Lower Duwamish Waterway
RM 1.0 to 1.3 West
(Kellogg Island to Lafarge)

Summary of Existing Information and Identification of Data Gaps

Prepared for

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Acronyms and Abbreviations

2LAET	second lowest apparent effects threshold
AET	apparent effects threshold
BART	best available retrofit technology
BEHP	bis(2-ethylhexyl)phthalate
bgs	below ground surface
BMP	best management practice
CKD	cement kiln dust
COC	chemical of concern
CSCSL	Confirmed or Suspected Contaminated Sites List
CSL	Cleanup Screening Level
CSO	combined sewer overflow
DW	dry weight
EAA	Early Action Area
ECHO	Enforcement and Compliance History Online
Ecology	Washington State Department of Ecology
EOF	emergency overflow
EPA	U.S. Environmental Protection Agency
GIS	Geographic Information Systems
HPAH	high molecular weight polycyclic aromatic hydrocarbon
ISIS	Integrated Site Information System
LAET	lowest apparent effects threshold
LDW	Lower Duwamish Waterway
LDWG	Lower Duwamish Waterway Group
LUST	leaking underground storage tank
mg/kg	milligrams per kilogram
MOU	Memorandum of Understanding
ng/kg	nanogram per kilogram
NOAA	National Oceanic and Atmospheric Administration
NOV	Notice of Violation
NPDES	National Pollutant Discharge Elimination System
NTU	nephelometric turbidity unit
NWRO	Northwest Regional Office
OC	organic carbon
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCT	polychlorinated terphenyl
PSAPCA	Puget Sound Air Pollution Control Agency
PSCAA	Puget Sound Clean Air Agency
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RM	River Mile
SAIC	Science Applications International Corporation
SCAP	Source Control Action Plan
SMS	Sediment Management Standards

SQS	Sediment Quality Standard
SVOC	semivolatile organic compound
SWPPP	Stormwater Pollution Prevention Plan
TEQ	toxicity equivalent
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TSS	total suspended solids
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound
WAC	Washington Administrative Code
WQC	water quality criterion
WWTP	wastewater treatment plant
µg/L	micrograms per liter

1.0 Introduction

1.1 Background and Purpose

This *Summary of Existing Information and Identification of Data Gaps* report (Data Gaps Report) pertains to River Mile (RM) 1.0 to 1.3 West[1] (Kellogg Island to Lafarge), one of 24 source control areas identified as part of the overall cleanup process for the Lower Duwamish Waterway (LDW) Superfund Site (Figure 1). It summarizes readily available information regarding properties in the Kellogg Island to Lafarge source control area.

The purpose of this Data Gaps Report is as follows:

- Identify chemicals of potential concern in sediments near the Kellogg Island to Lafarge source control area.
- Evaluate potential contaminant migration pathways to LDW sediments.
- Identify and describe potential adjacent or upland sources of contaminants that could be transported to sediments.
- Identify critical data gaps that should be addressed to assess the potential for recontamination of sediments and the need for source control.
- Determine what, if any, effective source control is already in place.

The LDW consists of 5.5 miles of the Duwamish Waterway, as measured from the southern tip of Harbor Island to just south of the Norfolk Combined Sewer Overflow (CSO). The LDW flows into Elliott Bay in Seattle, Washington. The LDW was added to the U.S. Environmental Protection Agency (USEPA or EPA) National Priorities List in September 2001 due to the presence of chemical contaminants in sediment. The key parties involved in the LDW site are EPA, the Washington State Department of Ecology (Ecology), and the Lower Duwamish Waterway Group (LDWG), which is composed of the City of Seattle, King County, the Port of Seattle, and The Boeing Company. In December 2000, EPA and Ecology signed an agreement with the LDWG to conduct a Remedial Investigation/Feasibility Study (RI/FS) for the LDW site.

EPA is leading the effort to determine the most effective cleanup strategies for the LDW through the RI/FS process. Ecology is leading the effort to investigate upland sources of contamination and to develop plans to reduce contaminant migration to waterway sediments.[2] The LDWG collected data during a Phase 1 Remedial Investigation (RI) (Windward 2003) that were used to identify candidate locations for early cleanup action. Seven candidate early action areas (EAAs or Tier 1 sites) were identified. Ecology's *Lower Duwamish Waterway Source Control Status Report, 2003 to June 2007* (Ecology 2007a) and *Lower Duwamish Waterway Source Control Status Report, July 2007 to March 2008* (Ecology 2008) identified another 16 areas where source control actions may be necessary. One additional source control area was added by Ecology in 2010, for a total of 24 source control areas. The Kellogg Island to Lafarge source control area was identified as one of these areas. Subsequently, Ecology and EPA redefined the boundaries of

[1] River miles as defined in this report are measured from the southern tip of Harbor Island.
[2] EPA and Ecology signed an interagency Memorandum of Understanding (MOU) in April 2002 and updated the MOU in April 2004. The MOU divides responsibilities for the site. EPA is the lead agency for the sediment RI/FS, while Ecology is the lead agency for source control issues (EPA and Ecology 2002, 2004).

the source control areas, generally defined by stormwater drainage basins. The seven candidate EAAs and 17 additional source control areas are shown on Figure 1. Stormwater drainage basins located in the vicinity of the RM 1.0-1.3 West source control area are shown on Figure 2.

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

The LDW Source Control Strategy (Ecology 2004) describes the process for identifying source control issues and implementing effective controls for the LDW. The plan is to identify and manage potential sources of sediment recontamination in coordination with sediment cleanups. Source control will be achieved by using existing administrative and legal authorities to perform inspections and require necessary source control actions.

The strategy is based primarily on the principles of source control for sediment sites described in EPA's *Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites* (EPA 2002), and the Washington State Sediment Management Standards (SMS) (Washington Administrative Code [WAC] 173-340-370[7] and WAC 173-204-400). The Source Control Strategy involves developing and implementing a series of detailed, area-specific Source Control Action Plans (SCAPs).

Before developing a SCAP, Ecology prepares a Data Gaps Report for the source control area. Findings from the Data Gaps Report are reviewed by LDW stakeholders and are incorporated into the SCAP. This process helps to ensure that the action items identified in the SCAP will be effective, implementable, and enforceable. As part of the source control efforts for the Kellogg Island to Lafarge source control area, Ecology requested Science Applications International Corporation (SAIC) to prepare this Data Gaps Report.

1.2 Report Organization

Section 2.0 of this report provides background information on the Kellogg Island to Lafarge source control area, including location, physical characteristics, chemicals of concern (COCs), and pathways by which contaminants may reach sediments. Sections 3.0 and 4.0 describe potential sources of contaminants and data gaps that must be addressed in order to minimize the potential for LDW sediment recontamination. Section 5.0 provides a summary of data gaps, and Section 6.0 lists the documents reviewed during preparation of this report.

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

- Ecology Northwest Regional Office (NWRO) Central Records,
- Washington State Archives,
- Ecology Underground Storage Tank (UST) and Leaking Underground Storage Tank (LUST) lists,
- Ecology Facility/Site Database,
- Ecology Integrated Site Information System (ISIS) 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, Property Tax Records, and iMap, and
- Historical aerial photographs.

Information collected from the Facility/Site Database, ISIS, ECHO, EPA Envirofacts Warehouse, and King County property tax records was current as of December 13, 2010. Recent updates to these databases may not be reflected in this report.

1.3 Scope of Report

This report documents readily available information relevant to potential sources of contaminants to sediments near the Kellogg Island to Lafarge source control area, including outfalls and adjacent properties.

Information presented in this report is limited to the Kellogg Island to Lafarge source control area, direct discharges to the sediments near the source control area, and potential adjacent and upland contaminant sources. Source control with regard to any contaminated sediments removed or left in place during cleanup in this portion of the LDW will need to be addressed as part of the remedial action decision and design for this area.

Chemical data have been compared to relevant regulatory criteria and guidelines, as appropriate. The level of assessment conducted for the data reviewed in this report is determined by the source control objectives. The scope of this Data Gaps Report does not include data validation or analysis that exceeds what is required to reasonably achieve source control.

Air pollution is a potential source of sediment contamination with origins both inside and outside of the Kellogg Island to Lafarge source control area. Although limited discussion of atmospheric deposition is provided in Section 2.0, the scope of this report does not include an assessment of data gaps pertaining to the effects of air pollution on the sediments near the source control area. Because air pollution is a concern for the wider LDW region, Ecology will review work being conducted by the Washington State Department of Health and planned by the Puget Sound Partnership regarding atmospheric deposition.

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2.0 Kellogg Island to Lafarge Source Control Area

The Kellogg Island to Lafarge source control area (also referred to as the RM 1.0-1.3 West source control area) is located along the western side of the LDW Site between RM 1.0 and 1.3, as measured from the southern end of Harbor Island (Figure 1). There is only one property, Lafarge North America, Inc. (Lafarge), located within the Kellogg Island to Lafarge source control area (Figure 3). The Lafarge property extends from RM 1.0 to approximately 150 to 200 feet south of RM 1.2 West. To the west of the Kellogg Island to Lafarge source control area are West Marginal Way SW and Burlington Northern Railroad. The Kellogg Island to Lafarge source control area is bordered by the LDW to the north and east.

The Chemithon Corporation is located to the southwest and Alaska Marine Lines is immediately south of the Kellogg Island to Lafarge source control area and Lafarge property. These facilities were discussed in the Glacier Bay (RM 1.3-1.6 West) source control area Data Gaps Report and SCAP (SAIC 2007b; Ecology 2007c).

2.1 Site Description

General background information on the LDW is provided in the LDW RI Report (Windward 2010), which describes the history of dredging/filling and industrialization of the Duwamish River and its environs, as well as the physiographic properties, 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 Lafarge include an intermodal transportation terminal, railroad operations, and a manufacturer of synthetic detergents and surfactants.

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. Historically, the source control area was marsh and intertidal land until it was filled in 1921 during channel construction (Harper-Owes 1985).

Groundwater in the Duwamish Valley alluvium is typically encountered within about 3 meters (10 feet) of the ground surface and under unconfined conditions (Windward 2010). 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). Seeps along the northern property boundary indicate a northern component to groundwater flow beneath the Lafarge property (Windward 2004).

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. LDW sediments in the vicinity of the Kellogg Island to Lafarge source control area range

from greater than 80 percent fines near RM 1.0 West to 45–75 percent fines at the upstream end of the source control area, with isolated patches of finer and coarser material (Windward 2010). Total organic carbon (TOC) ranges from 0.09 to 4.12 percent (Appendix A).

In an effort to more thoroughly understand and evaluate facility operations and development in the source control area, SAIC reviewed historical aerial photographs from 1936 to 2004. These photographs represent conditions during roughly each decade. The current source control area is outlined in blue and has been superimposed on these photos. Throughout the review, the areas upland of the source control area remained forested, with increased residential housing over time. The aerial photographs and complete descriptions for the years 1936, 1946, 1956, 1960, 1969, 1974, 1980, 1990, and 2004 are provided in Appendix B. The descriptions are summarized below:

1936: The land adjacent to the LDW is in the early stages of development. A dirt road and small wharf exist at the north end of the property around RM 1.0. There are large amounts of logs rafted around Kellogg Island. The southern plot of land has been cleared and graded. No buildings are present.

1946: Development continues on the land within the Kellogg Island to Lafarge source control area. Two buildings have been constructed on the north central area of the property. The western edge of the property has been cleared of vegetation, but not yet developed. A fence has been constructed on the southern property boundary. Reclamation of 55-gallon drums was known to take place on the property from 1944 to 1946. Logs are rafted near the eastern edge of the property, along with a large vessel and smaller boat.

1956: Ten new buildings have been built on the western portion of the property. While they appear to be industrial, it is unclear what types of operations occur at the new facilities. The fence on the southern boundary has been removed and the properties within the source control area appear to have merged into a single property. The shoreline to the north has been reinforced with riprap and logs are rafted off the eastern edge adjacent to the LDW. A pier has been constructed on the center portion of the property.

1960: The buildings on all areas of the property have been deconstructed but not replaced. Dirt roads running through the property remain similar to previous years. Logs are rafted along the eastern edge of the property. A railway has been constructed along the western property boundary, parallel to West Marginal Way SW.

1969: The Ideal Basic Industries (predecessor to Lafarge) cement manufacturing facility has been completely developed. Cement storage silos have been constructed on the northwestern portion of the property. A barge loading dock has also been constructed along the northern edge of the facility. A wharf has been built along the length of the property from north to south. A clay storage pit is visible inland along the northern portion of the wharf, and a larger limestone storage area runs along the wharf to the south. On the southeastern corner of the facility, a barge unloading tower is present. Inland from the wharf and storage pits is the manufacturing facility. The manufacturing area contains slurry tanks, numerous silos, mill buildings, a kiln dust tank, and a cooling tower. To the west, along West Marginal Way SW, there is a main office and parking lot. Another facility, Chemithon (Glacier Bay source control area), has been constructed southwest of the property boundary.

1974 to 1980: The source control area is relatively unchanged.

1990: The facility and operations remain largely unchanged since previous years. The barge unloading tower has been moved to the center portion of the property, between the two storage pits along the eastern wharf. Material conveyors have been installed from the clay storage pit through the storage area into the manufacturing area.

2004: The source control area is relatively unchanged.

2.2 Chemicals of Concern in Sediment

COCs in sediment near the Kellogg Island to Lafarge source control area were identified based on sediment sampling conducted between 1997 and 2006.

2.2.1 Sediment Investigations

Sediment samples have been collected from the area near RM 1.0-1.3 West as part of the investigations listed below. Sampling locations are listed in Table 1, and are shown in Figure 4. Data and information regarding the investigations performed prior to 2005 were compiled by Windward for the LDW RI (Windward 2003, 2010). Sediment sampling results (detections only) are listed in Appendix A, Tables A-1 and A-2, for surface and subsurface sediment samples, respectively.

- **Duwamish Waterway Sediment Characterization Study (NOAA 1998)**

  Eight surface sediment samples were collected near the source control area between September and October 1997. These samples were analyzed for polychlorinated biphenyls (PCBs) and polychlorinated terphenyls (PCTs).

- **EPA Site Inspection, Lower Duwamish River (Weston 1999)**

  Nine surface sediment samples were collected near the source control area in August 1998. Samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons (PAHs), metals, PCBs, dioxins/furans, and TOC.

- **LDW Phase 2 Remedial Investigation, Rounds 1, 2, and 3 Surface Sediment Sampling (Windward 2005a, 2005b, 2007b)**

  Six surface sediment samples were collected near the source control area during Rounds 1, 2, and 3 of the LDW Phase 2 RI during January and March 2005, and October 2006. All samples were analyzed for SVOCs, metals, PCBs, total solids, TOC, grain size, ammonia, sulfides, organochlorine pesticides, and butyltins. A subset of samples was also analyzed for dioxins/furans.

- **LDW Subsurface Sediment Sampling (Windward 2007a)**

  Twenty samples from three subsurface sediment cores were analyzed near the source control area during February 2006. Core depths ranged from 11.3 to 11.9 feet deep and were analyzed for metals, PCBs, and SVOCs. A subset of samples was analyzed for organo-tin compounds, pesticides, and dioxins/furans.

2.2.2 Identification of Chemicals of Concern

A COC is defined in this report as a chemical that is present in RM 1.0-1.3 West sediments at concentrations above regulatory criteria, and is therefore of particular interest with respect to source control. These COCs are the initial focus of the evaluation of potential contaminant sources.

The Washington SMS (Chapter 173-204 WAC) establish marine Sediment Quality Standard (SQS) and Cleanup Screening Level (CSL) values for some chemicals that may be present in sediments. The SQS values correspond to a sediment quality level that will result in no adverse effects on biological resources and no significant human health risk. CSLs represent minor adverse effects levels and are used as an upper regulatory threshold for making decisions about source control and cleanup. The SQS and CSL values are based on the Lowest Apparent Effects Threshold (LAET) and Second Lowest Apparent Effects Threshold (2LAET). Apparent Effects Threshold (AET) values are the concentrations of specific chemicals in sediment above which a significant adverse biological effect is observed (Ecology 1996). The AET values form the basis for both the Puget Sound Dredged Disposal Analysis program guidelines and the criteria contained in the SMS rule.

A chemical was identified as a COC for RM 1.0-1.3 West if it was detected in sediment at concentrations above the SQS in one or more surface or subsurface samples. A comparison of sample results to the SQS and 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 2 and 3. For non-polar organics, the dry weight concentrations were organic carbon (OC) normalized to allow comparison to the SQS/CSL, except when TOC in the sample is less than 0.5 percent or greater than 4 percent. When TOC is outside this range, OC normalization is not considered to be appropriate (Michelsen and Bragdon-Cook 1993, as cited in Windward 2010), and the dry weight (DW) concentrations for non-polar organics are instead compared to the LAET and 2LAET values, which are functionally equivalent to the SQS and CSL.

Chemicals detected in sediment for which no SQS/CSL values are available may be identified as COCs on a case-by-case basis. Additional contaminants may be present in soil, groundwater, stormwater, or stormwater solids at concentrations above regulatory criteria and/or draft soil-to-sediment or groundwater-to-sediment screening levels (SAIC 2006). These screening levels were developed to assist in the identification of upland properties that may pose a 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 exceedances of the SMS. 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. While not currently considered COCs in sediment, these chemicals may warrant further investigation, depending on site-specific

conditions, to evaluate the likelihood that they will lead to exceedances of the SMS criteria. Potential upland COCs are discussed as appropriate in Section 4.0

Chemicals with concentrations above the SQS or LAET in surface or subsurface sediment samples are listed below. In general, Tables 2 and 3 show chemicals were present in sediment samples at concentrations only slightly above the SQS or LAET values. The greatest exceedances in surface samples were observed for PAHs at location DR50 downstream of Outfall 004 (Figure 4). The greatest exceedances in subsurface samples were observed for metals and PCBs offshore of Outfall 001/2139[3] at a 6- to 7-foot deep sample from coring location LDW-SC19 (Figure 4).

The following chemicals are considered to be COCs in sediment for the Kellogg Island to Lafarge source control area:

Chemicals Detected at Concentrations above the SQS/CSL or LAET/2LAET	Surface Sediment		Subsurface Sediment	
	>SQS/ LAET	>CSL/ 2LAET	>SQS/ LAET	>CSL/ 2LAET
PAHs				
Benzo(a)anthracene	●			
Chrysene	●			
Fluoranthene	●	●		
Pyrene	●	●		
Total HPAH	●	●		
PCBs				
Total PCBs	●		●	●
Phthalate				
Bis(2-ethylhexyl)phthalate	●			

Exceedance factors, which are a measure of the degree to which maximum detected concentrations exceed the SQS/CSL values, are listed in Tables 2 and 3.

HPAH = high molecular weight PAH

Results for these chemicals are discussed in more detail below.

PAHs

The concentrations of benzo(a)anthracene (1.6 mg/kg DW) and chrysene (2.1 mg/kg DW), exceeded the LAET in sample DR050. DR050 is located downstream of Outfall 004 on the northeast side of the Lafarge property (Figure 4). Fluoranthene (6.7 mg/kg DW), pyrene (4.2 mg/kg DW), and total HPAH (18.2 mg/kg DW) concentrations exceeded the LAET and 2LAET in the same sample.

[3] Outfalls from Lafarge documents (Outfalls 001, 002, and 008) have been cross-referenced with outfall locations found during the LDW Remedial Investigation (RI) (Windward 2004). Outfall 004 was not located during the RI.

PCBs

Total PCB concentrations exceeded the SQS/LAET in two surface sediment samples, DR050 (0.24 mg/kg DW) and LDW-SS322 (0.28 mg/kg DW). These two samples were collected near Outfall 004, offshore of the dock on the northeast corner of the property (Figure 4).

Total PCB concentrations exceeded the SQS in eight subsurface samples collected from three coring locations (LDW-SC19, LDW-SC21, and LDW-SC24) and exceeded the CSL in two subsurface samples from coring locations LDW-SC19 and LDW-SC21. Concentrations at LDW-SC19 ranged from 0.23 mg/kg DW at 1 to 2 feet bgs to 2.4 mg/kg DW at 6 to 7 feet bgs. Concentrations at LDW-SC21 ranged from 0.25 mg/kg DW at 0 to 1 foot bgs to 1.7 mg/kg DW at 4 to 6.2 feet bgs. At LDW-SC24, total PCBs were detected at 0.28 mg/kg DW (14 mg/kg OC) at 0 to 1 foot bgs, which exceeded the SQS.

Phthalates

Bis(2-ethylhexyl)phthalate (BEHP) exceeded the SQS in one surface sample collected at LDW-SS322, which is downstream of Outfall 004, with a concentration of 0.45 mg/kg DW.

Other COCs

Although no sediment quality standards have been promulgated for dioxin/furan compounds and they are not shown on the table above, data for both chemical classes are shown in Tables A-1 and A-2 with other SMS chemicals of concern. Dioxin/furan compounds are considered potential COCs due to their presence in sediment samples at four locations in this area. Greatest concentrations of mammalian dioxin/furan toxic equivalents (TEQs) were detected at surface sample location LDW-SS36 (26 nanograms per kilogram [ng/kg] DW) and at coring location LDW-SC19 (28 ng/kg DW) from 0 to 1 foot bgs.

Organo-tin compounds are considered to be potential COCs at the Kellogg Island to Lafarge source control area due to their presence in sediment samples collected in this area. Organo-tin compounds were detected at six sampling locations, with concentrations from 0.0079 mg/kg DW dibutyltin at location LDW-SS38 to 0.17 mg/kg DW tributyltin at DR049.

2.2.3 Summary of Chemicals of Concern in Sediments

As described above, COCs were identified based on the results of sediment sampling conducted between 1997 and 2006. Chemicals that exceeded the SQS or LAET in at least one sediment sample offshore of the Kellogg Island to Lafarge source control area are considered COCs. In summary, the following chemicals are considered to be COCs in sediment near the Kellogg Island to Lafarge source control area:

- PAHs
- PCBs
- Phthalates
- Dioxin/furans
- Organo-tin compounds

2.3 Potential Pathways to Sediment

Potential sources of sediment recontamination associated with the Kellogg Island to Lafarge source control area include storm drains and discharges from adjacent properties. Transport pathways that could contribute to the recontamination of sediments associated with the Kellogg Island to Lafarge source control area following remedial activities include direct discharges via outfalls, surface runoff (sheet flow) from the adjacent Lafarge property, bank erosion, groundwater discharges, air deposition, and spills directly to the LDW. These pathways are described below and are discussed in more specific detail in Sections 3.0 and 4.0.

2.3.1 Direct Discharges via Outfalls

Direct discharges may occur from storm drain systems, CSOs, and emergency overflows (EOFs).

Some areas of the LDW are served by combined sewer systems, which carry both stormwater and municipal/industrial wastewater in a single pipe. These systems were generally constructed before about 1970 because it was less expensive to install a single pipe rather than separate storm and sanitary systems. Under normal rainfall conditions, wastewater and stormwater are conveyed through this combined sewer pipe to a wastewater treatment facility. During large storm events; however, the total volume of wastewater and stormwater can sometimes exceed the conveyance and treatment capacity of the combined sewer system. When this occurs, the combined sewer system is designed to overflow through relief points, called CSOs. The CSOs prevent the combined sewer system from backing up and creating flooding problems.

Untreated municipal/industrial wastewater and stormwater can potentially be discharged through CSOs to the LDW during these storm events. The City of Seattle owns and operates the local sanitary sewer collectors and trunk lines, while King County owns and operates the larger interceptor lines that transport flow from the local systems to the West Point Wastewater Treatment Plant (WWTP). The city's CSO network has its own National Pollutant Discharge Elimination System (NPDES) permit; the county's CSOs are administered under the NPDES permit established for the West Point WWTP.

An EOF is a discharge that can occur from either the combined or sanitary sewer systems that is not necessarily related to storm conditions and/or system capacity limitations. EOF discharges typically occur as a result of mechanical issues (e.g., pump station failures) or when transport lines are blocked; pump stations are operated by both the city and county. Pressure relief points are provided in the drainage network to discharge flow to an existing storm drain or CSO pipe under emergency conditions to prevent sewer backups. EOF events are not covered under the city's or county's existing CSO wastewater permits.

When preparing a Data Gaps Report for a source control area, all properties that potentially discharge to that source control area (whether through a CSO/EOF or a separated storm drain) are identified to the extent that the boundaries of the drainage basin are known. However, for areas where drainage basins overlap, a property review is performed only if the property has not already been included in a previously published Data Gaps Report. Exceptions include situations where contaminants may be transported to the current source control area via a transport pathway that was not applicable for the earlier evaluation.

Four active private outfalls and four abandoned outfalls associated with the Lafarge property are present within the RM 1.0-1.3 West source control area (Figure 3). One of the active outfalls (007) was addressed in the Data Gaps Report for the Glacier Bay source control area (SAIC 2007b). The Lafarge facility is the sole source of discharge within the source control area. Ecology issued the Lafarge facility an updated NPDES permit on December 30, 2010 (Ecology 2010).

Contaminants discharged via these outfalls could directly affect waterway sediments. There are no CSO or EOF outfalls within the RM 1.0-1.3 West source control area.

2.3.2 Surface Runoff (Sheet Flow)

In areas lacking collection systems, spills or leaks on properties adjacent to the LDW could flow directly over impervious surfaces or through creeks and ditches to the waterway. Current operational practices at adjacent properties could potentially contribute to the movement of contaminants to the LDW via runoff. The Lafarge facility has an extensive stormwater collection system for the treatment of stormwater before discharge. If the stormwater system exceeds capacity, surface runoff may result in transport of contaminants to sediment.

2.3.3 Spills to the LDW

Near-water and over-water activities have the potential to impact adjacent sediment from spills of material containing COCs. The Lafarge facility conducts dock operations for the loading and unloading of materials. Accidental spills to the LDW during loading/unloading operations at the Lafarge facility may result in transport of contaminants to sediment.

2.3.4 Groundwater Discharges

Contaminants in soil resulting from spills and releases to adjacent properties may be transported to groundwater and subsequently be released to the LDW. Approximately 90 percent of the Lafarge property is covered in pavement, buildings, or other structures. Groundwater contamination has not been documented at the Lafarge property.

Two seeps were identified at the facility during a survey of the LDW in July 2004 (Windward 2004). Seep location LDW-SP-65 was identified but not sampled (Figure 4). A sample was collected from seep location LDW-SP-64 at RM 1.0 West. The sample was analyzed for total PCBs, PAHs, pesticides, metals, and SVOCs, VOCs, TOC, total petroleum hydrocarbon (TPH), and total suspended solids (TSS). The total PCB concentration in the sample was 0.46 micrograms per liter (µg/L), which exceeds the marine chronic water quality criterion (WQC) for PCBs (0.014 µg/L). No other analytes were detected at concentrations that exceeded the WQC. Chemicals detected at this sample location are listed in Appendix A, Table A-3.

2.3.5 Bank Erosion

The banks of the LDW shoreline are susceptible to erosion by wind and surface water, particularly in areas where banks are steep. Shoreline armoring and the presence of vegetation reduce the potential for bank erosion. Contaminants in soils along the banks of the LDW, if present, could be released directly to sediments via erosion. During a reconnaissance survey of

the LDW in February 2011 by SAIC, it was observed that the Lafarge facility's banks were lined with bulkheads, pilings, and wharfs. No soil was visible at the time of the survey.

2.3.6 Atmospheric Deposition

Atmospheric deposition occurs when air pollutants enter the LDW directly or through stormwater. Air pollutants may be generated from point or non-point sources. Point sources include industrial facilities, and air pollutants may be generated from painting, sandblasting, loading/unloading of raw materials, and other activities, or through industrial smokestacks. Non-point sources include dispersed sources such as vehicle emissions, aircraft exhaust, and off-gassing from common materials such as plastics. Air pollutants may be transported over long distances by wind, and can be deposited to land and water surfaces by precipitation or particle deposition.

Contaminants originating from nearby properties and streets may be transported through the air and deposited at RM 1.0-1.3 West or in areas that drain to the LDW. Although chemical deposition from air directly to the LDW probably occurs, this mechanism is not likely to result in sediment concentrations above local background levels. Secondary impacts of air sources on the stormwater pathway to receiving waters and sediment are not well understood; additional information is needed. Recent and ongoing atmospheric deposition studies in the LDW area are summarized in the LDW Source Control Status Report (Ecology 2007a and subsequent updates). Ecology will continue to monitor these efforts.

Historically, the Lafarge facility was regulated as a point source of air emissions under the federal Clean Air Act. In January 2010, the USEPA and Lafarge entered a consent decree settlement to address alleged violations of the Clean Air Act at operations across the U.S. Several states and agencies, including Washington State and the Puget Sound Clean Air Agency (PSCAA), joined in the settlement. The consent decree required Lafarge to enhance the cement kiln at the Seattle facility to reduce emissions of nitrogen oxides, sulfur dioxide, and particulate matter if operations were to continue (EPA 2010c). Enhancements were not made to the kiln due to the high costs of capital investment and decreased market demand for cement. The kiln was to be put into a care and maintenance mode at the end of 2010 (Lafarge 2010).

The Lafarge air permit did not address sediment-specific contaminants in the LDW and the enforcement action did not indicate the ways in which reduced emissions of particulate matter, sulfur, or nitrogen oxides would affect sediment or water quality in the LDW.

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3.0 Potential for Sediment Recontamination from Outfalls

Storm drains convey stormwater runoff collected from streets, parking lots, roof drains, and residential, commercial, and industrial properties to the LDW. Storm drains entering the LDW carry runoff generated by rain and snow. A wide range of chemicals may become dissolved or suspended in runoff as rainwater flows over the land. Urban areas generally accumulate particulates, dust, oil, asphalt, rust, rubber, metals, pesticides, detergents, or other materials as a result of human activities throughout the drainage basin.

Human activities include landscaping, spills, illegal dumping, vehicle maintenance (fueling, washing), and vehicle use (wear on roads, tires, brakes, fluid leaks, and emissions). These materials can be flushed into storm drains during wet weather and are then conveyed to the waterway, mainly through the stormwater system. In addition, contaminants in soil or groundwater could enter the storm drain system through cracks or gaps in the stormwater piping.

No public outfalls, EOFs, or CSOs are located within the Kellogg Island to Lafarge source control area.

3.1 Lafarge Corporation Outfalls

The Lafarge property, which comprises the Kellogg Island to Lafarge source control area, is approximately 19.4 acres and about 90 percent covered with pavement, buildings, or other structures (Appendix B).

Eight outfalls are present on the Lafarge facility (Holnam 1994):

Outfall No.[1]	Diameter/Material	Outfall Type	Active
001/2139	8 inches cast iron	Recycled water	Y
002/2138	6 inches cast iron	Non-contact cooling water	N
003	Unknown	Non-contact cooling water	N
004	Unknown	Dock trench and plant drainage	Y
005	Unknown	Dock trench drainage	N
006	Unknown	Dock trench drainage	N
007	36 inches	Chemithon outfall	Y
008/2137	Unknown	Recycled water	Y

[1]Outfalls from Holnam/Lafarge documents (Outfalls 001, 002, and 008) have been cross-referenced with outfall locations found during the LDW Remedial Investigation (Windward 2010).

Lafarge Outfalls and Storm Drain System

The current water collection and drainage system at Lafarge is the result of several changes over time. In 1998, 20-horsepower lift pumps were installed on each drainage line for Outfalls 001/2139 and 004 to divert stormwater to the stormwater vault (see Basin 11 on Figure 5) for storage and reuse. These lift pumps (see Lift Stations 1 and 4 on Figure 5) have the capacity to pump between 600 and 1,200 gallons per minute (Lafarge 2010b). The system has the capability to handle flows up to the 10-year, 24-hour event (2.9 inches). The capture system allows the

plant to recycle a vast majority of its stormwater back into the cement manufacturing process. In 2001, the facility instituted a comprehensive stormwater recycling program as part of the SPU Water Smart Technology Program. Under routine operating conditions, stormwater was captured and reused as make-up water in the cement manufacturing process (Ecology 2011).

The facility storm drain system is shown in Figure 5. A water handling figure is shown in Appendix C. The content in these figures has not been independently verified by SAIC. The sewer point of discharge 1 (Basin 4) and truck wash sewer point of discharge 2 (Basin 1B) discharge to the sanitary sewer. These locations are not associated with an outfall and do not discharge to the LDW. Surface discharge (Basin 3) does not correlate with any known outfalls.

Until recently, the kiln continued working under normal operating conditions. Even with collection and reuse in the manufacturing process, stormwater occasionally needed to be discharged. Collected stormwater was used in the process and the facility did not discharge unless there was more rain than the collection system and recycling pumps could manage. Untreated stormwater was discharged from Outfalls 001/2139 and 004, although it is important to note that no discharges of this kind have occurred since 2007. Now that the kiln is no longer in use, stormwater continues to be collected and, if storage capacity is exceeded, the water is treated and discharged through Outfall 008/2137. Since 2006, discharges of this kind have occurred seven times (Ecology 2011).

Lafarge has incorporated many changes related to stormwater over the years. These are summarized in Section II.A. of Ecology's NPDES permit fact sheet (Ecology 2011), but the primary improvements dealt with nearly doubling storage capacity for collected water and better routing and flow management for recycling with a series of lift stations and pumps. In 2009, Lafarge pilot tested an electro-coagulation system for stormwater treatment because, with a decreased economy and lower demand for cement, the facility has gone into prolonged periods of shutdown. As noted above, when captured stormwater is not being recycled it exceeds storage capacity and needs to be discharged. Consequently, in preparation for reissuance of their NPDES permit and to address Ecology's concerns regarding adequacy of the stormwater collection and treatment system prior to 2009, Lafarge pilot-tested the electro-coagulation treatment system for stormwater. Lafarge submitted an AKART Engineering Report for the system to Ecology in June 2010, which was approved in August. Lafarge planned to decommission Outfalls 001/2139 and 004 in November 2010, and discharge stormwater solely from Outfall 008/2137 (Aquarias 2010). The new NPDES permit, which became effective January 1, 2011, requires Lafarge to evaluate operations of the final installation and provide an Engineering Report Addendum for review and approval. Meanwhile, Section S.1. of the NPDES permit contains effluent limits for turbidity, oil and grease, and pH with additional monitoring for certain chemicals in the water. Section S.2. of the permit summarizes other pollutants that are to be monitored in addition to the limited parameters. These chemicals are monitored twice a month in effluent: total copper, total lead, and total zinc. Other chemicals are monitored twice a year in effluent: phthalates, PCBs, PAHs, antimony, arsenic, beryllium, chromium III and VI, mercury, nickel, selenium, silver, and thallium (Ecology 2010).

