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August 13, 2013

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Re: Jorgensen Forge Early Action Area—Revisions to the Final Basis of Design Report, Water Quality Monitoring Plan, and Quality Assurance Project Plan

Dear Ms. Chu:

Following submittal of responses to the U.S. Environmental Protection Agency's (EPA's) comments on the Draft Basis of Design Report (BODR) and associated revisions to the BODR documents on July 2, 2013, Anchor QEA attended a conference call with EPA on July 12, 2013, to discuss additional minor revisions to the documents. During the call, EPA requested that the chemical water monitoring frequency described in Section 3.5 of the Water Quality Monitoring Plan (WQMP; Appendix E to the BODR) be revised to include sampling only once per day, but on two separate days during both Tier 1 monitoring and Relatively Elevated Total Polychlorinated Biphenyl (PCB) Areas monitoring. EPA also requested that the necessary text be revised to designate the "relatively elevated PCB Areas" as plural. In a subsequent email sent on July 31, 2013, EPA required that hydrogen ion concentration (pH) be added to the list of field parameters being monitored and that both temperature and pH criteria be achieved at the applicable point of compliance. EPA stated these revisions are consistent with The Boeing Company (Boeing) and Port of Seattle Terminal 117 Early Action Area cleanup monitoring approach.

The requested revisions led to minor modifications to the BODR and associated Appendix E WQMP. A summary of the minor updates is as follows:

- Chemical monitoring frequency was updated to include sampling only once per day, but on two separate days on pages 14-15 (Section 3.5.1 and 3.5.2) and 16 (Section 3.5.4) of the WQMP, and on pages 64-66 (Sections 8.3.3.1, 8.3.3.2, and 8.3.3.4) of the BODR.
- Text was revised to designate the "relatively elevated PCB Areas" as plural on pages 14 (Sections 3.5 and 3.5.1) and 16 (Section 3.5.4) of the WQMP, and on pages 64 (Section 8.3.3) and 66 (8.3.3.4) of the BODR.
- Field monitoring parameters were updated to include temperature and pH on pages 9 (Section 3.1), 10-11 (Sections 3.2.3 and 3.2.4), 12 (Section 3.3), 14-17 (Sections 3.5.1 through 3.5.4 and 4.1), and 24 (Section 6.2.1) of the WQMP, and on pages 61-62 (Sections 8.3.1 and 8.3.2) and 64-66 (Sections 8.3.3.1 through 8.3.4.1) of the BODR.
- Chemical Monitoring Frequency in Table 2 of the WQMP was revised as noted above for Tier 1 and Relatively Elevated PCB Areas.
- Field monitoring parameters were updated in Tables 1 and 2 of the WQMP as noted above for temperature and pH.

In addition, an inconsistency in the turbidity and DO criteria identified in Table 1 of the Appendix E WQMP was corrected.

Lastly, in an electronic email dated July 18, 2013, EPA requested the Quality Assurance Project Plan (QAPP; Attachment 1 of the Appendix I Sampling and Analysis Plan) be revised to include additional information that was included in the BODR and other appendices. The QAPP was revised consistent with this request and EPA approved the revised QAPP in a letter dated July 31, 2013.

Anchor QEA looks forward to EPA's approval of the Basis of Design Report submittal and implementation of the associated construction activities.

Sincerely,

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Anchor QEA, LLC

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REPORT

BASIS OF DESIGN REPORT
JORGENSEN FORGE EARLY ACTION AREA

Prepared for

U.S. Environmental Protection Agency, Region 10

On Behalf of

Earle M. Jorgensen Company and
Jorgensen Forge Corporation

Prepared by

Anchor QEA, LLC

August 2013

BASIS OF DESIGN REPORT
JORGENSEN FORGE EARLY ACTION AREA

Prepared for

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August 2013

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LIST OF ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
ACES	Automated Coastal Engineering System
Action Memo	Action Memorandum for a Non-Time-Critical Removal Action at the Jorgensen Forge Early Action Area of the Lower Duwamish Waterway Superfund Site in Seattle, Washington
AO	Agreed Order
AOC	Administrative Settlement Agreement and Order on Consent
APE	Area of Potential Effects
ARAR	Applicable or Relevant and Appropriate Requirement
BA	Biological Assessment
bgs	below ground surface
BiOps	Biological Opinions
BMP	best management practice
BODR	Basis of Design Report
Boeing	The Boeing Company
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfs	cubic feet per second
CMP	corrugated metal pipes
COC	chemical of concern
COI	chemical of interest
CQAO	Construction Quality Assurance Officer
CQAP	Construction Quality Assurance Plan
CSM	conceptual site model
CSO	combined sewer overflow
CWA	Clean Water Act
cy	cubic yard
DCE	dichloroethene
DMU	dredge management unit
DO	dissolved oxygen

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DOC	depth of contamination
DSOA	Duwamish Sediment Other Area
EAA	Early Action Area
Ecology	Washington State Department of Ecology
EE/CA	Engineering Evaluation/Cost Analysis
EMJ	Earle M. Jorgensen Company
EM	Engineering Manual
EMS	Environmental Management System
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
Facility	Jorgensen Forge facility
FIS	Flood Insurance Study
fps	Feet per second
GAC	granular activated carbon
HDPE	high-density polyethylene
H:V	horizontal to vertical
HVOC	halogenated volatile organic compounds
Jorgensen Forge	Jorgensen Forge Corporation
LAET	lowest apparent effects threshold
Lafarge	Lafarge North America
LDW	Lower Duwamish Waterway
LNAPL	light non-aqueous phase liquid
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mg/kg-OC	milligrams per kilogram of organic carbon normalized
MHHW	mean higher high water
MLLW	mean lower low water
mm	millimeter
MOU	Memorandum of Understanding
MSS	Marine Sampling Services
MTCA	Modeled Toxics Control Act
NCP	National Contingency Plan
NMFS	National Marine Fisheries Service

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NRHP	National Register of Historic Places
NPDES	National Pollutant Discharge Elimination Study
NTCRA	non-time-critical removal action
NTU	nephelometric turbidity units
OMMP	Operations, Monitoring, and Maintenance Plan
Owner	EMJ and Jorgensen Forge
PCB	polychlorinated biphenyl
Permit	Industrial Stormwater General Permit
psf	per square feet
RAB	removal action boundary
RAO	removal action objectives
RAWP	Removal Action Work Plan
RBC	Risk Based Concentration
RCRA	Resource Conservation and Recovery Act
RM	river mile
ROD	Record of Decision
RTK	Real Time Kinetic
RvAL	removal action level
SCER	Source Control Evaluation Report
SHPO	State Historic Preservation Officer
SIA	Sediment Investigation Area
SMS	Sediment Management Standards
SMU	Sediment Management Unit
SOW	Statement of Work
STAR	Sediment Transport Analysis Report
SQS	Sediment Quality Standards
TBC	"to be considered"
TCE	trichloroethene
TESC	Temporary Erosion and Sedimentation Control
TOC	total organic carbon
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USCG	U.S. Coast Guard

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WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington State Department of Natural Resources
WQMP	Water Quality Monitoring Plan
WSDOH	Washington State Department of Health
WSDOT	Washington State Department of Transportation

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DOCUMENT ROADMAP

Where Can I Find Information About:	Find in:
Background information on this project?	• Section 1 – Introduction
A description of the cleanup site?	• Section 3 – Site Characteristics • Appendix A – Supporting Documents
Proposed cleanup activities?	• Section 2 – Removal Action Description
Water quality monitoring activities?	• Section 8 – Short-term Impacts During Construction • Appendix E – Water Quality Monitoring Plan
Activities to ensure cleanup objectives are achieved and documented?	• Appendix D – Construction Quality Assurance Plan
Detailed engineering drawings and contractor cleanup requirements?	• Appendix G – Construction Drawings • Appendix H – Construction Specifications
In-water dredging activities?	• Section 4 – Dredge Plan
Shoreline bank excavation activities?	• Section 5 – Backfill Plan • Appendix B – Erosion Analysis • Appendix C – Slope Stability Analysis • Appendix H – Construction Specifications
Stabilizing and armoring the shoreline bank?	• Section 6 – Slope Containment Plan • Section 10 – Construction Sequencing and Schedule • Appendix H – Construction Specifications
Anticipated short-term impacts during construction?	• Section 8 – Short-term Impacts During Construction
Permitting and historical preservation requirements?	• Section 9 – Substantive Requirements of Permits • Section 13 – Cultural Resources Assessment • Appendix M – Cultural Resources Assessment
Summary of cleanup costs?	• Appendix L – Cost Estimate Details
Controls to be implemented to protect the community?	• Section 12 – Institutional Controls • Appendix L – Cost Estimate Details
Health and safety procedures?	• Appendix K – Health and Safety Plan

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1 INTRODUCTION

This Basis of Design Report (BODR) has been prepared on behalf of Earle M. Jorgensen Company (EMJ) and Jorgensen Forge Corporation (Jorgensen Forge; herein referred to collectively as the Owner) pursuant to the Administrative Settlement Agreement and Order on Consent for Removal Action Implementation (AOC; EPA Region 10 CERCLA Docket No. 10-2013-0032) and attached Statement of Work (SOW). This BODR presents the Final Design submittal for the removal of contaminated sediments and associated bank soils in a portion of the Lower Duwamish Waterway (LDW) Superfund Site adjacent to the Jorgensen Forge facility (Facility) located in Tukwila, King County, Washington (Figure 1; Jorgensen Forge Early Action Area [EAA]).

This BODR provides the basis of the design for in-water dredging, shoreline excavation, placement of backfill and armor materials, transport and off-site disposal of impacted sediments and soils, and associated construction and monitoring activities. The cleanup will be conducted as a non-time-critical removal action (NTCRA) in accordance with the U.S. Environmental Protection Agency's (EPA's) selected removal action alternative documented in the *Action Memorandum for a Non-Time-Critical Removal Action at the Jorgensen Forge Early Action Area of the Lower Duwamish Waterway Superfund Site in Seattle, Washington* (Action Memo; EPA 2011a) and detailed in the *Final Engineering Evaluation/Cost Analysis [EE/CA] – Jorgensen Forge Facility, 8531 East Marginal Way South, Seattle, Washington* (Anchor QEA 2011a).

As documented in the EPA-approved Final EE/CA (Anchor QEA 2011a), the Jorgensen Forge EAA removal action boundary (RAB) was determined based on the nature and extent of chemicals that exceeded the Washington State Department of Ecology (Ecology) Sediment Management Standards (SMS) Sediment Quality Standards (SQS) criteria (Washington Administrative Code [WAC] 173-204-320). Polychlorinated biphenyl (PCB) concentrations have the greatest lateral and vertical distribution of SMS SQS criteria exceedances and encompass all other chemical concentration exceedances. Therefore, EPA approved that the RAB be determined based on SMS SQS PCB criteria exceedances (EPA 2008b). A detailed description of the RAB is provided in Section 2.

As identified in Section 4.1 of the Final EE/CA (Anchor QEA 2011a), the primary objective of the removal action is to reduce the chemical concentrations throughout the EPA-defined 0- to 1.5-foot vertical point of compliance (EPA 2008b) within the RAB to below the SMS SQS (termed the removal action level [RvAL] throughout this BODR) for PCBs and other chemicals. This reduction will significantly reduce unacceptable risks to human health and the environment resulting from potential exposure to elevated chemical concentrations.

A Preliminary Draft Biological Assessment (BA) and Preliminary Draft Clean Water Act (CWA) 404(b)(1) Evaluation were submitted to EPA as appendices to the Final EE/CA (Anchor QEA 2011a). The two documents were updated to reflect the preferred alternative selected in the Action Memo (EPA 2011a) and submitted to EPA in November 2011 and June 2012, respectively. EPA initiated formal Endangered Species Act (ESA) consultation with the Services (i.e., the National Marine Fisheries Service [NMFS] and the U.S. Fish and Wildlife Service [USFWS]) in late November 2011 through the submittal of the BA. Anchor QEA provided EPA with an updated CWA 404(b)(1) Evaluation based on their comments. EPA accepted the updates and provided final minor updates. Anchor QEA finalized the CWA 404(b)(1) Evaluation and submitted the final document at the end of June 2012. With this submission, Anchor QEA does not anticipate any further action related to this document. Anchor QEA and EPA responded to comments from the Services on the BA in February 2012. Formal ESA consultation was completed with the issuance of the Services' (BiOps) on August 22, 2012, and September 27, 2012, respectively. The BiOps cover activities occurring at the Boeing Plant 2 Duwamish Sediment Other Area (DSOA), Southwest Bank Corrective Measure and Habitat Project as well as at the Jorgenson Forge Facility and EAA4. The terms and conditions provided in the BiOps will be evaluated against the Owner's Final Design submittal to confirm consistency and applicability. If any issues are identified, the Owner will coordinate with EPA to address any inconsistencies.

The BODR also includes the following appendices that are a part of the Final Design submittal:

- Appendix A – Design Subsurface Sediment Characterization Supporting Documents
- Appendix B – Erosion Analysis
- Appendix C – Slope Stability Analysis
- Appendix D – Construction Quality Assurance Plan

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- Appendix E – Water Quality Monitoring Plan
- Appendix F – Operations, Monitoring, and Maintenance Plan
- Appendix G – Construction Drawings
- Appendix H – Construction Specifications
- Appendix I – Sampling and Analysis Plan
- Appendix J – Green Remediation Strategy
- Appendix K – Health and Safety Plan
- Appendix L – Cost Estimate Details
- Appendix M – Cultural Resources Assessment

1.1 Background

EMJ entered into an AOC with EPA on July 10, 2003 (EPA Docket No. CERCLA-10-2003-0111), to investigate whether the Facility, which is currently owned and operated by Jorgensen Forge and formerly owned and operated by EMJ, is or has been a source of PCBs to the LDW. The analytical results of soil and sediment samples collected during the investigation detected concentrations of PCBs in sediment and soil on the shoreline bank in the LDW adjacent to the Facility. EPA determined that these concentrations present a risk to human health and the environment and met the criteria for conducting a NTCRA under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; EPA 2008a). EPA and EMJ entered into the First Amendment to the AOC in April 2008. This amendment required EMJ to prepare an EE/CA, BA, and CWA Section 404(b)(1) Evaluation for the completion of a NTCRA of sediments and associated shoreline bank soil in the RAB that contain concentrations of chemicals that exceed the Ecology SMS SQS. The RAB was approved by EPA in 2008 (EPA 2008b).

The Owner previously submitted a Draft EE/CA, Second Draft EE/CA, and Final EE/CA to EPA in March 2009 (Anchor QEA 2009), November 2010 (Anchor QEA 2010), and October 2011 (Anchor QEA 2011a), respectively. EPA provided conditional approval of the Final EE/CA with slight modifications in a letter dated September 29, 2011, and subsequently provided formal approval of the Final EE/CA and selected the removal action alternative (Alternative 4 in the Final EE/CA) in the Action Memo (EPA 2011a). The issuance of the Action Memo completed the requirements of the AOC (EPA Docket No. CERCLA-10-2003-

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0111). Design, construction and long-term operations, maintenance, and monitoring are being conducted under a new AOC (EPA Docket No. 10-2013-0032) entered into between EPA and EMJ.

The Boeing Company (Boeing) is conducting an interim corrective action under the Resource Conservation and Recovery Act (RCRA) adjacent to the Boeing Plant 2 Facility in the area immediately adjacent and downstream from the RAB (Figure 1). This corrective action area is termed the DSOA and Southwest Bank Corrective Measure and is also identified as an EAA by EPA. EPA collectively defined the DSOA and the Jorgensen Forge EAA as EAA-4. Due to the adjacency of these EAAs, the First Amendment to the Investigation AOC (EPA 2008a) between EMJ and EPA incorporated a Memorandum of Understanding (MOU) executed by the Owner and Boeing. The MOU administratively requires the coordination and cooperation of all parties conducting cleanup within the adjoining Boeing DSOA and RAB. This BODR incorporates and fulfills this requirement.

This BODR also discusses the removal action that will be performed by Jorgensen Forge and Boeing under a Second Modification (date pending) to the AOC with the EPA Office of Emergency Response. As discussed in Section 2.2.2.1, the removal action will include removal of the inactive corrugated metal pipes (CMP) and underlying soils with PCBs that exist in the northwest corner of the Jorgensen Forge property (Figure 2). This work is scheduled to be conducted either prior to or concurrently with the removal action activities within the RAB. In either case, the removal action will be directly adjacent to the RAB shoreline reconfiguration so the designs for these removal action activities will be integrated.

This BODR does not account for the cleanup that will be conducted in the EPA-identified EAA-5 cleanup at Terminal 117 directly across the LDW from the Facility (Figure 1) as it will be initiated following the scheduled completion of the removal action within the RAB.

1.2 Report Organization

The BODR is organized into the following sections:

- Section 2 – Removal Action Description
- Section 3 – Site Characteristics

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- Section 4 – Dredge Plan
- Section 5 – Backfill Plan
- Section 6 – Slope Containment Plan
- Section 7 – Habitat Enhancement Plan
- Section 8 – Short-term Impacts During Construction
- Section 9 – Substantive Requirements of Permits
- Section 10 – Construction Sequencing and Schedule
- Section 11 – Long-term Operations, Monitoring and Maintenance
- Section 12 – Institutional Controls
- Section 13 – References

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2 REMOVAL ACTION DESCRIPTION

The following sections provide a summary of the design guidance, Facility source control, selected removal action alternative, and green remediation guidance.

2.1 Design Guidance

2.1.1 Removal Action Objectives

As described in Section 4.1 of the EE/CA, the removal action is being prepared prior to the Record of Decision (ROD) for the LDW Superfund Site; therefore, removal action objectives (RAOs) and final removal action standards, including the vertical point of compliance, target media removal action levels, and sediment removal action boundaries, are not available for use in this BODR. In order to facilitate development of this BODR prior to completion of the ROD, EPA directed (EPA 2010) that the following RAOs be used for the removal action to maintain consistency with the current removal action objectives required throughout the LDW Superfund Site:

1. Human Health – Seafood Consumption. Reduce human health risks associated with the consumption of resident LDW seafood by reducing sediment and surface water concentrations of chemicals of concern (COCs) to protective levels.
2. Human Health – Direct Contact. Reduce human health risks associated with exposure to COCs through direct contact with sediments and incidental sediment ingestion by reducing sediment concentrations of COCs to protective levels.
3. Ecological Health – Benthic. Reduce toxicity to benthic invertebrates by reducing sediment concentrations of COCs to comply with Ecology SMS SQS.
4. Ecological Health – Seafood Consumption. Reduce risks to crabs, fish, birds, and mammals from exposure to COCs by reducing concentrations of COCs in sediment and surface water to protective levels.
5. Groundwater and Sediment Protection. Reduce migration of contaminants in groundwater to sediments to reduce risk to human health and the environment.

To achieve these RAOs in the 0-to 1.5-foot vertical point of compliance, EPA directed the use of the SQS for total PCBs (12 milligrams per kilogram of normalized organic carbon [mg/kg-OC]) as the appropriate delineating criterion and the appropriate RvAL for sediment

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removal and/or shoreline containment in the RAB (EPA 2010a). The use of the total PCB SQS criterion as the RvAL for sediment removal and shoreline containment is consistent with the LDW Slip 4 EAA, Terminal 117 EAA, and Boeing Plant 2 DSOA EAA cleanups.

As identified in EPA's Action Memo (EPA 2011a), the EPA-selected removal action will meet the above RAOs with the exception of the RAO for human seafood consumption over the long term. The Action Memo states:

> *"The RBCs* [Risk Based Concentration] *necessary to protect unlimited human seafood consumption are very stringent. The goal for the LDW as a whole is to get as close to them as practicable. Achieving them may be impossible as they are more stringent than background concentrations, including natural background as defined by MTCA. However, this sediment removal will remove all contaminant concentrations over its aerial extent and will replace them with clean fill material meeting the backfill levels for final actions. Upon completion therefore, these formerly contaminated sediments will meet all cleanup goals and levels until they are recontaminated, to however marginal degree, by surrounding LDW concentrations, and LDW sources generally. These later post-NTCRA levels will be addressed by the LDW Record of Decision in a manner consistent with the rest of the LDW since the Jorgensen Forge EAA will remain part of the LDW site after this NTCRA is completed. It is important to emphasize that protective levels of COCs, particularly PCBs, are well below background concentrations, so it will not be possible, based on everything we know at this time, over the long term, to completely eliminate any unacceptable risk from this pathway without limiting fish consumption to some degree".*

2.1.2 Performance Standards

To achieve the Jorgensen Forge EAA RAOs, performance standards were established and are described as follows. These performance standards were used to guide the removal action design, construction, construction verification, and long-term monitoring activities.

2.1.2.1 In-water Dredging and Off-site Disposal

The following in-water dredging and off-site disposal performance standards were established:

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- Impacted sediment, defined as sediments containing total PCB concentrations greater than the PCB RvAL (12 mg/kg OC) shall be removed within the EPA-approved RAB.
- The work shall be completed consistent with best management practices (BMPs) in order to minimize dredge residuals, releases, and recontamination of adjacent areas outside the RAB.
- The work shall be completed consistent with BMPs and 401(c) Water Quality Memorandum requirements in order to minimize water quality impacts outside the compliance boundary.
- The dredged sediment shall be transported to a future identified off-site offloading facility anticipated to be located within the LDW Site and subsequently hauled and disposed at an approved landfill facility.

2.1.2.2 Backfill of Dredge Areas

The following backfill performance standards in dredge areas were established:

- Areas dredged or excavated to remove sediments and soils exceeding the PCB RvAL shall be restored to roughly the pre-removal grade with backfill material. Some areas within and directly adjacent to the navigation channel and on the shoreline bank may be at lower elevations following backfilling than pre-removal grade.
- The gradation of the backfill material shall be such that the surface of the backfill material generally remains stable without significant erosion.
- Imported backfill material shall meet defined chemical and geotechnical goals.
- The work shall be completed consistent with BMPs in order to minimize adjacent slope instability and dredge residuals migration.
- The work shall be completed consistent with BMPs and the EPA-prepared 401(c) Water Quality Memorandum requirements in order to minimize water quality impacts outside the compliance boundary.

2.1.2.3 Shoreline Stabilization

The following shoreline stabilization performance standards were established:

- The shoreline bank shall be regraded to a flatter slope to promote better long-term stability.

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- The nearshore bank sediment, soil, pilings, concrete, and debris excavated from the designated shoreline shall be disposed of at an approved landfill facility.
- The excavated surface of the shoreline bank shall be contained and armored to resist erosion and instability. The surface armoring shall be designed to resist bed shear velocities induced by a 100-year flood flow, 100-year wind-induced waves, vessel-induced waves from typical passing vessels, and anticipated propeller wash from vessels that operate in the area. The armoring design also accounts for projected sea level rise in the Puget Sound area.
- The target total thickness of the shoreline bank containment shall be a minimum of 4 feet thick and will include 1.5 feet of filter material overlain by 2.5 feet of armor overlain by 0.5 feet of habitat material.
- Imported shoreline bank stabilization materials shall meet defined chemical and geotechnical goals.
- The work shall be completed consistent with BMPs in order to minimize slope instability during construction, in-water work based on tidal elevations during construction, and excavation residuals migration.
- The work shall be completed consistent with BMPs and 401(c) Water Quality Memorandum requirements in order to minimize water quality impacts outside the compliance boundary.

2.2 Source Control

The following subsections summarize the current status of Facility and off-site source control.

2.2.1 Facility Source Control

Jorgensen Forge entered into an Agreed Order (AO; Docket No. DE 4127) with Ecology to conduct a source control evaluation to determine if there are ongoing sources of chemicals from the Facility to the LDW sediments and/or water column that are above applicable screening levels. Ecology is the lead agency for controlling ongoing sources of hazardous substances to the LDW and has developed the *Lower Duwamish Water Source Control Strategy* (Ecology 2004). The source control evaluation was conducted and sequenced such that the nature and extent of potential ongoing sources of chemicals from the Facility to the

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LDW will be documented and controlled prior to initiation of sediment removal action activities to minimize the potential for sediment recontamination following removal action.

The Facility source control investigations completed to date and findings are comprehensively summarized in the Source Control Evaluation Report (SCER; Anchor and Farallon 2008a) and SCER Addendum (Anchor QEA and Farallon 2009). These documents resulted in the development of a conceptual site model (CSM) that facilitated evaluation of the possible migration pathways for chemicals of interest (COIs) from the Sediment Investigation Area (SIA) that may represent an ongoing source of chemical concentrations to the LDW above sediment and surface water screening levels. COIs are specifically those chemicals that were used in historical operations or otherwise known to be present on the SIA at detectable concentrations.

The results of the source control investigation, including the information obtained through source control data gap sampling activities conducted in 2009, indicate the following ongoing or potential future sources of COCs (chemicals with concentrations above relevant screening levels) to the LDW from the SIA and the recommended path forward for source control implementation, if necessary:

- Direct discharge of COCs in products associated with ongoing operations on the SIA to the stormwater system with subsequent discharge to the LDW through SIA outfalls 001, 002, or 003.
  - No additional source control implementation is necessary for this pathway beyond continued implementation of existing BMPs.
- Erosion of exposed soil containing PCBs and metals to the stormwater system with subsequent discharge to the LDW through SIA outfalls 001, 002, or 003.
  - No additional source control implementation is necessary for this pathway beyond the continued implementation of existing BMPs.
- Discharge of SIA stormwater to the LDW through outfalls 001, 002, or 003 containing concentrations of metals.
  - Additional source control implementation is necessary by Jorgensen Forge beyond the continued implementation of existing BMPs and monitoring.

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The migration pathway for discharge of groundwater is complete but concentrations of COCs have not been detected in groundwater exceeding the screening levels, with the exception of single anomalous detections of COCs in groundwater collected from single monitoring wells located in discrete areas of the SIA distant from the LDW. As discussed in the SCER Addendum (Anchor QEA and Farallon 2009), the COCs detected in groundwater exceeding the screening levels on the SIA do not pose a risk to the sediment or surface water of the LDW. The potential for ongoing releases of products to soil and groundwater is minimized through the implementation of BMPs and a Spill Prevention, Control, and Countermeasure Plan (Anchor QEA 2013c).

The erosion of exposed soil containing concentrations of PCBs and metals along the shoreline bank is an incomplete pathway to the LDW because the shoreline is heavily armored and significantly limits any potential erosion of bank fill material.

The necessary source control actions to reduce stormwater discharge concentrations from the SIA below the applicable benchmarks are being completed in accordance with the Facility's National Pollutant Discharge Elimination System (NPDES) Industrial Stormwater General Permit (Permit No. WAR003231) and sequenced so that the sources are controlled prior to initiation of sediment removal action activities. In accordance with the Permit and AO (Docket No. 9429), Jorgensen Forge submitted an Engineering Report (Anchor QEA 2012) to Ecology on May 18, 2012 and it was subsequently approved by Ecology on September 6, 2012. Plans and specifications detailing the treatment system design were submitted to Ecology on October 12, 2012, and Jorgensen Forge completed installation and startup of the treatment system on January 13, 2013. The stormwater treatment system is currently in operation and Jorgensen Forge is conducting monthly monitoring to evaluate the system performance with respect to Permit benchmarks, as well as the potential for sediment recontamination from Facility stormwater discharge.

2.2.2 Off-site Source Control

The SCER (Anchor and Farallon 2008) identified potential off-site sources of chemicals to the LDW sediments in the vicinity of the SIA from adjacent upland properties. In addition,

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review of sediment quality and sediment transport and deposition information presented in the LDW Final RI (Windward 2010) indicates off-site sediments with elevated chemical concentrations have the potential to migrate into the RAB. A brief summary of these potential sources is provided in the following subsections. Control of some of these off-site sources are beyond the control of the Owner but will be critical to the long-term success of the removal action within the RAB.

2.2.2.1 Property Line Storm Pipe Outfall Solids

Elevated concentrations of total PCBs have been identified in the inactive Boeing 12-inch storm pipe and directly-adjacent inactive 24-inch property line storm pipe (collectively referred to as property line storm pipes) that transit the northern Facility property boundary (Figure 2). Historical inputs to the Boeing 12-inch property line storm pipe were solely from Plant 2. Historical stormwater inputs to the 24-inch property line storm pipe were primarily from Plant 2 and Boeing Field/King County International Airport and to a lesser extent the Facility and the City of Tukwila stormwater drainage. A summary of the investigations and data findings and evaluations is summarized in the *Storm Drain Line Data Summary* technical memorandum (Farallon 2005) and *Historical 6-inch and 12-inch Lateral Pipes Investigation Report – Stormwater Source Control Implementation, Jorgensen Forge Facility, Seattle, Washington* (Anchor QEA 2010b).

EPA prepared the *Action Memorandum for the Jorgensen Forge Outfall Site, Seattle, King County, Washington* (2010b). This memorandum documented approval of the selected time-critical removal action under CERCLA for removal action activities associated with the concrete portions of the property line storm pipes that discharge to the RAB. Boeing and Jorgensen Forge are named as potentially responsible parties in the Action Memo. Boeing performed the removal action actions and Jorgensen Forge provided access to the Facility. As required by the Action Memorandum, Boeing submitted the *Source Control Action – 15-inch and 24-inch Pipes Cleanout Work Plan* detailing the removal action and closure activities on December 17, 2010 (Floyd|Snider 2010). The removal action consisted of the cleaning and closure of the concrete portions of the full extents of both property line storm pipes on the Facility to remove and prevent continued discharge of stormwater through known PCB contamination to the LDW. Boeing initiated the removal action and closure

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activities in November 2010 and submitted the Source Control Action Completion Report dated May 27, 2011 (Floyd|Snider 2011). EPA approved the removal action and closure activities in a letter dated July 15, 2011 (EPA 2011b).

As part of the removal action and closure activities, Boeing also completed soil sampling along the top of shoreline bank area near the alignment of the property line storm pipes. This investigation identified elevated PCB concentrations in soil at depths from 8- to 25-feet below ground surface (bgs) in the vicinity of the northwest corner of the Facility directly adjacent to the property boundary with the Plant 2 (Figure 3). Due to these findings, EPA required the completion of additional focused soil sampling under a First Modification to the AOC entered into by Jorgensen Forge and Boeing in September 2011. Jorgensen Forge completed the additional soil investigation in March 2012 in accordance with the Phase 2 Geoprobe Soil Investigation Work Plan (Anchor QEA and Farallon Consulting 2012a). The results were presented in the Phase 2 Geoprobe Investigation Summary Report – Jorgensen Forge Outfall Site (Anchor QEA and Farallon Consulting 2012b), and EPA approved completion of the First Modification to the AOC work in a letter to Jorgensen Forge dated September 11, 2012.

