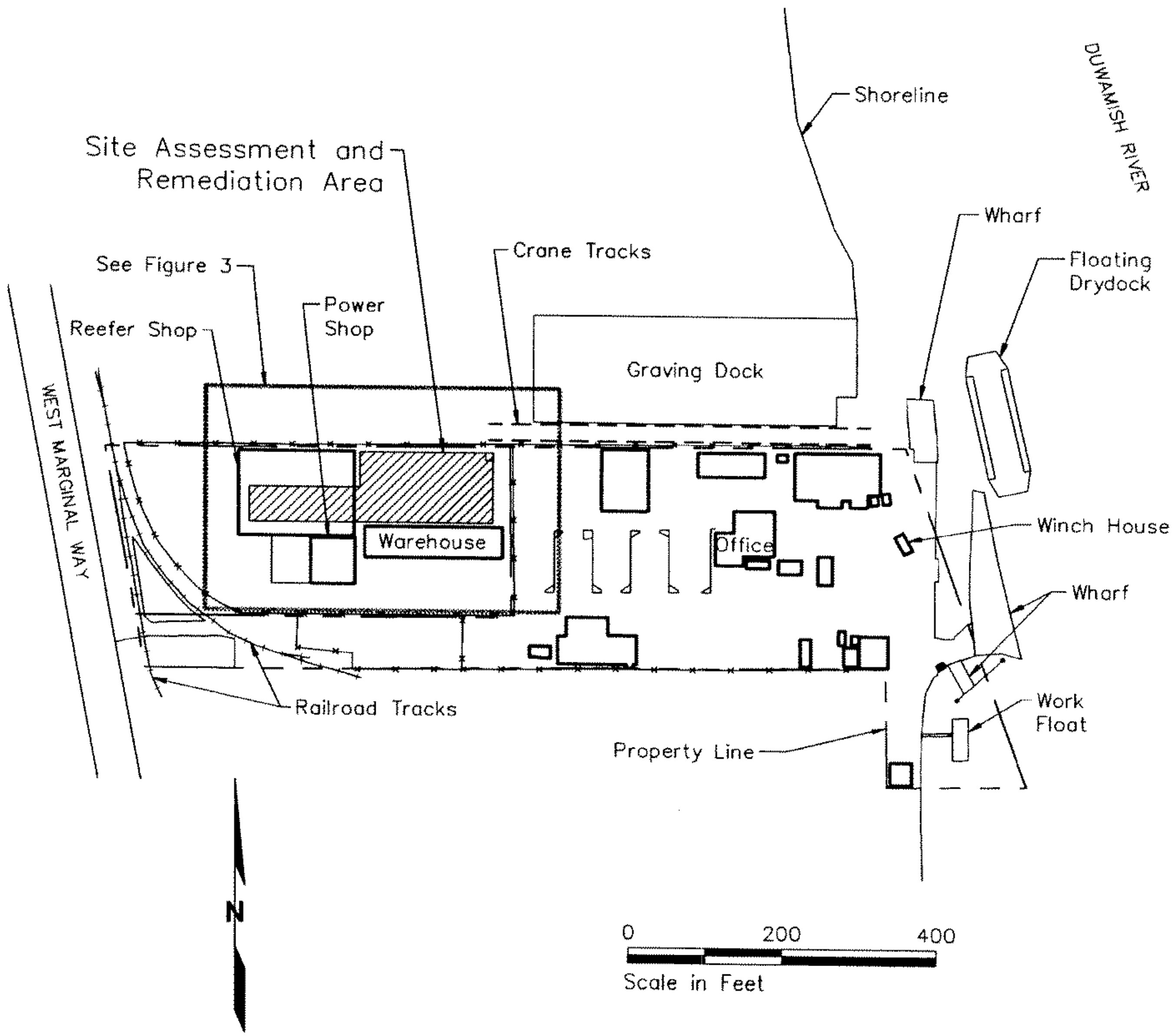
NDA No data available to calculate a cleanup level.

* cPAH

ND Not detected above the analytical detection limit.

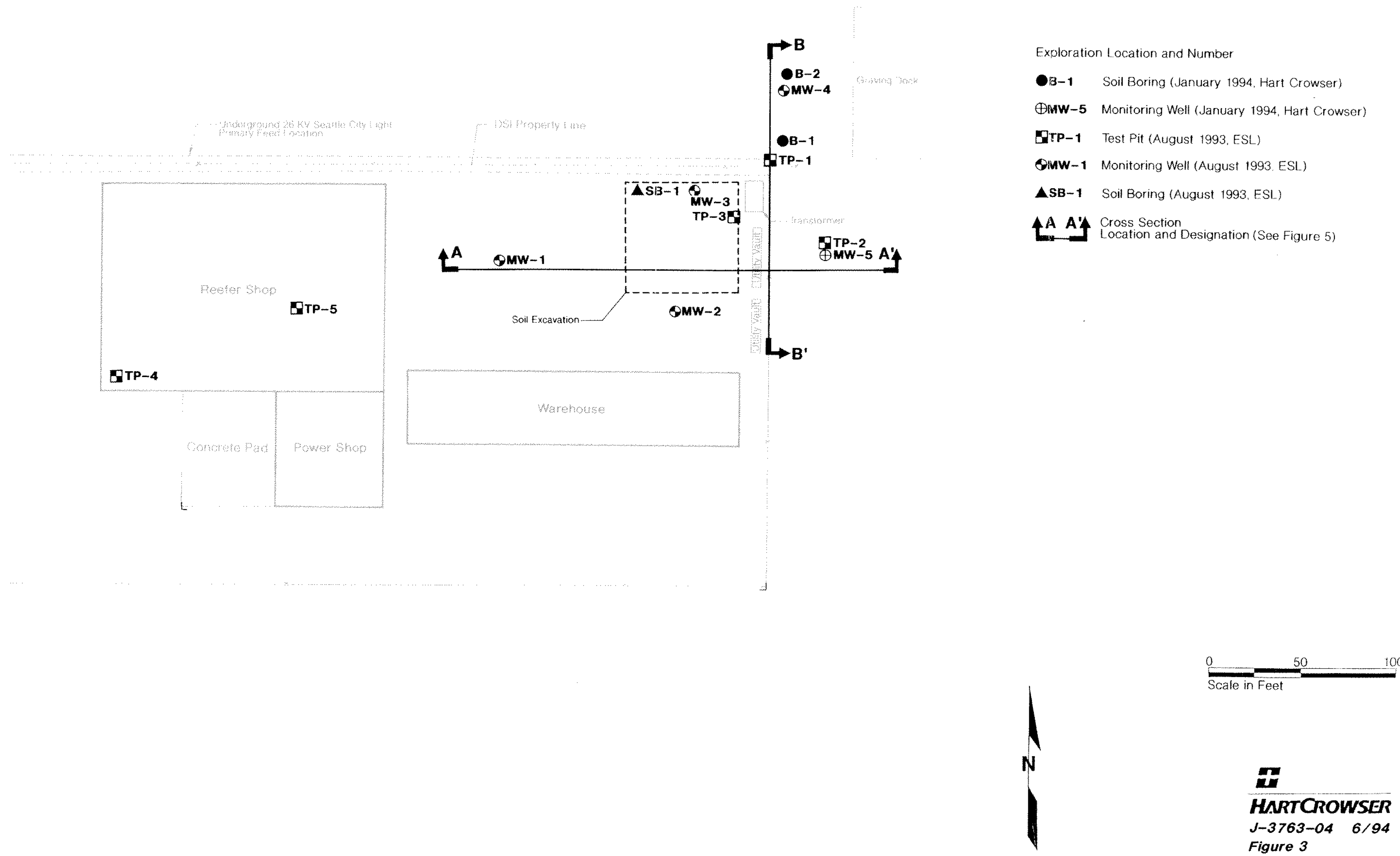
JCH 6/6/94 1=200 HC.pcp
37630401

Site Plan



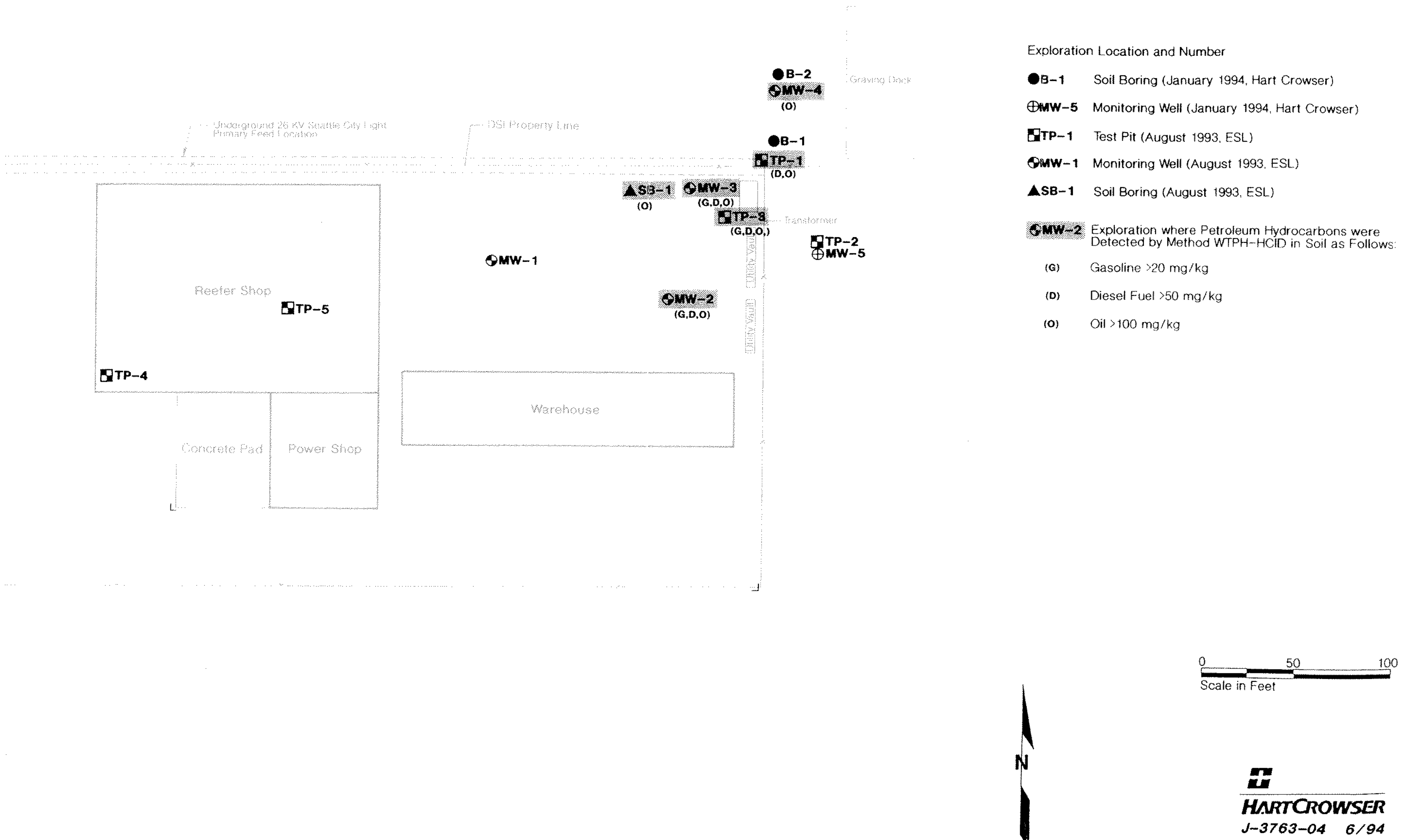
HARTCROWSER
J-3763-04 6/94
Figure 2

Site and Exploration Plan



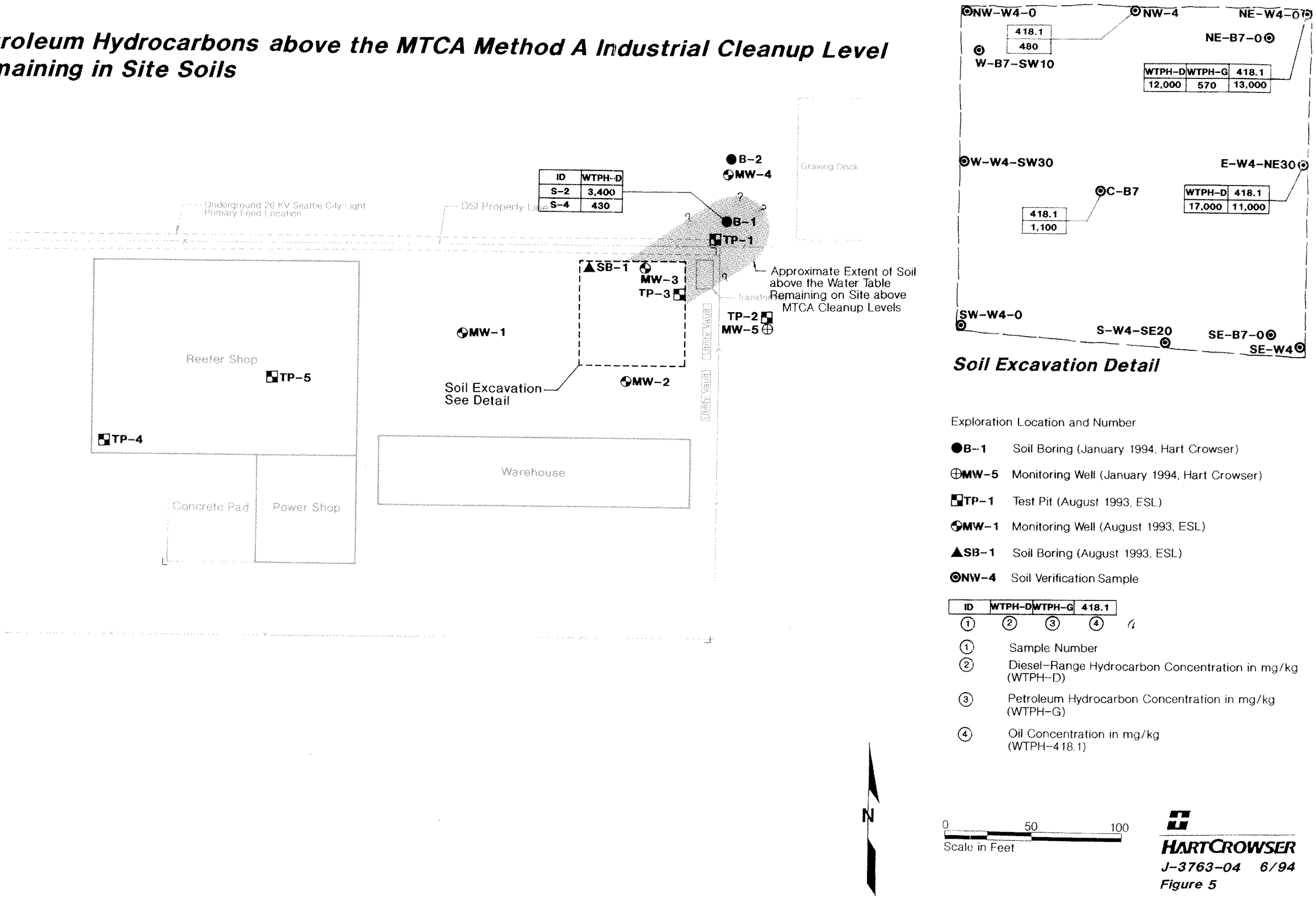
HARTCROWSER
J-3763-04 6/94
Figure 3

Petroleum Hydrocarbon Constituents Detected in Soil
August 1993



HARTCROWSER
J-3763-04 6/94
Figure 4

Petroleum Hydrocarbons above the MTCA Method A Industrial Cleanup Level Remaining in Site Soils



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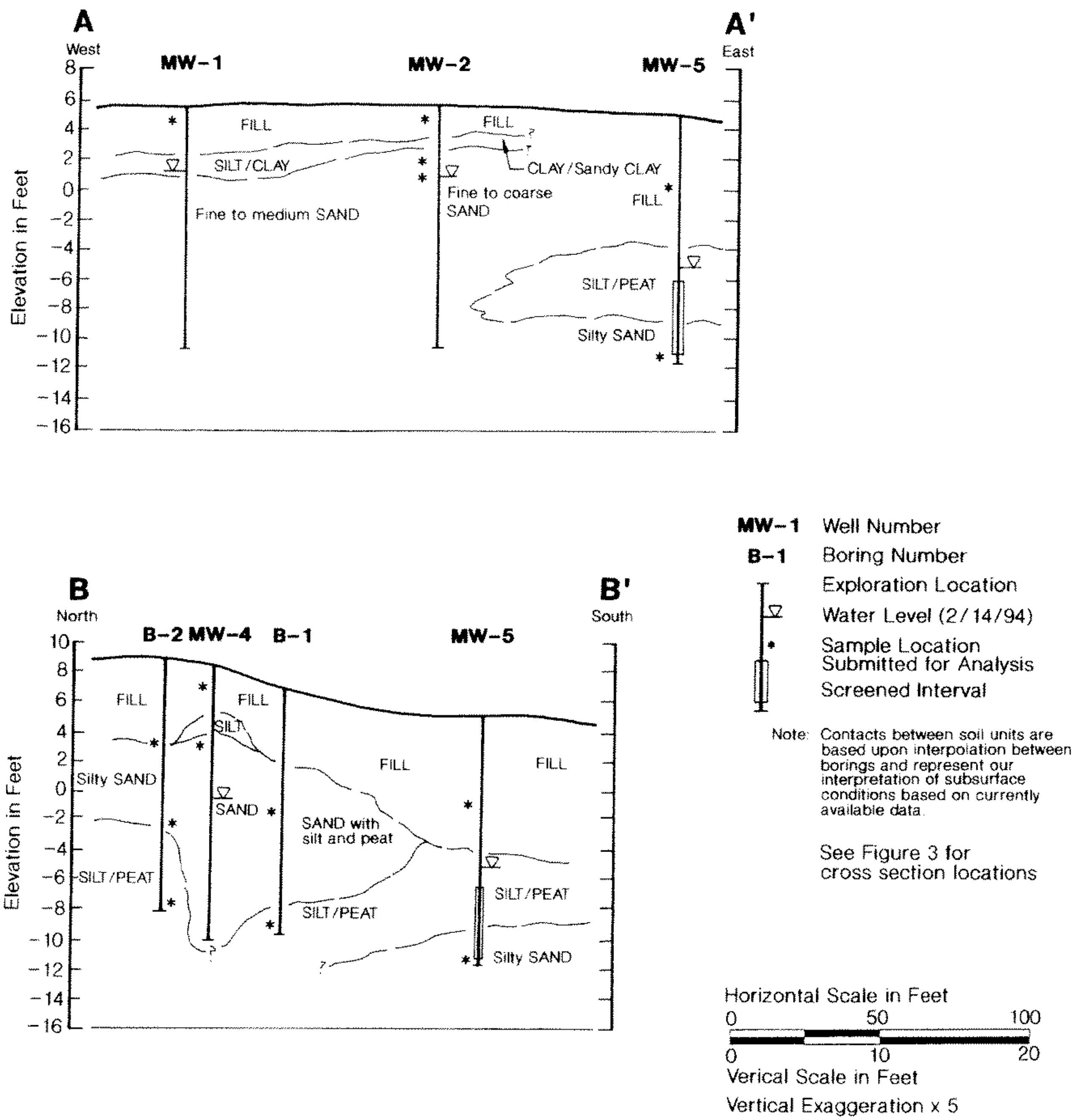
J-3763-04 6/94

Figure 5

Generalized Subsurface Cross Section A–A' and B–B'



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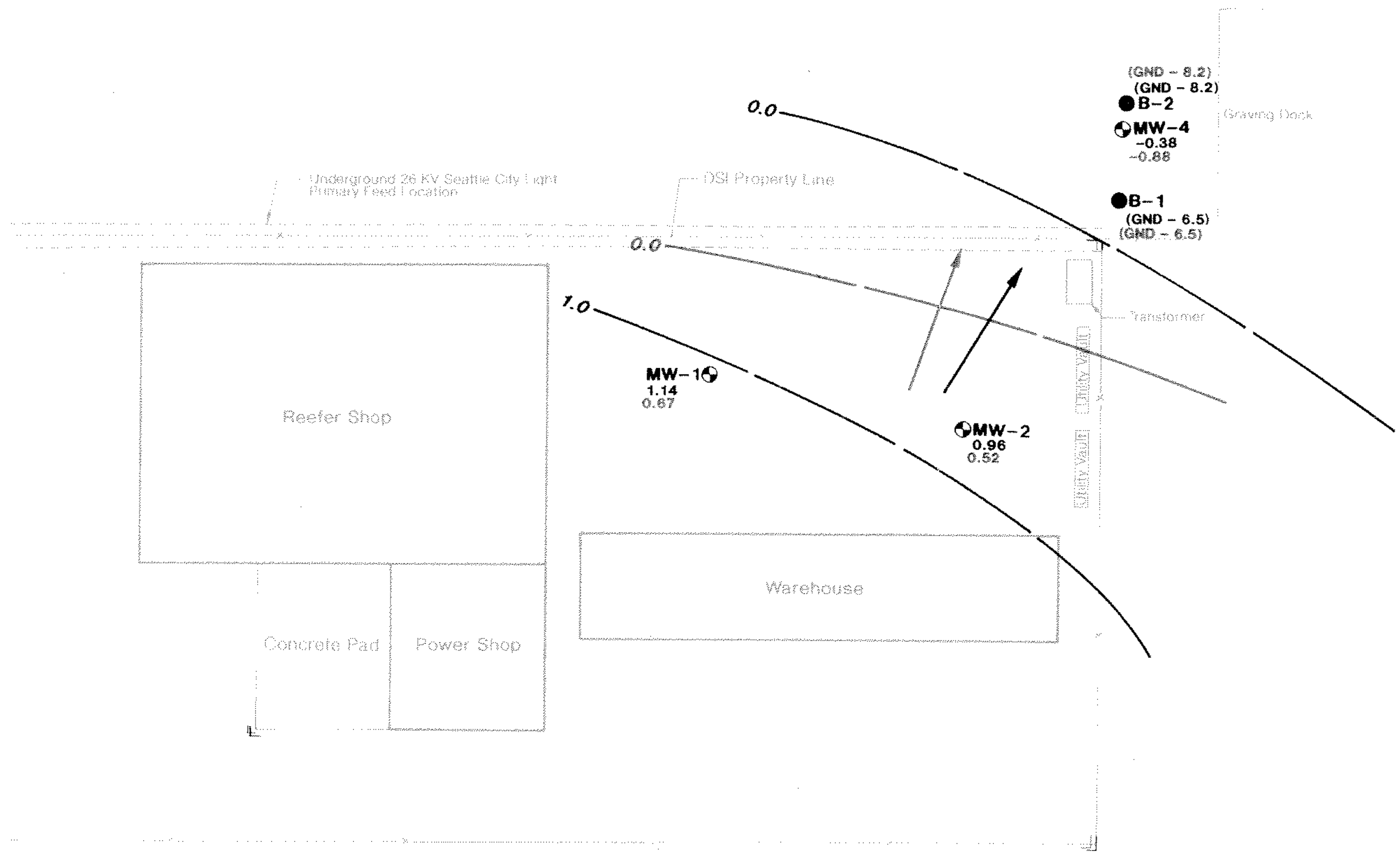
J-3763-04 6/94
Figure 6

Groundwater Elevation Contour Map



MW-1 Monitoring Well Location and Number

B-1 Soil Boring Location and Number

Groundwater Elevation in Feet

1.14 High Tide 0.67 Low Tide

Groundwater Elevation Contour in Feet

—*1.0*— High Tide —*0.0*— Low Tide

Groundwater Flow Direction

← High Tide ← Low Tide

Note: High tide was measured at 19:28 on 2/14/94. High tide groundwater measurements were collected between 16:30 and 18:00.

Low tide was measured at 14:37 on 2/8/94. Low tide groundwater measurements were collected between 14:48 and 15:00.

0 50 100

Scale in Feet

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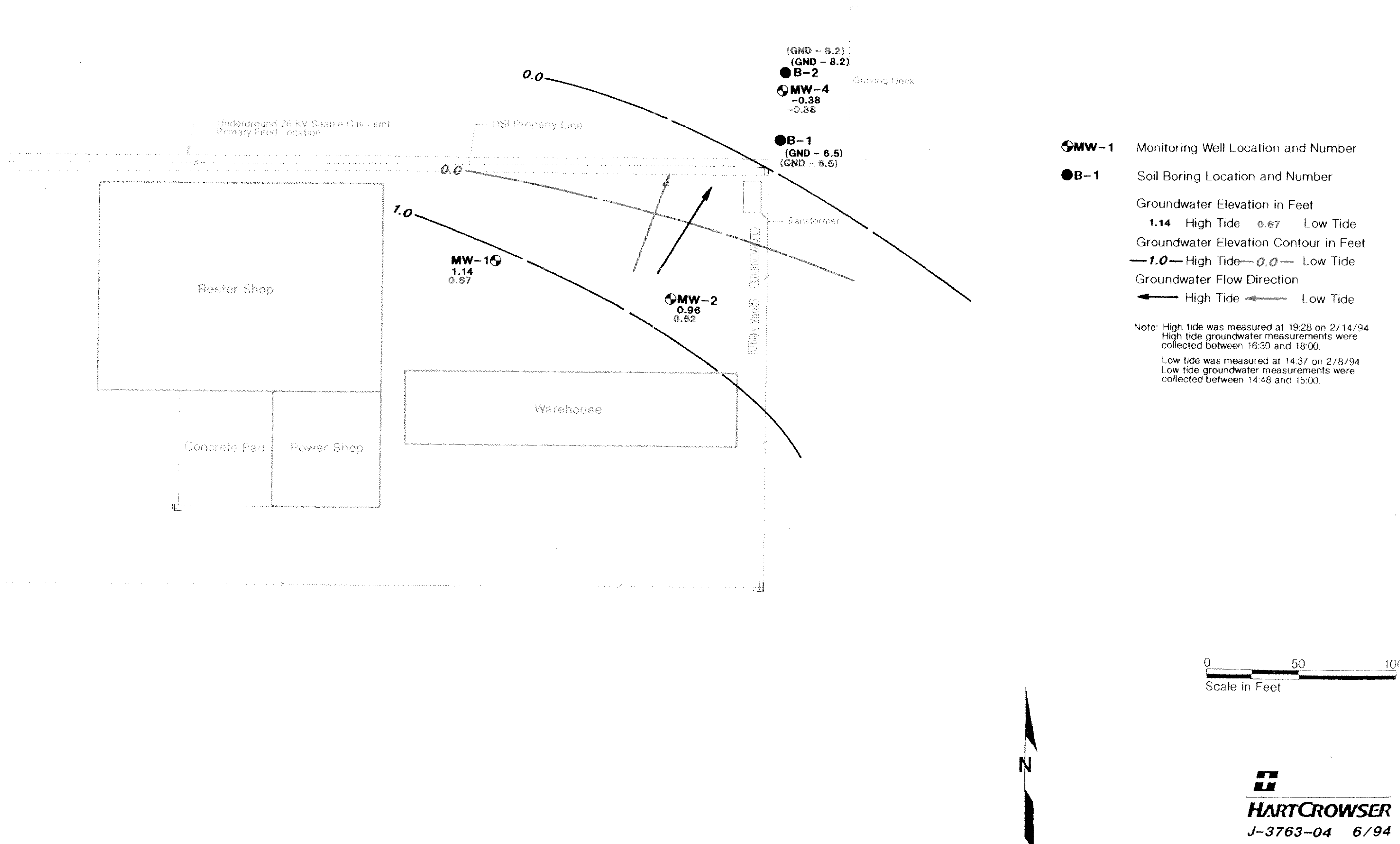
J-3763-04 6/94

Figure 7

Groundwater Elevation Contour Map



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J-3763-04 6/94
Figure 7

Appendix C
Duwamish Shipyard Historical Data

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HARTCROWSER

Earth and Environmental Technologies

Results of Sampling and Analysis
Sediment Monitoring Plan
Duwamish Shipyard, Inc.
Seattle, Washington

Prepared for
Duwamish Shipyard, Inc.

November 17, 1993
J-3763-03

Table 1 - Physical, Biological, and Chemical Data for Duwamish Shipyard Sediment Samples

The following notes apply to the various sheets of this table.

Notes:

[ ]	Exceeds CSL.
—	Not applicable.
*	Normalized in mg/kg (ppm).
(a)	LPAH criterion represents the sum of Acenapthene, Acenaphthylene, Anthracene, Fluorene, Phenanthrene, and Naphthalene.
(b)	HPAH criterion represents the sum of Benzo(b)Fluoranthene, Benzo(k)Fluoranthene, Benzo(a)Anthracene, Benzo(a)Pyrene, Chrysene, Dibenzo(a,h)Anthracene, Fluoranthene, Indeno(1,2,3-c,d)Pyrene, and Pyrene.
(c)	To allow for comparison with Ecology Sediment Management Standards (SMS) 173-204 WAC, chemical concentration data is expressed as mg/kg dry weight to mg/kg total organic carbon (TOC), calculated by dividing the dry weight concentration by the decimal percent TOC in the individual sample.
(d)	Analytes not detected above the detection limit (U) which exceed the CSL after normalization to TOC have not been identified as exceeding the CSL.
U	Indicates analyte was not detected above the detection limit.
J	Indicates an estimated value.
UJ	The analyte was not present above the level of the associated numerical value. The associated numerical value may not accurately or precisely represent the concentration necessary to detect the analyte in this sample.