Chemithon Corporation

Outfall 007 is owned by the Chemithon Corporation and was addressed in the Glacier Bay source control area Data Gaps Report (SAIC 2007b). In October 2006, Chemithon initiated plans

to discharge stormwater runoff to the LDW. No additional information was available during preparation of this report.Data Gaps

Information needed to assess the potential for sediment recontamination associated with the outfalls at the Lafarge facility is listed below:

- The Stormwater Treatment System Engineering Report (Aquarius 2010) indicated that Outfalls 001/2139 and 004 were planned to be decommissioned in November 2010. Information regarding the status of these outfalls is needed to assess the potential for sediment recontamination.
- The Stormwater Pollution Prevention Plan (SWPPP) stated that an updated stormwater treatment system would be installed within 12 months of NPDES permit renewal. Information regarding the status of a new stormwater system is needed to assess the potential for sediment recontamination.

As operations shift, a follow-up business inspection of Lafarge is needed to verify compliance with Ecology's recommendations, applicable regulations, and best management practices (BMPs) to prevent the release of contaminants to the LDW via stormwater.Additional data gaps associated with stormwater discharges are discussed in Section 5.1.

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4.0 Potential for Sediment Recontamination from Adjacent Properties

Property and facility-specific details regarding the parcel located within the Lafarge property are presented in this section. Lafarge is the only facility located within the Kellogg Island to Lafarge source control area. The potential for sediment recontamination associated with this facility is discussed in the following section.

Aerial photographs of the source control area for the years 1936, 1946, 1956, 1960, 1974, 1980, 1990, and 2004 are provided in Appendix B. A summary of the aerial photographs are provided in Appendix B.

4.1 Lafarge North America Inc. Seattle

Facility Summary: Lafarge North America Inc. Seattle	
Tax Parcel No.	1924049003
Address	5400 West Marginal Way SW
Property Owner	Lafarge North America, Inc.
Parcel Size	22.11 acres (963,128 sq ft)
Facility/Site ID	2132
SIC Code(s)	3241: Cement Manufacturing
EPA ID No.	WAD041580176
NPDES Permit No.	WA-000223-2
UST/LUST ID No.	3835/3004

The Lafarge facility comprises Parcel 9003. Lafarge is bordered to the north and east by the LDW and by West Marginal Way SW to the west (Figure 3). Chemithon Corporation and Alaska Marine Lines border the Lafarge facility on the southern boundary, and are discussed as part of the Glacier Bay source control area (SAIC 2007b). The Lafarge facility was built in 1967 and has remained relatively unchanged since its original construction. One aggregated building with a footprint of 141,125 square feet (sq ft) is present on the property. The entire site is paved, except for a grassy area near the front entrance. There is also unpaved ground beneath the limestone and gypsum outdoor storage areas (Lafarge 2010b).

4.1.1 Current Operations

On April 30, 2010, Lafarge issued a press release stating the recent economic downturn and upcoming federal air quality regulations caused a shift in operations and production at the facility. The kiln was to be placed in a care and maintenance mode for an indefinite period. The facility has transitioned into a cement grinding, blending, and shipping operation, and will no longer manufacture cement (Lafarge 2010a). Stormwater that was previously recycled into cement manufacturing will now need to be treated and discharged to the LDW or King County sanitary sewer.

The press release indicated that the plant transition was set to occur towards the end of 2010. Additional information on the facility transition was not available at the time this draft Data Gaps Report was prepared.

Material Used in Operations

Historically, the Lafarge facility's Alternate Raw Materials and Alternate Fuels Program converted a variety of recyclable materials (fly ash, granulated blast furnace slag, spent alumina catalyst, and contaminated soils) into cement and incorporated used oil and tire-derived fuel as alternate fuel sources. These materials were stored at the facility in large outdoor bunkers until they were incorporated into the cement manufacturing process. Once the plant shifts into care and maintenance mode, these materials will no longer be of concern due to the transition away from wet kiln production. Granulated slag will continue to be imported and ground. It is not known if Lafarge will import clinker to make Portland cement. The facility will offer formulations of limestone, slag, and gypsum to customers (Ecology 2010b). Additional information is needed to determine if the grinding of materials raises concerns for the atmospheric deposition to stormwater pathway.

4.1.2 Raw Material Storage

Historically, contaminated soils were used in the cement manufacturing process. Contaminated soils were stored in a discrete location at the western side of the facility. Although Ecology has some concern about contaminated soils entering the stormwater system, this concern will be eliminated once the contaminated soils are exhausted. Due to the change in facility function, the supplies will not be replenished (Ecology 2010b).

The raw materials used in cement production included limestone, sand, shale, iron-bearing materials, soil and gravel, granulated blast furnace slag, gypsum, and other alternate raw materials containing calcium, silica, iron, or alumina (see Basins 1, 3, and 8 on Figure 5) (Lafarge 2010b). Over the years, Ecology observed most piles were kept uncovered and exposed to wind and rain at the site. Ecology is concerned that exposed raw material piles may be a source of contaminants to the LDW (Ortiz De Anaya 2011).

Waste Handling

Historically, process wastewater and non-contact cooling water were prohibited from discharge and were collected and used in the cement manufacturing process. Currently, trucks loaded with bulk cement are washed near the facility entrance and wash water is discharged to the King County/Metro sanitary sewer system according to permit requirements (Ecology 2011).

Ecology observed a large pile of cement kiln dust (CKD) along West Marginal Way SW. CKD is a fine cement-like material captured by electrostatic precipitator from the kiln exhaust. The pile is subject to wind erosion and sloughing over the brick wall. CKD can be very high in a number of metals (including arsenic) with a pH of up to 13 (Ortiz De Anaya 2011).

Stormwater Discharges

Historically, stormwater at the Lafarge facility was collected and recycled into the cement manufacturing process, which limited discharge to the LDW during non-production periods or

when the stormwater system exceeded its capacity (system designed for a 10-year 24-hour storm). Discharge was covered under the NPDES permit issued to Lafarge on June 30, 2006.

Due to the transition away from cement production, increased volumes of stormwater will be discharged to the King County sanitary sewer (within permit requirements) or to the LDW. In late 2009, Lafarge installed a new electro-coagulation stormwater treatment system, which provides pH adjustment, mechanical screening, and cartridge filtration before stormwater is discharged to the LDW. Sample measurements from monthly discharge monitoring reports between November 2009 and April 2010 are summarized below (Ecology 2011):

Parameter	Concentration
Turbidity	1.2 to 180 NTU
Oil & Grease	<5 mg/L
Copper, total	3 to 75 µg/L
Lead, total	<1 to 5 µg/L
Zinc, total	<1 to 58 µg/L
Total suspended solids	<2 to 53 mg/L
pH	6.8 to 9.1 Standard Units

NTU = nephelometric turbidity unit

Due to the increase in stormwater discharge frequency, installation of a larger treatment system has been planned. The proposed treatment system consists of an electro-coagulation unit with four cells, three 10,000-gallon settling tanks, three media filters, and a pH adjustment system (Ecology 2011).

4.1.3 Historical Operations

Kroll maps reviewed by EPA from 1930, 1939, and 1950 indicate several industries operated on and near the Lafarge property prior to 1960 including Seattle Brick Company, Siler Mill Company, West Waterway Shipyards, Seabell Shipbuilding Company, and Pacific Metal and Salvage Company (Maas 2011).

Northwest Drum Company

The United States Army implemented a 55-gallon drum reclamation program from June 1944 to March 1946 at five sites along the LDW. The Northwest Drum Company performed drum reclamation for the Army at the location that is now occupied by Lafarge. Small-scale operations began in July 1944, with full production capacity by August 1944. Drums arrived at the location by ship and were stockpiled. The drums had been used to store petroleum products. Dents were removed and the drums were sandblasted to remove residual material and heavy rust. Drums were then painted before being sent off site to be refilled. Galvanized drums were stockpiled for disposal and were not recycled. The plant had the capacity to reclaim 4,500 drums every 24 hours. Drum reclamation was terminated in September 1945 and all surplus drums were shipped off site by March 1946 (McKnight 1946). Drums appear to be stored at the facility in the aerial photo B-4 in Appendix B. Based on photographs of the Northwest Drum Company (Appendix D), the facility was not paved.

Ideal Basic Industries and Holnam, Inc.

Ideal Basic Industries (Ideal) and Holnam, Inc. (Holnam) are historical names/owners for the facility. Ideal submitted an application to the U.S. Army Corps of Engineers, Seattle District, to begin plant construction in 1960 (Army 1960). Ideal began cement production at the site in 1967. On March 7, 1990, Ideal merged with its parent company, Holnam (Ideal 1990b). Lafarge purchased the Holnam facility in the fall of 1998 (Lafarge 1998). Wet kiln cement production has been the only operation to take place at the facility since its construction in 1967 (Ecology 2011).

Holnam/Lafarge used replacement fuel to heat the kiln under prescribed conditions. Replacement fuels are non-hazardous materials such as used oil, refined oil tank bottoms, raw crude tank bottoms, heavy vacuum gas oil waste, and off-specification fuel oil. Puget Sound Air Pollution Control Agency (PSAPCA) approved the use of replacement fuel at the facility (PSAPCA 1995).

4.1.4 Regulatory History

Stormwater Inspections

On June 8, 1972, Ecology inspected the Ideal facility during preparation of a waste discharge permit. It was noted that plant wash down and stormwater runoff were sources of turbidity to the LDW, and that kiln dust leachate was a source of settleable solids in the sanitary sewer system. The City of Seattle also met with Ideal over concerns of sewer blockage (Ecology 1972).

Ecology issued an NPDES permit (WA-000223-2) to Ideal in June 1978 for the discharge of non-contact cooling water to the LDW (Ecology 2011).

Ecology conducted an inspection of Ideal on June 12, 1981. Ecology was satisfied with upkeep at the facility, although there was colored discharge due to a washing operation being conducted. It was noted that the discharge did not constitute a permit violation (Ecology 1981). Ecology renewed Ideal's NPDES permit on November 12, 1985 (Ecology 1985a).

During an inspection on December 17, 1985, Ecology found Ideal to be out of compliance with their NPDES permit. Under permit conditions, water from the truck wash station was to be diverted to a clay soaking pit and then reused in the manufacturing process. The inspector noted a sediment plume in the river, which originated from the truck wash station (Ecology 1985b). Ecology sent a follow-up letter to Ideal that required them to cease discharge immediately (Ecology 1986). In a letter dated July 24, 1989, Ideal indicated they had finished renovation of the truck wash discharge reclamation system to eliminate truck wash discharge to the waterway (Ideal 1989).

On August 4, 1986, Ecology conducted an inspection to review management of spent sandblast grit used in the cement manufacturing process. Sand blast grit was screened for compliance with toxicity regulations prior to being transported to Ideal, and was then held in a materials stockpile area before being used in the manufacturing process. It was determined that the management and recycling activities of sandblast grit did not present a threat to the environment (Ecology 1986).

Ecology was notified that Ideal merged into Holnam on March 7, 1990. Ideal requested that the facility's NPDES permit be transferred to the new owner-operator. All aspects of operation at the cement manufacturer were to remain the same (Ideal 1990a). Ecology integrated stormwater

discharge requirements into the NPDES permit renewal in November 1994. Ecology modified the permit on October 16, 1998, to transfer the permit to Lafarge North America, Inc. (Ecology 2011).

Ecology issued a new permit for the facility on June 30, 2006. Ecology staff conducted two non-sampling compliance inspections since the June 30, 2006, permit issuance, determining Lafarge to be in compliance with permit conditions.

A Notice of Violation (NOV) was issued to Lafarge in September 2009, following a joint inspection by Ecology and EPA in June 2009. Violations included (Ecology 2011):

- Stormwater discharges that occurred when the stormwater system was below the 10-year, 24-hour design storm capacity;
- Discharges of process wastewater;
- Discharge of polluting matter into waters of the state;
- Failure to provide proper operation and maintenance for all systems of treatment and control;
- Failure to provide map and accurate depiction of the stormwater drainage on site as required by the SWPPP;
- Failure to provide adequate cover and secondary containment for a large red tank of Chemical Grinding Aid; and
- Failure to implement source control BMPs.

In addition, Ecology issued a Follow-up Order and Agreed Order in November 2009. The Follow-up Order required Lafarge to correct the violations noted in the NOV. The Agreed Order listed actions Lafarge was required to take during plant shutdown periods to allow the discharge of stormwater above and beyond the permit discharge limits. Lafarge agreed to treat all stormwater for turbidity and pH and to implement the following corrective actions (Ecology 2011):

- Proper covering and storage of contaminated piles of fine granular solids,
- Employing good housekeeping techniques and sweeping schedules,
- Monitoring of stormwater discharges, and
- Complying with all other provisions of the permit.

Ecology issued an updated NPDES permit to Lafarge on December 30, 2010. The permit maintains limits on turbidity, oil and grease, and pH. The updated permit will set water quality-based effluent limits for other pollutants once adequate sampling information indicates reasonable potential to violate water criteria (Ecology 2010).

Underground Storage Tank Inspections

Ideal installed a 1,000-gallon diesel UST and a 1,000-gallon gasoline UST in 1966. Another 1,000-gallon gasoline UST was installed in 1976 (Ecology 1992a). The diesel UST failed a tightness test during an Ecology inspection in January 1992. In October 1992 all three tanks were removed and contaminated soil was excavated; no groundwater was encountered (Ecology 1992b). A map showing historical UST locations was unavailable. Holnam installed a 2,000-

gallon diesel UST and 1,000-gallon unleaded gasoline UST in November 1992 (Figure 5) (Ecology 1992c).

In July 2003, Ecology issued a Notice of Non-Compliance to Lafarge because the corrosion protection system had not been tested within a required three-year period, and the release detection for the system's automatic tank gauge was not maintained to the manufacturer's specifications of frequency. Ecology also required Lafarge to furnish a letter meeting financial responsibility requirements and a copy of a Master Business License showing two UST endorsements (Ecology 2003). Lafarge submitted a tank monitor maintenance annual certification on July 30, 2003 (Lafarge 2003) and a UST addendum to address financial responsibility and master business license on February 17, 2004 (Lafarge 2004b).

Lafarge submitted a cathodic protection report for the USTs to Ecology in January 2004 and December 2007 (Lafarge 2004a, 2007).

An inspection by Ecology on August 6, 2009, resulted in a Notice of Non-Compliance for violations including operating a regulated UST without a valid permit; failure to provide spill and/or overfill prevention equipment on a new UST system; and failure to install, calibrate, operate, or maintain release detection methods in accordance with the manufacturer's instruction (Ecology 2009). Lafarge submitted a UST tightness testing checklist to Ecology on August 21, 2009 (Lafarge 2009).

Air Emissions

The PSCAA (formerly PSAPCA) received an air operating permit application from the facility operator on January 20, 1995. A completeness determination was made by PSCAA on August 3, 1995, acknowledging that the application met requirements and was complete. The facility operated under Air Operating Permit No. 14046. For years, PSCAA documented chronic violations, as self reported through Continuous Emission Monitors from Lafarge on a monthly basis. Since September 1998, PSCAA has focused on NOVs and civil penalties issued to sources with the greatest significance. This resulted in the resolution of all NOVs and civil penalties prior to January 1, 2000 (PSCAA 2004). Information on total number of NOVs and civil penalties issued to Lafarge prior to this period was not available.

On February 28, 2000, Lafarge was issued an NOV for emissions from the main stack that exceeded emission opacity regulations. PSCAA granted Lafarge an exemption and closed the case on April 13, 2000 (PSCAA 2004).

PSCAA issued an NOV to Lafarge on September 5, 2000, for emission of air contaminants in quantities, characteristics, and duration so as to be injurious or interfere with enjoyment of life and property. PSCAA issued an NOV to Lafarge on December 14, 2000, for failure to maintain equipment in working order. Both violations were the result of a clinker cooler bypass event. The NOVs were resolved with a Consent Order and Assurance of Discontinuance requiring Lafarge to pay a penalty, although a portion of the penalty was suspended on the condition that no repeat violations occurred June through December 2001. The agreement has since expired and is closed (PSCAA 2004).

PSCAA issued an NOV to Lafarge on May 25, 2001, for a clinker cooler bypass event. PSCAA determined the event was covered under an exemption and no further enforcement action was taken. PSCAA issued an NOV in late February 2001 for four emission events of opacity above

regulated levels. An exemption was granted for one of the four events, with the remaining three events resulting in a monetary penalty, which Lafarge paid in full on July 30, 2001 (PSCAA 2004).

In 2006, PSCAA issued an Order of Approval allowing Lafarge to perform a two-year test to burn whole tires in kiln operations. At this time, Lafarge was using chipped tires as fuel and had shown that chipped tires reduced most emissions when substituted for coal (PSCAA 2006). Test results indicated that dioxin emissions levels increased, but formaldehyde, mercury, carbon monoxide and nitrogen oxides (NO_x) emissions levels decreased when burning a mixture of whole tires and coal (PSCAA 2007). Test results from May and October 2008 showed that dioxin emissions were below the allowable concentrations established by the EPA. PSCAA reviewed the final engineering report compiling and analyzing the data from the whole tire burning tests. The report concluded there was no statistically significant effect on emissions linked to whole tire use in kiln operations. PSCAA determined this conclusion was based on the limited amount of data that was available for comparison. PSCAA did not issue a final permit because of the kiln shutdown (PSCAA 2011).

On January 21, 2010, the USEPA filed a Clean Air Act settlement requiring all 13 U.S. plants owned by Lafarge to implement pollution control upgrades, acceptance of enforceable emission limits, and payment of civil penalties. The controls under the consent decree will be fully implemented by 2014 (EPA 2010a). As a result of the settlement, the Seattle plant has been required to install and operate dry absorbent addition systems to control SO_2 as well as install and operate selective non-catalytic reduction systems to control NO_x (EPA 2010b). Lafarge has agreed to pay civil penalties to PSCAA and Ecology (USEPA 2010c).

Ecology issued a Compliance Order (No. 7841) to Lafarge on July 28, 2010. The order was based on an October 2008 determination that Best Available Retrofit Technology (BART) was required to reduce regional haze impacts of emissions from Lafarge (Ecology 2010a).

Other Regulatory Interactions

Ideal was granted an exemption in November 1987 for CKD use, and disposal of this material at the Dale Strip Pit near Ravensdale, Washington. The exemption was subject to general and specific conditions, which applied to agricultural uses of CKD as a soil conditioner and fertilizer, waste solidification, landfill cover for solid waste disposal facilities, and wet scrubber lime solution for waste incinerators and coal power plants (Ecology 1987). A notification that this exemption would be canceled was sent to Holnam by Ecology on January 8, 1997 (Ecology 1997).

In July 1992, Ecology approved the use of this sandblast grit and foundry sand in the cement manufacturing process. Provisions regarding the use of sandblast grit and foundry sand required that Toxicity Characteristic Leaching Procedure (TCLP) tests be conducted on the material and TCLP standards not be exceeded for metals. Another provision required that the material be transported and managed in an environmentally safe manner and none of the material be released to the environment (Ecology 1992).

EPA sent a CERCLA section 104(e) Request for Information letter to Lafarge in August 2007. The response has been received, but was not reviewed for the Data Gaps Report. Pertinent

information from the response will be included in the SCAP for the Kellogg Island to Lafarge source control area.

4.1.5 Environmental Investigations and Cleanups

Underground Storage Tank Removal (1992)

In October 1992, three 1,000-gallon USTs storing leaded gasoline, unleaded gasoline, and diesel fuel, were removed from the Lafarge facility. Soil samples from tank excavation pits provided evidence of petroleum-contaminated soil under and around all three tanks. Four test pits were excavated to establish the extent of contamination. One of four test pits had visual evidence of contamination. Approximately 295 cubic yards of contaminated material was excavated on September 21, 1992, and October 1, 1992. The contaminated material was stored at the facility prior to disposal. Twelve samples were analyzed for TPHs, VOCs, and total lead; no analytes were detected at concentrations exceeding Ecology cleanup levels. No groundwater was encountered during the excavation (Bison 1992). A map showing the locations of the former USTs and the excavated area was not available for review.

Washington State Dioxin Source Assessment (1998)

In 1998, Ecology published the Washington State Dioxin Source Assessment. The report evaluated cement kilns, along with other Washington State industries as potential sources of dioxins to the environment. Holnam was included in the study. Holnam produced CKD, a fine cement-like material captured by their electrostatic precipitator from the kiln exhaust. Since 1987, a majority of Holnam's CKD has been used in agriculture and construction. Holnam conducted stack tests between 1994 and 1996. Ecology determined that the CKD dioxin load from Holnam was quite small, with an average emission load of 1.26 mg TEQ/day. Loads from the Holnam facility appeared to be well characterized assuming that there were no major changes in fuels, raw materials, or operations at the kiln (Ecology 1998).

4.1.6 Potential for Sediment Recontamination

Chemical concentrations of PAHs, PCBs, and BEHP exceed the SQS in sediments near the Lafarge facility (Figure 3, Tables 2 and 3). In addition, dioxin/furans and organo-tin compounds have also been detected.

The potential for sediment recontamination associated with this property is summarized below by transport pathway.

Stormwater

Historically, stormwater at the facility was treated and recycled in the cement manufacturing process. At the time of this report, the facility is in a state of transition from cement production to materials grinding, blending, and shipping. Decreased demand for stormwater in the manufacturing process will require Lafarge to discharge stormwater to the LDW at a greater volume and frequency. The potential for sediment recontamination via this pathway is unknown and depends on the frequency of discharges to the LDW and the potential concentrations of sediment COCs, if any, in discharges originating from this property.

Surface Runoff/Spills

Operations at Lafarge include loading and unloading of raw materials, such as limestone, slag, and gypsum, from barges along the waterway. A facility inspection by Ecology in 2007 observed evidence of spills on the wharf adjacent to the LDW (Ecology 2007b). Raw material storage piles exposed to wind and rain have the potential to enter the stormwater system. Although limestone, slag, and gypsum are not considered sediment COCs, spills of these materials may potentially harm the river environment. The facility is adjacent to the LDW; therefore, surface runoff and spills have the potential to reach the LDW.

Soil and Groundwater

Drum recycling and reclamation operations were performed at the property from July 1944 to March 1946. This industrial activity is associated with soil and groundwater contamination at Industrial Container Services within EAA-2, where drum recycling has occurred since the early 1940s. At the Industrial Container Services, soil and groundwater are contaminated with metals, PCBs, pesticides, SVOCs (including phthalates and PAHs), and petroleum hydrocarbons (SAIC 2007a, c). Contaminants in groundwater at the Lafarge property (if any) may be a source of contaminants to LDW sediments.

Three USTs were removed from the property in 1992. An excavation was performed to remove contaminated soils surrounding the USTs. Groundwater was not encountered in the excavation. Petroleum hydrocarbons are not a COC in the LDW.

Two seeps, one of which was sampled, were identified along the northern boundary of the property adjacent to the LDW, at approximately RM 1.0 West. The sample at Seep 64 had a total PCB concentration that exceeded the marine chronic WQC.

Bank Erosion

Bulkheads, wharfs, and pilings line the facility adjacent to the LDW. Ecology reported that Lafarge lost part of their foundation under the wharf where the crane is located to unload barges. The gravel subgrade behind the bulkhead was washed away (Ecology 2009) In 2006, Lafarge was granted a Joint Aquatic Resource permit to repair the damaged bulkhead (Army 2006). Little information was available regarding the potential presence of contamination behind the bulkhead. The potential for sediment recontamination via this pathway is unknown.

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5.0 Summary of Data Gaps

This section identifies data gaps associated with the Kellogg Island to Lafarge source control area, listed by potential sediment recontamination pathway. Table 4 provides a summary of the data gaps discussed below.

5.1 Outfalls and Stormwater Discharges

The Lafarge facility has recently made a transition from a cement manufacturing operation to a cement grinding, blending, and shipping operation. This change has resulted in an increase of stormwater discharge volume and frequency to the LDW. The following information is needed to assess the potential for sediment contamination associated with the stormwater pathway:

- The Stormwater Treatment System Engineering Report (Aquarius 2010) indicated that Outfalls 001/2139 and 004 were planned to be decommissioned in November 2010. Information regarding the status of these outfalls is needed to assess potential for sediment recontamination.
- The SWPPP indicated that an updated stormwater treatment system would be installed within 12 months of an NPDES permit renewal. Information regarding the status of a new stormwater system is needed to assess the potential for sediment recontamination.
- As operations shift, a follow-up business inspection of Lafarge is needed to verify compliance with Ecology's recommendations, applicable regulations, and BMPs to prevent the release of contaminants to the LDW.

5.2 Surface Runoff/Spills

If the stormwater system exceeds its capacity as a result of the shift in facility operations, surface runoff has the potential to reach the LDW. Additional information is needed to determine whether surface runoff is a potential source of sediment recontamination.

Raw material storage piles exposed to wind and rain have the potential to enter the stormwater system. Information regarding the containment of these materials is needed to prevent the release of contaminants via stormwater or air deposition.

5.3 Groundwater Discharge

Historical drum recycling and reclamation activities at the Lafarge property may have resulted in contamination of soil and groundwater at the property. Soil and groundwater at Industrial Container Services (EAA-2), where drum recycling and reclamation has been ongoing since the 1940s, are contaminated with metals, PCBs, PAHs, phthalates, other SVOCs, pesticides, and petroleum hydrocarbons (SAIC 2007a, c). Additional information is needed to determine if soil and groundwater are contaminated due to historical drum recycling and reclamation activities at the Lafarge property. Contaminants in groundwater (if any) may be a source of contaminants to LDW sediments.

PCBs were detected at concentrations above the marine water quality criterion in a seep sample at the Lafarge property. Additional information is needed to determine the source of PCB contamination.

5.4 Bank Erosion

Information is needed to determine if Lafarge has repaired or replaced the cutaway section of the bulkhead between the facility and the LDW. Information regarding the nature and composition of the material behind the bulkhead is needed to determine the potential for sediment recontamination via this pathway.

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Figures

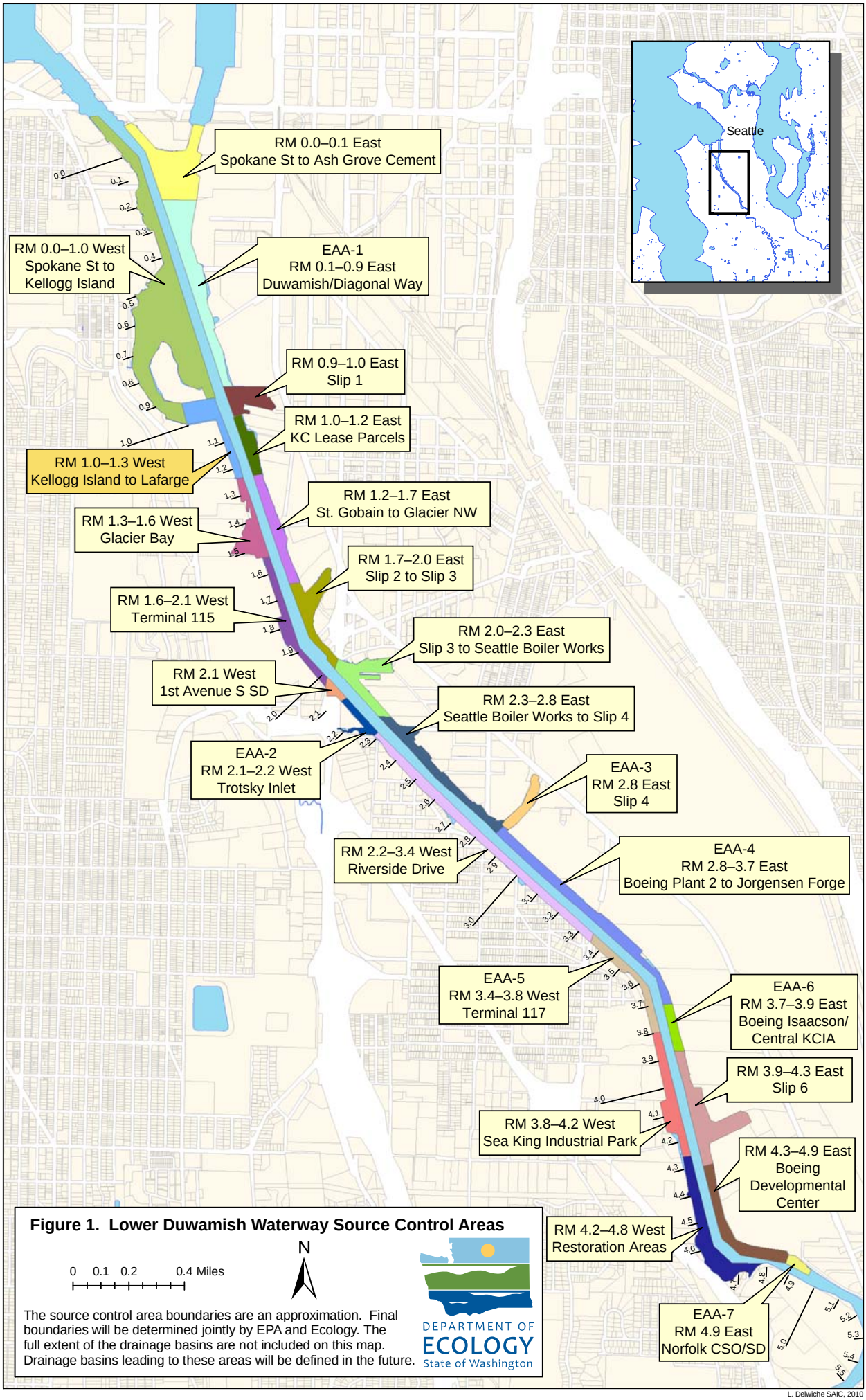

Figure 1. Lower Duwamish Waterway Source Control Areas

The source control area boundaries are an approximation. Final boundaries will be determined jointly by EPA and Ecology. The full extent of the drainage basins are not included on this map. Drainage basins leading to these areas will be defined in the future.

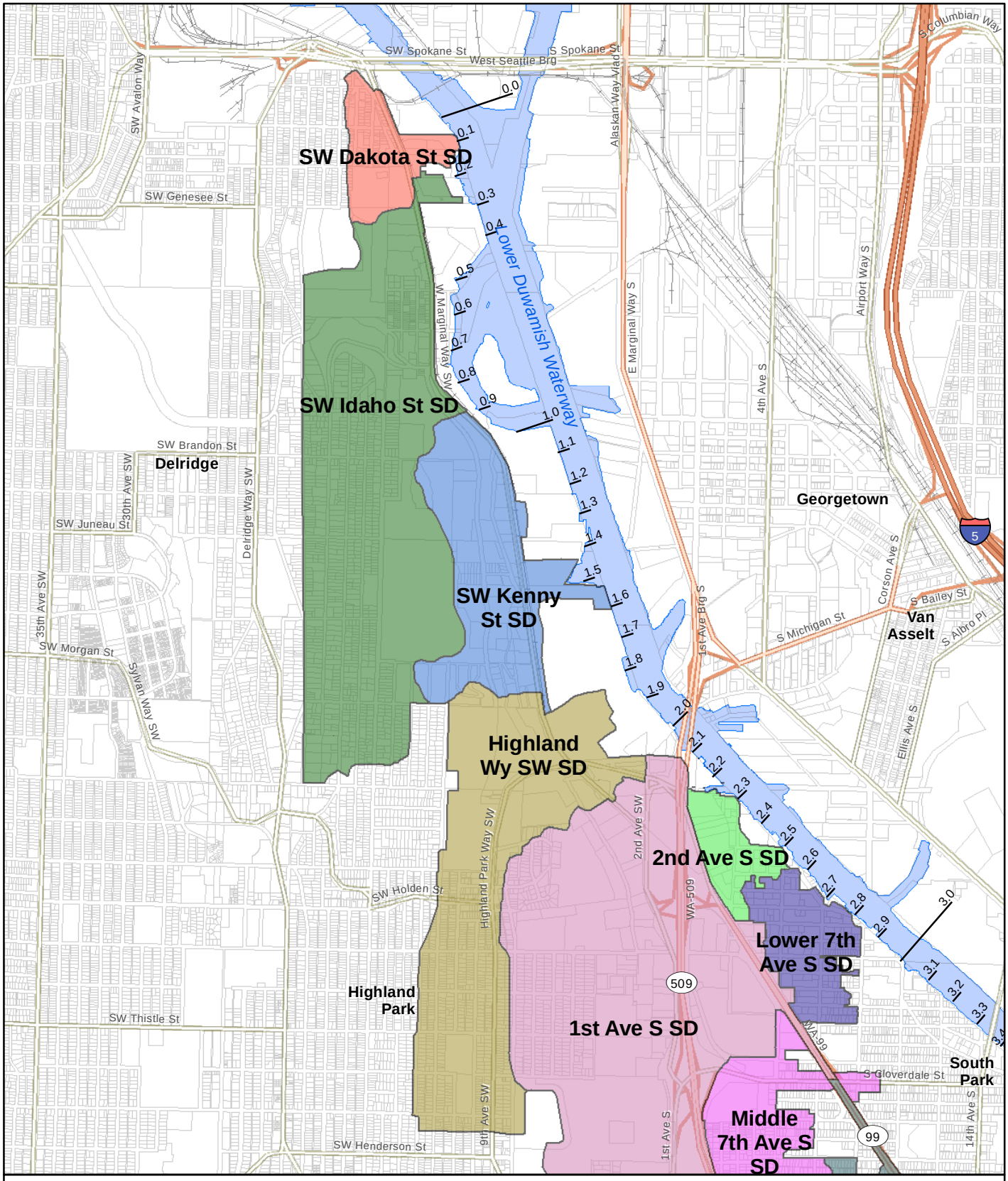

Figure 2. Lower Duwamish Waterway Storm Drain Basins — West Side

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0 1,400 2,800 Feet

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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: apw
File: figure-2_StormDrainBasinMap_overview.mxd
Illustrative purposes only.