Although the existing Phase 1 and Phase 2 Investigation lateral data density is very high (Geoprobe borings spaced approximately 2 to 10 feet apart throughout the Site), there were three borings where the deepest soil sample collected contained total PCBs greater than the 1 milligram per kilogram (mg/kg) total PCB screening level. In coordination with EPA and Ecology, Jorgensen Forge and Boeing developed the *Work Plan Addendum for Additional Vertical Polychlorinated Biphenyls Characterization in Soil – Jorgensen Forge Outfall Site* (Anchor QEA and Floyd|Snider 2012) to further assess the vertical extent of total PCBs greater than 1 mg/kg (referred to as the Phase 3 Investigation) at these isolated locations. Jorgensen Forge managed performance of the work in December 2012 with oversight by Boeing. A summary of the Phase 3 Investigation results is detailed in the *Results of Additional Soil Geoprobe Vertical Characterization at the Jorgensen Forge Outfall Site* (Anchor QEA 2013a).

Jorgensen Forge and Boeing are currently coordinating with EPA for a Second Modification to the AOC that will require the removal of the CMP that exists in the furthest

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downgradient portions of the property line pipes as well as soils in the direct vicinity of these pipes that contain total PCB concentrations greater than 1 mg/kg (Figure 3). Jorgensen Forge and Boeing are evaluating the schedule for execution of the Second Modification to the AOC and development of the removal action design documents. At a minimum, a sheetpile wall will be installed on the shoreline bank at the appropriate schedule to facilitate the sediment removal action activities within the RAB immediately adjacent to the sheetpile wall. This BODR and attached Final Design documents account for the presence of this sheetpile wall so the abutting removal action activities will be successfully integrated and sequenced to prevent delays to either removal action. Just prior to installation of the sheetpile wall, additional angled Geoprobe borings will be performed to further characterize the sediment and soil quality immediately water-side of the wall beneath the design shoreline bank excavation grades identified in the Construction Drawings (Appendix G of this BODR). This data will inform whether additional removal below the current design shoreline bank excavation grades will be necessary during the removal action in the RAB and the appropriate disposal removal facility for any additional removed materials.

2.2.2.2 Boeing Plant 2 2-66 Study Area

The 2-66 Study Area is located along the southwest corner of Boeing Plant 2 and borders Boeing DSOA and northwest corner of the Facility (Figure 2). This area includes the Southwest Bank CMS Study Area and the Transformer PCB Investigation Area (referred to as OA-11 [Floyd|Snider 2007]). Migration of chemicals from the 2-66 Study Area to the Facility and LDW sediments has occurred from two sources. They include an underground storage tank located outside the southwestern corner of former Building 2-66 that historically stored trichloroethene (TCE) and a piping system that was and continues to be a source of TCE degradation byproducts to groundwater on the northwest corner of the Facility.

Quarterly and semi-annual groundwater monitoring conducted by Boeing, including monitoring wells located along the northwestern corner of the Facility (PL2-JF01AR, PL2-JF01B, PL2-JF01C, PL2-JF02A, and historically PL2-03A; Figure 4), has consistently shown detections of elevated halogenated volatile organic compounds (HVOCs; dichloroethene [DCE], and vinyl chloride) due to the deflection of groundwater around the

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2-66 sheetpile enclosure and onto the northwest corner of the Facility. Sediment porewater monitoring (Windward 2006) adjacent to the Southwest Bank Area also identified detections of HVOCs documenting that the TCE plume has a complete pathway to the LDW sediments adjacent to the northwest portion of the Facility within the Boeing DSOA. Boeing recently completed soil removal within the sheetpile enclosure under EPA oversight to remove soils impacted by HVOCs. It is currently unclear what additional source control measures Boeing will take to control this known source of HVOCs to the Boeing DSOA immediately downstream from the RAB.

The Southwest Bank Area (Figure 2; Boeing DSOA bank extending downstream/north from the southern Plant 2 property boundary) is composed of riprap and a significant amount of debris fill containing concrete rubble, metal scraps, and brick. Soil samples were collected from the Southwest Bank Area and showed metals and PCB concentrations above the SQS criteria (Ecology 2007). Boeing's proposed remedy for the DSOA (AMEC and Floyd|Snider 2010) includes reconfiguring the Southwest Bank Area to eliminate this potential bank erosion pathway.

Per the MOU between Boeing and the Owner (EMJ et al. 2007), the southern portion of the Boeing DSOA and Southwest Bank Area cleanup is anticipated to occur immediately following the removal action within the RAB and the backfill operations for both projects will be sequenced to minimize the potential for recontamination of the RAB, Boeing DSOA, and Southwest Bank Area.

2.2.2.3 Sediment to Sediment Pathway

The LDW Final RI (Windward 2010) defines the nature and extent of sediment concentrations throughout the LDW. Elevated concentrations for a variety of chemicals have been documented throughout the LDW, particularly in the direct vicinity of the RAB. Specifically, the sediments adjacent to the following properties have been identified as EAAs due to elevated PCB concentrations in surface and subsurface sediments: Boeing DSOA (southern portion of EAA-4), Terminal 117 on the west bank of the LDW directly across the RAB (EAA-5), and the Boeing-Isaacson Property combined sewer overflow (CSO) discharge location (EAA-6; Figure 1). Per the MOU between Boeing and the Owner (EMJ et al. 2007),

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the removal actions within the Boeing DSOA and the RAB are required to be integrated and sequenced to minimize the potential for recontamination of sediments adjacent to either facility during and prior to removal action. EPA has also committed to completing the EAA-5 cleanup concurrent with the Boeing DSOA and RAB cleanups during the 2013 in-water work window, although the current schedules shows the EAA-5 cleanup initiating following completion of the RAB cleanup. EPA will require the use of sufficient environmental controls during these cleanup actions to significantly minimize the potential for sediment transport and deposition to the RAB during the cleanup activities.

Alternatively, EAA-6, which is located immediately upstream of the RAB, and other sediment areas further upstream are not currently scheduled for cleanup prior to cleanup in the RAB. Ongoing releases and/or sediment transport and deposition to the RAB from these areas could contribute elevated chemical concentrations to the RAB following completion of the removal action. Long-term monitoring within the RAB will document the sediment quality impacts due to this ongoing off-site source loading.

2.3 Selected Removal Action Alternative

The EPA-approved removal action alternative (EPA 2011a) includes the vertical and horizontal removal of all total PCB RvAL sediment and shoreline bank exceedances identified within the RAB. In accordance with EPA's direction, the RAB was developed by screening all of the available sediment and shoreline bank soils total PCB data against the total PCB RvAL. Based on the findings of the data screening and the site-specific conditions described in the Final EE/CA (Anchor QEA 2011a), the EPA-approved RAB was identified as the approximately 1.6-acre area shown in Figure 4, and is bounded by the following:

- To the east by the top of shoreline bank (including the top of sheetpile and concrete panel walls) extending from the northern to southern Facility property boundaries, with two areas extending just beyond the top of bank, as discussed below
- To the south by the extension of the southern Facility property boundary from the top of the concrete panel wall to the eastern boundary of the federal navigation channel
- To the west by the eastern boundary of the federal navigation channel extending from the southern boundary to the Boeing DSOA in-water cleanup boundary

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identified in the MOU (EMJ et al. 2007) followed by the surveyed (during low tide on August 28, 2008) toe of riprap elevation north of the in-water cleanup boundary

  - Per EPA's letter (2008b), the western boundary includes an isolated 20-foot extension into the federal navigation channel centered on station SD-322-S

- To the north by two boundaries: 1) the Boeing DSOA in-water cleanup boundary on the southern end; and 2) the Facility northern property line on the northern end

The removal action includes shoreline bank excavation and placement of slope containment materials. This portion of the shoreline is degraded, containing elevated chemical concentrations above the SMS SQS criteria and total PCB RvAL exceedances; highly armored and over-steepened (approximately 1 to 1 horizontal to vertical slope [1H:1V slope]) banks; and, contains derelict creosote-treated piles, remnant overhanging asphalt pads, and other types of debris. Existing derelict creosote-treated piles, overhanging asphalt structures, and debris (Figures 5a, 5b, and 5c) will be removed from the bank prior to excavation and slope containment. Upon excavation to the target depths, inert debris identified along the new surface may be allowed to remain in place if doing so would not affect the function of the overlying slope containment. The removed materials will be transported and disposed at an off-site RCRA-permitted Subtitle D disposal facility.

Following completion of the shoreline bank excavation to the design grades, clean slope containment materials will be placed on the post-excavation surface. The slope containment will be composed of a 1.5-foot "filter" layer amended with granular activated carbon (GAC; consisting of sandy gravel to gravelly sand) overlain by a 2.5-foot "armor" layer (consisting of light loose riprap) further overlain by a 0.5-foot layer of habitat substrate (anticipated to consist of rounded or sub-rounded 2.5-inch minus gravel). The filter layer will act as a containment layer, the armor layer will function to protect the filter layer from erosion, and the habitat layer will provide a uniform habitat substrate within the intertidal areas that functions to fill the interstitial areas of the armor layer.

The removal action will be completed such that impacts to the existing sheetpile wall and concrete panel walls are minimized, as well as existing in use concrete foundations and

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structures within close proximity of the top of shoreline bank. This will include offsets during dredging to minimize undermining as well as damage from construction equipment.

2.4 Additional Soil Removal Action

Concurrent with completion of the shoreline bank excavation, Ecology recommended that Jorgensen Forge consider removal of additional soil from the top of shoreline bank proximate to borings SB-3 and SB-4 containing surface total PCB concentrations above the Washington State Model Toxics Control Act Cleanup Regulation (MTCA) Method A soil cleanup levels for industrial properties (10 mg/kg total PCBs), as established in Section 745 of Chapter 173-340 of the WAC (Figure 8). The total PCB soil concentration at SB-3 is 17.8 mg/kg in the 0- to 2-foot interval and 6.8, 1.9, and 11. 3 mg/kg in the 0- to 2-foot, 2- to 4-foot, and 4- to 6-foot intervals at SB-4. All observed total PCB concentrations in SB-1, SB-2, SB-5, SB-6, and SB-7 across the remainder of the top of shoreline bank were well below the MTCA Method A industrial land use cleanup level.

The removal action design shoreline bank excavation grades extend through soils in the direct vicinity of SB-3 and SB-4. The Contractor will also will also have mobile equipment working in the vicinity of these borings in order to perform the shoreline bank excavation. Jorgensen Forge is concerned these soil disturbances could lead to track-out of soils containing PCBs to nearby upland surfaces. Due to these concerns, Jorgensen Forge has agreed to conduct the additional removal as shown in Figure 8. The area of additional removal is beyond the proposed reconfigured top of bank described in the EPA-approved Final EE/CA and Action Memorandum (EPA 2011a) so this removal will not be administered under the EPA AOC. Rather, this additional soil removal will be completed by Jorgensen Forge as an Interim Action under an amendment to the existing Ecology Agreed Order (No. DE 4127) at the Facility. The amendment is currently being developed by Ecology. The soil removal will be performed concurrently with the EPA removal action shoreline bank reconfiguration activities (see Section 10).

2.5 Construction Strategy

Due to ESA considerations, work in the RAB and below the mean higher high water (MHHW) elevation is restricted to only typically occur between August 1 and February 15 of

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each year (EPA 2013), unless modified by EPA and the Services. It is anticipated that work will be able to be performed 24 hours per day consistent with the Boeing cleanup activities in the northern portion of the DSOA. The dredging work (Section 4) will be sequenced and coordinated with Boeing and is expected to be performed from generally upstream to downstream and generally from the top of the bank to the bottom. This will minimize slope instabilities, the amount of in-water work and potential impacts, as well as the amount of residual material that could be left in place.

The shoreline bank work will be completed to the maximum extent practicable with land-based equipment and "in the dry" given the tidal conditions during the construction period. It is anticipated that the shoreline bank materials will be loaded into trucks and either hauled directly to an approved offsite Subtitle D landfill or hauled to a transloading facility and transferred to rail cars for transport to a Subtitle D landfill. The entire reconfigured shoreline bank from the newly constructed toe to the top of bank will be armored to prevent erosion of the bank. The new top of bank (approximately 20 feet mean lower low water [MLLW] elevation) is significantly higher than the 11 feet MHHW elevation and projected increases in water surface elevations due to sea level rise, so the shoreline bank armor design conservatively protects the bank from LDW currents and waves.

The in-water work will be performed with a closed environmental bucket (e.g., Young's Bucket) to the maximum extent possible given the physical characteristics of the encountered materials. A conventional derrick with clamshell, grapple, or vibratory hammer will be used as necessary for removal of large debris and piling. The articulated bucket will be mounted on an excavator that is located on a barge. It is anticipated that the removed materials will be loaded into a haul barge, dewatered on the barge, and hauled to a transloading facility where it will be loaded into rail cars for transport to a Subtitle D landfill. The dewater fluids will be treated as necessary on a barge (similar to Slip 4 EAA removal action process) or on the landside (similar to ongoing Boeing DSOA cleanup) prior to discharge back into the LDW.

Verification of the completion of dredging and shoreline reconfiguration requirements will be performed on a "management unit" basis. A dredge management unit (DMU) is a dredging area within the RAB that will be used for assessing compliance with elevation

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targets and dredging thickness removal. Following completion of each sediment and shoreline bank DMU, those areas will be covered with a 3- to 6-inch layer of interim backfill or filter material to limit the potential for resuspension and release of sediments and soil. Subunits will be determined during construction. The number and orientation of DMUs will be determined in coordination with the Engineer and Contractor based on the Contractor's means, methods, and construction sequencing. The DMUs will be sized such that enough area can be dredged and managed before covering, but not too large such that the effect of the cover minimizing resuspension is lost.

When all dredging and shoreline bank excavation is complete the RAB will be backfilled with a sand and gravel mix to nominally restore the previous elevations, except within 10 feet of and inside the navigation channel where the final target backfill elevations will be lower than the existing mudline to support navigation channel elevations maintained by the U.S. Army Corps of Engineers (USACE) approximately 2 feet below the authorized navigational channel depth of -15 feet MLLW (USACE 2010).

2.6 Green Remediation Strategy

The Owner is committed to integrating appropriate removal action activities using methods and procedures that conserve natural resources in accordance with EPA Region 10 "Clean and Green Policy". This policy attempts to increase the environmental sustainability and benefits of remediation completed at Superfund sites and provides guidance on specific goals for environmental performance during the completion of remediation activities.
The removal action design has incorporated this policy guidance where relevant and practicable. Appendix J provides a summary of the strategy elements that were incorporated into the removal action design to increase the environmental sustainability and benefits.

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3 SITE CHARACTERISTICS

3.1 Adjacent Land Uses and Ownership

This section summarizes the land uses and ownership of the properties adjacent to the Facility. No Washington State Department of Natural Resources (WDNR)-permitted aquatic land uses exist within the Jorgensen Forge EAA or at the surrounding properties.

Land uses and ownership directly north and south of the Facility include:

- **Boeing Plant 2**: Located adjacent and directly north/downstream of the Facility, it occupies approximately 109 acres of developed topographically flat land covered by buildings and paved yards. Since 1936, Boeing Plant 2 specialized in manufacturing aluminum alloy, steel alloy, and titanium alloy parts for airplanes using a wide range of hazardous chemicals including heavy metals (i.e., chromium, zinc, copper, cadmium, and silver), cyanide, mineral acids and bases, petroleum products, PCBs, and chlorinated solvents such as TCE. In recent years, the function of Plant 2 has shifted toward research and administration (Floyd|Snider 2007).
- **Boeing-Isaacson Property**: located directly south/upstream from the Facility, it is a 9.7-acre rectangular parcel that has had mixed uses. From the 1920s to 1949, a portion of the land was used as a lumber mill. In the early 1950s, the Isaacson Structural Steel Company purchased the Boeing-Isaacson Property and conducted galvanizing, steel fabrication, and storage through the 1960s (ERM and Exponent 2000). This property is also the discharge point for the combined King County International Airport Middle Outfall and Seattle Public Utilities CSO No. 156. The sediments adjacent to the discharge point have been identified by EPA as EAA-6 due to elevated chemical concentrations, primarily PCBs.

Further details on these facilities, including facility history, development, and status of source control evaluations, can be found in the *Lower Duwamish Waterway Early Action Area 4 Final Summary of Available Information and Identification of Data Gaps Report* (Ecology and Environment 2007) and *Lower Duwamish Waterway Source Control Action Plan for Early Action Area 4* (Ecology 2007).

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Directly east of the Facility is East Marginal Way South, which is bounded further to the east by the King County International Airport. Directly west of the Facility is the shoreline bank and LDW. The Port of Seattle manages the lands from the top of the shoreline bank to the eastern boundary of the federal navigation channel as successor in interest to the King County Commercial Waterway District No. 1 (often referred to as Duwamish Commercial Waterway District No. 1).

3.2 Physical Setting

This section summarizes the physical setting within the RAB and at the Facility. Further details and information on the physical characteristics of the Facility are provided in the SCER (Anchor and Farallon 2008a).

3.2.1 Shoreline Conditions, Outfalls and Debris

Figures 5a through 5c show photographs of the shoreline conditions during a low tide (approximately –3 feet MLLW), both within the RAB and immediately upstream and downstream. The shoreline north of the sheetpile wall is steep (approximately 1H:1V) and covered with a combination of riprap, concrete blocks, chunks of asphalt, other debris, and approximately 40 visible aboveground remnant timber piles of variable length. The shoreline also includes the following features:

- Six historical inactive (i.e., abandoned) outfall discharge pipes (outfalls 004, 005, 006, 007, 008, and 009) that extend through the bank along this portion of the shoreline.
- A single inactive stormwater outfall that has never been managed by the Facility also discharges through the shoreline bank. Previous investigations by Boeing and Jorgensen Forge identified that this outfall has conveyed discharges from two pipes, referred to as the Boeing 12-inch and 24-inch property line storm pipes (see Section 2.2.2.1). This outfall was abandoned in 2011.
- Remnant timber decking along the bank and overhanging a small portion of the shoreline above outfall 008.
- A small cantilevered concrete pad slightly overhanging the top of bank adjacent to outfall 007.
- Several debris piles that look to be composed of solidified molten metal at the toe of the bank between outfalls 004 and 006.

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The shoreline along the approximately southern 100 linear feet of the RAB contains a gradual sloping mudline adjacent to an abutted sheetpile wall and concrete panel wall. The slope along the sheetpile wall contains scattered larger debris, riprap, and cobble with decreasing coverage of cobble farther towards the channel. The slope adjacent to the majority of the concrete panel wall is a mudflat with limited scattered cobble. A large building is located approximately 20 feet east of the top of the sheetpile and concrete panel walls.

No utility crossings through the RAB have been identified.

3.2.2 Topography and Bathymetry

The topography within the RAB is relatively flat and ranges from elevations of approximately 19 to 20 feet MLLW at the top of shoreline bank.

The mudline elevation along the eastern edge of the federal navigation channel within the RAB ranges from -10 to -14 feet MLLW. As shown in Figures 5a through 5b, the shoreline bank area is steep (approximately 1H:1V slope) north/downstream of the sheetpile wall, with a more gradual slope below the toe of slope extending to the navigation channel. The mudline elevation adjacent to the sheetpile wall is approximately 5 feet MLLW with a generally constant gradual slope extending to the navigation channel. The mudline elevation adjacent to the concrete panel wall is approximately 2 feet MLLW with a relatively gentler slope starting extending from this elevation resulting in a localized mudflat area.

3.2.3 Geotechnical

A number of upland and offshore sediment sampling investigations have been conducted in and around the Facility.

Previous subsurface investigations conducted at the Facility indicated that the upland soils are primarily fill material consisting of gray and brown sand that ranges from very fine to coarse subrounded grains. The fill material appears to extend to a depth of 2 to 10 feet bgs. A pervasive silt layer with organic material is encountered between 8 and 10 feet bgs and

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represents the uppermost native soil. The uppermost native soil generally consists of a 1- to 3-foot-thick, organic-rich, dark gray silt to clayey silt layer.

Offshore sediment characterizations within the RAB have identified surface sediments containing between 40 to 80 percent fines (clay and silt) near the federal navigation channel with a general decrease in fines to between 20 to 60 percent in the nearshore areas. The shoreline bank area has less than 40 percent fines with several areas with significant armoring and/or debris showing less than 20 percent fines. Total organic carbon (TOC) generally ranges from 1.4 to 3.4 percent, with generally higher percentages adjacent to the federal navigation channel.

Core logs from these various sediment investigations generally showed a variable thickness of recently deposited silts underlain by upper alluvium interbedded silts and sands. Consistent with the lithology identified in the LDW Final Remedial Investigation (Windward 2010), the bottom depths of some cores showed a lower alluvium layer consisting of non-silty dense sand.

A comprehensive summary of the various upland soil and offshore sediment sampling investigations are summarized in the SCER (Anchor and Farallon 2008) and *Final Investigation Data Summary Report* (Anchor and Farallon 2006), respectively.

3.2.4 Hydrogeology

The drainage basin into the LDW is underlain by a single, large alluvial aquifer system that extends from the water table at 10 feet bgs to a depth of 70 to 80 feet bgs. The Facility is underlain by heterogeneous lenses and layers of silt and clay with no identified discrete zones, and only a few units can be correlated within the Facility's monitoring wells.

The stratigraphy is further complicated by placement of fill atop the pre-development topography, including placement of fill between May 1944 and July 1945 into the previously existing embayment located in the central western portion of the Facility property. Groundwater at the Facility is typically encountered from 9 to 13 feet bgs. The observed groundwater conditions during semi-annual groundwater monitoring events indicate that the groundwater flow direction is to the southwest on the eastern half of the Facility with

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the gradient increasing and the flow direction becoming more westerly toward the shoreline (Anchor QEA and Farallon 2009).

3.2.5 Surface Water Hydrology and Tidal Conditions

Numerous hydrologic studies in the LDW have evaluated the general circulation patterns and characteristics in the vicinity of the project site but no site-specific studies have been conducted. As part of the *Draft Final Feasibility Study: Lower Duwamish Waterway* (AECOM 2010), a hydrodynamic model was performed to assess discharge, velocity, and depositional/erosional areas throughout the LDW Superfund Site. This information can be generally applied at the RAB.

The hydrology within RAB is influenced primarily by general circulation patterns in the LDW. Average downstream flow for the LDW as measured at the Tukwila gaging station was 1,533 cubic feet per second (cfs) during 2003 to 2004 and ranged from 327 cfs in August to 3,290 cfs in June (Clemens 2007). Flow rates are greatest during the winter months because of seasonal precipitation and lowest throughout the late summer dry season.

Surface water runoff within the LDW drainage basin also contributes to flow to the LDW, including sources such as storm drains, tributary creeks, CSOs, and non-point inputs. These sources are expected to be less than 1 percent of the total discharge, even during peak flow events (Windward 2010), and will be affected by the magnitude and duration of the runoff input and river discharge and tidal elevations. Two main tributary creeks drain into the LDW: Hamm Creek at approximately river mile (RM) 4.2 upstream from the RAB and Puget Creek at approximately RM 0.7 downstream from the RAB.

A number of parties have measured current velocities within the LDW as part of numerous environmental investigations (Harper-Owes 1983; King County 1999; Prych et al. 1976; Santos and Stoner 1972; Stevens, Thompson, and Runyan 1972; Weston 1993). The most extensive measurements within the LDW were collected by King County in 1996. The measurements were made at two locations in the LDW (RM 1.1 and RM 3.5) for a 3-month period beginning in August 1996 and recorded currents at 15-minute intervals along a vertical profile (King County 1999). The RM 3.5 deployment station is just downstream from

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the RAB; therefore, it provides a measure of anticipated velocities within the vicinity of the RAB. Measured current velocities during this study rarely exceeded 1.3 feet per second.

Further details on the surface water hydrology for the LDW are described in detail in the LDW Final RI (Windward 2010).

3.2.6 Sea-Level Rise

A potential rise in mean sea-level was considered as part of the design process, as requested by EPA. Mean sea level is projected to rise by 6.5 inches by 2050 for the state of Washington with a range of -1 to 19 inches (National Research Council 2012). This would result in a future predicted MHHW elevation of 11.6 feet MLLW (in comparison to the current MHHW elevation of 11.1 feet based on MLLW defined by the current tidal epoch). It is expected that sea level will rise gradually over time. An increase in mean sea level will correspond to a likewise increase in design water levels at the site. This will result in a minor reduction of bottom currents due to both river/tidal currents and prop wash velocities. This decrease in bottom currents will result in a reduction in shear stress induced on the sea bed (given that all other design criteria remain the same). Therefore, the projected increase in mean sea level is not anticipated to impact the hydraulic stability of the backfill and shoreline containment design within the RAB.

3.2.7 Navigational Uses

Navigation that occurs within and adjacent to the RAB is mainly associated with commercial vessel activities within the federal navigation channel, although recreational vessels do frequent the LDW in the vicinity of the RAB.

An analysis of vessel traffic presented in *the Draft Final Feasibility Study: Lower Duwamish Waterway* (AECOM 2010) attempted to quantify vessel traffic within the LDW. However, the evaluation focused on larger vessel traffic as it was conducted based on the number of times bridges spanning the LDW are opened on an annual basis. The results of the study indicate:

- 35 to 40 percent of the larger vessel traffic continues upstream at least as far as the South Park Bridge at RM2.0 (the RAB is located at approximately RM 3.6)

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- Tug traffic occurs two to five times per week
- Yachts ranging from 100 to 160 feet in length travel to and from Delta Marine, located at RM 4.2 (upstream of the RAB)

3.2.8 Ecosystem Considerations

This section provides a brief overview of the habitat likely to be affected near the RAB:

- Biota:
  - The dominant benthic macrofauna included nematodes, oligochaetes, the gammarid amphipod *Corophium spp.*, the cumacean *Leucon sp.*, the polychaetes *Manayunkia aesturina* and *Hobsonia florida*, and several species in the family *Spionidae*.
  - The bivalve *Macoma spp.*
  - The benthic meiofauna (smaller marine organisms) community is dominated by harpacticoid copepods and nematode worms (Cordell et al. 1994, 1996).
- **Shellfish**: includes clams (mostly *Macoma balthica*, and occasionally *Macoma spp.* and *Mya arenaria)*, crabs (slender crab [*Cancer gracilis*] and Dungeness crab [*Cancer magister*]), shrimp, and mussels.
- **Salmonids**: species include Chinook salmon *(Oncorhynchus tshawytscha),* coho salmon *(Oncorhynchus kisutch),* chum salmon (*Oncorhynchus keta),* pink salmon *(Oncorhynchus gorbuscha),* steelhead trout *(Oncorhynchus mykiss),* cutthroat trout *(Oncorhynchus clarkiclarki)*
  - Note: to protect listed salmonid species, timing for in-water construction work (for example, dredging, backfilling, and habit placement) in the LDW typically extends annually from October 1 to February 15 (the USACE work window). However, the NMFS and USFWS have allowed work to start August 1, 2013.
- **Non-salmonid Fish**: includes shiner surfperch *(Cymatogaster aggregata),* snake prickleback*(Lumpenus sagitta),* Pacific sandlance*(Polygonella myriophylla),* Pacific staghornsculpin*(Leptocottus armatus),* longfin smelt *(Spirinchus thaleichthys),* English sole (*Pleuronectes vetulus),* juvenile Pacific tomcod *(Microgadus proximus),* pile perch (*Damalichthys vacca),* rock sole (*Lepidopsetta bilineata),* surf smelt

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(Hypomesus pretiosus), three-spined stickleback (*Gasterosteus aculeatus),* Pacific herring (*Clupea herengus pallasii),* Starry flounder (*Platichthys stellatus)*

- Wildlife:
  - Bird species likely include great blue heron (*Ardea herodias*), killdeer *(Charadrius vociferus),* Canada geese *(Branta canadensis),* belted kingfishers *(Megaceryle alcyon),* spotted sandpipers *(Actitis macularius),* European starlings (*Sturnus vulgaris),* and a variety of gull species, swallows, sparrows, finches, rock doves, crows.
    - Bald eagles (*Haliaeetus leucocephalus*), peregrine falcons (*Falco peregrines*), and osprey (*Pandion haliaetus*) have been observed along the LDW
  - Aquatic species include a variety of ducks, including mallards, gadwall, scoters, goldeneyes, and scaup.
    - Pigeon guillemots, mergansers, grebes, and cormorants may feed on small fish (Cordell et al. 1996; USACE et al. 1994; Weston 1996)
  - Mammals include rabbits, opossums, mice, shrews, moles, bats, squirrels, muskrats, raccoons, seals, and otters.
  - Terrestrial mammals are likely not present due to the highly developed land use surrounding the project site.
- Threatened and Endangered Species: 19 fish and wildlife species observed in the LDW are listed under the ESA and/or by Washington Department of Fish and Wildlife (WDFW) as threatened, endangered, candidate species, or species of concern. Except for Chinook salmon, coho salmon, bull trout, bald eagle, western grebe *(Aechmophorus occidentalis)*, and perhaps Pacific herring, use of the LDW by these listed species is rare or incidental (Windward 2003).

A comprehensive summary of the various habitats identified near the RAB and potential uses by these benthic invertebrates, fish, and wildlife and impacts is presented in the Final EE/CA (Anchor QEA 2011a).

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3.3 Soil and Sediment Environmental Characterization

3.3.1 Historical Sampling

The sediments within the RAB have been characterized during a number of investigations, most recently by Boeing (MCS 2004), the Owner (Anchor and Farallon 2006), a joint effort by USACE and EPA (Herrera and USACE 2008), and EPA (Windward 2007a, 2007b). The Lower Duwamish Waterway Group compiled the sediment quality information into a single database to ensure all parties have access to and use the same data set for sediment quality evaluations. This database was used for the data summary and evaluations presented in the Final EE/CA (Anchor QEA 2011a).