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Table 1 - Physical, Biological, and Chemical Data for Duwamish Shipyard Sediment Samples

Sample ID:	SS-1	TOC* (c)(d)	SMS Sediment Quality Standards (SQS)	SMS Sediment Cleanup Screening Levels (CSL)
Grain Size in Percent				
Percent Sand >62μm	29	—	—	—
Percent Silt 4–62μm	55	—	—	—
Percent Clay <4μm	16	—	—	—
Bioassay Results				
– Acute Ten–Day Amphipod Mortality				
Is response to sediment sample signigicantly different from control sediment?	Yes	—	—	—
– Acute Larval Mortality/Abnormality				
Is response to sediment sample signigicantly different from control sediment?	No	—	—	—
– Chronic Twenty–Day Juvenile Polychaete				
Is response to sediment sample signigicantly different from control sediment?	No	—	—	—
Conventionals in percent				
Total Organic Carbon	1.90	—	—	—
Total Solids	47.61	—	—	—
Total Metals in mg/kg–DW (ppm)				
Antimony	3.1 J	—	—	—
Arsenic	41	—	57	93
Beryllium	0.4	—	—	—
Cadmium	0.7	—	5.1	6.7
Chromium	44	—	260	270
Copper	361 J	—	390	390
Lead	109 J	—	450	530
Mercury	0.27	—	0.41	0.59
Nickel	31	—	—	—
Selenium	0.2 U	—	—	—
Silver	0.6 U	—	6.1	6.1
Thallium	1 U	—	—	—
Zinc	335 J	—	410	960
Low Molecular Weight PAHs in mg/kg (ppm) (c)				
2–Methylnaphthalene	0.079	4.2	38	64
Acenaphthene	0.270	14.2	16	57
Acenaphthylene	0.049 J	2.6 J	66	66
Anthracene	0.830	43.7	220	1,200
Fluorene	0.420	22.1	23	79
Phenanthrene	1.900	100.0	100	480
Naphthalene	0.069 J	3.6 J	99	170
Total LPAH (a)	3.538 J	186.2 J	370	780

Table 1 - Physical, Biological, and Chemical Data for Duwamish Shipyard Sediment Samples

Sample ID:	SS-1	TOC* (c)(d)	SMS Sediment Quality Standards (SQS)	SMS Sediment Cleanup Screening Levels (CSL)
High Molecular Weight PAHs in mg/kg (ppm) (c)				
Benzo(b)Fluoranthene	1.000	52.6	—	—
Benzo(k)Fluoranthene	1.100	57.9	—	—
Benzo(a)Anthracene	1.100	57.9	110	270
Benzo(a)Pyrene	0.780	41.1	99	210
Chrysene	1.600	84.2	110	460
Dibenzo(a,h)Anthracene	0.170	8.9	12	33
Fluoranthene	3.000	157.9	160	1,200
Indeno(1,2,3-c,d)Pyrene	0.610	32.1	34	88
Pyrene	2.100	110.5	1,000	1,400
Benzo(g,h,i)perylene	0.45	23.7	31	78
Total HPAH (b)	11.460	603.2	960	5,300
Chlorinated Hydrocarbons in mg/kg (ppm) (c)				
1,3-Dichlorobenzene	0.077 U	4.1 U	—	—
1,4-Dichlorobenzene	0.077 U	4.1 U	3.1	9
1,2-Dichlorobenzene	0.077 U	4.1 U	2.3	2.3
1,2,4-Trichlorobenzene	0.077 U	4.1 U	0.81	1.8
Hexachlorobenzene	0.077 U	4.1 U	0.38	2.3
Hexachloroethane	0.077 U	4.1 U	—	—
Hexachlorobutadiene	0.077 U	4.1 U	3.9	6.2
Phthalate Esters in mg/kg (ppm) (c)				
Dimethyl phthalate	0.048 J	2.5 J	53	53
Diethyl phthalate	0.077 U	4.1 U	61	110
Di-n-butyl phthalate	0.040 J	2.1 J	22	1,700
Butylbenzylphthalate	0.096	5.1	4.9	64
Bis(2-ethylhexyl)phthalate	1.000	52.6	47	78
Di-n-octyl phthalate	0.077 U	4.1 U	58	4,500
Miscellaneous Neutrals in mg/kg (ppm) (c)				
Benzyl alcohol	0.077 U	—	57	73
Benzoic Acid	0.770 U	—	650	650
Dibenzofuran	0.250	13.2	15	58
Organonitrogen Compounds in mg/kg (ppm) (c)				
N-nitrosodiphenylamine	0.770 U	40.5 U	11	11
Butyltins in μg/kg-DW (ppb)				
Tributyltin	226.2 J	—	—	—
Dibutyltin	58.3 J	—	—	—
Monobutyltin	1.2 UJ	—	—	—

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Table 1 - Physical, Biological, and Chemical Data for Duwamish Shipyard Sediment Samples

Sample ID:	SS-2	TOC* (c)(d)	SMS Sediment Quality Standards (SQS)	SMS Sediment Cleanup Screening Levels (CSL)
Grain Size in Percent				
Percent Sand >62μm	57	—	—	—
Percent Silt 4-62μm	27	—	—	—
Percent Clay <4μm	16	—	—	—
Bioassay Results				
- Acute Ten-Day Amphipod Mortality				
Is response to sediment sample signigicantly different from control sediment?	Yes	—	—	—
- Acute Larval Mortality/Abnormality				
Is response to sediment sample signigicantly different from control sediment?	Yes	—	—	—
- Chronic Twenty-Day Juvenile Polychaete				
Is response to sediment sample signigicantly different from control sediment?	No	—	—	—
Conventionals in percent				
Total Organic Carbon	2.74	—	—	—
Total Solids	67.13	—	—	—
Total Metals in mg/kg-DW (ppm)				
Antimony	120 J	—	—	—
Arsenic	1,130	—	57	93
Beryllium	0.7	—	—	—
Cadmium	3.5	—	5.1	6.7
Chromium	145	—	260	270
Copper	1,970 J	—	390	390
Lead	854 J	—	450	530
Mercury	0.35	—	0.41	0.59
Nickel	59	—	—	—
Selenium	0.9	—	—	—
Silver	1 U	—	6.1	6.1
Thallium	0.8 U	—	—	—
Zinc	4,440 J	—	410	960
Low Molecular Weight PAHs in mg/kg (ppm) (c)				
2-Methylnaphthalene	0.19	6.9	38	64
Acenaphthene	0.84	30.7	16	57
Acenaphthylene	0.1	3.6	66	66
Anthracene	1.4	51.1	220	1,200
Fluorene	1.2	43.8	23	79
Phenanthrene	7.1	259.1	100	480
Naphthalene	0.15	5.5	99	170
Total LPAH (a)	10.79	393.8	370	780

Table 1 - Physical, Biological, and Chemical Data for Duwamish Shipyard Sediment Samples

Sample ID:	SS-2	TOC* (c)(d)	SMS Sediment Quality Standards (SQS)	SMS Sediment Cleanup Screening Levels (CSL)
High Molecular Weight PAHs in mg/kg (ppm) (c)				
Benzo(b)Fluoranthene	1.8	65.7	—	—
Benzo(k)Fluoranthene	1.7	62.0	—	—
Benzo(a)Anthracene	2.3	83.9	110	270
Benzo(a)Pyrene	1.4	51.1	99	210
Chrysene	3	109.5	110	460
Dibenzo(a,h)Anthracene	0.25	9.1	12	33
Fluoranthene	9.7	354.0	160	1,200
Indeno(1,2,3-c,d)Pyrene	1.1	40.1	34	88
Pyrene	6.1	222.6	1,000	1,400
Benzo(g,h,i)perylene	0.77	28.1	31	78
Total HPAH (b)	27.35	998.2	960	5,300
Chlorinated Hydrocarbons in mg/kg (ppm) (c)				
1,3-Dichlorobenzene	0.078 U	2.8 U	—	—
1,4-Dichlorobenzene	0.078 U	2.8 U	3.1	9
1,2-Dichlorobenzene	0.078 U	2.8 U	2.3	2.3
1,2,4-Trichlorobenzene	0.078 U	2.8 U	0.81	1.8
Hexachlorobenzene	0.078 U	2.8 U	0.38	2.3
Hexachloroethane	0.078 U	2.8 U	—	—
Hexachlorobutadiene	0.078 U	2.8 U	3.9	6.2
Phthalate Esters in mg/kg (ppm) (c)				
Dimethyl phthalate	0.078 U	2.8 U	53	53
Diethyl phthalate	0.078 U	2.8 U	61	110
Di-n-butyl phthalate	0.078 U	2.8 U	22	1,700
Butylbenzylphthalate	0.078 U	2.8 U	4.9	64
Bis(2-ethylhexyl)phthalate	1.8	65.7	47	78
Di-n-octyl phthalate	0.078 U	2.8 U	58	4,500
Miscellaneous Neutrals in mg/kg (ppm) (c)				
Benzyl alcohol	0.078 U	—	57	73
Benzoic Acid	0.78 U	—	650	650
Dibenzofuran	0.66	24.1	15	58
Organonitrogen Compounds in mg/kg (ppm) (c)				
N-nitrosodiphenylamine	0.078 U	2.8 U	11	11
Butyltins in μg/kg-DW (ppb)				
Tributyltin	431.7 J	—	—	—
Dibutyltin	171.9 J	—	—	—
Monobutyltin	1.2 UJ	—	—	—

JOBS\376303\DUWMSEDI.wk1

Table 1 - Physical, Biological, and Chemical Data for Duwamish Shipyard Sediment Samples

Sample ID:	SS-3	TOC* (c)(d)	SMS Sediment Quality Standards (SQS)	SMS Sediment Cleanup Screening Levels (CSL)
Grain Size in Percent				
Percent Sand >62μm	19	—	—	—
Percent Silt 4-62μm	52	—	—	—
Percent Clay <4μm	29	—	—	—
Bioassay Results				
- Acute Ten-Day Amphipod Mortality				
Is response to sediment sample signigicantly different from control sediment?	Yes	—	—	—
- Acute Larval Mortality/Abnormality				
Is response to sediment sample signigicantly different from control sediment?	Yes	—	—	—
- Chronic Twenty-Day Juvenile Polychaete				
Is response to sediment sample signigicantly different from control sediment?	No	—	—	—
Conventionals in percent				
Total Organic Carbon	2.35	—	—	—
Total Solids	49.08	—	—	—
Total Metals in mg/kg-DW (ppm)				
Antimony	5 J	—	—	—
Arsenic	75	—	57	93
Beryllium	0.4	—	—	—
Cadmium	0.6	—	5.1	6.7
Chromium	51	—	260	270
Copper	507 J	—	390	390
Lead	144 J	—	450	530
Mercury	0.3 J	—	0.41	0.59
Nickel	32	—	—	—
Selenium	0.2 U	—	—	—
Silver	0.6 U	—	6.1	6.1
Thallium	1 U	—	—	—
Zinc	418 J	—	410	960
Low Molecular Weight PAHs in mg/kg (ppm) (c)				
2-Methylnaphthalene	0.077 U	3.3 U	38	64
Acenaphthene	0.075 J	3.2 J	16	57
Acenaphthylene	0.077 U	3.3 U	66	66
Anthracene	0.31	13.2	220	1,200
Fluorene	0.1	4.3	23	79
Phenanthrene	0.63	26.8	100	480
Naphthalene	0.039 J	1.7 J	99	170
Total LPAH (a)	1.231 J	52.4 J	370	780

Table 1 - Physical, Biological, and Chemical Data for Duwamish Shipyard Sediment Samples

Sample ID:	SS-3	TOC* (c)(d)	SMS Sediment Quality Standards (SQS)	SMS Sediment Cleanup Screening Levels (CSL)
High Molecular Weight PAHs in mg/kg (ppm) (c)				
Benzo(b)Fluoranthene	0.74	31.5	—	—
Benzo(k)Fluoranthene	0.84	35.7	—	—
Benzo(a)Anthracene	0.74	31.5	110	270
Benzo(a)Pyrene	0.64	27.2	99	210
Chrysene	1.2	51.1	110	460
Dibenzo(a,h)Anthracene	0.11	4.7	12	33
Fluoranthene	2.1	89.4	160	1,200
Indeno(1,2,3-c,d)Pyrene	0.5	21.3	34	88
Pyrene	1.5	63.8	1,000	1,400
Benzo(g,h,i)perylene	0.3	12.8	31	78
Total HPAH (b)	8.37	356.2	960	5,300
Chlorinated Hydrocarbons in mg/kg (ppm) (c)				
1,3-Dichlorobenzene	0.077 U	3.3 U	—	—
1,4-Dichlorobenzene	0.077 U	3.3 U	3.1	9
1,2-Dichlorobenzene	0.077 U	3.3 U	2.3	2.3
1,2,4-Trichlorobenzene	0.077 U	3.3 U	0.81	1.8
Hexachlorobenzene	0.077 U	3.3 U	0.38	2.3
Hexachloroethane	0.077 U	3.3 U	—	—
Hexachlorobutadiene	0.077 U	3.3 U	3.9	6.2
Phthalate Esters in mg/kg (ppm) (c)				
Dimethyl phthalate	0.077 U	3.3 U	53	53
Diethyl phthalate	0.077 U	3.3 U	61	110
Di-n-butyl phthalate	0.077 U	3.3 U	22	1,700
Butylbenzylphthalate	0.12	5.1	4.9	64
Bis(2-ethylhexyl)phthalate	0.95	40.4	47	78
Di-n-octyl phthalate	0.077 U	3.3 U	58	4,500
Miscellaneous Neutrals in mg/kg (ppm) (c)				
Benzyl alcohol	0.077 U	—	57	73
Benzoic Acid	0.77 U	—	650	650
Dibenzofuran	0.066 J	2.8 J	15	58
Organonitrogen Compounds in mg/kg (ppm) (c)				
N-nitrosodiphenylamine	0.077 U	3.3 U	11	11
Butyltins in μg/kg-DW (ppb)				
Tributyltin	418.1 J	—	—	—
Dibutyltin	85.9 J	—	—	—
Monobutyltin	18.8 J	—	—	—

JOBS\376303\DUWMSEDI.wk1

Table 1 - Physical, Biological, and Chemical Data for Duwamish Shipyard Sediment Samples

Sample ID:	SS-4	TOC* (c)(d)	SMS Sediment Quality Standards (SQS)	SMS Sediment Cleanup Screening Levels (CSL)
Grain Size in Percent				
Percent Sand >62μm	17	—	—	—
Percent Silt 4-62μm	60	—	—	—
Percent Clay <4μm	22	—	—	—
Bioassay Results				
- Acute Ten-Day Amphipod Mortality				
Is response to sediment sample				
signigicantly different from control sediment?	Yes	—	—	—
- Acute Larval Mortality/Abnormality				
Is response to sediment sample				
signigicantly different from control sediment?	No	—	—	—
- Chronic Twenty-Day Juvenile Polychaete				
Is response to sediment sample				
signigicantly different from control sediment?	No	—	—	—
Conventionals in percent				
Total Organic Carbon	1.54	—	—	—
Total Solids	49.45	—	—	—
Total Metals in mg/kg-DW (ppm)				
Antimony	29 J	—	—	—
Arsenic	120	—	57	93
Beryllium	0.6	—	—	—
Cadmium	1.5	—	5.1	6.7
Chromium	48.0	—	260	270
Copper	247 J	—	390	390
Lead	102 J	—	450	530
Mercury	0.25	—	0.41	0.59
Nickel	34	—	—	—
Selenium	0.2 U	—	—	—
Silver	0.6 U	—	6.1	6.1
Thallium	1 U	—	—	—
Zinc	526 J	—	410	960
Low Molecular Weight PAHs in mg/kg (ppm) (c)				
2-Methylnaphthalene	0.074 U	4.8 U	38	64
Acenaphthene	0.074 U	4.8 U	16	57
Acenaphthylene	0.074 U	4.8 U	66	66
Anthracene	0.15	9.7	220	1,200
Fluorene	0.045 J	2.9 J	23	79
Phenanthrene	0.41	26.6	100	480
Naphthalene	0.074 U	4.8 U	99	170
Total LPAH (a)	0.827 J	53.7 J	370	780

Table 1 - Physical, Biological, and Chemical Data for Duwamish Shipyard Sediment Samples

Sample ID:	SS-4	TOC* (c)(d)	SMS Sediment Quality Standards (SQS)	SMS Sediment Cleanup Screening Levels (CSL)
High Molecular Weight PAHs in mg/kg (ppm) (c)				
Benzo(b)Fluoranthene	0.46	29.9	—	—
Benzo(k)Fluoranthene	0.36	23.4	—	—
Benzo(a)Anthracene	0.38	24.7	110	270
Benzo(a)Pyrene	0.37	24.0	99	210
Chrysene	0.56	36.4	110	460
Dibenzo(a,h)Anthracene	0.08	5.2	12	33
Fluoranthene	0.98	63.6	160	1,200
Indeno(1,2,3-c,d)Pyrene	0.31	20.1	34	88
Pyrene	0.76	49.4	1,000	1,400
Benzo(g,h,i)perylene	0.23	14.9	31	78
Total HPAH (b)	4.26	276.6	960	5,300
Chlorinated Hydrocarbons in mg/kg (ppm) (c)				
1,3-Dichlorobenzene	0.074 U	4.8 U	—	—
1,4-Dichlorobenzene	0.074 U	4.8 U	3.1	9
1,2-Dichlorobenzene	0.074 U	4.8 U	2.3	2.3
1,2,4-Trichlorobenzene	0.074 U	4.8 U	0.81	1.8
Hexachlorobenzene	0.074 U	4.8 U	0.38	2.3
Hexachloroethane	0.074 U	4.8 U	—	—
Hexachlorobutadiene	0.074 U	4.8 U	3.9	6.2
Phthalate Esters in mg/kg (ppm) (c)				
Dimethyl phthalate	0.074 U	4.8 U	53	53
Diethyl phthalate	0.074 U	4.8 U	61	110
Di-n-butyl phthalate	0.074 U	4.8 U	22	1,700
Butylbenzylphthalate	0.074 U	4.8 U	4.9	64
Bis(2-ethylhexyl)phthalate	2.2	142.9	47	78
Di-n-octyl phthalate	0.074 U	4.8 U	58	4,500
Miscellaneous Neutrals in mg/kg (ppm) (c)				
Benzyl alcohol	0.074 U	—	57	73
Benzoic Acid	0.74 U	—	650	650
Dibenzofuran	0.074 U	4.8 U	15	58
Organonitrogen Compounds in mg/kg (ppm) (c)				
N-nitrosodiphenylamine	0.074 U	4.8 U	11	11
Butyltins in μg/kg-DW (ppb)				
Tributyltin	159.1 J	—	—	—
Dibutyltin	38.5 J	—	—	—
Monobutyltin	4.6 J	—	—	—

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Table 1 - Physical, Biological, and Chemical Data for Duwamish Shipyard Sediment Samples

Sample ID:	SS-5	TOC* (c)(d)	SMS Sediment Quality Standards (SQS)	SMS Sediment Cleanup Screening Levels (CSL)
Grain Size in Percent				
Percent Sand >62μm	13	—	—	—
Percent Silt 4–62μm	62	—	—	—
Percent Clay <4μm	25	—	—	—
Bioassay Results				
– Acute Ten-Day Amphipod Mortality				
Is response to sediment sample				
signigicantly different from control sediment?	—	—	—	—
– Acute Larval Mortality/Abnormality				
Is response to sediment sample				
signigicantly different from control sediment?	—	—	—	—
– Chronic Twenty-Day Juvenile Polychaete				
Is response to sediment sample				
signigicantly different from control sediment?	—	—	—	—
Conventionals in percent				
Total Organic Carbon	1.41	—	—	—
Total Solids	48.14	—	—	—
Total Metals in mg/kg-DW (ppm)				
Antimony	0.3 J	—	—	—
Arsenic	16	—	57	93
Beryllium	0.5	—	—	—
Cadmium	0.4	—	5.1	6.7
Chromium	39	—	260	270
Copper	111 J	—	390	390
Lead	59 J	—	450	530
Mercury	0.28	—	0.41	0.59
Nickel	29	—	—	—
Selenium	0.2 U	—	—	—
Silver	0.6 U	—	6.1	6.1
Thallium	1 U	—	—	—
Zinc	161 J	—	410	960
Low Molecular Weight PAHs in mg/kg (ppm) (c)				
2-Methylnaphthalene	0.012 J	0.83 J	38	64
Acenaphthene	0.024	1.7	16	57
Acenaphthylene	0.015 J	1.1 J	66	66
Anthracene	0.1	7.1	220	1,200
Fluorene	0.034	2.4	23	79
Phenanthrene	0.28	19.9	100	480
Naphthalene	0.015 J	1.1 J	99	170
Total LPAH (a)	0.468 J	33.2 J	370	780

Table 1 - Physical, Biological, and Chemical Data for Duwamish Shipyard Sediment Samples

Sample ID:	SS-5	TOC* (c)(d)	SMS Sediment Quality Standards (SQS)	SMS Sediment Cleanup Screening Levels (CSL)
High Molecular Weight PAHs in mg/kg (ppm) (c)				
Benzo(b)Fluoranthene	0.36	25.5	—	—
Benzo(k)Fluoranthene	0.39	27.7	—	—
Benzo(a)Anthracene	0.26	18.4	110	270
Benzo(a)Pyrene	0.27	19.1	99	210
Chrysene	0.42	29.8	110	460
Dibenzo(a,h)Anthracene	0.076	5.4	12	33
Fluoranthene	0.59	41.8	160	1,200
Indeno(1,2,3-c,d)Pyrene	0.22	15.6	34	88
Pyrene	0.51	36.2	1,000	1,400
Benzo(g,h,i)perylene	0.16	11.3	31	78
Total HPAH (b)	3.096	219.5	960	5,300
Chlorinated Hydrocarbons in mg/kg (ppm) (c)				
1,3-Dichlorobenzene	0.019 U	1.3 U	—	—
1,4-Dichlorobenzene	0.019 U	1.3 U	3.1	9
1,2-Dichlorobenzene	0.019 U	1.3 U	2.3	2.3
1,2,4-Trichlorobenzene	0.019 U	1.3 U	0.81	1.8
Hexachlorobenzene	0.019 U	1.3 U	0.38	2.3
Hexachloroethane	0.019 U	1.3 U	—	—
Hexachlorobutadiene	0.019 U	1.3 U	3.9	6.2
Phthalate Esters in mg/kg (ppm) (c)				
Dimethyl phthalate	0.019 J	1.3 J	53	53
Diethyl phthalate	0.019 U	1.3 U	61	110
Di-n-butyl phthalate	0.02	1.4	22	1,700
Butylbenzylphthalate	0.054	3.8	4.9	64
Bis(2-ethylhexyl)phthalate	0.41	29.1	47	78
Di-n-octyl phthalate	0.019 U	1.3 U	58	4,500
Miscellaneous Neutrals in mg/kg (ppm) (c)				
Benzyl alcohol	0.019 U	— U	57	73
Benzoic Acid	0.19 U	— U	650	650
Dibenzofuran	0.025	1.8	15	58
Organonitrogen Compounds in mg/kg (ppm) (c)				
N-nitrosodiphenylamine	0.019 U	1.3 U	11	11
Butyltins in μg/kg-DW (ppb)				
Tributyltin	87.4 J	—	—	—
Dibutyltin	19.5 J	—	—	—
Monobutyltin	3.8 J	—	—	—

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Table 2 - Sediment Sampling Field Observations

Sample Number	Date	Time	Water Depth in Feet	Penetration Depth in Centimeters	Comments
SS-1	8/17/93	12:30	27	18	Sheen observed on water when emptying sediment from van Veen. Brown. Collected top 7.5 centimeters.
SS-2	8/17/93	3:20	14.5	15	Black-brown sandy silt. Sheen observed. Collected top 7.5 centimeters.
SS-3	8/17/93	5:00	40	20	Black-brown slightly sandy silt. Sheen - no odor. Some shells. Collected top 5 centimeters. Collected field duplicate (SS-6).
SS-4	8/17/93	10:50	26	20	MS/MSD collected. Shell fragments. No sheen or odor. Worms. Collected top 10 centimeters.
SS-5	8/17/93	1:00	44	8	Brownish black slightly sandy silt. No worms, shells, no sheen or odor. Collected top 5 centimeters.

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Table 3 - Parameters of Concern, Methods, and Limit of Detection Limit Goals

Parameter	Method	Limit of Detection
TOTAL METALS	METHOD (SW)	mg/kg Dry Weight
Antimony	ICP (6010)	3.2
Arsenic	GFAA (7061)	0.1
Beryllium	ICP (6010)	0.1
Cadmium	ICP (6010)	4.0
Chromium	ICP (6010)	0.5
Copper	ICP (6010)	0.6
Lead	ICP (6010)	4.2
Mercury	CVAA (7471)	0.01
Nickel	ICP (6010)	1.5
Selenium	GFAA (7061)	0.1
Silver	ICP (6010)	0.7
Thallium	GFA (7061)	0.1
Zinc	ICP (6010)	0.2
LOW MOLECULAR WEIGHT AROMATIC HYDROCARBONS	SW METHOD	µg/kg Dry Weight
Naphthalene	8270	20
2-Methylnaphthalene	8270	20
Acenaphthylene	8270	20
Acenaphthene	8270	20
Fluorene	8270	20
Phenanthrene	8270	20
Anthracene	8270	20

Table 3 - Parameters of Concern, Methods, and Limit of Detection Limit Goals

Parameter	Method	Limit of Detection
HIGH MOLECULAR WEIGHT AROMATIC HYDROCARBONS	SW METHOD	µg/kg Dry Weight
Fluoranthene	8270	20
Pyrene	8270	20
Benzo(a)anthracene	8270	20
Chrysene	8270	20
Benzo(b)fluoranthene	8270	20
Benzo(k)fluoranthene	8270	20
Benzo(a)pyrene	8270	20
Indeno(1,2,3-cd)pyrene	8270	20
Dibenzo(a,h)anthracene	8270	20
CHLORINATED HYDROCARBONS	SW METHOD	µg/kg Dry Weight
1,3-Dichlorobenzene	8270	20
1,4-Dichlorobenzene	8270	20
1,2-Dichlorobenzene	8270	20
1,2,4-Trichlorobenzene	8270	20
Hexachlorobenzene	8270	20
Hexachloroethane	8270	20
Hexachlorobutadiene	8270	20
PHTHALATE ESTERS	SW METHOD	µg/kg Dry Weight
Dimethyl phthalate	8270	20
Diethyl phthalate	8270	20
Di-n-butyl phthalate	8270	20
Butylbenzylphthalate	8270	20
Bis(2-ethylhexyl)phthalate	8270	20
Di-n-octyl phthalate	8270	20

Table 3 - Parameters of Concern, Methods, and Limit of Detection Limit Goals

Parameter	Method	Limit of Detection
MISCELLANEOUS NEUTRALS	SW METHOD	μg/kg Dry Weight
Benzyl alcohol	8270	20
Benzoic Acid	8270	200
Dibenzofuran	8270	20
ORGANONITROGEN COMPOUNDS	SW METHOD	μg/kg Dry Weight
N-Nitrosodiphenylamine	8270	20
BUTLYTINS	METHOD	μg/kg Dry Weight
Tributyltin	GC/FPD	20
Dibutyltin	GC/FPD	20
Monobutyltin	GC/FPD	Unknown
CONVENTIONALS	METHOD	Percent Dry Weight
Total Organic Carbon (TOC)	PSEP (5310 B)	0.1

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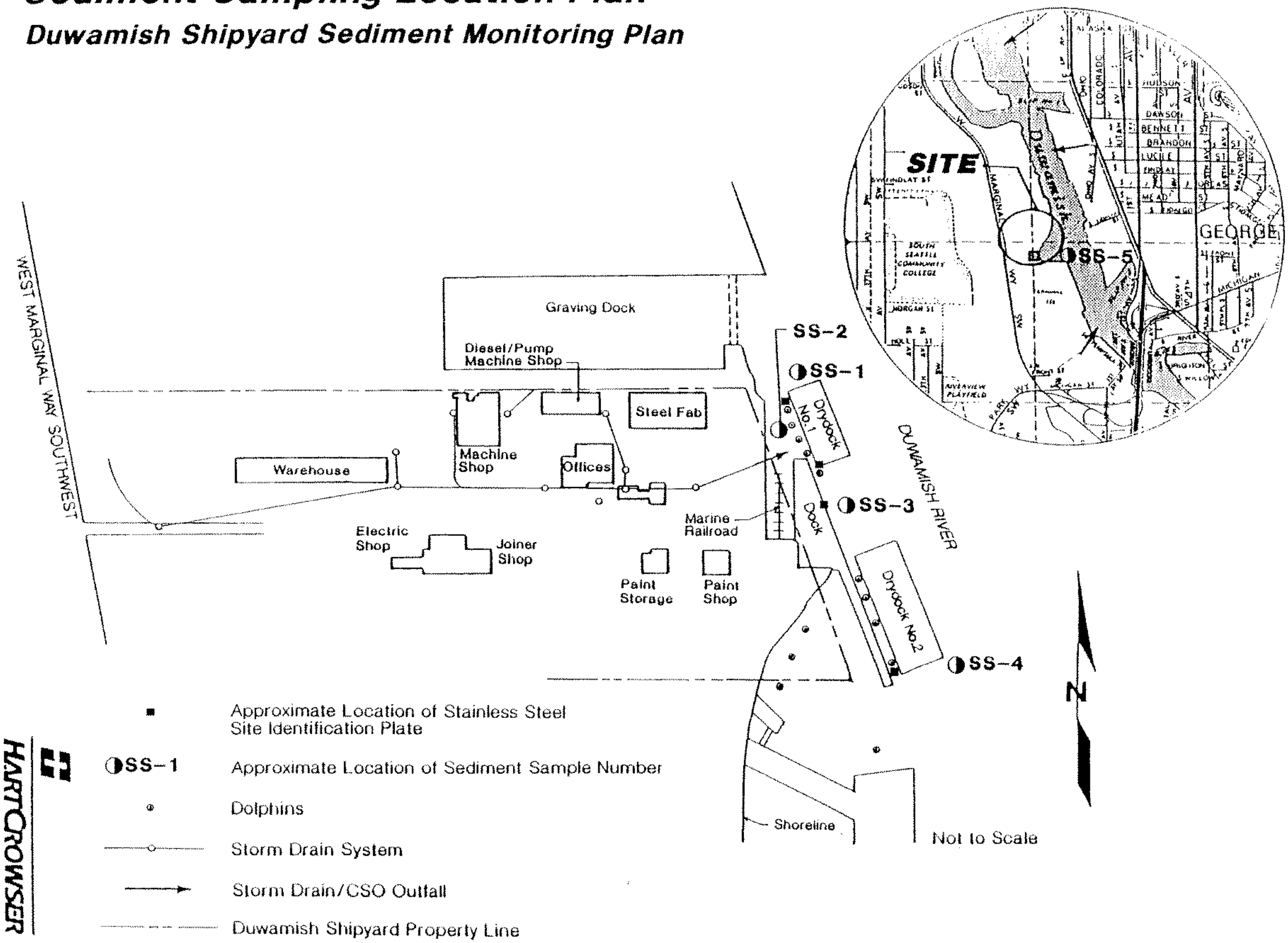
Sediment Sampling Location Plan

Duwamish Shipyard Sediment Monitoring Plan



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J-3763-03 11/93
Figure 1

Dry Dock and Graving Dock
Discharge Metals Report
Duwamish Shipyard
Seattle, Washington

Prepared for
Duwamish Shipyard, Inc.

December 24, 1996
J-3763-06

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Earth and Environmental Technologies

**Table 1 - Metals Concentrations in Discharges from Dry Docks and Graving Dock
Duwamish Shipyard, Inc.**

Sample Date (1996)	Total Metals Concentrations in ug/L											
	Dry Dock #1 Flood Water Outfall 001 (1)			Dry Dock #3 Flood Water Outfall 002 (1)			Graving Dock Pump-Out Outfall 003 (2)			Graving Dock Flood Water Outfall 004 (3)		
	Copper	Lead	Zinc	Copper	Lead	Zinc	Copper	Lead	Zinc	Copper	Lead	Zinc
Jan	15	1	7	10	0.6	10	44	2.3	23	24	3.5	46
Feb	79	9	96	ns	ns	ns	36	10	56	24	9	34
March	24	1	25	28	1	23	29	2	34	28	2	14
April	9	1.5	16	21	2.5	21	46	1	44	22	0.8	18
May	16	0.72	29	130	4	53	77	1.5	100	46	1.5	41
June	21	0.3	16	61	0.3	33	46	1	49	41	0.4	23
July	50	2	67	69	0.2	37	13	2	39	130	1	35
Aug	5	0.16	21	250	4	93	47	0.81	19	9	0.97	23
Sept	14	1	22	28	1	28	6	0.3	15	9	2	10
Oct	37	1	18	170	3	110	15	2	31	18	0.8	20
Nov	42	2	46	120	2	54	510	69	1400	390	4	78
Average	28.4	1.8	33.0	88.7	1.9	46.2	79.0	8.4	164.5	67.4	2.4	31.1

Notes:

ns No sample collected

(1) Dry dock flood water samples are collected during flooding operations, when there is 3 to 6 feet of water over the dry dock floor.

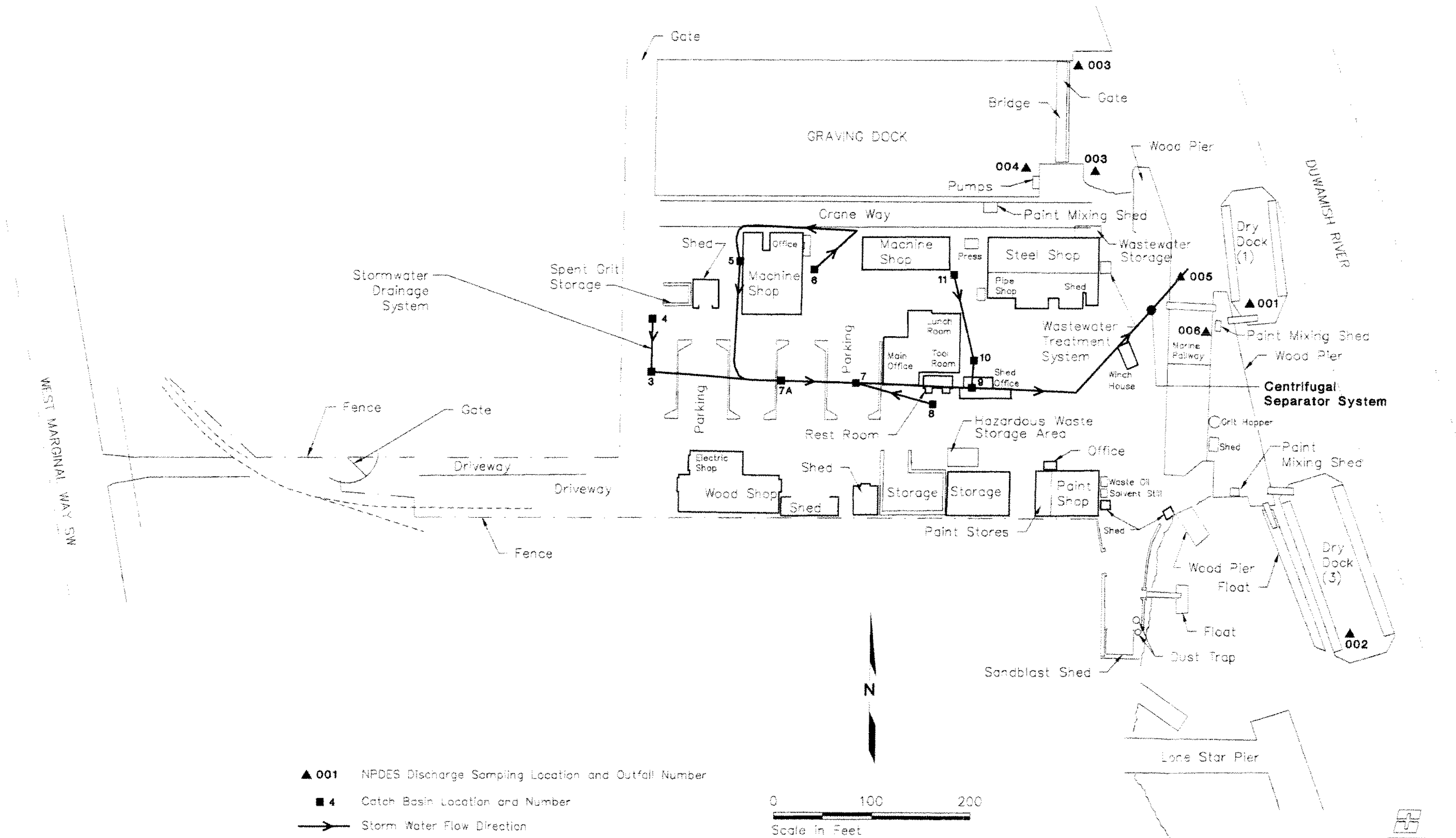
(2) Water leaking into the graving dock is pumped out through two discharge pipes. Pump-out water samples are collected at least once in any month when water is discharged. Grab samples are collected from the two discharge pipes, and composited for metals analysis.

(3) Graving dock flood water samples are collected when the graving dock is flooded prior to opening the tide gate to launch a vessel.

(4) Currently there are no effluent limitations for copper, lead, and zinc in these four outfalls. The Washington State Department of Ecology reserves the right to establish limits following the process outlined in the Fact Sheet which accompanies DSI's NPDES permit. For comparison purposes, the Washington State Marine Water Acute criteria are 2.5 ug/L for copper, 151.1 ug/L for lead, and 84.6 ug/L for zinc.