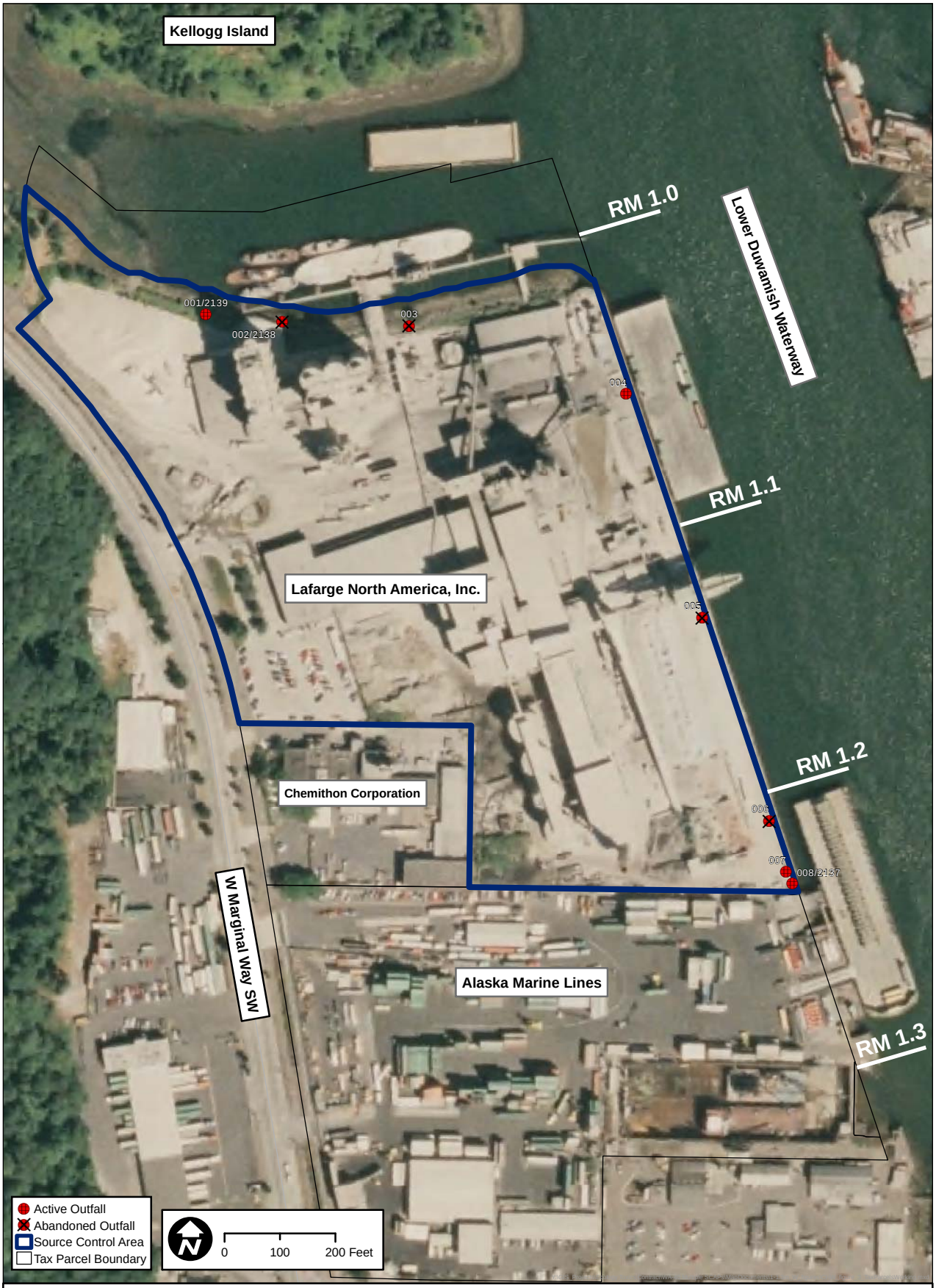

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Figure 3. RM 1.0–1.3 West (Kellogg Island to Lafarge) Source Control Area

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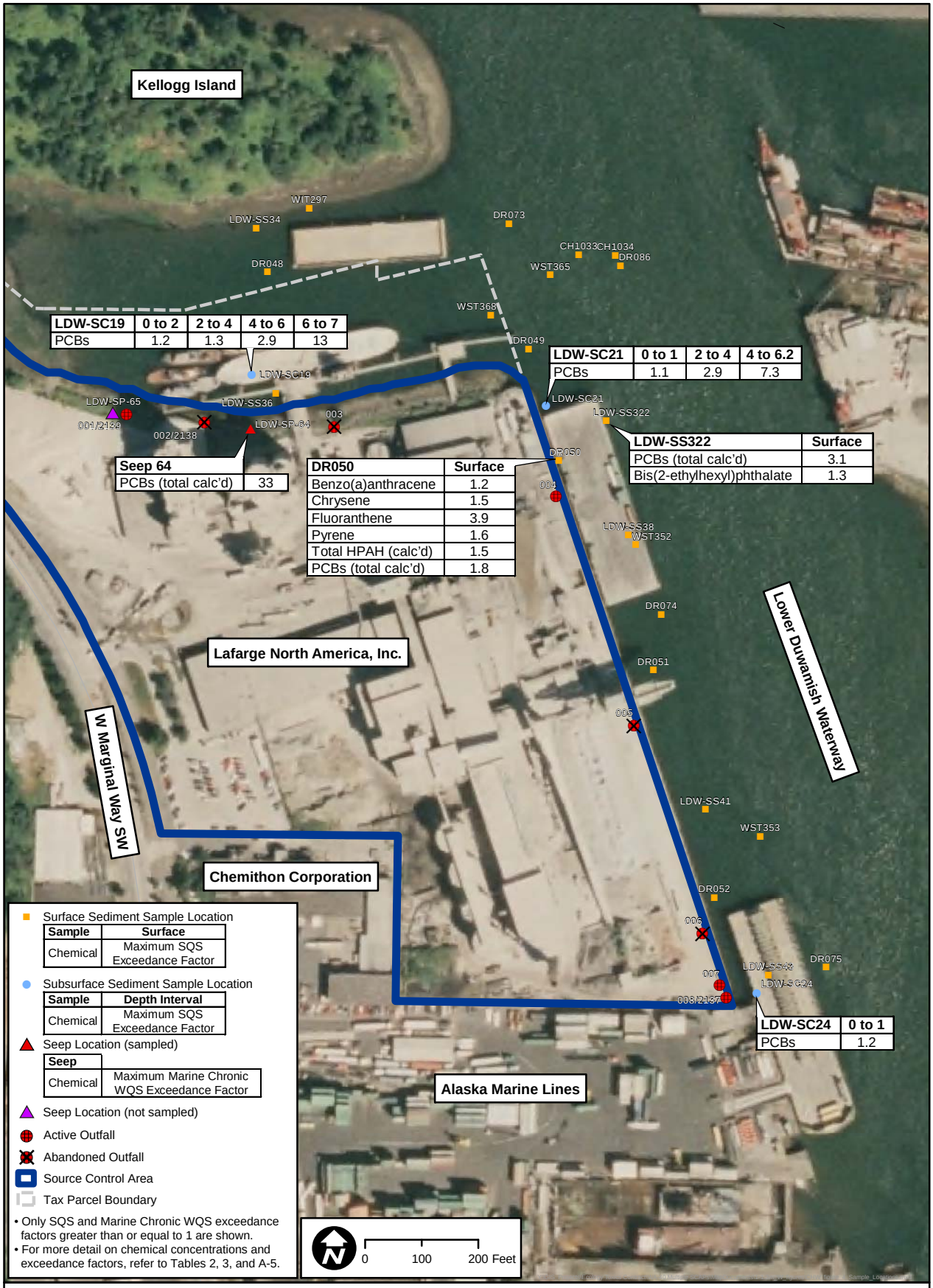

LDW-SC19	0 to 2	2 to 4	4 to 6	6 to 7
PCBs	1.2	1.3	2.9	13

LDW-SC21	0 to 1	2 to 4	4 to 6.2
PCBs	1.1	2.9	7.3

LDW-SS322	Surface
PCBs (total calc'd)	3.1
Bis(2-ethylhexyl)phthalate	1.3

Seep 64	
PCBs (total calc'd)	33

DR050	Surface
Benzo(a)anthracene	1.2
Chrysene	1.5
Fluoranthene	3.9
Pyrene	1.6
Total HPAH (calc'd)	1.5
PCBs (total calc'd)	1.8

LDW-SC24	0 to 1
PCBs	1.2

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Figure 4. RM 1.0–1.3 West (Kellogg Island to Lafarge) Sediment and Seep Sampling Locations

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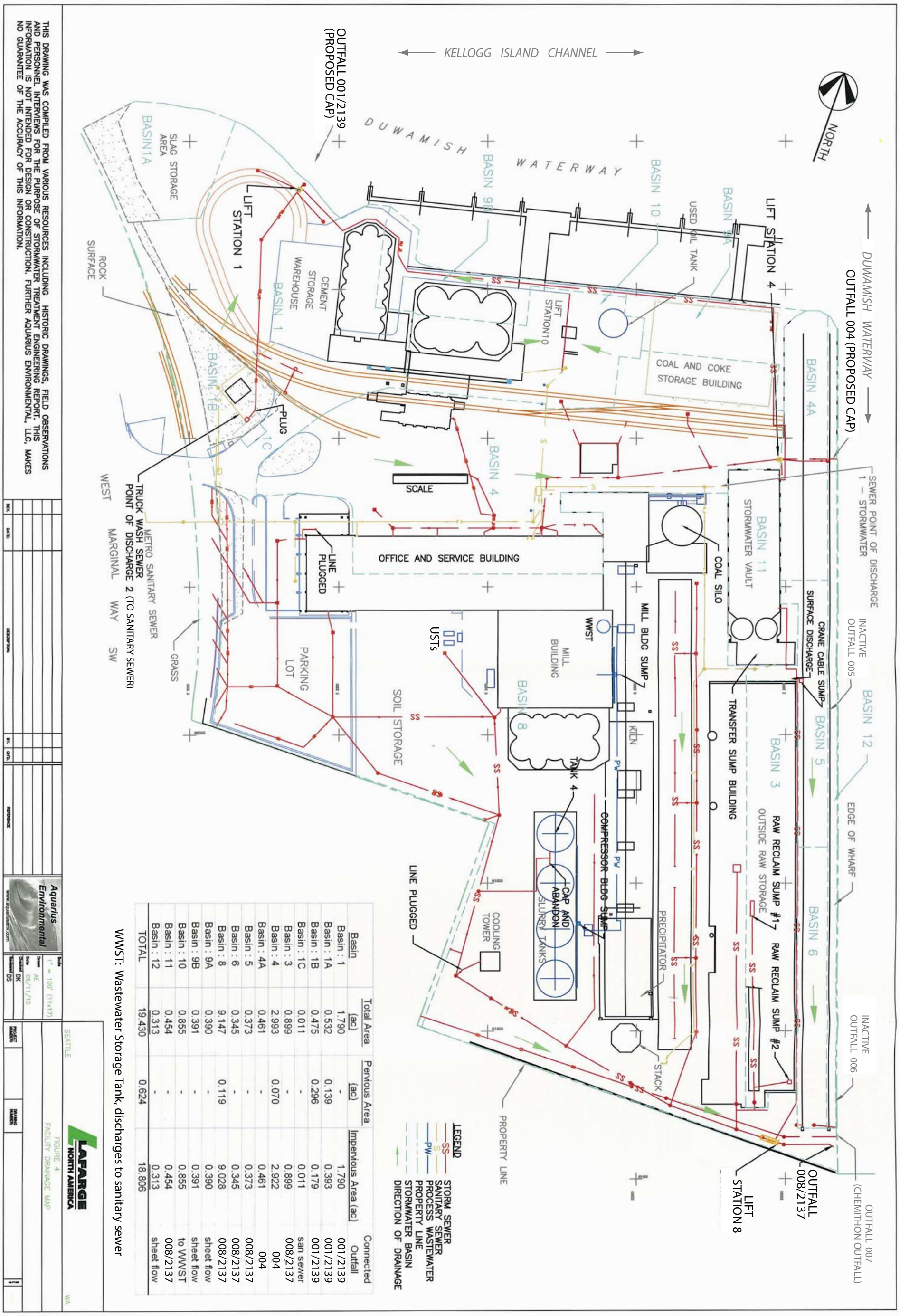

Basin	Total Area (ac)	Pervious Area (ac)	Impervious Area (ac)	Connected Outfall
Basin : 1	1.790	-	1.790	001/2139
Basin : 1A	0.532	0.139	0.393	001/2139
Basin : 1B	0.475	0.296	0.179	001/2139
Basin : 1C	0.011	-	0.011	san sewer
Basin : 3	0.899	-	0.899	008/2137
Basin : 4	2.993	0.070	2.922	004
Basin : 4A	0.461	-	0.461	004
Basin : 5	0.373	-	0.373	008/2137
Basin : 6	0.345	-	0.345	008/2137
Basin : 8	9.147	0.119	9.028	008/2137
Basin : 9A	0.390	-	0.390	sheet flow
Basin : 9B	0.391	-	0.391	sheet flow
Basin : 10	0.855	-	0.855	to WWST
Basin : 11	0.454	-	0.454	008/2137
Basin : 12	0.313	-	0.313	sheet flow
TOTAL	19.430	0.624	18.806	

WWST: Wastewater Storage Tank, discharges to sanitary sewer

Source: Adapted from Lafarge 2010b. Note: SAIC did not perform an independent verification of content.

Figure 5. Facility Drainage Map

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Tables

Table 1
Sediment Samples Collected Near the Kellogg Island to Lafarge Source Control Area

Location Name	Date Collected	Collection Depth (feet)	Event Name	Source
WST366	9/15/1997	Surface	NOAA Site Characterization	NOAA 1998
WST352	9/16/1997			
WST353	9/16/1997			
WST368	9/16/1997			
WST365	9/18/1997			
WIT297	9/19/1997			
CH1033	10/16/1997			
CH1034	10/17/1997			
DR048	8/12/1998	Suface	EPA Site Inspection	Weston 1999
DR049	8/12/1998			
DR051	8/12/1998			
DR052	8/12/1998			
DR073	8/12/1998			
DR074	8/12/1998			
DR075	8/12/1998			
DR050	8/31/1998			
DR086	8/31/1998			
LDW-SS38	1/18/2005	Surface	LDW RI Phase 2 Round 1	Windward 2005a
LDW-SS43	1/21/2005			
LDW-SS36	1/24/2005			
LDW-SS41	3/8/2005	Surface	LDW RI Phase 2 Round 2	Windward 2005b
LDW-SS34	3/14/2005			
LDW-SC21	2/14/2006	0 to 1	LDW Subsurface Sediment 2006	Windward 2007a
	2/14/2006	1 to 2		
	2/14/2006	2 to 4		
	2/14/2006	4 to 6.2		
	2/14/2006	6.2 to 8		
	2/14/2006	8 to 10		
	2/14/2006	10 to 11.3		
LDW-SC24	2/17/2006	0 to 1		
	2/17/2006	1 to 2		
	2/17/2006	2 to 4		
	2/17/2006	4 to 6		
	2/17/2006	6 to 8		
	2/17/2006	8 to 10		
LDW-SC19	2/24/2006	0 to 1		
	2/24/2006	1 to 2		
	2/24/2006	2 to 4		
	2/24/2006	4 to 6		
	2/24/2006	6 to 7		
	2/24/2006	7 to 9		
	2/24/2006	9 to 11.9		
LDW-SS322	10/4/2006	Surface	LDW RI Phase 2 Round 3	Windward 2007b

Table 2
Chemicals Detected Above Screening Levels in Surface Sediment Samples
Near the Kellogg Island to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Chemical	Conc'n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS/ LAET	CSL/ 2LAET	Units	SQS Exceedance	CSL Exceedance
PAHs											
EPA SI	DR050[a]	8/31/1998	Benzo(a)anthracene	1.6	4.12		1.3	1.6	mg/kg DW	1.2	1
EPA SI	DR050[a]	8/31/1998	Chrysene	2.1	4.12		1.4	2.8	mg/kg DW	1.5	<1
EPA SI	DR050[a]	8/31/1998	Fluoranthene	6.7	4.12		1.7	2.5	mg/kg DW	3.9	2.7
EPA SI	DR050[a]	8/31/1998	Pyrene	4.2	4.12		2.6	3.3	mg/kg DW	1.6	1.3
EPA SI	DR050[a]	8/31/1998	Total HPAH (calc'd)	18.2	4.12		12	17	mg/kg DW	1.5	1.1
PCBs											
EPA SI	DR050[a]	8/31/1998	PCBs (total calc'd)	0.24 J	4.12		0.13	1.0	mg/kg DW	1.8	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	PCBs (total calc'd)	0.28 J	0.77	37	12	65	mg/kg OC	3.1	<1
Phthalate											
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Bis(2-ethylhexyl)phthalate	0.45	0.77	59	47	78	mg/kg OC	1.3	<1

mg/kg - milligram per kilogram
DW - Dry weight
TOC - Total organic carbon
OC - Organic carbon normalized
SQS - SMS Sediment Quality Standard
CSL - SMS Cleanup Screening Level

SMS - Sediment Management Standard (Washington Administrative Code 173-204)
PAH - Polycyclic aromatic hydrocarbon
Total HPAH - Total high molecular weight PAH
PCB - Polychlorinated biphenyl
J - Estimated value between the method detection limit and the laboratory reporting limit
[a] Due to the high TOC in this sample, results were compared to the Lowest Apparent Effects Threshold (LAET) and the second LAET (2LAET) value rather than the SQS and CSL. The LAET is functionally equivalent to the SQS and the 2LAET is functionally equivalent to the CSL.

Table presents detected chemicals only.
Exceedance factors are the ratio of the detected concentrations to the CSL or SQS; exceedance factors are shown only if they are greater than 1.
Sampling events are listed in Table 1.

Table 3
Chemicals Detected Above Screening Levels in Subsurface Sediment Samples
Near the Kellogg Island to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Sample Depth (feet)	Chemical	Conc,n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance	CSL Exceedance
PCBs												
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	6 - 7	PCBs (total calc'd)	2.4	1.54	160	12	65	mg/kg OC	13	2.5
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	4 - 6	PCBs (total calc'd)	0.44	1.26	35	12	65	mg/kg OC	2.9	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	PCBs (total calc'd)	0.25	1.56	16	12	65	mg/kg OC	1.3	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	PCBs (total calc'd)	0.23	1.7	14	12	65	mg/kg OC	1.2	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	4 - 6.2	PCBs (total calc'd)	1.68	1.94	87	12	65	mg/kg OC	7.3	1.3
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	PCBs (total calc'd)	0.38 J	1.64	23	12	65	mg/kg OC	1.9	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	PCBs (total calc'd)	0.25	1.98	13	12	65	mg/kg OC	1.1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	PCBs (total calc'd)	0.28	1.99	14	12	65	mg/kg OC	1.2	<1

mg/kg - Milligram per kilogram
DW - Dry weight
TOC - Total organic carbon
OC - Organic carbon normalized
SQS - SMS Sediment Quality Standard
CSL - SMS Cleanup Screening Level

SMS - Sediment Management Standard (Washington Administrative Code 173-204)
PCB - Polychlorinated biphenyl
J - Estimated value between the method detection limit and the laboratory reporting limit

Table presents detected chemicals only.
Exceedance factors are the ratio of the detected concentrations to the CSL or SQS; exceedance factors are shown only if they are greater than 1.
Sampling events are listed in Table 1.

Table 4
Summary of Data Gaps
Kellogg Island to Lafarge Source Control Area

Facility	Data Gap
Lafarge North America Inc.	***Outfalls and Stormwater Discharge***
	The Stormwater Treatment System Engineering Report indicated that Outfalls 001/2139 and 004 were planned to be decommissioned in November 2010. Information regarding the status of these outfalls is needed to assess potential for sediment recontamination.
	The SWPPP indicated that an updated stormwater treatment system would be installed within 12 months of an NPDES permit renewal. Information regarding the status of a new stormwater system is needed to assess the potential for sediment recontamination.
	As operations shift, a follow-up business inspection of Lafarge is needed to verify compliance with Ecology's recommendations, applicable regulations, and BMPs to prevent the release of contaminants to the LDW.
	Surface Runoff/Spills
	If the stormwater system exceeds its capacity as a result of the shift in facility operations, surface runoff has the potential to reach the LDW. Additional information is needed to determine whether surface runoff is a potential source of sediment recontamination.
	Raw material storage piles exposed to wind and rain have the potential to enter the stormwater system. Information regarding the containment of these materials is needed to prevent the release of contaminants via stormwater or air deposition.
	Groundwater Discharge
	Historical drum recycling and reclamation activities at the Lafarge property may have resulted in contamination of soil and groundwater at the property. Additional information is needed to determine if soil and groundwater are contaminated due to historical drum recycling and reclamation activities at the Lafarge property. Contaminants in groundwater (if any) may be a source of contaminants to LDW sediments.
	PCBs were detected at concentrations above the marine water quality criterion in a seep sample at the Lafarge property. Additional information is needed to determine the source of PCB contamination.
	Bank Erosion
	Information is needed to determine if Lafarge has repaired or replaced the cutaway section of the bulkhead between the facility and the LDW.
	Information regarding the nature and composition of the material behind the bulkhead is needed to determine the potential for sediment recontamination via this pathway.

Appendix A

Sediment and Seep Sampling Data
Kellogg Island to Lafarge Source Control Area

Table A-1 Chemicals Detected in Surface Sediment Samples

Table A-2 Chemicals Detected in Subsurface Sediment Samples

Table A-3 Chemicals Detected in Seep Sample

Table A-1
Chemicals Detected in Surface Sediment Sample
Near the Kellogg to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Chemical	Conc'n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
EPA SI	DR051	8/12/1998	1,2,3,4,6,7,8-HpCDD	4.30E-04	2.77	1.55E-02					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	1,2,3,4,6,7,8-HpCDD	6.39E-04	1.67	3.83E-02					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	1,2,3,4,6,7,8-HpCDD	9.82E-04	1.89	5.20E-02					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	1,2,3,4,6,7,8-HpCDD	4.76E-04	0.766	6.21E-02					
EPA SI	DR051	8/12/1998	1,2,3,4,6,7,8-HpCDF	6.20E-05	2.77	2.24E-03					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	1,2,3,4,6,7,8-HpCDF	1.10E-04	1.67	6.59E-03					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	1,2,3,4,6,7,8-HpCDF	1.23E-04	1.89	6.51E-03					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	1,2,3,4,6,7,8-HpCDF	9.21E-05	0.766	1.20E-02					
EPA SI	DR051	8/12/1998	1,2,3,4,7,8,9-HpCDF	6.60E-06 J	2.77	2.38E-04					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	1,2,3,4,7,8,9-HpCDF	9.85E-06 J	1.67	5.90E-04					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	1,2,3,4,7,8,9-HpCDF	1.03E-05 J	1.89	5.45E-04					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	1,2,3,4,7,8,9-HpCDF	7.14E-06 J	0.766	9.32E-04					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	1,2,3,4,7,8-HxCDD	2.77E-06 J	1.67	1.66E-04					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	1,2,3,4,7,8-HxCDD	5.90E-06 J	1.89	3.12E-04					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	1,2,3,4,7,8-HxCDD	3.75E-06 J	0.766	4.90E-04					
EPA SI	DR051	8/12/1998	1,2,3,4,7,8-HxCDF	9.50E-06 J	2.77	3.43E-04					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	1,2,3,4,7,8-HxCDF	1.44E-05 J	1.67	8.62E-04					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	1,2,3,4,7,8-HxCDF	1.54E-05 J	1.89	8.15E-04					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	1,2,3,4,7,8-HxCDF	1.19E-05 J	0.766	1.55E-03					
EPA SI	DR051	8/12/1998	1,2,3,6,7,8-HxCDD	1.60E-05	2.77	5.78E-04					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	1,2,3,6,7,8-HxCDD	1.75E-05	1.67	1.05E-03					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	1,2,3,6,7,8-HxCDD	2.43E-05	1.89	1.29E-03					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	1,2,3,6,7,8-HxCDD	1.76E-05	0.766	2.30E-03					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	1,2,3,6,7,8-HxCDF	3.44E-06 J	1.67	2.06E-04					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	1,2,3,6,7,8-HxCDF	4.20E-06 J	1.89	2.22E-04					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	1,2,3,6,7,8-HxCDF	3.69E-06 J	0.766	4.82E-04					
EPA SI	DR051	8/12/1998	1,2,3,7,8,9-HxCDD	1.10E-05	2.77	3.97E-04					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	1,2,3,7,8,9-HxCDD	1.09E-05 J	1.67	6.53E-04					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	1,2,3,7,8,9-HxCDD	1.96E-05 J	1.89	1.04E-03					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	1,2,3,7,8,9-HxCDD	1.15E-05 J	0.766	1.50E-03					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	1,2,3,7,8,9-HxCDF	3.64E-07 J	1.67	2.18E-05					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	1,2,3,7,8,9-HxCDF	5.50E-07 J	1.89	2.91E-05					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	1,2,3,7,8,9-HxCDF	3.17E-07 J	0.766	4.14E-05					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	1,2,3,7,8-PeCDD	1.82E-06 J	1.67	1.09E-04					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	1,2,3,7,8-PeCDD	3.26E-06 J	1.89	1.72E-04					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	1,2,3,7,8-PeCDD	2.06E-06 J	0.766	2.69E-04					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	1,2,3,7,8-PeCDF	1.22E-06 J	1.67	7.31E-05					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	1,2,3,7,8-PeCDF	1.90E-06 J	1.89	1.01E-04					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	1,2,3,7,8-PeCDF	1.52E-06 J	0.766	1.98E-04					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	1,4-Dichlorobenzene	6.20E-03	0.766	8.09E-01	3.1	9	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	2,3,4,6,7,8-HxCDF	2.38E-06 J	1.67	1.43E-04					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	2,3,4,6,7,8-HxCDF	3.31E-06 J	1.89	1.75E-04					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	2,3,4,6,7,8-HxCDF	2.63E-06 J	0.766	3.43E-04					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	2,3,4,7,8-PeCDF	2.44E-06 J	1.67	1.46E-04					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	2,3,4,7,8-PeCDF	4.25E-06 J	1.89	2.25E-04					

Table A-1
Chemicals Detected in Surface Sediment Sample
Near the Kellogg to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Chemical	Conc'n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	2,3,4,7,8-PeCDF	3.81E-06 J	0.766	4.97E-04					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	2,3,7,8-TCDD	5.98E-07 J	1.67	3.58E-05					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	2,3,7,8-TCDD	8.59E-07 J	1.89	4.54E-05					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	2,3,7,8-TCDD	7.19E-07 J	0.766	9.39E-05					
EPA SI	DR051	8/12/1998	2,3,7,8-TCDF	2.30E-06	2.77	8.30E-05					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	2,3,7,8-TCDF	1.20E-06	1.67	7.19E-05					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	2,3,7,8-TCDF	2.20E-06	1.89	1.16E-04					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	2,3,7,8-TCDF	2.04E-06 J	0.766	2.66E-04					
EPA SI	DR050[a]	8/31/1998	2-Methylnaphthalene	1.20E-01	4.12	2.91E+00	0.67	1.4	mg/kg DW	<1	<1
EPA SI	DR049	8/12/1998	Acenaphthene	9.00E-02	2.64	3.41E+00	16	57	mg/kg OC	<1	<1
EPA SI	DR051	8/12/1998	Acenaphthene	2.80E-01	2.77	1.01E+01	16	57	mg/kg OC	<1	<1
EPA SI	DR052	8/12/1998	Acenaphthene	2.00E-02	2.56	7.81E-01	16	57	mg/kg OC	<1	<1
EPA SI	DR073	8/12/1998	Acenaphthene	2.00E-02	2.49	8.03E-01	16	57	mg/kg OC	<1	<1
EPA SI	DR075	8/12/1998	Acenaphthene	3.00E-02	2.31	1.30E+00	16	57	mg/kg OC	<1	<1
EPA SI	DR050[a]	8/31/1998	Acenaphthene	3.00E-01	4.12	7.28E+00	0.5	0.73	mg/kg DW	<1	<1
EPA SI	DR086	8/31/1998	Acenaphthene	9.00E-02	1.97	4.57E+00	16	57	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Acenaphthene	6.90E-02 J	1.89	3.65E+00	16	57	mg/kg OC	<1	<1
EPA SI	DR050[a]	8/31/1998	Acenaphthylene	3.00E-02	4.12	7.28E-01	1.3	1.3	mg/kg DW	<1	<1
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Acenaphthylene	8.80E-02 J	1.89	4.66E+00	66	66	mg/kg OC	<1	<1
EPA SI	DR048	8/12/1998	Aluminum	2.10E+04	2.03	1.03E+06					
EPA SI	DR049	8/12/1998	Aluminum	1.70E+04	2.64	6.44E+05					
EPA SI	DR051	8/12/1998	Aluminum	2.20E+04	2.77	7.94E+05					
EPA SI	DR052	8/12/1998	Aluminum	1.90E+04	2.56	7.42E+05					
EPA SI	DR073	8/12/1998	Aluminum	1.90E+04	2.49	7.63E+05					
EPA SI	DR074	8/12/1998	Aluminum	2.10E+04	2.46	8.54E+05					
EPA SI	DR075	8/12/1998	Aluminum	2.10E+04	2.31	9.09E+05					
EPA SI	DR050	8/31/1998	Aluminum	2.90E+04	4.12	7.04E+05					
EPA SI	DR086	8/31/1998	Aluminum	2.70E+04	1.97	1.37E+06					
EPA SI	DR048	8/12/1998	Anthracene	2.60E-01	2.03	1.28E+01	220	1200	mg/kg OC	<1	<1
EPA SI	DR049	8/12/1998	Anthracene	2.30E-01	2.64	8.71E+00	220	1200	mg/kg OC	<1	<1
EPA SI	DR051	8/12/1998	Anthracene	1.50E-01	2.77	5.42E+00	220	1200	mg/kg OC	<1	<1
EPA SI	DR052	8/12/1998	Anthracene	1.10E-01	2.56	4.30E+00	220	1200	mg/kg OC	<1	<1
EPA SI	DR073	8/12/1998	Anthracene	1.10E-01	2.49	4.42E+00	220	1200	mg/kg OC	<1	<1
EPA SI	DR074	8/12/1998	Anthracene	9.00E-02	2.46	3.66E+00	220	1200	mg/kg OC	<1	<1
EPA SI	DR075	8/12/1998	Anthracene	9.00E-02	2.31	3.90E+00	220	1200	mg/kg OC	<1	<1
EPA SI	DR050[a]	8/31/1998	Anthracene	9.10E-01	4.12	2.21E+01	0.96	4.4	mg/kg DW	<1	<1
EPA SI	DR086	8/31/1998	Anthracene	1.60E-01	1.97	8.12E+00	220	1200	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Anthracene	3.70E-02	1.95	1.90E+00	220	1200	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Anthracene	2.20E-02	1.67	1.32E+00	220	1200	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Anthracene	1.40E-01	1.89	7.41E+00	220	1200	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Anthracene	4.90E-02	2.35	2.09E+00	220	1200	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Anthracene	2.00E-02	1.52	1.32E+00	220	1200	mg/kg OC	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Anthracene	1.30E-01	0.766	1.70E+01	220	1200	mg/kg OC	<1	<1
EPA SI	DR050	8/31/1998	Antimony	5.00E+00 J	4.12	1.21E+02			mg/kg DW		
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Antimony	6.00E-01 J	1.67	3.59E+01			mg/kg DW		