A detailed summary of the sampling density for each of the SMS analytes and exceedances of the associated SQS and CSL criteria are summarized in Section 2.4 of the Final EE/CA. The analytical results detected concentrations of PCBs, metals, and semivolatile organic compounds (SVOCs) in sediments and/or shoreline bank soils above the SQS criteria within the RAB. Total PCB SQS exceedances were identified in surface and subsurface sediment over a wide range, both vertically and horizontally. Additionally, all identified surface and subsurface SQS exceedances for the full range of SMS analytes were co-located with total PCB SQS exceedances. Only two subsurface samples contained SQS exceedances for non-PCB chemicals (arsenic, lead, and zinc) and they were co-located with PCB SQS exceedances.

3.3.2 Results of 2011 Additional Sampling

As was discussed in the *Work Plan Memorandum* dated February 8, 2011 (Anchor QEA 2011b), additional subsurface sediment sampling was performed in the RAB to:1) identify the complete vertical exceedances of the total PCB RvAL (12 mg/kg-OC) in subsurface sampling locations that were previously vertically unbounded within the RAB; 2) provide some additional lateral and vertical characterization of total PCBs within the RAB; and 3) to provide some additional lateral and vertical characterization of total PCBs within the Boeing DSOA directly adjacent to the in-water cleanup boundary with the RAB. If the TOC concentration of the sediment sample was less than 0.5 percent or greater than 3 percent, then an alternate RvAL was defined as the total PCB lowest apparent effects threshold (LAET) criteria of 0.13 mg/kg dry weight.

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Sample results are summarized in Table 1 and depicted on Figure 6. Appendix A contains the core collection and processing forms, the chain-of-custody forms, the sample results summary forms, and the data validation reports.

Sixteen sediment cores were collected as outlined in the Work Plan Memorandum (Anchor QEA 2011b) and two additional cores were later collected to provide additional spatial resolution of the total PCB RvAL exceedances. The proposed and actual station locations for these cores are provided in Table 2 along with the mudline elevations and total core lengths processed. Station locations and sample results are depicted on Figure 6. The core samples were collected using a vibracore sampling device deployed from a Marine Sampling Services (MSS) vessel. All cores were driven to 14 feet or to refusal. All collected cores achieved at least 75 percent recovery, with the exception of the core collected at station JVE-02. Two cores were collected at this station and the second core was retained. The recovery of this core was the greater of the two at 72 percent.

The core samples were processed and logged as described in the Work Plan Memorandum (Anchor QEA 2011b). Cores were subsampled in one-foot intervals and total solids, TOC, and PCB analyses were initiated following a tiered approach. The approach targeted the identification of the deepest depth of total PCBs RvAL exceedance in each core. Analyses of the deeper intervals of each core were initially analyzed and the shallower intervals were archived pending results of the deeper intervals. If the deeper interval total PCB concentration was less than the RvAL criteria, the next shallowest 1-foot interval in the core was triggered for analysis. This tiered analysis approach continued until the total PCB concentration exceeded the RvAL criteria or the 0- to 1-foot interval was analyzed.

The full subsurface depth of total PCB RvAL exceedances was identified in the previously unbounded core locations. The updated data set was used to refine the target removal depths for the EPA-approved Alternative 4 identified in the Final EE/CA (Anchor QEA 2011a) to remove the full vertical lateral and vertical extents of total PCB RvAL exceedances within the RAB.

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4 DREDGE PLAN

The Final EE/CA (Anchor QEA 2011a) selected dredging as a major part of the removal action. This section describes the project constraints and related design considerations that affect the dredge plan design.

4.1 Design Considerations

The development of the dredge plan takes into consideration technical feasibility and RAB restrictions that may affect the ability to meet the project RAOs discussed in Section 2.1.1. Important design considerations include Facility security and access procedures, physical constraints, equipment selection, and dredging performance criteria and associated dredging BMPs.

Jorgensen Forge's security procedures require that all visitors to the Facility comply with a Visitor Security Plan in accordance with the security requirements imposed by Jorgensen Forge's contracts with the U.S. Navy, U.S. Navy suppliers, and other defense-related firms. The Visitor Security Plan establishes specific requirements for visitor security and access to the Facility. Jorgensen Forge also requires that all visitors have the appropriate safety training for the work they will perform and are citizens of the United States. All non-U.S. citizens must be escorted at all times. A chain-link fence secures the entire western boundary of the Facility adjacent to the RAB. The removal action will require reconfiguration of the shoreline bank east of this fence, so the fence will need to be relocated further east. In accordance with the Visitor Security Plan, Jorgensen Forge requires that a fence be maintained and secured during completion of the removal action activities to restrict access to individuals with the appropriate security clearance and safety training. Any ingress or egress through this fence or the main access gate will require clearance by a security guard and possession of a visitor badge. Jorgensen Forge will provide the necessary safety training for all visitors that will enter the Facility through this fence or the main access gate on the eastern portion of the Facility. Visitors must don the appropriate safety gear (as communicated during the safety training) during their access on the Facility.

Key physical constraints include the federal navigation channel located to the west of the RAB, the steep shoreline bank to the east, and the sheet pile and concrete panel walls in the

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southeast portion of the RAB (see Figure 4). The uplands portion of the Facility must be protected and preserved as much as possible to minimize potential impacts to ongoing operations at the Facility.

Equipment selection and productivity must be considered in the design such that the removal action is completed in an efficient manner that is compatible with RAB constraints, minimizes over-excavation in the RAB, and produces a material that is compatible with the transport and offsite disposal methods.

Dredging performance criteria are designed to limit the concentrations of PCBs in the LDW water column due to dredging operations. Dredging and excavation of sediments cannot avoid the resuspension of sediments; however, specific methods and BMPs that, in combination, support the project objective of completing the removal action in a timely manner while reducing the suspension and release of sediments. The BMPs discussed in the next section and detailed in Appendix E of the Final EE/CA (Anchor QEA 2011a) support the following performance criteria:

- **Residuals** –Remove the targeted sediment using environmental dredging methods that are specifically designed to limit (not avoid) the formation of dredging-generated residuals on the bed of the LDW, thereby limiting sediment resuspension and release to the water column.
- **Water Quality** –Remove the targeted sediment using environmental dredging methods and BMPs that are specifically designed to limit suspension of sediments into the water column, thereby limiting impacts to water quality during the removal action.
- **Productivity** – Remove the targeted sediment in an efficient manner that is compatible with the RAB constraints, limits excess removal of non-targeted sediment, produces a material that is compatible with delivery by truck and/or rail to a Subtitle D landfill in eastern Washington or eastern Oregon, and maintains removal productivity at a level that would allow the dredging to be completed in one season.

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4.2 Removal Action Dredging BMPs

Appendix E of the Final EE/CA (Anchor QEA 2011a) detailed specific removal action BMPs to reduce suspension of sediment into the water column while maintaining productivity. This information is reproduced in the following subsections.

4.2.1 Depth of Contamination

This BMP involves the following actions:

- Develop an accurate model for depth of contamination (DoC).
- Use the results of the completed sediment coring program, in combination with geospatial analysis, to develop an accurate DoC to be removed during dredging.

The purpose of accurately measuring DoC elevation is to accurately characterize the extent of the target material with a high degree of confidence for input into the dredge plan.

4.2.2 Design Dredge Elevation

This BMP involves the following action:

- Use the DoC findings, plus an allowance for dredge accuracy and tolerance, to develop an accurate design for dredge elevations.

The purpose of accurately measuring the design dredge elevation is to develop a dredging plan with a high degree of confidence that the target material will be removed efficiently in a single dredging event. The design dredge elevation was set at the DoC elevation with a non-paid overdredge allowance of 2 feet to account for the vertical tolerance of a precision excavator dredge.

4.2.3 Single Dredging Event

This BMP involves the following action:

- Perform dredging to the design dredge elevation in a single dredge event, as verified by periodic bathymetric surveys.

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Performing a single dredging event relies on implementation of the design dredge elevation BMP, so that each subunit can be dredged to the required elevation, verified with bathymetric surveys, and then as soon as practical within the operational efficiency of the project place of a minimum 3-inch to 6-inch thick lift of clean backfill material over the dredge subunit. Post-dredge surface samples may be collected before or after placement of the clean back fill material, as described in the Construction Quality Assurance Plan (CQAP; Appendix D). This BMP also allows the dredged area to be quickly covered, reducing the potential for ongoing resuspension and release from the loosened residual sediment.

4.2.4 Sand Cover

This BMP involves the following actions:

- Place a clean sand cover (3 to 6 inches) over dredge cuts in each subunit of the RAB in a timely manner, as soon as practical, after dredging of the subunit is complete.
  - This placement will limit the potential for resuspension and release of sediment from the loosened post-dredging residual material.
- Phase additional backfilling, as appropriate, once all upstream and adjacent dredging is complete.
- The final layer of backfill within the RAB will be placed to the final target grade after all dredging is complete.

4.2.5 Dredging Equipment

This BMP involves the following action:

- Select the appropriate dredging equipment (excavator or derrick) based on the RAB conditions and accuracy requirements.

EPA directed the use of an excavator (also known as an articulated fixed-arm dredge) with a closed environmental bucket as the primary dredging equipment for the removal action (EPA 2011c). Appendix E of the Final EE/CA (Anchor QEA 2011a) describes that in areas where an excavator with an enclosed bucket is unable to remove the encountered materials due to the physical characteristics (e.g., material is too stiff, large debris, pilings, etc.), a conventional derrick with clamshell, grapple, or vibratory hammer will be used.

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4.2.6 Dredging Bucket

This BMP involves the following actions:

- Use an enclosed environmental type bucket to limit sediment loss to the extent possible.
- A standard clamshell bucket may be required for denser sediments and debris removal.

Larger debris that have been identified in the RAB, such as trees, large concrete blocks, intact and broken pilings, and molten debris piles, are likely beyond the lifting capacity of this type of bucket. In areas where a closed environmental bucket is unable to remove the encountered material, a heavier bucket with digging capabilities or a conventional wire-supported clamshell dredge, or grapple would be required. Use of an enclosed bucket may limit the loss of sediment from the bucket to the water column, depending on the amount of debris encountered. Limiting loss from the bucket limits the resuspension and release from dredging. The use of other heavy-duty equipment during hard material and debris removal may include an open bucket.

4.2.7 Dredge Bucket Positioning

This BMP involves the following action:

- Use sub-foot accuracy GPS for accurate bucket positioning.

Using on-board Real Time Kinetic (RTK) GPS digital equipment capable of displaying the location of the dredge bucket within 4 to 6 inches horizontally and vertically helps to assured that the target material is captured by the dredge.

4.2.8 Dredge Cuts on Slopes

This BMP involves the following action:

- Implement stair-step dredge cuts for steeper slopes to reduce sloughing of sediment.
- Dredge from the top of the slope downward.

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Implementing stair-step dredge cuts limits the bank sloughing that can occur with deep vertical cuts into the sediment (referred to as "box cuts"). Dredge cuts that extend several feet vertically into the sediment bed will eventually slough to a flatter and more stable slope. The sloughed sediment will be remolded with water, and come to rest on the bed as a lower density, higher water content, and lower strength generated residual that is more easily eroded and suspended than native intact sediment. Stair stepping the dredge cuts helps to reduce the formation of generated residuals and reduces the potential for resuspension and release. In addition, slopes will be excavated from the top down to avoid raveling and sloughing.

4.2.9 Piling Removal

This BMP includes removal of piling in a manner that minimizes the release of sediment. Piling removal will require conventional marine construction equipment, such as a derrick configured with pile-pulling and heavy lifting equipment. If a vibratory hammer is used, care shall be taken not to destabilize slopes and/or banks. If individual pilings cannot be removed, then they will be cut off at the sediment/soil excavation surface or at least 3 feet below the final grade, whichever is deeper.

4.2.10 Dredge Slopes with Excavator

This BMP involves the following action:

- Use an excavator dredge, as appropriate, for improved bucket control on steeper slopes.

The purpose of dredging steeper slopes using an excavator, as opposed to a cable-deployed bucket, is to limit the disturbance of impacted sediment on the slope during dredging, and in turn limit resuspension and release. A cable-deployed bucket from a conventional derrick or crane barge can tip and slide down slope as the bucket engages the inclined face of submerged steep slope. Also, a cable-deployed bucket is like a pendulum and the positioning of a swinging bucket can be difficult to accurately track. Alternatively, a bucket deployed on the fixed arm of an excavator can be held in place at a known location and elevation on the slope while the bucket is closed, reducing the disturbance of the sediment on the slope.

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4.2.11 Water Management

This BMP involves the following action:

- Prohibit direct overflow of water in sediment haul barges back to the LDW without prior processing and management as dredging return water.
- Manage and remove upland stockpile water that comes in contact with stockpiled material.

The purpose of the water management is to stop the release of sediment and associated contaminants back into the LDW from the sediment haul barge.

The material placed in a barge by an environmental mechanical dredge using an enclosed bucket consists of both sediment and water, since the bucket is not 100 percent full of sediment and water is not allowed to drain from the bucket. During precision environmental dredging projects, the dredging bucket may be only half-full of sediment on average over the course of the project due to relatively thin cuts intended to avoid removal of non-impacted sediment and to avoid over-penetration of the bucket, with water filling the other half of the bucket. The volume of water placed in the barges for an environmental dredging project can therefore equal the volume of sediment dredged from the LDW. Thus, a 20,000-cubic yard (cy) dredging project can result in that volume of sediment placed into barges plus another 20,000 cy of water. This is consistent with the volume of water collected with the equipment at Boeing Plant 2 where approximately 140 gallons of water were collected for every 1 cy of sediment dredged. Failure to manage the water in the barge during dredging can result in the release of turbid water back into the dredged area with the potential for increased sediment resuspension, release, and additional generated residuals.

Implementation of the barge water management BMP for the removal action will involve the active pumping of the excess water from the sediment haul barges and may include the addition of dewatering agent (for example, Portland cement, lime kiln dust, or diatomaceous earth) to limit the amount of ponded water within the barge and preventing direct overflow from the barge back to the LDW. Any removed water would be pumped to a water management system designed to remove excess sediment and associated contaminants prior to discharge of the treated dredge return water back to the work area within the LDW (in

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accordance with the appropriate permits). The water management system will be contained on a barge similar to the system employed for the Slip 4 EAA removal action.

The water management system used to process the dredge water will utilize all known and reasonable technologies prior to discharging the water back to the LDW to achieve the applicable permit-specified limits at the in-water points of compliance. A barge system may include pumping water from the sediment barge to a designated water management barge (e.g., flexi-float or flat deck barge), into storage and settling tanks or other methods to filter out suspended particles, processing the water by filtration (e.g., filters and/or activated carbon filters) to remove additional suspended particles and dissolved organic constituents, and discharging the water back to the LDW within the active work area. An onshore water management system similar to that being used for the Boeing DSOA cleanup may include pumping the water from the sediment barge to the onshore system, removing large particles and suspended solids, followed by filtration (e.g., sand filters and/or activated carbon filtration) to remove additional suspended particles and dissolved organic constituents prior to discharge back to the LDW within the active work area. The chemical parameters and frequency of sampling will be defined in the Water Quality Monitoring Plan (WQMP; Appendix E).

This BMP also includes the use of upland stockpiling management procedures to contain excavated shoreline soils within stockpile areas such that transport of stockpiled soils and water that comes into contact with stockpiled material to the LDW does not occur. Stockpiles will be surrounded by Ecology blocks, lined with an impervious material, and protected from weather and disturbances by an impervious covering when stockpiling is not occurring. Upland project water that contacts contaminated stockpiled soil and runoff from the stockpile to adjacent areas will be managed, collected, treated and/or disposed.

4.2.12 Intertidal Sediment and Shoreline Bank Soil Removal

This BMP involves the following action:

- Conduct intertidal sediment and shoreline bank soil excavation “in the dry” to the degree reasonably possible using land-based equipment.

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Intertidal sediment and shoreline bank soil excavation "in the dry" reduces the potential for release of impacted intertidal sediment and shoreline bank soils to the LDW by removing the sediment accessible from the upland when the tides are out and the sediment is exposed. The work is best done during daylight hours during very low tides, which occur only during May through August of each year. Alternatively, low tides during the in-water construction window occur during night hours.

This BMP includes the use of shoreline-based excavation equipment that is working at least 2 feet back from the actual water line at all times. When and where possible, the shoreline excavation will be completed prior to dredging as the in-water removal activities proceed generally from upstream to downstream. Excavation and dredging from upslope to down slope will reduce slope failures that can resuspend sediment and will enable capturing any material that moves down slope during shoreline excavation work. Additional measures to minimize potential erosion in the intertidal zone will include removing large pieces debris remaining on the surface and using the excavator bucket or similar equipment to compact the newly excavated surface during periods when shoreline excavation is not being conducted. A Temporary Erosion and Sedimentation Control (TESC) fence will also be required during shoreline excavation.

4.3 Dredge Prism Design

The layout of the dredge plan is based on design removal grades, equipment capabilities, anticipated equipment size, and existing topography. The dredge prism design supports the removal of the horizontal and vertical extents of total PCB RvAL exceedances within the RAB and includes removal depths ranging from 1 to 11 feet below mudline.

The dredge prism design was refined from what was identified in the Final EE/CA (Anchor QEA 2011a), to more precisely remove total PCB RvAL exceedances. The sediment management units (SMUs) presented in the Final EE/CA were developed to roughly approximate areas with consistent removal depths based on existing sediment core data. This approximation allowed consistent evaluation of removal areas, volumes, and costs across the removal action alternatives to support selection of the preferred alternative (Alternative 4 presented in this BODR). In this BODR, the SMUs were converted to Thiessen polygons. Thiessen polygons are commonly used to define representative areas surrounding point data

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and are developed by connecting the equidistant midpoint of a single core to all surrounding cores. A dredge prism design was then developed to remove total PCB RvAL exceedances represented by each irregularly shaped Thiessen polygon. Due to variable slopes and constructability issues, the removal depths were often deeper than the total PCB RvAL exceedances in each Thiessen polygon (see Figures 9a, 9b, and 9c).

The following subsections describe the in-water and shoreline bank dredge prism design.

4.3.1 In-Water Dredging

Existing sediment chemistry data were used to develop a DoC surface that represents the deepest vertical extent of total PCB RvAL exceedances throughout the RAB. Thiessen polygons were generated around each core location (if two cores were approximately co-located the more recent data was used for design) collected during the additional design characterization 2011 sediment sampling (see Section 3.3.2) and previous sediment sampling programs. The deepest PCB RvAL exceedance in each core defined the necessary removal depth and the dredge design was developed to remove that depth (at a minimum) across the associated core Thiessen polygon area. Conservative adjustments to removal depths (i.e., changing shallow removal depths to deeper depths) were made to six polygons. The removal depths in the Thiessen polygons representing SD-212 and SD-214 were increased from 2 feet to 6 feet because only limited subsurface total PCB data were available at these locations and it was considered likely the total PCB RvAL exceedance depth would be equivalent that shown in the directly adjacent JVE-216 core. The removal depth in Thiessen polygons representing JVE-07, JVE-210, JVE-215, and SD-209 were increased from no dredging to 1 foot to achieve a minimum 1-foot removal in these areas (with an additional 2-foot non-paid overdredge allowance).

The required minimum removal depth in each Thiessen polygon is shown in Figure 7 and represents the target removal action dredge surface. This surface is also known as the contaminated “neatline” surface which can be used to specify the minimum required depth of removal to a dredging contractor (the Contractor). In addition to removing the contaminated “neatline” surface, the Contractor will also be working with a specified “overdredge allowance” to account for equipment tolerances. The development of a

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contaminated surface is used to establish the required dredging elevations and optimize the overall dredge plan design.

The design process converts the target removal action surface based on Thiessen polygons into a dredge plan consisting of a constructible mosaic of rectilinear dredging units with constant elevation or constant slope. In order to remove the irregular depths identified in the Thiessen polygons while maintaining constructability, in many areas the design dredge surface removes additional materials below the required depths. The following general steps summarize the dredge plan design process:

- Define the contaminated "neatline" surface to be dredged (discussed previously) based on the DoC.
- Define the type(s) of dredging equipment to be used. The type and size of dredging equipment (along with ancillary equipment) may influence the design of the dredge prism.
- Identify the allowable overdredge to be applied to the dredge prism. Allowable overdredge accounts for equipment tolerance, and payment or no payment for allowable overdredge can be used as a control to limit the Contractor from significant overdredging.
- Identify RAB restrictions that modify the dredge prism. RAB restrictions may include accessibility, predominant direction of dredging, and structural and/or slope setbacks due to unstable slopes and structures.

Figure 8 depicts the dredge plan based on following the above steps. This dredge plan achieves removal to the contaminated "neatline" surface throughout the RAB. The dredge prism is comprised of two components: the required dredge prism and the allowable overdredge. The required dredge prism represents the elevation, grades, and horizontal extent that the Contractor will be required to remove. The allowable overdredge is a constant thickness of sediment below the required dredge prism that design engineers typically allow (and the Contractor is typically paid for) to account for dredging equipment accuracy and tolerances. Specifically, in order to achieve a required elevation or grade, the dredge ends up removing excess material below the required dredge prism. For this removal action, the non-paid overdredge allowance is 2 feet.

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To ensure the dredge plan removed the full extents of the required Thiessen polygon depths, a comparison between the dredge plan and Thiessen polygon surfaces was completed. To illustrate comparison of the two surfaces, five cross sections were cut through the RAB extending from the toe of slope in the intertidal area to the edge of the navigation channel in the subtidal area. In each cross section, the existing mudline, the minimum required Thiessen polygon removal depth, the dredge design surface, and the maximum allowable overdredge surface were overlaid. The results of this evaluation are shown in Figures 9a through 9d. These figures show that throughout the RAB the minimum required Thiessen polygon removal depth is achieved and many areas the dredge design, without application of the overdredge tolerance, result in feet of additional removal beyond the required depth.

4.3.2 Shoreline Bank Excavation

The shoreline bank excavation is proposed to occur over a total distance of approximately 570 linear feet, extending from the downriver side of the sheetpile wall to approximately the Facility/Boeing Plant 2 property line (Figure 4). The proposed bank excavation extends from the top of the existing bank from approximately +19 feet MLLW to -5 to -8 feet MLLW. The lower elevation range was selected based on tidal variations and the reach length of typical long-reach excavators. The design excavation would reconfigure the slope to a flatter, more stable 2H:1V slope shoreward of the existing ground surface approximately from the toe of slope upwards to a location that is no closer than 5 feet to any foundation (Figure 8) . The preferred method for these activities will be to attempt to conduct excavation occurring in this range of elevations during low tides to facilitate doing this work “in the dry” from the land side. An estimated 55 to 65 piles (roughly 50 to 60 tons of piles) and debris would be removed and disposed of off-site at a permitted Subtitle D landfill.

As described in Section 2.2.2.1, Jorgensen Forge and Boeing are currently coordinating with EPA to perform a limited soil and CMP removal action along the northwest corner of the pipe where the property line pipes discharge (Figure 3). To support this removal, a sheetpile wall will be installed at approximately the mean higher high water line along the northwest shoreline of the RAB (Figure 3). The shoreline bank sediment and soil quality directly waterside of the sheetpile wall is currently unknown but will be characterized as part of the upland removal action. This data will support whether additional removal waterside of the

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sheetpile wall will be required below the design grades identified in this BODR by the in-water contractor. There is a potential that total PCB concentrations greater than 50 mg/kg could be identified during this characterization, which would require disposal of this material in a hazardous waste landfill (see Section 4.7.3). This removal would occur directly adjacent to the sheetpile wall so the in-water contractor would need to take the necessary precautions to not impact the structure and coordinate as necessary with the upland contractor to facilitate completion of this work.

4.4 Quantities

The in-waterway dredging would result in the required removal of approximately 10,800 cy. The shoreline bank excavation would result in the required removal of approximately 5,400 cy of impacted soil/fill and sediment, debris, and other encountered material and would create intertidal habitat.

The total amount of sediments actually removed will be measured by computing the difference in volume between the bottom surface as shown by the soundings of the pre-dredge survey and the bottom surface as shown by the soundings of the post-dredge survey. This volume will be used to calculate the volume of sediment that was dredged by the Contractor (and will be paid for if above the required dredge lines and elevations) and the volume of sediment disposed off site.

4.5 Potential Impacts to Adjacent Slopes, Structures, Navigation

Dredging will take place at the base of, and on, existing side slopes along the LDW adjacent to the Facility. Debris (e.g., asphalt, creosote-treated timbers, and piles) are present in intertidal sediments and along the shoreline bank and will be removed. Slope stability will be maintained by dredging to stable slope angles, and backfilling the dredged area to increase the long-term stability of the slopes.

There are several structures along the southern shoreline (i.e., sheet pile wall and a concrete panel walls) that will be near dredging operations and removal directly adjacent to these structures is prohibited to adequately protect their structural integrity. The dredge plan has

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been designed to mitigate potential impacts on these structures by requiring setbacks from these structures a distance of 5 feet to minimize for potential instability.

The pre-dredging and post-dredging stability of slopes and existing structures was evaluated and is presented in Appendix C using the geotechnical data presented in Section 3.2.1. This includes core logs from the LDW, and borings completed on the Facility uplands.

The dredge plan intends to maintain current navigational access once the dredging, including backfilling, is complete. During the dredge process, navigational access may be restricted, but that can be mitigated through notices to mariners and via radio communications with the U.S. Coast Guard's (USCG's) Seattle Traffic (VHF channel 14).

4.6 Equipment Considerations

As discussed in Section 4.2.5, EPA has required (EPA 2011c) that sediments be dredged using a barge-mounted hydraulic excavator (e.g., fixed arm) equipped with an articulating closed dredge bucket with a hydraulic closing mechanism, as outlined in Appendix E to the removal action EE/CA. It is anticipated that a 4 to 6 cy size dredge bucket will be used for dredging given the size of the project and requirements for shoreline bank dredging. The Contractor will be required to have an enclosed environmental bucket mounted on the excavator available and to use this equipment to the extent practicable recognizing that the shoreline bank is heavily armored with debris. In areas that contain small to larger debris (e.g., heavy vegetation, rock and concrete slabs, intact and broken pilings, and molten debris piles) or harder sediment, this type of equipment is anticipated to be ineffective as debris limits the ability to use an environmental bucket; therefore, a heavier bucket with digging capabilities or a conventional wire-supported clamshell dredge bucket, grapple, or vibratory hammer would likely be the equipment required and selected by the Contractor. Sediments will be loaded into haul barges for dewatering and transportation to an offsite rehandling facility for transport to an off-site, Subtitle D landfill for disposal. As noted in Section 4.3.2, there is a potential that total PCB concentrations greater than 50 mg/kg could be identified during future characterization adjacent to the planned sheetpile wall, which would require disposal of this material in a hazardous waste landfill (see Section 4.7.3).

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Land-based excavation using excavators, backhoes, and other conventional earth moving equipment may be used to remove the shoreline bank materials. Excavation in these areas may be coordinated "in the dry" during periods of low tidal elevations. Given the geometry of the shoreline and the typical reach of upland equipment, it is anticipated that materials removed from the shoreline bank area would be placed into an upland stockpile area or directly into trucks. The stockpiled materials would either be later rehandled into lined trucks or haul barges and transloaded onto railcars for transport to an off-site, Subtitle D landfill for disposal.

4.7 Sediment Handling, Transportation and Disposal

4.7.1 Initial Handling

While dredging and loading the haul barge, the dredge operator will minimize entrained water during dredging. Some typical methods include: 1) properly sizing and operating the clamshell bucket to obtain full buckets for the planned cut; 2) avoiding multiple grabs or stockpiling on the bottom (which results in slurry); and 3) pausing at the water surface to allow free water to escape as needed prior to placement on the haul barge. Barges will be filled to capacity or less; no overflow of the barge will be allowed.

4.7.2 Transport

There are two possible types of haul barges, flat-bottom (including flat-deck barges with watertight sidewalls) and split-hull. If split-hull barges are used, they will remain sealed at all times. The ponded water on the haul barges will be collected and treated as necessary to maintain compliance with the 401 Water Quality Memorandum and pumped off of the barge to avoid barge overflow as described in the water management BMP in Section 4.2.10.

In general, dredged sediment will be loaded into haul barges and taken to a transloading facility, where the material will be transferred from the barges to trucks or rail cars for transportation to disposal facilities. The material will be unloaded from the barges using a rehandling bucket and placed in 20 foot intermodal shipping containers or gondolas lined with durable (e.g., 8-millimeter [mm] thick) plastic sheets. The haul route from the RAB to the off-site landfill for disposal, including the locations of any transloading facilities, will be determined by the Contractor and defined in the Removal Action Work Plan (RAWP).

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Spillage or direct discharge of sediments into the receiving water will not be permitted during transfer of the sediment from the barge. The Contractor will be required to specify method(s) to control sediment loss as part of the Dredging and Disposal Plan and Contractor Quality Control Plan. A potential prevention method may include use of a spill apron or plate between the barge and shore to collect any dripping or spillage and direct it back into the barge or onto the shore. The containers will either be staged on railcars at the offload facility or trucked to an intermodal facility and placed on railcars for transport to a licensed upland disposal facility. The containers will be lined with plastic and sealed to prevent leakage onto the road or rail bed during transit.

4.7.3 Disposal

Disposal of required dredged and excavated materials will be at a permitted Subtitle D landfill. Two upland regional landfills have established services to receive dredged contaminated sediments: Roosevelt Regional Landfill near Goldendale, Washington, and Columbia Ridge Landfill near Arlington, Oregon. These sites are licensed as RCRA Subtitle D commercial landfills in the states in which they operate, and both have the ability to receive wet dredged sediments delivered to the landfill by rail.

As described in Section 4.3.2, future characterization of the soils directly waterside of the sheetpile wall that will be installed to support the upland property line outfall removal action could potentially result in the identification of total PCB concentrations greater than 50 mg/kg, which would require disposal at a permitted Subtitle C landfill. If this occurred, any of these removed materials would need to be appropriately segregated from materials to be disposed at a Subtitle D landfill. The nearest regional Subtitle C landfill is the Chemical Waste Management Northwest Landfill located in Arlington, Oregon.