Site Plan Showing NPDES Discharge Sampling Locations

Duwamish Shipyard, Inc.



▲ 001 NPDES Discharge Sampling Location and Outfall Number

■ 4 Catch Basin Location and Number

→ Storm Water Flow Direction

0 100 200
Scale in Feet

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J-3763-06 12/96
Figure 1

1997 Dry Dock and Graving Dock Discharge Metals Report
Duwamish Shipyard
Seattle, Washington

Prepared for
Duwamish Shipyard, Inc.

May 15, 1998
J-3763-09

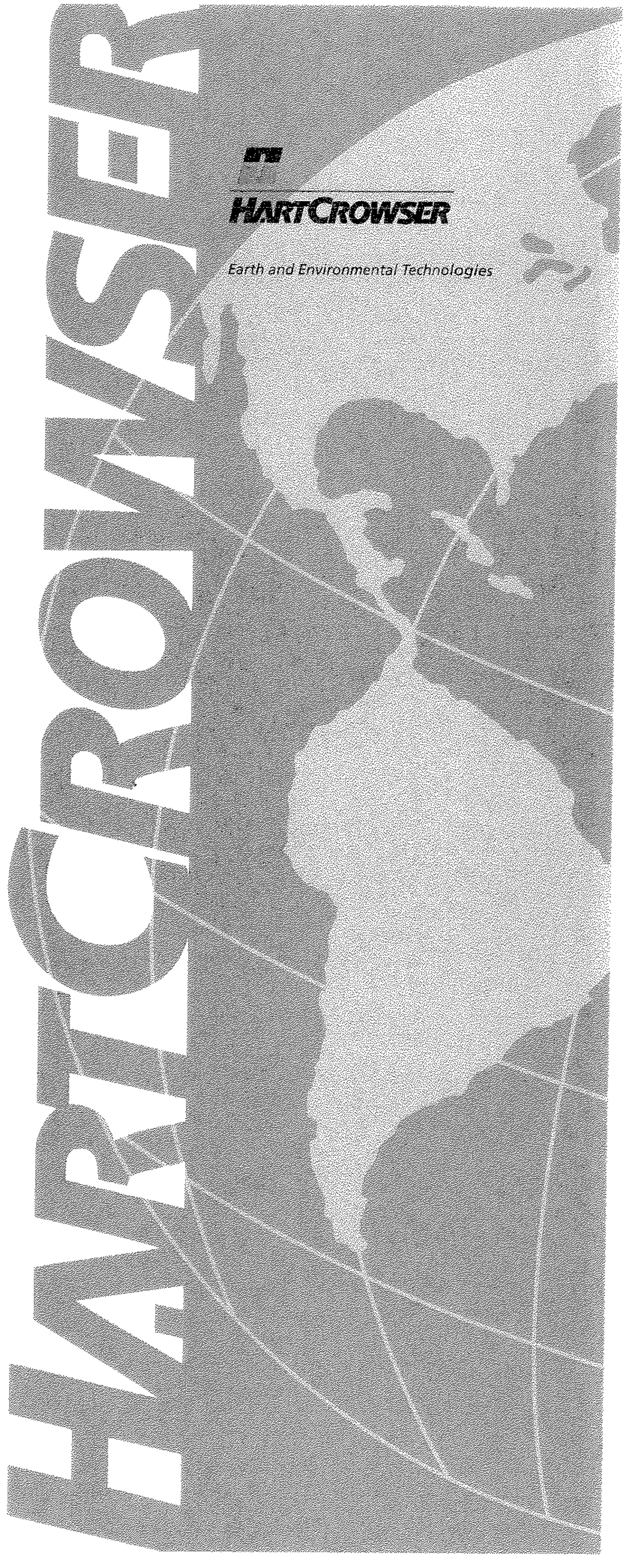


Table 1 - Metals Concentrations in Discharges from Dry Docks and Graving Dock
Duwamish Shipyard, Inc.

Sample Date (1997)	Total Metals Concentrations in ug/L: Dry Dock #1 Flood Water Outfall 001 (1)			Dry Dock #3 Flood Water Outfall 002 (1)			Graving Dock Pump-Out Outfall 003 (2)			Graving Dock Flood Water Outfall 004 (3)			Background Sample		
	Copper	Lead	Zinc	Copper	Lead	Zinc	Copper	Lead	Zinc	Copper	Lead	Zinc	Copper	Lead	Zinc
Jan	26	2	17	62	3	17	38	<0.8	21	4	0.9	50	3	0.8	5
Feb	3	<0.3	6	29	<0.3	38	6	<0.3	13	35	<0.6	38	3	<0.3	20
March	10	0.6	12	10	<0.3	18	2	<0.3	5	2	<0.3	7	3	<0.3	5
April	40	3	70	ns	ns	ns	10	<1	52	19	<0.6	18	2	1	3
May	50	<0.6	65	3	<0.3	14	9	<0.6	39	26	<0.6	23	2	<0.3	3
June	38	<1	50	ns	ns	ns	140	<1	390	89	<1	26	22	<1	8
July	7	1	24	15	<1	47	10	<1	28	30	0.9	45	ns	ns	ns
Aug	100	65	86	38	<1	36	11	<1	43	7	<1	17	280	<1	5
Sept	25	2	28	ns	ns	ns	7.3	<0.1	20	220	2	42	6	3	16
Oct	13	<0.1	8	76	3	38	16	<0.1	22	10	<0.1	22	9	<0.1	26
Nov	8	<0.1	21	ns	ns	ns	8	3	38	ns	ns	ns	4	1	8
Dec	13	1	33	4	<1	13	4	<1	18	9	<1	13	19	2	27
1997 Average	27.8	6.3	35.0	29.6	1.0	27.6	21.8	0.6	57.4	41.0	0.6	27.4	32.1	0.8	11.5
1996 Average	28.4	1.8	33.0	88.7	1.9	46.2	79.0	8.4	164.5	67.4	2.4	31.1			

Notes:

ns = No sample collected.

(1) Dry dock flood water samples are collected during flooding operations, when there is 3 to 6 feet of water over the dry dock floor.

(2) Water leaking into the graving dock is pumped out through two discharge pipes. Pump-out water samples are collected at least once in any month when water is discharged. Grab samples are collected from the two discharge pipes, and composited for metals analysis.

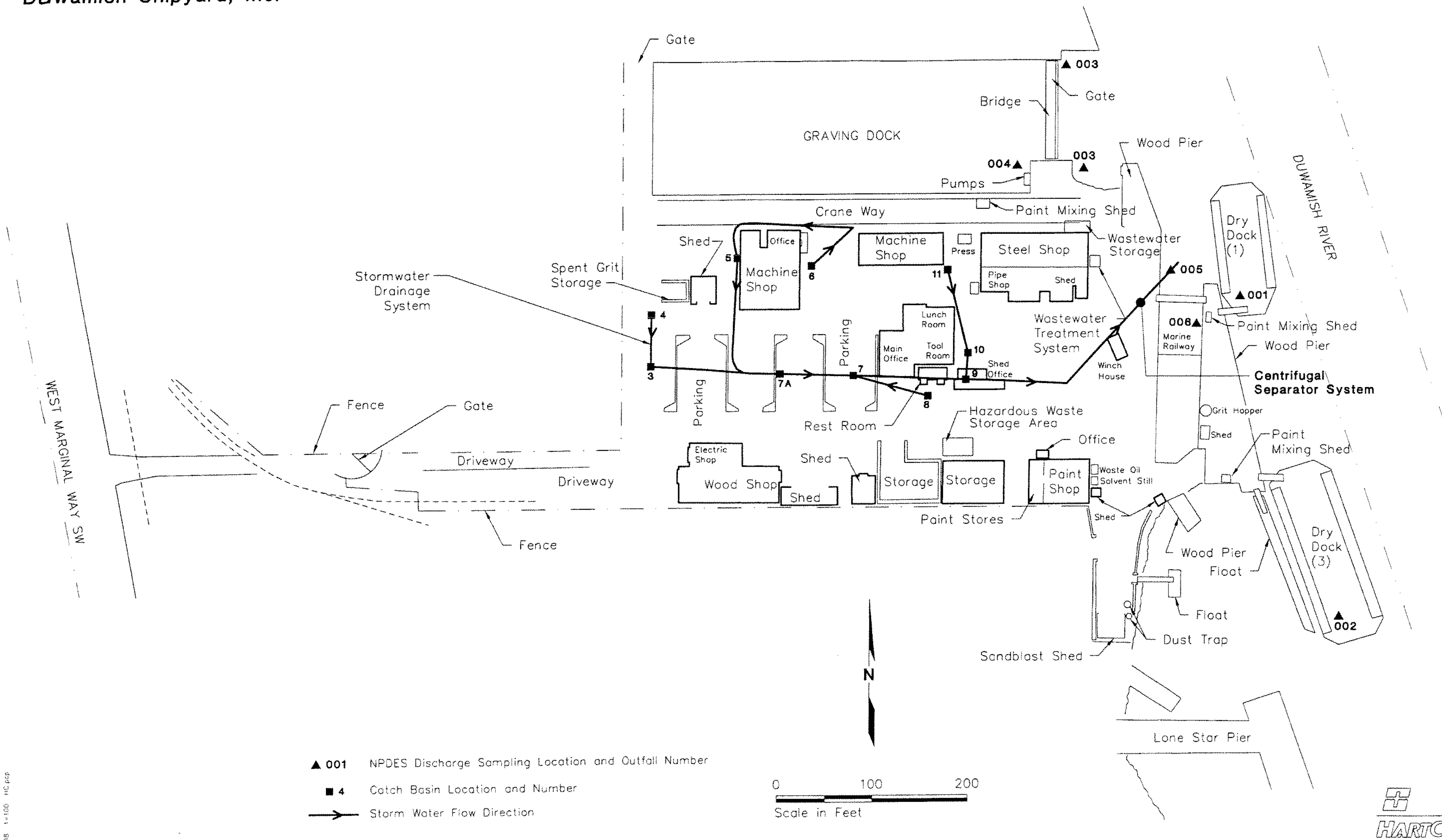
(3) Graving dock flood water samples are collected when the graving dock is flooded prior to opening the tide gate to launch a vessel.

(4) Currently there are no effluent limitations for copper, lead, and zinc in these four outfalls. The Washington State Department of Ecology reserves the right to establish limits following the process outlined in the Fact Sheet which accompanies DSI's NPDES permit. For comparison purposes, the Washington State Marine Water Acute criteria are 2.5 ug/L for copper, 151.1 ug/L for lead, and 84.6 ug/L for zinc.

(5) For purposes of calculating an average value, non-detected constituents are assumed to be present at one-half the detection limit.

Site Plan Showing NPDES Discharge Sampling Locations

Duwamish Shipyard, Inc.



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J-3763-09 5/98

Figure 1

1429/548568

Release #548568
Duwamish Shipyard
Seattle/King

SIT 2,3

Independent Remedial Action Report
Underground Storage Tank Closure

Duwamish Shipyard
Seattle, Washington

October 6, 2000

Submitted to:	Department of Ecology, Northwest Region
Prepared for:	Duwamish Shipyard, Inc.
Prepared by:	RK Kuroiwa, PE

TRANSGLOBAL ENVIRONMENTAL GEOSCIENCES NORTHWEST, INC.

DUWAMISH SHIPYARD PROJECT
Seattle, Washington
Roy Kuroiwa, P.E.

Analyses of BTEX (EPA 8021B) & Gasoline (NWTPH-Gx) in Soil.

Sample Number	Date Analyzed	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	Gasoline (mg/kg)	Surrogate Recovery(%)
Method Blank	8/31/00	nd	nd	nd	nd	nd	98
B2	8/31/00	nd	nd	nd	nd	nd	103
SS-2	8/31/00	1.6	2.0	nd	0.3	1900	105
B1	8/31/00	--	--	--	--	3200	int
B4	8/31/00	3.5	1.2	0.81	2.1	88	108
B3	8/31/00	0.4	1.4	nd	nd	170	100
SS-1	8/31/00	--	--	--	--	140	108
SS-2(2)	8/31/00	nd	nd	nd	nd	76	111
SS-3	8/31/00	--	--	--	--	3400	int
SS-4	8/31/00	nd	nd	nd	nd	nd	100
SS-5	8/31/00	nd	nd	nd	nd	nd	98
SS-3(2)	8/31/00	0.38	nd	nd	nd	300	115
B1(2)	8/31/00	0.70	nd	0.64	1.3	nd	112
B5	8/31/00	nd	nd	nd	nd	nd	96
B5 Dupl	8/31/00	nd	nd	nd	nd	nd	91
SS-6	8/31/00	nd	nd	nd	nd	nd	106
SS-6 Dupl	8/31/00	nd	nd	nd	nd	nd	86
SS-7	8/31/00	nd	nd	nd	nd	nd	102
SS-8	8/31/00	nd	nd	nd	nd	nd	112
SP-1	8/31/00	nd	nd	nd	nd	nd	96
SP-2	8/31/00	nd	nd	nd	nd	nd	98
SP-3	8/31/00	nd	nd	nd	nd	nd	91
SP-3 Dupl	8/31/00	nd	nd	nd	nd	nd	109
B4(1)	8/31/00	--	--	--	--	800	int
Detection Limits		0.05	0.05	0.05	0.05	10	

" -- " Indicates analysis not performed.
"nd" Indicates no detection at listed detection limits.
"int" Indicates interferences prevent determination.

Analyses Performed by : Michael Dee

TRANSGLOBAL ENVIRONMENTAL GEOSCIENCES NORTHWEST, INC.

DUWAMISH SHIPYARD PROJECT
Port Angeles, Washington
KHM Environmental Management, Inc.

Diesel and Oil in Soil by NWTPH-Dx/Dextended.

Sample Number	Date Analyzed	Surrogate Recovery (%)	Diesel (mg/kg)	Oil (mg/kg)
Method Blank	8/31/00	106	nd	nd
B2	8/31/00	106	330	200
SS-2	8/31/00	106	210	--
B1	8/31/00	int	--	--
B4	8/31/00	102	nd	--
B3	8/31/00	int	460	--
SS-1	8/31/00	108	900	100
SS-2(2)	8/31/00	109	225	nd
SS-3	8/31/00	int	--	--
SS-4	8/31/00	104	39	--
B3(2)	8/31/00	105	4000	--
SS-5	8/31/00	110	nd	--
SS-3(2)	8/31/00	102	130	--
B1(2)	8/31/00	111	560	--
B5	8/31/00	113	nd	--
B5 Dupl	8/31/00	102	nd	--
SS-6	8/31/00	123	nd	--
SS-6 Dupl	8/31/00	90	nd	--
SS-7	8/31/00	108	nd	--
SS-8	8/31/00	100	64	--
SP-1	8/31/00	110	200	--
SP-2	8/31/00	102	96	--
SP-3	8/31/00	104	nd	--
SP-3 Dupl	8/31/00	106	nd	--
B4(1)	8/31/00	int	340	--
Detection Limits			20	40

" -- " Indicates analysis not performed.
"nd" Indicates no detection at listed detection limits.
"int" Indicates interferences prevent determination.

Analyses Performed by : Michael Dee

TRANSGLOBAL ENVIRONMENTAL GEOSCIENCES NORTHWEST, INC.

DUWAMISH SHIPYARD PROJECT
Seattle, Washinton
RK Kuroiwa, PE
Client Project #DW

Heavy Metals in Soil by EPA-7000 Series

Sample Number	Date Analyzed	Lead (Pb) EPA 7420 (mg/kg)
Method Blank	9/1/00	nd
SS-1	9/1/00	25
SS-1 Dup.	9/1/00	27
SS-2 (2)	9/1/00	61
SS-3 (2)	9/1/00	48
SS-5	9/1/00	22
SP-1	9/1/00	41
SP-3	9/1/00	56
B-1 (2)	9/1/00	37
B-2	9/1/00	62
B-3	9/1/00	28
B-5	9/1/00	70
Method Detection Limits		5

"nd" Indicates not detected at listed detection limits.

ANALYSES PERFORMED BY: Tim McCall

TRANSGLOBAL ENVIRONMENTAL GEOSCIENCES NORTHWEST, INC.

DUWAMISH SHIPYARD PROJECT
Seattle, Washinton
RK Kuroiwa, PE
Client Project #DW

QA/QC Data - Total Metals EPA-7000 Series Analyses

Sample Number: SS-1							
	Matrix Spike			Matrix Spike Duplicate			RPD
	Spiked Conc. (mg/kg)	Measured Conc. (mg/kg)	Spike Recovery (%)	Spiked Conc. (mg/kg)	Measured Conc. (mg/kg)	Spike Recovery (%)	(%)
Lead	250	269	108	250	253	101	6.13

Laboratory Control Sample			
	Spiked Conc. (mg/kg)	Measured Conc. (mg/kg)	Spike Recovery (%)
Lead	250	241	96

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 65%-135%
ACCEPTABLE RPD IS 20%

ANALYSES PERFORMED BY: Tim McCall
DATA REVIEWED BY: Sherry Chilcutt

TEG NW SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

TEG Job Number:	S00901-1
Client:	RK KUROIWA, PE
Client Job Name:	DUWAMISH SHIPYARD
Client Job Number:	NA

Analytical Results

BTEX		MTH BLK	LCS	B-4(1)
Matrix	Soil	Soil	Soil	Soil
Date extracted	Reporting	09/01/00	09/01/00	09/01/00
Date analyzed	Limits	09/01/00	09/01/00	09/01/00
Moisture, %				15%
BTEX , µg/kg				
Benzene	50	nd	72%	nd
Toluene	50	nd	81%	230
Ethylbenzene	50	nd		3,300
Xylenes	50	nd		13,000
Surrogate recoveries:				
Trifluorotoluene		91%	84%	127%
Bromofluorobenzene		98%	92%	C

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

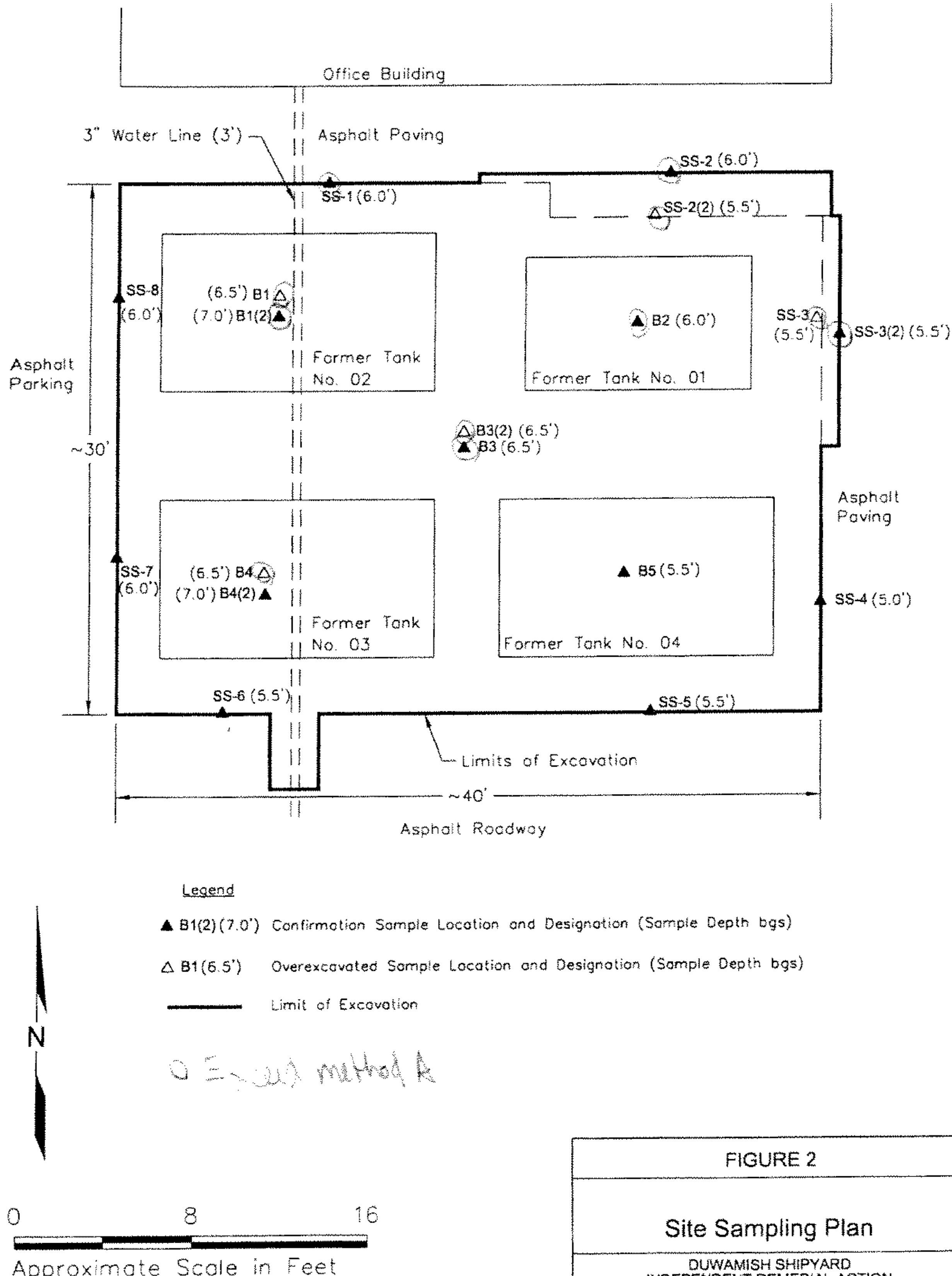

FIGURE 2

Site Sampling Plan

DUWAMISH SHIPYARD
INDEPENDENT REMEDIAL ACTION
SEATTLE, WASHINGTON

RK Kuroiwa, PE — September 25, 2000

Duwamish Shipyard Inc 9II 3.6.1

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PRELIMINARY INVESTIGATION DATA REPORT

DUWAMISH SHIPYARD, INC. (SITE #1429)
SEATTLE, WASHINGTON

Prepared for

Duwamish Shipyard, Inc.
5658 West Marginal Way SW
Seattle, Washington 98106

Prepared by

Anchor Environmental, L.L.C.
1423 Third Avenue, Suite 300
Seattle, Washington 98101

December 2006

Table 2
Summary of Sample Coordinates and Intervals

Station ID	Soil/Catch Basin Sample ID	Sample Interval (feet)		Groundwater Sample ID	Screened Sample Interval (feet)		Northing (feet)	Easting (feet)	Ground Surface Elevation
DSI01	DSI01-SO-A	0	3	DSI01-GW	0	10	204362.38	1267483.65	15.85
	DSI01-SO-B	4	6	-			204362.38	1267483.65	15.85
DSI02	DSI02-SO-A	0	3	DSI02-GW	-	-	204484.72	1267482.28	16.55
	DSI02-SO-B	3	5	-			204484.72	1267482.28	16.55
DSI03	DSI03-SO-A	0	3	DSI03-GW	0	10	204614.54	1267538.20	16.56
	DSI03-SO-B	5	6.5	-			204614.54	1267538.20	16.56
DSI04	DSI04-SO-A	0	3	DSI04-GW	0	10	204577.53	1267677.30	14.95
	DSI04-SO-B	3	5	-			204577.53	1267677.30	14.95
DSI05	DSI05-SO-A	0	3	DSI05-GW	0	10	204414.79	1267664.49	15.38
	DSI05-SO-B	3	5	-			204414.79	1267664.49	15.38
DSI06	DSI06-SO-A	0	3	DSI06-GW	0	10	204403.48	1267832.57	15.38
	DSI06-SO-B	4	6	-			204403.48	1267832.57	15.38
DSI07	DSI07-SO-A	0	3	DSI07-GW	0	10	204440.17	1267843.29	15.30
	DSI07-SO-B	3	5	-			204440.17	1267843.29	15.30
DSI08	DSI08-SO-A	0	3	DSI08-GW	0	10	204599.08	1267815.08	15.08
	DSI08-SO-B	3	5	-			204599.08	1267815.08	15.08
DSI09	DSI09-SO-A	0	3	DSI09-GW	0	10	204599.10	1267972.09	15.10
	DSI09-SO-B	3	5	-			204599.10	1267972.09	15.10
DSI10	DSI10-SO-A	0	3	DSI10-GW	0	10	204456.02	1267928.63	14.96
	DSI10-SO-B	3	5	-			204456.02	1267928.63	14.96
DSI11	DSI11-SO-A	0	3	DSI11-GW	0	10	204358.81	1267970.43	14.74
	DSI11-SO-B	3	5	-			204358.81	1267970.43	14.74
DSI12	DSI12-SO-A	0	3	DSI12-GW	0	10	204269.04	1267970.42	14.38
	DSI12-SO-B	3	5	-			204269.04	1267970.42	14.38
DSI13	DSI13-CB-YYMMDD	-	-	-	-	-	204534.18	1267506.84	15.60
DSI14	DSI14-CB-YYMMDD	-	-	-	-	-	204487.92	1267507.37	15.31
DSI15	DSI15-CB-YYMMDD	-	-	-	-	-	204566.32	1267577.87	14.60
DSI16	DSI16-CB-YYMMDD	-	-	-	-	-	204603.21	1267662.99	14.75
DSI17	DSI17-CB-YYMMDD	-	-	-	-	-	204482.78	1267687.03	14.66
DSI18	DSI18-CB-YYMMDD	-	-	-	-	-	204572.22	1267818.66	14.97
DSI19	DSI19-CB-YYMMDD	-	-	-	-	-	204512.92	1267823.23	14.49
DSI20	DSI20-CB-YYMMDD	-	-	-	-	-	204435.85	1267776.70	14.43
DSI21	DSI21-CB-YYMMDD	-	-	-	-	-	204471.91	1267822.86	15.23
DSI22	DSI22-CB-YYMMDD	0	1.5	-	-	-	204481.19	1268018.19	-
DSI23	DSI23-CB-YYMMDD	-	-	-	-	-	204460.68	1267966.97	14.59
MW-4	-	-	-	MW4-GW-YYMMDD	5	17	204675.26	1267474.81	20.09
MW-5	-	-	-	MW5-GW-YYMMDD	11	16	204585.26	1267494.81	16.49

Northing and Easting coordinates are referenced to the Washington State Coordinate System, North Zone in U.S. Survey feet
Ground surface elevation coordinates are referenced to mean lower low water (MLLW) in feet.

Table 3
Summary of Analytical Results for Soil Samples and Comparison with MTCA Method A Cleanup Levels

Location ID		DSI-01	DSI-01	DSI-02	DSI-02	DSI-03	DSI-03	DSI-04
Sample ID		DSI01-SO-A	DSI01-SO-B	DSI02-SO-A	DSI02-SO-B	DSI03-SO-A	DSI03-SO-B	DSI04-SO-A
Sample Date		9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/27/2006
Depth Interval		0-3 ft	4-6 ft	0-3 ft	3-5 ft	0-3 ft	5-6.5 ft	0-3 ft
Sample Matrix	MTCA A	SO	SO	SO	SO	SO	SO	SO
Sample Type	Industrial	N	N	N	N	N	N	N
Conventionals (%)								
Total solids	--	88.40	80.20	96.10	78.60	96.10	89.40	74.30
Total Organic Carbon	--	1.11	0.384	0.305	0.698	0.325	0.781	0.579
TPH (mg/kg)								
TPH - Gasoline Range	30/100[1]	5.3 U	6.3 U	4.8 U	22	92	110	20
TPH - Diesel Range	2000	65	12	15	66	61	380	40
TPH - Motor Oil Range	2000	140	33	170	130	110	310	100
Metals (mg/kg)								
Arsenic	20	48.1 J	3.5	18.9	5.8	7.1	10.4	6.4
Cadmium	2	0.4	0.2	2 U	0.3	1 U	0.5	0.5
Chromium	2000	20.4	15.9	5	21.7	61	34	27.2
Chromium VI	19	0.125 UJ	0.135 UJ	0.116 UJ	0.140 UJ	0.111 UJ	0.126 UJ	0.151 UJ
Copper	--	103 J	20.4	55	33.6	539	238	45.9
Lead	1000	36 J	6	20 U	32	460	94	14
Mercury	2	0.09	0.05 U	0.05	0.20	0.05 U	0.05 U	0.15
Silver	--	0.3 U	0.3 U	3 U	0.4 U	2 U	0.8 U	0.4 U
Zinc	--	192	36.8	57	57.7	129	160	85.4
Pesticides (µg/kg)								
4,4'-DDD	--	3.3 U	3.2 U	3.2 U	3.3 U	3.2 U	3.2 U	3.2 U
4,4'-DDE	--	3.3 U	3.2 U	3.2 U	3.3 U	3.2 U	3.2 U	3.2 U
4,4'-DDT	4000	3.3 U	3.2 U	3.2 U	3.3 U	3.2 U	3.2 U	3.2 U
Total DDT (U=1/2)	--	4.95 U	4.8 U	4.8 U	4.95 U	4.8 U	4.8 U	4.8 U
Aldrin	--	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
alpha-BHC	--	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
beta-BHC	--	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
delta-BHC	--	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
gamma-BHC (Lindane)	10	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
alpha-Chlordane	--	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
gamma-Chlordane	--	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
Dieldrin	--	3.3 U	3.2 U	3.2 U	3.3 U	8.5 U	3.2 U	3.2 U
Endosulfan I	--	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
Endosulfan II	--	3.3 U	3.2 U	3.2 U	3.3 U	9.9 U	7.2 U	3.2 U
Endosulfan Sulfate	--	3.3 U	3.2 U	3.2 U	3.3 U	15 U	3.2 U	3.2 U
Endrin	--	3.3 U	3.2 U	3.2 U	3.3 U	3.2 U	3.2 U	3.2 U
Endrin aldehyde	--	3.3 U	3.2 U	3.2 U	3.3 U	3.2 U	3.2 U	3.2 U
Endrin ketone	--	3.3 U	3.2 U	3.2 U	3.3 U	3.2 U	3.2 U	3.2 U
Heptachlor	--	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
Heptachlor Epoxide	--	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
Methoxychlor	--	16 U	16 U	16 U	16 U	16 U	16 U	16 U
Toxaphene	--	160 U	160 U	160 U	160 U	160 U	160 U	160 U
PCBs (µg/kg)								
Aroclor 1016	--	9.8 U	9.8 U	9.7 U	9.7 U	48 U	9.5 U	9.6 U
Aroclor 1221	--	9.8 U	9.8 U	9.7 U	9.7 U	48 U	9.5 U	9.6 U
Aroclor 1232	--	9.8 U	9.8 U	9.7 U	9.7 U	48 U	9.5 U	9.6 U
Aroclor 1242	--	9.8 U	9.8 U	9.7 U	9.7 U	48 U	9.5 U	9.6 U
Aroclor 1248	--	9.8 U	9.8 U	9.7 U	9.7 U	48 U	9.5 U	9.6 U
Aroclor 1254	--	9.8 U	9.8 U	9.7 U	9.7 U	48 U	9.5 U	9.6 U
Aroclor 1260	--	43 J	10 J	9.7 UJ	9.7 UJ	300 J	94 J	9.6 UJ
Total PCBs (U=1/2)	10000	72.4	39.4	34 U	34 U	444	122	33.6 U
SVOCs (µg/kg)								

Location ID	DSI-04	DSI-05	DSI-05	DSI-06	DSI-06	DSI-07	DSI-07
Sample ID	DSI04-SO-B	DSI05-SO-A	DSI05-SO-B	DSI06-SO-A	DSI06-SO-B	DSI07-SO-A	DSI07-SO-B
Sample Date	9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/28/2006	9/28/2006
Depth Interval	3-5 ft	0-3 ft	3-5 ft	0-3 ft	4-6 ft	0-3 ft	3-5 ft
Sample Matrix	SO	SO	SO	SO	SO	SO	SO
Sample Type	N	N	N	N	N	N	N
Conventionals (%)							
Total solids	87.60	76.70	88.90	78.40	90.20	74.10	95.50
Total Organic Carbon	0.084	1.07	0.226	1.37	0.308	1.05	0.097
TPH (mg/kg)							
TPH - Gasoline Range	6.4 U	16	8.4	120	13	74	36
TPH - Diesel Range	5.5 U	46	5.7 U	2700	2200	16	20
TPH - Motor Oil Range	11 U	160	11 U	260	190	29	18
Metals (mg/kg)							
Arsenic	1.1	7.1	1.3	7.0	2.2	4.3 J	1.6
Cadmium	0.2 U	0.6	0.2 U	0.3	0.2 U	0.3 U	0.2 U
Chromium	10.4	21.1	11.0	20.0	15.2	19.6	25.9
Chromium VI	0.127 UJ	0.142 UJ	0.127 UJ	0.143 UJ	0.120 UJ	0.150 UJ	0.115 UJ
Copper	9.0	122	11.9	37.1	18.2	52.1 J	10.3
Lead	2 U	78	3	14	6	11 J	3
Mercury	0.04 U	0.27	0.04 U	0.14	0.05 U	0.72 J	0.04 U
Silver	0.3 U	0.4 U	0.3 U	0.4 U	0.3 U	0.4 U	0.3 U
Zinc	21.9	127	26.4	57.5	33.6	53.2	29.1
Pesticides (µg/kg)							
4,4'-DDD	3.1 U	28	3.2 U	3.2 U	3.3 U	3.2 U	3.2 U
4,4'-DDE	3.1 U	3.1 U	3.2 U	3.2 U	3.3 U	3.2 U	3.2 U
4,4'-DDT	3.1 U	3.1 U	3.2 U	3.2 U	3.3 U	3.2 U	3.2 U
Total DDT (U=1/2)	4.65 U	31.1	4.8 U	4.8 U	4.95 U	4.8 U	4.8 U
Aldrin	1.6 U	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
alpha-BHC	1.6 U	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
beta-BHC	1.6 U	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
delta-BHC	1.6 U	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
gamma-BHC (Lindane)	1.6 U	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
alpha-Chlordane	1.6 U	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
gamma-Chlordane	1.6 U	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
Dieldrin	3.1 U	3.1 U	3.2 U	3.2 U	3.3 U	3.2 U	3.2 U
Endosulfan I	1.6 U	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
Endosulfan II	3.1 U	3.1 U	3.2 U	3.2 U	3.3 U	3.2 U	3.2 U
Endosulfan Sulfate	3.1 U	3.1 U	3.2 U	3.2 U	3.3 U	3.2 U	3.2 U
Endrin	3.1 U	3.1 U	3.2 U	3.2 U	3.3 U	3.2 U	3.2 U
Endrin aldehyde	3.1 U	3.1 U	3.2 U	3.2 U	3.3 U	3.2 U	3.2 U
Endrin ketone	3.1 U	3.1 U	3.2 U	3.2 U	3.3 U	3.2 U	3.2 U
Heptachlor	1.6 U	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
Heptachlor Epoxide	1.6 U	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
Methoxychlor	16 U	16 U	16 U	16 U	17 U	16 U	16 U
Toxaphene	160 U	160 U	160 U	160 U	170 U	160 U	160 U
PCBs (µg/kg)							
Aroclor 1016	9.5 U	9.8 U	9.6 U	9.7 U	9.7 U	9.7 U	9.6 U
Aroclor 1221	9.5 U	9.8 U	9.6 U	9.7 U	9.7 U	9.7 U	9.6 U
Aroclor 1232	9.5 U	9.8 U	9.6 U	9.7 U	9.7 U	9.7 U	9.6 U
Aroclor 1242	9.5 U	9.8 U	9.6 U	9.7 U	9.7 U	9.7 U	9.6 U
Aroclor 1248	9.5 U	9.8 U	9.6 U	9.7 U	9.7 U	9.7 U	9.6 U
Aroclor 1254	9.5 U	39 U	9.6 U	9.7 U	9.7 U	9.7 U	9.6 U
Aroclor 1260	9.5 UJ	46 J	9.6 UJ	9.7 UJ	9.7 UJ	9.7 U	9.6 U
Total PCBs (U=1/2)	33.2 U	90	33.6 U	34 U	34 U	34 U	33.6 U
SVOCs (µg/kg)							