Table A-1
Chemicals Detected in Surface Sediment Sample
Near the Kellogg to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Chemical	Conc'n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Aroclor-1242	2.30E-02	1.95	1.18E+00					
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Aroclor-1242	3.90E-02	2.35	1.66E+00					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Aroclor-1242	4.00E-02 J	0.766	5.22E+00					
EPA SI	DR048	8/12/1998	Aroclor-1254	4.00E-02	2.03	1.97E+00					
EPA SI	DR049	8/12/1998	Aroclor-1254	5.60E-02	2.64	2.12E+00					
EPA SI	DR052	8/12/1998	Aroclor-1254	6.30E-02	2.56	2.46E+00					
EPA SI	DR073	8/12/1998	Aroclor-1254	7.30E-02	2.49	2.93E+00					
EPA SI	DR074	8/12/1998	Aroclor-1254	6.20E-02	2.46	2.52E+00					
EPA SI	DR075	8/12/1998	Aroclor-1254	5.50E-02	2.31	2.38E+00					
EPA SI	DR050	8/31/1998	Aroclor-1254	1.30E-01	4.12	3.16E+00					
EPA SI	DR086	8/31/1998	Aroclor-1254	6.20E-02	1.97	3.15E+00					
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Aroclor-1254	5.00E-02	1.95	2.56E+00					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Aroclor-1254	1.80E-02 J	1.67	1.08E+00					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Aroclor-1254	2.40E-02	1.89	1.27E+00					
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Aroclor-1254	9.90E-02	2.35	4.21E+00					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Aroclor-1254	1.00E-01	0.766	1.31E+01					
EPA SI	DR048	8/12/1998	Aroclor-1260	4.80E-02	2.03	2.36E+00					
EPA SI	DR049	8/12/1998	Aroclor-1260	6.40E-02	2.64	2.42E+00					
EPA SI	DR052	8/12/1998	Aroclor-1260	7.50E-02	2.56	2.93E+00					
EPA SI	DR073	8/12/1998	Aroclor-1260	8.10E-02	2.49	3.25E+00					
EPA SI	DR074	8/12/1998	Aroclor-1260	6.50E-02	2.46	2.64E+00					
EPA SI	DR075	8/12/1998	Aroclor-1260	6.30E-02	2.31	2.73E+00					
EPA SI	DR050	8/31/1998	Aroclor-1260	1.10E-01 J	4.12	2.67E+00					
EPA SI	DR086	8/31/1998	Aroclor-1260	5.40E-02 J	1.97	2.74E+00					
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Aroclor-1260	4.20E-02	1.95	2.15E+00					
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Aroclor-1260	6.00E-02	2.35	2.55E+00					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Aroclor-1260	1.40E-01	0.766	1.83E+01					
EPA SI	DR048	8/12/1998	Arsenic	1.20E+01 J	2.03	5.91E+02	57	93	mg/kg DW	<1	<1
EPA SI	DR049	8/12/1998	Arsenic	1.30E+01 J	2.64	4.92E+02	57	93	mg/kg DW	<1	<1
EPA SI	DR051	8/12/1998	Arsenic	1.20E+01 J	2.77	4.33E+02	57	93	mg/kg DW	<1	<1
EPA SI	DR052	8/12/1998	Arsenic	1.30E+01 J	2.56	5.08E+02	57	93	mg/kg DW	<1	<1
EPA SI	DR073	8/12/1998	Arsenic	1.30E+01 J	2.49	5.22E+02	57	93	mg/kg DW	<1	<1
EPA SI	DR074	8/12/1998	Arsenic	9.50E+00 J	2.46	3.86E+02	57	93	mg/kg DW	<1	<1
EPA SI	DR075	8/12/1998	Arsenic	1.00E+01 J	2.31	4.33E+02	57	93	mg/kg DW	<1	<1
EPA SI	DR050	8/31/1998	Arsenic	1.60E+01	4.12	3.88E+02	57	93	mg/kg DW	<1	<1
EPA SI	DR086	8/31/1998	Arsenic	9.10E+00	1.97	4.62E+02	57	93	mg/kg DW	<1	<1
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Arsenic	1.45E+01	1.95	7.44E+02	57	93	mg/kg DW	<1	<1
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Arsenic	2.35E+01	1.67	1.41E+03	57	93	mg/kg DW	<1	<1
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Arsenic	1.80E+01	1.89	9.52E+02	57	93	mg/kg DW	<1	<1
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Arsenic	4.50E+01	2.35	1.91E+03	57	93	mg/kg DW	<1	<1
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Arsenic	3.10E+00	1.52	2.04E+02	57	93	mg/kg DW	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Arsenic	1.33E+01	0.766	1.74E+03	57	93	mg/kg DW	<1	<1
EPA SI	DR048	8/12/1998	Barium	7.40E+01	2.03	3.65E+03					
EPA SI	DR049	8/12/1998	Barium	7.60E+01	2.64	2.88E+03					
EPA SI	DR051	8/12/1998	Barium	8.10E+01	2.77	2.92E+03					

Table A-1
Chemicals Detected in Surface Sediment Sample
Near the Kellogg to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Chemical	Conc'n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
EPA SI	DR052	8/12/1998	Barium	8.50E+01	2.56	3.32E+03					
EPA SI	DR073	8/12/1998	Barium	7.80E+01	2.49	3.13E+03					
EPA SI	DR074	8/12/1998	Barium	7.60E+01	2.46	3.09E+03					
EPA SI	DR075	8/12/1998	Barium	8.20E+01	2.31	3.55E+03					
EPA SI	DR050	8/31/1998	Barium	1.20E+02	4.12	2.91E+03					
EPA SI	DR086	8/31/1998	Barium	9.10E+01	1.97	4.62E+03					
EPA SI	DR048	8/12/1998	Benzo(a)anthracene	8.40E-01	2.03	4.14E+01	110	270	mg/kg OC	<1	<1
EPA SI	DR049	8/12/1998	Benzo(a)anthracene	4.90E-01	2.64	1.86E+01	110	270	mg/kg OC	<1	<1
EPA SI	DR051	8/12/1998	Benzo(a)anthracene	3.60E-01	2.77	1.30E+01	110	270	mg/kg OC	<1	<1
EPA SI	DR052	8/12/1998	Benzo(a)anthracene	3.40E-01	2.56	1.33E+01	110	270	mg/kg OC	<1	<1
EPA SI	DR073	8/12/1998	Benzo(a)anthracene	3.10E-01	2.49	1.24E+01	110	270	mg/kg OC	<1	<1
EPA SI	DR074	8/12/1998	Benzo(a)anthracene	2.80E-01	2.46	1.14E+01	110	270	mg/kg OC	<1	<1
EPA SI	DR075	8/12/1998	Benzo(a)anthracene	2.90E-01	2.31	1.26E+01	110	270	mg/kg OC	<1	<1
EPA SI	DR050[a]	8/31/1998	Benzo(a)anthracene	1.60E+00	4.12	3.88E+01	1.3	1.6	mg/kg DW	1.2	<1
EPA SI	DR086	8/31/1998	Benzo(a)anthracene	3.80E-01	1.97	1.93E+01	110	270	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Benzo(a)anthracene	1.90E-01	1.95	9.74E+00	110	270	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Benzo(a)anthracene	1.20E-01	1.67	7.19E+00	110	270	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Benzo(a)anthracene	4.00E-01	1.89	2.12E+01	110	270	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Benzo(a)anthracene	3.10E-01	2.35	1.32E+01	110	270	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Benzo(a)anthracene	5.90E-02	1.52	3.88E+00	110	270	mg/kg OC	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Benzo(a)anthracene	4.30E-01	0.766	5.61E+01	110	270	mg/kg OC	<1	<1
EPA SI	DR048	8/12/1998	Benzo(a)pyrene	3.80E-01	2.03	1.87E+01	99	210	mg/kg OC	<1	<1
EPA SI	DR049	8/12/1998	Benzo(a)pyrene	3.80E-01	2.64	1.44E+01	99	210	mg/kg OC	<1	<1
EPA SI	DR051	8/12/1998	Benzo(a)pyrene	2.90E-01	2.77	1.05E+01	99	210	mg/kg OC	<1	<1
EPA SI	DR052	8/12/1998	Benzo(a)pyrene	2.70E-01	2.56	1.05E+01	99	210	mg/kg OC	<1	<1
EPA SI	DR073	8/12/1998	Benzo(a)pyrene	2.80E-01	2.49	1.12E+01	99	210	mg/kg OC	<1	<1
EPA SI	DR074	8/12/1998	Benzo(a)pyrene	2.70E-01	2.46	1.10E+01	99	210	mg/kg OC	<1	<1
EPA SI	DR075	8/12/1998	Benzo(a)pyrene	2.60E-01	2.31	1.13E+01	99	210	mg/kg OC	<1	<1
EPA SI	DR050[a]	8/31/1998	Benzo(a)pyrene	8.20E-01	4.12	1.99E+01	1.6	3	mg/kg DW	<1	<1
EPA SI	DR086	8/31/1998	Benzo(a)pyrene	2.10E-01	1.97	1.07E+01	99	210	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Benzo(a)pyrene	2.70E-01	1.95	1.38E+01	99	210	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Benzo(a)pyrene	1.50E-01	1.67	8.98E+00	99	210	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Benzo(a)pyrene	2.80E-01	1.89	1.48E+01	99	210	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Benzo(a)pyrene	3.90E-01	2.35	1.66E+01	99	210	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Benzo(a)pyrene	4.60E-02	1.52	3.03E+00	99	210	mg/kg OC	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Benzo(a)pyrene	3.80E-01	0.766	4.96E+01	99	210	mg/kg OC	<1	<1
EPA SI	DR048	8/12/1998	Benzo(b)fluoranthene	5.10E-01	2.03	2.51E+01					
EPA SI	DR049	8/12/1998	Benzo(b)fluoranthene	5.20E-01	2.64	1.97E+01					
EPA SI	DR051	8/12/1998	Benzo(b)fluoranthene	4.20E-01	2.77	1.52E+01					
EPA SI	DR052	8/12/1998	Benzo(b)fluoranthene	3.70E-01	2.56	1.45E+01					
EPA SI	DR073	8/12/1998	Benzo(b)fluoranthene	3.50E-01	2.49	1.41E+01					
EPA SI	DR074	8/12/1998	Benzo(b)fluoranthene	3.50E-01	2.46	1.42E+01					
EPA SI	DR075	8/12/1998	Benzo(b)fluoranthene	3.80E-01	2.31	1.65E+01					
EPA SI	DR050	8/31/1998	Benzo(b)fluoranthene	1.10E+00	4.12	2.67E+01					
EPA SI	DR086	8/31/1998	Benzo(b)fluoranthene	2.50E-01	1.97	1.27E+01					

Table A-1
Chemicals Detected in Surface Sediment Sample
Near the Kellogg to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Chemical	Conc'n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Benzo(b)fluoranthene	2.90E-01	1.95	1.49E+01					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Benzo(b)fluoranthene	1.40E-01	1.67	8.38E+00					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Benzo(b)fluoranthene	4.60E-01	1.89	2.43E+01					
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Benzo(b)fluoranthene	2.80E-01	2.35	1.19E+01					
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Benzo(b)fluoranthene	5.90E-02	1.52	3.88E+00					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Benzo(b)fluoranthene	6.20E-01	0.766	8.09E+01					
EPA SI	DR048	8/12/1998	Benzo(g,h,i)perylene	1.80E-01	2.03	8.87E+00	31	78	mg/kg OC	<1	<1
EPA SI	DR049	8/12/1998	Benzo(g,h,i)perylene	2.00E-01	2.64	7.58E+00	31	78	mg/kg OC	<1	<1
EPA SI	DR051	8/12/1998	Benzo(g,h,i)perylene	1.90E-01	2.77	6.86E+00	31	78	mg/kg OC	<1	<1
EPA SI	DR052	8/12/1998	Benzo(g,h,i)perylene	1.70E-01	2.56	6.64E+00	31	78	mg/kg OC	<1	<1
EPA SI	DR073	8/12/1998	Benzo(g,h,i)perylene	1.70E-01	2.49	6.83E+00	31	78	mg/kg OC	<1	<1
EPA SI	DR074	8/12/1998	Benzo(g,h,i)perylene	1.90E-01	2.46	7.72E+00	31	78	mg/kg OC	<1	<1
EPA SI	DR075	8/12/1998	Benzo(g,h,i)perylene	2.00E-01	2.31	8.66E+00	31	78	mg/kg OC	<1	<1
EPA SI	DR050[a]	8/31/1998	Benzo(g,h,i)perylene	3.80E-01	4.12	9.22E+00	0.67	0.72	mg/kg DW	<1	<1
EPA SI	DR086	8/31/1998	Benzo(g,h,i)perylene	1.10E-01	1.97	5.58E+00	31	78	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Benzo(g,h,i)perylene	6.20E-02	1.95	3.18E+00	31	78	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Benzo(g,h,i)perylene	4.60E-02	1.67	2.75E+00	31	78	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Benzo(g,h,i)perylene	9.00E-02 J	1.89	4.76E+00	31	78	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Benzo(g,h,i)perylene	5.10E-02	2.35	2.17E+00	31	78	mg/kg OC	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Benzo(g,h,i)perylene	1.60E-01	0.766	2.09E+01	31	78	mg/kg OC	<1	<1
EPA SI	DR048	8/12/1998	Benzo(k)fluoranthene	4.00E-01	2.03	1.97E+01					
EPA SI	DR049	8/12/1998	Benzo(k)fluoranthene	3.90E-01	2.64	1.48E+01					
EPA SI	DR051	8/12/1998	Benzo(k)fluoranthene	2.90E-01	2.77	1.05E+01					
EPA SI	DR052	8/12/1998	Benzo(k)fluoranthene	2.80E-01	2.56	1.09E+01					
EPA SI	DR073	8/12/1998	Benzo(k)fluoranthene	3.00E-01	2.49	1.20E+01					
EPA SI	DR074	8/12/1998	Benzo(k)fluoranthene	2.80E-01	2.46	1.14E+01					
EPA SI	DR075	8/12/1998	Benzo(k)fluoranthene	2.70E-01	2.31	1.17E+01					
EPA SI	DR050	8/31/1998	Benzo(k)fluoranthene	7.50E-01	4.12	1.82E+01					
EPA SI	DR086	8/31/1998	Benzo(k)fluoranthene	2.10E-01	1.97	1.07E+01					
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Benzo(k)fluoranthene	8.70E-02	1.95	4.46E+00					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Benzo(k)fluoranthene	9.90E-02	1.67	5.93E+00					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Benzo(k)fluoranthene	4.40E-01	1.89	2.33E+01					
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Benzo(k)fluoranthene	1.20E-01	2.35	5.11E+00					
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Benzo(k)fluoranthene	7.60E-02	1.52	5.00E+00					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Benzo(k)fluoranthene	4.40E-01	0.766	5.74E+01					
EPA SI	DR048	8/12/1998	Benzofluoranthenes (total-calc'd)	9.10E-01	2.03	4.48E+01	230	450	mg/kg OC	<1	<1
EPA SI	DR049	8/12/1998	Benzofluoranthenes (total-calc'd)	9.10E-01	2.64	3.45E+01	230	450	mg/kg OC	<1	<1
EPA SI	DR051	8/12/1998	Benzofluoranthenes (total-calc'd)	7.10E-01	2.77	2.56E+01	230	450	mg/kg OC	<1	<1
EPA SI	DR052	8/12/1998	Benzofluoranthenes (total-calc'd)	6.50E-01	2.56	2.54E+01	230	450	mg/kg OC	<1	<1
EPA SI	DR073	8/12/1998	Benzofluoranthenes (total-calc'd)	6.50E-01	2.49	2.61E+01	230	450	mg/kg OC	<1	<1
EPA SI	DR074	8/12/1998	Benzofluoranthenes (total-calc'd)	6.30E-01	2.46	2.56E+01	230	450	mg/kg OC	<1	<1
EPA SI	DR075	8/12/1998	Benzofluoranthenes (total-calc'd)	6.50E-01	2.31	2.81E+01	230	450	mg/kg OC	<1	<1
EPA SI	DR050[a]	8/31/1998	Benzofluoranthenes (total-calc'd)	1.90E+00	4.12	4.61E+01	3.2	3.6	mg/kg DW	<1	<1
EPA SI	DR086	8/31/1998	Benzofluoranthenes (total-calc'd)	4.60E-01	1.97	2.34E+01	230	450	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Benzofluoranthenes (total-calc'd)	3.80E-01	1.95	1.95E+01	230	450	mg/kg OC	<1	<1

Table A-1
Chemicals Detected in Surface Sediment Sample
Near the Kellogg to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Chemical	Conc'n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Benzofluoranthenes (total-calc'd)	2.40E-01	1.67	1.44E+01	230	450	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Benzofluoranthenes (total-calc'd)	9.00E-01	1.89	4.76E+01	230	450	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Benzofluoranthenes (total-calc'd)	4.00E-01	2.35	1.70E+01	230	450	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Benzofluoranthenes (total-calc'd)	1.35E-01	1.52	8.88E+00	230	450	mg/kg OC	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Benzofluoranthenes (total-calc'd)	1.06E+00	0.766	1.38E+02	230	450	mg/kg OC	<1	<1
EPA SI	DR048	8/12/1998	Beryllium	4.50E-01	2.03	2.22E+01					
EPA SI	DR049	8/12/1998	Beryllium	4.30E-01	2.64	1.63E+01					
EPA SI	DR051	8/12/1998	Beryllium	4.50E-01	2.77	1.62E+01					
EPA SI	DR052	8/12/1998	Beryllium	4.20E-01	2.56	1.64E+01					
EPA SI	DR073	8/12/1998	Beryllium	4.40E-01	2.49	1.77E+01					
EPA SI	DR074	8/12/1998	Beryllium	4.40E-01	2.46	1.79E+01					
EPA SI	DR075	8/12/1998	Beryllium	4.50E-01	2.31	1.95E+01					
EPA SI	DR050	8/31/1998	Beryllium	4.70E-01	4.12	1.14E+01					
EPA SI	DR086	8/31/1998	Beryllium	4.70E-01	1.97	2.39E+01					
EPA SI	DR049	8/12/1998	Bis(2-ethylhexyl)phthalate	4.20E-01	2.64	1.59E+01	47	78	mg/kg OC	<1	<1
EPA SI	DR051	8/12/1998	Bis(2-ethylhexyl)phthalate	4.40E-01	2.77	1.59E+01	47	78	mg/kg OC	<1	<1
EPA SI	DR074	8/12/1998	Bis(2-ethylhexyl)phthalate	4.80E-01	2.46	1.95E+01	47	78	mg/kg OC	<1	<1
EPA SI	DR075	8/12/1998	Bis(2-ethylhexyl)phthalate	5.30E-01	2.31	2.29E+01	47	78	mg/kg OC	<1	<1
EPA SI	DR050[a]	8/31/1998	Bis(2-ethylhexyl)phthalate	5.10E-01	4.12	1.24E+01	1.3	1.9	mg/kg DW	<1	<1
EPA SI	DR086	8/31/1998	Bis(2-ethylhexyl)phthalate	2.40E-01	1.97	1.22E+01	47	78	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Bis(2-ethylhexyl)phthalate	8.00E-02	1.67	4.79E+00	47	78	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Bis(2-ethylhexyl)phthalate	1.30E-01	1.89	6.88E+00	47	78	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Bis(2-ethylhexyl)phthalate	3.40E-02	1.52	2.24E+00	47	78	mg/kg OC	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Bis(2-ethylhexyl)phthalate	4.50E-01	0.766	5.87E+01	47	78	mg/kg OC	1.2	<1
EPA SI	DR048	8/12/1998	Butyl benzyl phthalate	4.00E-02	2.03	1.97E+00	4.9	64	mg/kg OC	<1	<1
EPA SI	DR049	8/12/1998	Butyl benzyl phthalate	4.00E-02	2.64	1.52E+00	4.9	64	mg/kg OC	<1	<1
EPA SI	DR051	8/12/1998	Butyl benzyl phthalate	4.00E-02	2.77	1.44E+00	4.9	64	mg/kg OC	<1	<1
EPA SI	DR052	8/12/1998	Butyl benzyl phthalate	4.00E-02	2.56	1.56E+00	4.9	64	mg/kg OC	<1	<1
EPA SI	DR073	8/12/1998	Butyl benzyl phthalate	4.00E-02	2.49	1.61E+00	4.9	64	mg/kg OC	<1	<1
EPA SI	DR074	8/12/1998	Butyl benzyl phthalate	4.00E-02	2.46	1.63E+00	4.9	64	mg/kg OC	<1	<1
EPA SI	DR075	8/12/1998	Butyl benzyl phthalate	5.00E-02	2.31	2.16E+00	4.9	64	mg/kg OC	<1	<1
EPA SI	DR050[a]	8/31/1998	Butyl benzyl phthalate	5.00E-02	4.12	1.21E+00	0.063	0.9	mg/kg DW	<1	<1
EPA SI	DR086	8/31/1998	Butyl benzyl phthalate	2.00E-02	1.97	1.02E+00	4.9	64	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Butyl benzyl phthalate	2.70E-02	1.95	1.38E+00	4.9	64	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Butyl benzyl phthalate	1.40E-02	2.35	5.96E-01	4.9	64	mg/kg OC	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Butyl benzyl phthalate	3.80E-02	0.766	4.96E+00	4.9	64	mg/kg OC	1	<1
EPA SI	DR048	8/12/1998	Cadmium	3.20E-01	2.03	1.58E+01	5.1	6.7	mg/kg DW	<1	<1
EPA SI	DR049	8/12/1998	Cadmium	5.30E-01	2.64	2.01E+01	5.1	6.7	mg/kg DW	<1	<1
EPA SI	DR051	8/12/1998	Cadmium	3.40E-01	2.77	1.23E+01	5.1	6.7	mg/kg DW	<1	<1
EPA SI	DR052	8/12/1998	Cadmium	4.00E-01	2.56	1.56E+01	5.1	6.7	mg/kg DW	<1	<1
EPA SI	DR073	8/12/1998	Cadmium	4.60E-01	2.49	1.85E+01	5.1	6.7	mg/kg DW	<1	<1
EPA SI	DR074	8/12/1998	Cadmium	3.10E-01	2.46	1.26E+01	5.1	6.7	mg/kg DW	<1	<1
EPA SI	DR075	8/12/1998	Cadmium	3.50E-01	2.31	1.52E+01	5.1	6.7	mg/kg DW	<1	<1
EPA SI	DR050	8/31/1998	Cadmium	6.10E-01	4.12	1.48E+01	5.1	6.7	mg/kg DW	<1	<1
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Cadmium	6.00E-01	1.95	3.08E+01	5.1	6.7	mg/kg DW	<1	<1

Table A-1
Chemicals Detected in Surface Sediment Sample
Near the Kellogg to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Chemical	Conc'n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Cadmium	5.00E-01	1.89	2.65E+01	5.1	6.7	mg/kg DW	<1	<1
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Cadmium	5.00E-01	2.35	2.13E+01	5.1	6.7	mg/kg DW	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Cadmium	5.00E-01	0.766	6.53E+01	5.1	6.7	mg/kg DW	<1	<1
EPA SI	DR048	8/12/1998	Calcium	1.10E+04 J	2.03	5.42E+05					
EPA SI	DR049	8/12/1998	Calcium	6.70E+03 J	2.64	2.54E+05					
EPA SI	DR051	8/12/1998	Calcium	8.30E+03 J	2.77	3.00E+05					
EPA SI	DR052	8/12/1998	Calcium	9.20E+03 J	2.56	3.59E+05					
EPA SI	DR073	8/12/1998	Calcium	6.40E+03 J	2.49	2.57E+05					
EPA SI	DR074	8/12/1998	Calcium	6.70E+03 J	2.46	2.72E+05					
EPA SI	DR075	8/12/1998	Calcium	6.60E+03 J	2.31	2.86E+05					
EPA SI	DR050	8/31/1998	Calcium	1.50E+04	4.12	3.64E+05					
EPA SI	DR086	8/31/1998	Calcium	6.90E+03	1.97	3.50E+05					
EPA SI	DR048	8/12/1998	Carbazole	3.00E-02	2.03	1.48E+00					
EPA SI	DR049	8/12/1998	Carbazole	6.00E-02	2.64	2.27E+00					
EPA SI	DR051	8/12/1998	Carbazole	4.00E-02	2.77	1.44E+00					
EPA SI	DR052	8/12/1998	Carbazole	3.00E-02	2.56	1.17E+00					
EPA SI	DR073	8/12/1998	Carbazole	3.00E-02	2.49	1.20E+00					
EPA SI	DR074	8/12/1998	Carbazole	3.00E-02	2.46	1.22E+00					
EPA SI	DR075	8/12/1998	Carbazole	4.00E-02	2.31	1.73E+00					
EPA SI	DR050	8/31/1998	Carbazole	2.60E-01	4.12	6.31E+00					
EPA SI	DR086	8/31/1998	Carbazole	3.00E-02	1.97	1.52E+00					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Carbazole	1.70E-01	1.89	8.99E+00					
EPA SI	DR048	8/12/1998	Carcinogenic PAHs - Mammal - Half DL	6.20E-01	2.03	3.05E+01					
EPA SI	DR049	8/12/1998	Carcinogenic PAHs - Mammal - Half DL	5.80E-01	2.64	2.20E+01					
EPA SI	DR051	8/12/1998	Carcinogenic PAHs - Mammal - Half DL	4.40E-01	2.77	1.59E+01					
EPA SI	DR052	8/12/1998	Carcinogenic PAHs - Mammal - Half DL	4.20E-01	2.56	1.64E+01					
EPA SI	DR073	8/12/1998	Carcinogenic PAHs - Mammal - Half DL	4.20E-01	2.49	1.69E+01					
EPA SI	DR074	8/12/1998	Carcinogenic PAHs - Mammal - Half DL	4.10E-01	2.46	1.67E+01					
EPA SI	DR075	8/12/1998	Carcinogenic PAHs - Mammal - Half DL	4.00E-01	2.31	1.73E+01					
EPA SI	DR050	8/31/1998	Carcinogenic PAHs - Mammal - Half DL	1.30E+00	4.12	3.16E+01					
EPA SI	DR086	8/31/1998	Carcinogenic PAHs - Mammal - Half DL	3.20E-01	1.97	1.62E+01					
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Carcinogenic PAHs - Mammal - Half DL	3.50E-01	1.95	1.79E+01					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Carcinogenic PAHs - Mammal - Half DL	2.00E-01	1.67	1.20E+01					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Carcinogenic PAHs - Mammal - Half DL	4.50E-01	1.89	2.38E+01					
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Carcinogenic PAHs - Mammal - Half DL	4.90E-01	2.35	2.09E+01					
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Carcinogenic PAHs - Mammal - Half DL	7.20E-02	1.52	4.74E+00					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Carcinogenic PAHs - Mammal - Half DL	5.70E-01 J							
EPA SI	DR048	8/12/1998	Chromium	3.00E+01 J	2.03	1.48E+03	260	270	mg/kg DW	<1	<1
EPA SI	DR049	8/12/1998	Chromium	2.70E+01 J	2.64	1.02E+03	260	270	mg/kg DW	<1	<1
EPA SI	DR051	8/12/1998	Chromium	3.20E+01 J	2.77	1.16E+03	260	270	mg/kg DW	<1	<1
EPA SI	DR052	8/12/1998	Chromium	3.00E+01 J	2.56	1.17E+03	260	270	mg/kg DW	<1	<1
EPA SI	DR073	8/12/1998	Chromium	2.90E+01 J	2.49	1.16E+03	260	270	mg/kg DW	<1	<1
EPA SI	DR074	8/12/1998	Chromium	3.10E+01 J	2.46	1.26E+03	260	270	mg/kg DW	<1	<1
EPA SI	DR075	8/12/1998	Chromium	3.20E+01 J	2.31	1.39E+03	260	270	mg/kg DW	<1	<1
EPA SI	DR050	8/31/1998	Chromium	4.00E+01	4.12	9.71E+02	260	270	mg/kg DW	<1	<1

Table A-1
Chemicals Detected in Surface Sediment Sample
Near the Kellogg to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Chemical	Conc'n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
EPA SI	DR086	8/31/1998	Chromium	3.10E+01	1.97	1.57E+03	260	270	mg/kg DW	<1	<1
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Chromium	3.90E+01	1.95	2.00E+03	260	270	mg/kg DW	<1	<1
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Chromium	3.29E+01	1.67	1.97E+03	260	270	mg/kg DW	<1	<1
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Chromium	3.80E+01	1.89	2.01E+03	260	270	mg/kg DW	<1	<1
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Chromium	3.05E+01	2.35	1.30E+03	260	270	mg/kg DW	<1	<1
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Chromium	9.90E+00	1.52	6.51E+02	260	270	mg/kg DW	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Chromium	3.50E+01	0.766	4.57E+03	260	270	mg/kg DW	<1	<1
EPA SI	DR048	8/12/1998	Chrysene	1.10E+00	2.03	5.42E+01	110	460	mg/kg OC	<1	<1
EPA SI	DR049	8/12/1998	Chrysene	7.10E-01	2.64	2.69E+01	110	460	mg/kg OC	<1	<1
EPA SI	DR051	8/12/1998	Chrysene	5.00E-01	2.77	1.81E+01	110	460	mg/kg OC	<1	<1
EPA SI	DR052	8/12/1998	Chrysene	4.70E-01	2.56	1.84E+01	110	460	mg/kg OC	<1	<1
EPA SI	DR073	8/12/1998	Chrysene	4.80E-01	2.49	1.93E+01	110	460	mg/kg OC	<1	<1
EPA SI	DR074	8/12/1998	Chrysene	4.10E-01	2.46	1.67E+01	110	460	mg/kg OC	<1	<1
EPA SI	DR075	8/12/1998	Chrysene	4.00E-01	2.31	1.73E+01	110	460	mg/kg OC	<1	<1
EPA SI	DR050[a]	8/31/1998	Chrysene	2.10E+00	4.12	5.10E+01	1.4	2.8	mg/kg DW	1.5	<1
EPA SI	DR086	8/31/1998	Chrysene	4.00E-01	1.97	2.03E+01	110	460	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Chrysene	2.30E-01	1.95	1.18E+01	110	460	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Chrysene	1.30E-01	1.67	7.78E+00	110	460	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Chrysene	8.90E-01	1.89	4.71E+01	110	460	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Chrysene	2.20E-01	2.35	9.36E+00	110	460	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Chrysene	9.60E-02	1.52	6.32E+00	110	460	mg/kg OC	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Chrysene	7.10E-01	0.766	9.27E+01	110	460	mg/kg OC	<1	<1
EPA SI	DR048	8/12/1998	Cobalt	1.00E+01	2.03	4.93E+02					
EPA SI	DR049	8/12/1998	Cobalt	1.00E+01	2.64	3.79E+02					
EPA SI	DR051	8/12/1998	Cobalt	1.00E+01	2.77	3.61E+02					
EPA SI	DR052	8/12/1998	Cobalt	1.10E+01	2.56	4.30E+02					
EPA SI	DR073	8/12/1998	Cobalt	1.00E+01	2.49	4.02E+02					
EPA SI	DR074	8/12/1998	Cobalt	1.10E+01	2.46	4.47E+02					
EPA SI	DR075	8/12/1998	Cobalt	1.00E+01	2.31	4.33E+02					
EPA SI	DR050	8/31/1998	Cobalt	1.20E+01	4.12	2.91E+02					
EPA SI	DR086	8/31/1998	Cobalt	1.20E+01	1.97	6.09E+02					
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Cobalt	1.09E+01	1.95	5.59E+02					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Cobalt	1.12E+01	1.67	6.71E+02					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Cobalt	9.80E+00	1.89	5.19E+02					
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Cobalt	9.30E+00	2.35	3.96E+02					
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Cobalt	4.60E+00	1.52	3.03E+02					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Cobalt	9.50E+00	0.766	1.24E+03					
EPA SI	DR048	8/12/1998	Copper	6.70E+01	2.03	3.30E+03	390	390	mg/kg DW	<1	<1
EPA SI	DR049	8/12/1998	Copper	7.80E+01	2.64	2.95E+03	390	390	mg/kg DW	<1	<1
EPA SI	DR051	8/12/1998	Copper	7.60E+01	2.77	2.74E+03	390	390	mg/kg DW	<1	<1
EPA SI	DR052	8/12/1998	Copper	9.80E+01	2.56	3.83E+03	390	390	mg/kg DW	<1	<1
EPA SI	DR073	8/12/1998	Copper	8.10E+01	2.49	3.25E+03	390	390	mg/kg DW	<1	<1
EPA SI	DR074	8/12/1998	Copper	7.00E+01	2.46	2.85E+03	390	390	mg/kg DW	<1	<1
EPA SI	DR075	8/12/1998	Copper	7.80E+01	2.31	3.38E+03	390	390	mg/kg DW	<1	<1
EPA SI	DR050	8/31/1998	Copper	1.10E+02	4.12	2.67E+03	390	390	mg/kg DW	<1	<1

Table A-1
Chemicals Detected in Surface Sediment Sample
Near the Kellogg to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Chemical	Conc'n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
EPA SI	DR086	8/31/1998	Copper	5.10E+01	1.97	2.59E+03	390	390	mg/kg DW	<1	<1
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Copper	1.07E+02	1.95	5.49E+03	390	390	mg/kg DW	<1	<1
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Copper	1.21E+02	1.67	7.25E+03	390	390	mg/kg DW	<1	<1
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Copper	1.04E+02	1.89	5.50E+03	390	390	mg/kg DW	<1	<1
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Copper	1.03E+02	2.35	4.38E+03	390	390	mg/kg DW	<1	<1
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Copper	1.60E+01 J	1.52	1.05E+03	390	390	mg/kg DW	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Copper	9.60E+01	0.766	1.25E+04	390	390	mg/kg DW	<1	<1
EPA SI	DR048	8/12/1998	Dibenzo(a,h)anthracene	7.00E-02	2.03	3.45E+00	12	33	mg/kg OC	<1	<1
EPA SI	DR049	8/12/1998	Dibenzo(a,h)anthracene	7.00E-02	2.64	2.65E+00	12	33	mg/kg OC	<1	<1
EPA SI	DR051	8/12/1998	Dibenzo(a,h)anthracene	5.00E-02	2.77	1.81E+00	12	33	mg/kg OC	<1	<1
EPA SI	DR052	8/12/1998	Dibenzo(a,h)anthracene	6.00E-02	2.56	2.34E+00	12	33	mg/kg OC	<1	<1
EPA SI	DR073	8/12/1998	Dibenzo(a,h)anthracene	5.00E-02	2.49	2.01E+00	12	33	mg/kg OC	<1	<1
EPA SI	DR074	8/12/1998	Dibenzo(a,h)anthracene	7.00E-02	2.46	2.85E+00	12	33	mg/kg OC	<1	<1
EPA SI	DR075	8/12/1998	Dibenzo(a,h)anthracene	5.00E-02	2.31	2.16E+00	12	33	mg/kg OC	<1	<1
EPA SI	DR050[a]	8/31/1998	Dibenzo(a,h)anthracene	1.20E-01	4.12	2.91E+00	0.23	0.54	mg/kg DW	<1	<1
EPA SI	DR086	8/31/1998	Dibenzo(a,h)anthracene	3.00E-02	1.97	1.52E+00	12	33	mg/kg OC	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Dibenzo(a,h)anthracene	5.10E-02 J	0.766	6.66E+00	12	33	mg/kg OC	<1	<1
EPA SI	DR049	8/12/1998	Dibenzofuran	6.00E-02	2.64	2.27E+00	15	58	mg/kg OC	<1	<1
EPA SI	DR051	8/12/1998	Dibenzofuran	1.00E-01	2.77	3.61E+00	15	58	mg/kg OC	<1	<1
EPA SI	DR073	8/12/1998	Dibenzofuran	2.00E-02	2.49	8.03E-01	15	58	mg/kg OC	<1	<1
EPA SI	DR075	8/12/1998	Dibenzofuran	3.00E-02	2.31	1.30E+00	15	58	mg/kg OC	<1	<1
EPA SI	DR050[a]	8/31/1998	Dibenzofuran	2.60E-01	4.12	6.31E+00	0.54	0.7	mg/kg DW	<1	<1
EPA SI	DR086	8/31/1998	Dibenzofuran	9.00E-02	1.97	4.57E+00	15	58	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Dibenzofuran	1.30E-01	1.89	6.88E+00	15	58	mg/kg OC	<1	<1
EPA SI	DR049	8/12/1998	Dibutyltin as ion	3.60E-02	2.64	1.36E+00					
EPA SI	DR051	8/12/1998	Dibutyltin as ion	4.90E-02	2.77	1.77E+00					
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Dibutyltin as ion	7.90E-03	1.95	4.05E-01					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Dibutyltin as ion	2.60E-02	1.67	1.56E+00					
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Dibutyltin as ion	3.60E-03 J	2.35	1.53E-01					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Diethyl phthalate	6.60E-03	1.67	3.95E-01	61	110	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Diethyl phthalate	7.30E-03	2.35	3.11E-01	61	110	mg/kg OC	<1	<1
EPA SI	DR050[a]	8/31/1998	Dimethyl phthalate	2.00E-02	4.12	4.85E-01	0.071	0.16	mg/kg DW	<1	<1
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Dimethyl phthalate	7.30E-03	1.67	4.37E-01	53	53	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Dimethyl phthalate	8.00E-03	2.35	3.40E-01	53	53	mg/kg OC	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Dimethyl phthalate	8.70E-03	0.766	1.14E+00	53	53	mg/kg OC	<1	<1
EPA SI	DR074	8/12/1998	Di-n-butyl phthalate	3.00E-02	2.46	1.22E+00	220	1700	mg/kg OC	<1	<1
EPA SI	DR051	8/12/1998	Dioxin/furan TEQ - Mammal	1.20E-05 J	2.77	4.33E-04					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Dioxin/furan TEQ - Mammal	1.73E-05 J	1.67	1.04E-03					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Dioxin/furan TEQ - Mammal	2.60E-05 J	1.89	1.38E-03					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Dioxin/furan TEQ - Mammal	1.63E-05 J							
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Dioxin/furan TEQ - Mammal	1.64E-05 J							
EPA SI	DR048	8/12/1998	Fluoranthene	2.50E-01	2.03	1.23E+01	160	1200	mg/kg OC	<1	<1
EPA SI	DR049	8/12/1998	Fluoranthene	1.80E+00	2.64	6.82E+01	160	1200	mg/kg OC	<1	<1
EPA SI	DR051	8/12/1998	Fluoranthene	1.20E+00	2.77	4.33E+01	160	1200	mg/kg OC	<1	<1
EPA SI	DR052	8/12/1998	Fluoranthene	9.90E-01	2.56	3.87E+01	160	1200	mg/kg OC	<1	<1