The Contractor is expected to be responsible for identifying the landfill, subject to approval by the Owner, and how the materials will be transported, but will be required to provide detailed information in the RAWP that will describe the proposed means and methods. In the RAWP, the Contractor will be required to provide information about the following items:

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- Methods and equipment that will be used for excavation and dredging
- Methods and equipment that will be used for transport and hauling of excavated and dredged materials
- Sequence and estimated duration of excavation and dredging activity including anticipated cy of excavated upland soils and marine sediment generated daily
- Means by which limits and cut depths will be checked and verified by the Contractor
- Means for managing excavated and dredged materials and preparing them for transportation
- Disposal locations for excavated and dredged materials, including haul routes and any locations where rehanding or offloading is required, and documentation of the disposal facility acceptance of the waste
- Methods, equipment, and location(s) for establishing temporary stockpiles, including isolation of stockpiled soil from the environment and preventing unfiltered off-flow water from entering adjacent waters
- Means of protecting sediment and soil stockpiles from erosion, wind, and spillage
- Worker safety and protection of the public
- Methods and equipment for survey control
- Methods for shoring and securing trenches and temporary excavations
- Traffic control while performing excavations and backfilling
- Notification and procedures to be used to coordinate with and accommodate marine vessel traffic while dredging
- Marine equipment anchoring locations and procedures

4.7.4 Other Materials Not Requiring Remediation

4.7.4.1 Debris

Debris encountered within the removal action area will be disposed at a Subtitle D landfill. Debris includes all material that is not sediment, including rock. The Contractor will identify the method (or methods) that will be used to remove debris or stockpile it and transport it to a landfill. The Contractor will maintain a daily journal of activity, which shall include description of the debris handled during dredging.

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5 BACKFILL PLAN

The purpose for the backfill material is to nominally return the mudline to the original grade and to provide a residual mixing layer in the sediment removal areas. The dredged areas will be backfilled with a volume of backfill material that is approximately the same volume as the dredging volume to restore the riverbed to the pre-dredging elevations except in and within 10 feet of the navigation channel. This 10-foot offset supports maintaining deeper depths in the navigation channel for deeper draft vessels (USACE 2010). The amount of backfill material is estimated to range approximately between 1 and 10 feet thick.

This backfill layer is subject to erosive forces from localized propeller wash from vessels maneuvering within the project remediation area as well as river currents. The intent of the backfill is not to be resistant to every erosive force imported, but to generally remain stable to roughly the grades achieved after construction. Some movement of the material is anticipated.

Appendix B details the evaluation of these potential erosive forces related to evaluation of the backfill material. A summary of the analysis and results is presented herein.

5.1 Propeller Wash

As a vessel passes over an area, the vessel's propellers can impart an erosive force to the mudline surface. This temporary force can cause the backfill and/or armor materials to be suspended and redeposited back in the same general area. Using the methods presented in the EPA's "Armor Layer Design for the Guidance for In-Situ Subaqueous Capping of Contaminated Sediment" (Maynord 1998), the stable particle sizes to resist propeller wash for vessels operating in this section of the LDW was evaluated. The selection of the design vessels identified and the operating criteria stated previously was based on previous studies conducted around the RAB, which evaluated vessel traffic within this specific reach of the LDW, primarily AMEC (AMEC and Floyd|Snider 2011) and Lower Duwamish Waterway Group Sediment Transport Analysis Report (QEA 2008). The tugboat *Patricia S* was identified as the vessel with the highest bottom velocity that would operate directly over the backfill placement areas.

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Using the guidance presented in Chapter 3 of the EM 110-2-1601 manual (USACE 1994) and modified by Maynord, the resulting stable rock size to protect against the *Patricia S* efflux jet velocity was determined to be a material with a D_{50} of 11 inches (0.9 feet) when the vessel is operating during a low water condition or a material with a D_{50} of 1 inch (0.1 feet) when the tugboat is operating during a high tide.

Subsequently, the estimates of potential surface sediment mixing and scour depths was evaluated for a coarse grain sand (D_{50} = 0.2 mm). The Hamill (1988) method was used to predict this potential mixing depth. For the *Patricia S* design vessel, the potential mixing depths ranged from 1.5- to 2-inches assuming the vessel operates over the backfill for a short time period (2 to 5 minutes). Therefore, the use of a gravelly sand or coarse sand with the proposed backfill placement thickness ranging from 1 to 10 feet would provide a sufficient residual mixing layer and meet the substrate conditions of the existing riverbed.

5.2 River Currents

The expected erosive forces due to LDW currents over the proposed backfill areas were evaluated for typical tidal velocities as well as the 2-year and 100-year return period flows based on information provided in the King County, Washington Flood Insurance Study (FIS) (FEMA 2005), the Sediment Transport Analysis Report (STAR) (Windward and QEA 2008), and Sediment Transport Modeling Report (STM) (QEA 2008).

The 2-year, 10-year and 100-year return-interval flow at the site are 8,400 and 12,000 cfs, respectively. The calculated maximum bottom shear stress for a 100-year storm expected at the project site is 0.06 pounds per square foot (psf) which results in a stable grain size of 6.0 mm (a fine gravel), as summarized in Table 3.

5.3 Backfill Material

Based on the analysis of the erosive forces expected at the RAB, a backfill material consisting of gravelly sand or coarse sand material placed in the dredged areas should remain relatively stable. A finer grained material could be placed in the lower portions of the fill depth as long as a minimum thickness of gravelly sand occurs at the surface.

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The backfill material will be sampled at the material source and analyzed at an independent laboratory for physical (Table 4) and chemical analyses (Table 5). A minimum of five samples will be collected at spatially dispersed and representative locations from the quarry that contributes to the final material that meets the geotechnical specifications. The five sub-samples will then be combined to form a single composite sample that will be submitted for physical and chemical analysis. The gradation of the sample must fall within the allowable gradation range summarized in Table 4. The chemical concentrations must be below the EPA-approved (EPA 2011a) backfill levels listed in Table 5 and the material source must be approved by the EPA to ensure the material meets requirements for clean fill. EPA has granted approval of quarry sources for material to be used at Boeing Plant 2 based on existing data (Floyd|Snider 2012; EPA 2012).

Habitat material placed in the intertidal areas on top of shoreline bank armor material is discussed in Section 7.

5.3.1 Quantities

Backfill material placed over the dredge areas to generally return the areas to pre-construction elevations will result in the required placement of approximately 8,000 cy of backfill material.

5.4 Equipment Considerations

It is anticipated that equipment used by the Contractor as described in section 4.6 will also be used to place backfill material. Backfill material will be placed in the dry as much as feasible. The Contractor will be required to place the backfill material in lifts working from the toe of the slope upward in a manner that minimizes disturbance to the dredged surface.

EMJ014107

6 SLOPE CONTAINMENT PLAN

The purpose of the shoreline slope containment is to contain the soils and sediments along the shoreline from the LDW and to stabilize the shoreline from future erosion. The shoreline areas are to be excavated and reconfigured and a shoreline armoring layer is proposed to provide protection against erosive processes. The armoring material will be placed on top of a filter layer and a surface layer of habitat material will be placed on top of the armoring material to fill the interstices as discussed in Section 7. Erosive processes likely to impact the shoreline design include waves generated by passing vessels and currents in the river.

Appendix B details the evaluation of these potential erosive forces related to selection of the shoreline armoring material. A summary of the analysis and results is presented herein.

6.1 Vessel-generated Wakes

Vessel-generated waves from vessels transiting along this reach of the LDW were computed using the methods presented in Sorensen (1997). As identified in Section 5, the selection of design vessel criteria was based on previous studies conducted around the RAB.

Predicted vessel-generated wave heights expected to be generated near the RAB ranged from between 0.5 feet to 1.5 feet, with periods of approximately 2 seconds. To compute the stable particle size and shoreline containment cover gradation and thickness to protect the slope from the maximum expected vessel-wake (1.5-foot height, 2-second period), the Automated Coastal Engineering System (ACES) Rubble Mound Revetment Design Module was used. The resulting gradation for the restored 2H:1V shoreline slope includes a D_{50} of 0.4 feet for the armor stone material and a D_{50} of 0.05 feet for the underlying filter layer.

6.2 River Currents

As discussed in Section 3.2.4, the expected erosive forces due to river currents at the RAB was evaluated for a 100-year return period event based on information available in previous studies (described above).

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Appendix B details the evaluation of the expected river currents and stone size selection for the shoreline armor stone. A summary of the analysis and results is presented herein.

To determine the stable armor stone sizing required along the shoreline, a depth-average velocity over the entire water column was used to determine the appropriate design velocity. The design velocity for a 100-year event was calculated to be 5.7 feet per second (fps). Using the methods presented in Maynord (1998), the resulting stable particle size for the restored shoreline slope of 2H:1V is 0.9 feet.

6.3 Shoreline Containment Material

6.3.1 Shoreline Armor Layer

Based on the analysis of the erosive forces expected at the site, the 100-year river current event is the dominate force. Riprap with a D_{50} of 0.9 feet is recommended for the shoreline containment material. The armoring should extend to the base of the 2H:1V slope with an anchor toe constructed to support the material.

The Washington State Department of Transportation (WSDOT) material gradation best meeting the shoreline armor layer material requirements is the specification for light loose riprap material (Table 6).

6.3.2 Filter Material Layer

The filter layer material will be placed between the regraded shoreline slope and the placed shoreline armor material to prevent migration of fine soil particles, to distribute the weight of the armor units, to provide more uniform settlement, and to permit relief of hydrostatic pressure within the soils (USACE 1995).

Using guidance presented in Engineer Manual (EM) 1110-2-1614 (USACE 1995), the selected filter layer must also satisfy requirements pertaining to both the armor-to-filter relation as well as filter-to-underlying soil relation.

Table 7 presents the material gradation specification for the proposed filter layer material.

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By comparing the existing shoreline sediment characteristics at the RAB (Section 3.2.1) to the shoreline armoring material (Section 6.3.1) and the preferred filter material (Table 7), the filter material is coarse enough to prevent loss through the armor layer and provides sufficient fine material to minimize the loss of underlying soil. This filter material specification meets the range for permeability based on the underlying soil with the exception of locations where coarser grained sediment is present.

The filter material will be uniformly amended with GAC at a minimum content 0.5 percent GAC by dry weight. The activated carbon would likely be mixed with the filter material prior to being brought to the site.

6.3.3 Quantities

Application of the slope containment will result in the placement of approximately 2,500 cy of filter material and 3,800 cy of riprap material over approximately a total of 0.75 acres.

6.4 Equipment Considerations

It is anticipated that equipment used by the Contractor as described in section 4.6 will also be used to place shoreline containment materials. Filter and armor materials will be placed in the dry as much as feasible. The Contractor will be required to place the materials in lifts working from the toe of the slope upward in a manner that minimizes disturbance to the surface below.

6.5 Stormwater Outfalls

As described in Section 2.2.1, outfalls 001 and 002 were inactivated as part of installation of the stormwater treatment system installed in January 2013. The stormwater within the outfall 001 and 002 drainage are now reconveyed through the treatment system and discharged to outfall 003 post-treatment. Concurrent with the dredging and shoreline reconfiguration, a new single outfall will be constructed to replace outfall 003 through the reconfigured bank and discharge into the LDW (Figure 9). As necessary, a trench will be dug along the alignment of the new outfall to facilitate installation below the dredge surface and overlying clean backfill.

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The new outfall will be butt-fused 24-inch high-density polyethylene (HDPE) SDR 17 pipe with an outfall invert elevation of approximately -9.5 feet MLLW. A 24-foot by 10-foot dispersion pad will be installed at the outfall pipe discharge location (Figure 9). Concrete ballast will be installed every 7.5 feet between 0 feet MLLW and the invert. Ballast spacing will be increased to every 3.75 feet at 20 feet from the end of the outfall pipe. Buoyancy calculations to account for installation and flotation potential of the new outfall pipe were based on the pipe system being sunk while still containing 20 percent air by volume. Once the outfall pipe has been placed in the trench and filled with water, the factor of safety against flotation is 5.5. Drag and uplift forces on the outfall end of the pipe were also calculated to determine the effects that the LDW current would have on the new outfall. The maximum end of pipe deflections resulting from drag and uplift are 0.02 inches and 0.07 inches, respectively. Buoyancy and end of pipe force calculations are included in Appendix G of the Jorgensen Forge NPDES Engineering Report (Anchor QEA 2012).

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7 HABITAT ENHANCEMENTS

Habitat enhancements are incorporated into the removal action design for EPA's selected remedy. Properly functioning estuarine habitat is critical to the survival of salmonids, including Puget Sound Chinook salmon, steelhead, and bull trout that are currently listed as threatened under ESA. The proposed removal action is a fundamental component of improving the estuarine environment of the LDW. In an effort to improve habitat conditions in the LDW and support the recovery of these three ESA-listed species, habitat enhancement activities have been incorporated into the removal action design.

7.1 Shoreline Substrate Enhancement

The following summary describes the substrate modification activities that will be implemented to enhance habitat as part of the removal action.

7.1.1 Design Considerations

Productive communities of epibenthic and infaunal invertebrates are often associated with fine-grained (silt and sand) substrates in the intertidal zone of estuaries (Simenstad 1983). Larger substrate such as gravel and cobble tends to have less productive epibenthic and infaunal communities, while very large substrate such as riprap supports even fewer invertebrates. If smaller substrate fills the riprap interstices over time or by design, more extensive benthic communities may develop. Juvenile salmonids, specifically Chinook salmon, prefer areas with small substrates (sand and gravel) (Tabor, as cited in GLWTC 2001).

In the RAB, sand and gravel substrate will be added to areas with riprap armor within the intertidal area. This substrate mix will fill in the interstitial spaces between the riprap, removing potential hiding places for salmonid predators and provide a uniform habitat substrate that will increase the habitat available for epibenthic and infaunal invertebrates, which are important prey items for juvenile salmonids. The substrate size is not designed to stay in place given the erosive forces expected in the in-water armored areas so some movement and relocation of the material is expected over time.

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BMPs identified in Section 4.2 will be followed during the removal action to reduce suspension of sediment into the water column while maintaining ecological community productivity.

7.1.2 Habitat Material Characteristics

Consistent with Section 5.3, the habitat material will be sampled at the material source and analyzed at an independent laboratory for physical and chemical analyses (Table 5). A minimum of five sub-samples will be collected at spatially dispersed and representative locations from the quarry that contributes to the final material that meets the geotechnical specifications. The five sub-samples will then be combined to form a single composite sample that will be submitted for physical and chemical analysis.

The habitat material chemical concentrations must be below the EPA-approved backfill levels (EPA 2011a) listed in Table 5 and the material source must be approved by the EPA to ensure the material meets the requirements for clean fill. EPA has granted approval of quarry sources for material to be used at Boeing Plant 2 based on existing data (Floyd|Snider 2012; EPA 2012).

The habitat material will consist of clean, naturally-occurring round or sub-angular 2.5-inch minus sand and gravel material consistent with other projects within the region. For example, in Commencement Bay, the WDFW and the NMFS specified a sand and gravel (2-inch minus) mixture known as "habitat mix" as the preferred substrate for juvenile salmonids in estuarine habitats during a CERCLA cleanup project in Middle Waterway (Anchor Environmental 2002). The sand and gravel material will be rounded and not angular. Table 8 presents the material gradation specification for the proposed habitat substrate material.

7.1.3 Quantities

A 0.5-foot layer of habitat substrate will be added to all intertidal areas where riprap armor will be placed which will result in the placement of approximately 1,300 cy of habitat substrate.

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7.1.4 Equipment Considerations

Habitat substrate material will be placed in a manner and with equipment similar to that described in Section 6.4.

7.2 Riparian Buffer Vegetation Restoration (Optional)

Jorgensen Forge may decide to voluntarily construct (i.e., this work is not required by EPA and is therefore identified as an optional bid item in the Construction Specifications) a 10-foot-wide riparian planting area along the top of shoreline bank adjacent to the post-remediation shoreline. The intent of the planting would be to provide a buffer between the shoreline and the adjacent industrial property with a diverse, native riparian vegetation canopy of trees and shrubs. As the vegetation matures, it would overhang the bank and provide potential habitat enhancements.

The following summary describes the riparian buffer restoration activities that may be implemented to enhance habitat as part of the removal action.

7.2.1 Design Considerations

Salmon need several types of habitats within and around rivers, including adjacent riparian buffer vegetation areas. Restoration of woody riparian vegetation in association with the shoreline substrate improvements will increase habitat functions for fish and wildlife. Habitat functions likely to be improved include water quality, shading and cooling, and insect prey input for rearing juveniles. This type of habitat restoration also provides habitat benefits for other fish, mammals, amphibians, and terrestrial species that utilize riparian habitats in addition to those that would benefit salmon. Dense vegetation would also limit human disturbance of stream habitat.

7.2.2 Proposed Materials and Techniques

The following materials and techniques for the restoration of riparian buffer vegetation would be used:

- The 10-foot-wide planting areas immediately adjacent to the post-remediation shoreline bank beyond the slope would be planted with native riparian and upland

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vegetation species. These species are native plant species indigenous to the area and adapted to site conditions and proven to be successfully established under challenging conditions. They would also be more adaptable to poor soil conditions, sun exposure and rapid drainage.

- Coniferous trees would be included to provide shade and help moderate temperature throughout the year in the long term.
- The riparian planting would involve preparing the subgrade through rototilling the existing substrate to a depth of 6-inches. A first lift of 6 inches of topsoil would be rototilled into the prepared subgrade. Another 12 inches of topsoil would be placed for a total depth of prepared topsoil between 12 inches minimum at the edges of the planting area and 24 inches along the centerline of the planting strip.
- Log edging would be installed along the perimeter of the planting area to retain the soils placed.
- Plants would be installed in individual plant pits and backfilled with topsoil.
- Planting areas would receive wood chip mulch to retain moisture and suppress weed establishment.

7.2.3 Quantities

A total of 26 trees and 174 shrubs would be installed over approximately 2780 square feet of planting area. Between 12 and 18 inches (minimum and maximum depths) of imported topsoil would be placed in the planting areas forming a low berm. The topsoil would be retained with the help of a continuous log edging along the perimeter of the planting area. A 6-inch layer of the existing surface material would be amended (mixed) with 6 inches of this topsoil. Total placement of topsoil would be 135 cy, with an additional 34 cy of wood chip mulch.

7.2.4 Equipment Considerations

Riparian buffer vegetation restoration materials would be placed and installed utilizing conventional upland equipment (e.g., excavator and manual labor).

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8 SHORT-TERM IMPACTS DURING CONSTRUCTION

This section describes the temporary impacts that are anticipated due to the construction activities.

8.1 Construction Impacts to Adjacent Sediments

To minimize the potential for resuspension of contaminated sediments, BMPs, operational controls, engineering controls, and monitoring requirements have all been specified as part of the design as described in Section 4.1. Collectively, all these elements will greatly reduce any potential for contamination of sediments both upstream and downstream of the RAB.

In addition, pre- and post-remediation perimeter surface sediment samples will be collected to confirm that there are no material increases in concentrations of COCs in surface sediments adjacent to the RAB relative to their pre-remediation concentrations. Detailed sampling methods, sampling station coordinates, and quality control protocols are provided in the CQAP (Appendix D).

A summary of perimeter monitoring methods and objectives is provided in this section.

8.1.1 Monitoring Objectives, Methods, and Timing

The objective of perimeter surface sediment monitoring adjacent to the RAB is to verify that COC concentrations in adjacent surface sediment (0 to 10 cm) have not significantly increased as a result of the removal action. The perimeter surface sediment monitoring is designed to compare pre-remediation and post-remediation COC concentrations in areas adjacent to the RAB that may have been impacted by the remedial action.

To better assess the potential contributions from removal action construction releases versus off-site sources, samples will be collected in an area directly adjacent to the RAB as well as an upstream area outside the influence of the construction, as shown on Figure 3 of the CQAP (Appendix D). A total of six discrete samples from each area will be chemically analyzed for PCBs, metals, and TOC.

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Pre-construction grab samples will be collected at the locations shown in Figure 3 of the CQAP (Appendix D) prior to the start of any removal action activities. Post-construction grab samples will be collected from the locations shown in Figure 3 of the CQAP (Appendix D) as soon as possible after backfill to the final grade is complete.

Additional surface sediment monitoring of sediments adjacent to the RAB may be performed during active remediation, contingent upon removal activity by other LDW parties, concurrent with construction.

8.2 Construction Impacts to Structures or Outfalls

There are no adverse construction impacts anticipated to any outfalls located within or near the RAB.

Within the vicinity of the RAB, there are currently nine outfalls. All six of the outfalls located downstream of the sheetpile wall are inactive as well as outfalls 001 and 002 that historically discharge through the concrete panel and sheetpile walls, respectively. Outfall 003 discharges through the sheetpile wall and is still being used for ongoing Facility stormwater discharges. However, as discussed in Section 6.5, outfall 003 will be abandoned following the installation of a new outfall that will occur concurrently with the removal action construction activities. The newly constructed outfall will extend through the shoreline bank and discharge at approximately -9.5 foot MLLW elevation. The outfall discharge will be equipped with a diffuser arrangement that will be protected from scour and debris. The outfall construction will be sequenced and coordinated with the dredging and shoreline bank reconfiguration.

8.3 Water Quality Impacts

Short-term impacts to water quality may occur during subtidal or intertidal sediment-disturbing construction activities. These potential impacts would be primarily associated with increased turbidity caused by the resuspension or erosion of sediments or backfill material into the water column in active construction areas. Potential turbidity-generating construction activities for this project include dredging and backfilling in the subtidal

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portions of the RAB, and excavating and slope containment placement in the intertidal portions of the RAB.

A WQMP (Appendix E) will be implemented to confirm that water quality standards are maintained during construction in accordance with EPA's 401 Water Quality Memorandum. Construction BMPs combined with a tiered program of instrumented and chemical water quality monitoring will be performed to monitor and control short-term water quality impacts from project construction activities and to address the substantive requirements of the Water Quality Memorandum.

A detailed description of recommended construction BMPs; water quality monitoring parameters, methods, locations, and schedules; a decision framework for contingency response; reporting requirements; and staff roles and responsibilities are provided in the WQMP (Appendix E). Key aspects of the WQMP are briefly summarized as follows.

8.3.1 Water Quality Criteria

Based on beneficial use classification of the LDW as "excellent quality," the following Class A (excellent quality) marine water quality standards for field parameters will apply to this removal action except within the authorized mixing zone:

- Turbidity. Turbidity must not exceed 5 nephelometric turbidity units (NTU) over background when background turbidity is less than 50 NTU, or have more than a 10 percent increase over background when the background turbidity is greater than 50 NTU.
- Dissolved oxygen (DO). DO shall not drop below 6.0 milligrams per liter (mg/L) at the compliance boundary. When natural conditions such as upwelling occur, causing the DO to be depressed near or below 6.0 mg/L, natural DO levels may be degraded by up to 0.2 mg/L by human-caused activities.
- Temperature. Temperature at the point of compliance shall not exceed 16°C (60.8°F). When the water temperature is naturally warmer than the criterion (or within 0.3°C [0.54°F] of the criterion), then human actions may not cause the 7-day average of daily maximum temperatures to increase more than 0.3°C (0.54°F). When the natural condition of the water is cooler than the criterion, temperature increases must not, at

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any time, exceed 12/(T-2) as measured at the edge of a mixing zone boundary (where T represents the background temperature as measured at a point or points unaffected by the discharge and representative of the highest ambient water temperature in the vicinity of the discharge). Additionally, when the natural condition of the water is cooler than the criterion, temperature increases resulting from the combined effect of all non-point source activities in the water body must not, at any time, exceed 2.8°C (5.04°F).

- Hydrogen ion concentration (pH). At the point of compliance, pH shall be within the range of 7.0 to 8.5 with a human-caused variation within this range of less than 0.5 unit.

Compliance with field parameters will be evaluated at the compliance boundary (edge of the mixing zone), which is located 150 feet downcurrent (i.e., downstream during ebb tide and weak flood tides or upstream during strong flood tides) from the construction activity.

In addition, chemical monitoring of the site COCs will be performed during removal action construction activities. Compliance criteria for the COCs will be both the acute and chronic water quality criteria based on the National Recommended Water Quality Criteria for metals and the Washington State Acute Marine Criterion for PCBs (WAC 173-201A-240). Compliance with these criteria will be evaluated at the edge of the 150- and 300-foot compliance boundaries, which are located 150 and 300 feet from the construction work area, respectively.

Finally, the following visual parameters will be monitored during construction:

- Oil Sheen. No oil sheen or product must be visible anywhere in the project area
- Distressed or dying fish. No distressed or dying fish must be visible anywhere in the project area

8.3.2 Monitoring Locations

During each monitoring event, field parameters (i.e., turbidity, DO, temperature, and pH) will be measured at the background station and the upriver or downriver early warning station and 150-foot compliance boundary stations (depending on tide direction), as shown

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on Figure 3 in the WQMP (Appendix E). Chemical monitoring, when required, will be performed at the background, 150- and 300-foot compliance stations (Figure 3). Chemistry samples will be collected from both the background and compliance stations (upriver and downriver) regardless of tidal direction. Samples collected at the background and downcurrent 150-foot and 300-foot compliance stations (depending on tide direction) from the depth with the highest concurrent turbidity will be submitted for analysis. Samples collected at the upcurrent 150-foot and 300-foot compliance stations and all other depths will be archived for future potential analysis, pending results of the samples taken at the downcurrent depth with the highest turbidity (see Section 8.3.4).

The location of the background station will remain the same for all monitoring events. A description of all monitoring stations is provided below and shown on Figure 3 of the WQMP.

- **150-foot Compliance Stations (150C)**. The 150-foot compliance station is located at the edge of the inner mixing zone 150 feet up or downriver (depending on tide direction) from the construction work area. The 150-foot compliance station (Station 150C) is at approximately the same water depth as the construction activity. Compliance with field parameter water quality criteria will be evaluated at the downcurrent 150C station. When required by the monitoring schedule, compliance with COC acute criteria will be evaluated at upcurrent and downcurrent 150C stations.
- **300-foot Compliance Station (300C)**. The 300-foot compliance stations are located at the edge of the outer mixing zone 300 feet upriver and downriver from the construction work area. The 300-foot compliance stations (station 300C) are at approximately the same water depth as the construction activity. Compliance with chemical parameter chronic criteria will be evaluated at these stations.
- **Early Warning Station (EW)**. The early warning station (Station EW) is located 75 feet up or downriver (depending on tide direction) from the construction work area, at approximately the same water depth as the construction activity. The objective of the early warning station is to become more quickly aware of potential water quality impacts at the construction work area, and to be able to adjust dredging operations or BMPs before an exceedance occurs at the compliance station.

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- **Background Station (BG)**. The background station (Station BG) is located 600 feet upriver from the RAB and beyond the influence of removal action construction activities. Coordinates of the background station are provided on Figure 3 of the WQMP. The background station will be monitored during every event because the turbidity criterion is based on an acceptably small increase in the vicinity of the RAB relative to ambient LDW background levels.

8.3.3 Monitoring Schedules

Water quality monitoring schedules are divided into three tiers for all in-water work, as summarized in Table 2 of the WQMP (Appendix E). Tier I indicates monitoring that will be performed during the first 4 days of in-water removal work. Tier II reflects monitoring that will occur during all in-water removal work after the first 4 days of monitoring have been performed. Finally, Tier III reflects monitoring that will occur during in-water backfill placement. Additionally, chemical monitoring at the Tier I frequency will occur during removal activities performed within three small areas in the RAB showing relatively elevated total PCB concentrations (Figure 4 of the WQMP). The following subsections and Table 2 of the WQMP provide a detailed summary of the monitoring schedules for the specific removal action activities.

8.3.3.1 Tier I Schedule

Tier I monitoring will be conducted concurrent with removal in areas showing the highest relative total PCB concentrations. This level of monitoring will occur for the first 4 days of in-water removal activity (i.e., dredging, in-water debris removal, pile removal or submerged shoreline bank excavation) and includes the measurement of field parameters (i.e., turbidity, DO, temperature, and pH) twice daily at the background, early warning and 150-foot compliance stations. In addition, water samples will be collected for chemical analysis once daily at the background, 150-foot compliance, and 300-foot compliance stations twice during the first 4 days of monitoring.

The first daily monitoring round should be conducted at least 1 hour after the startup of daily work activities. The second daily monitoring round should be separated by a minimum of four hours from the first monitoring round. If practicable, monitoring events should target

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one flood tide and one ebb tide condition. No monitoring will be performed within two hours before dark and during dark hours due to safety concerns.

As described in Section 8.3.2, during ebb and slack tides, the early warning and 150-foot compliance stations for field parameters will be oriented downriver. During flood tides, the early warning and 150-foot compliance stations for field parameters will be oriented upriver to account for the reversing tidal current, as shown on Figure 3 of the WQMP. When chemical monitoring is required, samples will be collected from both the upriver and downriver 150- and 300-foot compliance stations. Samples collected at the background and downcurrent compliance stations (depending on tide direction) from the depth with the highest concurrent turbidity will be submitted for analysis. Samples collected at the upcurrent compliance stations and all other depths will be archived for future potential analysis, pending results of the sample taken at the downcurrent depth with the highest turbidity (see Section 8.3.4).

8.3.3.2 Tier II Schedule

After 4 consecutive days of Tier I monitoring, monitoring will be reduced to the Tier II schedule, which includes measurement of the field parameters (i.e., turbidity, DO, temperature, and pH) twice daily, three days per week. In addition, water samples will be collected for chemical analysis once daily, twice per week. Field parameter and chemical monitoring will be scheduled each week to coincide with removal of the highest relative total PCB concentrations.

As described in Section 8.3.2, during ebb and slack tides, the early warning and 150-foot compliance stations for field parameters will be oriented downriver. During flood tides, the early warning and 150-foot compliance stations for field parameters will be oriented upriver to account for the reversing tidal current, as shown on Figure 3 of the WQMP. When chemical monitoring is required, samples will be collected from both the upriver and downriver150- and 300-foot compliance stations. Samples collected at the background and downcurrent compliance stations (depending on tide direction) from the depth with the highest concurrent turbidity will be submitted for analysis. Samples collected at the upcurrent compliance stations and all other depths will be archived for future potential

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analysis, pending results of the sample taken at the downcurrent depth with the highest turbidity (see Section 8.3.4).