Table 3

Summary of Analytical Results for Soil Samples and Comparison with MTCA Method A Cleanup Levels

Location ID		DSI-01	DSI-01	DSI-02	DSI-02	DSI-03	DSI-03	DSI-04	DSI-04	DSI-05	DSI-05	DSI-06	DSI-06	DSI-07	DSI-07
Sample ID		DSI01-SO-A	DSI01-SO-B	DSI02-SO-A	DSI02-SO-B	DSI03-SO-A	DSI03-SO-B	DSI04-SO-A	DSI04-SO-B	DSI05-SO-A	DSI05-SO-B	DSI06-SO-A	DSI06-SO-B	DSI07-SO-A	DSI07-SO-B
Sample Date		9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/28/2006	9/28/2006
Depth Interval		0-3 ft	4-6 ft	0-3 ft	3-5 ft	0-3 ft	5-6.5 ft	0-3 ft	3-5 ft	0-3 ft	3-5 ft	0-3 ft	4-6 ft	0-3 ft	3-5 ft
Sample Matrix	MTCA A	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO
Sample Type	Industrial	N	N	N	N	N	N	N	N	N	N	N	N	N	N
1,2,3-Trichlorobenzene	--	4.6 U	5.6 U	4.8 U	5.2 U	5.2 U	4.6 U	6.5 U	5.6 U	6.4 UJ	6.4 U	470 U	5.5 U	6.1 U	6.2 U
1,2,4-Trichlorobenzene	--	4.6 U	5.6 U	4.8 U	5.2 U	5.2 U	4.6 U	6.5 U	5.6 U	6.4 UJ	6.4 U	470 U	5.5 U	6.1 U	6.2 U
1,2,4-Trimethylbenzene	--	0.9 U	1.1 U	3.8	100	1.0 U	0.9 U	1.3 U	1.1 U	1.3 UJ	1.3 U	120	1.1 U	3200	51
1,2-Dichlorobenzene	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 UJ	1.3 U	93 U	1.1 U	1.2 U	1.2 U
1,3,5-Trimethylbenzene	--	0.9 U	1.1 U	1.2	39	1.0 U	0.9 U	1.3 U	1.1 U	1.3 UJ	1.3 U	93 U	1.1 U	80	15
1,3-Dichlorobenzene	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 UJ	1.3 U	93 U	1.1 U	1.2 U	1.2 U
1,4-Dichlorobenzene	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 UJ	1.3 U	93 U	1.1 U	1.2 U	1.2 U
2,4-Dimethylphenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	--	19	5.0 U	4.7	98	4.7 U	40	16	5.0 U	26	4.7 U	33	27 U	22	66
2-Methylphenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Methylphenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	--	5.8	5.0 U	4.7 U	120	5.6	4.7 U	5.0 U	5.0 U	4.9 U	4.7 U	30 U	27 U	5.0 U	9.9
Acenaphthylene	--	9.1	5.0 U	4.7 U	4.8 U	4.7 U	4.7 U	5.0 U	5.0 U	6.4	4.7 U	30 U	48	5.0 U	5.0 U
Anthracene	--	44	8.4	4.7 U	100	5.1	8.5	5.9	5.0 U	12	4.7 U	30 U	27 U	5.5	7.9
Benzo(a)anthracene	--	64	9.9	4.7 U	110	9.8	11	14	5.0 U	28	4.7 U	30	43	14	6.4
Benzo(a)pyrene	2000	56	9.4	5.7	110	10	12	8.4	5.0 U	29	4.7 U	39	99	11	5.9
Benzo(b)fluoranthene	--	120	15	11	72	12	21	16	5.0 U	48	4.7 U	57	91	16	5.9
Benzo(g,h,i)perylene	--	65	9.4	5.7	38	7.0	5.2	5.0 U	5.0 U	13	4.7 U	30 U	54	9.5	5.0 U
Benzo(k)fluoranthene	--	74	17	9.4	90 J	14	15	13	5.0 U	28	4.7 U	54	94	14	5.0 U
Benzoic acid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzyl alcohol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Butylbenzylphthalate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	--	130	22	10	140 J	17	31	25	5.0 U	50	4.7 U	78	120	22	6.9
Dibenzo(a,h)anthracene	--	18	5.0 U	4.7 U	12	4.7 U	4.7 U	5.0 U	5.0 U	4.9 U	4.7 U	30 U	27 U	5.0 U	5.0 U
Dibenzofuran	--	12	5.0 U	4.7 U	56	4.7 U	9.4	5.4	5.0 U	16	4.7 U	30 U	27 U	5.0 U	5.0 U
Diethylphthalate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-butylphthalate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-octylphthalate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	--	170	36	11	270	26	38	40	5.0 U	96	4.7 U	120	120	45	15
Fluorene	--	11	5.0 U	4.7 U	120	5.1	19	5.0 U	5.0 U	6.9	4.7 U	30 U	27	5.0 U	14
Hexachlorobenzene	--	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
Hexachlorobutadiene	--	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
Hexachloroethane	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	--	54	8.9	4.7 U	37	5.6	4.7 U	5.4	5.0 U	13	4.7 U	30 U	48	7.0	5.0 U
Naphthalene	5000	24	5.0	5.2	180	6.5	12	13	5.0 U	53	4.7 U	57	27	69	47
n-Nitrosodiphenylamine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	--	68	14	7.6	410 J	27	100	24	5.0 U	91	4.7 U	90	80	25	13
Phenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	--	140	29	10	280	21	37	33	5.0 U	72	4.7 U	160	320	34	21
Total PAHs (U=1/2)	--	1053	194	92	2091	176	319	210	40 U	551	37.6 U	790	1212	282	165
Volatiles (µg/kg)															
1,1,1,2-Tetrachloroethane	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 UJ	1.3 U	93 U	1.1 U	1.2 U	1.2 U
1,1,1-Trichloroethane	2000	13	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
1,1,2,2-Tetrachloroethane	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 UJ	1.3 U	93 U	1.1 U	1.2 U	1.2 U
1,1,2-Trichloroethane	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
1,1-Dichloroethane	--	10	7.9	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
1,1-Dichloroethene	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U

Table 3
Summary of Analytical Results for Soil Samples and Comparison with MTCA Method A Cleanup Levels

Location ID		DSI-01	DSI-01	DSI-02	DSI-02	DSI-03	DSI-03	DSI-04	DSI-04	DSI-05	DSI-05	DSI-06	DSI-06	DSI-07	DSI-07
Sample ID		DSI01-SO-A	DSI01-SO-B	DSI02-SO-A	DSI02-SO-B	DSI03-SO-A	DSI03-SO-B	DSI04-SO-A	DSI04-SO-B	DSI05-SO-A	DSI05-SO-B	DSI06-SO-A	DSI06-SO-B	DSI07-SO-A	DSI07-SO-B
Sample Date		9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/28/2006	9/28/2006
Depth Interval		0-3 ft	4-6 ft	0-3 ft	3-5 ft	0-3 ft	5-6.5 ft	0-3 ft	3-5 ft	0-3 ft	3-5 ft	0-3 ft	4-6 ft	0-3 ft	3-5 ft
Sample Matrix	MTCA A	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO
Sample Type	industrial	N	N	N	N	N	N	N	N	N	N	N	N	N	N
1,1-Dichloropropene	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
1,2,3-Trichloropropane	--	1.8 U	2.2 U	1.9 U	2.1 U	2.1 U	1.8 U	2.6 U	2.2 U	2.5 UJ	2.6 U	190 U	2.2 U	2.4 U	2.5 U
1,2-Dibromo-3-chloropropane	--	4.6 U	5.6 U	4.8 U	5.2 U	5.2 U	4.6 U	6.5 U	5.6 U	6.4 UJ	6.4 U	470 U	5.5 U	6.1 U	6.2 U
1,2-Dibromoethane	5	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
1,2-Dichloroethane	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
1,2-Dichloropropane	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
1,3-Dichloropropane	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
2,2-Dichloropropane	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
2-Butanone	--	**11**	**12**	**5.2**	**18**	**11**	**5.2**	**9.2**	5.6 U	6.4 U	**10**	**780**	**13**	**27**	**16**
2-Chlorotoluene	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 UJ	1.3 U	93 U	1.1 U	1.2 U	1.2 U
2-Hexanone	--	4.6 U	5.6 U	4.8 U	5.2 U	5.2 U	4.6 U	6.5 U	5.6 U	6.4 U	6.4 U	470 U	5.5 U	6.1 U	6.2 U
4-Chlorotoluene	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 UJ	1.3 U	93 U	1.1 U	1.2 U	1.2 U
4-Isopropyltoluene	--	0.9 U	1.1 U	1.0 U	**6.0**	1.0 U	0.9 U	1.3 U	1.1 U	1.3 UJ	1.3 U	93 U	1.1 U	1.2 U	**1.3**
4-Methyl-2-pentanone	--	4.6 U	5.6 U	4.8 U	5.2 U	5.2 U	4.6 U	6.5 U	5.6 U	6.4 U	6.4 U	470 U	5.5 U	6.1 U	6.2 U
Acetone	--	**77**	**70**	**83**	**160**	**85**	41 U	**66**	29 U	51 U	**90**	**6500**	**92**	6.1 U	**110**
Benzene	30	0.9 U	**1.2**	1.0 U	**2.0**	1.0 U	0.9 U	**1.6**	1.1 U	**1.8**	1.3 U	**260**	**1.7**	**50**	**6.0**
Bromobenzene	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 UJ	1.3 U	93 U	1.1 U	1.2 U	1.2 U
Bromochloromethane	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
Bromodichloromethane	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
Bromoform	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 UJ	1.3 U	93 U	1.1 U	1.2 U	1.2 U
Bromomethane	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
Carbon disulfide	--	**1.8**	**11**	**1.2**	**4.9**	**1.4**	**1.2**	**8.6**	1.1 U	1.3 U	**17**	93 U	**30**	**3.3**	**10**
Carbon tetrachloride	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
Chloroethane	--	**1.5**	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
Chloroform	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
Chloromethane	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
cis-1,2-Dichloroethene	--	0.9 U	**2.2**	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
cis-1,3-Dichloropropene	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
Dibromochloromethane	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
Dibromomethane	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
Dichlorodifluoromethane	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
Dichloromethane	20	2.1 U	2.6 U	1.9 U	2.1 U	2.1 U	1.8 U	2.6 U	2.2 U	2.5 U	2.6 U	190 U	2.5 U	**2.6**	2.5 U
Ethylbenzene	6000	0.9 U	1.1 U	1.0 U	**6.0**	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	**60**	**7.4**
Isopropylbenzene	--	0.9 U	1.1 U	1.0 U	**19**	1.0 U	0.9 U	1.3 U	1.1 U	1.3 UJ	1.3 U	93 U	1.1 U	**34**	**5.0**
n-Butylbenzene	--	0.9 U	1.1 U	1.0 U	**4.4**	1.0 U	0.9 U	1.3 U	1.1 U	1.3 UJ	1.3 U	93 U	1.1 U	**22**	**20**
n-Propylbenzene	--	0.9 U	1.1 U	1.0 U	**9.9**	1.0 U	0.9 U	1.3 U	1.1 U	1.3 UJ	1.3 U	93 U	1.1 U	**120**	**28**
sec-Butylbenzene	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 UJ	1.3 U	93 U	1.1 U	1.2 U	**5.4**
Styrene	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
tert-Butylbenzene	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 UJ	1.3 U	93 U	1.1 U	1.2 U	1.2 U
tert-Butylmethylether	100	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
Tetrachloroethene	50	**3.7**	**1.3**	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
Toluene	7000	0.9 U	1.1 U	**1.8**	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	**5.5**	1.2 U
trans-1,2-Dichloroethene	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
trans-1,3-Dichloropropene	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
Trichloroethene	30	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
Trichlorofluoromethane	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
Vinyl chloride	--	0.9 U	1.1 U	1.0 U	1.0 U	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	93 U	1.1 U	1.2 U	1.2 U
m,p-Xylenes	--	0.9 U	1.1 U	**3.6**	**47**	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	**290**	**1.5**	**160**	**13**
o-Xylene	--	0.9 U	1.1 U	**1.8**	**26**	1.0 U	0.9 U	1.3 U	1.1 U	1.3 U	1.3 U	**100**	1.1 U	**5.1**	1.2 U

Table 3
Summary of Analytical Results for Soil Samples and Comparison with MTCA Method A Cleanup Levels

Location ID		DSI-08	DSI-08	DSI-09	DSI-09	DSI-10	DSI-10	DSI-11	DSI-11	DSI-12	DSI-12
Sample ID		DSI08-SO-A	DSI08-SO-B	DSI09-SO-A	DSI09-SO-B	DSI10-SO-A	DSI10-SO-B	DSI11-SO-A	DSI11-SO-B	DSI12-SO-A	DSI12-SO-B
Sample Date		9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/28/2006
Depth Interval		0-3 ft	3-5 ft	0-3 ft	3-5 ft	0-3 ft	3-5 ft	0-3 ft	3-5 ft	0-3 ft	3-5 ft
Sample Matrix	MTCA A	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO
Sample Type	Industrial	N	N	N	N	N	N	N	N	N	N
Conventionals (%)											
Total solids	--	70.40	92.90	92.60	89.60	69.70	95.30	76.10	93.70	87.70	86.70
Total Organic Carbon	--	0.661	0.133	0.939	2.35	1.30	0.147	1.34	0.099	1.25	1.12
TPH (mg/kg)											
TPH - Gasoline Range	30/100[1]	8.8 U	6.7 U	14	200	8.3 U	6.0 U	8.0	5.9 U	6.6 U	27
TPH - Diesel Range	2000	6.7 U	5.4 U	42	56	16	5.2 U	120	5.5 U	88	170
TPH - Motor Oil Range	2000	21	11 U	87	110	39	10 U	180	11 U	130	240
Metals (mg/kg)											
Arsenic	20	4.8	0.7	3.7	20.2	6.2	1.9	4.4	1.4	17.1	3.3
Cadmium	2	0.3 U	0.2 U	0.3	8.5	0.3 U	0.2 U	0.3	0.2 U	0.2	0.2 U
Chromium	2000	17.7	9.7	17.4	36	20.2	14.2	17.1	11.4	20.1	15.5
Chromium VI	19	0.160 UJ	0.116 UJ	0.117 UJ	0.124 UJ	0.157 UJ	0.117 UJ	2.05 J	0.120 UJ	0.125 UJ	0.123 UJ
Copper	--	31.0	8.5	65.9	3310	29.0	8.8	49.0	8.4	34.2	18.1
Lead	1000	11	2 U	118	4940	8	11	92	2 U	20	6
Mercury	2	0.10	0.05 U	0.31	0.18	0.11	0.04 U	0.76	0.04 U	0.08	0.05 U
Silver	--	0.4 U	0.3 U	0.3 U	1.2	0.4 U	0.3 U	0.4 U	0.3 U	0.3 U	0.3 U
Zinc	--	52.3	30.5	115	5840	43.7	25.2	78.3	23.0	77.4	36.8
Pesticides (μg/kg)											
4,4'-DDD	--	3.2 U	3.2 U	3.2 U	3.3 U	3.3 U	3.3 U	3.2 U	3.3 UJ	3.3 U	3.3 U
4,4'-DDE	--	3.2 U	3.2 U	3.2 U	3.3 U	3.3 U	3.3 U	3.2 U	3.3 UJ	3.3 U	3.3 U
4,4'-DDT	4000	3.2 U	3.2 U	3.2 U	3.3 U	3.3 U	3.3 U	3.2 U	3.3 UJ	3.3 U	12 U
Total DDT (U=1/2)	--	4.8 U	4.8 U	4.8 U	4.95 U	4.95 U	4.95 U	4.8 U	4.95 U	4.95 U	9.3 U
Aldrin	--	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 UJ	1.6 U	1.6 U
alpha-BHC	--	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 UJ	1.6 U	1.6 U
beta-BHC	--	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 UJ	4.0 U	3.1 U
delta-BHC	--	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 UJ	1.6 U	1.6 U
gamma-BHC (Lindane)	10	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 UJ	1.6 U	1.6 U
alpha-Chlordane	--	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 UJ	1.6 U	1.6 U
gamma-Chlordane	--	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 UJ	1.6 U	1.6 U
Dieldrin	--	3.2 U	3.2 U	3.2 U	3.3 U	3.3 U	3.3 U	3.2 U	3.3 UJ	3.3 U	3.3 U
Endosulfan I	--	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 UJ	1.6 U	1.6 U
Endosulfan II	--	3.2 U	3.2 U	3.2 U	3.3 U	3.3 U	3.3 U	3.2 U	3.3 UJ	3.3 U	3.3 U
Endosulfan Sulfate	--	3.2 U	3.2 U	3.2 U	3.3 U	3.3 U	3.3 U	3.2 U	3.3 UJ	19 U	21 U
Endrin	--	3.2 U	3.2 U	3.2 U	3.3 U	3.3 U	3.3 U	3.2 U	3.3 UJ	14 U	17 U
Endrin aldehyde	--	3.2 U	3.2 U	3.2 U	3.3 U	3.3 U	3.3 U	3.2 U	3.3 UJ	3.3 U	3.3 U
Endrin ketone	--	3.2 U	3.2 U	3.2 U	3.3 U	3.3 U	3.3 U	3.2 U	3.3 UJ	15 U	16 U
Heptachlor	--	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 UJ	1.6 U	1.6 U
Heptachlor Epoxide	--	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 UJ	1.6 U	3.8 U
Methoxychlor	--	16 U	16 U	16 U	16 U	16 U	17 U	16 U	16 UJ	16 U	16 U
Toxaphene	--	160 U	160 U	160 U	160 U	160 U	170 U	160 U	160 UJ	160 U	160 U
PCBs (μg/kg)											
Aroclor 1016	--	9.8 U	9.5 U	9.6 U	9.8 U	9.8 U	9.4 U	9.8 U	9.9 U	29 U	29 U
Aroclor 1221	--	9.8 U	9.5 U	9.6 U	9.8 U	9.8 U	9.4 U	9.8 U	9.9 U	29 U	29 U
Aroclor 1232	--	9.8 U	9.5 U	9.6 U	9.8 U	9.8 U	9.4 U	9.8 U	9.9 U	29 U	29 U
Aroclor 1242	--	9.8 U	9.5 U	9.6 U	9.8 U	9.8 U	9.4 U	9.8 U	9.9 U	29 U	29 U
Aroclor 1248	--	9.8 U	9.5 U	9.6 U	9.8 U	9.8 U	9.4 U	9.8 U	9.9 U	29 U	29 U
Aroclor 1254	--	9.8 U	9.5 U	9.6 U	9.8 U	9.8 U	9.4 U	9.8 U	9.9 U	29 U	29 U
Aroclor 1260	--	9.8 U	9.5 U	9.6 U	9.8 U	9.8 U	9.4 U	35	9.9 U	29 U	29 U
Total PCBs (U=1/2)	10000	34.3 U	33.2 U	33.6 U	34.3 U	34.3 U	32.9 U	64.4	34.6 U	102 U	102 U
SVOCs (μg/kg)											

Table 3
Summary of Analytical Results for Soil Samples and Comparison with MTCA Method A Cleanup Levels

Location ID		DSI-08	DSI-08	DSI-09	DSI-09	DSI-10	DSI-10	DSI-11	DSI-11	DSI-12	DSI-12
Sample ID		DSI08-SO-A	DSI08-SO-B	DSI09-SO-A	DSI09-SO-B	DSI10-SO-A	DSI10-SO-B	DSI11-SO-A	DSI11-SO-B	DSI12-SO-A	DSI12-SO-B
Sample Date		9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/28/2006
Depth Interval		0-3 ft	3-5 ft	0-3 ft	3-5 ft	0-3 ft	3-5 ft	0-3 ft	3-5 ft	0-3 ft	3-5 ft
Sample Matrix	MTCA A	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO
Sample Type	industrial	N	N	N	N	N	N	N	N	N	N
1,2,3-Trichlorobenzene	--	6.4 U	5.7 U	5.2 U	5.0 UJ-	6.0 U	5.1 U	5.6 U	5.3 U	4.9 U	5.4 U
1,2,4-Trichlorobenzene	--	6.4 U	5.7 U	5.2 U	5.0 UJ-	6.0 U	5.1 U	5.6 U	5.3 U	4.9 U	5.4 U
1,2,4-Trimethylbenzene	--	1.3 U	1.2 U	1.0 U	1.4 J-	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
1,2-Dichlorobenzene	--	1.3 U	1.2 U	1.0 U	1.0 UJ-	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
1,3,5-Trimethylbenzene	--	1.3 U	1.2 U	1.0 U	1.0 UJ-	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
1,3-Dichlorobenzene	--	1.3 U	1.2 U	1.0 U	1.0 UJ-	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
1,4-Dichlorobenzene	--	1.3 U	1.2 U	1.0 U	1.0 UJ-	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
2,4-Dimethylphenol	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	--	5.0	4.9 U	47	34	7.8	5.0 U	19	4.8 U	230	300
2-Methylphenol	--	--	--	--	--	--	--	--	--	--	--
4-Methylphenol	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	--	5.0 U	4.9 U	82	30	4.8 U	5.0 U	6.9	4.8 U	37 U	45
Acenaphthylene	--	5.0 U	4.9 U	14	5.4	4.8 U	5.0 U	14	4.8 U	680	1700
Anthracene	--	5.0 U	4.9 U	87	19	11	5.0 U	18	4.8 U	290	450
Benzo(a)anthracene	--	12	4.9 U	160	27	18	5.0 U	54	4.8 U	1800	3600
Benzo(a)pyrene	2000	12	4.9 U	180	23	15	5.0 U	61	4.8 U	3000	7900
Benzo(b)fluoranthene	--	18	4.9 U	240	35	20	5.0 U	73	4.8 U	1700	3400
Benzo(g,h,i)perylene	--	8.4	4.9 U	110	9.9	6.3	5.0 U	37	4.8 U	1300	2900
Benzo(k)fluoranthene	--	13	4.9 U	230	26	18	5.0 U	67	4.8 U	2100	5600
Benzoic acid	--	--	--	--	--	--	--	--	--	--	--
Benzyl alcohol	--	--	--	--	--	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	--	--	--	--	--	--	--	--	--	--	--
Butylbenzylphthalate	--	--	--	--	--	--	--	--	--	--	--
Chrysene	--	22	4.9 U	280	54	23	5.0 U	87	4.8 U	3000	7500
Dibenzo(a,h)anthracene	--	5.0 U	4.9 U	38	5.0 U	4.8 U	5.0 U	8.4	4.8 U	390	900
Dibenzofuran	--	5.0 U	4.9 U	32	18	6.8	5.0 U	7.9	4.8 U	37 U	38 U
Diethylphthalate	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	--	--	--	--	--	--	--	--	--	--	--
Di-n-butylphthalate	--	--	--	--	--	--	--	--	--	--	--
Di-n-octylphthalate	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	--	37	4.9 U	480	91	61	5.0 U	120	4.8 U	2500	6000
Fluorene	--	5.0 U	4.9 U	88	35	7.3	5.0 U	7.9	4.8 U	67	53
Hexachlorobenzene	--	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 UJ	1.6 U	1.6 U
Hexachlorobutadiene	--	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 UJ	1.6 U	1.6 U
Hexachloroethane	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	--	7.4	4.9 U	110	9.4	6.3	5.0 U	35	4.8 U	1200	2700
Naphthalene	5000	5.0 U	4.9 U	74	58	7.3	5.0 U	24	4.8 U	340	470
n-Nitrosodiphenylamine	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	--	26	4.9 U	370	140	27	5.0 U	54	4.8 U	510	640
Phenol	--	--	--	--	--	--	--	--	--	--	--
Pyrene	--	32	4.9 U	400	110	51	5.0 U	120	4.8 U	4000	10000
Total PAHs (U=1/2)	--	203	39.2 U	2943	675	278	40 U	787	38.4 U	23096	53858
Volatiles (µg/kg)											
1,1,1,2-Tetrachloroethane	--	1.3 U	1.2 U	1.0 U	1.0 UJ-	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
1,1,1-Trichloroethane	2000	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
1,1,2,2-Tetrachloroethane	--	1.3 U	1.2 U	1.0 U	1.0 UJ-	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
1,1,2-Trichloroethane	--	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
1,1-Dichloroethane	--	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
1,1-Dichloroethene	--	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U

Table 3
Summary of Analytical Results for Soil Samples and Comparison with MTCA Method A Cleanup Levels

Location ID		DSI-08	DSI-08	DSI-09	DSI-09	DSI-10	DSI-10	DSI-11	DSI-11	DSI-12	DSI-12
Sample ID		**DSI08-SO-A**	**DSI08-SO-B**	**DSI09-SO-A**	**DSI09-SO-B**	**DSI10-SO-A**	**DSI10-SO-B**	**DSI11-SO-A**	**DSI11-SO-B**	**DSI12-SO-A**	**DSI12-SO-B**
Sample Date		**9/28/2006**	**9/28/2006**	**9/28/2006**	**9/28/2006**	**9/28/2006**	**9/28/2006**	**9/28/2006**	**9/28/2006**	**9/28/2006**	**9/28/2006**
Depth Interval		**0-3 ft**	**3-5 ft**	**0-3 ft**	**3-5 ft**	**0-3 ft**	**3-5 ft**	**0-3 ft**	**3-5 ft**	**0-3 ft**	**3-5 ft**
Sample Matrix	**MTCA A**	**SO**	**SO**	**SO**	**SO**	**SO**	**SO**	**SO**	**SO**	**SO**	**SO**
Sample Type	**industrial**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
1,1-Dichloropropene	--	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
1,2,3-Trichloropropane	--	2.6 U	2.3 U	2.1 U	2.0 UJ-	2.4 U	2.0 U	2.2 U	2.1 U	2.0 U	2.2 U
1,2-Dibromo-3-chloropropane	--	6.4 U	5.7 U	5.2 U	5.0 UJ-	6.0 U	5.1 U	5.6 U	5.3 U	4.9 U	5.4 U
1,2-Dibromoethane	5	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
1,2-Dichloroethane	--	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
1,2-Dichloropropane	--	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
1,3-Dichloropropane	--	1.3 U	1.2 U	1.0 U	1.0 UJ-	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
2,2-Dichloropropane	--	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
2-Butanone	--	**6.6**	5.7 U	**10**	5.0 U	**6.5**	5.1 U	**12**	**9.4**	**5.6**	5.4 U
2-Chlorotoluene	--	1.3 U	1.2 U	1.0 U	1.0 UJ-	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
2-Hexanone	--	6.4 U	5.7 U	5.2 U	5.0 UJ-	6.0 U	5.1 U	5.6 U	5.3 U	4.9 U	5.4 U
4-Chlorotoluene	--	1.3 U	1.2 U	1.0 U	1.0 UJ-	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
4-Isopropyltoluene	--	1.3 U	1.2 U	1.0 U	1.0 UJ-	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
4-Methyl-2-pentanone	--	6.4 U	5.7 U	5.2 U	5.0 U	6.0 U	5.1 U	5.6 U	5.3 U	4.9 U	5.4 U
Acetone	--	**62**	**49**	**100**	**55**	**55**	35 U	**96**	**70**	**57**	**45**
Benzene	30	1.3 U	1.2 U	**1.0**	**1.3**	1.2 U	1.0 U	**2.3**	1.1 U	**1.4**	**3.0**
Bromobenzene	--	1.3 U	1.2 U	1.0 U	1.0 UJ-	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
Bromochloromethane	--	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
Bromodichloromethane	--	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
Bromoform	--	1.3 U	1.2 U	1.0 U	1.0 UJ-	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
Bromomethane	--	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
Carbon disulfide	--	1.3 U	1.2 U	1.0 U	**1.6**	1.2 U	**1.0**	**1.9**	**15**	1.0 U	1.1 U
Carbon tetrachloride	--	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
Chloroethane	--	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
Chloroform	--	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
Chloromethane	--	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
cis-1,2-Dichloroethene	--	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
cis-1,3-Dichloropropene	--	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
Dibromochloromethane	--	1.3 U	1.2 U	1.0 U	1.0 UJ-	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
Dibromomethane	--	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
Dichlorodifluoromethane	--	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
Dichloromethane	20	**2.8**	2.3 U	2.1 U	2.0 U	2.4 U	**2.3**	2.2 U	2.1 U	2.0 U	2.2 U
Ethylbenzene	6000	1.3 U	1.2 U	1.0 U	1.0 UJ-	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
isopropylbenzene	--	1.3 U	1.2 U	1.0 U	1.0 UJ-	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
n-Butylbenzene	--	1.3 U	1.2 U	1.0 U	1.0 UJ-	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
n-Propylbenzene	--	1.3 U	1.2 U	1.0 U	1.0 UJ-	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
sec-Butylbenzene	--	1.3 U	1.2 U	1.0 U	1.0 UJ-	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
Styrene	--	1.3 U	1.2 U	1.0 U	1.0 UJ-	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
tert-Butylbenzene	--	1.3 U	1.2 U	1.0 U	1.0 UJ-	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
tert-Butylmethylether	100	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
Tetrachloroethene	50	**3.6**	**1.4**	1.0 U	1.0 UJ-	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
Toluene	7000	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	**3.4**
trans-1,2-Dichloroethene	--	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
trans-1,3-Dichloropropene	--	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
Trichloroethene	30	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
Trichlorofluoromethane	--	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
Vinyl chloride	--	1.3 U	1.2 U	1.0 U	1.0 U	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
m,p-Xylenes	--	1.3 U	1.2 U	1.0 U	1.0 UJ-	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
o-Xylene	--	1.3 U	1.2 U	1.0 U	1.0 UJ-	1.2 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U

Table 3
Notes

<u>Qualifiers:</u>

N	normal field sample
FD	field duplicate
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
U	The analyte was analyzed for, but not detected above the sample reporting limit.
	Denotes criteria exceedance
Bold	Denotes detections

<u>Notes:</u>

--	No numerical criterion of this type for this chemical
MTCA	Model Toxics Control Act (WAC 173-340)
HPAH	High molecular weight polycyclic aromatic hydrocarbon
LPAH	Low molecular weight polycyclic aromatic hydrocarbon
mg/kg	milligrams per kilogram
µg/kg	micrograms per kilogram
(1)	If benzene is present, the cleanup level is 30 mg/kg. If benzene is not present, the cleanup level is 100 mg/kg

Table 4

Summary of Analytical Results for Groundwater Samples and Comparison with MTCA Method A Cleanup Levels