Table A-1
Chemicals Detected in Surface Sediment Sample
Near the Kellogg to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Chemical	Conc'n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
EPA SI	DR073	8/12/1998	Fluoranthene	8.80E-01	2.49	3.53E+01	160	1200	mg/kg OC	<1	<1
EPA SI	DR074	8/12/1998	Fluoranthene	6.30E-01	2.46	2.56E+01	160	1200	mg/kg OC	<1	<1
EPA SI	DR075	8/12/1998	Fluoranthene	6.60E-01	2.31	2.86E+01	160	1200	mg/kg OC	<1	<1
EPA SI	DR050[a]	8/31/1998	Fluoranthene	6.70E+00	4.12	1.63E+02	1.7	2.5	mg/kg DW	3.9	2.7
EPA SI	DR086	8/31/1998	Fluoranthene	1.30E+00	1.97	6.60E+01	160	1200	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Fluoranthene	1.90E-01	1.95	9.74E+00	160	1200	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Fluoranthene	1.50E-01	1.67	8.98E+00	160	1200	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Fluoranthene	2.30E+00	1.89	1.22E+02	160	1200	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Fluoranthene	3.30E-01	2.35	1.40E+01	160	1200	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Fluoranthene	1.80E-01	1.52	1.18E+01	160	1200	mg/kg OC	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Fluoranthene	7.20E-01	0.766	9.40E+01	160	1200	mg/kg OC	<1	<1
EPA SI	DR048	8/12/1998	Fluorene	5.00E-02	2.03	2.46E+00	23	79	mg/kg OC	<1	<1
EPA SI	DR049	8/12/1998	Fluorene	8.00E-02	2.64	3.03E+00	23	79	mg/kg OC	<1	<1
EPA SI	DR051	8/12/1998	Fluorene	9.00E-02	2.77	3.25E+00	23	79	mg/kg OC	<1	<1
EPA SI	DR052	8/12/1998	Fluorene	4.00E-02	2.56	1.56E+00	23	79	mg/kg OC	<1	<1
EPA SI	DR073	8/12/1998	Fluorene	4.00E-02	2.49	1.61E+00	23	79	mg/kg OC	<1	<1
EPA SI	DR074	8/12/1998	Fluorene	3.00E-02	2.46	1.22E+00	23	79	mg/kg OC	<1	<1
EPA SI	DR075	8/12/1998	Fluorene	4.00E-02	2.31	1.73E+00	23	79	mg/kg OC	<1	<1
EPA SI	DR050[a]	8/31/1998	Fluorene	3.30E-01	4.12	8.01E+00	0.54	1	mg/kg DW	<1	<1
EPA SI	DR086	8/31/1998	Fluorene	2.60E-01	1.97	1.32E+01	23	79	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Fluorene	9.60E-02 J	1.89	5.08E+00	23	79	mg/kg OC	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Fluorene	4.60E-02 J	0.766	6.01E+00	23	79	mg/kg OC	<1	<1
EPA SI	DR048	8/12/1998	Indeno(1,2,3-cd)pyrene	2.10E-01	2.03	1.03E+01	34	88	mg/kg OC	<1	<1
EPA SI	DR049	8/12/1998	Indeno(1,2,3-cd)pyrene	2.30E-01	2.64	8.71E+00	34	88	mg/kg OC	<1	<1
EPA SI	DR051	8/12/1998	Indeno(1,2,3-cd)pyrene	2.10E-01	2.77	7.58E+00	34	88	mg/kg OC	<1	<1
EPA SI	DR052	8/12/1998	Indeno(1,2,3-cd)pyrene	1.90E-01	2.56	7.42E+00	34	88	mg/kg OC	<1	<1
EPA SI	DR073	8/12/1998	Indeno(1,2,3-cd)pyrene	2.00E-01	2.49	8.03E+00	34	88	mg/kg OC	<1	<1
EPA SI	DR074	8/12/1998	Indeno(1,2,3-cd)pyrene	2.10E-01	2.46	8.54E+00	34	88	mg/kg OC	<1	<1
EPA SI	DR075	8/12/1998	Indeno(1,2,3-cd)pyrene	2.20E-01	2.31	9.52E+00	34	88	mg/kg OC	<1	<1
EPA SI	DR050[a]	8/31/1998	Indeno(1,2,3-cd)pyrene	4.20E-01	4.12	1.02E+01	0.6	0.69	mg/kg DW	<1	<1
EPA SI	DR086	8/31/1998	Indeno(1,2,3-cd)pyrene	1.20E-01	1.97	6.09E+00	34	88	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Indeno(1,2,3-cd)pyrene	1.80E-01	1.95	9.23E+00	34	88	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Indeno(1,2,3-cd)pyrene	1.10E-01	1.67	6.59E+00	34	88	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Indeno(1,2,3-cd)pyrene	7.70E-02	1.89	4.07E+00	34	88	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Indeno(1,2,3-cd)pyrene	2.20E-01	2.35	9.36E+00	34	88	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Indeno(1,2,3-cd)pyrene	1.40E-02	1.52	9.21E-01	34	88	mg/kg OC	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Indeno(1,2,3-cd)pyrene	1.50E-01	0.766	1.96E+01	34	88	mg/kg OC	<1	<1
EPA SI	DR048	8/12/1998	Iron	3.00E+04 J	2.03	1.48E+06					
EPA SI	DR049	8/12/1998	Iron	2.80E+04 J	2.64	1.06E+06					
EPA SI	DR051	8/12/1998	Iron	3.10E+04 J	2.77	1.12E+06					
EPA SI	DR052	8/12/1998	Iron	3.00E+04 J	2.56	1.17E+06					
EPA SI	DR073	8/12/1998	Iron	3.00E+04 J	2.49	1.20E+06					
EPA SI	DR074	8/12/1998	Iron	3.00E+04 J	2.46	1.22E+06					
EPA SI	DR075	8/12/1998	Iron	3.10E+04 J	2.31	1.34E+06					
EPA SI	DR050	8/31/1998	Iron	3.90E+04 J	4.12	9.47E+05					

Table A-1
Chemicals Detected in Surface Sediment Sample
Near the Kellogg to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Chemical	Conc'n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
EPA SI	DR086	8/31/1998	Iron	3.30E+04 J	1.97	1.68E+06					
EPA SI	DR048	8/12/1998	Lead	3.80E+01 J	2.03	1.87E+03	450	530	mg/kg DW	<1	<1
EPA SI	DR049	8/12/1998	Lead	1.40E+01 J	2.64	5.30E+02	450	530	mg/kg DW	<1	<1
EPA SI	DR051	8/12/1998	Lead	4.20E+01 J	2.77	1.52E+03	450	530	mg/kg DW	<1	<1
EPA SI	DR052	8/12/1998	Lead	4.70E+01 J	2.56	1.84E+03	450	530	mg/kg DW	<1	<1
EPA SI	DR073	8/12/1998	Lead	4.90E+01 J	2.49	1.97E+03	450	530	mg/kg DW	<1	<1
EPA SI	DR074	8/12/1998	Lead	3.80E+01 J	2.46	1.54E+03	450	530	mg/kg DW	<1	<1
EPA SI	DR075	8/12/1998	Lead	4.30E+01 J	2.31	1.86E+03	450	530	mg/kg DW	<1	<1
EPA SI	DR050	8/31/1998	Lead	6.60E+01 J	4.12	1.60E+03	450	530	mg/kg DW	<1	<1
EPA SI	DR086	8/31/1998	Lead	2.50E+01 J	1.97	1.27E+03	450	530	mg/kg DW	<1	<1
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Lead	5.80E+01	1.95	2.97E+03	450	530	mg/kg DW	<1	<1
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Lead	4.80E+01	1.67	2.87E+03	450	530	mg/kg DW	<1	<1
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Lead	6.10E+01	1.89	3.23E+03	450	530	mg/kg DW	<1	<1
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Lead	6.20E+01	2.35	2.64E+03	450	530	mg/kg DW	<1	<1
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Lead	7.00E+00	1.52	4.61E+02	450	530	mg/kg DW	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Lead	5.60E+01	0.766	7.31E+03	450	530	mg/kg DW	<1	<1
EPA SI	DR048	8/12/1998	Magnesium	8.40E+03	2.03	4.14E+05					
EPA SI	DR049	8/12/1998	Magnesium	8.10E+03	2.64	3.07E+05					
EPA SI	DR051	8/12/1998	Magnesium	9.10E+03	2.77	3.29E+05					
EPA SI	DR052	8/12/1998	Magnesium	8.80E+03	2.56	3.44E+05					
EPA SI	DR073	8/12/1998	Magnesium	8.60E+03	2.49	3.45E+05					
EPA SI	DR074	8/12/1998	Magnesium	9.20E+03	2.46	3.74E+05					
EPA SI	DR075	8/12/1998	Magnesium	9.30E+03	2.31	4.03E+05					
EPA SI	DR050	8/31/1998	Magnesium	1.00E+04	4.12	2.43E+05					
EPA SI	DR086	8/31/1998	Magnesium	8.90E+03	1.97	4.52E+05					
EPA SI	DR048	8/12/1998	Manganese	3.80E+02	2.03	1.87E+04					
EPA SI	DR049	8/12/1998	Manganese	3.20E+02	2.64	1.21E+04					
EPA SI	DR051	8/12/1998	Manganese	3.30E+02	2.77	1.19E+04					
EPA SI	DR052	8/12/1998	Manganese	3.60E+02	2.56	1.41E+04					
EPA SI	DR073	8/12/1998	Manganese	3.40E+02	2.49	1.37E+04					
EPA SI	DR074	8/12/1998	Manganese	3.00E+02	2.46	1.22E+04					
EPA SI	DR075	8/12/1998	Manganese	3.20E+02	2.31	1.39E+04					
EPA SI	DR050	8/31/1998	Manganese	4.30E+02	4.12	1.04E+04					
EPA SI	DR086	8/31/1998	Manganese	3.80E+02	1.97	1.93E+04					
EPA SI	DR048	8/12/1998	Mercury	1.80E-01	2.03	8.87E+00	0.41	0.59	mg/kg DW	<1	<1
EPA SI	DR049	8/12/1998	Mercury	2.40E-01	2.64	9.09E+00	0.41	0.59	mg/kg DW	<1	<1
EPA SI	DR051	8/12/1998	Mercury	2.20E-01	2.77	7.94E+00	0.41	0.59	mg/kg DW	<1	<1
EPA SI	DR052	8/12/1998	Mercury	2.20E-01	2.56	8.59E+00	0.41	0.59	mg/kg DW	<1	<1
EPA SI	DR073	8/12/1998	Mercury	1.90E-01	2.49	7.63E+00	0.41	0.59	mg/kg DW	<1	<1
EPA SI	DR074	8/12/1998	Mercury	1.90E-01	2.46	7.72E+00	0.41	0.59	mg/kg DW	<1	<1
EPA SI	DR075	8/12/1998	Mercury	2.10E-01	2.31	9.09E+00	0.41	0.59	mg/kg DW	<1	<1
EPA SI	DR050	8/31/1998	Mercury	3.20E-01	4.12	7.77E+00	0.41	0.59	mg/kg DW	<1	<1
EPA SI	DR086	8/31/1998	Mercury	1.40E-01	1.97	7.11E+00	0.41	0.59	mg/kg DW	<1	<1
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Mercury	3.00E-01	1.95	1.54E+01	0.41	0.59	mg/kg DW	<1	<1
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Mercury	1.70E-01	1.67	1.02E+01	0.41	0.59	mg/kg DW	<1	<1

Table A-1
Chemicals Detected in Surface Sediment Sample
Near the Kellogg to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Chemical	Conc'n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Mercury	2.40E-01	1.89	1.27E+01	0.41	0.59	mg/kg DW	<1	<1
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Mercury	1.80E-01	2.35	7.66E+00	0.41	0.59	mg/kg DW	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Mercury	3.00E-01	0.766	3.92E+01	0.41	0.59	mg/kg DW	<1	<1
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Molybdenum	2.00E+00	1.95	1.03E+02					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Molybdenum	2.00E+00	1.67	1.20E+02					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Molybdenum	2.00E+00	1.89	1.06E+02					
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Molybdenum	3.40E+00	2.35	1.45E+02					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Molybdenum	7.00E-01	0.766	9.14E+01					
EPA SI	DR049	8/12/1998	Monobutyltin as ion	4.10E-02 J	2.64	1.55E+00					
EPA SI	DR051	8/12/1998	Monobutyltin as ion	2.60E-02 J	2.77	9.39E-01					
EPA SI	DR075	8/12/1998	Naphthalene	2.00E-02	2.31	8.66E-01	99	170	mg/kg OC	<1	<1
EPA SI	DR050[a]	8/31/1998	Naphthalene	1.00E-01	4.12	2.43E+00	2.1	2.4	mg/kg DW	<1	<1
EPA SI	DR048	8/12/1998	Nickel	2.20E+01	2.03	1.08E+03			mg/kg DW		
EPA SI	DR049	8/12/1998	Nickel	2.20E+01	2.64	8.33E+02			mg/kg DW		
EPA SI	DR051	8/12/1998	Nickel	2.20E+01	2.77	7.94E+02			mg/kg DW		
EPA SI	DR052	8/12/1998	Nickel	2.10E+01	2.56	8.20E+02			mg/kg DW		
EPA SI	DR073	8/12/1998	Nickel	2.20E+01	2.49	8.84E+02			mg/kg DW		
EPA SI	DR074	8/12/1998	Nickel	2.20E+01	2.46	8.94E+02			mg/kg DW		
EPA SI	DR075	8/12/1998	Nickel	2.20E+01	2.31	9.52E+02			mg/kg DW		
EPA SI	DR050	8/31/1998	Nickel	2.60E+01 J	4.12	6.31E+02			mg/kg DW		
EPA SI	DR086	8/31/1998	Nickel	2.20E+01 J	1.97	1.12E+03			mg/kg DW		
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Nickel	2.70E+01	1.95	1.38E+03			mg/kg DW		
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Nickel	2.60E+01	1.67	1.56E+03			mg/kg DW		
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Nickel	2.40E+01	1.89	1.27E+03			mg/kg DW		
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Nickel	1.90E+01	2.35	8.09E+02			mg/kg DW		
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Nickel	8.00E+00	1.52	5.26E+02			mg/kg DW		
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Nickel	2.90E+01	0.766	3.79E+03			mg/kg DW		
EPA SI	DR051	8/12/1998	OCDD	4.50E-03	2.77	1.62E-01					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	OCDD	6.62E-03	1.67	3.96E-01					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	OCDD	9.23E-03	1.89	4.88E-01					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	OCDD	4.11E-03	0.766	5.37E-01					
EPA SI	DR051	8/12/1998	OCDF	2.20E-04	2.77	7.94E-03					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	OCDF	3.24E-04	1.67	1.94E-02					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	OCDF	4.93E-04	1.89	2.61E-02					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	OCDF	3.53E-04	0.766	4.61E-02					
NOAA SiteChar	WST366	9/15/1997	PCBs (total calc'd)	7.20E-02 J	1.23	5.85E+00	12	65	mg/kg OC	<1	<1
NOAA SiteChar	WST352	9/16/1997	PCBs (total calc'd)	6.50E-02 J	2.13	3.05E+00	12	65	mg/kg OC	<1	<1
NOAA SiteChar	WST353	9/16/1997	PCBs (total calc'd)	7.20E-02 J	2.36	3.05E+00	12	65	mg/kg OC	<1	<1
NOAA SiteChar	WST368	9/16/1997	PCBs (total calc'd)	8.70E-02 J	2.01	4.33E+00	12	65	mg/kg OC	<1	<1
NOAA SiteChar	WST365	9/18/1997	PCBs (total calc'd)	7.80E-02 J	1.96	3.98E+00	12	65	mg/kg OC	<1	<1
NOAA SiteChar	WIT297	9/19/1997	PCBs (total calc'd)	5.20E-03 J	0.09	5.78E+00	0.13	1	mg/kg DW	<1	<1
NOAA SiteChar	CH1033	10/16/1997	PCBs (total calc'd)	1.00E-01	2.08	4.81E+00	12	65	mg/kg OC	<1	<1
NOAA SiteChar	CH1034	10/17/1997	PCBs (total calc'd)	5.10E-02 J	1.61	3.17E+00	12	65	mg/kg OC	<1	<1
EPA SI	DR048	8/12/1998	PCBs (total calc'd)	8.80E-02	2.03	4.33E+00	12	65	mg/kg OC	<1	<1
EPA SI	DR049	8/12/1998	PCBs (total calc'd)	1.20E-01	2.64	4.55E+00	12	65	mg/kg OC	<1	<1

Table A-1
Chemicals Detected in Surface Sediment Sample
Near the Kellogg to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Chemical	Conc'n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
EPA SI	DR052	8/12/1998	PCBs (total calc'd)	1.38E-01	2.56	5.39E+00	12	65	mg/kg OC	<1	<1
EPA SI	DR073	8/12/1998	PCBs (total calc'd)	1.54E-01	2.49	6.18E+00	12	65	mg/kg OC	<1	<1
EPA SI	DR074	8/12/1998	PCBs (total calc'd)	1.27E-01	2.46	5.16E+00	12	65	mg/kg OC	<1	<1
EPA SI	DR075	8/12/1998	PCBs (total calc'd)	1.18E-01	2.31	5.11E+00	12	65	mg/kg OC	<1	<1
EPA SI	DR050[a]	8/31/1998	PCBs (total calc'd)	2.40E-01 J	4.12	5.83E+00	0.13	1	mg/kg DW	1.8	<1
EPA SI	DR086	8/31/1998	PCBs (total calc'd)	1.16E-01 J	1.97	5.89E+00	12	65	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	PCBs (total calc'd)	1.15E-01	1.95	5.90E+00	12	65	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	PCBs (total calc'd)	1.80E-02 J	1.67	1.08E+00	12	65	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	PCBs (total calc'd)	2.40E-02	1.89	1.27E+00	12	65	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	PCBs (total calc'd)	1.98E-01	2.35	8.43E+00	12	65	mg/kg OC	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	PCBs (total calc'd)	2.80E-01 J	0.766	3.66E+01	12	65	mg/kg OC	3.0	<1
NOAA SiteChar	WST366	9/15/1997	PCBs + PCTs (total)	8.70E-02	1.23	7.07E+00					
NOAA SiteChar	WST352	9/16/1997	PCBs + PCTs (total)	7.80E-02	2.13	3.66E+00					
NOAA SiteChar	WST353	9/16/1997	PCBs + PCTs (total)	8.40E-02	2.36	3.56E+00					
NOAA SiteChar	WST368	9/16/1997	PCBs + PCTs (total)	1.00E-01	2.01	4.98E+00					
NOAA SiteChar	WST365	9/18/1997	PCBs + PCTs (total)	9.00E-02	1.96	4.59E+00					
NOAA SiteChar	WIT297	9/19/1997	PCBs + PCTs (total)	7.30E-03	0.09	8.11E+00					
NOAA SiteChar	CH1033	10/16/1997	PCBs + PCTs (total)	1.20E-01	2.08	5.77E+00					
NOAA SiteChar	CH1034	10/17/1997	PCBs + PCTs (total)	5.90E-02	1.61	3.66E+00					
NOAA SiteChar	WST366	9/15/1997	PCTs (total)	1.50E-02	1.23	1.22E+00					
NOAA SiteChar	WST352	9/16/1997	PCTs (total)	1.30E-02	2.13	6.10E-01					
NOAA SiteChar	WST353	9/16/1997	PCTs (total)	1.20E-02	2.36	5.08E-01					
NOAA SiteChar	WST368	9/16/1997	PCTs (total)	1.40E-02	2.01	6.97E-01					
NOAA SiteChar	WST365	9/18/1997	PCTs (total)	1.20E-02	1.96	6.12E-01					
NOAA SiteChar	WIT297	9/19/1997	PCTs (total)	2.10E-03 J	0.09	2.33E+00					
NOAA SiteChar	CH1033	10/16/1997	PCTs (total)	2.00E-02	2.08	9.62E-01					
NOAA SiteChar	CH1034	10/17/1997	PCTs (total)	8.00E-03 J	1.61	4.97E-01					
EPA SI	DR048	8/12/1998	Phenanthrene	2.90E-01	2.03	1.43E+01	100	480	mg/kg OC	<1	<1
EPA SI	DR049	8/12/1998	Phenanthrene	5.70E-01	2.64	2.16E+01	100	480	mg/kg OC	<1	<1
EPA SI	DR051	8/12/1998	Phenanthrene	5.80E-01	2.77	2.09E+01	100	480	mg/kg OC	<1	<1
EPA SI	DR052	8/12/1998	Phenanthrene	2.10E-01	2.56	8.20E+00	100	480	mg/kg OC	<1	<1
EPA SI	DR073	8/12/1998	Phenanthrene	2.50E-01	2.49	1.00E+01	100	480	mg/kg OC	<1	<1
EPA SI	DR074	8/12/1998	Phenanthrene	2.10E-01	2.46	8.54E+00	100	480	mg/kg OC	<1	<1
EPA SI	DR075	8/12/1998	Phenanthrene	3.00E-01	2.31	1.30E+01	100	480	mg/kg OC	<1	<1
EPA SI	DR050[a]	8/31/1998	Phenanthrene	1.40E+00	4.12	3.40E+01	1.5	5.4	mg/kg DW	<1	<1
EPA SI	DR086	8/31/1998	Phenanthrene	1.50E+00	1.97	7.61E+01	100	480	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Phenanthrene	7.50E-02	1.95	3.85E+00	100	480	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Phenanthrene	6.80E-02	1.67	4.07E+00	100	480	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Phenanthrene	1.80E+00	1.89	9.52E+01	100	480	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Phenanthrene	1.30E-01	2.35	5.53E+00	100	480	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Phenanthrene	3.40E-02	1.52	2.24E+00	100	480	mg/kg OC	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Phenanthrene	2.90E-01	0.766	3.79E+01	100	480	mg/kg OC	<1	<1
EPA SI	DR048	8/12/1998	Phenol	5.00E-02	2.03	2.46E+00	0.42	1.2	mg/kg DW	<1	<1
EPA SI	DR049	8/12/1998	Phenol	1.50E-01	2.64	5.68E+00	0.42	1.2	mg/kg DW	<1	<1
EPA SI	DR051	8/12/1998	Phenol	4.00E-02	2.77	1.44E+00	0.42	1.2	mg/kg DW	<1	<1

Table A-1
Chemicals Detected in Surface Sediment Sample
Near the Kellogg to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Chemical	Conc'n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
EPA SI	DR052	8/12/1998	Phenol	9.00E-02	2.56	3.52E+00	0.42	1.2	mg/kg DW	<1	<1
EPA SI	DR074	8/12/1998	Phenol	1.50E-01	2.46	6.10E+00	0.42	1.2	mg/kg DW	<1	<1
EPA SI	DR075	8/12/1998	Phenol	7.00E-02	2.31	3.03E+00	0.42	1.2	mg/kg DW	<1	<1
EPA SI	DR050	8/31/1998	Phenol	3.00E-02	4.12	7.28E-01	0.42	1.2	mg/kg DW	<1	<1
EPA SI	DR048	8/12/1998	Potassium	3.10E+03	2.03	1.53E+05					
EPA SI	DR049	8/12/1998	Potassium	3.00E+03	2.64	1.14E+05					
EPA SI	DR051	8/12/1998	Potassium	3.20E+03	2.77	1.16E+05					
EPA SI	DR052	8/12/1998	Potassium	3.10E+03	2.56	1.21E+05					
EPA SI	DR073	8/12/1998	Potassium	3.20E+03	2.49	1.29E+05					
EPA SI	DR074	8/12/1998	Potassium	3.30E+03	2.46	1.34E+05					
EPA SI	DR075	8/12/1998	Potassium	3.30E+03	2.31	1.43E+05					
EPA SI	DR050	8/31/1998	Potassium	3.70E+03	4.12	8.98E+04					
EPA SI	DR086	8/31/1998	Potassium	3.20E+03	1.97	1.62E+05					
EPA SI	DR048	8/12/1998	Pyrene	1.20E+00	2.03	5.91E+01	1000	1400	mg/kg OC	<1	<1
EPA SI	DR049	8/12/1998	Pyrene	9.70E-01	2.64	3.67E+01	1000	1400	mg/kg OC	<1	<1
EPA SI	DR051	8/12/1998	Pyrene	7.30E-01	2.77	2.64E+01	1000	1400	mg/kg OC	<1	<1
EPA SI	DR052	8/12/1998	Pyrene	6.30E-01	2.56	2.46E+01	1000	1400	mg/kg OC	<1	<1
EPA SI	DR073	8/12/1998	Pyrene	5.90E-01	2.49	2.37E+01	1000	1400	mg/kg OC	<1	<1
EPA SI	DR074	8/12/1998	Pyrene	4.90E-01	2.46	1.99E+01	1000	1400	mg/kg OC	<1	<1
EPA SI	DR075	8/12/1998	Pyrene	5.70E-01	2.31	2.47E+01	1000	1400	mg/kg OC	<1	<1
EPA SI	DR050[a]	8/31/1998	Pyrene	4.20E+00	4.12	1.02E+02	2.6	3.3	mg/kg DW	1.6	1.3
EPA SI	DR086	8/31/1998	Pyrene	8.80E-01	1.97	4.47E+01	1000	1400	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Pyrene	1.80E-01	1.95	9.23E+00	1000	1400	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Pyrene	1.80E-01	1.67	1.08E+01	1000	1400	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Pyrene	1.70E+00	1.89	8.99E+01	1000	1400	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Pyrene	3.00E-01	2.35	1.28E+01	1000	1400	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Pyrene	1.10E-01	1.52	7.24E+00	1000	1400	mg/kg OC	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Pyrene	6.20E-01	0.766	8.09E+01	1000	1400	mg/kg OC	<1	<1
EPA SI	DR048	8/12/1998	Selenium	8.00E-01 J	2.03	3.94E+01			mg/kg DW		
EPA SI	DR049	8/12/1998	Selenium	1.00E+00 J	2.64	3.79E+01			mg/kg DW		
EPA SI	DR051	8/12/1998	Selenium	8.00E-01 J	2.77	2.89E+01			mg/kg DW		
EPA SI	DR052	8/12/1998	Selenium	1.00E+00	2.56	3.91E+01			mg/kg DW		
EPA SI	DR073	8/12/1998	Selenium	7.00E-01 J	2.49	2.81E+01			mg/kg DW		
EPA SI	DR074	8/12/1998	Selenium	1.00E+00	2.46	4.07E+01			mg/kg DW		
EPA SI	DR075	8/12/1998	Selenium	7.00E-01 J	2.31	3.03E+01			mg/kg DW		
EPA SI	DR050	8/31/1998	Selenium	2.40E+01 J	4.12	5.83E+02			mg/kg DW		
EPA SI	DR086	8/31/1998	Selenium	2.30E+01 J	1.97	1.17E+03			mg/kg DW		
EPA SI	DR048	8/12/1998	Silver	3.40E-01	2.03	1.67E+01	6.1	6.1	mg/kg DW	<1	<1
EPA SI	DR049	8/12/1998	Silver	3.20E-01	2.64	1.21E+01	6.1	6.1	mg/kg DW	<1	<1
EPA SI	DR051	8/12/1998	Silver	3.10E-01	2.77	1.12E+01	6.1	6.1	mg/kg DW	<1	<1
EPA SI	DR052	8/12/1998	Silver	3.20E-01	2.56	1.25E+01	6.1	6.1	mg/kg DW	<1	<1
EPA SI	DR073	8/12/1998	Silver	3.20E-01	2.49	1.29E+01	6.1	6.1	mg/kg DW	<1	<1
EPA SI	DR074	8/12/1998	Silver	2.60E-01	2.46	1.06E+01	6.1	6.1	mg/kg DW	<1	<1
EPA SI	DR075	8/12/1998	Silver	3.00E-01	2.31	1.30E+01	6.1	6.1	mg/kg DW	<1	<1
EPA SI	DR050	8/31/1998	Silver	4.80E-01	4.12	1.17E+01	6.1	6.1	mg/kg DW	<1	<1

Table A-1
Chemicals Detected in Surface Sediment Sample
Near the Kellogg to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Chemical	Conc'n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
EPA SI	DR086	8/31/1998	Silver	3.30E-01	1.97	1.68E+01	6.1	6.1	mg/kg DW	<1	<1
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Silver	7.00E-01	1.95	3.59E+01	6.1	6.1	mg/kg DW	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Silver	5.00E-01 J	0.766	6.53E+01	6.1	6.1	mg/kg DW	<1	<1
EPA SI	DR048	8/12/1998	Sodium	1.10E+04	2.03	5.42E+05					
EPA SI	DR049	8/12/1998	Sodium	1.20E+04	2.64	4.55E+05					
EPA SI	DR051	8/12/1998	Sodium	1.30E+04	2.77	4.69E+05					
EPA SI	DR052	8/12/1998	Sodium	1.20E+04	2.56	4.69E+05					
EPA SI	DR073	8/12/1998	Sodium	1.20E+04	2.49	4.82E+05					
EPA SI	DR074	8/12/1998	Sodium	1.30E+04	2.46	5.28E+05					
EPA SI	DR075	8/12/1998	Sodium	1.30E+04	2.31	5.63E+05					
EPA SI	DR050	8/31/1998	Sodium	1.40E+04	4.12	3.40E+05					
EPA SI	DR086	8/31/1998	Sodium	1.20E+04	1.97	6.09E+05					
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Sulfides (total)	3.80E+01 J	1.95	1.95E+03					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Sulfides (total)	1.30E+03 J	1.67	7.78E+04					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Sulfides (total)	9.10E+02	1.89	4.81E+04					
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Sulfides (total)	1.10E+02 J	2.35	4.68E+03					
EPA SI	DR048	8/12/1998	Thallium	1.20E-01	2.03	5.91E+00					
EPA SI	DR049	8/12/1998	Thallium	1.20E-01	2.64	4.55E+00					
EPA SI	DR051	8/12/1998	Thallium	1.20E-01	2.77	4.33E+00					
EPA SI	DR052	8/12/1998	Thallium	1.30E-01	2.56	5.08E+00					
EPA SI	DR073	8/12/1998	Thallium	1.20E-01	2.49	4.82E+00					
EPA SI	DR074	8/12/1998	Thallium	1.20E-01	2.46	4.88E+00					
EPA SI	DR075	8/12/1998	Thallium	1.30E-01	2.31	5.63E+00					
EPA SI	DR050	8/31/1998	Thallium	1.70E-01 J	4.12	4.13E+00					
EPA SI	DR086	8/31/1998	Thallium	1.30E-01 J	1.97	6.60E+00					
EPA SI	DR048	8/12/1998	Tin	6.00E+00 J	2.03	2.96E+02					
EPA SI	DR049	8/12/1998	Tin	6.00E+00 J	2.64	2.27E+02					
EPA SI	DR051	8/12/1998	Tin	6.00E+00 J	2.77	2.17E+02					
EPA SI	DR052	8/12/1998	Tin	8.00E+00 J	2.56	3.13E+02					
EPA SI	DR073	8/12/1998	Tin	6.00E+00 J	2.49	2.41E+02					
EPA SI	DR074	8/12/1998	Tin	6.00E+00 J	2.46	2.44E+02					
EPA SI	DR075	8/12/1998	Tin	6.00E+00 J	2.31	2.60E+02					
EPA SI	DR050	8/31/1998	Tin	1.10E+01	4.12	2.67E+02					
EPA SI	DR048	8/12/1998	Total HPAH (calc'd)	5.10E+00	2.03	2.51E+02	960	5300	mg/kg OC	<1	<1
EPA SI	DR049	8/12/1998	Total HPAH (calc'd)	5.80E+00	2.64	2.20E+02	960	5300	mg/kg OC	<1	<1
EPA SI	DR051	8/12/1998	Total HPAH (calc'd)	4.20E+00	2.77	1.52E+02	960	5300	mg/kg OC	<1	<1
EPA SI	DR052	8/12/1998	Total HPAH (calc'd)	3.77E+00	2.56	1.47E+02	960	5300	mg/kg OC	<1	<1
EPA SI	DR073	8/12/1998	Total HPAH (calc'd)	3.61E+00	2.49	1.45E+02	960	5300	mg/kg OC	<1	<1
EPA SI	DR074	8/12/1998	Total HPAH (calc'd)	3.18E+00	2.46	1.29E+02	960	5300	mg/kg OC	<1	<1
EPA SI	DR075	8/12/1998	Total HPAH (calc'd)	3.30E+00	2.31	1.43E+02	960	5300	mg/kg OC	<1	<1
EPA SI	DR050[a]	8/31/1998	Total HPAH (calc'd)	1.82E+01	4.12	4.42E+02	12	17	mg/kg DW	1.5	1.1
EPA SI	DR086	8/31/1998	Total HPAH (calc'd)	3.90E+00	1.97	1.98E+02	960	5300	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Total HPAH (calc'd)	1.68E+00	1.95	8.62E+01	960	5300	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Total HPAH (calc'd)	1.13E+00	1.67	6.77E+01	960	5300	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Total HPAH (calc'd)	6.60E+00 J	1.89	3.49E+02	960	5300	mg/kg OC	<1	<1