8.3.3.3 Tier III Schedule

Tier III monitoring will be performed during in-water backfill placement and includes the one-time measurement of field parameters (i.e., turbidity, DO, temperature, and pH) two times in a single day at the background, early warning and 150-foot compliance stations. No chemical monitoring will be performed during backfill placement. No monitoring will be performed within two hours before dark and during dark hours due to safety concerns.

8.3.3.4 Elevated Total PCB Concentration Areas Schedule

During in-water removal activity conducted within the relatively elevated total PCB concentration areas shown on Figure 4 of the WQMP (Appendix E), chemical monitoring at the Tier I frequency will occur (i.e., once daily, twice per week). Chemical samples will be collected from the background and upstream and downstream 150C and 300C stations (Figure 3 of the WQMP). Downcurrent (depending on tide direction) and background samples collected from the depth with the highest turbidity identified with concurrent turbidity measurements will be submitted for analysis. Samples collected at all other depths and upcurrent compliance stations will be archived for future potential analysis, pending results of the sample taken at the downcurrent depth with the highest turbidity (see Section 8.3.4). Field parameters will also be collected at the Tier I schedule.

8.3.4 Responding to Exceedances of Water Quality Criteria

A detailed summary of the necessary response actions if water quality exceedances are identified is provided in the WQMP (Appendix E) and summarized in the subsections below.

8.3.4.1 Exceedance of Conventional Parameters

If conventional parameters (turbidity, DO, temperature, or pH) are exceeded at the 150-foot compliance boundary during removal action construction activities, the following contingency actions will be implemented:

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1. Immediately notify Contractor and the Construction Quality Assurance Officer (CQAO).Immediately re-take field measurements at the Compliance Stations (and if necessary, the Background Station) to confirm, or not confirm, the exceedance.
2. If exceedance is confirmed, immediately notify the Contractor, CQAO, and EPA.
3. Evaluate the concurrent measurements at the Background Station and supporting visual evidence to determine whether the exceedance is caused by removal action construction activities versus other ambient conditions in the LDW (e.g., wind waves, boat wakes, barge/ship traffic, or storm inflow).
4. If the exceedance is confirmed and attributed to removal action construction activities:
    a. Immediately notify the Contractor and the CQAO.
    b. The Contractor will be directed to immediately modify operations or implement additional BMPs to mitigate the exceedance (see Section 4 for list of construction BMPs to protect water quality).
    c. Immediately collect additional chemical water samples at the upstream and downstream 150- and 300-foot compliance stations and background station.
        i. Immediately analyze the background and downcurrent compliance stations (depending on tide direction) from the depth with the highest concurrent turbidity. Archive all other samples for future potential analysis, pending results of the sample taken at the downcurrent depth with the highest turbidity (see Section 8.3.2.4).
5. Re-take field measurements at all stations 2 hours later, after additional BMPs or operational modifications are implemented.
6. Within 24 hours, notify EPA of the exceedance, actions taken to mitigate the exceedance, and the results of the follow-up measurements. If the water quality exceedance continues to persist, even with additional BMPs or operational modifications, a path forward will be discussed with EPA. The path forward could include some or all of the following:
    a. Implement more aggressive BMPs or operational modifications.
    b. Implement more intensive monitoring to better track the growth or dissipation of the plume.
    c. If options (a) or (b) are not successful at controlling the water quality exceedance, it may be necessary to stop work to further assess the source of

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the exceedance, identify effective mitigation measures, and allow the water column to recover.

8.3.4.2 Exceedance of Chemical Criteria

If acute criteria are exceeded at the downcurrent 150-foot compliance boundary at the depth with the highest turbidity, or chronic criteria are exceeded at the downcurrent 300-foot compliance boundary at the depth with the highest turbidity, the following actions will be implemented:

1. Immediately notify the Contractor, CQAO, and EPA.
2. In consultation with EPA, evaluate the concurrent measurements at the Background Station and supporting evidence to determine whether the exceedance is caused by removal action construction activities versus other ambient conditions in the LDW (e.g., visual observations, wind waves, boat wakes, barge/ship traffic, other construction activity within the LDW, or storm inflow).
3. If exceedance is attributed to removal action construction activities:
    a. Assess construction methods and existing BMPs.
    b. Analyze concurrent archived samples collected at the compliance boundary (both upstream and downstream) where exceedance was observed to determine if 1-hour average concentrations exceed the compliance criteria.
    c. If 1-hour average concentrations at the 300-foot compliance boundary exceed the chronic criteria, analyze remaining archived samples collected at the 300-foot compliance station on the day of the exceedance to determine if 24-hour concentrations exceed the compliance criteria.
4. If average concentrations exceed the compliance criteria, discuss path forward with EPA. The path forward could include some or all of the following:
    a. Implement more aggressive BMPs or operational modifications.
    b. Implement more intensive monitoring to better track the growth or dissipation of the plume.
    c. If options (a) or (b) are not successful at controlling the water quality exceedance, it may be necessary to temporarily stop work to further assess

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the source of the exceedance and identify effective mitigation measures. Additionally, samples may be collected at 200 and 250 feet from construction activity to support a potential modification to the 150-foot mixing zone.

8.3.5 Reporting

Daily, weekly, and final reporting of water quality monitoring results is required for this project as described in the WQMP (Appendix E).

- **Daily Reporting**. Daily field documentation will be scanned and e-mailed to the CQAO at the end of each field day. Unless an exceedance of a water quality parameter occurs (which would trigger contingency response actions), daily field results will not be transmitted to EPA unless specifically requested.
- **Weekly Reporting**. The results from each week's water quality monitoring activities will be compiled into a summary table with a comparison to water quality compliance criteria and provided to EPA as part of the Weekly Progress Report.
- **Final Water Quality Monitoring Results**. After all construction has been completed, the water quality monitoring data for the entire construction project will be provided to EPA in the *Draft Removal Action Completion Report*. This data summary will include a discussion of any water quality exceedances (if any), probable cause of the exceedance(s), results of follow-up measurements, agency communications and decisions, actions taken to mitigate the exceedance(s), and lessons learned for future projects.

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9 SUBSTANTIVE REQUIREMENTS OF PERMITS

9.1 Substantive Requirements of Permits/Applicable or Relevant or Appropriate Requirements

All removal actions conducted under CERCLA authority must comply with other state and federal Applicable or Relevant and Appropriate Requirements (ARARs) to the extent practicable given the urgency of the situation and the scope of the removal action (40 CFR 300.415[i]). Local regulations may be included as "to be considered" (TBC) standards, but are not designated as ARARs under CERCLA. ARARs and TBCs are discussed as they pertain to the removal action presented in this document.

ARARs consist of promulgated federal and stricter state environmental or facility siting laws and regulations which are either applicable or relevant and appropriate requirements. EPA, working with the State, consistent with the National Contingency Plan (NCP), is required to identify ARARs that will be met during the implementation of the removal action. TBCs include other than formally promulgated federal and stricter state standards, local government requirements in ordinances and regulations, and other pertinent published criteria, that are TBC by EPA in the implementation of the removal action. TBCs are discretionary rather than mandatory, but compliance is recommended.

For CERCLA actions such as the removal action described in this report, regulatory permits are not required for onsite actions. However, these actions should be conducted in a manner such that the intent or substantive provisions of the permits or regulatory requirements would be met. Actions that occur off-site (e.g., material transportation, dredge material disposal, wastewater discharge to a publicly owned treatment works) are expected to obtain all applicable permits and regulatory approvals.

ARARs identified by EPA in Table 9 were considered in defining the scope and the RAOs for this removal action and in the selection of the recommended removal action alternative in the EE/CA (See Final EE/CA Table 4-1; Anchor QEA 2011a). During the EE/CA process, it was demonstrated that the preferred alternative was in substantive compliance with the CWA Section 404(b)(1) in the CWA Section 404(b)(1) Evaluation (Anchor QEA 2011c). The CWA Section 404(b)(1) concluded that there was no need for compensatory mitigation due

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to the negligible impacts to waters of the United States and the increase in 500 square feet of intertidal habitat resulting from the implementation of the bank slope reconfiguration and containment.

Anchor QEA and EPA responded to comments from the Services on the BA in February 2012. Formal ESA consultation was completed with the issuance of the Services BiOps on August 22, 2012, and September 27, 2012, respectively. The terms and conditions provided in the BiOps will be evaluated against the Owner final design documents to confirm consistency and applicability. If any issues are identified, Jorgenson Forge will coordinate with EPA to address any inconsistencies.

Table 9 provides a summary of the demonstration of compliance with the ARARs identified for the removal action. During the removal action, the substantive requirements of the EPA-approved ARARs in Table 9 will be met to the extent practicable, as required by the NCP.

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10 CONSTRUCTION SEQUENCING AND SCHEDULE

This section describes the planned schedule and construction sequencing for the removal action activities planned in the RAB.

Construction activities are scheduled to commence in August 2013 per the EPA-approved work window. Construction activities are anticipated to last for up to 8 to 12 weeks and are anticipated to be performed 24 hours per day, 5 to 7 days per week consistent with the Boeing DSOA cleanup activities completed in early 2013. Construction activities will commence either concurrently or prior to the CMP and soil removal action to be performed by Jorgensen Forge and Boeing in the uplands directly adjacent to the northwest corner of the Jorgensen Forge property (see Section 2.2.2.1). The CMP and soil removal is currently scheduled to commence in July 2013 and occur for approximately 8 weeks. The rigid containment system (Figure 4) to be installed as part of the CMP and soil removal action shall be fully installed and able to support directly adjacent riverward shoreline bank reconfiguration before the bank reconfiguration construction activities commence.

The Contractor will be required to maintain an up-to-date detailed schedule of activities through construction per the project specifications provided in Appendix H.

The means and methods for construction will ultimately be the Contractor's decision and presented in its RAWP. Anchor QEA foresees the following set of activities occurring during completion of the removal action:

- Mobilization and setup of temporary facilities
- Preconstruction survey
- Top of bank excavation of the soils within the "Ecology Soil Investigation Areas" shown in Figure 8 in the vicinity of soil borings SB-3 and SB-4 (see Section 2.4) followed by placement of clean backfill
- Removal of debris from the shoreline bank area
- Shoreline excavation
- Placement of shoreline bank portion of new outfall structure
- Dredging from the navigation channel to the western boundary of the RAB (general coincident with the navigation channel) starting in upriver area and proceeding

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downriver
- Dredging and shoreline acceptance survey by DMU
- Backfilling from the western boundary of the RAB (general coincident with the navigation channel) to the toe of shoreline bank
- Shoreline armor layer placement (filter layer followed by armor layer followed by habitat material) and acceptance surveys by DMU for backfill and shoreline containment materials.
- Final survey and inspections
- Corrective measures, if necessary
- Demobilization and cleanup

For the purposes of this report, the description for construction sequencing is separated into two phases (work performed "in the wet"; work performed "in the dry") as separate equipment and construction methods are envisioned for each. It is highly probable that multiple activities may be occurring at the same time.

10.1 Construction Work Performed in the Wet

Construction activities anticipated to be performed from the water include dredging of chemically impacted sediments from the western boundary of the RAB to the toe of the eastern shoreline and placement of the backfill material over the dredge areas.

Dredging will generally be sequenced from upstream to downstream in order to capture material that migrates downstream during dredging. Dredging will also be completed from top of slope to bottom to minimize the potential for slope instability. Dredging will be performed using mechanical dredging equipment and the removed dredged material will be placed into material barges and transported to the off-site transloading facility for disposal at the appropriate off-site location.

The dredging area will be monitored and defined by station and offset to facilitate continuous tracking of the dredging progress, to allow rapid placement of the backfill material, and to allow final acceptance of a dredging area prior to the entire RAB being

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completed. The dredge design is based on the DoC found in the investigation phase of the project and on constructability issues (see Section 4).

After dredging has been deemed complete within a DMU by the Contractor, a post-dredge bathymetric survey will be performed to verify that the required dredging depths and extents have been achieved. Once the dredging depth and extents have been verified, a 3 to 6 inch layer of cover material (termed interim backfill) will be placed over the recently dredged area. Backfilling to the final target grade will not be performed until all dredging is complete to prevent possible recontamination of the backfill with residuals from the dredging operations. The backfill material will likely be placed using an excavator or conventional derrick with suitable bucket or skip box that spreads the material uniformly over the bottom of the waterway; the material is typically released just above the water surface as the boom is swung and the material disperses as it falls through the water column. Backfill placement may occur in several lifts in a working area to achieve the design thickness.

Once the full thickness of the backfill material has been placed, a second bathymetric survey (post-backfill) will then be performed over the completed area to verify the appropriate thickness has been placed. The backfill material thickness will be determined by comparing the post-dredge surface to the post-backfill surface.

10.2 Construction Work Performed "In the Dry"

Construction activities anticipated to be performed from land include the shoreline bank piling and debris removal, shoreline bank excavation, placement of the shoreline bank armoring layer, and installation of a portion of the new outfall structure.

Existing derelict creosote-treated piles, overhanging asphalt structures, and debris including concrete debris and riprap, steel rails, chain link fencing, milled wood, and slag will be removed from the bank prior to shoreline excavation. Shoreline bank excavation work will occur from upslope to downslope and will be completed prior to dredging of the adjacent in-water area in order to capture material that moves downslope during the excavation process. It is anticipated that land based excavator equipment will be utilized to complete the

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shoreline bank excavation and dump trucks will be used to transport the removed material to a transloading facility or directly to the off-site, Subtitle D landfill.

Once the excavation of the shoreline bank within a DMU has been deemed complete by the Contractor, a survey of the shoreline bank will be performed to verify the design extents and slopes have been achieved. Following verification, the various shoreline armoring materials will be placed. Shoreline armoring placement will occur starting at the bottom of the slope and progress upslope and will likely build off of the in-water backfill placement as necessary to maintain a stable slope. This work may be completed using either barge mounted floating equipment or land-based earthmoving equipment (excavators, front-end loaders, and dump trucks). After each layer of armor material is placed a subsequent survey will be performed to ensure the design thickness and grade has been achieved.

Similar to the dredging and backfill activities, this work will begin upstream with the Contractor progressing work downstream.

10.3 Outfall Construction

As discussed in Section 6.5, as part of NPDES permit activities, the existing upland stormwater conveyance system will be modified and the three existing outfalls will be replaced with a single 24-inch diameter outfall located to the north of existing outfall 003 (Figure 9). The new outfall will be extended farther and deeper into the LDW than the current outfalls, which discharge directly from the face of the concrete panel wall (outfall 001) and abutting sheetpile wall (outfall 002 and 003).

Construction of the new stormwater outfall will be completed in multiple phases to allow for installation of a new stormwater treatment system prior to the start of the removal action activities. Following construction of the stormwater treatment system, treated stormwater will be temporarily discharged to the LDW though the existing outfall 003 pending initiation and completion of the removal action activities, whereby the treated stormwater will then be rerouted to discharge from the new outfall and outfall 003 will be abandoned.

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Outfall construction up to the property line location near the top of the shoreline bank excavation limits has been completed as part of the work being conducted by Jorgensen Forge as part of their NPDES permit compliance activities. Outfall construction west of the property line location will be completed as part of the removal action activities. The two phases of outfall construction will be well coordinated to ensure successful integration. Outfall construction will follow the general sequence outlined in the following sections.

10.3.1 Phase 1 – Upland Stormwater Conveyance and Treatment Modifications

Stormwater system modifications completed as part of Jorgensen Forge's NPDES permit compliance activities included:

- Intercept outfall 001and 002 conveyance piping and re-route to the existing 003 conveyance piping and outfall
- Abandon outfall 001 and 002 in place
- Install a new pump station to capture the combined flows in the 003 conveyance piping
- Install a high flow bypass weir to convey flows in exceedance of the design storm around the pump station
- Construct an above ground treatment system with discharge temporarily conveyed back to the existing 003 outfall
- Install a new manhole structure (SDMH 1) and initial segment of the new 24-inch outfall piping up to the shoreline bank excavation limits to be completed as part of the removal action

A temporary connection between the new outfall upgradient manhole (SDMH 1) and the existing 003 outfall manhole structure (SDMH 003-2) has been installed as part of phase 1 to allow stormwater flow to continue discharging to the existing 003 outfall. The first segment of the new 24-inch HDPE outfall pipe has been installed beginning at the new SDMH 1 manhole structure and extending up to the property line near the top of bank excavation limits. A flange connection has been installed at this location and temporarily blind flanged so that piping can be continued in phase 2 by connecting the final pipe segment to the flange.

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10.3.2 Phase 2 – Bank and in-water Outfall Construction

Excavation and dredging to achieve design inverts for placement of the Phase 2 outfall piping segment will need to be coordinated with the overall bank and sediment removal action activities. Excavation and installation of the outfall piping should be conducted during low tide periods. Following excavation of the outfall pipe trench, gravel ballast bedding material will be placed in accordance with the plans and specifications to achieve design invert elevations.

The means and methods for installation of the piping for Phase 2 will need to be determined by the Contractor. It is anticipated that the entire Phase 2 pipe segment will be fused together on land and dragged and floated to the proper position over the trench excavation. The pipe segment will then be sunk into place using concrete ballasts and backfilled with gravel ballast bedding material in accordance with the plans and specifications. The excavation will then be backfilled to finish grade in accordance with the plans and specifications.

Following installation and connection of the final outfall segment to the phase 1 segment, stormwater discharge will be diverted to the new outfall by permanently capping the existing 003 outfall pipe within SDMH 1. The discharge end of the existing 003 outfall pipe will also be permanently capped.

10.4 Coordination with Property Line Pipes Removal Action and Boeing DSOA Corrective Action

As discussed in Section 2.2.2.1, Jorgensen Forge and Boeing are currently coordinating with EPA to perform the removal of the CMP that exists in the furthest downgradient portions of the property line pipes as well as soils in the direct vicinity of these pipes that contain elevated PCBs (Figure 3). Jorgensen Forge and Boeing are currently working with EPA to execute a Second Modification to the AOC and development of the removal action design documents in order for this work to be conducted either concurrently or following the removal action activities within the RAB. At a minimum, a sheetpile wall will be installed on the on the shoreline bank at the appropriate schedule to facilitate the sediment removal action activities within the RAB immediately adjacent to the sheetpile wall.

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Per the MOU between Boeing and the Owner (EMJ et al. 2007), the southern portion of the Boeing DSOA cleanup is anticipated to occur immediately following the removal action within the RAB and the backfill operations for both projects will be sequenced to minimize the potential for recontamination of the RAB. The Owner and Boeing continue to coordinate during the design development process to establish a seamless transition in the shoreline bank and in-water "transition zone" between the two cleanup projects and ensure all sediments with RvAL exceedances are removed.

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11 LONG-TERM OPERATIONS, MONITORING, AND MAINTENANCE

Long-term monitoring will be performed to confirm that removal action performance standards are being met in the years following construction, and to demonstrate that Facility source controls are effectively protecting the quality of the adjacent LDW sediments and preventing their recontamination. Detailed sampling methods, sampling station coordinates, quality control protocols, and contingency response plans are provided in the Operations, Monitoring, and Maintenance Plan (OMMP; Appendix F).

A summary of long-term monitoring methods and objectives is provided in this section.

11.1 Performance Standards

The following are the proposed standards that will be used to evaluate the long-term performance of the removal action.

- **Sediment Recontamination**. Clean imported sediments will be placed throughout the entire in-water and shoreline bank areas in the RAB following completion of the removal action. Over time, this clean sediment surface is expected to increase in concentration due to migration of chemicals from ongoing off-site sources in the LDW. The changes in surface sediment concentration within the RAB will be evaluated over time.
- **Shoreline Bank Containment Integrity**. Shoreline bank area of the RAB will be contained with a 1.5-foot filter material layer, overlain by a 2.5-foot riprap material layer, further overlain by a 0.5-foot layer of habitat substrate. The integrity of this containment will be maintained over the long term. Specifically, the bank will be inspected for significant signs of sloughing or erosion. Note that the intent of the habitat substrate is to allow it to naturally accrete or erode; it will not be specifically maintained.

11.2 Monitoring Activities

The following long-term monitoring activities will be performed to confirm the performance standards of the removal action are being met.

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11.2.1 Monitoring of Sediment Quality

Post-construction surface sediment monitoring will be performed in the RAB to monitor changes in surface sediment concentrations over time. To evaluate changes in surface sediment concentrations within the RAB, surface sediment samples will be collected within the dredging areas (Figure 3 of the OMMP in Appendix F). Surface sediment samples will be collected and submitted for chemical analysis for the site COCs defined in the OMMP (Appendix F). In addition, surface samples will be collected from two other areas, including one immediately adjacent area outside the RAB, and one area upstream from the RAB (Figure 3 of the OMMP in Appendix F). Samples collected from areas outside the RAB will be archived to support potential future analysis of off-site sources.

An initial Year 0 sediment sampling event will be conducted as part of the CQAP activities to verify the final "as built" quality of the sediment surface at the close of construction (in addition to the "Z-Layer" sampling described in the CQAP). This will serve as the baseline condition to compare with subsequent sediment sampling events conducted under the OMMP.

Sediment sampling under the OMMP will be performed at all locations in Years 1, 3, 5, 7, and 10 following the completion of the removal action. The monitoring schedule will be re-evaluated in consultation with EPA after the first two events are completed and analyzed. The monitoring frequency may be decreased if sediment concentrations are consistently below the RvAL.

11.2.2 Visual Monitoring of Shoreline Area

Visual monitoring will be performed in the Reconfigured Bank Monitoring Area, shown on Figure 3 in the OMMP (Appendix F) to verify that slope containment remains stable and there are no signs of significant riprap movement, sloughing, or erosion. In addition, the condition and coverage of the 0.5-foot habitat cover layer will be visually assessed. Note that the intent of the habitat cover layer is to allow it to naturally migrate and come to equilibrium based on the encountered erosional force and that it will not be maintained.

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A visual survey of the shoreline bank area will be completed that will look for evidence of sloughing and erosion to ensure that the function and integrity of the shoreline containment is being maintained. In addition, a visual survey of the habitat layer will be completed to estimate the coverage of the habitat material over the riprap. Observers will walk the entire shoreline area looking for areas of erosion or accretion. The estimated percent coverage of riprap by the habitat layer, areas of exposed riprap, and the estimated thickness of the habitat layer will be recorded.

If sloughing, erosion, or movement of the riprap layer is observed over a significant portion of the shoreline, contingency response actions will be evaluated. Because the habitat cover layer is expected to naturally migrate and come to equilibrium in response to river dynamics, the loss of this material from the shoreline area will not trigger a response action.

Visual monitoring of the shoreline area will be performed in Years 1, 3, 5, 7, and 10 following the completion of the removal action. Contingent visual monitoring of the shoreline area will be performed in response to a storm event or flood event of 25-year return period or greater, if one happens to occur in the LDW during the OMMP monitoring period.

11.3 Contingency Response Actions

The OMMP (Appendix F) describes potential response actions that will be undertaken if monitoring results indicate long-term performance standards are not being met. Contingency response actions are specific to the particular monitoring activity and objective (i.e., monitoring to prevent slope movement in the backfill area, recontamination within the RAB, and erosion of the shoreline containment). Depending on the nature and severity of the performance issue, the contingency response actions will be decided in consultation with EPA and may include one or more of the following:

- Increased monitoring frequency, potentially including a follow-up round of confirmation sediment testing
- Upland source tracing and environmental monitoring to better identify sources of recontamination
- Evaluation of additional cost-effective source control measures or BMPs

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- Implementation of slope stabilization measures
- Application of thin sand cover layer to subtidal areas
- Application of additional armor thickness, or larger armor material, to shoreline containment area

11.4 Reporting

OMMP (Appendix F) monitoring reports will be prepared following Year 1, 3, 5, 7, and 10 monitoring events, as well as any emergency monitoring events that may need to be conducted in response to a severe storm or flood. Specific reporting requirements are presented in the OMMP.

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12 INSTITUTIONAL CONTROLS

The Action Memo for the removal action includes institutional controls as part of the proposed action (EPA 2011a). The Final EE/CA indicated that the complete removal of impacted sediments would be preferable, in small part due to the fact that complete removal would lead to reduced area requiring long-term maintenance or institutional controls (Anchor QEA 2011a). Institutional controls generally consist of activities, documents, information devices, physical restrictions, or legal restrictions that ensure the protectiveness of the remedy and minimize, limit, or prevent human exposures to site COCs. They do not include active remediation actions. The Action Memo indicates that the removal action institutional controls should consist only of the LDW-wide fish consumption advisory (EPA 2011a). EPA is currently evaluating whether additional institutional controls should be implemented to further protect the community and stakeholders and is coordinating directly with the Owner on this issue.

This section presents the plan for implementing the specific institutional control identified by EPA for the Facility. Documentation of implementation of the institutional control will be submitted after removal action construction.

12.1 Purpose and Objectives of Institutional Controls for RAB

The proposed removal action does not include placement of engineered caps, and dredging is intended to remove the full extent of PCB contamination from the sediment and place backfill comprised of suitable substrate to the existing grade. Therefore, the area requiring coverage by institutional controls is minimized. The shoreline bank reconfiguration involves placement of material that should be protected from future disturbance without first notifying appropriate regulatory authorities. EPA indicated that the waterway-wide institutional controls may be applicable and that the scope of those controls under currently being evaluated.

Land use within the RAB primarily consists of commercial and recreational navigation, sport fishing, and Tribal fishing. The backfill areas would not be required to be protected from small-vessel anchorage, fishing, or clamming activities associated with these potential uses. Commercial navigation would occur directly west of the channelward extents of the RAB

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and future navigational dredging may extend some distance into the channelward SMUs. Industrial land use would continue on adjacent upland parcels.

Therefore, the seafood consumption advisories issued by the Washington State Department of Health (WSDOH) are likely to be maintained and potentially expanded as an institutional control for the entire LDW, including the RAB. Consumption advisories would not be necessary for the removal action alone, because clean material will be used as backfill following dredging, and the seafood consumption advisories apply to many organisms that range over a much larger area.

The necessary institutional controls could be fully implemented within approximately 1 year of construction completion. Engineering controls, BMPs, and other measures to ensure compliance with ARARs would control short-term risks during implementation.

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13 CULTURAL RESOURCES ASSESSMENT

For the proposed removal action, EPA must substantively comply with Section 106 and its implementing regulations at 36 CFR 800. CERCLA Section 121(e)(1) provides that no federal, state, or local permits are required for remedial activities conducted entirely on site. However, this does not remove the requirement to meet (or waive) the substantive provisions of permitting regulations that are ARARs. Section 106 is an ARAR for the proposed removal action. Section 106 requires federal agencies to consider the effects of their undertakings on historic properties listed in (or eligible for listing in) the National Register of Historic Places (NRHP). Thirty-six CFR 800 describes a five-step process for implementing Section 106:

1. Consult with the State Historic Preservation Officer (SHPO), interested and affected Indian Tribes, interested parties, and the public;
2. Determine the undertaking's Area of Potential Effects (APE);
3. Determine whether potential historic properties are present in the APE;
4. Evaluate whether the properties are NRHP-eligible, and if so, whether the project will affect them; and
5. Mitigate adverse effects to NRHP-eligible historic properties.

The Cultural Resources Assessment provided in Appendix M is intended to assist EPA in complying with Section 106 and 36 CFR 800 by describing the APE, describing known and potential historic properties in the APE, and recommending NRHP eligibility and project effects.

Appendix D of the Construction Specifications (Appendix H to this BODR) provides an Inadvertent Discovery Plan that describes actions that should be taken in the event of a discovery of archaeological materials or human remains, to ensure that the project remains in compliance with the applicable state laws.