Location ID		DSI-01	DSI-02	DSI-03	DSI-04	DSI-05	DSI-06	DSI-07	DSI-07	DSI-08	DSI-09	DSI-10	DSI-11	DSI-12	MW-4	MW-5
Sample ID		DSI01-GW	DSI02-GW	DSI03-GW	DSI04-GW	DSI05-GW	DSI06-GW	DSI07-GW	DSI57-GW	DSI08-GW	DSI09-GW	DSI10-GW	DSI11-GW	DSI12-GW	MW-4-GW-060929	MW-5-GW-060929
Sample Date		9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/29/2006	9/29/2006
Sample Matrix	MTCA A	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG
Sample Type	Industrial	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N
TPH (mg/L)																
TPH - Gasoline Range	800/1000[1]	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	2.0	2.2	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
TPH - Diesel Range	500	0.25 U	0.25 U	0.93	0.25 U	0.25 U	0.25 U	1.9	1.9	0.25 U	0.25 U	0.25 U	3.2	0.63	0.35	0.25 U
TPH - Motor Oil Range	500	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Metals-dissolved (µg/L)																
Arsenic	--	68.4	2.4	1.5	2.2	0.6	1.8	3.8	4.2	1.4	1.6	0.8	0.8	5.0	1.0	3.4
Cadmium	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chromium	--	0.5 UJ	0.5 U	2 U	2 U	2 U	0.5 U	2 U	2 U	2 U	2 U	2 U	2 U	0.5 U	1 U	42
Copper	--	0.5 U	0.5 U	0.8	0.7	0.5 U	0.5 U	0.6	1.1	0.7	0.9	0.5 U	0.5 U	0.5 U	0.5 U	14.3
Lead	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Mercury	--	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Silver	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.4
Zinc	--	5	4 U	13	4 U	7	5	6	7	4 U	44	7	8	4 U	4	8
Metals-total (µg/L)																
Arsenic	5	84.4	16.4	9.5	11.2	2	2.3	9.5	7.2	11.8	2.6	2.4	6.7	32.5	1.0	4.9
Cadmium	5	0.3	0.3	0.2	0.2	0.2 U	0.2 U	0.2 U	0.2 U	0.3	0.2 U	0.3	1.6	0.3	0.2 U	0.2 U
Chromium	50	7	49	38	29	6	2 U	21	14	37	5 U	5	34	20	1 U	54
Copper	--	18.5	86.7	53	55.6	15.2	7.5	39.1	24	70.4	34.4	26.1	49.2	126	0.5 U	29
Lead	15	3	11	8	13	6	2	6	5	12	55	14	10	27	1 U	2
Mercury	2	0.1 U	0.1	0.1 U	0.1 U	0.1 U	0.1 U	0.10 U	0.10 U	0.12	0.10 U	0.10 U	0.10 U	0.12	0.10 U	0.10 U
Silver	--	0.2 UJ	0.3	0.3	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.4	0.2	0.2 U	0.2 U	0.2	0.2 U	0.8
Zinc	--	33	137	147	92	25	9	61	42	103	98	19	154	109	4	14
Pesticides (µg/L)																
4,4'-DDD	--	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
4,4'-DDE	--	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
4,4'-DDT	0.3	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Total DDT (U=1/2)	--	0.017 U	0.017 U	0.017 U	0.017 U	0.017 U	0.017 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U
Aldrin	--	0.0054 U	0.0056 U	0.0055 U	0.0054 U	0.0053 U	0.0055 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
alpha-BHC	--	0.0054 U	0.0056 U	0.0055 U	0.0054 U	0.0053 U	0.0055 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
beta-BHC	--	0.0054 U	0.0056 U	0.0055 U	0.0054 U	0.0053 U	0.0055 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
delta-BHC	--	0.0054 U	0.0056 U	0.0055 U	0.0054 U	0.0053 U	0.0055 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
gamma-BHC (Lindane)	--	0.0054 U	0.0056 U	0.0055 U	0.0054 U	0.0053 U	0.0055 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.018 U	0.0050 U	0.0050 U
alpha-Chlordane	--	0.0054 U	0.0056 U	0.0055 U	0.0054 U	0.0053 U	0.0055 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
gamma-Chlordane	--	0.0054 U	0.0056 U	0.0055 U	0.0054 U	0.0053 U	0.0055 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Dieldrin	--	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Endosulfan I	--	0.0054 U	0.0056 U	0.0055 U	0.0054 U	0.0053 U	0.0055 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Endosulfan II	--	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Endosulfan Sulfate	--	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Endrin	--	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Endrin aldehyde	--	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Endrin ketone	--	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Heptachlor	--	0.0054 U	0.0056 U	0.0055 U	0.0054 U	0.0053 U	0.0055 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Heptachlor Epoxide	--	0.0054 U	0.0056 U	0.0055 U	0.0054 U	0.0053 U	0.0055 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Methoxychlor	--	0.054 U	0.056 U	0.055 U	0.054 U	0.053 U	0.055 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Toxaphene	--	0.54 U	0.56 U	0.55 U	0.54 U	0.53 U	0.55 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U

Table 4

Summary of Analytical Results for Groundwater Samples and Comparison with MTCA Method A Cleanup Levels

Location ID Sample ID Sample Date Sample Matrix Sample Type	MTCA A Industrial	DSI-01 DSI01-GW 9/27/2006 WG N	DSI-02 DSI02-GW 9/27/2006 WG N	DSI-03 DSI03-GW 9/27/2006 WG N	DSI-04 DSI04-GW 9/27/2006 WG N	DSI-05 DSI05-GW 9/27/2006 WG N	DSI-06 DSI06-GW 9/27/2006 WG N	DSI-07 DSI07-GW 9/28/2006 WG N	DSI-07 DSI57-GW 9/28/2006 WG FD	DSI-08 DSI08-GW 9/28/2006 WG N	DSI-09 DSI09-GW 9/28/2006 WG N	DSI-10 DSI10-GW 9/28/2006 WG N	DSI-11 DSI11-GW 9/28/2006 WG N	DSI-12 DSI12-GW 9/28/2006 WG N	MW-4 MW-4-GW-060929 9/29/2006 WG N	MW-5 MW-5-GW-060929 9/29/2006 WG N
PCBs (µg/L)																
Aroclor 1016	--	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 UJ
Aroclor 1221	--	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.080 U	0.080 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 UJ
Aroclor 1232	--	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.040 U	0.080 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 UJ
Aroclor 1242	--	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 UJ
Aroclor 1248	--	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 UJ
Aroclor 1254	--	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 UJ
Aroclor 1260	--	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 U	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 U	0.020 UJ
Total PCBs (U=1/2)	0.1	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.11 U	0.13 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U

Location ID Sample ID Sample Date Sample Matrix Sample Type	MTCA A Industrial	DSI-01 DSI01-GW 9/27/2006 WG N	DSI-02 DSI02-GW 9/27/2006 WG N	DSI-03 DSI03-GW 9/27/2006 WG N	DSI-04 DSI04-GW 9/27/2006 WG N	DSI-05 DSI05-GW 9/27/2006 WG N	DSI-06 DSI06-GW 9/27/2006 WG N	DSI-07 DSI07-GW 9/28/2006 WG N	DSI-07 DSI57-GW 9/28/2006 WG FD	DSI-08 DSI08-GW 9/28/2006 WG N	DSI-09 DSI09-GW 9/28/2006 WG N	DSI-10 DSI10-GW 9/28/2006 WG N	DSI-11 DSI11-GW 9/28/2006 WG N	DSI-12 DSI12-GW 9/28/2006 WG N	MW-4 MW-4-GW-060929 9/29/2006 WG N	MW-5 MW-5-GW-060929 9/29/2006 WG N
SVOCs (µg/L)																
1,2,3-Trichlorobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.5 U
1,2,4-Trichlorobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.5 U
1,2,4-Trimethylbenzene	--	0.2 U	0.4	0.2 U	0.2 U	0.2 U	0.2 U	24	26	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
1,2-Dichlorobenzene	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
1,3,5-Trimethylbenzene	--	0.2 U	0.3	0.2 U	0.2 U	0.2 U	0.2 U	10	12	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
1,3-Dichlorobenzene	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
1,4-Dichlorobenzene	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
2-Methylnaphthalene	--	0.10 U	0.07 U	0.11	0.02 U	0.12	0.06 U	32	28	0.06 U	0.08 U	0.06 U	0.07 U	0.47	1.3	0.01 U
Acenaphthene	--	0.07	0.03	0.01	0.01 U	0.06	0.09	0.54	0.53	0.01 J	0.05	0.11	0.22	2.2	2.9	0.01 U
Acenaphthylene	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 J	0.06	0.06	0.01 U	0.01 U	0.01 U	0.02	1.8	0.08	0.01 U
Anthracene	--	0.02	0.01 J	0.02	0.01 U	0.01 J	0.01 J	0.03	0.03	0.01 J	0.02	0.01 U	0.01	2.6	0.14	0.01 U
Benzo(a)anthracene	--	0.01 J	0.01 U	0.03	0.01 U	0.01 J	0.01 U	0.01 U	0.01 U	0.01 U	0.01	0.01 U	0.01 U	3.4	0.01 U	0.01 U
Benzo(a)pyrene	0.1	0.01 U	0.01 U	0.02	0.01 U	0.01 J	0.01 U	0.01 U	0.01 U	0.01 U	0.01 J	0.01 U	0.01 U	3.5	0.01 U	0.01 U
Benzo(b)fluoranthene	--	0.01 U	0.01 U	0.02	0.01 U	0.01 J	0.01 U	0.01 U	0.01 U	0.01 U	0.01 J	0.01 J	0.01 U	2.0	0.01 U	0.01 U
Benzo(g,h,i)perylene	--	0.01 U	0.01 U	0.01 J	0.01 U	0.01 J	0.01 U	0.01 J	0.01 U	0.01 U	0.01 U	0.01 J	0.01 U	1.9	0.01 U	0.01 U
Benzo(k)fluoranthene	--	0.01 U	0.01 U	0.03	0.01 U	0.01 J	0.01 U	0.01 U	0.01 U	0.01 U	0.01 J	0.01 J	0.01 U	2.2	0.01 U	0.01 U
Chrysene	--	0.01	0.01 J	0.06	0.01 U	0.02	0.01 J	0.01 J	0.01 J	0.01 J	0.02	0.02	0.01 J	5.0	0.01 U	0.01 U
Dibenzo(a,h)anthracene	--	0.01 U	0.01 U	0.01 J	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.65	0.01 U	0.01 U
Dibenzofuran	--	0.03	0.01	0.01	0.01 U	0.01 J	0.01 J	0.14	0.14	0.01 J	0.01 J	0.01 U	0.03	0.44	0.13	0.01 U
Fluoranthene	--	0.05	0.02	0.02	0.01	0.02	0.03	0.02	0.02	0.02	0.04	0.01 J	0.03	8.5	0.13	0.01 J
Fluorene	--	0.06	0.03	0.02	0.01 U	0.01	0.03	0.57	0.54	0.01 J	0.03	0.01 J	0.16	3.3	2.0	0.01 J
Hexachlorobenzene	--	0.0054 U	0.0056 U	0.0055 U	0.0054 U	0.0053 U	0.0055 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Hexachlorobutadiene	--	0.0054 U	0.0056 U	0.0055 U	0.0054 U	0.0053 U	0.0055 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	--	--
Indeno(1,2,3-cd)pyrene	--	0.01 U	0.01 U	0.01 J	0.01 U	0.01 J	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	1.5	0.01 U	0.01 U
Naphthalene	160	0.12	0.12	0.13	0.07	0.16	0.15	4.7	4.2	0.08	0.10	0.10	0.20	1.2	8.7	0.01 J
Phenanthrene	--	0.14	0.05	0.06	0.01	0.04	0.04	0.31	0.31	0.03	0.13	0.02	0.04	5.6	0.15	0.02
Pyrene	--	0.04	0.02	0.01	0.01 J	0.02	0.05	0.02	0.02	0.01	0.05	0.01	0.02	11	0.07	0.01 J
Total PAHs (U=1/2)	--	0.55	0.33	0.46	0.16	0.41	0.45	6.3	5.75	0.22	0.5	0.34	0.74	55.4	14.2	0.11

Location ID Sample ID Sample Date Sample Matrix Sample Type	MTCA A Industrial	DSI-01 DSI01-GW 9/27/2006 WG N	DSI-02 DSI02-GW 9/27/2006 WG N	DSI-03 DSI03-GW 9/27/2006 WG N	DSI-04 DSI04-GW 9/27/2006 WG N	DSI-05 DSI05-GW 9/27/2006 WG N	DSI-06 DSI06-GW 9/27/2006 WG N	DSI-07 DSI07-GW 9/28/2006 WG N	DSI-07 DSI57-GW 9/28/2006 WG FD	DSI-08 DSI08-GW 9/28/2006 WG N	DSI-09 DSI09-GW 9/28/2006 WG N	DSI-10 DSI10-GW 9/28/2006 WG N	DSI-11 DSI11-GW 9/28/2006 WG N	DSI-12 DSI12-GW 9/28/2006 WG N	MW-4 MW-4-GW-060929 9/29/2006 WG N	MW-5 MW-5-GW-060929 9/29/2006 WG N
Volatiles (µg/L)																
1,1,1,2-Tetrachloroethane	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
1,1,1-Trichloroethane	200	1.0	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
1,1,2,2-Tetrachloroethane	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
1,1,2-Trichloroethane	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
1,1-Dichloroethane	--	0.2	0.2 U	0.2 U	0.2 U	0.2	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.4	0.6 U
1,1-Dichloroethene	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
1,1-Dichloropropene	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
1,2,3-Trichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.5 U
1,2-Dibromo-3-chloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.5 U
1,2-Dibromoethane	0.01	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
1,2-Dichloroethane	5	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
1,2-Dichloropropane	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
1,3-Dichloropropane	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
2,2-Dichloropropane	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
2-Butanone	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	3.0 U
2-Chlorotoluene	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
2-Hexanone	--	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	9.0 U
4-Chlorotoluene	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U

Table 4

Summary of Analytical Results for Groundwater Samples and Comparison with MTCA Method A Cleanup Levels

Location ID		DSI-01	DSI-02	DSI-03	DSI-04	DSI-05	DSI-06	DSI-07	DSI-07	DSI-08	DSI-09	DSI-10	DSI-11	DSI-12	MW-4	MW-5
Sample ID		DSI01-GW	DSI02-GW	DSI03-GW	DSI04-GW	DSI05-GW	DSI06-GW	DSI07-GW	DSI57-GW	DSI08-GW	DSI09-GW	DSI10-GW	DSI11-GW	DSI12-GW	MW-4-GW-060929	MW-5-GW-060929
Sample Date		9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/27/2006	9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/29/2006	9/29/2006
Sample Matrix	MTCA A	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG
Sample Type	Industrial	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N
4-isopropyltoluene	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
4-Methyl-2-pentanone	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	3.0 U
Acetone	--	**5.4**	**8.0**	**6.3**	**3.8**	3.0 U	**3.8**	3.0 U	3.0 U	**5.5**	**4.7**	**4.7**	**6.3**	**6.3**	**4.1**	9.0 U
Benzene	5	0.2 U	0.2 U	0.2 U	0.2 U	**0.2**	**0.6**	**180**	**210**	**0.3**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
Bromobenzene	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
Bromochloromethane	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
Bromodichloromethane	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
Bromoform	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
Bromomethane	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
Carbon disulfide	--	**0.2**	**0.6**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**0.3**	0.2 U	0.2 U	0.2 U	0.6 U
Carbon tetrachloride	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
Chloroethane	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
Chloroform	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
Chloromethane	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
cis-1,2-Dichloroethene	--	**0.5**	0.2 U	**0.2**	**0.6**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
cis-1,3-Dichloropropene	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
Dibromochloromethane	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
Dibromomethane	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
Dichlorodifluoromethane	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
Dichloromethane	5	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	**0.3**	0.9 U
Ethylbenzene	700	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**10**	**11**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
Isopropylbenzene	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**25**	**28**	0.2 U	0.2 U	0.2 U	**0.5**	**0.5**	0.2 U	0.6 U
n-Butylbenzene	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**14**	**13**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
n-Propylbenzene	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**94**	**110**	0.2 U	0.2 U	0.2 U	**0.5**	**0.5**	0.2 U	0.6 U
sec-Butylbenzene	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**8.2**	**8.5**	0.2 U	0.2 U	0.2 U	**0.2**	**0.2**	0.2 U	0.6 U
Styrene	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
tert-Butylbenzene	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**0.5**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
tert-Butylmethylether	20	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
Tetrachloroethene	5	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
Toluene	1000	**0.5**	**0.7**	**0.6**	**0.5**	**0.4**	**0.4**	**4.4**	**4.6**	**0.4**	**0.4**	**0.7**	**0.5**	**0.4**	0.2 U	0.6 U
trans-1,2-Dichloroethene	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
trans-1,3-Dichloropropene	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
Trichloroethene	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
Trichlorofluoromethane	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
Vinyl chloride	0.2	0.2 U	0.2 U	0.2 U	**0.6**	**0.3**	0.2 U	0.2 U	0.2 U	**0.4**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.6 U
m,p-Xylenes	1000	0.4 U	**0.5**	**0.5**	0.4 U	0.4 U	**0.4**	**6.4**	**7.1**	0.4 U	0.4 U	0.4 U	**0.5**	**0.5**	0.4 U	1.2 U
o-Xylene	--	0.2 U	**0.2**	**0.2**	0.2 U	0.2 U	**0.2**	0.2 U	**0.9**	0.2 U	0.2 U	0.2 U	**0.3**	**0.3**	0.2 U	0.6 U

Qualifiers:

N Normal field sample

FD Field duplicate

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

U The analyte was analyzed for, but not detected above the sample reporting limit

Denotes criteria exceedance

Bold Denotes detections

Notes:

-- No numerical criterion of this type for this chemical

MTCA Model Toxics Control Act (WAC 173-340)

HPAH High molecular weight polycyclic aromatic hydrocarbon

LPAH Low molecular weight polycyclic aromatic hydrocarbon

mg/L milligrams per liter

µg/L micrograms per liter

1 If benzene is present, the cleanup level is 800 mg/L. If benzene is not present, the cleanup level is 1,000 mg/L.

Table 5

Summary of Analytical Results for Selected Soil Samples (Organic Carbon Normalized) and Comparison with Washington Sediment Management Standards

Location ID Sample ID Sample Date Depth Interval Sample Matrix Sample Type	SMS SQS	SMS CSL	DSI-09 DSI09-SO-A 9/28/2006 0-3 ft SO N	DSI-09 DSI09-SO-B 9/28/2006 3-5 ft SO N	DSI-10 DSI10-SO-A 9/28/2006 0-3 ft SO N	DSI-10 DSI10-SO-B 9/28/2006 3-5 ft SO N	DSI-11 DSI11-SO-A 9/28/2006 0-3 ft SO N	DSI-11 DSI11-SO-B 9/28/2006 3-5 ft SO N	DSI-12 DSI12-SO-A 9/28/2006 0-3 ft SO N	DSI-12 DSI12-SO-B 9/28/2006 3-5 ft SO N	DSI-22 DSI22-CB-060929 9/29/2006 SE N
Conventionals (%)											
Total solids	--	--	92.60	89.60	69.70	95.30	76.10	93.70	87.70	86.70	67.00
Total Organic Carbon	--	--	0.939	2.35	1.30	0.147	1.34	0.099	1.25	1.12	3.28
Metals (mg/kg)											
Arsenic	57	93	3.7	20.2	6.2	1.9	4.4	1.4	17.1	3.3	29.7 J
Cadmium	5.1	6.7	0.3	8.5 * #	0.3 U	0.2 U	0.3	0.2 U	0.2	0.2 U	2
Chromium	260	270	17.4	36	20.2	14.2	17.1	11.4	20.1	15.5	87
Chromium VI			0.117 UJ	0.124 UJ	0.157 UJ	0.117 UJ	2.05 J	0.120 UJ	0.125 UJ	0.123 UJ	--
Copper	390	390	65.9	3310 * #	29.0	8.8	49.0	8.4	34.2	18.1	2450 * #
Lead	450	530	118	4940 * #	8	11	92	2 U	20	6	350 J
Mercury	0.41	0.59	0.31	0.18	0.11	0.04 U	0.76 * #	0.04 U	0.08	0.05 U	1.05 * #
Silver	6.1	6.1	0.3 U	1.2	0.4 U	0.3 U	0.4 U	0.3 U	0.3 U	0.3 U	2 U
Zinc	410	960	115	5840 * #	43.7	25.2	78.3	23.0	77.4	36.8	2600 * #
PCBs (mg/kg-OC)											
Total PCBs (SMS)	12	65	1.02 U	0.417 U	0.754 U	6.39 U	2.61	10 U	2.32 U	2.59 U	11.9 U
LPAH (mg/kg-OC)											
Naphthalene	99	170	7.88	2.47	0.562	3.4 U	1.79	4.85 U	27.2	42	12.5
Acenaphthylene	66	66	1.49	0.23	0.369 U	3.4 U	1.04	4.85 U	70.4 * #	152 * #	1.8 U
Acenaphthene	16	57	8.73	1.28	0.369 U	3.4 U	0.515	4.85 U	2.96 U	4.02	22.6 J *
Fluorene	23	79	9.37	1.49	0.562	3.4 U	0.59	4.85 U	5.36	4.73	17.7
Phenanthrene	100	480	39.4	5.96	2.08	3.4 U	4.03	4.85 U	40.8	57.1	67.1
Anthracene	220	1200	9.27	0.809	0.846	3.4 U	1.34	4.85 U	23.2	40.2	13.4
2-Methylnaphthalene	38	64	5.01	1.45	0.6	3.4 U	1.42	4.85 U	18.4	26.8	4.88
Total LPAH (SMS)	370	780	76.1	12.2	4.05	3.4 U	9.33	4.85 U	167	300	133
HPAH (mg/kg-OC)											
Fluoranthene	160	1200	51.1	3.87	4.69	3.4 U	8.96	4.85 U	200 *	536 *	97.6
Pyrene	1000	1400	42.6	4.68	3.92	3.4 U	8.96	4.85 U	320	893	79.3 J
Benzo(a)anthracene	110	270	17	1.15	1.38	3.4 U	4.03	4.85 U	144 *	321 * #	14.6
Chrysene	110	460	29.8	2.3	1.77	3.4 U	6.49	4.85 U	240 *	670 * #	39.6
Benzo(a)pyrene	99	210	19.2	0.979	1.15	3.4 U	4.55	4.85 U	240 * #	705 * #	21
Indeno(1,2,3-cd)pyrene	34	88	11.7	0.4	0.485	3.4 U	2.61	4.85 U	96 * #	241 * #	8.54
Dibenzo(a,h)anthracene	12	33	4.05	0.213 U	0.369 U	3.4 U	0.627	4.85 U	31.2 *	80.4 * #	2.44
Benzo(g,h,i)perylene	31	78	11.7	0.421	0.485	3.4 U	2.76	4.85 U	104 * #	259 * #	9.76
Total benzofluoranthenes (SMS)	230	450	50.1	2.6	2.92	3.4 U	10.4	4.85 U	304 *	804 * #	50.9
Total HPAH (SMS)	960	5300	237	16.4	16.8	3.4 U	49.4	4.85 U	1679 *	4509 *	324
Chlorinated Hydrocarbons (mg/kg-OC)											
1,4-Dichlorobenzene	3.1	9	0.106 U	0.0426 UJ-	0.0923 U	0.68 U	0.0821 U	1.11 U	0.08 U	0.0982 U	1.8 U
1,2-Dichlorobenzene	2.3	2.3	0.106 U	0.0426 UJ-	0.0923 U	0.68 U	0.0821 U	1.11 U	0.08 U	0.0982 U	1.8 U
1,2,4-Trichlorobenzene	0.81	1.8	0.554 U	0.213 UJ-	0.462 U	3.47 U	0.418 U	5.35 U	0.392 U	0.482 U	1.8 U
Hexachlorobenzene	0.38	2.3	0.17 U	0.0681 U	0.123 U	1.16 U	0.119 U	1.62 UJ	0.128 U	0.143 U	1.8 U
Phthalates (mg/kg-OC)											
Dimethylphthalate	53	53	NA	NA	NA	NA	NA	NA	NA	NA	1.8 U
Diethylphthalate	61	110	NA	NA	NA	NA	NA	NA	NA	NA	1.8 U
Di-n-butylphthalate	220	1700	NA	NA	NA	NA	NA	NA	NA	NA	5.49
Butylbenzylphthalate	4.9	64	NA	NA	NA	NA	NA	NA	NA	NA	14.3 *
bis(2-Ethylhexyl)phthalate	47	78	NA	NA	NA	NA	NA	NA	NA	NA	488 * #
Di-n-octylphthalate	58	4500	NA	NA	NA	NA	NA	NA	NA	NA	24.4
Misc Extractables (mg/kg-OC)											
Dibenzofuran	15	58	3.41	0.766	0.523	3.4 U	0.59	4.85 U	2.96 U	3.39 U	14.6
Hexachlorobutadiene	3.9	6.2	0.17 U	0.0681 U	0.123 U	1.16 U	0.119 U	1.62 UJ	0.128 U	0.143 U	1.8 U
n-Nitrosodiphenylamine	11	11	NA	NA	NA	NA	NA	NA	NA	NA	3.96 UJ

Table 5

Summary of Analytical Results for Selected Soil Samples (Organic Carbon Normalized) and Comparison with Washington Sediment Management Standards

Location ID			DSI-09	DSI-09	DSI-10	DSI-10	DSI-11	DSI-11	DSI-12	DSI-12	DSI-22
Sample ID			DSI09-SO-A	DSI09-SO-B	DSI10-SO-A	DSI10-SO-B	DSI11-SO-A	DSI11-SO-B	DSI12-SO-A	DSI12-SO-B	DSI22-CB-060929
Sample Date			9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/28/2006	9/29/2006
Depth Interval			0-3 ft	3-5 ft	0-3 ft	3-5 ft	0-3 ft	3-5 ft	0-3 ft	3-5 ft	
Sample Matrix	SMS	SMS	SO	SO	SO	SO	SO	SO	SO	SO	SE
Sample Type	SQS	CSL	N	N	N	N	N	N	N	N	N
Phenols (µg/kg)											
Phenol	420	1200	NA	NA	NA	NA	NA	NA	NA	NA	**140 J**
2-Methylphenol	63	63	NA	NA	NA	NA	NA	NA	NA	NA	59 U
4-Methylphenol	670	670	NA	NA	NA	NA	NA	NA	NA	NA	**96**
2,4-Dimethylphenol	29	29	NA	NA	NA	NA	NA	NA	NA	NA	59 U
Pentachlorophenol	360	690	NA	NA	NA	NA	NA	NA	NA	NA	290 UJ
Misc Extractables (µg/kg)											
Benzyl alcohol	57	73	NA	NA	NA	NA	NA	NA	NA	NA	240 U
Benzoic acid	650	650	NA	NA	NA	NA	NA	NA	NA	NA	590 U
Dibenzofuran	--	--	**32**	**18**	**6.8**	5.0 U	**7.9**	4.8 U	37 U	38 U	**480**
Hexachloroethane	--	--	NA	NA	NA	NA	NA	NA	NA	NA	59 U
Hexachlorobutadiene	--	--	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 UJ	1.6 U	1.6 U	59 U
n-Nitrosodiphenylamine	--	--	NA	NA	NA	NA	NA	NA	NA	NA	130 UJ

Qualifiers:

N normal field sample
FD field duplicate
J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
U The analyte was analyzed for, but not detected above the sample reporting limit.
Denotes criteria exceedance
* Exceeds SQS criteria
\# Exceeds CSL criteria
Bold Denotes detections

Notes:

-- No numerical criterion of this type for this chemical
NA Sample not analyzed for this chemical
HPAH High molecular weight polycyclic aromatic hydrocarbon
LPAH Low molecular weight polycyclic aromatic hydrocarbon
SMS Sediment Management Standards (WAC 173-204)
SQS Sediment Quality Standards (WAC 173-204-320)
CSL Cleanup Screening Level (WAC 173-204-520)
mg/kg milligrams per kilogram
µg/kg micrograms per kilogram
OC organic carbon normalized

Where laboratory analysis indicates a chemical is not detected in a sediment sample, the detection limit will be reported, except as noted. Where chemical criteria in this table represent the sums of individual compounds (e.g., total LPAHs and total HPAHs), isomers (e.g., total benzofluoranthenes), or groups of aroclors/congeners (e.g., total PCBs), and a chemical analysis identifies an undetected value for one or more individual compounds, isomers, or groups of congeners, the SMS require that the sum of the detected values should be used as the sum of the respective compounds or groups of isomers or aroclors/congeners. If all values are undetected, then the highest detection limit should be used as the sum of the respective compounds or groups of isomers or aroclors/congeners.

The listed values represent concentrations in parts per million (ppm) "normalized" on a total organic carbon (TOC) basis. To normalize to TOC, the dry-weight concentration for each parameter is divided by the decimal fraction representing the percent TOC content of the sediment.

The total LPAH criteria will be compared to the sum of the concentrations of the following LPAH compounds: naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene. 2-methylnaphthalene is not included in the LPAH definition under the SMS. Inclusion of 2-methylnaphthalene in the LPAH definition under the SMS is being considered. The total LPAH criteria are not the sums of the corresponding criteria listed for the individual LPAH compounds.

The total HPAH criteria will be compared to the sum of the concentrations of the following HPAH compounds: fluoranthene, pyrene, benz[a]-anthracene, chrysene, total benzo-fluoranthenes, benzo[a]pyrene, indeno[1,2,3-cd]pyrene, dibenz[a,h]anthracene, and benzo-[g,h,i]-perylene. The total HPAH criteria are not the sums of the corresponding criteria listed for the individual HPAH compounds.

The total benzofluoranthenes criteria will be compared to the sums of the concentrations of the b, j, and k isomers of benzofluoranthene.