Table A-1
Chemicals Detected in Surface Sediment Sample
Near the Kellogg to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Chemical	Conc'n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Total HPAH (calc'd)	2.22E+00	2.35	9.45E+01	960	5300	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Total HPAH (calc'd)	6.40E-01	1.52	4.21E+01	960	5300	mg/kg OC	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Total HPAH (calc'd)	4.28E+00 J	0.766	5.59E+02	960	5300	mg/kg OC	<1	<1
EPA SI	DR051	8/12/1998	Total HpCDD	1.30E-03	2.77	4.69E-02					
EPA SI	DR051	8/12/1998	Total HpCDF	2.70E-04	2.77	9.75E-03					
EPA SI	DR051	8/12/1998	Total HxCDD	1.60E-04	2.77	5.78E-03					
EPA SI	DR051	8/12/1998	Total HxCDF	9.50E-05	2.77	3.43E-03					
EPA SI	DR048	8/12/1998	Total LPAH (calc'd)	6.00E-01	2.03	2.96E+01	370	780	mg/kg OC	<1	<1
EPA SI	DR049	8/12/1998	Total LPAH (calc'd)	9.70E-01	2.64	3.67E+01	370	780	mg/kg OC	<1	<1
EPA SI	DR051	8/12/1998	Total LPAH (calc'd)	1.10E+00	2.77	3.97E+01	370	780	mg/kg OC	<1	<1
EPA SI	DR052	8/12/1998	Total LPAH (calc'd)	3.80E-01	2.56	1.48E+01	370	780	mg/kg OC	<1	<1
EPA SI	DR073	8/12/1998	Total LPAH (calc'd)	4.20E-01	2.49	1.69E+01	370	780	mg/kg OC	<1	<1
EPA SI	DR074	8/12/1998	Total LPAH (calc'd)	3.30E-01	2.46	1.34E+01	370	780	mg/kg OC	<1	<1
EPA SI	DR075	8/12/1998	Total LPAH (calc'd)	4.80E-01	2.31	2.08E+01	370	780	mg/kg OC	<1	<1
EPA SI	DR050[a]	8/31/1998	Total LPAH (calc'd)	3.10E+00	4.12	7.52E+01	5.2	13	mg/kg DW	<1	<1
EPA SI	DR086	8/31/1998	Total LPAH (calc'd)	2.00E+00	1.97	1.02E+02	370	780	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Total LPAH (calc'd)	1.12E-01	1.95	5.74E+00	370	780	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Total LPAH (calc'd)	9.00E-02	1.67	5.39E+00	370	780	mg/kg OC	<1	<1
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Total LPAH (calc'd)	2.20E+00 J	1.89	1.16E+02	370	780	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Total LPAH (calc'd)	1.80E-01	2.35	7.66E+00	370	780	mg/kg OC	<1	<1
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Total LPAH (calc'd)	5.40E-02	1.52	3.55E+00	370	780	mg/kg OC	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Total LPAH (calc'd)	4.70E-01 J	0.766	6.14E+01	370	780	mg/kg OC	<1	<1
EPA SI	DR048	8/12/1998	Total PAH (calc'd)	5.70E+00	2.03	2.81E+02					
EPA SI	DR049	8/12/1998	Total PAH (calc'd)	6.70E+00	2.64	2.54E+02					
EPA SI	DR051	8/12/1998	Total PAH (calc'd)	5.30E+00	2.77	1.91E+02					
EPA SI	DR052	8/12/1998	Total PAH (calc'd)	4.15E+00	2.56	1.62E+02					
EPA SI	DR073	8/12/1998	Total PAH (calc'd)	4.03E+00	2.49	1.62E+02					
EPA SI	DR074	8/12/1998	Total PAH (calc'd)	3.51E+00	2.46	1.43E+02					
EPA SI	DR075	8/12/1998	Total PAH (calc'd)	3.78E+00	2.31	1.64E+02					
EPA SI	DR050	8/31/1998	Total PAH (calc'd)	2.13E+01	4.12	5.17E+02					
EPA SI	DR086	8/31/1998	Total PAH (calc'd)	5.90E+00	1.97	2.99E+02					
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Total PAH (calc'd)	1.79E+00	1.95	9.18E+01					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Total PAH (calc'd)	1.22E+00	1.67	7.31E+01					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Total PAH (calc'd)	8.80E+00 J	1.89	4.66E+02					
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Total PAH (calc'd)	2.40E+00	2.35	1.02E+02					
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Total PAH (calc'd)	6.90E-01	1.52	4.54E+01					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Total PAH (calc'd)	4.75E+00 J	0.766	6.20E+02					
EPA SI	DR051	8/12/1998	Total PeCDF	3.20E-05	2.77	1.16E-03					
EPA SI	DR051	8/12/1998	Total TCDD	6.50E-06	2.77	2.35E-04					
EPA SI	DR051	8/12/1998	Total TCDF	3.80E-05	2.77	1.37E-03					
EPA SI	DR049	8/12/1998	Tributyltin as ion	1.70E-01	2.64	6.44E+00					
EPA SI	DR051	8/12/1998	Tributyltin as ion	1.60E-01	2.77	5.78E+00					
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Tributyltin as ion	2.30E-02	1.95	1.18E+00					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Tributyltin as ion	9.90E-02	1.67	5.93E+00					
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Tributyltin as ion	1.80E-02 J	2.35	7.66E-01					

Table A-1
Chemicals Detected in Surface Sediment Sample
Near the Kellogg to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Chemical	Conc'n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Tributyltin as ion	5.40E-03	1.52	3.55E-01					
EPA SI	DR048	8/12/1998	Vanadium	6.20E+01	2.03	3.05E+03					
EPA SI	DR049	8/12/1998	Vanadium	5.10E+01	2.64	1.93E+03					
EPA SI	DR051	8/12/1998	Vanadium	6.20E+01	2.77	2.24E+03					
EPA SI	DR052	8/12/1998	Vanadium	5.80E+01	2.56	2.27E+03					
EPA SI	DR073	8/12/1998	Vanadium	5.40E+01	2.49	2.17E+03					
EPA SI	DR074	8/12/1998	Vanadium	6.10E+01	2.46	2.48E+03					
EPA SI	DR075	8/12/1998	Vanadium	6.30E+01	2.31	2.73E+03					
EPA SI	DR050	8/31/1998	Vanadium	8.70E+01	4.12	2.11E+03					
EPA SI	DR086	8/31/1998	Vanadium	7.90E+01	1.97	4.01E+03					
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Vanadium	7.67E+01	1.95	3.93E+03					
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Vanadium	7.22E+01	1.67	4.32E+03					
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Vanadium	7.76E+01	1.89	4.11E+03					
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Vanadium	6.20E+01	2.35	2.64E+03					
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Vanadium	3.80E+01	1.52	2.50E+03					
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Vanadium	6.16E+01	0.766	8.04E+03					
EPA SI	DR048	8/12/1998	Zinc	1.20E+02	2.03	5.91E+03	410	960	mg/kg DW	<1	<1
EPA SI	DR049	8/12/1998	Zinc	1.30E+02	2.64	4.92E+03	410	960	mg/kg DW	<1	<1
EPA SI	DR051	8/12/1998	Zinc	1.30E+02	2.77	4.69E+03	410	960	mg/kg DW	<1	<1
EPA SI	DR052	8/12/1998	Zinc	1.40E+02	2.56	5.47E+03	410	960	mg/kg DW	<1	<1
EPA SI	DR073	8/12/1998	Zinc	1.40E+02	2.49	5.62E+03	410	960	mg/kg DW	<1	<1
EPA SI	DR074	8/12/1998	Zinc	1.20E+02	2.46	4.88E+03	410	960	mg/kg DW	<1	<1
EPA SI	DR075	8/12/1998	Zinc	1.40E+02	2.31	6.06E+03	410	960	mg/kg DW	<1	<1
EPA SI	DR050	8/31/1998	Zinc	1.70E+02	4.12	4.13E+03	410	960	mg/kg DW	<1	<1
EPA SI	DR086	8/31/1998	Zinc	9.40E+01	1.97	4.77E+03	410	960	mg/kg DW	<1	<1
LDW RI Phase 2 Round 1	LDW-SS38	1/18/2005	Zinc	1.55E+02	1.95	7.95E+03	410	960	mg/kg DW	<1	<1
LDW RI Phase 2 Round 1	LDW-SS43	1/21/2005	Zinc	1.65E+02	1.67	9.88E+03	410	960	mg/kg DW	<1	<1
LDW RI Phase 2 Round 1	LDW-SS36	1/24/2005	Zinc	2.56E+02	1.89	1.35E+04	410	960	mg/kg DW	<1	<1
LDW RI Phase 2 Round 2	LDW-SS41	3/8/2005	Zinc	1.75E+02	2.35	7.45E+03	410	960	mg/kg DW	<1	<1
LDW RI Phase 2 Round 2	LDW-SS34	3/14/2005	Zinc	3.26E+01 J	1.52	2.14E+03	410	960	mg/kg DW	<1	<1
LDW RI Phase 2 Round 3	LDW-SS322	10/4/2006	Zinc	1.55E+02	0.766	2.02E+04	410	960	mg/kg DW	<1	<1

Table A-1
Chemicals Detected in Surface Sediment Sample
Near the Kellogg to Lafarge Source Control Are

Event Name	Location Name	Date Collected	Chemical	Conc'n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor

mg/kg - Milligram per kilogram
ug/kg - Microgram per kilogram
DW - Dry weight
TOC - Total organic carbon
OC - Organic carbon normalized
SQS - SMS Sediment Quality Standard
CSL - SMS Cleanup Screening Level
PAH - Polycyclic aromatic hydrocarbon

Total HPAH - Total high molecular weight PAH
Total LPAH - Total low molecular weight PAH
PCB - Polychlorinated biphenyl
SMS - Sediment Management Standard (Washington Administrative Code 173-204)
JN - Estimated value between the method detection limit and laboratory reporting limit; tentative identification, the analyte exhibits low spectral match
NA - Not Applicable
[a] Due to the high TOC in this sample, results were compared to the Lowest Apparent Effects Threshold (LAET) or the second LAET (2LAET) value rather than the SQS and/or CSL. The LAET is functionally equivalent to the SQS and the 2LAET is functionally equivalent to the CSL.

Table presents detected chemicals only.
Exceedance factors are the ratio of the detected concentrations to the CSL or SQS; exceedance factors are shown only if they are greater than 1.
Chemicals with exceedance factors are shaded.
Sampling events are listed in Table 1.

Table A-2
Chemicals Detected in Subsurface Sediment Samples
Near the Kellogg Island to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Sample Depth (feet)	Chemical	Conc,n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	1,2,3,4,6,7,8-HpCDD	7.00E-04	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	1,2,3,4,6,7,8-HpCDD	7.40E-04	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	1,2,3,4,6,7,8-HpCDD	6.71E-04	1.56						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	1,2,3,4,6,7,8-HpCDF	1.29E-04	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	1,2,3,4,6,7,8-HpCDF	1.10E-04	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	1,2,3,4,6,7,8-HpCDF	1.15E-04	1.56						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	1,2,3,4,7,8,9-HpCDF	1.17E-05	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	1,2,3,4,7,8,9-HpCDF	8.85E-06	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	1,2,3,4,7,8,9-HpCDF	1.01E-05	1.56						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	1,2,3,4,7,8-HxCDD	4.14E-06	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	1,2,3,4,7,8-HxCDD	3.68E-06	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	1,2,3,4,7,8-HxCDD	3.65E-06	1.56						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	1,2,3,4,7,8-HxCDF	1.88E-05	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	1,2,3,4,7,8-HxCDF	1.30E-05	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	1,2,3,4,7,8-HxCDF	1.39E-05	1.56						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	1,2,3,6,7,8-HxCDD	2.42E-05	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	1,2,3,6,7,8-HxCDD	1.99E-05	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	1,2,3,6,7,8-HxCDD	2.26E-05	1.56						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	1,2,3,6,7,8-HxCDF	5.25E-06	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	1,2,3,6,7,8-HxCDF	3.81E-06	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	1,2,3,6,7,8-HxCDF	4.24E-06	1.56						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	1,2,3,7,8,9-HxCDD	1.49E-05	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	1,2,3,7,8,9-HxCDD	1.40E-05	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	1,2,3,7,8,9-HxCDD	1.32E-05	1.56						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	1,2,3,7,8,9-HxCDF	4.21E-07 J	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	1,2,3,7,8,9-HxCDF	3.42E-07 J	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	1,2,3,7,8,9-HxCDF	3.41E-07 J	1.56						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	1,2,3,7,8-PeCDD	2.80E-06	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	1,2,3,7,8-PeCDD	2.01E-06	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	1,2,3,7,8-PeCDD	2.64E-06	1.56						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	1,2,3,7,8-PeCDF	1.76E-06	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	1,2,3,7,8-PeCDF	1.28E-06	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	1,2,3,7,8-PeCDF	1.35E-06	1.56						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	2,3,4,6,7,8-HxCDF	3.86E-06	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	2,3,4,6,7,8-HxCDF	2.57E-06	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	2,3,4,6,7,8-HxCDF	3.26E-06	1.56						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	2,3,4,7,8-PeCDF	4.59E-06	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	2,3,4,7,8-PeCDF	2.80E-06	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	2,3,4,7,8-PeCDF	3.30E-06	1.56						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	2,3,7,8-TCDD	7.25E-07	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	2,3,7,8-TCDD	5.21E-07	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	2,3,7,8-TCDD	6.96E-07	1.56						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	2,3,7,8-TCDF	2.21E-06	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	2,3,7,8-TCDF	1.41E-06	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	2,3,7,8-TCDF	1.58E-06	1.56						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	2-Methylphenol	4.80E-03 J	2.28		63	63	ug/kg dw	<1	<1

Table A-2
Chemicals Detected in Subsurface Sediment Samples
Near the Kellogg Island to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Sample Depth (feet)	Chemical	Conc,n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Acenaphthylene	4.60E-02 J	2.28	2.00E+00	66	66	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Acenaphthylene	4.80E-02 J	1.7	2.80E+00	66	66	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Anthracene	1.50E-01	2.28	6.60E+00	220	1200	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Anthracene	1.30E-01	1.7	7.60E+00	220	1200	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Anthracene	6.30E-02	1.56	4.00E+00	220	1200	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Anthracene	9.40E-02	1.98	4.70E+00	220	1200	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Anthracene	5.30E-02 J	1.49	3.60E+00	220	1200	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Anthracene	7.40E-02	1.64	4.50E+00	220	1200	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Anthracene	8.10E-02	1.99	4.10E+00	220	1200	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24[a]	2/17/2006	1 - 2	Anthracene	1.60E-02 J	0.304		0.96	4.4	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	4 - 6	Aroclor-1242	5.40E-02	1.26						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	4 - 6	Aroclor-1242	3.20E-01	1.94						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Aroclor-1248	6.50E-02	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Aroclor-1248	5.90E-02	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Aroclor-1248	4.30E-02	1.56						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	6 - 7	Aroclor-1248	7.10E-01	1.54						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Aroclor-1248	5.00E-02	1.98						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Aroclor-1248	2.80E-02	1.49						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Aroclor-1248	9.00E-02	1.64						
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Aroclor-1248	4.70E-02	1.99						
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	1 - 2	Aroclor-1248	6.10E-03	0.304						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Aroclor-1254	1.00E-01	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Aroclor-1254	7.90E-02	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Aroclor-1254	9.20E-02	1.56						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	4 - 6	Aroclor-1254	2.00E-01	1.26						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	6 - 7	Aroclor-1254	1.10E+00	1.54						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Aroclor-1254	1.00E-01	1.98						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Aroclor-1254	6.30E-02	1.49						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Aroclor-1254	1.70E-01	1.64						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	4 - 6	Aroclor-1254	8.20E-01	1.94						
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Aroclor-1254	1.20E-01	1.99						
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	1 - 2	Aroclor-1254	1.90E-02	0.304						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Aroclor-1260	1.10E-01	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Aroclor-1260	9.50E-02	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Aroclor-1260	1.10E-01	1.56						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	4 - 6	Aroclor-1260	1.90E-01	1.26						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	6 - 7	Aroclor-1260	6.10E-01	1.54						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Aroclor-1260	9.90E-02	1.98						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Aroclor-1260	5.40E-02	1.49						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Aroclor-1260	1.20E-01 J	1.64						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	4 - 6	Aroclor-1260	5.40E-01	1.94						
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Aroclor-1260	1.10E-01	1.99						
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	1 - 2	Aroclor-1260	1.10E-02	0.304						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Arsenic	2.00E+01	2.28		57	93	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Arsenic	2.00E+01	1.7		57	93	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Arsenic	2.40E+01	1.56		57	93	mg/kg dw	<1	<1

Table A-2
Chemicals Detected in Subsurface Sediment Samples
Near the Kellogg Island to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Sample Depth (feet)	Chemical	Conc,n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Arsenic	2.00E+01	1.98		57	93	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Arsenic	1.90E+01	1.49		57	93	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Arsenic	3.40E+01	1.64		57	93	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Arsenic	3.00E+01	1.99		57	93	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	1 - 2	Arsenic	1.10E+01	0.304		57	93	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Benzo(a)anthracene	3.80E-01	2.28	1.70E+01	110	270	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Benzo(a)anthracene	1.80E-01	1.7	1.10E+01	110	270	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Benzo(a)anthracene	1.50E-01	1.56	9.60E+00	110	270	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Benzo(a)anthracene	2.30E-01	1.98	1.20E+01	110	270	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Benzo(a)anthracene	1.50E-01	1.49	1.00E+01	110	270	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Benzo(a)anthracene	2.30E-01	1.64	1.40E+01	110	270	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Benzo(a)anthracene	2.20E-01	1.99	1.10E+01	110	270	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24[a]	2/17/2006	1 - 2	Benzo(a)anthracene	5.00E-02	0.304		1.3	1.6	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Benzo(a)pyrene	3.00E-01	2.28	1.30E+01	99	210	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Benzo(a)pyrene	3.90E-01	1.7	2.30E+01	99	210	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Benzo(a)pyrene	2.00E-01	1.56	1.30E+01	99	210	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Benzo(a)pyrene	2.80E-01	1.98	1.40E+01	99	210	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Benzo(a)pyrene	2.20E-01	1.49	1.50E+01	99	210	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Benzo(a)pyrene	3.60E-01	1.64	2.20E+01	99	210	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Benzo(a)pyrene	3.50E-01	1.99	1.80E+01	99	210	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24[a]	2/17/2006	1 - 2	Benzo(a)pyrene	5.60E-02	0.304		1.6	3	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24[a]	2/17/2006	2 - 4	Benzo(a)pyrene	1.30E-02 J	0.435		1.6	3	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Benzo(b)fluoranthene	6.10E-01	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Benzo(b)fluoranthene	8.60E-01	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Benzo(b)fluoranthene	4.50E-01	1.56						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Benzo(b)fluoranthene	5.90E-01	1.98						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Benzo(b)fluoranthene	3.10E-01	1.49						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Benzo(b)fluoranthene	4.80E-01	1.64						
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Benzo(b)fluoranthene	5.20E-01	1.99						
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	1 - 2	Benzo(b)fluoranthene	7.50E-02	0.304						
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	2 - 4	Benzo(b)fluoranthene	1.80E-02 J	0.435						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Benzo(g,h,i)perylene	8.20E-02	2.28	3.60E+00	31	78	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Benzo(g,h,i)perylene	6.80E-02	1.7	4.00E+00	31	78	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Benzo(g,h,i)perylene	6.20E-02	1.56	4.00E+00	31	78	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Benzo(g,h,i)perylene	5.80E-02 J	1.98	2.90E+00	31	78	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Benzo(g,h,i)perylene	8.80E-02	1.49	5.90E+00	31	78	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Benzo(g,h,i)perylene	9.70E-02	1.64	5.90E+00	31	78	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Benzo(g,h,i)perylene	7.80E-02	1.99	3.90E+00	31	78	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24[a]	2/17/2006	1 - 2	Benzo(g,h,i)perylene	1.20E-02 J	0.304		0.67	0.72	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Benzo(k)fluoranthene	5.10E-01	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Benzo(k)fluoranthene	5.60E-01	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Benzo(k)fluoranthene	3.30E-01	1.56						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Benzo(k)fluoranthene	3.50E-01	1.98						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Benzo(k)fluoranthene	2.30E-01	1.49						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Benzo(k)fluoranthene	4.00E-01	1.64						
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Benzo(k)fluoranthene	4.90E-01	1.99						

Table A-2
Chemicals Detected in Subsurface Sediment Samples
Near the Kellogg Island to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Sample Depth (feet)	Chemical	Conc,n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	1 - 2	Benzo(k)fluoranthene	8.20E-02	0.304						
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	2 - 4	Benzo(k)fluoranthene	1.80E-02 J	0.435						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Benzofluoranthenes (total-calc'd)	1.12E+00	2.28	4.90E+01	230	450	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Benzofluoranthenes (total-calc'd)	1.42E+00	1.7	8.40E+01	230	450	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Benzofluoranthenes (total-calc'd)	7.80E-01	1.56	5.00E+01	230	450	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Benzofluoranthenes (total-calc'd)	9.40E-01	1.98	4.70E+01	230	450	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Benzofluoranthenes (total-calc'd)	5.40E-01	1.49	3.60E+01	230	450	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Benzofluoranthenes (total-calc'd)	8.80E-01	1.64	5.40E+01	230	450	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Benzofluoranthenes (total-calc'd)	1.01E+00	1.99	5.10E+01	230	450	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24[a]	2/17/2006	1 - 2	Benzofluoranthenes (total-calc'd)	1.57E-01	0.304		3.2	3.6	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24[a]	2/17/2006	2 - 4	Benzofluoranthenes (total-calc'd)	3.60E-02 J	0.435		3.2	3.6	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Benzoic acid	2.10E-01 J	2.28		650	650	ug/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Benzoic acid	8.80E-02 J	1.7		650	650	ug/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Benzoic acid	1.00E-01 J	1.56		650	650	ug/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Benzoic acid	9.50E-02	1.98		650	650	ug/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Benzoic acid	1.20E-01	1.49		650	650	ug/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Benzoic acid	1.00E-01	1.64		650	650	ug/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Benzoic acid	8.80E-02 J	1.99		0.65	0.65	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	1 - 2	Benzoic acid	4.80E-02 J	0.304		0.65	0.65	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Bis(2-ethylhexyl)phthalate	2.20E-01	2.28	9.60E+00	47	78	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Bis(2-ethylhexyl)phthalate	1.40E-01	1.7	8.20E+00	47	78	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Bis(2-ethylhexyl)phthalate	2.70E-01	1.56	1.70E+01	47	78	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Bis(2-ethylhexyl)phthalate	3.60E-01	1.98	1.80E+01	47	78	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Bis(2-ethylhexyl)phthalate	3.40E-01	1.49	2.30E+01	47	78	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Bis(2-ethylhexyl)phthalate	6.00E-01	1.64	3.70E+01	47	78	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Bis(2-ethylhexyl)phthalate	3.90E-01	1.99	2.00E+01	47	78	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24[a]	2/17/2006	1 - 2	Bis(2-ethylhexyl)phthalate	1.50E-02 J	0.304		1.3	1.9	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24[a]	2/17/2006	2 - 4	Bis(2-ethylhexyl)phthalate	1.60E-02 J	0.435		1.3	1.9	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Butyl benzyl phthalate	3.40E-02	2.28	1.50E+00	4.9	64	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Butyl benzyl phthalate	1.40E-02	1.7	8.20E-01	4.9	64	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Butyl benzyl phthalate	1.50E-02	1.56	9.60E-01	4.9	64	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Butyl benzyl phthalate	4.40E-02	1.98	2.20E+00	4.9	64	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Butyl benzyl phthalate	4.10E-02	1.49	2.80E+00	4.9	64	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Butyl benzyl phthalate	4.60E-02	1.64	2.80E+00	4.9	64	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Butyl benzyl phthalate	2.30E-02	1.99	1.20E+00	4.9	64	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Cadmium	7.00E-01	1.98		5.1	6.7	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Cadmium	6.00E-01	1.64		5.1	6.7	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Cadmium	4.00E-01	1.99		5.1	6.7	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Carcinogenic PAHs - Mammal - Half DL	4.80E-01 J							
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Carcinogenic PAHs - Mammal - Half DL	5.80E-01 J							
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Carcinogenic PAHs - Mammal - Half DL	3.10E-01							
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Carcinogenic PAHs - Mammal - Half DL	4.20E-01 J							
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Carcinogenic PAHs - Mammal - Half DL	3.10E-01							
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Carcinogenic PAHs - Mammal - Half DL	5.00E-01 J							
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Carcinogenic PAHs - Mammal - Half DL	5.00E-01	1.99						
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	1 - 2	Carcinogenic PAHs - Mammal - Half DL	8.30E-02 J	0.304						

Table A-2
Chemicals Detected in Subsurface Sediment Samples
Near the Kellogg Island to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Sample Depth (feet)	Chemical	Conc,n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	2 - 4	Carcinogenic PAHs - Mammal - Half DL	2.30E-02 J	0.435						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Chromium	3.60E+01	2.28		260	270	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Chromium	3.50E+01	1.7		260	270	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Chromium	3.06E+01	1.56		260	270	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Chromium	3.60E+01	1.98		260	270	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Chromium	3.40E+01	1.49		260	270	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Chromium	3.26E+01	1.64		260	270	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Chromium	3.41E+01	1.99		260	270	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	1 - 2	Chromium	1.37E+01	0.304		260	270	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	2 - 4	Chromium	1.11E+01	0.435		260	270	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Chrysene	7.00E-01	2.28	3.10E+01	110	460	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Chrysene	4.40E-01	1.7	2.60E+01	110	460	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Chrysene	2.30E-01	1.56	1.50E+01	110	460	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Chrysene	4.60E-01	1.98	2.30E+01	110	460	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Chrysene	2.20E-01	1.49	1.50E+01	110	460	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Chrysene	3.20E-01	1.64	2.00E+01	110	460	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Chrysene	3.60E-01	1.99	1.80E+01	110	460	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24[a]	2/17/2006	1 - 2	Chrysene	5.90E-02	0.304		1.4	2.8	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Cobalt	8.60E+00	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Cobalt	1.01E+01	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Cobalt	8.70E+00	1.56						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Cobalt	1.00E+01	1.98						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Cobalt	1.10E+01	1.49						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Cobalt	9.90E+00	1.64						
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Cobalt	1.10E+01	1.99						
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	1 - 2	Cobalt	5.10E+00	0.304						
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	2 - 4	Cobalt	4.30E+00	0.435						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Copper	1.01E+02	2.28		390	390	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Copper	8.92E+01	1.7		390	390	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Copper	8.79E+01	1.56		390	390	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Copper	9.55E+01	1.98		390	390	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Copper	8.57E+01	1.49		390	390	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Copper	1.14E+02	1.64		390	390	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Copper	1.42E+02	1.99		390	390	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	1 - 2	Copper	4.00E+01	0.304		390	390	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	2 - 4	Copper	1.54E+01	0.435		390	390	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Dibenzo(a,h)anthracene	3.80E-02 J	2.28	1.70E+00	12	33	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Dibenzo(a,h)anthracene	4.00E-02 J	1.7	2.40E+00	12	33	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Dibenzo(a,h)anthracene	2.90E-02 J	1.64	1.80E+00	12	33	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Di-n-butyl phthalate	3.00E-02 J	1.56	1.90E+00	220	1700	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Di-n-butyl phthalate	3.00E-02 J	1.98	1.50E+00	220	1700	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24[a]	2/17/2006	1 - 2	Di-n-butyl phthalate	1.30E-02 J	0.304		1.4	5.1	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24[a]	2/17/2006	2 - 4	Di-n-butyl phthalate	1.40E-02 J	0.435		1.4	5.1	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Dioxin/furan TEQ - Bird - Half DL	1.81E-05 J							
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Dioxin/furan TEQ - Bird - Half DL	1.33E-05 J							
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Dioxin/furan TEQ - Bird - Half DL	1.48E-05 J							

Table A-2
Chemicals Detected in Subsurface Sediment Samples
Near the Kellogg Island to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Sample Depth (feet)	Chemical	Conc,n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Dioxin/furan TEQ - Fish Sheboygan - Half DL	1.57E-05 J							
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Dioxin/furan TEQ - Fish Sheboygan - Half DL	1.19E-05 J							
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Dioxin/furan TEQ - Fish Sheboygan - Half DL	1.30E-05 J							
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Dioxin/furan TEQ - Fish WHO - Half DL	1.41E-05 J							
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Dioxin/furan TEQ - Fish WHO - Half DL	1.09E-05 J							
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Dioxin/furan TEQ - Fish WHO - Half DL	1.21E-05 J							
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Dioxin/furan TEQ - Mammal WHO 1998 - Half DL	2.24E-05 J							
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Dioxin/furan TEQ - Mammal WHO 1998 - Half DL	1.92E-05 J							
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Dioxin/furan TEQ - Mammal WHO 1998 - Half DL	1.99E-05 J							
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Dioxin/furan TEQ - Mammal WHO 2005 - Half DL	2.28E-05 J							
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Dioxin/furan TEQ - Mammal WHO 2005 - Half DL	2.01E-05 J							
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Dioxin/furan TEQ - Mammal WHO 2005 - Half DL	2.05E-05 J							
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Fluoranthene	6.60E-01	2.28	2.90E+01	160	1200	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Fluoranthene	2.70E-01	1.7	1.60E+01	160	1200	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Fluoranthene	2.60E-01	1.56	1.70E+01	160	1200	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Fluoranthene	5.40E-01	1.98	2.70E+01	160	1200	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Fluoranthene	3.00E-01	1.49	2.00E+01	160	1200	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Fluoranthene	6.10E-01	1.64	3.70E+01	160	1200	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Fluoranthene	4.70E-01	1.99	2.40E+01	160	1200	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24[a]	2/17/2006	1 - 2	Fluoranthene	1.40E-01	0.304		1.7	2.5	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Fluorene	4.60E-02 J	2.28	2.00E+00	23	79	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Fluorene	4.90E-02 J	1.7	2.90E+00	23	79	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Indeno(1,2,3-cd)pyrene	9.20E-02	2.28	4.00E+00	34	88	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Indeno(1,2,3-cd)pyrene	9.20E-02	1.7	5.40E+00	34	88	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Indeno(1,2,3-cd)pyrene	6.90E-02	1.56	4.40E+00	34	88	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Indeno(1,2,3-cd)pyrene	5.70E-02 J	1.98	2.90E+00	34	88	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Indeno(1,2,3-cd)pyrene	8.20E-02	1.49	5.50E+00	34	88	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Indeno(1,2,3-cd)pyrene	1.00E-01	1.64	6.10E+00	34	88	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Indeno(1,2,3-cd)pyrene	9.90E-02	1.99	5.00E+00	34	88	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24[a]	2/17/2006	1 - 2	Indeno(1,2,3-cd)pyrene	1.30E-02 J	0.304		0.6	0.69	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Lead	6.00E+01	2.28		450	530	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Lead	5.00E+01	1.7		450	530	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Lead	7.00E+01	1.56		450	530	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Lead	5.50E+01	1.98		450	530	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Lead	4.60E+01	1.49		450	530	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Lead	1.07E+02	1.64		450	530	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Lead	6.90E+01	1.99		450	530	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	1 - 2	Lead	8.00E+00	0.304		450	530	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Mercury	3.40E-01	2.28		0.41	0.59	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Mercury	2.50E-01	1.7		0.41	0.59	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Mercury	2.10E-01	1.56		0.41	0.59	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Mercury	3.00E-01	1.98		0.41	0.59	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Mercury	2.00E-01	1.49		0.41	0.59	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Mercury	2.60E-01	1.64		0.41	0.59	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Mercury	2.60E-01	1.99		0.41	0.59	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Molybdenum	1.00E+00	2.28						