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TABLES

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-01	JVE-01	JVE-01	JVE-01	JVE-01	JVE-01
				Sample ID	JVE-01SC-0001-110218	JVE-01SC-0102-110218	JVE-01SC-0203-110218	JVE-01SC-0304-110218	JVE-01SC-0405-110218	JVE-01SC-0506-110218
				Sample Date	2/18/2011	2/18/2011	2/18/2011	2/18/2011	2/18/2011	2/18/2011
				Depth	0 - 1 ft	1 - 2 ft	2 - 3 ft	3 - 4 ft	4 - 5 ft	5 - 6 ft
				Sample Type	N	N	N	N	N	N
				X	1275754.04	1275754.04	1275754.04	1275754.04	1275754.04	1275754.04
				Y	195763.89	195763.89	195763.89	195763.89	195763.89	195763.89
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					3.21	2.5	0.528	0.347	0.118	0.292
Total solids					47.8	59.4	80.9	80.7	93.4	85.9
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	37000	N/A	N/A	400	20 U	20 U
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			N/A	400	200	N/A	N/A	N/A

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-01	JVE-01	JVE-01	JVE-01	JVE-02	JVE-02
				Sample ID	JVE-01SC-0607-110218	JVE-01SC-0708-110218	JVE-01SC-0809-110218	JVE-01SC-099.7-110218	JVE-02SC-0001-110221	JVE-02SC-0102-110221
				Sample Date	2/18/2011	2/18/2011	2/18/2011	2/18/2011	2/21/2011	2/21/2011
				Depth	6 - 7 ft	7 - 8 ft	8 - 9 ft	9 - 9.7 ft	0 - 1 ft	1 - 2 ft
				Sample Type	N	N	N	N	N	N
				X	1275754.04	1275754.04	1275754.04	1275754.04	1275803.40	1275803.40
				Y	195763.89	195763.89	195763.89	195763.89	195713.39	195713.39
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					**0.467**	**0.315**	**0.048**	**0.068**	**2.57**	**0.153**
Total solids					**80.6**	**83.5**	**87.9**	**81.8**	**76.6**	**80.9**
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	19 U	20 UJ	**20 J**	19 U	N/A	**100**
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			N/A	N/A	N/A	N/A	**320**	N/A

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-02	JVE-02	JVE-02	JVE-02	JVE-02	JVE-02
				Sample ID	JVE-02SC-0203-110221	JVE-02SC-0304-110221	JVE-02SC-0405-110221	JVE-02SC-0506-110221	JVE-02SC-0607-110221	JVE-02SC-0708-110221
				Sample Date	2/21/2011	2/21/2011	2/21/2011	2/21/2011	2/21/2011	2/21/2011
				Depth	2 - 3 ft	3 - 4 ft	4 - 5 ft	5 - 6 ft	6 - 7 ft	7 - 8 ft
				Sample Type	N	N	N	N	N	N
				X	1275803.40	1275803.40	1275803.40	1275803.40	1275803.40	1275803.40
				Y	195713.39	195713.39	195713.39	195713.39	195713.39	195713.39
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					**0.114**	**0.081**	**0.101**	**0.11**	**0.071**	**0.044**
Total solids					**79.5**	**84.5**	**91.9**	**87**	**85.2**	**87**
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	20 U	20 U	19 U	20 U	20 U	20 UJ
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			N/A	N/A	N/A	N/A	N/A	N/A

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-02	JVE-02	JVE-03	JVE-03	JVE-03	JVE-03
				Sample ID	JVE-02SC-0809-110221	JVE-02SC-099.6-110221	JVE-03SC-0405-110221	JVE-03SC-0506-110221	JVE-03SC-0607-110221	JVE-03SC-0708-110221
				Sample Date	2/21/2011	2/21/2011	2/21/2011	2/21/2011	2/21/2011	2/21/2011
				Depth	8 - 9 ft	9 - 9.6 ft	4 - 5 ft	5 - 6 ft	6 - 7 ft	7 - 8 ft
				Sample Type	N	N	N	N	N	N
				X	1275803.40	1275803.40	1275760.37	1275760.37	1275760.37	1275760.37
				Y	195713.39	195713.39	195683.32	195683.32	195683.32	195683.32
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					0.096	0.072	2.21	2.47	1.86	1.49
Total solids					82.8	84.5	53	51.1	63	59.6
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	20 UJ	19 U	N/A	N/A	N/A	N/A
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			N/A	N/A	60	60	70	6

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-03	JVE-03	JVE-03	JVE-03	JVE-04	JVE-04
				Sample ID	JVE-03SC-0809-110221	JVE-03SC-0910-110221	JVE-03SC-1011-110221	JVE-03SC-1112.2-110221	JVE-04SC-0001-110221	JVE-04SC-0102-110221
				Sample Date	2/21/2011	2/21/2011	2/21/2011	2/21/2011	2/21/2011	2/21/2011
				Depth	8 - 9 ft	9 - 10 ft	10 - 11 ft	11 - 12.2 ft	0 - 1 ft	1 - 2 ft
				Sample Type	N	N	N	N	N	N
				X	1275760.37	1275760.37	1275760.37	1275760.37	1275802.99	1275802.99
				Y	195683.32	195683.32	195683.32	195683.32	195674.60	195674.60
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					**1.31**	**1.33**	**1.38**	**1.2**	**2.54**	**1.66**
Total solids					**75.2**	**74.8**	**74.1**	**76.4**	**53.8**	**77.8**
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	N/A	N/A	N/A	N/A	N/A	N/A
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			**10**	**1.7**	**5**	**10**	**20**	**10**

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-04	JVE-04	JVE-04	JVE-04	JVE-04	JVE-04
				Sample ID	JVE-04SC-0203-110221	JVE-04SC-0304-110221	JVE-04SC-0405-110221	JVE-04SC-0506-110221	JVE-04SC-0607-110221	JVE-04SC-0708-110221
				Sample Date	2/21/2011	2/21/2011	2/21/2011	2/21/2011	2/21/2011	2/21/2011
				Depth	2 - 3 ft	3 - 4 ft	4 - 5 ft	5 - 6 ft	6 - 7 ft	7 - 8 ft
				Sample Type	N	N	N	N	N	N
				X	1275802.99	1275802.99	1275802.99	1275802.99	1275802.99	1275802.99
				Y	195674.60	195674.60	195674.60	195674.60	195674.60	195674.60
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					**0.167**	**0.357**	**0.114**	**0.142**	**0.085**	**0.138**
Total solids					**81.9**	**81.6**	**86.1**	**81.4**	**84.3**	**85**
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	**54**	**71 J**	20 U	16 U	16 U	16 U
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			N/A	N/A	N/A	N/A	N/A	N/A

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-04	JVE-04	JVE-07	JVE-07	JVE-07	JVE-07
				Sample ID	JVE-04SC-089.2-110221	JVE-1004SC-0607-110221	JVE-07SC-0001-110218	JVE-07SC-0102-110218	JVE-07SC-0203-110218	JVE-07SC-0304-110218
				Sample Date	2/21/2011	2/21/2011	2/18/2011	2/18/2011	2/18/2011	2/18/2011
				Depth	8 - 9.2 ft	6 - 7 ft	0 - 1 ft	1 - 2 ft	2 - 3 ft	3 - 4 ft
				Sample Type	N	FD	N	N	N	N
				X	1275802.99	1275802.99	1275915.53	1275915.53	1275915.53	1275915.53
				Y	195674.60	195674.60	195362.27	195362.27	195362.27	195362.27
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					**0.104**	**0.11**	**2.43**	**1.68**	**1.72**	**2.55**
Total solids					**86.2**	**86.1**	**55.1**	**56.5**	**58.1**	**55.8**
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	19 U	20 U	N/A	N/A	N/A	N/A
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			N/A	N/A	**7 J**	**10 J**	**7**	**7**

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-07	JVE-07	JVE-07	JVE-07	JVE-07	JVE-07
				Sample ID	JVE-07SC-0405-110218	JVE-07SC-0506-110218	JVE-07SC-0607-110218	JVE-07SC-0708-110218	JVE-07SC-0809-110218	JVE-07SC-0910-110218
				Sample Date	2/18/2011	2/18/2011	2/18/2011	2/18/2011	2/18/2011	2/18/2011
				Depth	4 - 5 ft	5 - 6 ft	6 - 7 ft	7 - 8 ft	8 - 9 ft	9 - 10 ft
				Sample Type	N	N	N	N	N	N
				X	1275915.53	1275915.53	1275915.53	1275915.53	1275915.53	1275915.53
				Y	195362.27	195362.27	195362.27	195362.27	195362.27	195362.27
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					**1.29**	**1.44**	**0.825**	**0.396**	**1.69**	**2.23**
Total solids					**59.5**	**66**	**73.1**	**79.1**	**83.4**	**78.1**
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	N/A	N/A	N/A	20 U	N/A	N/A
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			**6.7**	**1.9 J**	**4 J**	N/A	1.1 UJ	0.9 U

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-07	JVE-07	JVE-07	JVE-205	JVE-205	JVE-205
				Sample ID	JVE-07SC-1011-110218	JVE-07SC-1112.2-110218	JVE-1007SC-0910-110218	JVE-1205SC-0203-110217	JVE-205SC-0203-110217	JVE-205SC-0304-110217
				Sample Date	2/18/2011	2/18/2011	2/18/2011	2/17/2011	2/17/2011	2/17/2011
				Depth	10 - 11 ft	11 - 12.2 ft	9 - 10 ft	2 - 3 ft	2 - 3 ft	3 - 4 ft
				Sample Type	N	N	FD	FD	N	N
				X	1275915.53	1275915.53	1275915.53	1275755.33	1275755.33	1275755.33
				Y	195362.27	195362.27	195362.27	195646.27	195646.27	195646.27
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					**1.39**	**4.39**	**3.98**	**1.66**	**1.55**	**1.93**
Total solids					**76.7**	**76**	**77.1**	**52.3**	**52.4**	**53.7**
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	N/A	20 U	19 U	N/A	N/A	N/A
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			1 U	N/A	N/A	1 U	**20**	**10**

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-205	JVE-205	JVE-205	JVE-205	JVE-205	JVE-205
				Sample ID	JVE-205SC-0405-110217	JVE-205SC-0506-110217	JVE-205SC-0607-110217	JVE-205SC-0708-110217	JVE-205SC-0809-110217	JVE-205SC-0910-110217
				Sample Date	2/17/2011	2/17/2011	2/17/2011	2/17/2011	2/17/2011	2/17/2011
				Depth	4 - 5 ft	5 - 6 ft	6 - 7 ft	7 - 8 ft	8 - 9 ft	9 - 10 ft
				Sample Type	N	N	N	N	N	N
				X	1275755.33	1275755.33	1275755.33	1275755.33	1275755.33	1275755.33
				Y	195646.27	195646.27	195646.27	195646.27	195646.27	195646.27
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					1.97	2.28	2.58	1.69	2.67	0.724
Total solids					51.9	50.5	53	60.6	61.5	59.2
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	N/A	N/A	N/A	N/A	N/A	N/A
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			30	10	110	110	60	9

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-205	JVE-205	JVE-206	JVE-206	JVE-206	JVE-206
				Sample ID	JVE-205SC-1011-110217	JVE-205SC-1112.1-110217	JVE-1206SC-1011-110316	JVE-206SC-0607-110316	JVE-206SC-0708-110316	JVE-206SC-0809-110316
				Sample Date	2/17/2011	2/17/2011	3/16/2011	3/16/2011	3/16/2011	3/16/2011
				Depth	10 - 11 ft	11 - 12.1 ft	10 - 11 ft	6 - 7 ft	7 - 8 ft	8 - 9 ft
				Sample Type	N	N	FD	N	N	N
				X	1275755.33	1275755.33	1275801.559430	1275801.559430	1275801.559430	1275801.559430
				Y	195646.27	195646.27	195612.970248	195612.970248	195612.970248	195612.970248
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					**0.511**	**0.821**	**1.69**	**2.48**	**2.1**	**2.19**
Total solids					**78.3**	**69**	**68.2**	**52.7**	**56.3**	**58.9**
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	N/A	N/A	N/A	N/A	N/A	N/A
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			4 U	**11**	**5**	**10**	**60**	**21 J**

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-206	JVE-206	JVE-206	JVE-206	JVE-206	JVE-207
				Sample ID	JVE-206SC-0910-110316	JVE-206SC-1011-110316	JVE-206SC-1112-110316	JVE-206SC-1213-110316	JVE-206SC-1313.6-110316	JVE-207SC-0102-110216
				Sample Date	3/16/2011	3/16/2011	3/16/2011	3/16/2011	3/16/2011	2/16/2011
				Depth	9 - 10 ft	10 - 11 ft	11 - 12 ft	12 - 13 ft	13 - 13.6 ft	1 - 2 ft
				Sample Type	N	N	N	N	N	N
				X	1275801.559430	1275801.559430	1275801.559430	1275801.559430	1275801.559430	1275817.24
				Y	195612.970248	195612.970248	195612.970248	195612.970248	195612.970248	195556.36
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					**1.76**	**1.54**	**2.24**	**1.78**	**1.67**	**2.03**
Total solids					**62.3**	**68**	**66.8**	**69.2**	**70.1**	**48**
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	N/A	N/A	N/A	N/A	N/A	N/A
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			**20**	**4**	**4**	**6**	**5**	**10 J**

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-207	JVE-207	JVE-207	JVE-207	JVE-207	JVE-207
				Sample ID	JVE-207SC-0203-110216	JVE-207SC-0304-110216	JVE-207SC-0405-110216	JVE-207SC-0506-110216	JVE-207SC-0607-110216	JVE-207SC-0708-110216
				Sample Date	2/16/2011	2/16/2011	2/16/2011	2/16/2011	2/16/2011	2/16/2011
				Depth	2 - 3 ft	3 - 4 ft	4 - 5 ft	5 - 6 ft	6 - 7 ft	7 - 8 ft
				Sample Type	N	N	N	N	N	N
				X	1275817.24	1275817.24	1275817.24	1275817.24	1275817.24	1275817.24
				Y	195556.36	195556.36	195556.36	195556.36	195556.36	195556.36
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					**1.73**	**2.06**	**2.77**	**2.53**	**2.38**	**1.88**
Total solids					**54.3**	**51.8**	**52.3**	**52.1**	**55**	**60.3**
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	N/A	N/A	N/A	N/A	N/A	N/A
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			**3**	**6**	**3**	0.8 U	**20**	**2.4**

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-207	JVE-207	JVE-207	JVE-207	JVE-207	JVE-208
				Sample ID	JVE-207SC-0809-110216	JVE-207SC-0910-110216	JVE-207SC-1011-110216	JVE-207SC-1112-110216	JVE-207SC-1212.6-110216	JVE-208SC-0506-110316
				Sample Date	2/16/2011	2/16/2011	2/16/2011	2/16/2011	2/16/2011	3/16/2011
				Depth	8 - 9 ft	9 - 10 ft	10 - 11 ft	11 - 12 ft	12 - 12.6 ft	5 - 6 ft
				Sample Type	N	N	N	N	N	N
				X	1275817.24	1275817.24	1275817.24	1275817.24	1275817.24	1275835.476860
				Y	195556.36	195556.36	195556.36	195556.36	195556.36	195513.207034
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					**2.23**	**3.46**	**1.06**	**1.47**	**0.095**	**2.27**
Total solids					**62.6**	**62.2**	**70.2**	**71.5**	**80.8**	**50.9**
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	N/A	**30**	N/A	N/A	20 U	N/A
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			**1**	N/A	1.8 U	**1.8**	N/A	**10 J**

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-208	JVE-208	JVE-208	JVE-208	JVE-208	JVE-208
				Sample ID	JVE-208SC-0607-110316	JVE-208SC-0708-110316	JVE-208SC-0809-110316	JVE-208SC-0910-110316	JVE-208SC-1011-110316	JVE-208SC-1112-110316
				Sample Date	3/16/2011	3/16/2011	3/16/2011	3/16/2011	3/16/2011	3/16/2011
				Depth	6 - 7 ft	7 - 8 ft	8 - 9 ft	9 - 10 ft	10 - 11 ft	11 - 12 ft
				Sample Type	N	N	N	N	N	N
				X	1275835.476860	1275835.476860	1275835.476860	1275835.476860	1275835.476860	1275835.476860
				Y	195513.207034	195513.207034	195513.207034	195513.207034	195513.207034	195513.207034
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					2.41	2.71	2.78	2.79	2.24	2.02
Total solids					52.9	55.1	55.2	55.4	64.3	66
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	N/A	N/A	N/A	N/A	N/A	N/A
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			50	190	200	160	21	6

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-208	JVE-210	JVE-210	JVE-210	JVE-210	JVE-210
				Sample ID	JVE-208SC-1212.5-110316	JVE-210SC-0001-110216	JVE-210SC-0102-110216	JVE-210SC-0203-110216	JVE-210SC-0304-110216	JVE-210SC-0405-110216
				Sample Date	3/16/2011	2/16/2011	2/16/2011	2/16/2011	2/16/2011	2/16/2011
				Depth	12 - 12.5 ft	0 - 1 ft	1 - 2 ft	2 - 3 ft	3 - 4 ft	4 - 5 ft
				Sample Type	N	N	N	N	N	N
				X	1275835.476860	1275858.39	1275858.39	1275858.39	1275858.39	1275858.39
				Y	195513.207034	195359.42	195359.42	195359.42	195359.42	195359.42
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					**0.11**	**2.62**	**2.11**	**1.77**	**1.85**	**2.39**
Total solids					**81.7**	**47.6**	**50**	**56.1**	**52.7**	**56.3**
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	120 U	N/A	N/A	N/A	N/A	N/A
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			N/A	**8 J**	**4**	1 U	1 U	**2**

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-210	JVE-210	JVE-210	JVE-210	JVE-210	JVE-210
				Sample ID	JVE-210SC-0506-110216	JVE-210SC-0607-110216	JVE-210SC-0708-110216	JVE-210SC-0809-110216	JVE-210SC-0910-110216	JVE-210SC-1011-110216
				Sample Date	2/16/2011	2/16/2011	2/16/2011	2/16/2011	2/16/2011	2/16/2011
				Depth	5 - 6 ft	6 - 7 ft	7 - 8 ft	8 - 9 ft	9 - 10 ft	10 - 11 ft
				Sample Type	N	N	N	N	N	N
				X	1275858.39	1275858.39	1275858.39	1275858.39	1275858.39	1275858.39
				Y	195359.42	195359.42	195359.42	195359.42	195359.42	195359.42
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					**2.04**	**2.33**	**2.64**	**1.14**	**0.272**	**1.19**
Total solids					**56.8**	**64.9**	**66.2**	**77.3**	**82.9**	**80.7**
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	N/A	N/A	N/A	N/A	20 U	N/A
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			**1**	**1**	**1**	2 U	N/A	2 U

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-210	JVE-210	JVE-215	JVE-215	JVE-215	JVE-215
				Sample ID	JVE-210SC-1112-110216	JVE-210SC-1212.7-110216	JVE-1215SC-0607-110216	JVE-215SC-0001-110216	JVE-215SC-0102-110216	JVE-215SC-0203-110216
				Sample Date	2/16/2011	2/16/2011	2/16/2011	2/16/2011	2/16/2011	2/16/2011
				Depth	11 - 12 ft	12 - 12.7 ft	6 - 7 ft	0 - 1 ft	1 - 2 ft	2 - 3 ft
				Sample Type	N	N	FD	N	N	N
				X	1275858.39	1275858.39	1275842.73	1275842.73	1275842.73	1275842.73
				Y	195359.42	195359.42	195459.56	195459.56	195459.56	195459.56
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					**4.51**	**2.7**	**2.08**	**2.26**	**1.53**	**2.11**
Total solids					**66.3**	**63.5**	**62.5**	**47.5**	**51.5**	**53.8**
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	20 U	N/A	N/A	N/A	N/A	N/A
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			N/A	0.7 U	**2**	**9 J**	**10**	**1**

Table 1
2011 Sampling Results

				Task	**Jorgensen Forge - Design Subsurface Sediment Sampling**	**Jorgensen Forge - Design Subsurface Sediment Sampling**	**Jorgensen Forge - Design Subsurface Sediment Sampling**	**Jorgensen Forge - Design Subsurface Sediment Sampling**	**Jorgensen Forge - Design Subsurface Sediment Sampling**	**Jorgensen Forge - Design Subsurface Sediment Sampling**
				Location ID	**JVE-215**	**JVE-215**	**JVE-215**	**JVE-215**	**JVE-215**	**JVE-215**
				Sample ID	**JVE-215SC-0304-110216**	**JVE-215SC-0405-110216**	**JVE-215SC-0506-110216**	**JVE-215SC-0607-110216**	**JVE-215SC-0708-110216**	**JVE-215SC-0809-110216**
				Sample Date	**2/16/2011**	**2/16/2011**	**2/16/2011**	**2/16/2011**	**2/16/2011**	**2/16/2011**
				Depth	**3 - 4 ft**	**4 - 5 ft**	**5 - 6 ft**	**6 - 7 ft**	**7 - 8 ft**	**8 - 9 ft**
				Sample Type	**N**	**N**	**N**	**N**	**N**	**N**
				X	**1275842.73**	**1275842.73**	**1275842.73**	**1275842.73**	**1275842.73**	**1275842.73**
				Y	**195459.56**	**195459.56**	**195459.56**	**195459.56**	**195459.56**	**195459.56**
	SMS_SQS	**SMS_CSL**	**LAET**	**2LAET**						
Conventional Parameters (pct)										
Total organic carbon					**1.82**	**1.06**	**2.5**	**1.58**	**1.52**	**1.78**
Total solids					**57.7**	**58**	**59.1**	**62.6**	**65.4**	**63**
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	N/A	N/A	N/A	N/A	N/A	N/A
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			**6**	2 U	0.8 U	**5.5**	1.3 U	1 U

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-215	JVE-215	JVE-215	JVE-215	JVE-216	JVE-216
				Sample ID	JVE-215SC-0910-110216	JVE-215SC-1011-110216	JVE-215SC-1112-110216	JVE-215SC-1212.8-110216	JVE-216SC-0506-110218	JVE-216SC-0607-110218
				Sample Date	2/16/2011	2/16/2011	2/16/2011	2/16/2011	2/18/2011	2/18/2011
				Depth	9 - 10 ft	10 - 11 ft	11 - 12 ft	12 - 12.8 ft	5 - 6 ft	6 - 7 ft
				Sample Type	N	N	N	N	N	N
				X	1275842.73	1275842.73	1275842.73	1275842.73	1275928.90	1275928.90
				Y	195459.56	195459.56	195459.56	195459.56	195180.94	195180.94
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					**1.95**	**1.4**	**0.649**	**0.39**	**2.05**	**1.63**
Total solids					**61.2**	**70.1**	**74.7**	**75.6**	**65**	**70.9**
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	N/A	N/A	N/A	19 U	N/A	N/A
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			**1**	1 U	2.9 U	N/A	**33**	**2.5**

Table 1
2011 Sampling Results

				Task	**Jorgensen Forge - Design Subsurface Sediment Sampling**	**Jorgensen Forge - Design Subsurface Sediment Sampling**	**Jorgensen Forge - Design Subsurface Sediment Sampling**	**Jorgensen Forge - Design Subsurface Sediment Sampling**	**Jorgensen Forge - Design Subsurface Sediment Sampling**	**Jorgensen Forge - Design Subsurface Sediment Sampling**
				Location ID	**JVE-216**	**JVE-216**	**JVE-216**	**JVE-216**	**JVE-216**	**JVE-309**
				Sample ID	**JVE-216SC-0708-110218**	**JVE-216SC-0809-110218**	**JVE-216SC-0910-110218**	**JVE-216SC-1011-110218**	**JVE-216SC-1112.1-110218**	**JVE-1309SC-0910-110217**
				Sample Date	**2/18/2011**	**2/18/2011**	**2/18/2011**	**2/18/2011**	**2/18/2011**	**2/17/2011**
				Depth	**7 - 8 ft**	**8 - 9 ft**	**9 - 10 ft**	**10 - 11 ft**	**11 - 12.1 ft**	**9 - 10 ft**
				Sample Type	**N**	**N**	**N**	**N**	**N**	**FD**
				X	**1275928.90**	**1275928.90**	**1275928.90**	**1275928.90**	**1275928.90**	**1275852.94**
				Y	**195180.94**	**195180.94**	**195180.94**	**195180.94**	**195180.94**	**195575.56**
	SMS_SQS	**SMS_CSL**	**LAET**	**2LAET**						
Conventional Parameters (pct)										
Total organic carbon					**0.12**	**0.16**	**0.127**	**0.24**	**0.327**	**0.138**
Total solids					**86.9**	**85.2**	**83.8**	**86.2**	**80.2**	**79.4**
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	20 U	19 U	19 UJ	19 U	20 U	20 U
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			N/A	N/A	N/A	N/A	N/A	N/A

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-309	JVE-309	JVE-309	JVE-309	JVE-309	JVE-309
				Sample ID	JVE-309SC-0203-110217	JVE-309SC-0304-110217	JVE-309SC-0405-110217	JVE-309SC-0506-110217	JVE-309SC-0607-110217	JVE-309SC-0708-110217
				Sample Date	2/17/2011	2/17/2011	2/17/2011	2/17/2011	2/17/2011	2/17/2011
				Depth	2 - 3 ft	3 - 4 ft	4 - 5 ft	5 - 6 ft	6 - 7 ft	7 - 8 ft
				Sample Type	N	N	N	N	N	N
				X	1275852.94	1275852.94	1275852.94	1275852.94	1275852.94	1275852.94
				Y	195575.56	195575.56	195575.56	195575.56	195575.56	195575.56
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					**0.551**	**0.206**	**0.137**	**1.03**	**0.131**	**0.617**
Total solids					**77.9**	**84.6**	**81.6**	**81.1**	**80.2**	**75.2**
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	N/A	32 U	20 U	N/A	20 U	N/A
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			**70**	N/A	N/A	2 U	N/A	3.1 U

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-309	JVE-309	JVE-309	JVE-309	JVE-311	JVE-311
				Sample ID	JVE-309SC-0809-110217	JVE-309SC-0910-110217	JVE-309SC-1011-110217	JVE-309SC-1111.5-110217	JVE-311SC-0506-110217	JVE-311SC-0607-110217
				Sample Date	2/17/2011	2/17/2011	2/17/2011	2/17/2011	2/17/2011	2/17/2011
				Depth	8 - 9 ft	9 - 10 ft	10 - 11 ft	11 - 11.5 ft	5 - 6 ft	6 - 7 ft
				Sample Type	N	N	N	N	N	N
				X	1275852.94	1275852.94	1275852.94	1275852.94	1275895.34	1275895.34
				Y	195575.56	195575.56	195575.56	195575.56	195460.86	195460.86
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					**0.767**	**0.185**	**0.376**	**2.55**	**0.734**	**0.304**
Total solids					**73.7**	**78.7**	**76.2**	**60.2**	**77.2**	**77.7**
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	N/A	20 U	20 U	N/A	N/A	19 U
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			3 U	N/A	N/A	0.8 U	**20**	N/A

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-311	JVE-311	JVE-314	JVE-314	JVE-314	JVE-314
				Sample ID	JVE-311SC-0708-110217	JVE-311SC-089.4-110217	JVE-1314SC-0506-110218	JVE-314SC-0001-110218	JVE-314SC-0102-110218	JVE-314SC-0203-110218
				Sample Date	2/17/2011	2/17/2011	2/18/2011	2/18/2011	2/18/2011	2/18/2011
				Depth	7 - 8 ft	8 - 9.4 ft	5 - 6 ft	0 - 1 ft	1 - 2 ft	2 - 3 ft
				Sample Type	N	N	FD	N	N	N
				X	1275895.34	1275895.34	1275966.80	1275966.80	1275966.80	1275966.80
				Y	195460.86	195460.86	195235.18	195235.18	195235.18	195235.18
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					**0.113**	**0.829**	**0.581**	**1.94**	**1.04**	**0.815**
Total solids					**82.9**	**84.7**	**85**	**61.7**	**66.4**	**77.2**
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	20 U	N/A	N/A	N/A	N/A	N/A
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			N/A	2 U	3.3 U	**20**	**13 J**	2.3 U

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-314	JVE-314	JVE-314	JVE-314	JVE-314	JVE-316
				Sample ID	JVE-314SC-0304-110218	JVE-314SC-0405-110218	JVE-314SC-0506-110218	JVE-314SC-0607-110218	JVE-314SC-077.9-110218	JVE-316SC-0304-110217
				Sample Date	2/18/2011	2/18/2011	2/18/2011	2/18/2011	2/18/2011	2/17/2011
				Depth	3 - 4 ft	4 - 5 ft	5 - 6 ft	6 - 7 ft	7 - 7.9 ft	3 - 4 ft
				Sample Type	N	N	N	N	N	N
				X	1275966.80	1275966.80	1275966.80	1275966.80	1275966.80	1275818.51
				Y	195235.18	195235.18	195235.18	195235.18	195235.18	195650.53
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					**0.659**	**0.795**	**0.527**	**0.916**	**0.726**	**1.78**
Total solids					**85.7**	**93**	**86.1**	**84.7**	**80.2**	**72.3**
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	N/A	N/A	N/A	N/A	N/A	N/A
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			2.9 U	3 U	3.6 U	2 U	2.6 U	**87 J**

Table 1
2011 Sampling Results

				Task	**Jorgensen Forge - Design Subsurface Sediment Sampling**	**Jorgensen Forge - Design Subsurface Sediment Sampling**	**Jorgensen Forge - Design Subsurface Sediment Sampling**	**Jorgensen Forge - Design Subsurface Sediment Sampling**	**Jorgensen Forge - Design Subsurface Sediment Sampling**	**Jorgensen Forge - Design Subsurface Sediment Sampling**
				Location ID	**JVE-316**	**JVE-316**	**JVE-316**	**JVE-316**	**JVE-316**	**JVE-316**
				Sample ID	**JVE-316SC-0405-110217**	**JVE-316SC-0506-110217**	**JVE-316SC-0607-110217**	**JVE-316SC-0708-110217**	**JVE-316SC-0809-110217**	**JVE-316SC-099.7-110217**
				Sample Date	**2/17/2011**	**2/17/2011**	**2/17/2011**	**2/17/2011**	**2/17/2011**	**2/17/2011**
				Depth	**4 - 5 ft**	**5 - 6 ft**	**6 - 7 ft**	**7 - 8 ft**	**8 - 9 ft**	**9 - 9.7 ft**
				Sample Type	**N**	**N**	**N**	**N**	**N**	**N**
				X	**1275818.51**	**1275818.51**	**1275818.51**	**1275818.51**	**1275818.51**	**1275818.51**
				Y	**195650.53**	**195650.53**	**195650.53**	**195650.53**	**195650.53**	**195650.53**
	SMS_SQS	**SMS_CSL**	**LAET**	**2LAET**						
Conventional Parameters (pct)										
Total organic carbon					**0.734**	**0.254**	**0.323**	**0.111**	**0.151**	**0.119**
Total solids					**80.7**	**82.3**	**77.4**	**83.5**	**85.7**	**81.5**
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	N/A	19 U	20 U	20 U	20 U	19 U
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			**8**	N/A	N/A	N/A	N/A	N/A

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-320	JVE-320	JVE-320	JVE-320	JVE-320	JVE-320
				Sample ID	JVE-320SC-0203-110217	JVE-320SC-0304-110217	JVE-320SC-0405-110217	JVE-320SC-0506-110217	JVE-320SC-0607-110217	JVE-320SC-0708-110217
				Sample Date	2/17/2011	2/17/2011	2/17/2011	2/17/2011	2/17/2011	2/17/2011
				Depth	2 - 3 ft	3 - 4 ft	4 - 5 ft	5 - 6 ft	6 - 7 ft	7 - 8 ft
				Sample Type	N	N	N	N	N	N
				X	1275930.07	1275930.07	1275930.07	1275930.07	1275930.07	1275930.07
				Y	195388.02	195388.02	195388.02	195388.02	195388.02	195388.02
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					2.95	1.91	2	2.58	2.23	2.29
Total solids					57.6	66.4	59.6	56.8	55.9	56.1
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	N/A	N/A	N/A	N/A	N/A	N/A
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			60	9	10	1.3	7	3