Table 6
Summary of Analytical Results for Selected Groundwater Samples and Comparison with Washington Marine Water Quality Criteria

Location ID / Sample ID / Sample Date / Sample Matrix / Sample Type	Washington Marine Chronic	Washington Marine Acute	DSI-06 DSI06-GW 9/27/2006 WG N	DSI-07 DSI07-GW 9/28/2006 WG N	DSI-07 DSI57-GW 9/28/2006 WG FD	DSI-08 DSI08-GW 9/28/2006 WG N	DSI-09 DSI09-GW 9/28/2006 WG N	DSI-10 DSI10-GW 9/28/2006 WG N	DSI-11 DSI11-GW 9/28/2006 WG N	DSI-12 DSI12-GW 9/28/2006 WG N
TPH (mg/L)										
TPH - Gasoline Range	--	--	0.25 U	2.0	2.2	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
TPH - Diesel Range	--	--	0.25 U	1.9	1.9	0.25 U	0.25 U	0.25 U	3.2	0.63
TPH - Motor Oil Range	--	--	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Metals-dissolved (µg/L)										
Arsenic	36	69	1.8	3.8	4.2	1.4	1.6	0.8	0.8	5.0
Cadmium	9.3	42	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chromium	--	--	0.5 U	2 U	2 U	2 U	2 U	2 U	2 U	0.5 U
Copper	3.1	4.8	0.5 U	0.6	1.1	0.7	0.9	0.5 U	0.5 U	0.5 U
Lead	8.1	210	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Mercury	0.025	1.8	0.1 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Silver	--	1.9	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Zinc	81	90	5	6	7	4 U	44	7	8	4 U
Metals-total (µg/L)										
Arsenic	--	--	2.3	9.5	7.2	11.8	2.6	2.4	6.7	32.5
Cadmium	--	--	0.2 U	0.2 U	0.2 U	0.3	0.2 U	0.3	1.6	0.3
Chromium	--	--	2 U	21	14	37	5 U	5	34	20
Copper	--	--	7.5	39.1	24	70.4	34.4	26.1	49.2	126
Lead	--	--	2	6	5	12	55	14	10	27
Mercury	--	--	0.1 U	0.10 U	0.10 U	0.12	0.10 U	0.10 U	0.10 U	0.12
Silver	--	--	0.2 U	0.2 U	0.2 U	0.4	0.2	0.2 U	0.2 U	0.2
Zinc	--	--	9	61	42	103	98	19	154	109
Pesticides (µg/L)										
4,4'-DDD	0.001	0.13	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
4,4'-DDE	0.001	0.13	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
4,4'-DDT	0.001	0.13	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Total DDT (U=1/2)	--	--	0.017 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U
Aldrin	0.0019	0.71	0.0055 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
alpha-BHC	--	--	0.0055 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
beta-BHC	--	--	0.0055 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
delta-BHC	--	--	0.0055 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
gamma-BHC (Lindane)	--	0.16	0.0055 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.018 U
alpha-Chlordane	--	--	0.0055 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
gamma-Chlordane	--	--	0.0055 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Dieldrin	0.0019	0.71	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Endosulfan I	--	--	0.0055 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Endosulfan II	--	--	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Endosulfan Sulfate	--	--	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Endrin	0.0023	0.037	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Endrin aldehyde	--	--	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Endrin ketone	--	--	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Heptachlor	0.0036	0.053	0.0055 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Heptachlor Epoxide	--	--	0.0055 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Methoxychlor	--	--	0.055 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Toxaphene	0.0002	0.21	0.55 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
PCBs (µg/L)										
Aroclor 1016	--	--	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor 1221	--	--	0.020 U	0.080 U	0.080 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor 1232	--	--	0.020 U	0.040 U	0.080 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor 1242	--	--	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor 1248	--	--	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor 1254	--	--	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor 1260	--	--	0.020 UJ	0.020 UJ	0.020 UJ	0.020 U	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Total PCBs (U=1/2)	0.03	10	0.07 U	0.11 U	0.13 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
SVOCs (µg/L)										
1,2,3-Trichlorobenzene	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene	--	--	0.2 U	24	26	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichlorobenzene	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3,5-Trimethylbenzene	--	--	0.2 U	10	12	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dichlorobenzene	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,4-Dichlorobenzene	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Methylnaphthalene	--	--	0.06 U	32	28	0.06 U	0.08 U	0.06 U	0.07 U	0.47
Acenaphthene	--	--	0.09	0.54	0.53	0.01 J	0.05	0.11	0.22	2.2
Acenaphthylene	--	--	0.01 J	0.06	0.06	0.01 U	0.01 U	0.01 U	0.02	1.8
Anthracene	--	--	0.01 J	0.03	0.03	0.01 J	0.02	0.01 U	0.01	2.6
Benzo(a)anthracene	--	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01	0.01 U	0.01 U	3.4
Benzo(a)pyrene	--	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 J	0.01 U	0.01 U	3.5
Benzo(b)fluoranthene	--	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 J	0.01 J	0.01 U	2.0
Benzo(g,h,i)perylene	--	--	0.01 U	0.01 J	0.01 U	0.01 U	0.01 U	0.01 J	0.01 U	1.9
Benzo(k)fluoranthene	--	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 J	0.01 J	0.01 U	2.2
Chrysene	--	--	0.01 J	0.01 J	0.01 J	0.01 J	0.02	0.02	0.01 J	5.0
Dibenzo(a,h)anthracene	--	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.65
Dibenzofuran	--	--	0.01 J	0.14	0.14	0.01 J	0.01 J	0.01 U	0.03	0.44
Fluoranthene	--	--	0.03	0.02	0.02	0.02	0.04	0.01 J	0.03	8.5
Fluorene	--	--	0.03	0.57	0.54	0.01 J	0.03	0.01 J	0.16	3.3
Hexachlorobenzene	--	--	0.0055 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Hexachlorobutadiene	--	--	0.0055 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Indeno(1,2,3-cd)pyrene	--	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	1.5
Naphthalene	--	--	0.15	4.7	4.2	0.08	0.10	0.10	0.20	1.2
Phenanthrene	--	--	0.04	0.31	0.31	0.03	0.13	0.02	0.04	5.6
Pyrene	--	--	0.05	0.02	0.02	0.01	0.05	0.01	0.02	11
Total PAHs (U=1/2)	--	--	0.45	6.3	5.75	0.22	0.5	0.34	0.74	56.4
Volatiles (µg/L)										
1,1,1,2-Tetrachloroethane	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,1-Trichloroethane	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2,2-Tetrachloroethane	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U

Table 6
Summary of Analytical Results for Selected Groundwater Samples and Comparison with Washington Marine Water Quality Criteria

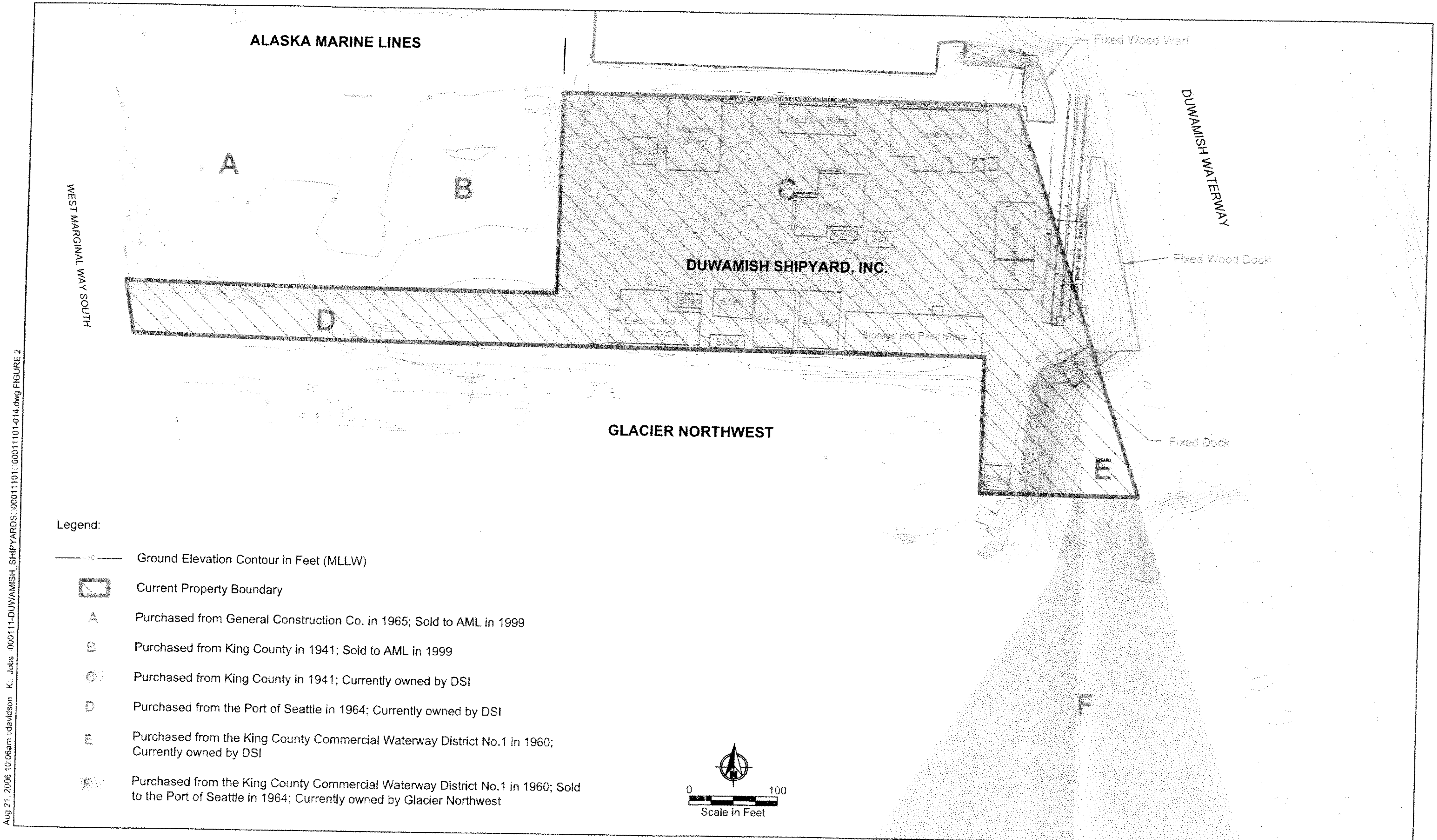
Location ID / Sample ID / Sample Date / Sample Matrix / Sample Type	Washington Marine Chronic	Washington Marine Acute	DSI-06 DSI06-GW 9/27/2006 WG N	DSI-07 DSI07-GW 9/28/2006 WG N	DSI-07 DSI57-GW 9/28/2006 WG FD	DSI-08 DSI08-GW 9/28/2006 WG N	DSI-09 DSI09-GW 9/28/2006 WG N	DSI-10 DSI10-GW 9/28/2006 WG N	DSI-11 DSI11-GW 9/28/2006 WG N	DSI-12 DSI12-GW 9/28/2006 WG N
1,1,2-Trichloroethane	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethane	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethene	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloropropene	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,3-Trichloropropane	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloroethane	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloropropane	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dichloropropane	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,2-Dichloropropane	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Butanone	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Chlorotoluene	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Hexanone	--	--	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
4-Chlorotoluene	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-Isopropyltoluene	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-Methyl-2-pentanone	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Acetone	--	--	**3.8**	3.0 U	3.0 U	**5.5**	**4.7**	4.7	6.3	6.3
Benzene	--	--	**0.6**	**180**	**210**	**0.3**	0.2 U	0.2 U	0.2 U	0.2 U
Bromobenzene	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromochloromethane	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromodichloromethane	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromoform	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromomethane	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Carbon disulfide	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**0.3**	0.2 U	0.2 U
Carbon tetrachloride	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloroethane	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloroform	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloromethane	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
cis-1,2-Dichloroethene	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
cis-1,3-Dichloropropene	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Dibromochloromethane	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Dibromomethane	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Dichlorodifluoromethane	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Dichloromethane	--	--	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Ethylbenzene	--	--	0.2 U	**10**	**11**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Isopropylbenzene	--	--	0.2 U	**25**	**28**	0.2 U	0.2 U	0.2 U	**0.5**	0.5
n-Butylbenzene	--	--	0.2 U	**14**	**13**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
n-Propylbenzene	--	--	0.2 U	**94**	**110**	0.2 U	0.2 U	0.2 U	**0.5**	0.5
sec-Butylbenzene	--	--	0.2 U	**8.2**	**8.5**	0.2 U	0.2 U	0.2 U	**0.2**	0.2
Styrene	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
tert-Butylbenzene	--	--	0.2 U	0.2 U	0.5	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
tert-Butylmethylether	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Tetrachloroethene	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Toluene	--	--	**0.4**	**4.4**	**4.6**	**0.4**	**0.4**	**0.7**	**0.5**	0.4
trans-1,2-Dichloroethene	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,3-Dichloropropene	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichloroethene	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichlorofluoromethane	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl chloride	--	--	0.2 U	0.2 U	0.2 U	**0.4**	0.2 U	0.2 U	0.2 U	0.2 U
m,p-Xylenes	--	--	**0.4**	**6.4**	**7.1**	0.4 U	0.4 U	0.4 U	**0.5**	0.5
o-Xylene	--	--	**0.2**	0.2 U	**0.9**	0.2 U	0.2 U	0.2 U	**0.3**	0.3

Qualifiers:

N normal field sample
FD field duplicate
J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
U The analyte was analyzed for, but not detected above the sample reporting limit.
Denotes criteria exceedance
* Exceeds chronic criteria
# Exceeds acute criteria
Bold Denotes detections

Notes:

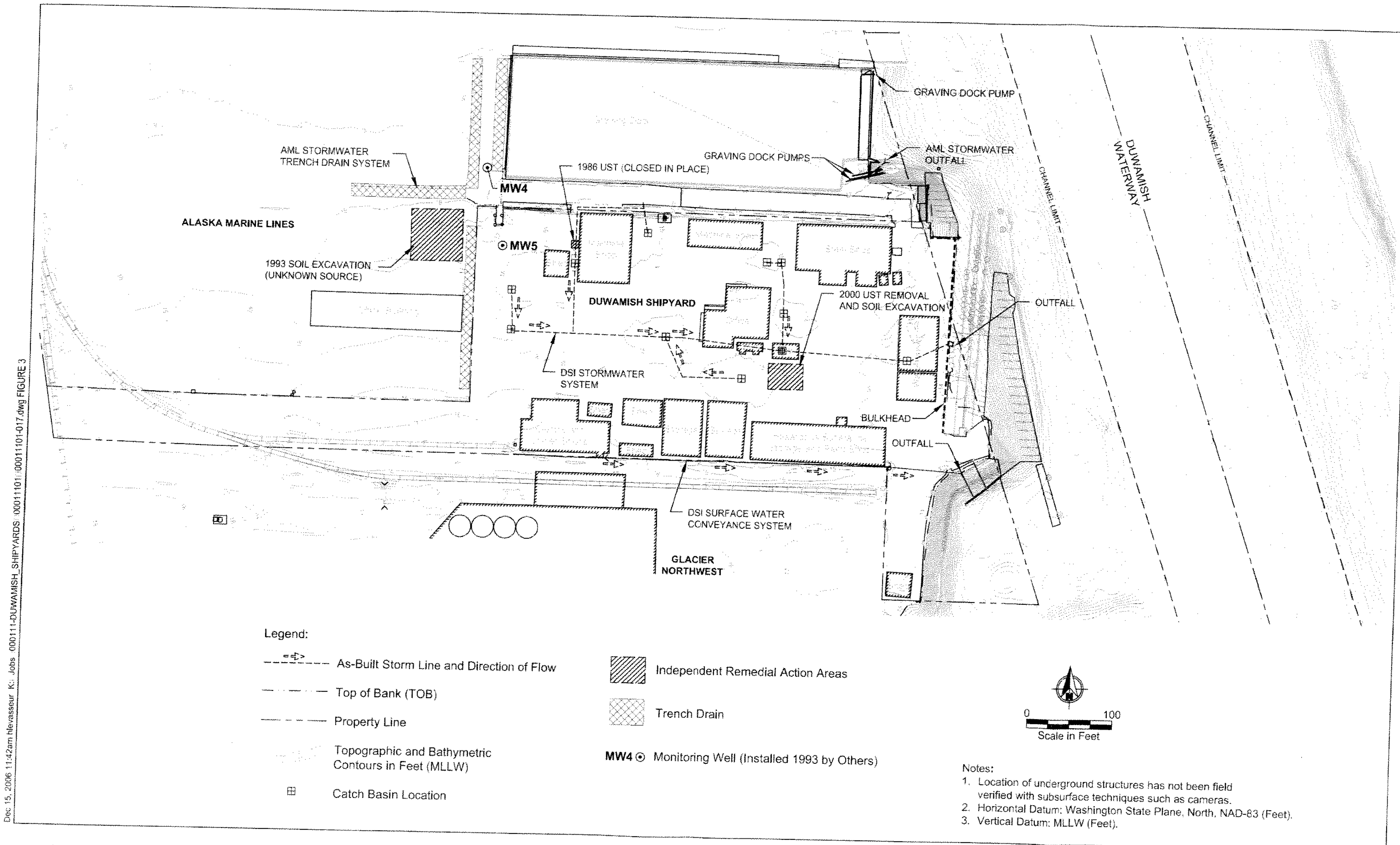
-- No numerical criterion of this type for this chemical
NA Sample not analyzed for this chemical
mg/L milligrams per liter
µg/L micrograms per liter



Aug 21, 2006 10:06am cdavidson K:\Jobs\000111-DUWAMISH_SHIPYARDS\00011101\00011101-014.dwg FIGURE 2

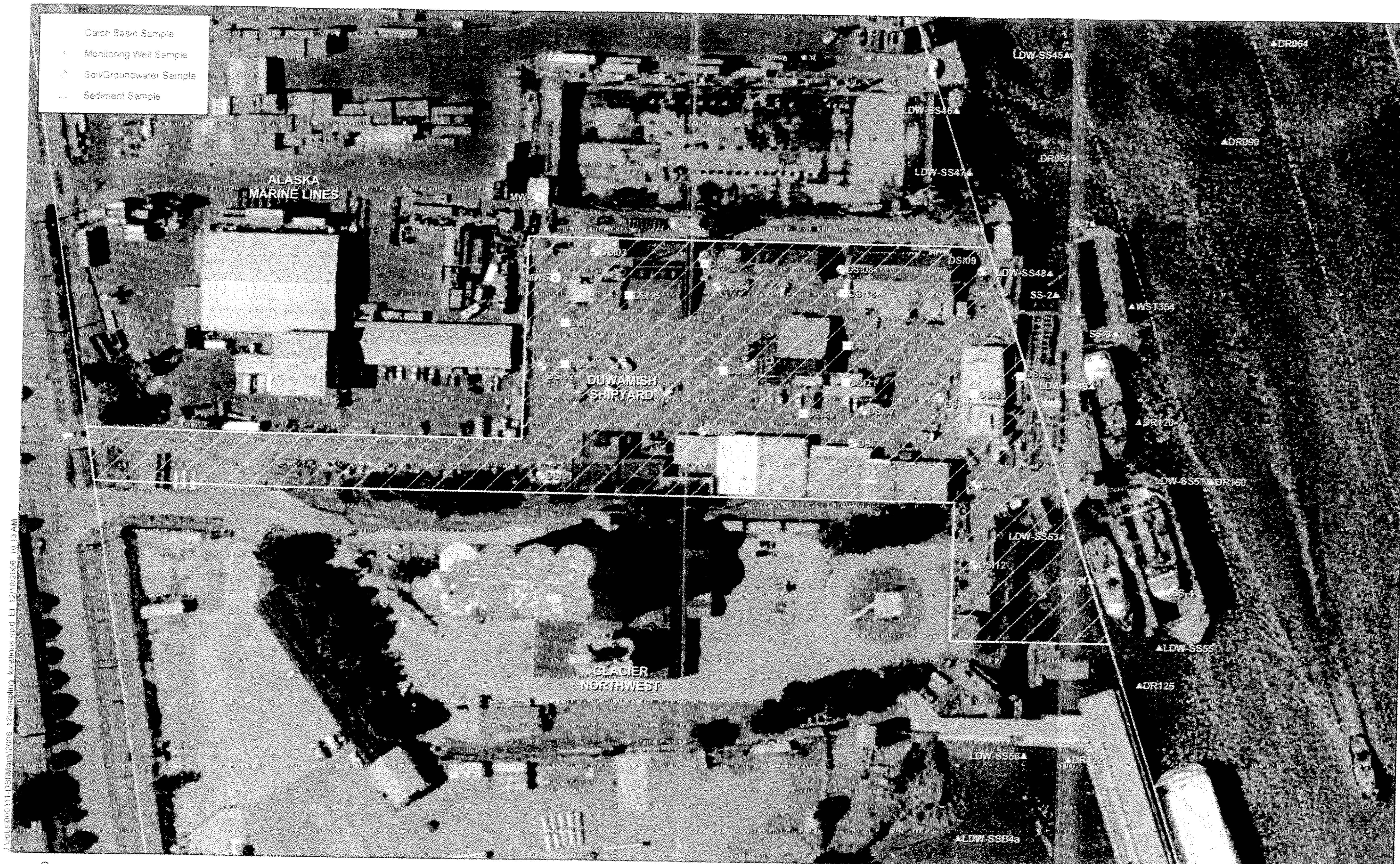
ANCHOR ENVIRONMENTAL, L.L.C.

Figure 2
Historic Property Boundaries
Duwamish Shipyard, Inc., Site #1429



ANCHOR ENVIRONMENTAL, L.L.C.

Figure 3
Existing Stormwater System and Independent Remedial Action Areas
Duwamish Shipyard, Inc., Site #1429



ANCHOR ENVIRONMENTAL L.L.C.

Scale in Feet

Figure 4
Preliminary Investigation Sample Location Map
Duwamish Shipyard, Inc., Site #1429

Appendix D
Glacier Northwest Historical Data

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ATTACHMENT B

Kaiser Property Environmental Audit

Port of Seattle

FEB 1 1988
Superfund Branch

May 1985

Parametrix, Inc.
13020 Northup Way, Suite 8
Bellevue, Washington 98005

MICROFILMED

TABLE 1

SUMMARY OF FIELD OBSERVATIONS

BORING & SAMPLE #	DEPTH	DESCRIPTION	BORING OVA	SOIL pH	SAMPLE OVA*
1-1	0.0	Orange Sawdust	>1000	8.2	>1000
1-2	2.5	Grey Sand		8.0	50
1-3	5.0	Grey Sand		7.4	>1000
2-1	2.5	Grey Sand	>1000	7.4	>1000
2-2	5.0	Grey Sand & Silty Fine Sand		7.2	>1000
3-1	2.5	Black Sand	>1000	6.3	10
3-2	5.0	Black Sand		6.1	10
3-3	7.5	Black Sand		6.3	50
3-4A	10.0	Black Sand		6.4	100
3-4B	10.5	Grey Silt		7.0	100
3-5	12.5	Silt & Silty Fine Sand w/organics		7.0	10
3-6	15.0	Black Medium Sand		6.3	14
4-1	2.5	Black Sand	>1000	9.7	0
4-2	5.0	Black Sand, wet		9.0	15
5-1	2.5	Black Sand	>1000	5.3	>1000
5-2	5.0	Black Sand		5.4	>1000
6-1	2.5	Black Sand	100	5.7	60
6-2	5.0	Black Sand		5.6	38
7-1	2.5	Brown Sand	200	5.3	4
7-2	5.0	Grey Sand		5.5	6
8-1	2.5	Black Sand	>1000	8.2	9
8-2	5.0	Black Sand, wet		6.4	6
9-1	2.5	Black Sand	10	6.8	9
9-2	5.0	Black Sand		6.1	160
10-1	2.5	Brown & Grey Sandy Silt & Sand	80	7.8	2
10-2	5.0	Grey Sand		-------	100
11-1	2.5	Grey Sand	250	7.6	>1000
11-2	5.0	Grey Silty Sand		7.5	>1000
12-1	2.5	Black Fine Sand w/ fine carbon	100	5.8	200
12-2	5.0	Black Medium Sand		5.9	50
13-1	1.0	Fine Carbon with Sand	>1000	6.3	-------
13-2	2.5	Black Sand		6.2	>1000
14-1	2.5	Grey Sand	------	7.3	450
14-2	5.0	Grey Sand and Silty Fine Sand		6.8	>1000
15-1	1.0	Sawdust	>1000	5.9	100
15-2	2.5	Black Sand		6.2	40
15-3	5.0	Silty Fine Sand		6.8	200

* OVA reading in auger after sample was taken

TABLE 1 (continued)

SUMMARY OF FIELD OBSERVATIONS

BORING & SAMPLE #	DEPTH	DESCRIPTION	BORING OVA	SOIL pH	SAMPLE OVA*
16-1	2.5	Brown Sand	------	7.6	350
16-2	5.0	Grey Sand & Grey Silt		-------	>1000
17-1	2.5	Brown Sand	>1000	7.6	230
17-2	5.0	Black Sand & Black Silt w/organics		8.2	>1000
18-1	2.5	Brown Sand	30	7.6	6
18-2	5.0	No Recovery		-------	7
19-1	2.5	Brown Fine Sand	50	7.8	2
19-2	5.0	Grey Sand		7.7	10
20-1	2.5	Grey Fine Sandy Silt w/organics	7	8.1	0
20-2	5.0	Grey Sand		7.3	3
21-1	2.5	Grey Sand	------	7.9	20
21-2	5.0	Grey Sand		7.5	600
22-1	2.5	Grey Silty Sand	9	6.6	9
22-2	5.0	Grey Sand		6.5	0
23-1	2.5	Black Sand w/ carbon	30	6.2	0
24-1	2.5	Black Sand	------	6.4	0
24-2	5.0	Black Sand		6.4	280
25-1	2.5	Dark Grey Silty Sand	60	6.5	2
26-1	2.5	Dark Grey Silty Sand	600	6.6	600
26-2	5.0	Dark Grey Sand		6.3	>1000
27-1	2.5	Grey Sand	0	6.8	0
27-2	5.0	Grey Sand		6.8	0
28-1	2.5	Fine Sandy Silt	>1000	7.0	0
28-2	5.0	Black Sand & Silty Sand		6.7	600
28-3	7.5	Black Sand		7.2	15
28-4	10.0	Brown Silt w/organics		7.9	10
28-5	12.5	Grey Sand		7.2	80
28-6	15.0	Grey Sandy Silt w/organics		8.0	660
29-1	2.5	Orange Sawdust	>1000	8.2	210
29-2	5.0	Yellow Sawdust and Black Sand		7.6	>1000

* OVA reading in auger after sample was taken

TABLE 2

SUMMARY OF COMPOSITE SAMPLES

COMPOSITE	BORING & SAMPLE #	DEPTH	BORING OVA	SOIL pH	SAMPLE OVA*
ONE	5-1	2.5	>1000	5.3	>1000
	5-2	5.0		5.4	>1000
	6-1	2.5	100	5.7	60
	6-2	5.0		5.6	38
	7-1	2.5	200	5.3	4
	7-2	5.0		5.5	6
TWO	1-1	0.0	>1000	8.2	>1000
	1-2	2.5		8.0	50
	1-3	5.0		7.4	>1000
	2-1	2.5	>1000	7.4	>1000
	2-2	5.0		7.2	>1000
	13-1	1.0	>1000	6.3	-------
	13-2	2.5		6.2	>1000
THREE	26-1	2.5	600	6.6	600
	26-2	5.0		6.3	>1000
	28-1	2.5	>1000	7.0	0
	28-2	5.0		6.7	600
	29-1	2.5	>1000	8.2	210
	29-2	5.0		7.6	>1000
FOUR	18-1	2.5	30	7.6	6
	19-1	2.5	50	7.8	2
	19-2	5.0		7.7	10
	20-1	2.5	7	8.1	0
	20-2	5.0		7.3	3

* OVA reading in auger after sample withdrawal

TABLE 3

SUMMARY OF DETECTABLE COMPONENTS FROM LABORATORY ANALYSIS

PARAMETER	UNITS	COMPOSITE NUMBER 1	2	3	4
PRIORITY POLLUTANT METALS					
Arsenic	mg/kg	51.0	26.0	46.0	20.0
Chromium	mg/kg	5.8	8.3	7.3	6.4
Copper	mg/kg	17.1	5.9	24.1	4.4
Lead	mg/kg	<2.5	2.5	<2.5	<2.5
Nickel	mg/kg	3.8	3.7	11.4	5.3
Mercury	mg/kg	<0.10	<0.10	<0.10	0.2
Zinc	mg/kg	27.6	18.7	40.3	17.0
Fluoride	mg/kg	116.0	92.0	84.0	98.0
SEMI-VOLATILE ORGANIC COMPOUNDS					
Di-n-butyl Phthalate	mg/kg	0.93	0.33	<0.08	0.43
Bis (2-ethylhexyl) phthalate	mg/kg	0.13	1.3	<0.08	<0.08
VOLATILE ORGANIC COMPOUNDS		None detected			
PESTICIDES & PCB's					
Aldrin	ug/kg	<2.0	<2.0	5.4	<2.0
Alpha - BHC	ug/kg	2.4	<1.5	3.4	<1.5
Dieldrin	ug/kg	<1.0	<1.0	<1.0	2.6

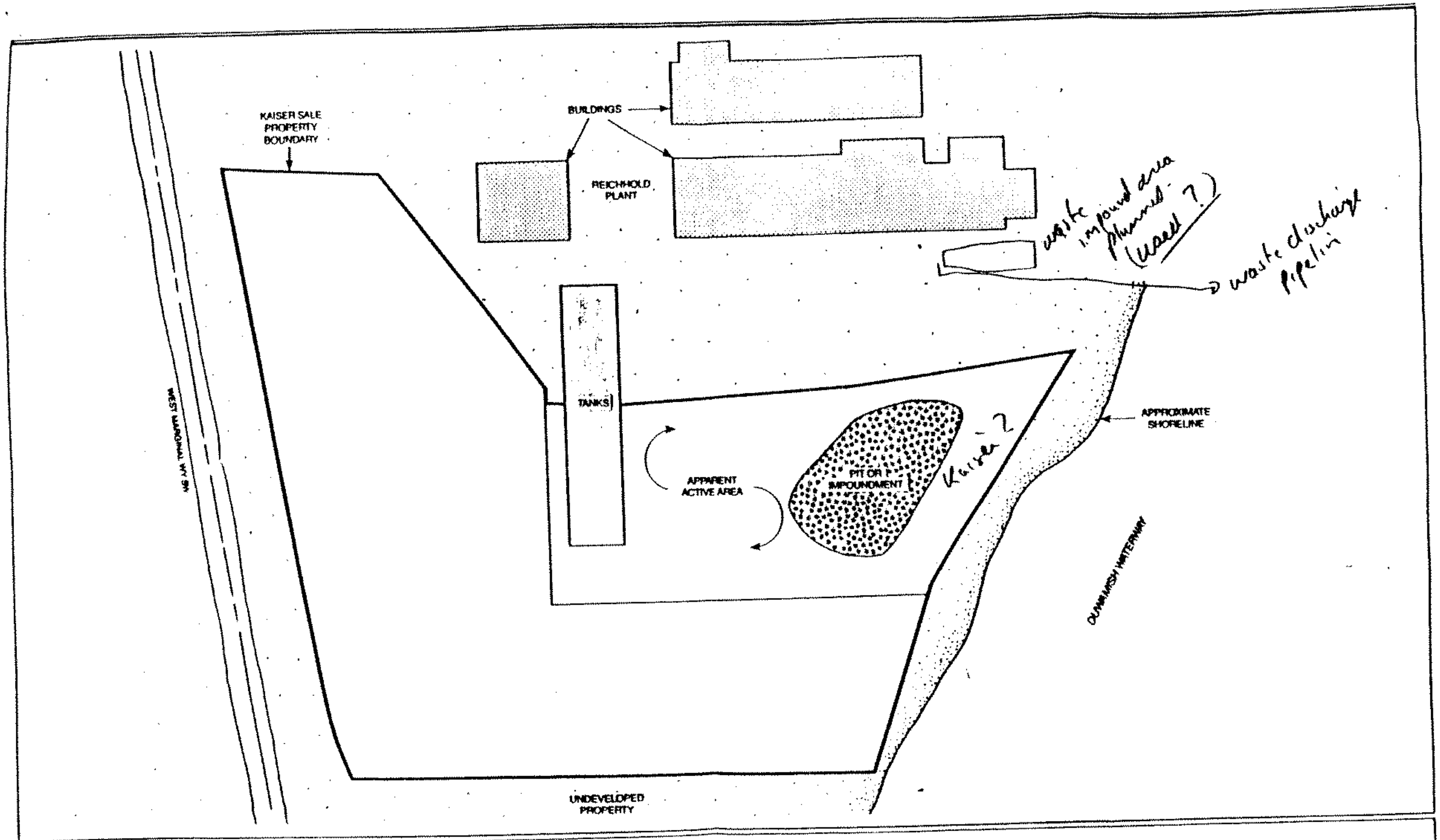


Figure 4.
Development of Ka:.er Sale Property In 1958.

Parametrix, Inc.

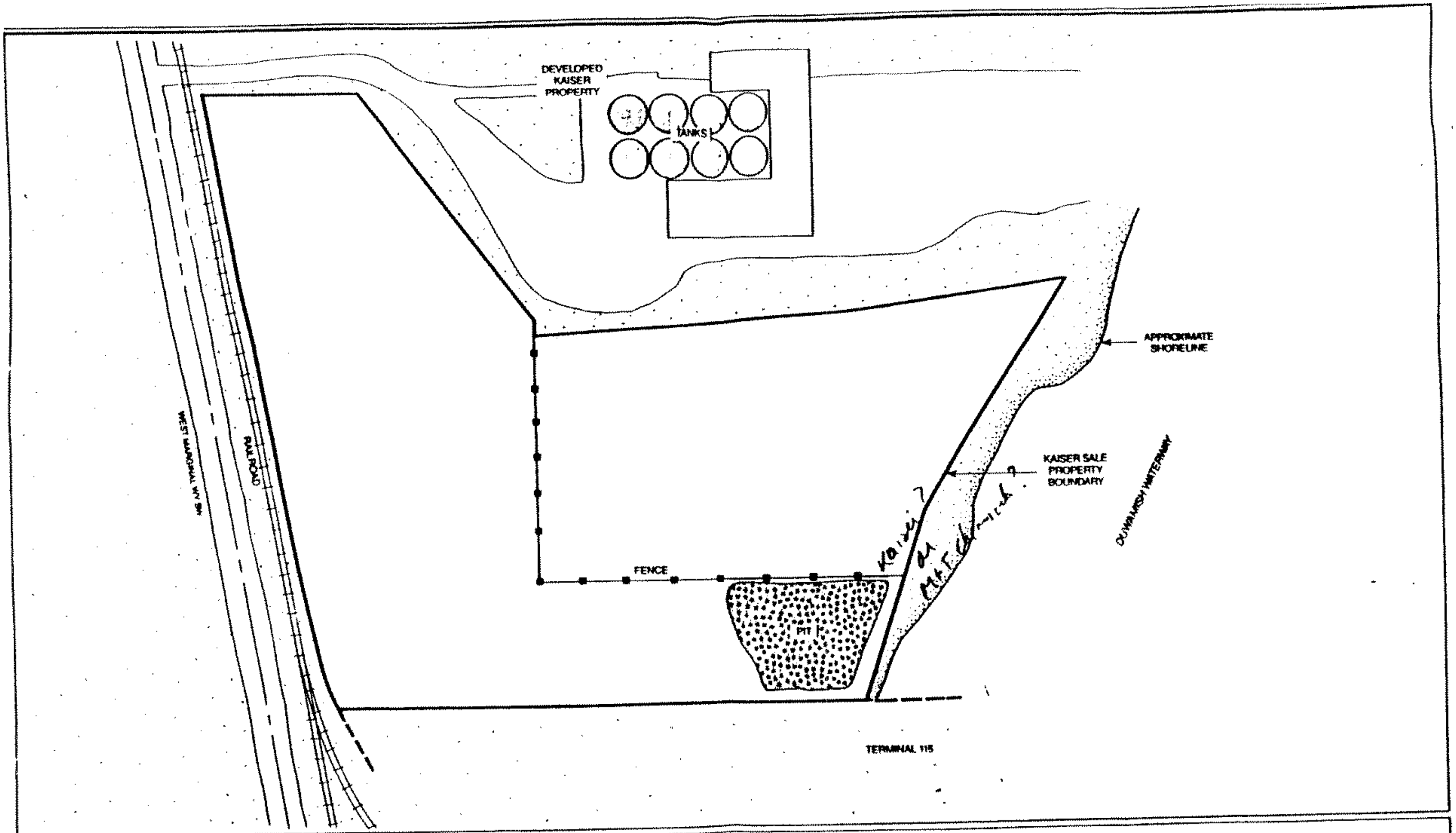


Figure 5.
Development of Kaiser Sale Property in 1974.

Parametrix, Inc.