Table A-2
Chemicals Detected in Subsurface Sediment Samples
Near the Kellogg Island to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Sample Depth (feet)	Chemical	Conc,n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Molybdenum	1.00E+00	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Molybdenum	1.30E+00	1.56						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Molybdenum	1.00E+00	1.98						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Molybdenum	1.00E+00	1.49						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Molybdenum	1.80E+00	1.64						
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Molybdenum	2.60E+00	1.99						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Nickel	2.40E+01	2.28				mg/kg dw		
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Nickel	2.60E+01	1.7				mg/kg dw		
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Nickel	2.20E+01	1.56				mg/kg dw		
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Nickel	2.50E+01	1.98				mg/kg dw		
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Nickel	2.70E+01	1.49				mg/kg dw		
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Nickel	2.10E+01	1.64				mg/kg dw		
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Nickel	2.40E+01	1.99				mg/kg dw		
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	1 - 2	Nickel	9.00E+00	0.304				mg/kg dw		
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	2 - 4	Nickel	7.00E+00	0.435				mg/kg dw		
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	OCDD	6.42E-03	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	OCDD	6.84E-03	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	OCDD	6.04E-03	1.56						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	OCDF	3.88E-04	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	OCDF	4.44E-04	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	OCDF	4.21E-04	1.56						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	PCBs (total calc'd)	2.80E-01	2.28	1.20E+01	12	65	mg/kg OC	1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	PCBs (total calc'd)	2.33E-01	1.7	1.40E+01	12	65	mg/kg OC	1.2	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	PCBs (total calc'd)	2.50E-01	1.56	1.60E+01	12	65	mg/kg OC	1.3	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	4 - 6	PCBs (total calc'd)	4.40E-01	1.26	3.50E+01	12	65	mg/kg OC	2.9	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	6 - 7	PCBs (total calc'd)	2.40E+00	1.54	1.60E+02	12	65	mg/kg OC	13	2.5
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	PCBs (total calc'd)	2.50E-01	1.98	1.30E+01	12	65	mg/kg OC	1.1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	PCBs (total calc'd)	1.45E-01	1.49	9.70E+00	12	65	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	PCBs (total calc'd)	3.80E-01 J	1.64	2.30E+01	12	65	mg/kg OC	1.9	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	4 - 6	PCBs (total calc'd)	1.68E+00	1.94	8.70E+01	12	65	mg/kg OC	7.3	1.3
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	PCBs (total calc'd)	2.80E-01	1.99	1.40E+01	12	65	mg/kg OC	1.2	<1
LDW Subsurface Sediment 2006	LDW-SC24[a]	2/17/2006	1 - 2	PCBs (total calc'd)	3.60E-02	0.304		0.13	1	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Pentachlorophenol	1.70E-02 J	2.28		360	690	ug/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Pentachlorophenol	2.00E-02 J	1.56		360	690	ug/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24[a]	2/17/2006	0 - 1	Pentachlorophenol	2.40E-02 J	1.99		0.36	0.69	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Phenanthrene	2.50E-01	2.28	1.10E+01	100	480	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Phenanthrene	2.00E-01	1.7	1.20E+01	100	480	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Phenanthrene	1.60E-01	1.56	1.00E+01	100	480	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Phenanthrene	1.80E-01	1.98	9.10E+00	100	480	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Phenanthrene	1.20E-01	1.49	8.10E+00	100	480	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Phenanthrene	2.10E-01	1.64	1.30E+01	100	480	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Phenanthrene	1.50E-01	1.99	7.50E+00	100	480	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24[a]	2/17/2006	1 - 2	Phenanthrene	3.00E-02	0.304		1.5	5.4	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Phenol	1.70E-01	2.28		420	1200	ug/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Phenol	8.20E-02	1.7		420	1200	ug/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Pyrene	1.20E+00 J	2.28	5.30E+01	1000	1400	mg/kg OC	<1	<1

Table A-2
Chemicals Detected in Subsurface Sediment Samples
Near the Kellogg Island to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Sample Depth (feet)	Chemical	Conc,n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Pyrene	2.10E+00 J	1.7	1.20E+02	1000	1400	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Pyrene	8.00E-01 J	1.56	5.10E+01	1000	1400	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Pyrene	5.60E-01	1.98	2.80E+01	1000	1400	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Pyrene	4.00E-01	1.49	2.70E+01	1000	1400	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Pyrene	9.30E-01	1.64	5.70E+01	1000	1400	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Pyrene	6.70E-01	1.99	3.40E+01	1000	1400	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24[a]	2/17/2006	1 - 2	Pyrene	2.30E-01	0.304		2.6	3.3	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24[a]	2/17/2006	2 - 4	Pyrene	1.90E-02 J	0.435		2.6	3.3	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Total HPAH (calc'd)	4.60E+00 J	2.28	2.00E+02	960	5300	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Total HPAH (calc'd)	5.00E+00 J	1.7	2.90E+02	960	5300	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Total HPAH (calc'd)	2.55E+00 J	1.56	1.60E+02	960	5300	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Total HPAH (calc'd)	3.13E+00 J	1.98	1.60E+02	960	5300	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Total HPAH (calc'd)	2.00E+00	1.49	1.30E+02	960	5300	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Total HPAH (calc'd)	3.56E+00 J	1.64	2.20E+02	960	5300	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Total HPAH (calc'd)	3.26E+00	1.99	1.60E+02	960	5300	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24[a]	2/17/2006	1 - 2	Total HPAH (calc'd)	7.20E-01 J	0.304		12	17	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24[a]	2/17/2006	2 - 4	Total HPAH (calc'd)	6.80E-02 J	0.435		12	17	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Total LPAH (calc'd)	4.90E-01 J	2.28	2.10E+01	370	780	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Total LPAH (calc'd)	4.30E-01 J	1.7	2.50E+01	370	780	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Total LPAH (calc'd)	2.20E-01	1.56	1.40E+01	370	780	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Total LPAH (calc'd)	2.70E-01	1.98	1.40E+01	370	780	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Total LPAH (calc'd)	1.70E-01 J	1.49	1.10E+01	370	780	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Total LPAH (calc'd)	2.80E-01	1.64	1.70E+01	370	780	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Total LPAH (calc'd)	2.30E-01	1.99	1.20E+01	370	780	mg/kg OC	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24[a]	2/17/2006	1 - 2	Total LPAH (calc'd)	4.60E-02 J	0.304		5.2	13	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Total PAH (calc'd)	5.10E+00 J	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Total PAH (calc'd)	5.40E+00 J	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Total PAH (calc'd)	2.77E+00 J	1.56						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Total PAH (calc'd)	3.40E+00 J	1.98						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Total PAH (calc'd)	2.17E+00 J	1.49						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Total PAH (calc'd)	3.84E+00 J	1.64						
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Total PAH (calc'd)	3.49E+00	1.99						
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	1 - 2	Total PAH (calc'd)	7.60E-01 J	0.304						
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	2 - 4	Total PAH (calc'd)	6.80E-02 J	0.435						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Vanadium	6.92E+01	2.28						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Vanadium	7.54E+01	1.7						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Vanadium	6.44E+01	1.56						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Vanadium	7.54E+01	1.98						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Vanadium	8.15E+01	1.49						
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Vanadium	6.91E+01	1.64						
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Vanadium	7.12E+01	1.99						
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	1 - 2	Vanadium	4.64E+01	0.304						
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	2 - 4	Vanadium	4.10E+01	0.435						
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	0 - 1	Zinc	1.62E+02	2.28		410	960	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	1 - 2	Zinc	1.48E+02	1.7		410	960	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC19	2/24/2006	2 - 4	Zinc	1.50E+02	1.56		410	960	mg/kg dw	<1	<1

Table A-2
Chemicals Detected in Subsurface Sediment Samples
Near the Kellogg Island to Lafarge Source Control Area

Event Name	Location Name	Date Collected	Sample Depth (feet)	Chemical	Conc,n (mg/kg DW)	TOC %	Conc'n (mg/kg OC)	SQS	CSL	Units	SQS Exceedance Factor	CSL Exceedance Factor
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	0 - 1	Zinc	1.55E+02	1.98		410	960	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	1 - 2	Zinc	1.33E+02	1.49		410	960	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC21	2/14/2006	2 - 4	Zinc	1.89E+02	1.64		410	960	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	0 - 1	Zinc	1.95E+02	1.99		410	960	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	1 - 2	Zinc	3.83E+01	0.304		410	960	mg/kg dw	<1	<1
LDW Subsurface Sediment 2006	LDW-SC24	2/17/2006	2 - 4	Zinc	2.26E+01	0.435		410	960	mg/kg dw	<1	<1

mg/kg - Milligram per kilogram
ug/kg - Microgram per kilogram
DW - Dry weight
TOC - Total organic carbon
OC - Organic carbon normalized
SQS - SMS Sediment Quality Standard
CSL - SMS Cleanup Screening Level
PAH - Polycyclic aromatic hydrocarbon
Total HPAH - Total high molecular weight PAH
Total LPAH - Total low molecular weight PAH
PCB - Polychlorinated biphenyl
SMS - Sediment Management Standard (Washington Administrative Code 173-204)
D - Duplicate sample
J - Estimated value between the method detection limit and the laboratory reporting limit
[a] Due to the low TOC in this sample, results were compared to the Lowest Apparent Effects Threshold (LAET) or the second LAET (2LAET) value rather than the SQS and/or CSL. The LAET is functionally equivalent to the SQS and the 2LAET is functionally equivalent to the CSL.

Table presents detected chemicals only.
Exceedance factors are the ratio of the detected concentrations to the CSL or SQS; exceedance factors are shown only if they are greater than 1.
Chemicals with exceedance factors are shaded.
Sampling events are listed in Table 1.

Table A-3
Chemicals Detected in Seep Sample
Near the Kellogg Island to Lafarge Source Control Area

Source	Date Sampled	Location Name	Chemical	Conc'n (ug/L)		Marine Chronic WQS	Marine Acute WQS	Chronic WQS Exceedance Factor
Filtered Samples			**Metals**					
Windward 2004	7/2/2004	Seep 64	Arsenic	1.28		36	69	<1
Windward 2004	7/2/2004	Seep 64	Cadmium	0.045		9.3	42	<1
Windward 2004	7/2/2004	Seep 64	Lead	0.19		8.1	210	<1
Windward 2004	7/2/2004	Seep 64	Mercury	0.001	J	0.025	1.8	<1
Windward 2004	7/2/2004	Seep 64	Silver	0.049		1.9	1.9	<1
Windward 2004	7/2/2004	Seep 64	Zinc	3.86		81	90	<1
Unfiltered Samples			**PCBs**					
Windward 2004	7/2/2004	Seep 64	Aroclor-1248	0.09		NA	NA	NA
Windward 2004	7/2/2004	Seep 64	Aroclor-1260	0.16		NA	NA	NA
Windward 2004	7/2/2004	Seep 64	Aroclor-1254	0.21	J	NA	NA	NA
Windward 2004	7/2/2004	Seep 64	PCBs (total calc'd)	0.46	J	0.03	10	15.3

WQS - Water Quality Standards, Nov 2006
CSL - Sediment Management Standards Cleanup Screening Level
NA - Not applicable
a - Groundwater to sediment screening level, based on sediment CSLs (SAIC 2006 [0100])
J - Estimated concentration

(1) Exceedance factors are the ratio of the detected concentration to the screening level; exceedance factors are shown only if they are greater than 1.

Appendix B

Historical Aerial Photograph Review

Appendix B

Lower Duwamish Waterway
RM 1.0–1.3 West (Kellogg Island to Lafarge)
Historical Aerial Photograph Review

In an effort to more thoroughly understand and evaluate historical facility operations and development in the RM 1.0–1.3 West source control area, SAIC reviewed historical aerial photographs from 1936 to 2004. At a minimum, these photographs represent conditions of roughly each decade. Additional photographs are available; however, if during a cursory assessment there were no apparent changes, photographs less than a decade apart were not included in this summary. Aerial photographs for the years 1936, 1946, 1956, 1960, 1969, 1974, 1980, 1990, and 2004 are described below.

For purposes of discussion, current-day street names are used as reference points. **Lafarge North America, Inc.** extends from RM 1.0 to roughly 150 to 200 feet south of RM 1.2 West. To the west of Lafarge are West Marginal Way SW and Burlington Northern Railroad. Lafarge is bordered by the LDW to the north and east. The Chemithon Corporation is located to the southwest, and Alaska Marine Lines is immediately south of the Kellogg Island to Lafarge source control area.

1936

The land adjacent to the LDW is in the early stages of development. A dirt road and small wharf exist at the north end of the property around RM 1.0. There are large amounts of logs rafted around Kellogg Island. The southern plot of land has been cleared and graded. No buildings are present.

1946

Development continues on the land within the Kellogg Island to Lafarge source control area. Two buildings have been constructed on the north central area of the property. The western edge of the property has been cleared of vegetation but not yet developed. A fence has been constructed on the southern property boundary. Reclamation of 55-gallon drums was known to take place on the property from 1944 to 1946. Logs are rafted near the eastern edge of the property, along with a large vessel and smaller boat.

1956

Ten new buildings have been built on the western portion of the property. While they appear to be industrial, it is unclear what types of operations occur at the new facilities. The fence on the southern boundary has been removed and the properties within the source control area appear to have merged into a single property. The shoreline to the north has been reinforced with riprap and logs continue to be rafted off the eastern edge adjacent to the LDW. A pier has been constructed on the center portion of the property.

1960

The buildings on all areas of the property have been deconstructed but not replaced. Dirt roads running through the property remain similar to previous years. Logs continue to be rafted along the eastern edge of the property. A railway has been constructed along the western property boundary, parallel to West Marginal Way SW.

1969

The Ideal Basic Industries (predecessor to Lafarge) cement manufacturing facility has been completely developed. Cement storage silos have been constructed on the northwestern portion of the property. A barge loading dock has also been constructed along the northern edge of the facility. A wharf has been built along the length of the property from north to south. A clay storage pit is visible inland along the northern portion of the wharf, and a larger limestone storage area runs along the wharf to the south. On the southeastern corner of the facility, a barge unloading tower is present. Inland from the wharf and storage pits is the manufacturing facility. The manufacturing area contains slurry tanks, numerous silos, mill buildings, a kiln dust tank, and a cooling tower. To the west, along West Marginal Way SW, there is a main office and parking lot. Another facility, Chemithon (Glacier Bay source control area), has been constructed southwest of the property boundary.

1974 to 1980

The source control area is relatively unchanged.

1990

The facility and operations remain largely unchanged since previous years. The barge unloading tower has been moved to the center portion of the property, between the two storage pits along the eastern wharf. Material conveyors have been installed from the clay storage pit through the storage area into the manufacturing area.

2004

The source control area is relatively unchanged.

Figure B–1. RM 1.0 to 1.3 West (Kellogg Island to Lafarge): 1936

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Figure B–2. RM 1.0 to 1.3 West (Kellogg Island to Lafarge): 1946

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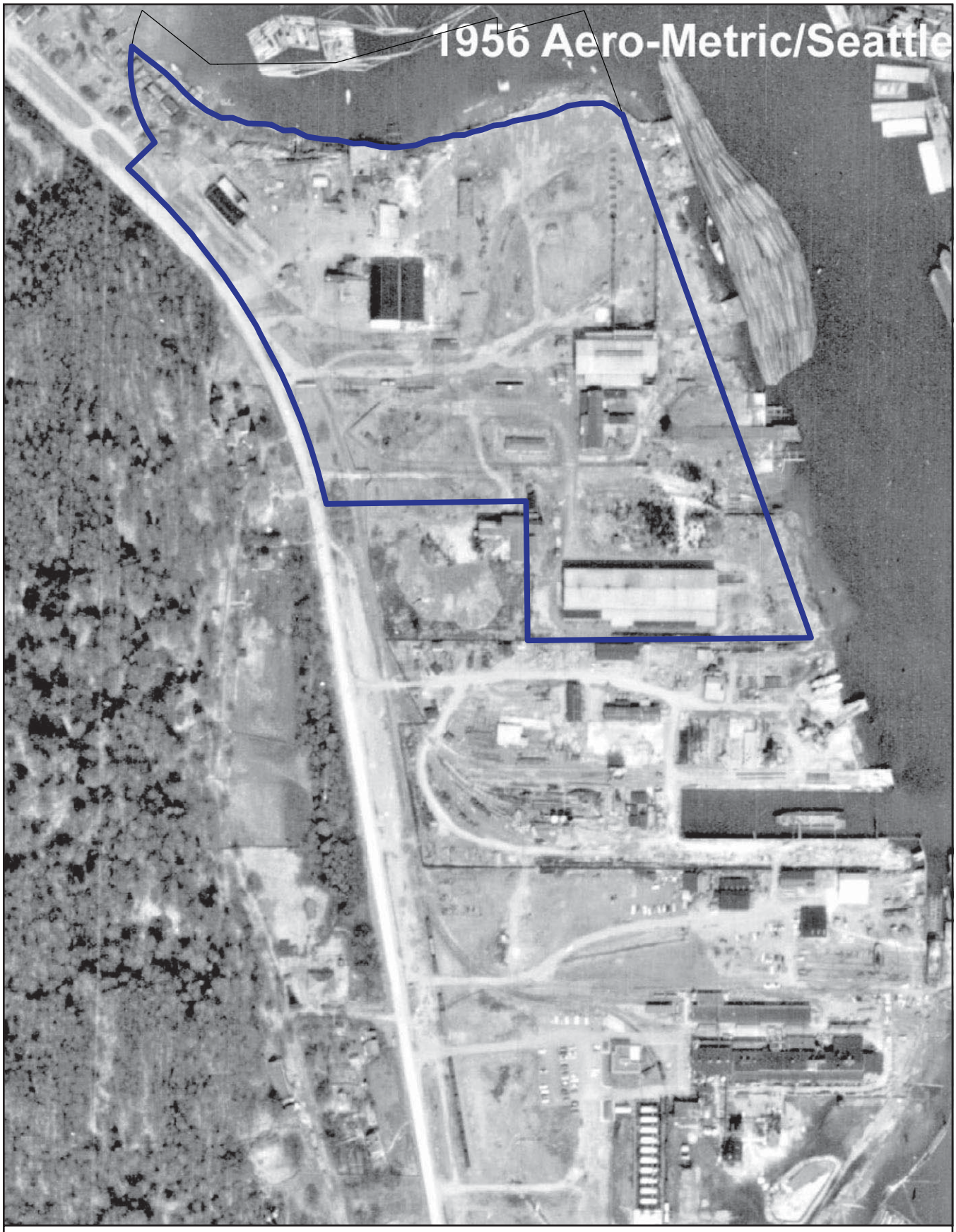

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Figure B–3. RM 1.0 to 1.3 West (Kellogg Island to Lafarge): 1956

SAIC
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Figure B–4. RM 1.0 to 1.3 West (Kellogg Island to Lafarge): 1960

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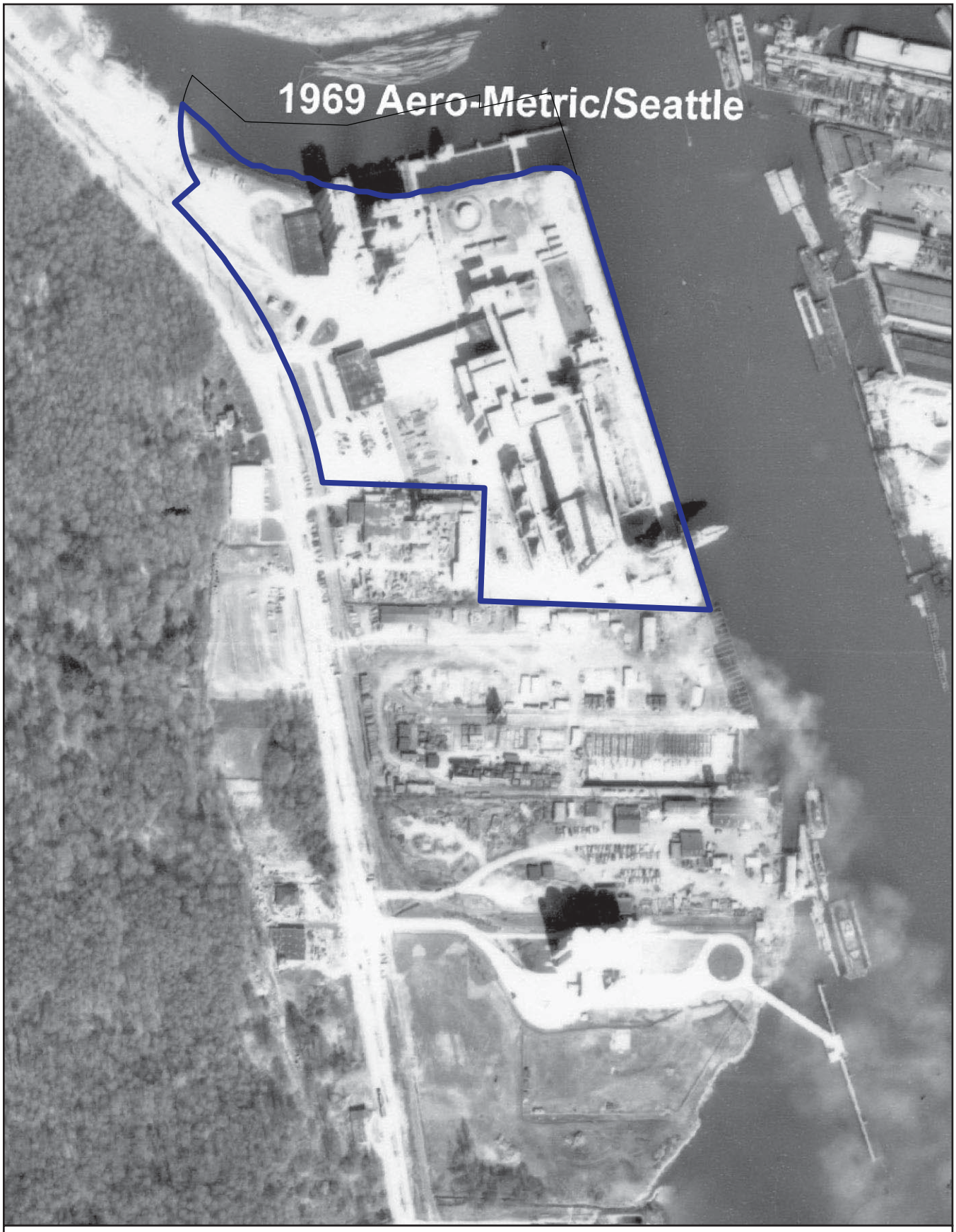

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Figure B–5. RM 1.0 to 1.3 West (Kellogg Island to Lafarge): 1969

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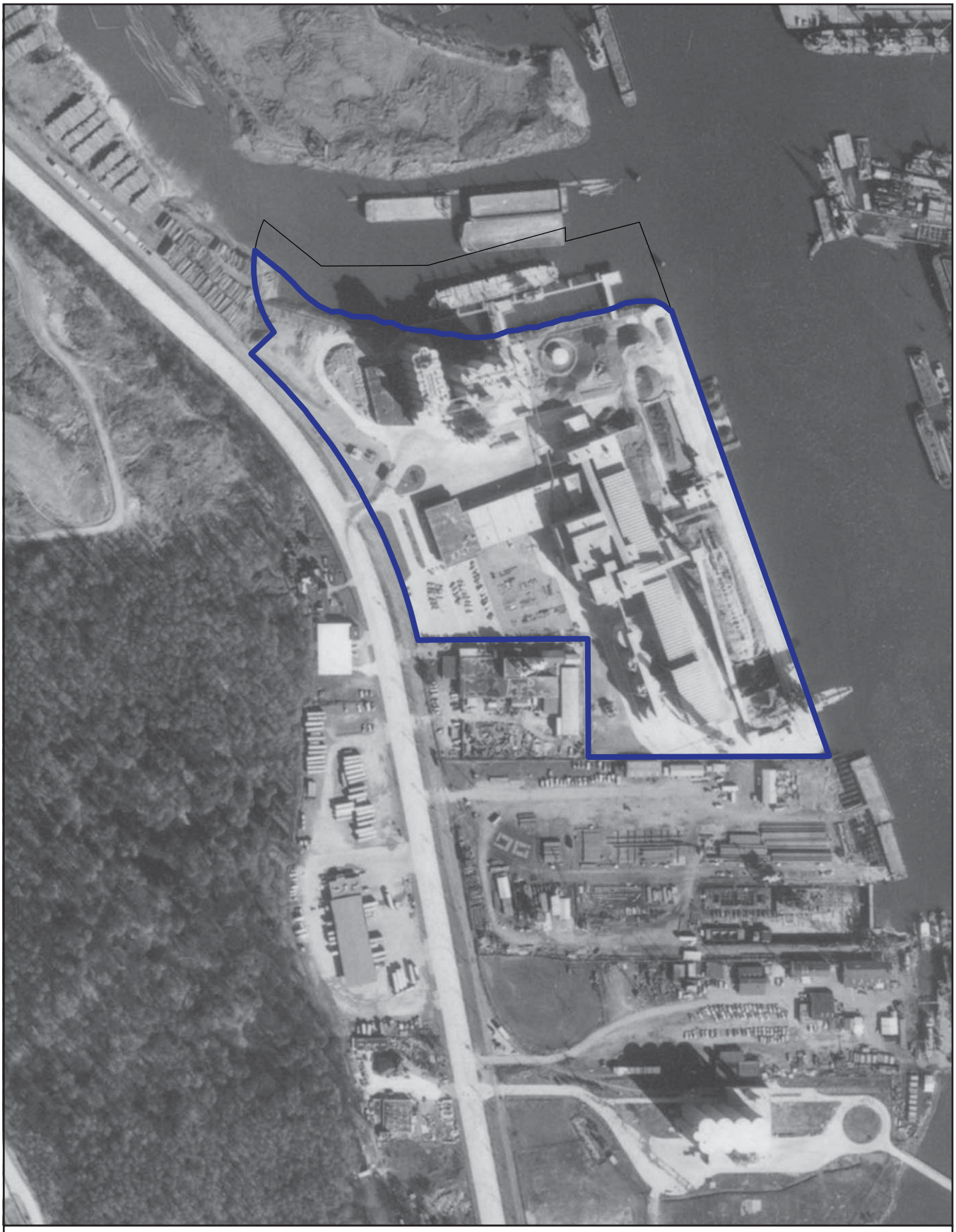

Figure B–6. RM 1.0 to 1.3 West (Kellogg Island to Lafarge): 1974

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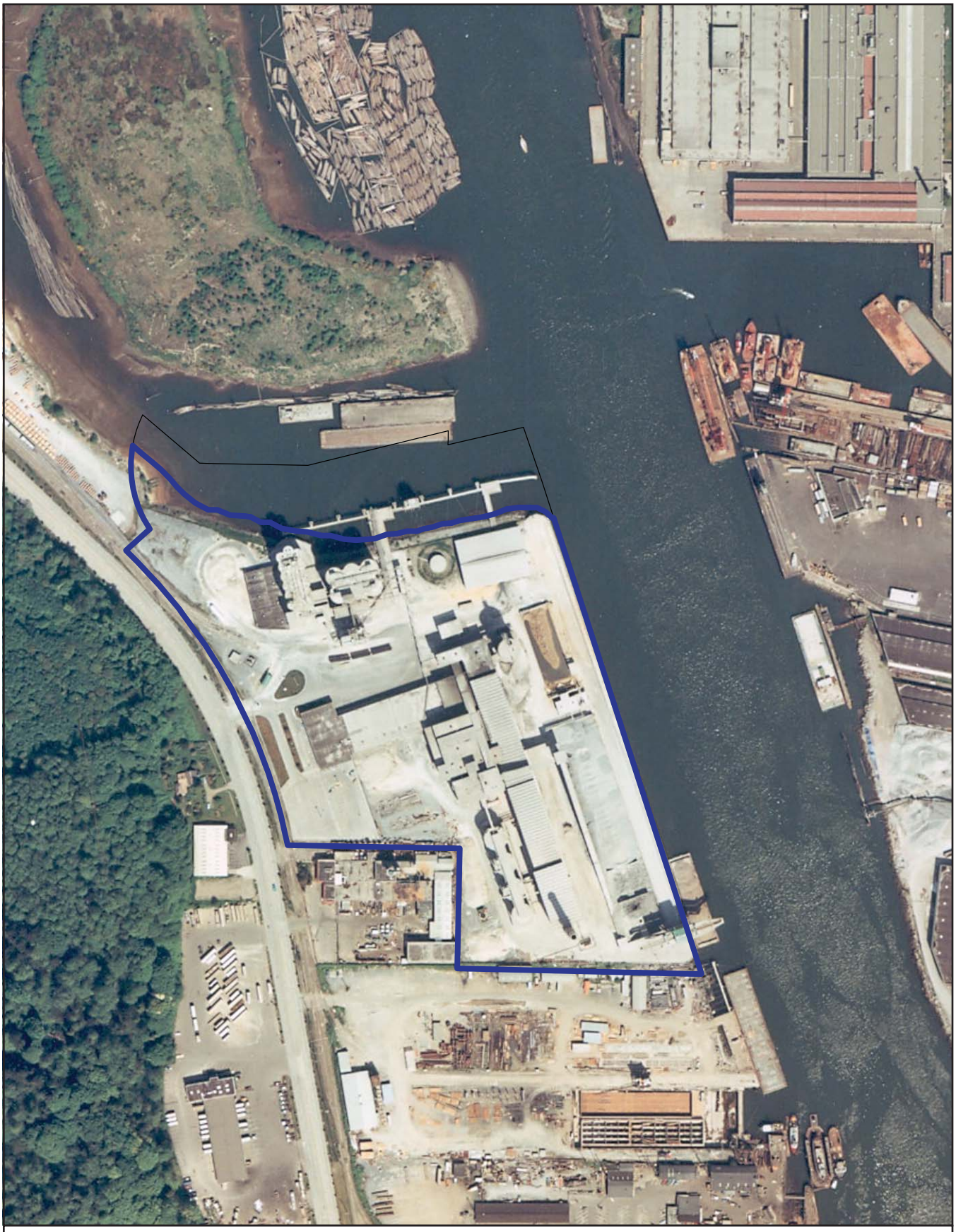

Figure B–7. RM 1.0 to 1.3 West (Kellogg Island to Lafarge): 1980

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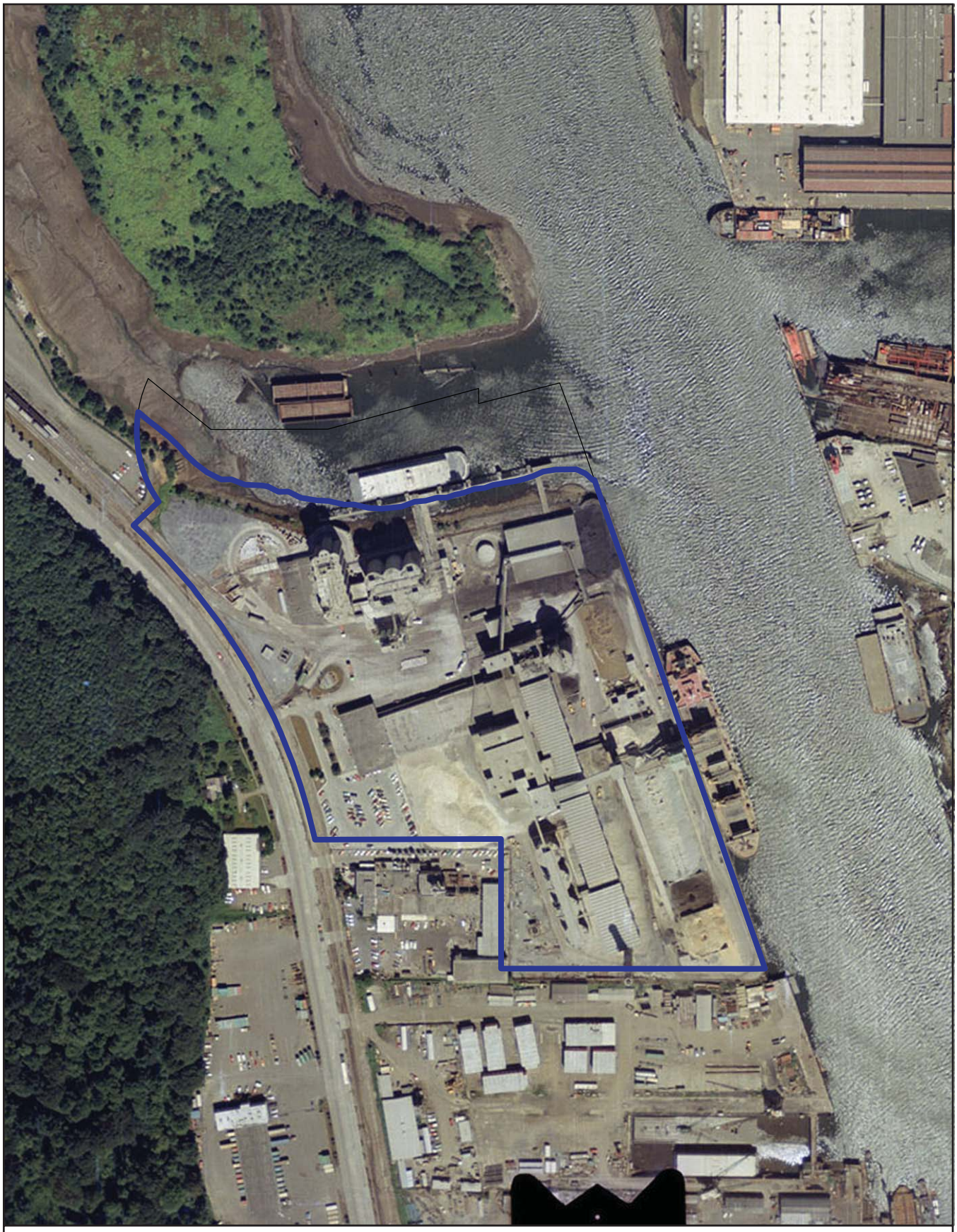

Figure B–8. RM 1.0 to 1.3 West (Kellogg Island to Lafarge): 1990

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Figure B–9. RM 1.0 to 1.3 West (Kellogg Island to Lafarge): 2004

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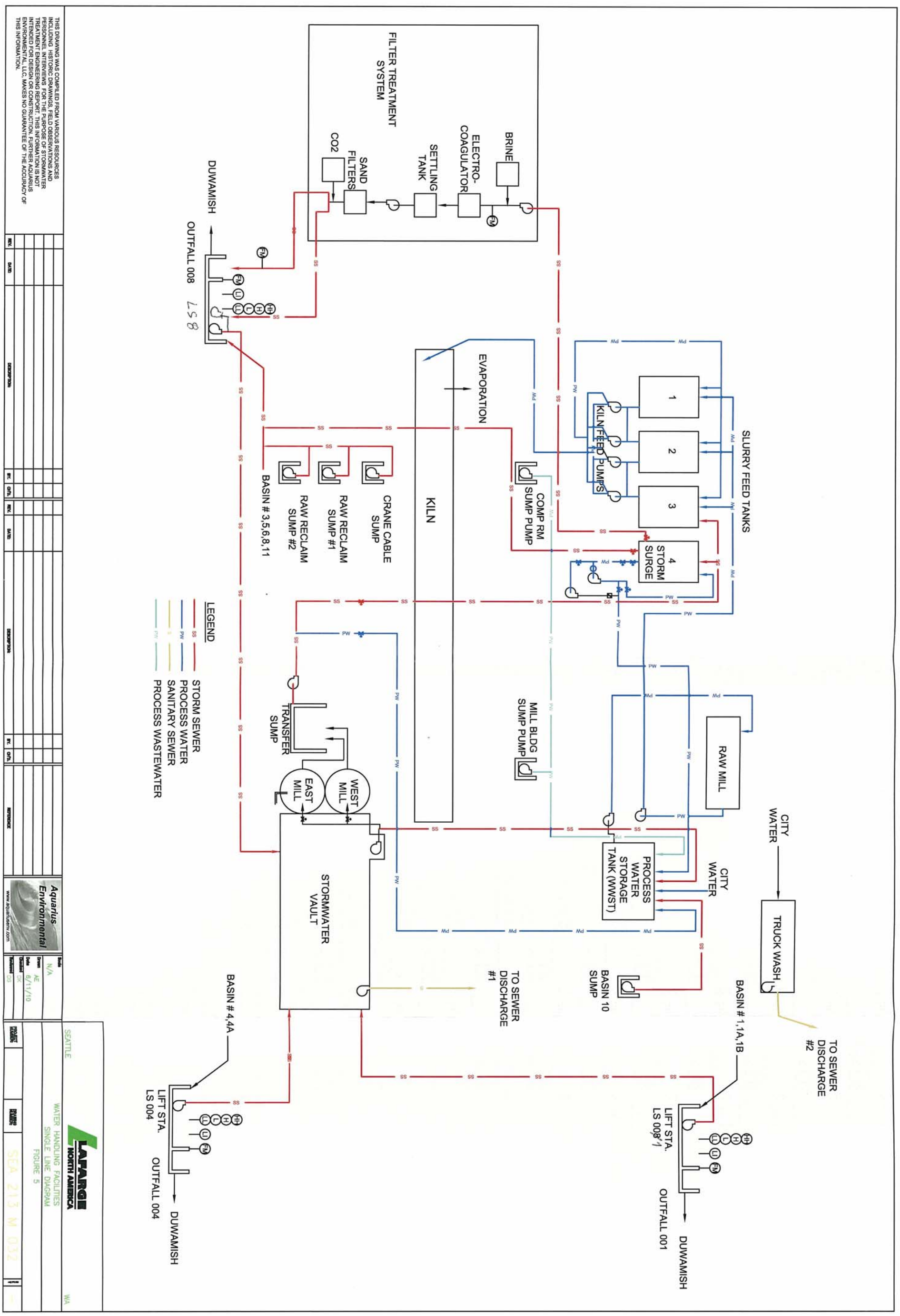
Appendix C

Water Handling Facilities Single Line Diagram



Source: Adapted from Lafarge 2010b.