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-320	JVE-320	JVE-320	JVE-320	JVE-320	JVE-322
				Sample ID	JVE-320SC-0809-110217	JVE-320SC-0910-110217	JVE-320SC-1011-110217	JVE-320SC-1112-110217	JVE-320SC-1212.9-110217	JVE-322SC-0607-110218
				Sample Date	2/17/2011	2/17/2011	2/17/2011	2/17/2011	2/17/2011	2/18/2011
				Depth	8 - 9 ft	9 - 10 ft	10 - 11 ft	11 - 12 ft	12 - 12.9 ft	6 - 7 ft
				Sample Type	N	N	N	N	N	N
				X	1275930.07	1275930.07	1275930.07	1275930.07	1275930.07	1275867.22
				Y	195388.02	195388.02	195388.02	195388.02	195388.02	195315.16
	SMS_SQS	SMS_CSL	LAET	2LAET						
Conventional Parameters (pct)										
Total organic carbon					**1.13**	**1.1**	**0.949**	**0.317**	**2.69**	**2.79**
Total solids					**65.7**	**67**	**72.4**	**83.7**	**67.8**	**61.2**
PCB Aroclors (µg/kg)										
Total PCB Aroclors (U = 0)			130	1000	N/A	N/A	N/A	20 U	N/A	N/A
PCB Aroclors (mg/kg-OC)										
Total PCB Aroclors (U = 0)	12	65			2 U	2 U	2 U	N/A	**2**	**80 J**

Table 1
2011 Sampling Results

				Task	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling	Jorgensen Forge - Design Subsurface Sediment Sampling
				Location ID	JVE-322	JVE-322	JVE-322	JVE-322	JVE-322
				Sample ID	JVE-322SC-0708-110218	JVE-322SC-0809-110218	JVE-322SC-0910-110218	JVE-322SC-1011-110218	JVE-322SC-1112.4-110218
				Sample Date	2/18/2011	2/18/2011	2/18/2011	2/18/2011	2/18/2011
				Depth	7 - 8 ft	8 - 9 ft	9 - 10 ft	10 - 11 ft	11 - 12.4 ft
				Sample Type	N	N	N	N	N
				X	1275867.22	1275867.22	1275867.22	1275867.22	1275867.22
				Y	195315.16	195315.16	195315.16	195315.16	195315.16
	SMS_SQS	SMS_CSL	LAET	2LAET					
Conventional Parameters (pct)									
Total organic carbon					**2.06**	**1.86**	**1.94**	**0.932**	**1.88**
Total solids					**62.7**	**72.1**	**80.1**	**86.4**	**77.1**
PCB Aroclors (µg/kg)									
Total PCB Aroclors (U = 0)			130	1000	N/A	N/A	N/A	N/A	N/A
PCB Aroclors (mg/kg-OC)									
Total PCB Aroclors (U = 0)	12	65			**60**	**1.1**	1 U	2 U	1 U

Notes:

Detected concentration is greater than SMS_CSL screening level
Detected concentration is greater than SMS_SQS screening level
Detected concentration is greater than LAET screening level
Detected concentration is greater than 2LAET screening level

Bold = Detected result
µg/kg = micrograms per kilogram
mg/kg-OC = milligrams per kilogram organic carbon normalized
CSL = Cleanup Screening Level
ft = feet
J = Estimated value
LAET = lowest apparent effects threshold
2LAET = second lowest apparent effects threshold
N/A = not applicable
PCB = polychlorinated biphenyls
pct = percent
SMS = Sediment Management Standards
SQS = Sediment Quality Standard
U = Compound analyzed, but not detected above detection limit
UJ = Compound analyzed, but not detected above estimated detection limit

Table 2
Core Collection Coordinates, Mudlines, and Core Lengths

			Coordinates[1]						
			Proposed		Actual				
Station	Date Collected	Date Processed	Easting	Northing	Easting	Northing	Mudline elevation (ft)	Core Length (ft)	% Recovery
JVE-01	2/16/2011	2/18/2011	195767.61	1275751.77	1275754	195763.9	-3.2	9.7	77%
JVE-02	2/16/2011	2/21/2011	195713.12	1275800.18	1275803	195713.4	-1.6	9.6	72%
JVE-03	2/16/2011	2/21/2011	195683.35	1275760.69	1275760	195683.3	-8.3	12.2	91%
JVE-04	2/16/2011	2/21/2011	195672.00	1275802.41	1275803	195674.6	-2.8	9.2	84%
JVE-07	2/16/2011	2/18/2011	195360.20	1275911.45	1275916	195362.3	-5.7	12.2	89%
JVE-205	2/15/2011	2/17/2011	195647.93	1275757.13	1275755	195646.3	-12.8	12.1	91%
JVE-206	3/10/2011	3/16/2011	195605.56	1275810.60	1275802	195613	-10.7	13.6	99%
JVE-207	2/15/2011	2/16/2011	195554.64	1275814.17	1275817	195556.4	-11.5	12.6	92%
JVE-208	3/10/2011	3/16/2011	195510.54	1275850.65	1275835	195513.2	-13.4	12.7	93%
JVE-210	2/15/2011	2/16/2011	195365.23	1275861.23	1275858	195359.4	-14.9	12.7	93%
JVE-215	2/15/2011	2/16/2011	195465.90	1275836.22	1275843	195459.6	-13.4	12.8	98%
JVE-216	2/16/2011	2/18/2011	195183.68	1275931.56	1275929	195180.9	-13.5	12.1	89%
JVE-309	2/15/2011	2/17/2011	195580.00	1275858.00	1275853	195575.6	-4.2	11.5	92%
JVE-311	2/15/2011	2/17/2011	195460.00	1275899.00	1275895	195460.9	-4	9.4	76%
JVE-314	2/16/2011	2/18/2011	195235.00	1275968.00	1275967	195235.2	-4.1	7.9	94%
JVE-316	2/15/2011	2/17/2011	195650.00	1275820.00	1275819	195650.5	-4.3	9.7	75%
JVE-320	2/15/2011	2/17/2011	195387.00	1275927.00	1275930	195388	-2.6	12.9	93%
JVE-322	2/16/2011	2/18/2011	195314.00	1275870.00	1275867	195315.2	-15.4	12.4	92%

Notes:

1 = Coordinates are in NAD83 Washington State Plane North

ft = feet

NAD83 = North American Datum 1983

Table 3
Bottom Elevation, Maximum Bed Shear, and Calculated Stable Particle Sizes

Event Return Period (year)	Range of bottom elevations (feet MLLW)	Maximum bed shear stress (psf)	Stable grain size (mm)
2	-3.4 to -8.4	0.04	3.0
10	-3.4 to -8.4	0.06	5.0
100	-13. 4 to -18.4	0.08	6.0

Notes:
MLLW = mean lower low water
mm = millimeters
psf = pounds per square foot

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Table 4
Backfill Material Gradation Specification

U.S. Standard Sieve Size	Percent Passing by Weight
3/8 inch	100
No. 4	95 - 100
No. 8	80 - 95
No. 16	40 - 70
No. 50	3 - 10
No. 200 wet	0 - 2

Note:
No. = number

Table 5
Backfill Chemical Acceptance Criteria[1]

Parameter	Backfill Levels (mg/kg)
Metals	
Arsenic	13.6
Cadmium	<5.1
Chromium[2]	67.6
Copper	49.9
Lead	250
Mercury	<0.41
Silver	<6.1
Zinc	<410
Organics	
PCBs[3]	< PQL of 0.03
SMS Organics[3]	< SMS SQS/LAET (expressed as dry weight)

Notes:

1. The EPA-approved backfill concentration levels are defined in the EPA letter RE: *Action Memorandum, Responsiveness Summary and Future Actions*, Jorgensen Forge Early Action Area, 8431 East Marginal Way South, Seattle, Washington, Comprehensive Environmental Response, Compensation and Liability Action (CERCLA) Administrative Order on Consent (EPA Docket No. CERCLA-10-2003-001) dated October 7, 2011.
2. See text in Action Memorandum for type of chromium used for this backfill level.
3. The PCBs and SMS SQS are listed as including the dry weight equivalents of the standards because the fill material is expected to contain very little organic carbon, making it inappropriate to carbon normalize the organic concentrations.

EPA = U.S. Environmental Protection Agency
LAET = Lowest Apparent Effects Threshold
mg/kg: milligram per kilogram
PCB = Polychlorinated biphenyl
PQL = Practical Quantitation Limit
SMS = Sediment Management Standard
SQS = Sediment Quality Standard

Table 6
WSDOT Light Loose Riprap Gradation Specification

Size Range	Maximum Size
20% to 90%	300 lbs to 1 ton (2 cubic feet to 1/2 cubic yards)
15% to 80%	50 lbs to 1 ton (1/3 cubic feet to 1/2 cubic yards)
10% to 20%	50 lbs (spalls)

Notes:
lbs = pounds
WSDOT = Washington State Department of Transportation

EMJ014184

Table 7
Filter Material Gradation Specification

U.S. Standard Sieve Size	Percent Passing by Weight
4 inch	90–100
3/4 inch	50–75
No. 4	35–55
No. 10	25–45
No. 40	10–25
No. 200	0–4 (wet sieve)

Note:
No. = number

Table 8
Habitat Substrate Material Gradation Specification

U.S. Standard Sieve Size	Percent Passing by Weight
2 1/2 inch	95 – 100
2 inch	70 – 100
1 1/2 inches	40 – 90
1 inch	3 – 30
3/4 inch	15 maximum
No. 200	5 maximum

Note:
No. = number

EMJ014186

Table 9
Applicable or Relevant and Appropriate Requirements

Topic	Standard or Requirement	Regulatory Citation		Comment	Compliance
		Federal	State		
Sediment Quality	Sediment quality standards; cleanup screening levels		Sediment Management Standards (WAC 173-204)	The SMS is a statutory requirement under MTCA and an ARAR under CERCLA. Numerical standards for the protection of benthic marine invertebrates.	As stated in the Action Memo, SMS numerical standards will be fully complied with. The SMS establish a narrative standard with specific biological effects criteria and numerical chemical concentrations for Puget Sound sediment. Under the SMS, the cleanup of a site should result in the elimination of adverse effects on biological resources and any health threats to humans. SMS has numerical standards for biological resources, and narrative standards for protection of human health. Further, the design requires the use of imported "clean" sand, gravel, and rock for backfill and slope containment materials, and the materials will be tested prior to placement.
Fish Tissue Quality	Concentrations of chemicals in fish tissues	Food and Drug Administration Maximum Concentrations of Contaminants in Fish Tissue (49 CFR 10372-10442)		The Washington State Department of Health assesses the need for fish consumption advisories.	The goal for the entire LDW is to meet RAO for reducing human health risks assocaited with consumption of resident LDW seafood. Achieving the RBCs necessary for this RAO may be impossible as the RBCs are more stringent than backgoround. This sediment removal will remove all impacted sediments and replace them with clean fill and will meet all cleanup goals and levels. As indicated in the Action Memo, further fish consumption advisories and/or other measures with respect to the RAB will be re-evaluated in the LDW-wide remedial decision-making process.
Surface Water Quality	Surface Water Quality Standards	Ambient Water Quality Criteria established under Section 304(a) of the Clean Water Act (33 USC 1251 et seq) http://www.epa.gov/ost/criteria/wgctable/	Surface Water Quality Standards (RCW 90-48; WAC 173-201A)	State surface water quality standards apply where the State has adopted and the U.S. Environmental Protection Agency has approved Water Quality Standards Federal recommended Water Quality Criteria established under Section 304(a) of the Clean Water Act that are more stringent than State criteria and that are relevant and appropriate also apply. Both chronic and acute standards, and marine and freshwater are used as appropriate.	WAC 173-201A sets forth water quality standards that must be met in the RAB. The most important standards for slope reconfiguration and containment and sediment dredging and backfill activities are turbidity, dissolved oxygen (DO), and toxic substances limits. These water quality standards must be met at the compliance point established by the water quality certificate.
Land Disposal of Waste	Disposal of materials containing PCBs	Toxic Substances Control Act (15 USC 2605; 40 CFR Part 761)			This regulation is applicable to excavated or dredged materials containing PCBs. The removal action will comply with TSCA by disposing of any soils and/or sediments with total PCB concentrations greater than 50 mg/kg at a TSCA landfill. However, predesign investigations do not indicate that such material exists. Disposal of soils and/or sediments with total PCB concentrations less than 50 mg/kg will follow the substantive requirements of 40 CFR 761.61, cleanup and disposal requirements for PCB remediation waste. Material meeting the definition of PCB remediation waste (761.3) must be disposed of pursuant to one or a combination of the three options under Section 761.61 (self-implementing option; performance-based option, and a risk-based option).
	Hazardous waste	Resource Conservation and Recovery Act Land Disposal Restrictions (42 USC 7401-7642; 40 CFR 268)	Dangerous Waste Regulations Land Disposal Restrictions (RCW 70.105; WAC 173-303, -140, -141)		The upland disposal of dredged contaminated sediments is not exempt from federal and state solid waste management requirements. The requirements of the federal regulations have been incorporated into Ecology's solid waste regulations and the removal action is not anticipated to generate hazardous wastes as defined by Ecology.
Waste Treatment Storage and Disposal		Resource Conservation and Recovery Act (42 USC 7401-7642;40 CFR 264 and 265)	Dangerous Waste Regulations (RCW 70.105; WAC 173-303)		The disposal of dredged sediments in an upland facility where there is no connection to surface water is not exempt from regulation. This exemption has been adopted by Ecology. All dredged material and debris will be transported according to the regulations. All dredged material and debris disposed of in an appropriately permitted upland disposal facility.
Noise	Maximum noise levels		Noise Control Act of 1974 (RCW 80.107; WAC 173-60)		Work will be conducted within the parameters of City of Tukwila noise ordinances.

Table 9
Applicable or Relevant and Appropriate Requirements

Topic	Standard or Requirement	Regulatory Citation		Comment	Compliance
		Federal	State		
Groundwater		Safe Drinking Water Act MCLs and non-zero MCLGs (40 CFR 141)	RCW 43.20A.165 and WAC 173-290-310	For on-site potable water, if any.	Groundwater beneath the facility is not potable due to marine tidal instrusion per salinity criteria in WAC 173-340-720(2). Drinking water standards are therefore not appropriate; however, groundwater was characterizaed as a potential surface water source. No exceedances have been reported from groundwater sampling in the RAB, with the exception of an anomalous detection from a single monitoring well.
Dredge/Fill and Other In-water Construction Work	Discharge of dredged/fill material into navigable waters or wetlands	Clean Water Act (33 USC 401 et seq; 33 USC 141; 33 USC 1251-1316; 40 CFR 230,231,404; 33 CFR 320-330) Rivers and Harbors Act (33 USC 401 et seq)	Hydraulic Code Rules (RCW 75.20; WAC 220-110)	For in-water dredging, filling or other construction.	The requirements of Section 10 have been addressed by EPA through addressing requirements of Section 404 of the CWA.
	Open-water disposal of dredged sediments	Marine Protection, Research and Sanctuaries Act (33 USC 1401-1445) 40 CFR 227	DMMP (RCW 79.90; WAC 332-30-166)		No open water disposal of dredged sediments in proposed as part of the removal action, therefore this is not applicable.
Solid Waste Disposal	Requirements for solid waste handling management and disposal	Solid Waste Disposal Act (42 USC 215103259-6901-6991; 40 CFR 257,258)	Solid Waste Handling Standards (RCW 70.95; WAC 173-350)		These requirements are applicable to the disposal of non-hazardous waste generated during removal activities. Because the disposal of the dredged sediments and debris will take place in a permitted solid waste landfill that is outside the site boundaries, both substantive and administrative requirements of applicable regulations must be met for this activity. The offsite rule (40 CFR 302.440) of the NCP requires that solid and hazardous waste offsite landfills to which CERCLA hazardous substances are being sent must be acceptable to EPA. The project specifications require the contractor to obtain EPA approval of the proposed disposal facility. The requirements for disposal of dredged sediments will be found in the permit of the landfill that agrees to accept the waste.
Discharge to Surface Water	Point source standards for new discharges to surface water	National Pollutant Discharge Elimination System (40 CFR 122, 125)	Discharge Permit Program (RCW 90.48; WAC 173-216, -222)		The substantive requirements of the state National Pollutant Discharge Elimination System (NPDES) program will be satisfied with EPA's finding that substantive requirements of the CWA 401 Water Quality Certification have been met. The discharge must not cause a violation of surface water quality standards outside the established compliance point.
Shoreline	Construction and development		Shoreline Management Act (RCW 90.58; WAC 173-16); King County Shoreline Master Plan and City of Tukwiilla Zoning Code (KCC Title 25; TMC 18.44)	For construction within 200 feet of the shoreline.	According to SMA regulation WAC 173-27-060, federal agency actions within a coastal county such as King County must be consistent to the maximum extent practicable with the approved Washington state coastal zone management program, subject to certain limitations set forth in the Federal Coastal Zone Management Act, 16 USC. 145 1 et seq. and regulations adopted pursuant to it. Tukwila Municipal Code 18.44 applies to all properties within the shoreline overlay as designated by the Shoreline Management Act at WAC 173-16. The removal of material and slope reconfiguration will improve shoreline conditions and is consistent with applicable regulations.
Floodplain Protection	Avoid adverse impacts, minimize potential harm,	Executive Order 11988, Protection of Flood Plains (40 CFR 6, Appendix A); FEMA National Flood Insurance Program Regulations [44 CFR 60.3Ld][3]).	KCC Title 9, TMC 16.52	For in-water construction activities, including any dredge or fill operations.	The substantive requirements of EO 11988 and 44 CFR 60.3Ld(3) are determination of no net change in the flood elevation as a result of the action. The removal action combined with the slope reconfiguration and containment will result in minimal changes to the bathymetry in the RAB due to the requirement that all dredged areas will be backfilled to grade. The CWA Section 404(b)(1) Evaluation indicates that the removal action will not have any impact on water circulation patterns, flows or currents.
Critical (or Sensitive) Area			Growth Management Act (RCW 37.70a); King County Critical Area Ordinance (KCC Title 21A.24); City of Tukwila (TMC 18.45.020)		The proposed removal action is consistent with the MTCA and the Shoreline ARARs and is therefore substantively compliant with critical area protections; the City of Tukwila designated the Green/Duwamish River environmentally sensitive areas and the implementation of the remedy will result in overall improvements to the LDW.

Table 9
Applicable or Relevant and Appropriate Requirements

Topic	Standard or Requirement	Regulatory Citation		Comment	Compliance
		Federal	State		
Dredge and Fill Requirements		Clean Water Act (Section 404 (b)(1)); 40 CFR 230		CWA regulations at 40 CFR Part 230 set for specific standards to evaluate the proposed placement of dredged or fill material into waters of the United States.	Concurrent with the Final EE/CA, a Section 404(b)(1) evaluation was completed for the project demonstrated that the preferred in-water removal action would be in substantive compliance with the requirements of CWA Section 404
Habitat for and Impacts to Protected Species and Habitats	Evaluate potential species and habitat impacts	U.S. Fish and Wildlife Mitigation Policy (44 FR 7644); U.S. Fish and Wildlife Coordination Act (16 USC 661 et seq); Migratory Bird Treaty Act (16 USC 703); Endangered Species Act (50 CFR 402); Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801); Marine Mammal Protection Act (16 USC 31); Bald and Golden Eagle Protection Act (16 U.S.C. 668)			EPA is consulting with U.S. Fish and Wildlife Service, National Marine Fisheries Service, and the Washington Department of Fish and Wildlife regarding potential effects of the removal action of fish and wildlife and measures that would avoid and minimize those impacts. During the removal action, efforts will be taken as needed to protect listed species and their habitat; protect habitat for migratory birds/eagles and avoid disturbances of their nests and eggs; avoid disturbance of marine mammals.
Pretreatment Standards	National Pretreatment Standards		40 CFR Part 403; Metro District Wastewater Discharge Ordinance (KCC) to be considered (as is local requirement)		The substantive requirements of the state National Pollutant Discharge Elimination System program will be satisfied with EPA's finding that substantive requirements of the CWA 401 WAter Quality Certification have been met. The discharge must not cause a violation of surface water quality standards outside the established mixing zone and applicable waterwater discharge requirements under local regulations.
Environmental Impact Review	State Environmental Policy Act		State Environmental Policy Act (RCW 43.21C; WAC 197-11-790)	Applicable to MTCA cleanups.	The proposed removal action is consistent with the MTCA and other ARARs as described above, and is therefore substantively compliant with SEPA

Notes:
ARARs = Applicable or Relevant and Appropriate Requirements
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
CFR = Code of Federal Regulations
DMMP = Dredged Material Management Program
EE/CA = Engineering Evaluation/Cost Analysis
EO = Executive Order
FEMA = Federal Emergency Management Agency
KCC = King County Code
LDW = Lower Duwamish Waterway
MCL = Maximum Containment Level
MTCA = Model Toxics Control Act
NCP = National Contingency Plan
PCBs = polychlorinated biphenyls
RAO = Remedial Action Objective
RBCs = Risk Based Concentration
RCW = Revised Code of Washington
TMC = Tukwila Municipal Code
WAC = Washington Administrative Code
USC = United States Code
SMC = Seattle Municipal Code
SMS = Sediment Management Standards

FIGURES

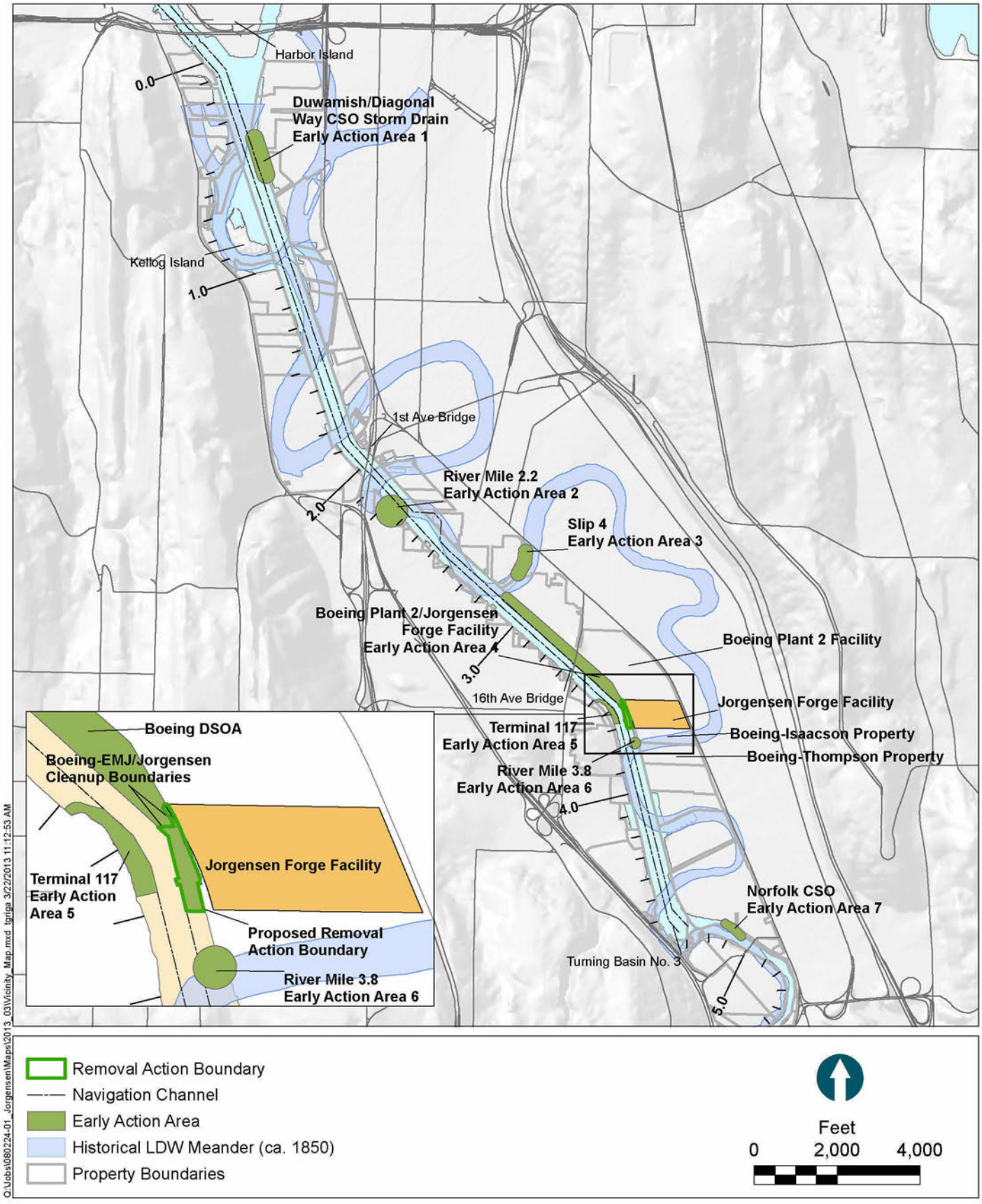

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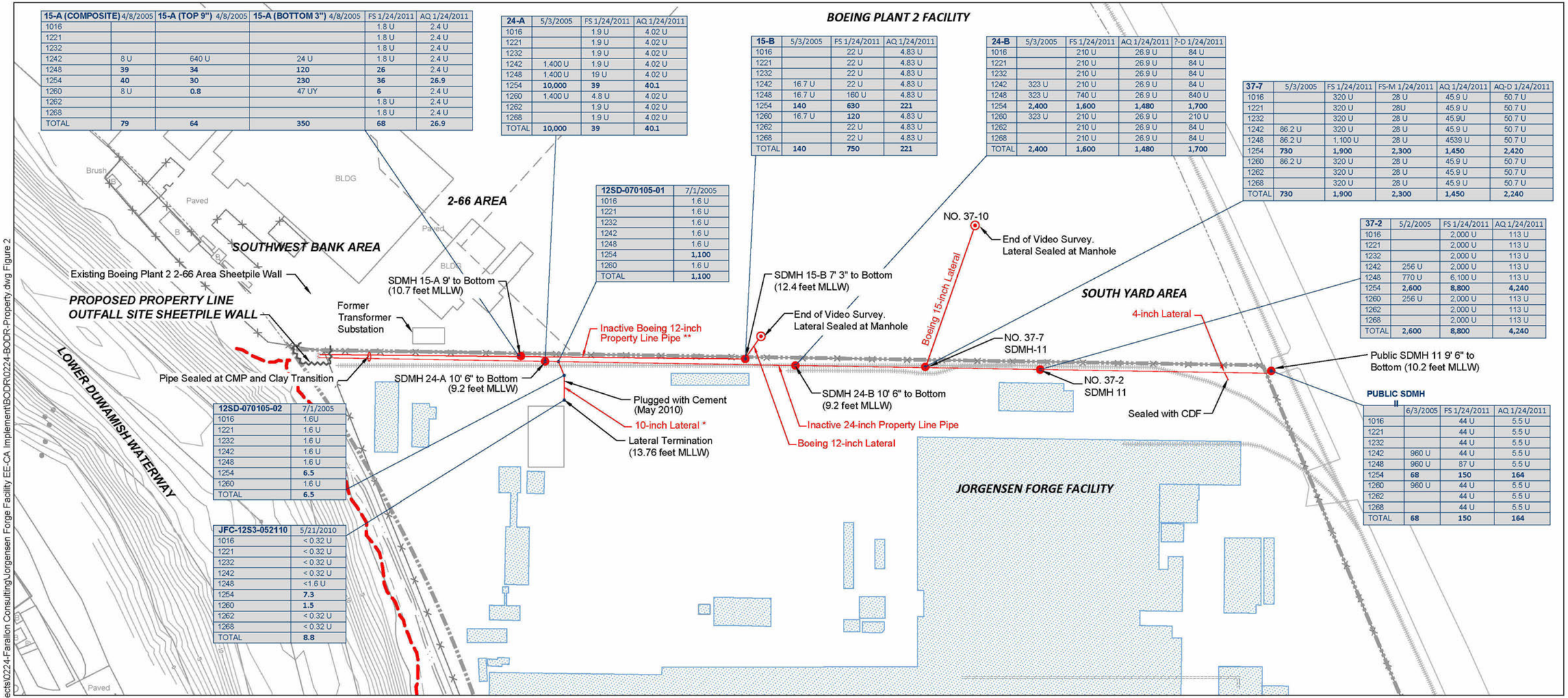
Figure 1
Removal Action Vicinity Map
Basis of Design Report
Jorgensen Forge Early Action Area



15-A (COMPOSITE)	4/8/2005	15-A (TOP 9") 4/8/2005	15-A (BOTTOM 3") 4/8/2005	FS 1/24/2011	AQ 1/24/2011
1016				1.8 U	2.4 U
1221				1.8 U	2.4 U
1232				1.8 U	2.4 U
1242	8 U	640 U	24 U	1.8 U	2.4 U
1248	**39**	**34**	**120**	**26**	2.4 U
1254	**40**	**30**	**230**	**36**	**26.9**
1260	8 U	**0.8**	47 UY	**6**	2.4 U
1262				1.8 U	2.4 U
1268				1.8 U	2.4 U
TOTAL	**79**	**64**	**350**	**68**	**26.9**

24-A	5/3/2005	FS 1/24/2011	AQ 1/24/2011
1016		1.9 U	4.02 U
1221		1.9 U	4.02 U
1232		1.9 U	4.02 U
1242	1,400 U	1.9 U	4.02 U
1248	1,400 U	19 U	4.02 U
1254	**10,000**	**39**	**40.1**
1260	1,400 U	4.8 U	4.02 U
1262		1.9 U	4.02 U
1268		1.9 U	4.02 U
TOTAL	**10,000**	**39**	**40.1**

12SD-070105-01	7/1/2005
1016	1.6 U
1221	1.6 U
1232	1.6 U
1242	1.6 U
1248	1.6 U
1254	**1,100**
1260	1.6 U
TOTAL	**1,100**

12SD-070105-02	7/1/2005
1016	1.6U
1221	1.6 U
1232	1.6 U
1242	1.6 U
1248	1.6 U
1254	**6.5**
1260	1.6 U
TOTAL	**6.5**

JFC-12S3-052110	5/21/2010
1016	< 0.32 U
1221	< 0.32 U
1232	< 0.32 U
1242	< 0.32 U
1248	<1.6 U
1254	**7.3**
1260	**1.5**
1262	< 0.32 U
1268	< 0.32 U
TOTAL	**8.8**

15-B	5/3/2005	FS 1/24/2011	AQ 1/24/2011
1016		22 U	4.83 U
1221		22 U	4.83 U
1232		22 U	4.83 U
1242	16.7 U	22 U	4.83 U
1248	16.7 U	160 U	4.83 U
1254	**140**	**630**	**221**
1260	16.7 U	**120**	4.83 U
1262		22 U	4.83 U
1268		22 U	4.83 U
TOTAL	**140**	**750**	**221**

24-B	5/3/2005	FS 1/24/2011	AQ 1/24/2011	?-D 1/24/2011
1016		210 U	26.9 U	84 U
1221		210 U	26.9 U	84 U
1232		210 U	26.9 U	84 U
1242	323 U	210 U	26.9 U	84 U
1248	323 U	740 U	26.9 U	840 U
1254	**2,400**	**1,600**	**1,480**	**1,700**
1260	323 U	210 U	26.9 U	210 U
1262		210 U	26.9 U	84 U
1268		210 U	26.9 U	84 U
TOTAL	**2,400**	**1,600**	**1,480**	**1,700**

37-7	5/3/2005	FS 1/24/2011	FS-M 1/24/2011	AQ 1/24/2011	AQ-D 1/24/2011
1016		320 U	28 U	45.9 U	50.7 U
1221		320 U	28U	45.9 U	50.7 U
1232		320 U	28 U	45.9U	50.7 U
1242	86.2 U	320 U	28 U	45.9 U	50.7 U
1248	86.2 U	1,100 U	28 U	4539 U	50.7 U
1254	**730**	**1,900**	**2,300**	**1,450**	**2,420**
1260	86.2 U	320 U	28 U	45.9 U	50.7 U
1262		320 U	28 U	45.9 U	50.7 U
1268		320 U	28 U	45.9 U	50.7 U
TOTAL	**730**	**1,900**	**2,300**	**1,450**	**2,240**

37-2	5/2/2005	FS 1/24/2011	AQ 1/24/2011
1016		2,000 U	113 U
1221		2,000 U	113 U
1232		2,000 U	113 U
1242	256 U	2,000 U	113 U
1248	770 U	6,100 U	113 U
1254	**2,600**	**8,800**	**4,240**
1260	256 U	2,000 U	113 U
1262		2,000 U	113 U
1268		2,000 U	113 U
TOTAL	**2,600**	**8,800**	**4,240**

PUBLIC SDMH II	6/3/2005	FS 1/24/2011	AQ 1/24/2011
1016		44 U	5.5 U
1221		44 U	5.5 U
1232		44 U	5.5 U
1242	960 U	44 U	5.5 U
1248	960 U	87 U	5.5 U
1254	**68**	**150**	**164**
1260	960 U	44 U	5.5 U
1262		44 U	5.5 U
1268		44 U	5.5 U
TOTAL	**68**	**150**	**164**

LEGEND:

- SDMH 15A — Manhole Location Sealed with CDF in February of 2011
- NO. 37-10 — Unsealed Manhole Location
- 10' 6" to Bottom — Feet to Bottom of Pipe
- (10.7 feet MLLW) — Conversion to MLLW (Mean Lower Low Water)
- Property Boundary
- Railroad Spur
- Fence
- Current Facility Structures
- * Formerly Referred to as '12-Inch Lateral'
- ** Formerly Referred to as 'Boeing 15-Inch Property Line Pipe'

Sample ID	Sample Date
PCB Aroclor	Concentration (mg/kg)

- **BOLD** Detected PCB Aroclor Concentration
- U No Detectable Aroclor Concentrations Above the Listed Laboratory Reporting Limit
- Y Analyte Reporting Limit is Raised Due to a Positive Chromatographic Interference. The Compound is Not Detected Above the Raised Limit but may be Present At or Below the Limit
- FS Floyd Snider Sample
- AQ Anchor QEA Split Sample
- D Duplicate Sample
- Toe of Existing Riprap

SOURCE: Prepared from drawing provided by Farallon Consulting dated April 15, 2008.