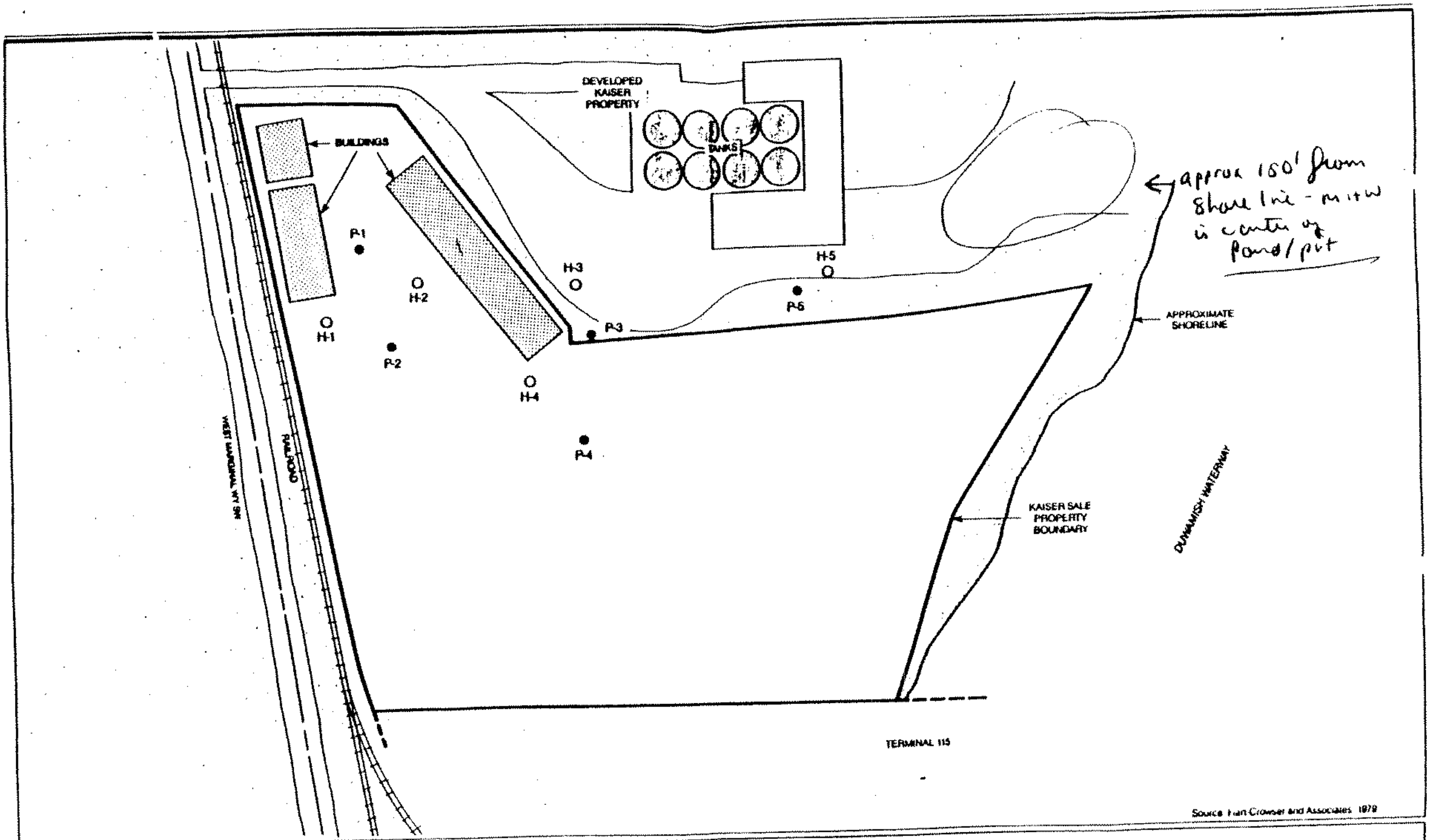


Figure 6.
Approximate locations of Dutch Cone Penetrometer probes and soil borings conducted by Hart-Crowser and Associates in 1979.

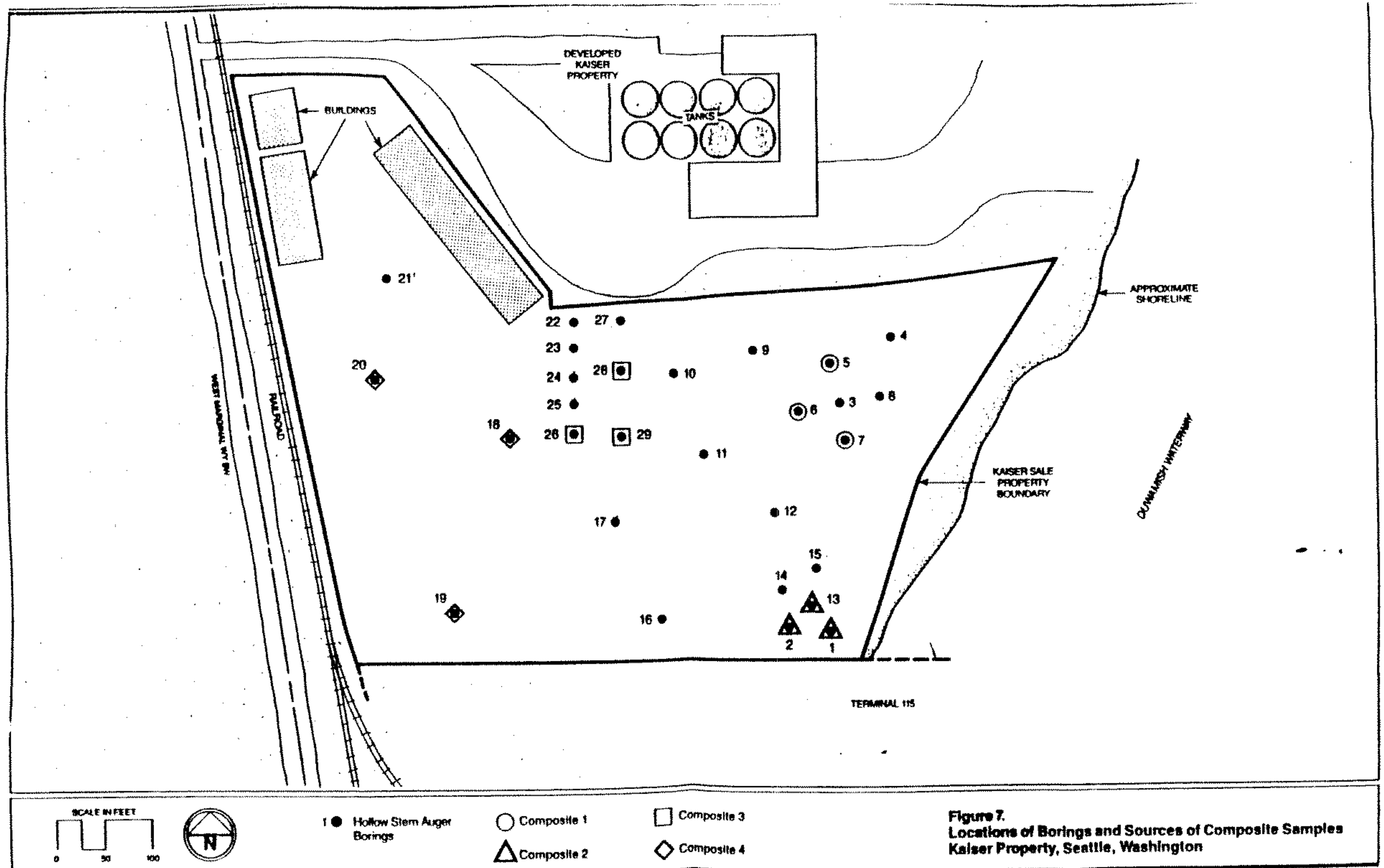


Figure 7.
Locations of Borings and Sources of Composite Samples
Kaiser Property, Seattle, Washington

Parametrix, Inc.

PHASE II SITE ASSESSMENT
5900 WEST MARGINAL WAY
SEATTLE, WASHINGTON

Prepared for

LONE STAR NORTHWEST
5975 East Marginal Way South
Seattle, Washington 98111

Prepared by

PARAMETRIX, INC.
13020 Northup Way
Bellevue, Washington 98005

August 1990

COPIED TO ECOLOGY, N.W. REGIONAL OFFICE
6/7/91

Table 1. Summary of analytical results from soil sampling.

Parameter	Sample Location													
	B-1	B-1	B-1	B-2	B-2	B-2	B-3	B-3	B-3	TP-1	TP-2	TP-3	TP-4	TP-5
DEPTH (feet)	4	8	C	4	8	C	4	8	C	1.5	1.5	1.5	1.5	1.5
TOX (mg/kg)	<4	<4	NA	<4	16	NA	4	<4	NA	<4	<4	23	<4	<4
TPH (mg/kg)	36	28	NA	51	57	NA	63	67	NA	92	240	10,000	130	180
TOTAL METALS (mg/kg)														
Arsenic	NA	NA	<0.5	NA	NA	79	NA	NA	150	NA	NA	NA	NA	NA
Barium	NA	NA	20	NA	NA	25	NA	NA	20	NA	NA	NA	NA	NA
Cadmium	NA	NA	<1	NA	NA	<1	NA	NA	<1	NA	NA	NA	NA	NA
Chromium	NA	NA	21	NA	NA	24	NA	NA	22	NA	NA	NA	NA	NA
Lead	NA	NA	<10	NA	NA	10	NA	NA	<10	NA	NA	NA	NA	NA
Mercury	NA	NA	0.26	NA	NA	0.22	NA	NA	<0.15	NA	NA	NA	NA	NA
Selenium	NA	NA	<0.5	NA	NA	<0.5	NA	NA	<0.5	NA	NA	NA	NA	NA
Silver	NA	NA	<2	NA	NA	<2	NA	NA	<2	NA	NA	NA	NA	NA
TLCP METALS (mg/l)														
Arsenic	NA	NA	0.006	NA	NA	0.29	NA	NA	0.60	0.24	0.043	0.073	NA	NA
Barium	NA	NA	0.18	NA	NA	0.09	NA	NA	<0.01	0.05	0.12	0.09	NA	NA
Cadmium	NA	NA	<0.01	NA	NA	<0.01	NA	NA	<0.01	<0.01	<0.01	0.01	NA	NA
Chromium	NA	NA	0.04	NA	NA	<0.02	NA	NA	<0.02	<0.02	<0.02	<0.02	NA	NA
Lead	NA	NA	<0.1	NA	NA	<0.01	NA	NA	<0.01	<0.1	<0.1	0.1	NA	NA
Mercury	NA	NA	<0.0005	NA	NA	<0.0005	NA	NA	<0.0005	<0.0005	<0.0005	<0.0005	NA	NA
Selenium	NA	NA	<0.005	NA	NA	<0.005	NA	NA	<0.005	<0.005	<0.005	<0.005	NA	NA
Silver	NA	NA	<0.02	NA	NA	<0.02	NA	NA	<0.02	<0.02	<0.02	<0.02	NA	NA

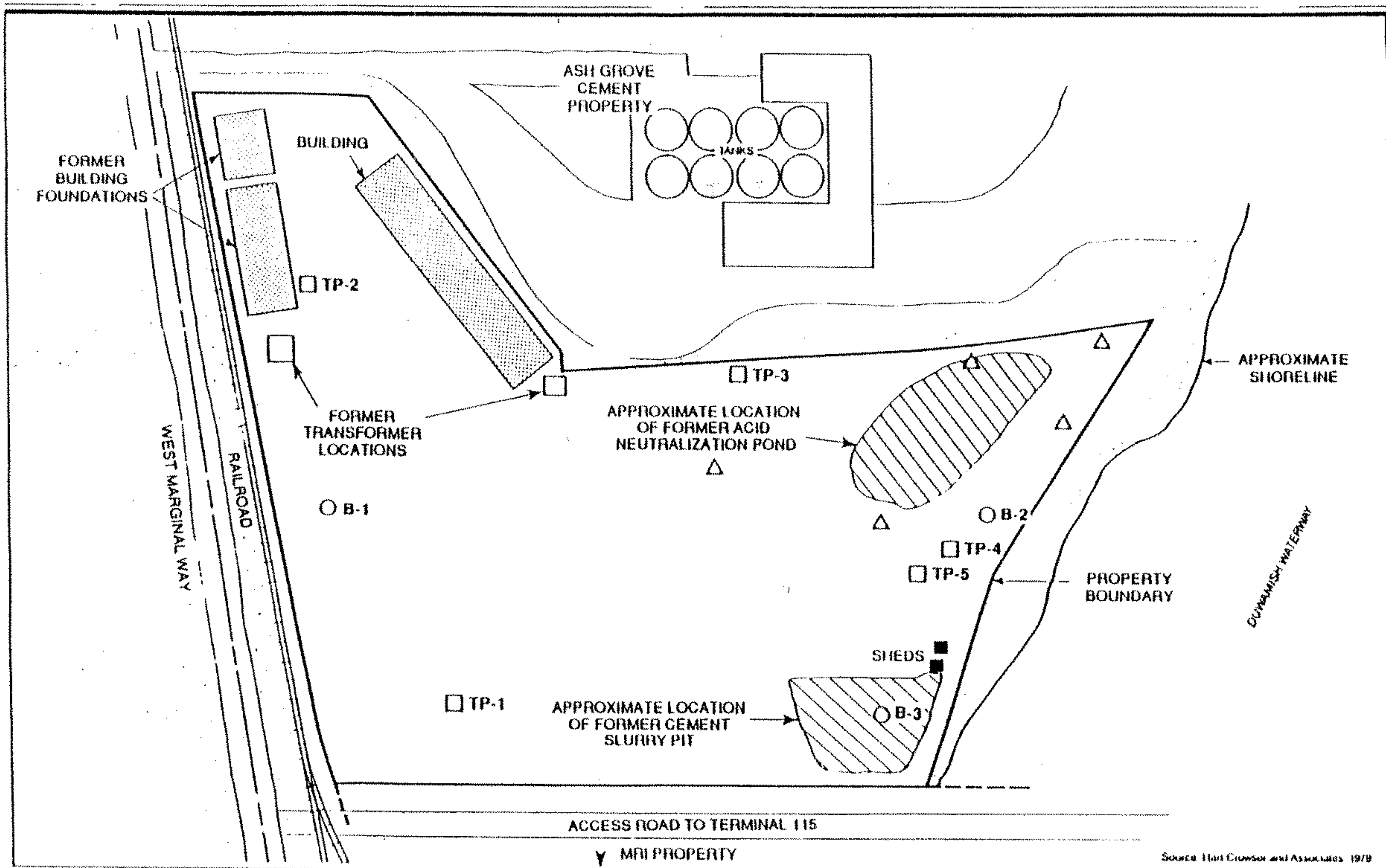
NA - Not analyzed
C - Composite sample

100281

Table 2. Summary of analytical results from groundwater sampling.

Parameter	Well Location and Sampling Date				
	Well B-1 (5/24/90)	Well B-2 (5/24/90)	Well B-3 (5/24/90)	Well B-2[1] (6/07/90)	Well B-3[1] (6/07/90)
PHYSICAL CHARACTERISICS					
pH	6.3	6.10	5.97	6.29	6.02
Specific Conductivity µhos	1,381	798	341	760	376
VOLATILE ORGANICS[2]					
Acetone		25			
Chloroform		3			
SEMI-VOLATILE ORGANICS[3] (µg/L)					
2-Chlorophenol		28			
2,4-Dichlorophenol		51			
Naphthalene		86			
2,4,6-Trichlorophenol		49			
Penthachlorophenol		3,000		2,800	
DISSOLVED METALS (mg/L)					
Antimony	<0.005	<0.005	<0.005		
Arsenic	<0.005	0.15	0.33		
Beryllium	<0.01	<0.01	<0.01		
Cadmium	0.0005	<0.0003	<0.0003		
Chromium	0.09	<0.02	<0.02		
Copper	0.04	<0.02	<0.02		
Lead	0.006	<0.005	0.005		
Mercury	<0.0005	<0.0005	<0.0005		
Nickel	<0.03	<0.03	<0.03		
Silver	0.27	0.43	0.34		
Thallium	<0.005	<0.005	<0.005		
Selenium	<0.005	<0.005	<0.005		
Zinc	0.04	<0.02	<0.02		

1 Sample only analyzed for penthachlorophenol.
2 No other volatile organic compounds were detected.
3 No other semi-volatile organic compounds were detected.



NOT TO SCALE

N

○ Monitoring Well

□ Test Pit

△ Proposed Monitoring Well Location

Figure 1.
Locations of monitoring wells, test pits, and proposed monitoring wells. 5900 West Marginal Way, Seattle, Washington

100277

HARTCROWSER

Earth and Environmental Technologies

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Fax 206.328.5581
Tel 206.324.9530

J-4267

August 3, 1995

Mr. Ching-Pi Wang, P.E.
Toxics Cleanup Program
Washington Department of Ecology
Northwest Regional Office
3190 - 160th Avenue S.E.
Bellevue, Washington 98008-5452

Re: Request for Initial Review of
Proposed RI/FS for Independent Cleanup Reichhold/Lone Star Site
5900 West Marginal Way,
Seattle, Washington

Dear Ching-Pi:

Following up on our phone conversation today, and on behalf of Reichhold Chemicals, Inc., I am providing all available site characterization data and a brief outline of a Remedial Investigation/Feasibility Study (RI/FS) of the Reichhold/Lone Star Site located at 5900 West Marginal Way, Seattle, Washington. Reichhold would like to work with the current property owner (Lone Star Northwest) in the hope of performing an RI/FS and subsequent site remediation as an independent action under the Model Toxics Control Act (MTCA) Cleanup Regulation. To facilitate this process, we are requesting Ecology's initial comments relating to three (3) issues: 1) the appropriate general scope of RI activities to complete the site characterization; 2) prospective remedial action alternatives to be evaluated in the FS and associated RI data collection requirements; and 3) the possible need for alternate administrative procedures (e.g., Agreed Orders) during the study and/or cleanup phases of the project. We understand that Ecology will be providing initial comments on these issues during a meeting at your offices scheduled for August 10, 1995.

Table 2 – Summary of Surface Water Seep Sampling and Analysis Data, 5900 West Marginal Way Site

Parameter	SW-01	SW-02	SW-03
Sampling Time	1:30 p.m.	1:40 p.m.	2:20 p.m.
Approximate Flow in gpm	2	0.5	0.05
Field Temperature in degrees C	20	19	20
Field pH in standard units	6.8	7.2	7.3
Field Salinity in ppt (a)	0.7	6.1	7.5
Total Arsenic in ug/L	85	82	30
Total Silver in ug/L	1 U	1 U	1 U
Total Pentachlorophenol in ug/L	1 U	1 U	1 U
Total WTPH-D in mg/L	0.25 U	0.25 U	No Data

NOTES:
a) Specific conductance in the nearshore Duwamish River during sampling ranged from 9.9 to 11.2 ppt.
U denotes that analyte was not detected at the indicated detection limit.
Samples collected May 15, 1995.

4267\surfwat.wk1

Table 1 - Summary of Soil and Groundwater Quality Conditions, 5900 West Marginal Way Site, Seattle, WA

	Former Reichhold Impoundment	Former Kaiser Concrete Pit	Former Lone Star Concrete Pit	Kaiser/Lone Star Solid Concrete Handling/Disposal	Surface Water Ditch
Area in acres; (approx.)	0.3	0.3	0.2	0.5+	ca. 0.05
Average Soil Quality (0 to 8 feet)					
pH in std. units	5.3 to 5.7 (6)	6.2 to 8.2 (7)	No Data	No Data	No Data
Arsenic in mg/kg	58 (4)	57 (4)	No Data	No Data	No Data
Silver in mg/kg	2 U (4)	2 U (4)	No Data	No Data	No Data
Pentachlorophenol in mg/kg	0.1 U (3)	0.1 U (3)	No Data	No Data	No Data
Total Petroleum Hydrocarbons in mg/kg	105 (4)	65 (2)	92 (1)	No Data	10,000 (1)
Leachable Metals					
TCLP-Arsenic in ug/L	290 (1)	600 (1)	240 (1)	No Data	73 (1)
TCLP-Silver in ug/L	20 U (1)	20 U (1)	20 U (1)	No Data	20 U (1)
Groundwater Quality					
Monitoring Well	MW-2	MW-3	No Data	MW-1 (?)	No Data
Salinity in ppt (approx.)	0.5 (2)	0.2 (2)	No Data	0.9 (1)	No Data
pH in std. units	6.2 (2)	6.0 (2)	No Data	6.3 (1)	No Data
Arsenic in ug/L	150 (1)	330 (1)	No Data	5 U (1)	No Data
Silver in ug/L	430 (1)	340 (1)	No Data	270 (1)	No Data
Pentachlorophenol in ug/L	2,900 (2)	50 U (1)	No Data	50 U (1)	No Data

Note:
U = Analyte was not detected at the indicated detection limit.
(Number of samples collected within individual operation areas indicated in parentheses)
4267\5900marg.wk1

Appendix E
MRI Corporation Historical Data

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MRI Corporation

Seattle, Washington

Waste Characterization Program

ENSR Consulting and Engineering

March 1991

Document Number 4506-001-781

NatEx Laboratories, Inc.
Pacific Northwest Environmental Laboratory, Inc.

\TCLP

TCLP ANALYSIS DATA SHEET
40 CFR Part 268, Method 1311

Client Sample ID:	Comp. L1-S1 thru L1-S6	**PNELI Sample ID:**	2933-01
Sample Matrix:	Soil	**Date Sample Received:**	02-13-91
Wt. Soil Extracted:	100 g	**Vol. Leachate:**	2.0 ℓ
Units of Measure:	mg/ℓ		

EP Toxicity Metals		Leachate Concentration		Maximum(1) Concentration	Method of Analysis
Arsenic	(As)	0.002		5.0	F
Barium	(Ba)	0.075		100.0	P
Cadmium	(Cd)	0.005		1.0	P
Chromium	(Cr)	0.010	U	5.0	P
Lead	(Pb)	0.306		5.0	P
Mercury	(Hg)	0.0002	U	0.2	CV
Selenium	(Se)	0.003	U	1.0	F
Silver	(Ag)	0.010	U	5.0	P
Tin	(Sn)	0.500	U	*NA	P
Zinc	(Zn)	19.8		*NA	P

Laboratory Method Blank

Arsenic	(As)	0.002	U	5.0	F
Barium	(Ba)	0.137		100.0	P
Cadmium	(Cd)	0.005	U	1.0	P
Chromium	(Cr)	0.010	U	5.0	P
Lead	(Pb)	0.030	U	5.0	P
Mercury	(Hg)	0.0002	U	0.2	CV
Selenium	(Se)	0.003	U	1.0	F
Silver	(Ag)	0.010	U	5.0	P
Tin	(Sn)	0.500	U	*NA	P
Zinc	(Zn)	0.071		*NA	P

(1) Maximum Concentration Based on 40 CFR Chapter 1, Part 261.24

* Regualtory limits do not exist for tin and zinc.

NatEx Laboratories, Inc.
Pacific Northwest Environmental Laboratory, Inc.

TCLP ANALYSIS DATA SHEET
40 CFR Part 268, Method 1311

Client Sample ID:	Comp. L2-S1 thru L2-S6	**PNELI Sample ID:**	2933-02
Sample Matrix:	Soil	**Date Sample Received:**	02-13-91
Wt. Soil Extracted:	100 g	**Vol. Leachate:**	2.0 ℓ
Units of Measure:	mg/ℓ		

EP Toxicity Metals		Leachate Concentration		Maximum(1) Concentration	Method of Analysis
Arsenic	(As)	0.003		5.0	F
Barium	(Ba)	0.188		100.0	P
Cadmium	(Cd)	0.005	U	1.0	P
Chromium	(Cr)	0.010	U	5.0	P
Lead	(Pb)	0.052		5.0	P
Mercury	(Hg)	0.0002	U	0.2	CV
Selenium	(Se)	0.003	U	1.0	F
Silver	(Ag)	0.010	U	5.0	P
Tin	(Sn)	0.500	U	*NA	P
Zinc	(Zn)	6.49		*NA	P

Laboratory Method Blank

Arsenic	(As)	0.002	U	5.0	F
Barium	(Ba)	0.137		100.0	P
Cadmium	(Cd)	0.005	U	1.0	P
Chromium	(Cr)	0.010	U	5.0	P
Lead	(Pb)	0.030	U	5.0	P
Mercury	(Hg)	0.0002	U	0.2	CV
Selenium	(Se)	0.003	U	1.0	F
Silver	(Ag)	0.010	U	5.0	P
Tin	(Sn)	0.500	U	*NA	P
Zinc	(Zn)	0.071		*NA	P

(1) **Maximum Concentration Based on 40 CFR Chapter 1, Part 261.24**

* Regualtory limits do not exist for tin and zinc.

NatEx Laboratories, Inc.
Pacific Northwest Environmental Laboratory, Inc.

TCLP ANALYSIS DATA SHEET
40 CFR Part 268, Method 1311

Client Sample ID: Comp. L3-S1 thru L3-S6
PNELI Sample ID: 2933-03
Sample Matrix: Soil
Date Sample Received: 02-13-91
Wt. Soil Extracted: 100 g
Vol. Leachate: 2.0 ℓ
Units of Measure: mg/ℓ

EP Toxicity Metals		Leachate Concentration		Maximum(1) Concentration	Method of Analysis
Arsenic	(As)	0.002		5.0	F
Barium	(Ba)	0.085		100.0	P
Cadmium	(Cd)	0.016		1.0	P
Chromium	(Cr)	0.010	U	5.0	P
Lead	(Pb)	0.353		5.0	P
Mercury	(Hg)	0.0002	U	0.2	CV
Selenium	(Se)	0.003	U	1.0	F
Silver	(Ag)	0.010	U	5.0	P
Tin	(Sn)	0.500	U	*NA	P
Zinc	(Zn)	93.2		*NA	P
Laboratory Method Blank					
Arsenic	(As)	0.002	U	5.0	F
Barium	(Ba)	0.137		100.0	P
Cadmium	(Cd)	0.005	U	1.0	P
Chromium	(Cr)	0.010	U	5.0	P
Lead	(Pb)	0.030	U	5.0	P
Mercury	(Hg)	0.0002	U	0.2	CV
Selenium	(Se)	0.003	U	1.0	F
Silver	(Ag)	0.010	U	5.0	P
Tin	(Sn)	0.500	U	*NA	P
Zinc	(Zn)	0.071		*NA	P

(1) Maximum Concentration Based on 40 CFR Chapter 1, Part 261.24

* Regualtory limits do not exist for tin and zinc.

TCLP ANALYSIS DATA SHEET
40 CFR Part 268, Method 1311

Client Sample ID:	Comp. L4-S1 thru L4-S6	**PNELI Sample ID:**	2933-04
Sample Matrix:	Soil	**Date Sample Received:**	02-13-91
Wt. Soil Extracted:	100 g	**Vol. Leachate:**	2.0 ℓ
Units of Measure:	mg/ℓ		

EP Toxicity Metals		Leachate Concentration		Maximum(1) Concentration	Method of Analysis
Arsenic	(As)	0.008		5.0	F
Barium	(Ba)	0.182		100.0	P
Cadmium	(Cd)	0.005	U	1.0	P
Chromium	(Cr)	0.011		5.0	P
Lead	(Pb)	1.07		5.0	P
Mercury	(Hg)	0.0002	U	0.2	CV
Selenium	(Se)	0.003	U	1.0	F
Silver	(Ag)	0.010	U	5.0	P
Tin	(Sn)	0.500	U	*NA	P
Zinc	(Zn)	48.6		*NA	P

Laboratory Method Blank

Arsenic	(As)	0.002	U	5.0	F
Barium	(Ba)	0.137		100.0	P
Cadmium	(Cd)	0.005	U	1.0	P
Chromium	(Cr)	0.010	U	5.0	P
Lead	(Pb)	0.030	U	5.0	P
Mercury	(Hg)	0.0002	U	0.2	CV
Selenium	(Se)	0.003	U	1.0	F
Silver	(Ag)	0.010	U	5.0	P
Tin	(Sn)	0.500	U	*NA	P
Zinc	(Zn)	0.071		*NA	P

(1) Maximum Concentration Based on 40 CFR Chapter 1, Part 261.24

* Regualtory limits do not exist for tin and zinc.

NatEx Laboratories, Inc.
Pacific Northwest Environ[illegible]ntal Laboratory, Inc.

\TCLP

TCLP ANALYSIS DATA SHEET
40 CFR Part 268, Method 1311

Client Sample ID: Comp. L5-S1 thru L5-S6
PNELI Sample ID: 2933-05
Sample Matrix: Soil
Date Sample Received: 02-13-91
Wt. Soil Extracted: 100 g
Vol. Leachate: 2.0 ℓ
Units of Measure: mg/ℓ

EP Toxicity Metals		Leachate Concentration		Maximum(1) Concentration	Method of Analysis
Arsenic	(As)	0.002		5.0	F
Barium	(Ba)	0.164		100.0	P
Cadmium	(Cd)	0.005	U	1.0	P
Chromium	(Cr)	0.010	U	5.0	P
Lead	(Pb)	0.069		5.0	P
Mercury	(Hg)	0.0002	U	0.2	CV
Selenium	(Se)	0.003	U	1.0	F
Silver	(Ag)	0.010	U	5.0	P
Tin	(Sn)	0.500	U	*NA	P
Zinc	(Zn)	13.0		*NA	P

Laboratory Method Blank

Arsenic	(As)	0.002	U	5.0	F
Barium	(Ba)	0.137		100.0	P
Cadmium	(Cd)	0.005	U	1.0	P
Chromium	(Cr)	0.010	U	5.0	P
Lead	(Pb)	0.030	U	5.0	P
Mercury	(Hg)	0.0002	U	0.2	CV
Selenium	(Se)	0.003	U	1.0	F
Silver	(Ag)	0.010	U	5.0	P
Tin	(Sn)	0.500	U	*NA	P
Zinc	(Zn)	0.071		*NA	P

(1) Maximum Concentration Based on 40 CFR Chapter 1, Part 261.24

* Regualtory limits do not exist for tin and zinc.

NatEx Laboratories, Inc.
Pacific Northwest Environm--ntal Laboratory, Inc.

TCLP ANALYSIS DATA SHEET
40 CFR Part 268, Method 1311

Client Sample ID:	Comp. L6-S1 thru L6-S6	**PNELI Sample ID:**	2933-06
Sample Matrix:	Soil	**Date Sample Received:**	02-13-91
Wt. Soil Extracted:	100 g	**Vol. Leachate:**	2.0 ℓ
Units of Measure:	mg/ℓ		

EP Toxicity Metals		Leachate Concentration		Maximum(1) Concentration	Method of Analysis
Arsenic	(As)	0.002	U	5.0	F
Barium	(Ba)	0.189		100.0	P
Cadmium	(Cd)	0.005	U	1.0	P
Chromium	(Cr)	0.010	U	5.0	P
Lead	(Pb)	0.173		5.0	P
Mercury	(Hg)	0.0002	U	0.2	CV
Selenium	(Se)	0.003	U	1.0	F
Silver	(Ag)	0.010	U	5.0	P
Tin	(Sn)	0.500	U	*NA	P
Zinc	(Zn)	27.3		*NA	P

Laboratory Method Blank

Arsenic	(As)	0.002	U	5.0	F
Barium	(Ba)	0.137		100.0	P
Cadmium	(Cd)	0.005	U	1.0	P
Chromium	(Cr)	0.010	U	5.0	P
Lead	(Pb)	0.030	U	5.0	P
Mercury	(Hg)	0.0002	U	0.2	CV
Selenium	(Se)	0.003	U	1.0	F
Silver	(Ag)	0.010	U	5.0	P
Tin	(Sn)	0.500	U	*NA	P
Zinc	(Zn)	0.071		*NA	P

(1) Maximum Concentration Based on 40 CFR Chapter 1, Part 261.24

* Regualtory limits do not exist for tin and zinc.

NatEx Laboratories, Inc.
Pacific Northwest Environmental Laboratory, Inc.

\TCLP

TCLP ANALYSIS DATA SHEET
40 CFR Part 268, Method 1311

Client Sample ID:	Rinseate Blank	PNELI Sample ID:	2933-07
Sample Matrix:	Water	Date Sample Received:	02-13-91
Wt. Soil Extracted:	NA	Vol. Leachate:	2.0 ℓ
Units of Measure:	mg/ℓ		

EP Toxicity Metals		Leachate Concentration		Maximum(1) Concentration	Method of Analysis
Arsenic	(As)	0.002	U	5.0	F
Barium	(Ba)	0.015	U	100.0	P
Cadmium	(Cd)	0.005	U	1.0	P
Chromium	(Cr)	0.010	U	5.0	P
Lead	(Pb)	0.030	U	5.0	P
Mercury	(Hg)	0.0002	U	0.2	CV
Selenium	(Se)	0.003	U	1.0	F
Silver	(Ag)	0.010	U	5.0	P
Tin	(Sn)	0.500	U	*NA	P
Zinc	(Zn)	0.052		*NA	P

Laboratory Method Blank

Arsenic	(As)	0.002	U	5.0	F
Barium	(Ba)	0.137		100.0	P
Cadmium	(Cd)	0.005	U	1.0	P
Chromium	(Cr)	0.010	U	5.0	P
Lead	(Pb)	0.030	U	5.0	P
Mercury	(Hg)	0.0002	U	0.2	CV
Selenium	(Se)	0.003	U	1.0	F
Silver	(Ag)	0.010	U	5.0	P
Tin	(Sn)	0.500	U	*NA	P
Zinc	(Zn)	0.071		*NA	P

(1) Maximum Concentration Based on 40 CFR Chapter 1, Part 261.24

* Regualtory limits do not exist for tin and zinc.

NatEx Laboratories, Inc.
Pacific Northwest Environmental Laboratory, Inc.