Figure C-1. Water Handling Facilities Single Line Diagram

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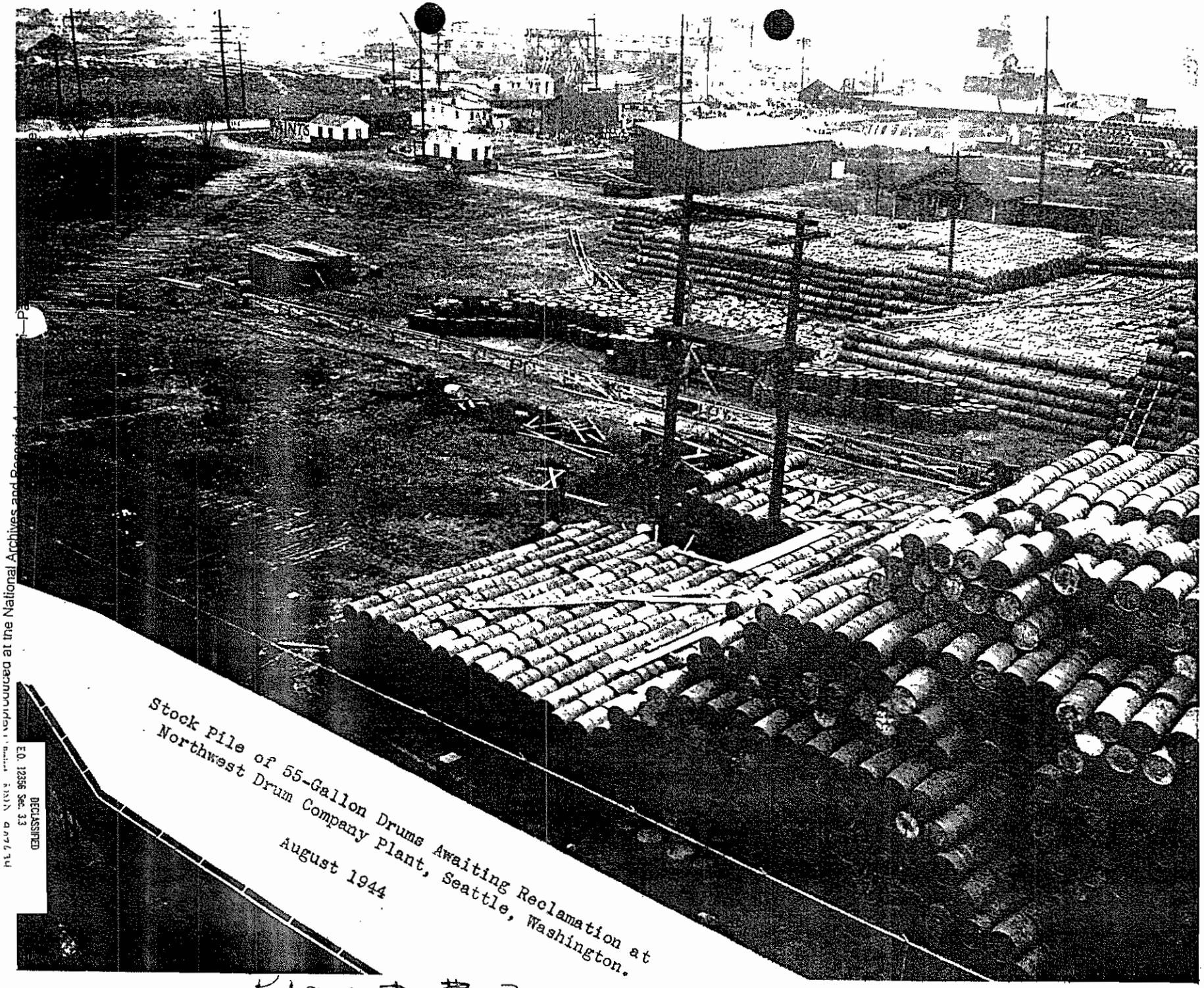
Appendix D

Historical Photographs and Facility Plan, Northwest Drum Company



Stock Pile of 55-Gallon Drums Awaiting Reclamation at
Northwest Drum Company Plant, Seattle, Washington.
August 1944

Plant # 2

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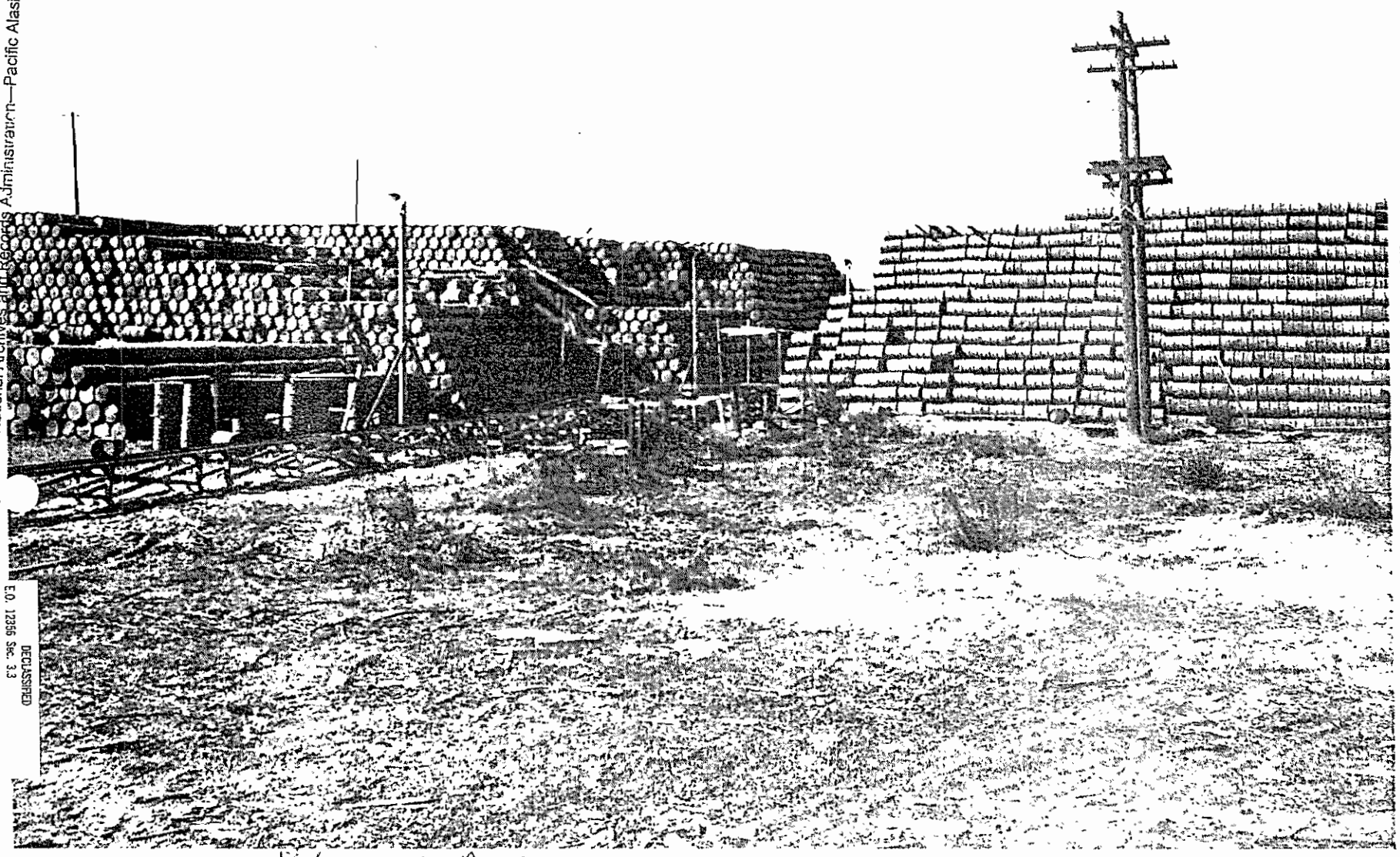
E.O. 12356 Sec. 3.3

Stock Pile of 55-Gallon Drums
Awaiting Reclamation at Northwest
Drum Company Plant, Seattle, Wash.

August 1944



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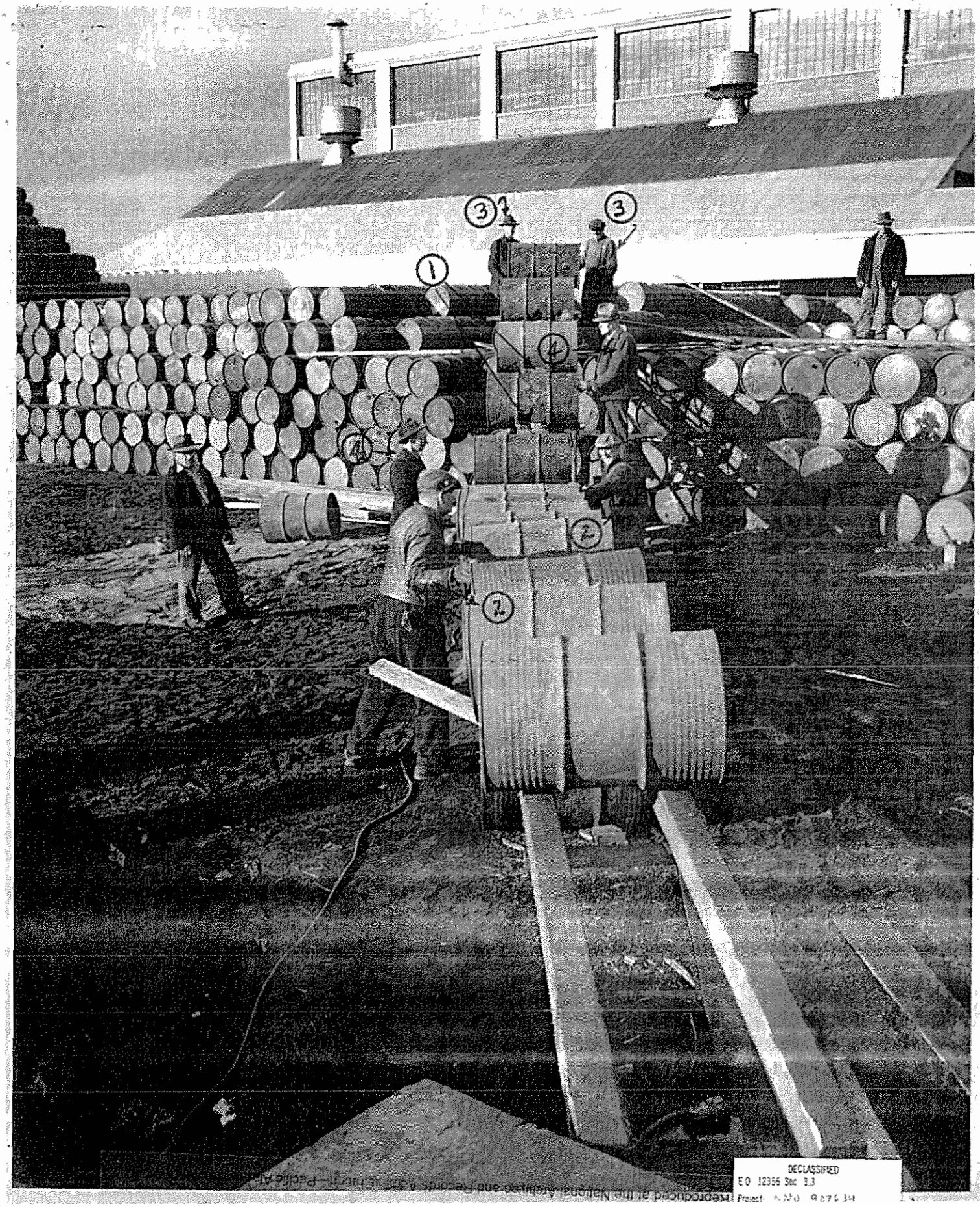

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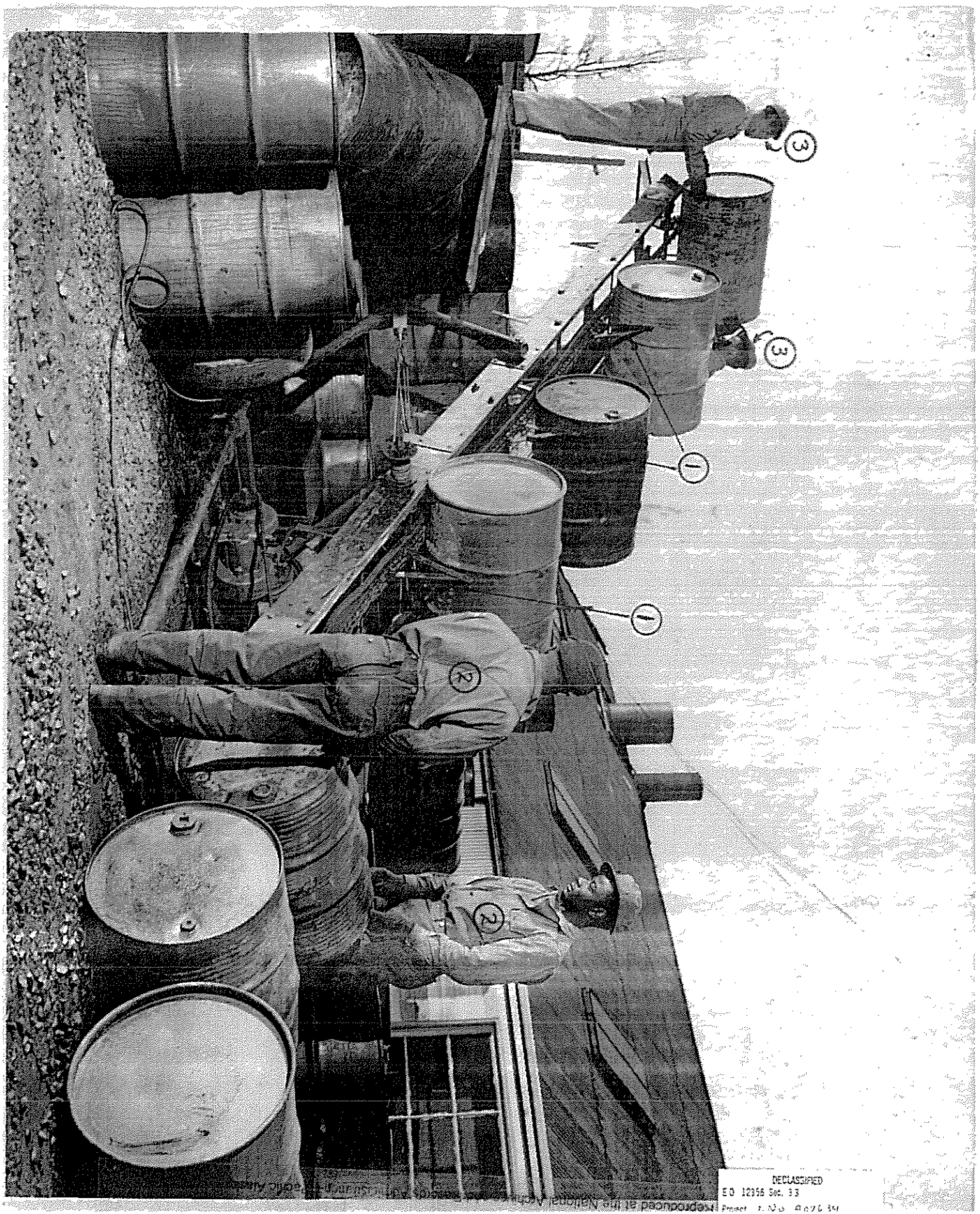

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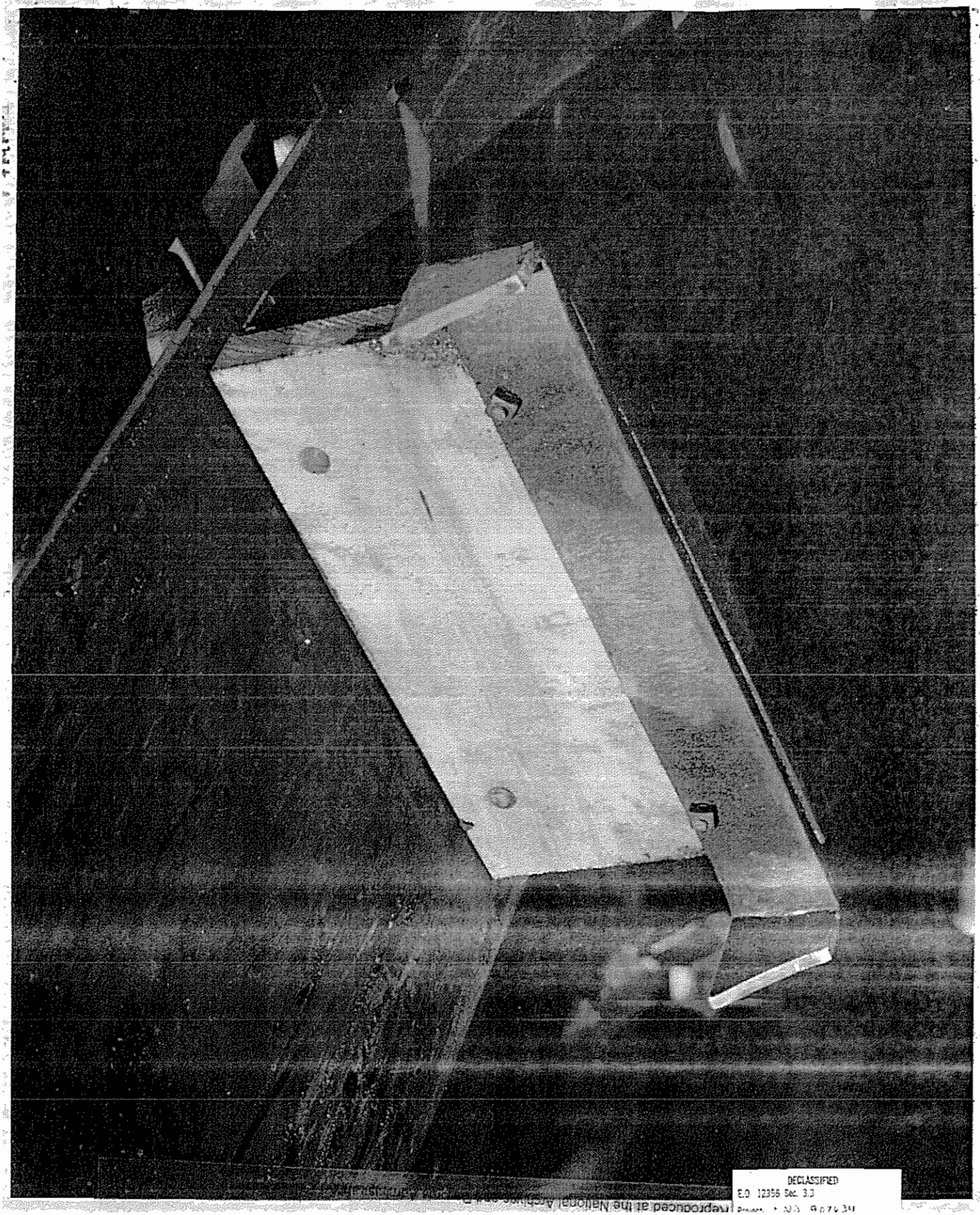

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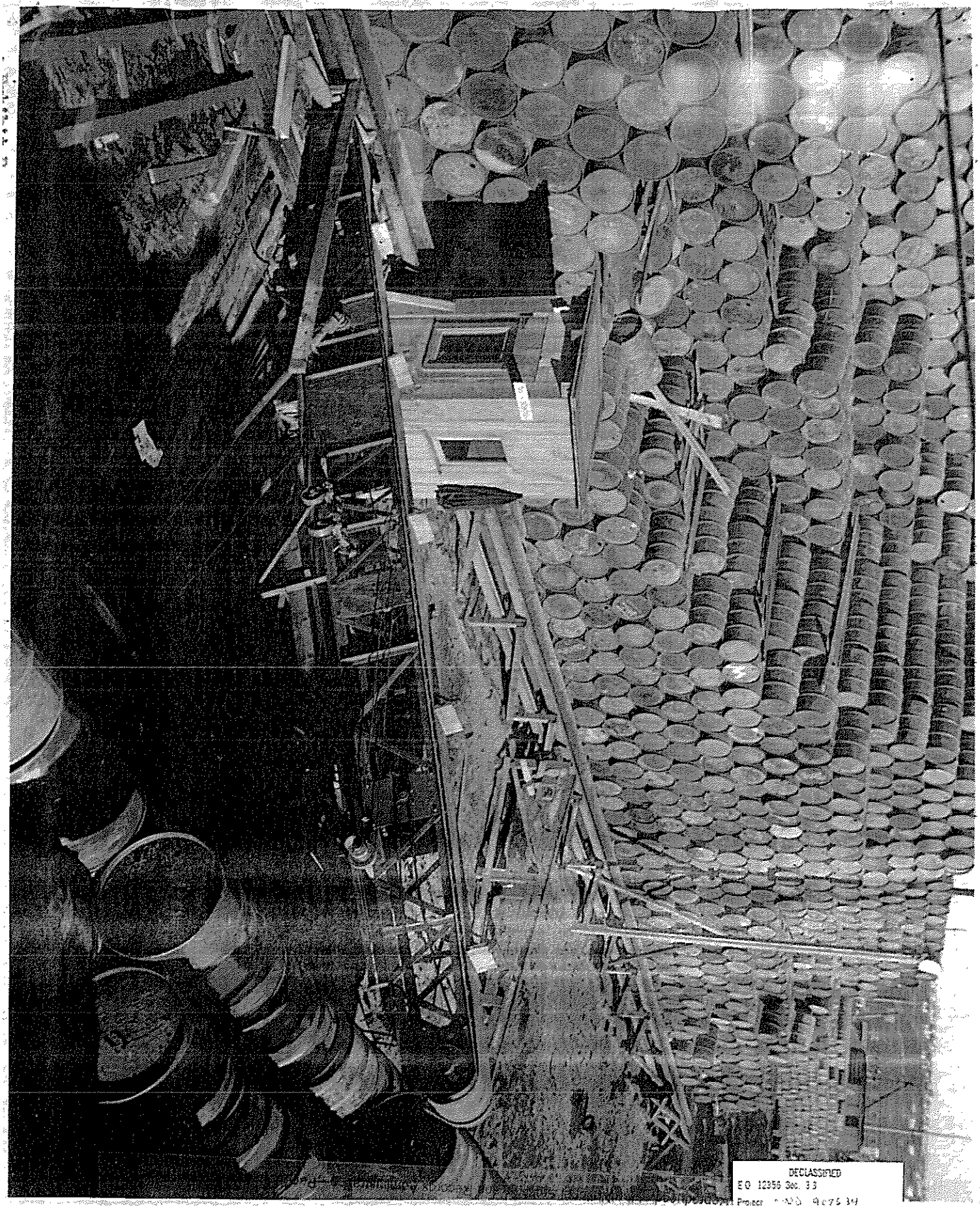

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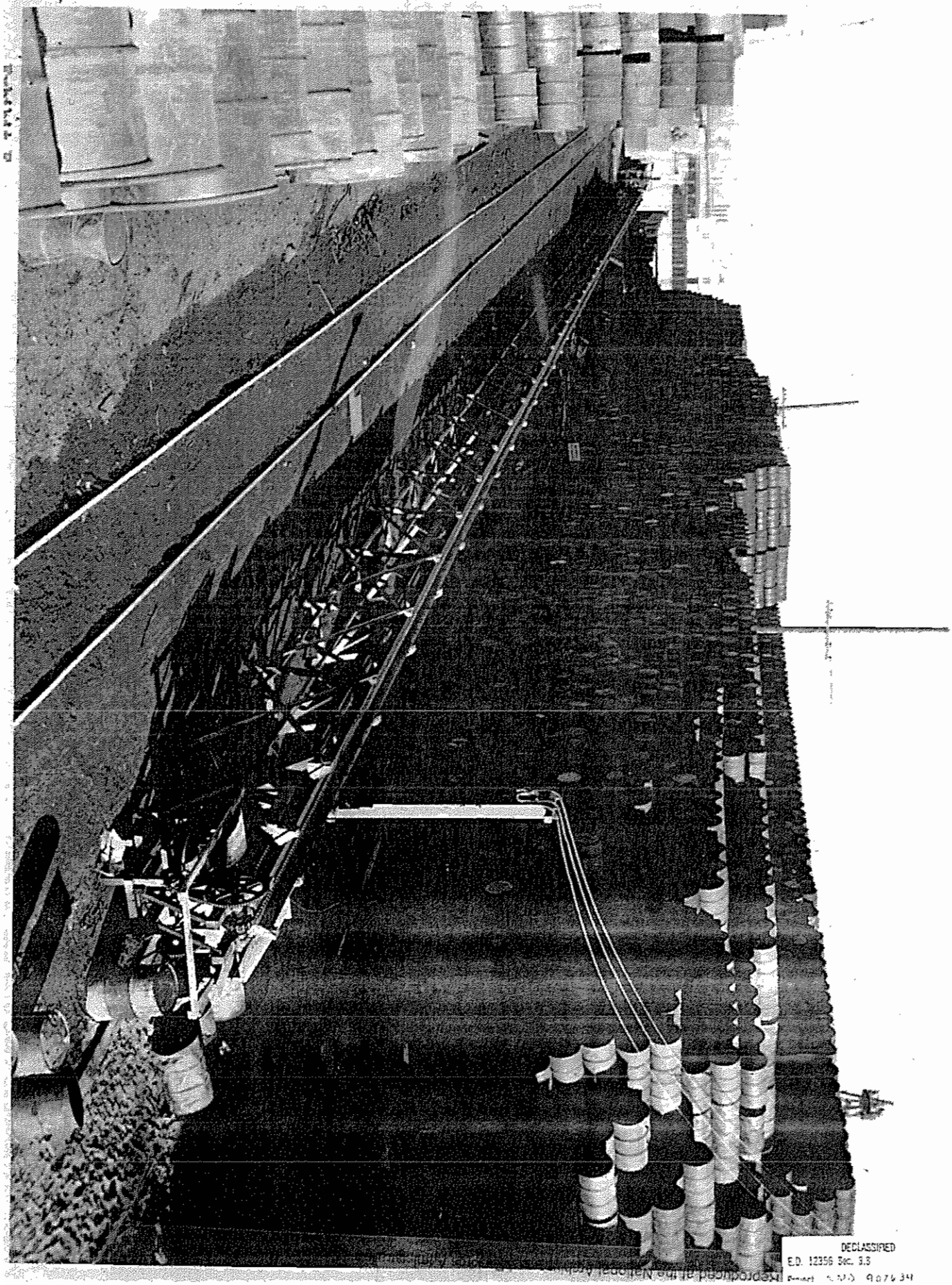

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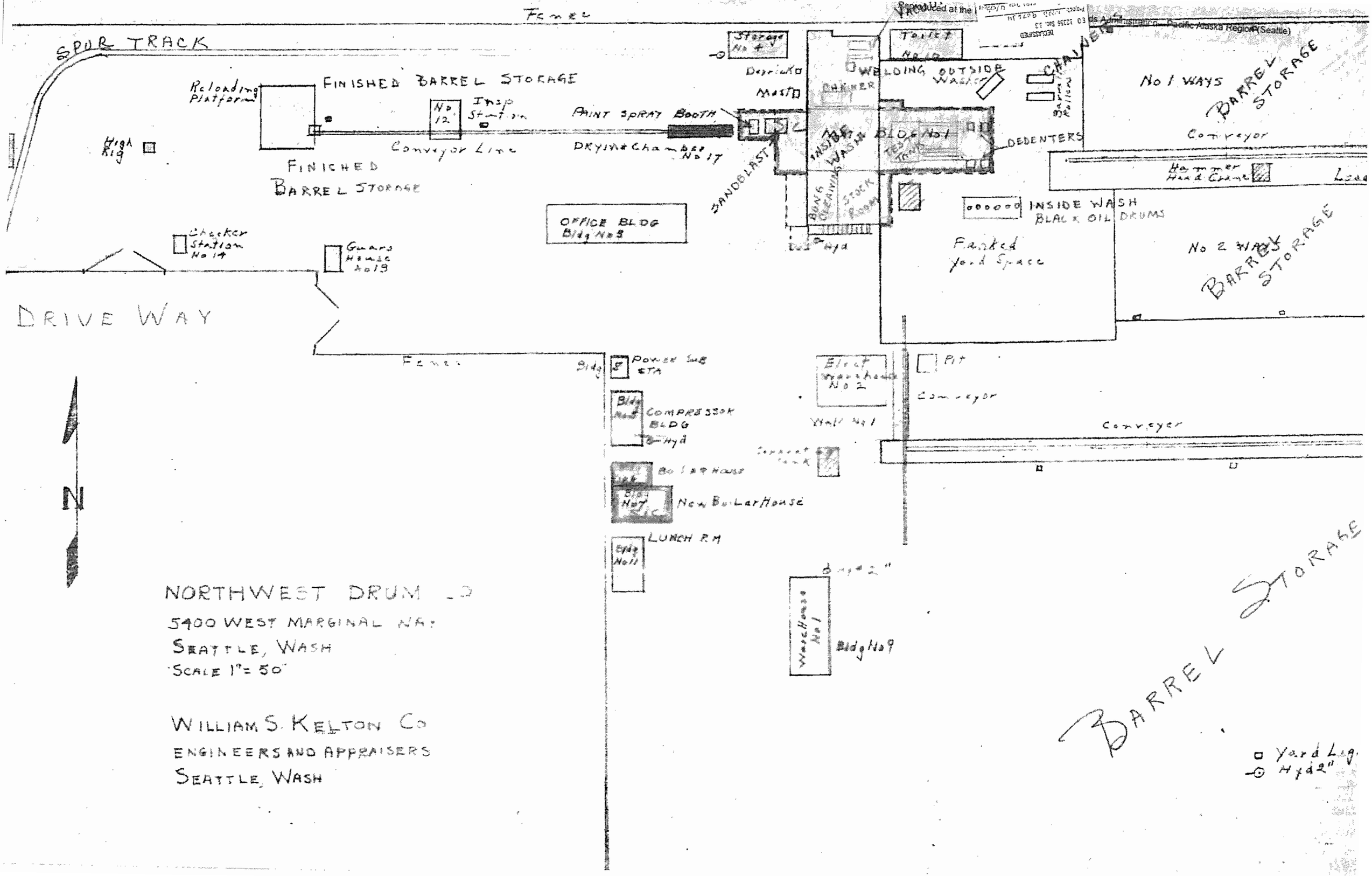

NORTHWEST DRUM CO
5400 WEST MARGINAL WAY
SEATTLE, WASH
SCALE 1" = 50'

WILLIAM S. KELTON CO
ENGINEERS AND APPRAISERS
SEATTLE, WASH