TCLP DUPLICATE/MATRIX SPIKE ANALYSIS DATA SHEET
40 CFR Part 268, Method 1311

Sample Duplicate

Client Sample ID: Comp. L3-S1 thru L3-S6
PNELI Sample ID: 2933-03DUP
Sample Matrix: Soil
Date Sample Received: 02-13-91
Wt. Soil Extracted: 100 g
Vol. Leachate: 2.0 ℓ
Units of Measure: mg/ℓ

EP Toxicity Metals		Duplicate Sample Leachate Concentration		Original Sample Leachate Concentration		Relative Percent Difference
Arsenic	(As)	0.002		0.002		0
Barium	(Ba)	0.147		0.085		53.4
Cadmium	(Cd)	0.016		0.016		0
Chromium	(Cr)	0.010	U	0.010	U	NC
Lead	(Pb)	0.363		0.353		2.8
Mercury	(Hg)	0.0002	U	0.0002	U	NC
Selenium	(Se)	0.003	U	0.003	U	NC
Silver	(Ag)	0.010	U	0.010	U	NC
Tin	(Sn)	0.500	U	0.500	U	NC
Zinc	(Zn)	89.4		93.2		4.2

Labratory Matrix Spike

Client Sample ID: Comp. L3-S1 thru L3-S6
PNELI Sample ID: 2933-03
Sample Matrix: Soil
Date Sample Received: 02-13-91
Wt. Soil Extracted: 100 g
Vol. Leachate: 2.0 ℓ
Units of Measure: mg/ℓ

EP Toxicity Metals		Spike Sample Leachate Concentration	Original Sample Leachate Concentration		Spike Level	Percent Recovery
Arsenic	(As)	0.040	0.002		0.040	95.0
Barium	(Ba)	1.95	0.085		2.0	93.2
Cadmium	(Cd)	0.065	0.016		0.050	98.0
Chromium	(Cr)	0.205	0.010	U	0.200	102
Lead	(Pb)	0.829	0.353		0.500	95.2
Mercury	(Hg)	0.00089	0.0002	U	0.001	89.0
Selenium	(Se)	0.006	0.003	U	0.010	60
Silver	(Ag)	0.046	0.010	U	0.050	92.0
Zinc	(Zn)	96.2	93.2		0.500	NS

INORGANIC ANALYSIS REPORT

Client Sample ID	Comp. L1-S1 thru L1-S6	Comp. L2-S1 thru L2-S6	Comp. L3-S1 thru L3-S6	Comp. L4-S1 thru L4-S6
PNELI Sample ID	2933-01	2933-02	2933-03	2933-04
Sample Matrix	Soil	Soil	Soil	Soil
Date Sample Received	02-13-91	02-13-91	02-13-91	02-13-91
Date Sample Analyzed	02-15-91	02-15-91	02-15-91	02-15-91

Compound				
Soil pH measured in deionized water	—	—	7.43	—
Soil pH measured in 0.01M $CaCl_2$	8.02	9.28	—	8.32

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INORGANIC ANALYSIS REPORT

Client Sample ID	Comp. L5-S1 thru L5-S6	Comp. L6-S1 thru L6-S6
PNELI Sample ID	2933-05	2933-06
Sample Matrix	Soil	Soil
Date Sample Received	02-13-91	02-13-91
Date Sample Analyzed	02-15-91	02-15-91

Compound		
Soil pH measured in deionized water	—	7.75
Soil pH measured in 0.01M $CaCl_2$	7.61	—

NatEx Laboratories, Inc.
Pacific Northwest Environmental Laboratory, Inc.

\IAR

INORGANIC DUPLICATE ANALYSIS REPORT

Client Sample ID: Comp. L3-S1 thru L3-S6 **PNELI Sample ID:** 2933-03

Sample Matrix: Soil **Date Sample Received:** 02-13-91

Analyte	Duplicate Sample Concentration	Original Sample Concentration	Relative % Difference
Soil pH measured in deionized water	7.33	7.43	1.36

INORGANIC ANALYSIS REPORT

Client Sample ID	Comp. L2-S1 thru L2-S6	Comp. L2-S1 thru L2-S6	Comp. L2-S1 thru L2-S6
PNELI Sample ID	2933-02	2933-02	2933-02
Sample Matrix	Soil	Soil	Soil
Date Sample Received	02-13-91	02-13-91	02-13-91
Date Sample Analyzed	03-02-91	03-02-91	02-27-91
Units of Measure	mg/kg	mg/kg	°C

Compound			
Reactive Cyanide	5.0 U	—	—
Reactive Sulfide	—	50.0 U	—
Ignitability	—	—	>100

RECEIVED
FEB 27 1998
DEPT. OF ECOLOGY

City of Seattle
Paul Schell, *Mayor*

King County
Ron Sims, *Executive*

Seattle-King County Department of Public Health

Alonzo L. Plough, Ph.D., MPH, *Director*

February 17, 1998

Port of Seattle
Property Manager
PO Box 1209
Seattle, WA 98111

Dear Owner:

The Seattle-King County Health Department has completed the site hazard assessment (SHA) of the MST Chemical at Terminal 115 site, as required under the Model Toxics Control Act. This site's hazard ranking, an estimation of the potential threat to human health and/or the environment relative to all other Washington State sites assessed at this time, has been determined to be a 5, where 1 represents the highest relative risk and 5 the lowest.

For your information, the Washington State Department of Ecology will be publishing the ranking of this and other recently assessed sites in the February 17, 1998 special issue of the Site Register. The site hazard ranking will be used in conjunction with other site-specific considerations in determining Ecology's priority for future actions.

If you have any questions relating to the SHA of your site, please contact me at (206) 296-4724. If you have any inquiries or comments about the site scoring/ranking process, please call Michael Spencer at (360) 407-7195. For inquiries regarding any further activities at your site now that it is on Ecology's Hazardous Sites List, please call Norm Peck at (425) 649-7047.

Sincerely,

Peter Isaksen
Environmental Health Specialist

CT:ma

cc: Michael Spencer, Department of Ecology Headquarters
Norm Peck, Department of Ecology Northwest Regional Office
Dennis Griffith, Schnitzer Steel Industries, Inc.

solidwaste/template/letter2

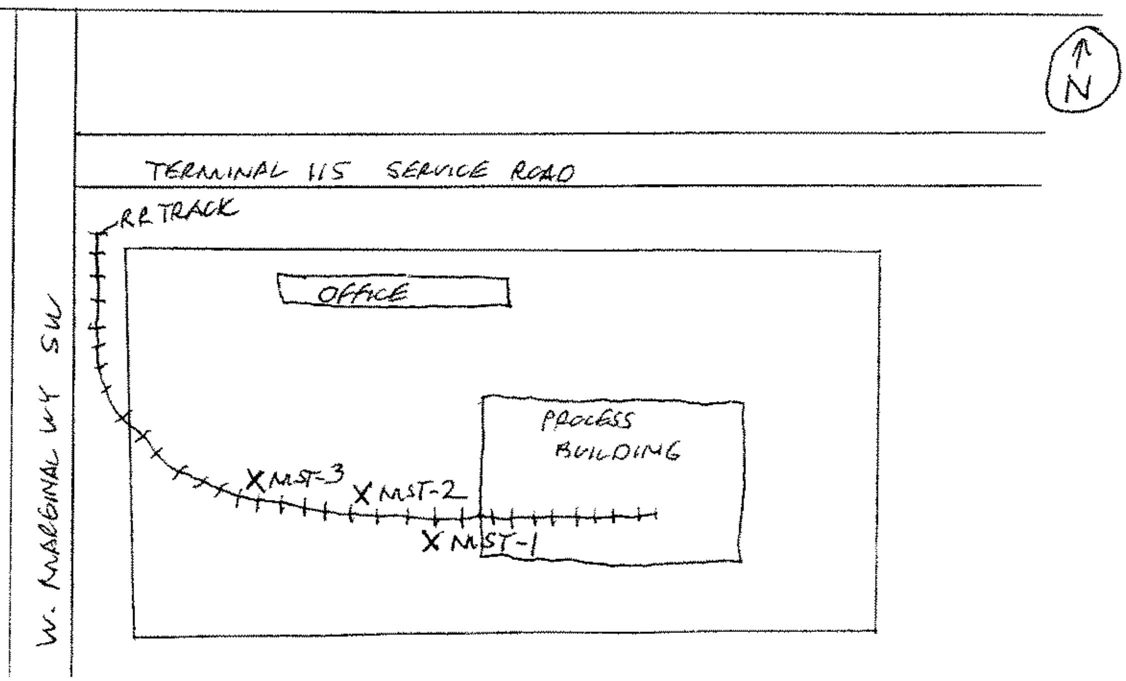
FIELD SAMPLE SHEET

Property Name: MST CHEMICALS
6020 W. MARGINAL WY SW

DATE: 11/07/97

Sample #	Type of Sample	Location/DEPTH
1. MST-1	SOIL/METALS	SEE MAP/6"
2. MST-2	SOIL/METALS	SEE MAP/5"
3. MST-3	SOIL/METALS	SEE MAP/16"
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Location Map:



Date of Report: November 17, 1997
Samples Submitted: November 7, 1997
Lab Traveler: 11-031
Project: MST Chemical

Total Metals
EPA 6010/7471

Date Extracted: 11-10&13-97
Date Analyzed: 11-12&13-97

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 11-031-1
Client ID: MST-1

Analyte	Method	Dilution Factor	Result	PQL
Arsenic	6010	1.0	**ND**	11
Barium	6010	1.0	**120**	0.57
Cadmium	6010	1.0	**0.98**	0.57
Chromium	6010	1.0	**22**	0.57
Lead	6010	1.0	**470**	5.7
Mercury	7471	1.0	**ND**	0.29
Selenium	6010	1.0	**ND**	11
Silver	6010	1.0	**ND**	0.57
Tin	6010	1.0	**550**	57
Zinc	6010	1.0	**310**	0.57

Date of Report: November 17, 1997
Samples Submitted: November 7, 1997
Lab Traveler: 11-031
Project: MST Chemical

Total Metals
EPA 6010/7471

Date Extracted: 11-10&13-97
Date Analyzed: 11-12&13-97

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 11-031-2
Client ID: MST-2

Analyte	Method	Dilution Factor	Result	PQL
Arsenic	6010	1.0	**ND**	11
Barium	6010	1.0	**32**	0.54
Cadmium	6010	1.0	**0.69**	0.54
Chromium	6010	1.0	**33**	0.54
Lead	6010	1.0	**110**	5.4
Mercury	7471	1.0	**ND**	0.27
Selenium	6010	1.0	**ND**	11
Silver	6010	1.0	**ND**	0.54
Tin	6010	10.0	**880**	540
Zinc	6010	1.0	**330**	0.54

Date of Report: November 17, 1997
Samples Submitted: November 7, 1997
Lab Traveler: 11-031
Project: MST Chemical

Total Metals
EPA 6010/7471

Date Extracted: 11-10&13-97
Date Analyzed: 11-12&13-97

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 11-031-3
Client ID: MST-3

Analyte	Method	Dilution Factor	Result	PQL
Arsenic	6010	1.0	**ND**	12
Barium	6010	1.0	**19**	0.59
Cadmium	6010	1.0	**ND**	0.59
Chromium	6010	1.0	**8.4**	0.59
Lead	6010	1.0	**36**	5.9
Mercury	7471	1.0	**ND**	0.29
Selenium	6010	1.0	**ND**	12
Silver	6010	1.0	**ND**	0.59
Tin	6010	1.0	**170**	59
Zinc	6010	1.0	**76**	0.59

Date of Report: November 17, 1997
Samples Submitted: November 7, 1997
Lab Traveler: 11-031
Project: MST Chemical

Total Metals
EPA 6010/7471
METHOD BLANK QUALITY CONTROL

Date Extracted:	11-10&13-97
Date Analyzed:	11-12&13-97
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	MB1110S1/MB1113S1

Analyte	Method	Dilution Factor	Result	PQL
Arsenic	6010	1.0	**ND**	10
Barium	6010	1.0	**ND**	0.50
Cadmium	6010	1.0	**ND**	0.50
Chromium	6010	1.0	**ND**	0.50
Lead	6010	1.0	**ND**	5.0
Mercury	7471	1.0	**ND**	0.25
Selenium	6010	1.0	**ND**	10
Silver	6010	1.0	**ND**	0.50
Tin	6010	1.0	**ND**	50.0
Zinc	6010	1.0	**ND**	0.50

Date of Report: November 17, 1997
Samples Submitted: November 7, 1997
Lab Traveler: 11-031
Project: MST Chemical

Total Metals
EPA 6010/7471
DUPLICATE QUALITY CONTROL

Date Extracted: 11-10&13-97
Date Analyzed: 11-12&13-97

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 11-024-1

Analyte	Dilution	Sample Result	Duplicate Result	RPD	Flags	PQL
Arsenic	1.0	**ND**	**ND**	NA		10
Barium	1.0	**45.4**	**44.5**	2.1		0.50
Cadmium	1.0	**ND**	**ND**	NA		0.50
Chromium	1.0	**7.40**	**6.80**	8.5		0.50
Lead	1.0	**14.5**	**14.1**	3.2		5.0
Mercury	1.0	**ND**	**ND**	NA		0.25
Selenium	1.0	**ND**	**ND**	NA		10
Silver	1.0	**ND**	**ND**	NA		0.50
Tin	1.0	**ND**	**ND**	NA		50.0
Zinc	1.0	**39.6**	**40.1**	1.1		0.50

Date of Report: November 17, 1997
Samples Submitted: November 7, 1997
Lab Traveler: 11-031
Project: MST Chemical

Total Metals
EPA 6010/7471
MS/MSD QUALITY CONTROL

Date Extracted: 11-10&13-97
Date Analyzed: 11-12&13-97

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 11-024-1

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Arsenic	100	**82.6**	83	**84.9**	85	2.7	
Barium	100	**126**	80	**137**	92	14	
Cadmium	50	**36.8**	74	**38.6**	77	4.6	
Chromium	100	**92.2**	85	**94.2**	87	2.4	
Lead	250	**197**	73	**204**	76	3.8	
Mercury	2.5	**2.57**	103	**2.43**	97	5.8	
Selenium	100	**114**	114	**108**	108	5.8	
Silver	50	**33.7**	67	**30.7**	61	9.3	
Tin	250	**182**	73	**185**	74	1.7	
Zinc	50	**83.1**	87	**77.7**	76	13	

Date of Report: November 17, 1997
Samples Submitted: November 7, 1997
Lab Traveler: 11-031
Project: MST Chemical

Date Analyzed: 11-10-97

% MOISTURE

Client ID	Lab ID	% Moisture
MST-1	11-031-1	13
MST-2	11-031-2	8.0
MST-3	11-031-3	15

Appendix F
Aerial Photos

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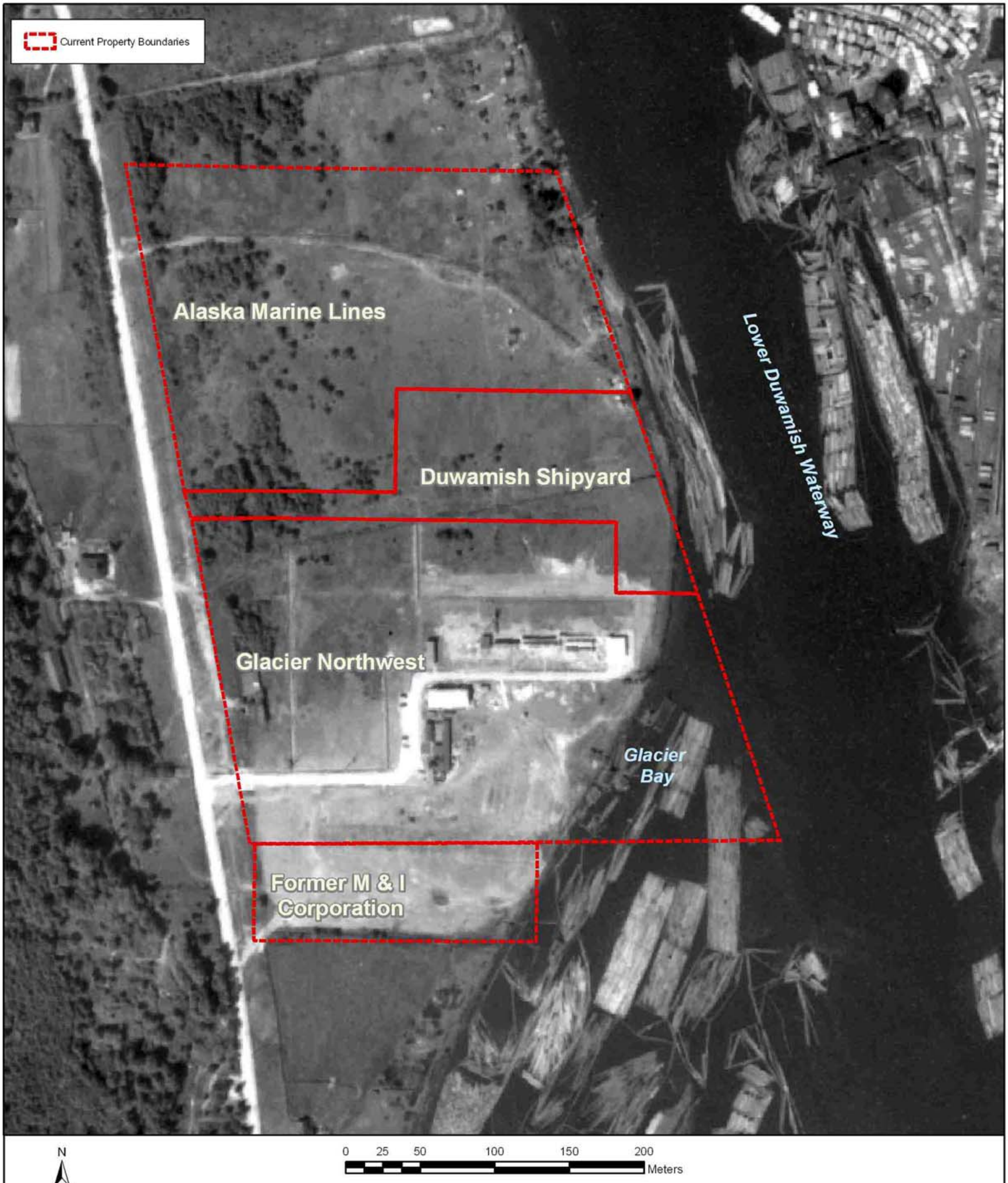
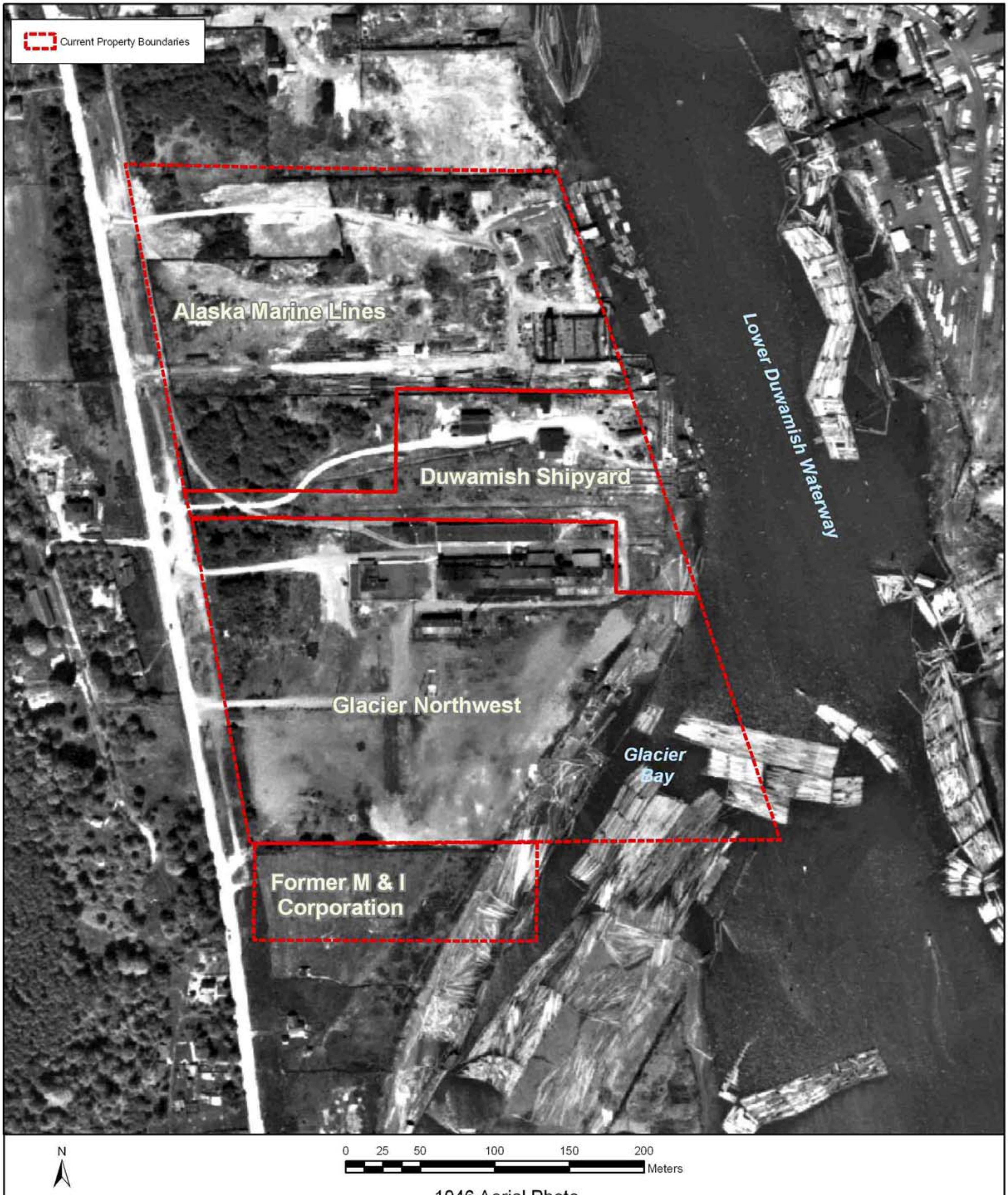


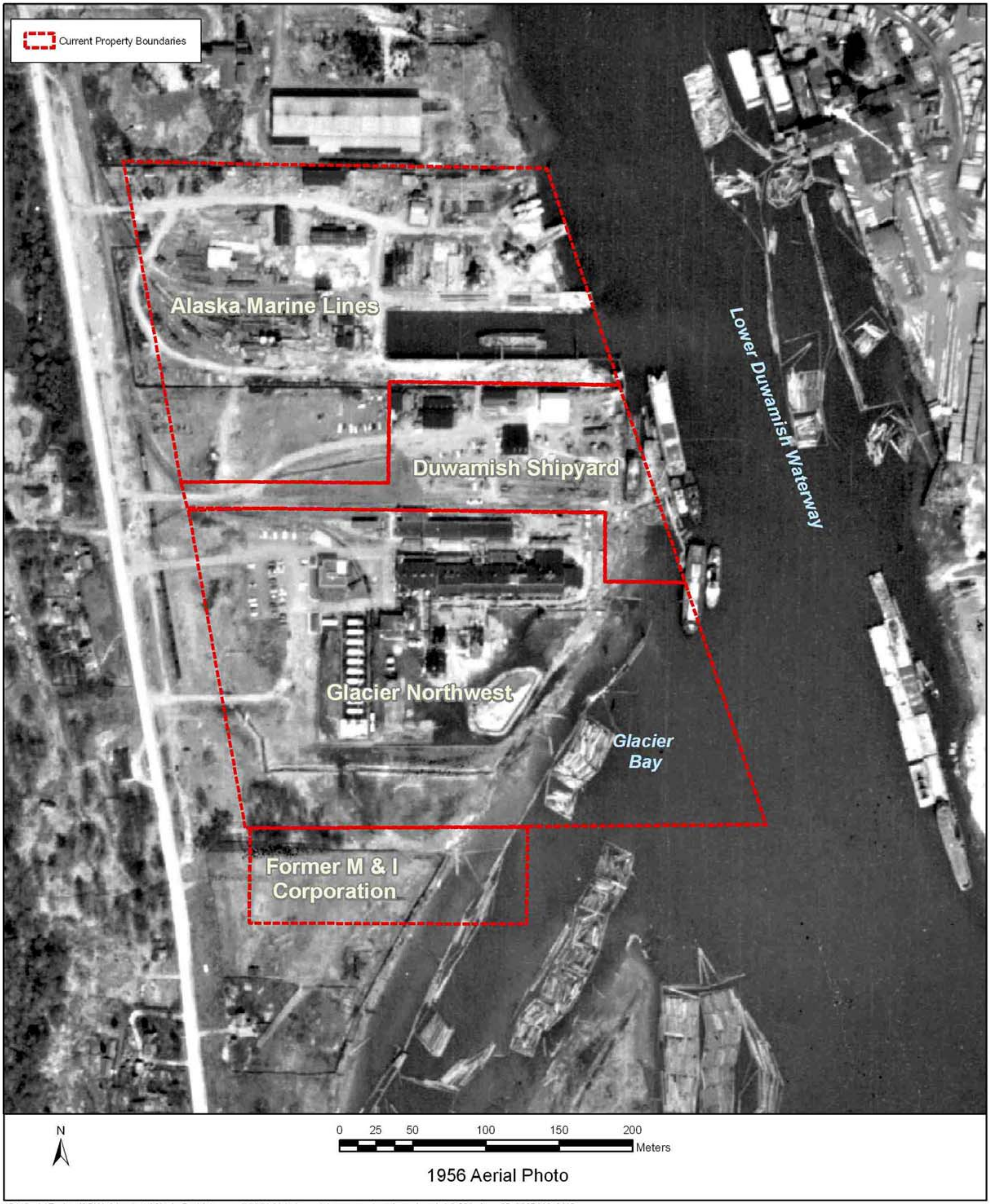
1941 Aerial Photo

\0440_gis\Ecology\LDW\gis\projects\GlacierBay\data_gaps\YYYY_historic_aerial_w-currrentpropbound.mxd 1:3,500 June 25, 2007 MG SAIC



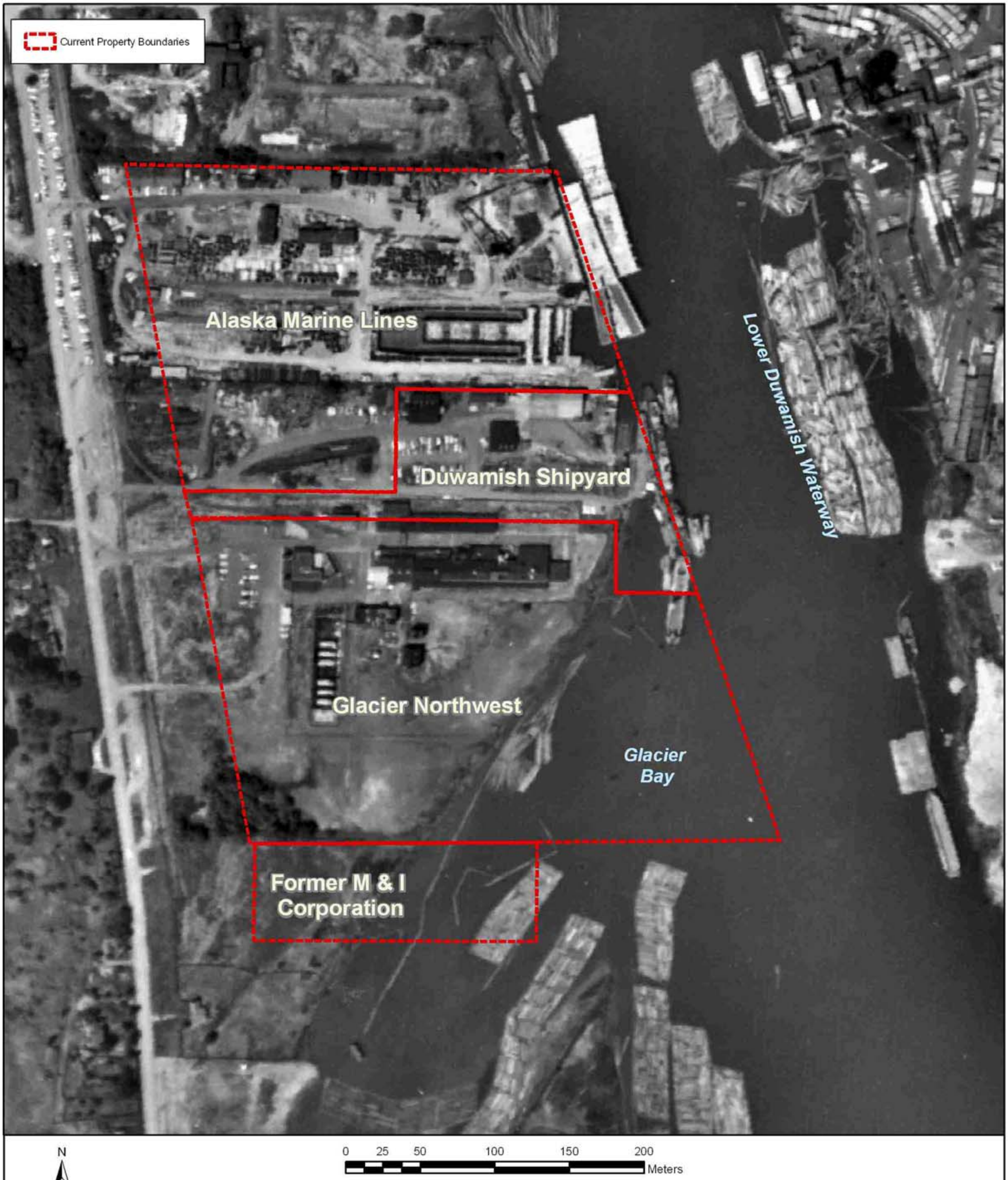
1946 Aerial Photo

:\0440_gis\Ecology\LDW\gis\projects\GlacierBay\data_gaps\YYYY_historic_aerial_w-currrentpropbound.mxd 1:3,500 June 25, 2007 MG SAIC



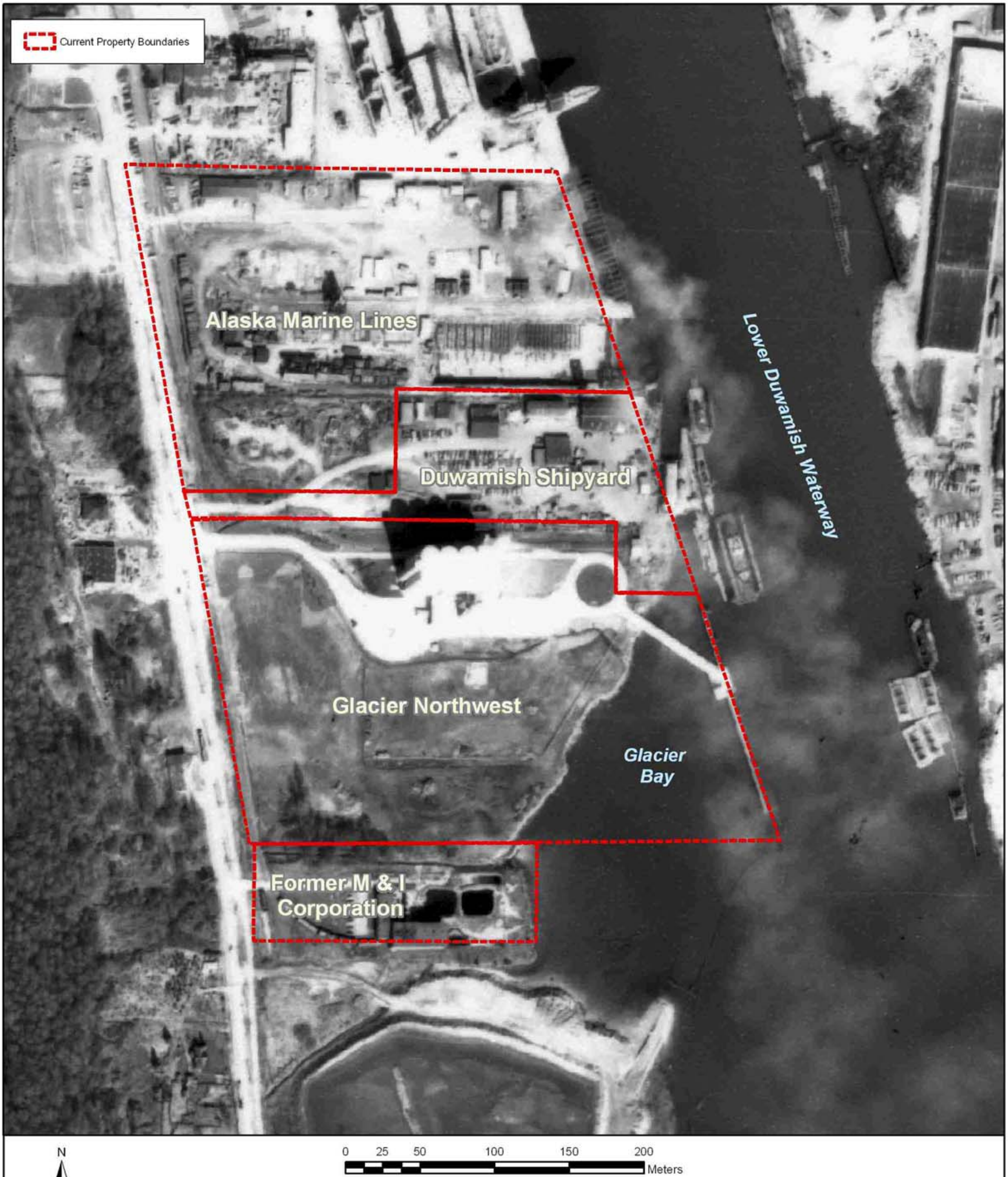
1956 Aerial Photo

\0440_gis\Ecology\LDW\gis\projects\GlacierBay\data_gaps\YYYY_historic_aerial_w-currrentpropbound.mxd 1:3,500 June 25, 2007 MG SAIC



1960 Aerial Photo

\0440_gis\Ecology\LDW\gis\projects\GlacierBay\data_gaps\YYYY_historic_aerial_w-currentpropbound.mxd 1:3,500 June 25, 2007 MG SAIC



1969 Aerial Photo

:\0440_gis\Ecology\LDW\gis\projects\GlacierBay\data_gaps\YYYY_historic_aerial_w-currrentpropbound.mxd 1:3,500 June 25, 2007 MG SAIC