NOTES:
1. All shown PCB concentrations are associated with solids sampled collected from bottom of Property Line Pipe at manhole locations shown on map.
2. Buildings and are not geo-referenced.
3. All Aroclor results in milligrams per kilogram (mg/kg).

HORIZONTAL DATUM: Washington State Plane North, NAD83.

0 140
Scale in Feet

K:\Projects\0224-Farallon Consulting\Jorgensen Forge Facility EE-CA Implement\BODR\0224-BODR-Property.dwg Figure 2

Mar 22, 2013 11:17am tgriga

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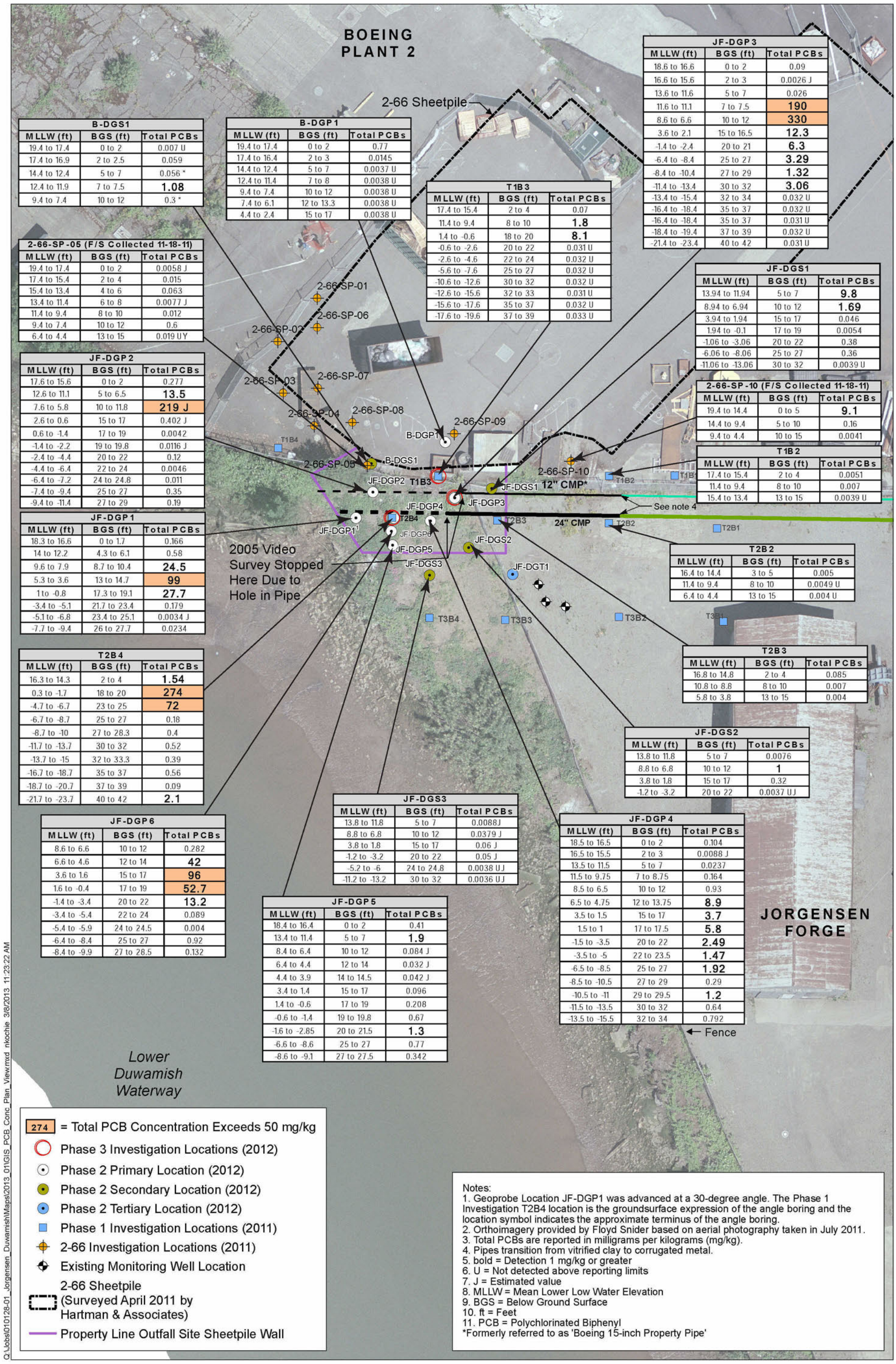
Figure 2
Property Line Pipe/Manhole Solids PCB Concentrations
Basis of Design Report
Jorgensen Forge Early Action Area

EMJ014192



B-DGS1

MLLW (ft)	BGS (ft)	Total PCBs
19.4 to 17.4	0 to 2	0.007 U
17.4 to 16.9	2 to 2.5	0.059
14.4 to 12.4	5 to 7	0.056 *
12.4 to 11.9	7 to 7.5	**1.08**
9.4 to 7.4	10 to 12	0.3 *

B-DGP1

MLLW (ft)	BGS (ft)	Total PCBs
19.4 to 17.4	0 to 2	0.77
17.4 to 16.4	2 to 3	0.0145
14.4 to 12.4	5 to 7	0.0037 U
12.4 to 11.4	7 to 8	0.0038 U
9.4 to 7.4	10 to 12	0.0038 U
7.4 to 6.1	12 to 13.3	0.0038 U
4.4 to 2.4	15 to 17	0.0038 U

JF-DGP3

MLLW (ft)	BGS (ft)	Total PCBs
18.6 to 16.6	0 to 2	0.09
16.6 to 15.6	2 to 3	0.0026 J
13.6 to 11.6	5 to 7	0.026
11.6 to 11.1	7 to 7.5	**190**
8.6 to 6.6	10 to 12	**330**
3.6 to 2.1	15 to 16.5	**12.3**
-1.4 to -2.4	20 to 21	**6.3**
-6.4 to -8.4	25 to 27	**3.29**
-8.4 to -10.4	27 to 29	**1.32**
-11.4 to -13.4	30 to 32	**3.06**
-13.4 to -15.4	32 to 34	0.032 U
-16.4 to -18.4	35 to 37	0.032 U
-16.4 to -18.4	35 to 37	0.031 U
-18.4 to -19.4	37 to 39	0.032 U
-21.4 to -23.4	40 to 42	0.031 U

T1B3

MLLW (ft)	BGS (ft)	Total PCBs
17.4 to 15.4	2 to 4	0.07
11.4 to 9.4	8 to 10	**1.8**
1.4 to -0.6	18 to 20	**8.1**
-0.6 to -2.6	20 to 22	0.031 U
-2.6 to -4.6	22 to 24	0.032 U
-5.6 to -7.6	25 to 27	0.032 U
-10.6 to -12.6	30 to 32	0.032 U
-12.6 to -15.6	32 to 33	0.031 U
-15.6 to -17.6	35 to 37	0.032 U
-17.6 to -19.6	37 to 39	0.033 U

2-66-SP-05 (F/S Collected 11-18-11)

MLLW (ft)	BGS (ft)	Total PCBs
19.4 to 17.4	0 to 2	0.0058 J
17.4 to 15.4	2 to 4	0.015
15.4 to 13.4	4 to 6	0.063
13.4 to 11.4	6 to 8	0.0077 J
11.4 to 9.4	8 to 10	0.012
9.4 to 7.4	10 to 12	0.6
6.4 to 4.4	13 to 15	0.019 UY

JF-DGS1

MLLW (ft)	BGS (ft)	Total PCBs
13.94 to 11.94	5 to 7	**9.8**
8.94 to 6.94	10 to 12	**1.69**
3.94 to 1.94	15 to 17	0.046
1.94 to -0.1	17 to 19	0.0054
-1.06 to -3.06	20 to 22	0.38
-6.06 to -8.06	25 to 27	0.36
-11.06 to -13.06	30 to 32	0.0039 U

JF-DGP2

MLLW (ft)	BGS (ft)	Total PCBs
17.6 to 15.6	0 to 2	0.277
12.6 to 11.1	5 to 6.5	**13.5**
7.6 to 5.8	10 to 11.8	**219 J**
2.6 to 0.6	15 to 17	0.402 J
0.6 to -1.4	17 to 19	0.0042
-1.4 to -2.2	19 to 19.8	0.0116 J
-2.4 to -4.4	20 to 22	0.12
-4.4 to -6.4	22 to 24	0.0046
-6.4 to -7.2	24 to 24.8	0.011
-7.4 to -9.4	25 to 27	0.35
-9.4 to -11.4	27 to 29	0.19

2-66-SP-10 (F/S Collected 11-18-11)

MLLW (ft)	BGS (ft)	Total PCBs
19.4 to 14.4	0 to 5	**9.1**
14.4 to 9.4	5 to 10	0.16
9.4 to 4.4	10 to 15	0.0041

T1B2

MLLW (ft)	BGS (ft)	Total PCBs
17.4 to 15.4	2 to 4	0.0051
11.4 to 9.4	8 to 10	0.007
15.4 to 13.4	13 to 15	0.0039 U

JF-DGP1

MLLW (ft)	BGS (ft)	Total PCBs
18.3 to 16.6	0 to 1.7	0.166
14 to 12.2	4.3 to 6.1	0.58
9.6 to 7.9	8.7 to 10.4	**24.5**
5.3 to 3.6	13 to 14.7	**99**
1 to -0.8	17.3 to 19.1	**27.7**
-3.4 to -5.1	21.7 to 23.4	0.179
-5.1 to -6.8	23.4 to 25.1	0.0034 J
-7.7 to -9.4	26 to 27.7	0.0234

T2B2

MLLW (ft)	BGS (ft)	Total PCBs
16.4 to 14.4	3 to 5	0.005
11.4 to 9.4	8 to 10	0.0049 U
6.4 to 4.4	13 to 15	0.004 U

T2B4

MLLW (ft)	BGS (ft)	Total PCBs
16.3 to 14.3	2 to 4	**1.54**
0.3 to -1.7	18 to 20	**274**
-4.7 to -6.7	23 to 25	**72**
-6.7 to -8.7	25 to 27	0.18
-8.7 to -10	27 to 28.3	0.4
-11.7 to -13.7	30 to 32	0.52
-13.7 to -15	32 to 33.3	0.39
-16.7 to -18.7	35 to 37	0.56
-18.7 to -20.7	37 to 39	0.09
-21.7 to -23.7	40 to 42	**2.1**

T2B3

MLLW (ft)	BGS (ft)	Total PCBs
16.8 to 14.8	2 to 4	0.085
10.8 to 8.8	8 to 10	0.007
5.8 to 3.8	13 to 15	0.004

JF-DGS2

MLLW (ft)	BGS (ft)	Total PCBs
13.8 to 11.8	5 to 7	0.0076
8.8 to 6.8	10 to 12	**1**
3.8 to 1.8	15 to 17	0.32
-1.2 to -3.2	20 to 22	0.0037 UJ

JF-DGP6

MLLW (ft)	BGS (ft)	Total PCBs
8.6 to 6.6	10 to 12	0.282
6.6 to 4.6	12 to 14	**42**
3.6 to 1.6	15 to 17	**96**
1.6 to -0.4	17 to 19	**52.7**
-1.4 to -3.4	20 to 22	**13.2**
-3.4 to -5.4	22 to 24	0.089
-5.4 to -5.9	24 to 24.5	0.004
-6.4 to -8.4	25 to 27	0.92
-8.4 to -9.9	27 to 28.5	0.132

JF-DGS3

MLLW (ft)	BGS (ft)	Total PCBs
13.8 to 11.8	5 to 7	0.0088J
8.8 to 6.8	10 to 12	0.0379 J
3.8 to 1.8	15 to 17	0.06 J
-1.2 to -3.2	20 to 22	0.05 J
-5.2 to -6	24 to 24.8	0.0038 UJ
-11.2 to -13.2	30 to 32	0.0036 UJ

JF-DGP4

MLLW (ft)	BGS (ft)	Total PCBs
18.5 to 16.5	0 to 2	0.104
16.5 to 15.5	2 to 3	0.0088 J
13.5 to 11.5	5 to 7	0.0237
11.5 to 9.75	7 to 8.75	0.164
8.5 to 6.5	10 to 12	0.93
6.5 to 4.75	12 to 13.75	**8.9**
3.5 to 1.5	15 to 17	**3.7**
1.5 to 1	17 to 17.5	**5.8**
-1.5 to -3.5	20 to 22	**2.49**
-3.5 to -5	22 to 23.5	**1.47**
-6.5 to -8.5	25 to 27	**1.92**
-8.5 to -10.5	27 to 29	0.29
-10.5 to -11	29 to 29.5	**1.2**
-11.5 to -13.5	30 to 32	0.64
-13.5 to -15.5	32 to 34	0.792

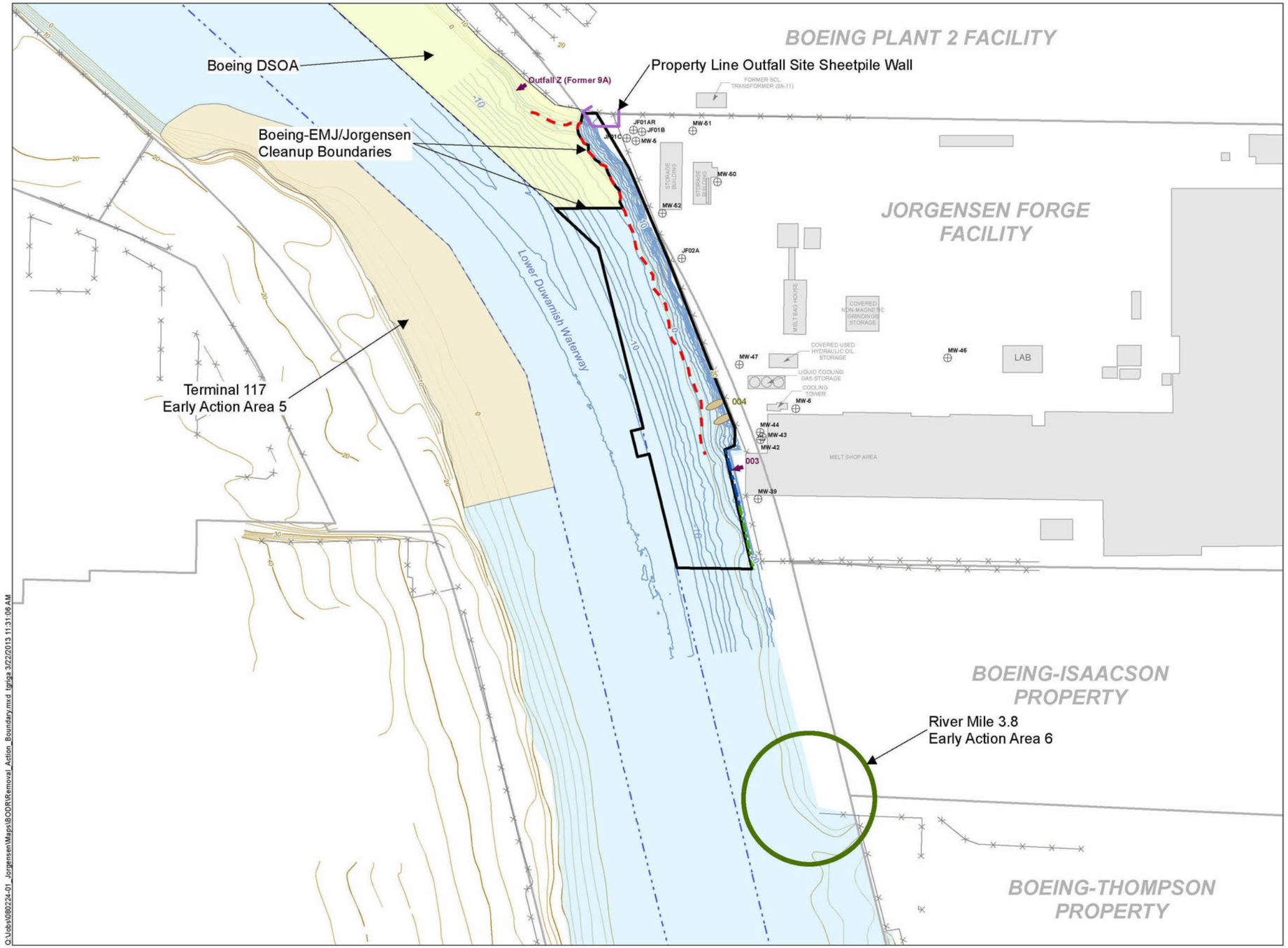
JF-DGP5

MLLW (ft)	BGS (ft)	Total PCBs
18.4 to 16.4	0 to 2	0.41
13.4 to 11.4	5 to 7	**1.9**
8.4 to 6.4	10 to 12	0.084 J
6.4 to 4.4	12 to 14	0.032 J
4.4 to 3.9	14 to 14.5	0.042 J
3.4 to 1.4	15 to 17	0.096
1.4 to -0.6	17 to 19	0.208
-0.6 to -1.4	19 to 19.8	0.67
-1.6 to -2.85	20 to 21.5	**1.3**
-6.6 to -8.6	25 to 27	0.77
-8.6 to -9.1	27 to 27.5	0.342

ANCHOR QEA

Feet
0 12.5 25 37.5 50

Figure 3
Soil Total PCB Concentrations
Basis of Design Report
Jorgensen Forge Early Action Area



LEGEND

- Groundwater Monitoring Well
- Active Outfall
- Toe of Existing Riprap
- Existing Sheetpile Wall
- Existing Concrete Panel Wall
- Fences
- Federal Navigation Channel
- Removal Action Boundary
- Debris Pile
- Property Boundaries
- Boeing DSOA
- Terminal 117 Early Action Area 5 Boundary
- Property Line Outfall Site Sheetpile Wall

NOTES:

1. Bathymetric survey by eTrac dated February 8, 2012. Additional back survey by AEC Consultants, Inc. dated February 21, 2012. Bathymetric and bank survey merged with upland survey by PLS, Inc. dated January 24, 2012.

2. Outfall locations field identified on May 14, 2003.

3. The toe of riprap slope was surveyed during a low tide on August 28, 2008.

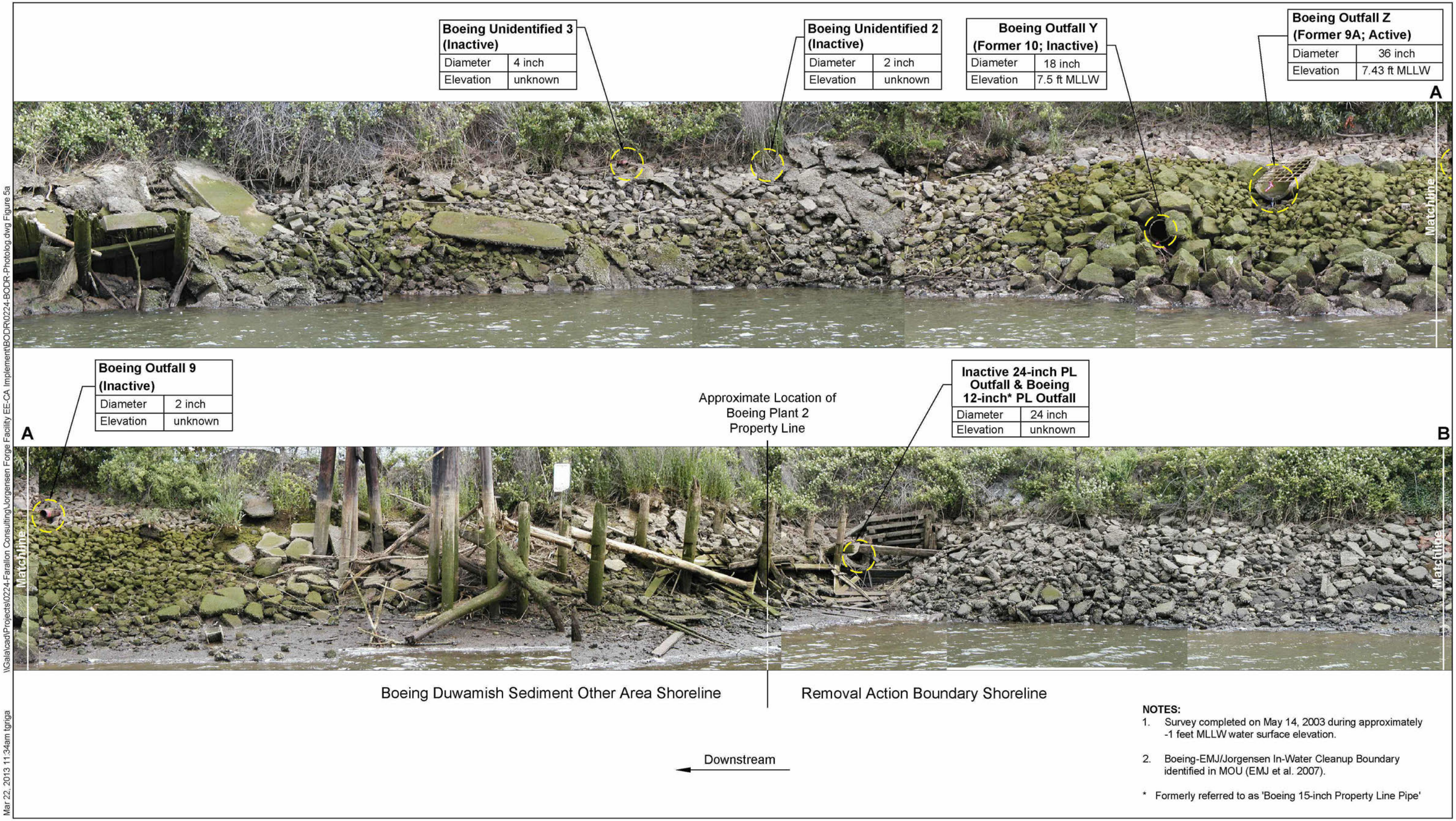
4. The Boeing-EMJ/Jorgensen cleanup boundaries are identified in the Memorandum of Understanding between Boeing and EMJ/Jorgensen Forge, dated August 2007 (EMJ et al. 2007).

Feet
0 80 160 240 320

Q:\Jobs\080224-01_Jorgensen\Maps\BODR\Removal_Action_Boundary.mxd tgriga 3/22/2013 11:31:06 AM

ANCHOR QEA

Figure 4
Removal Action Boundary
Basis of Design Report
Jorgensen Forge Early Action Area



NOTES:

1. Survey completed on May 14, 2003 during approximately -1 feet MLLW water surface elevation.
2. Boeing-EMJ/Jorgensen In-Water Cleanup Boundary identified in MOU (EMJ et al. 2007).

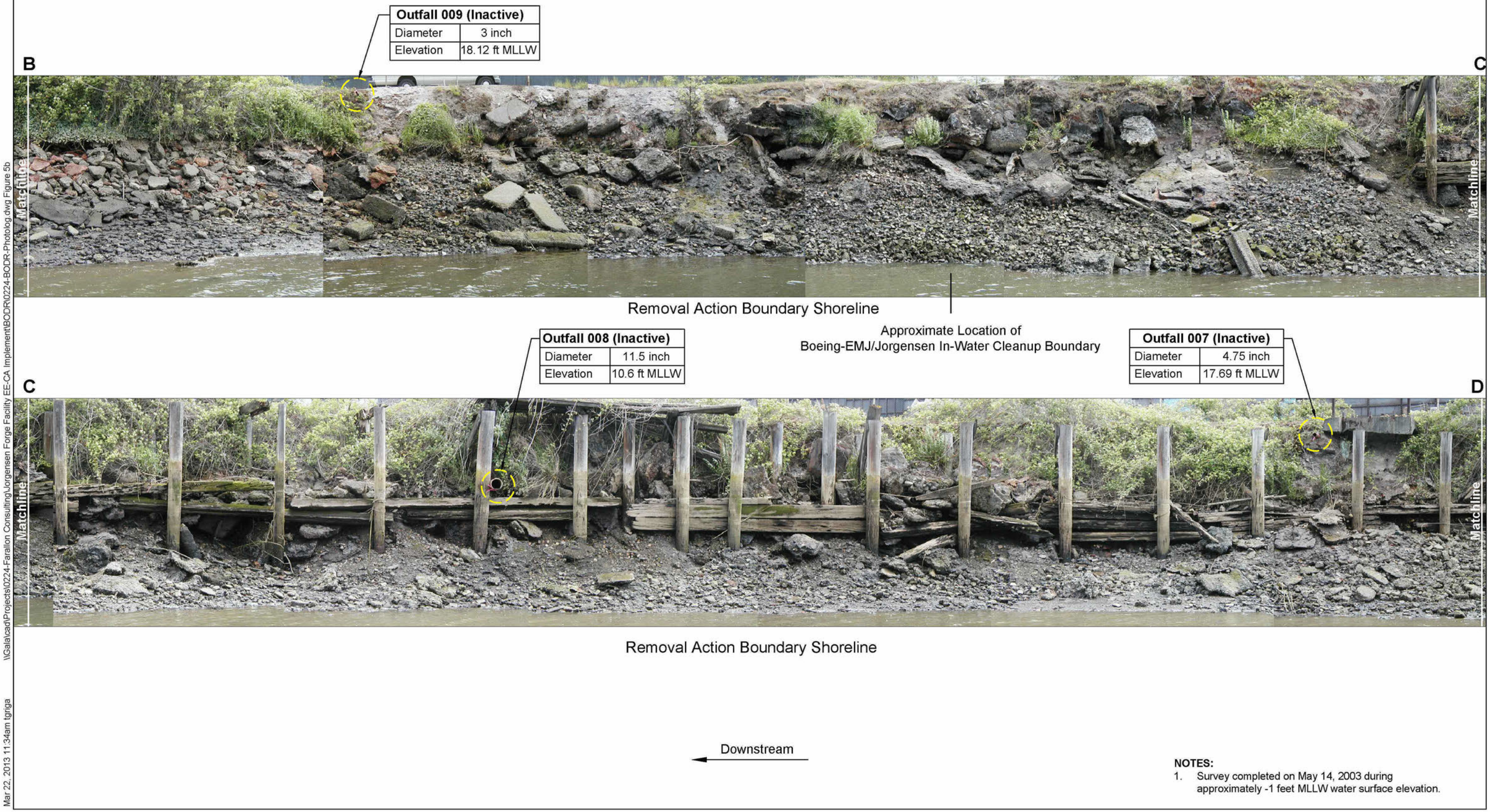
* Formerly referred to as 'Boeing 15-inch Property Line Pipe'

\\Galalcad\Projects\0224-Farallon Consulting\Jorgensen Forge Facility EE-CA Implement\BODR\0224-BODR-Photolog.dwg Figure 5a

Mar 22, 2013 11:34am tgriga

ANCHOR QEA

Figure 5a
Outfall and Shoreline Reconnaissance Photolog - Northern Shoreline
Basis of Design Report
Jorgensen Forge Early Action Area



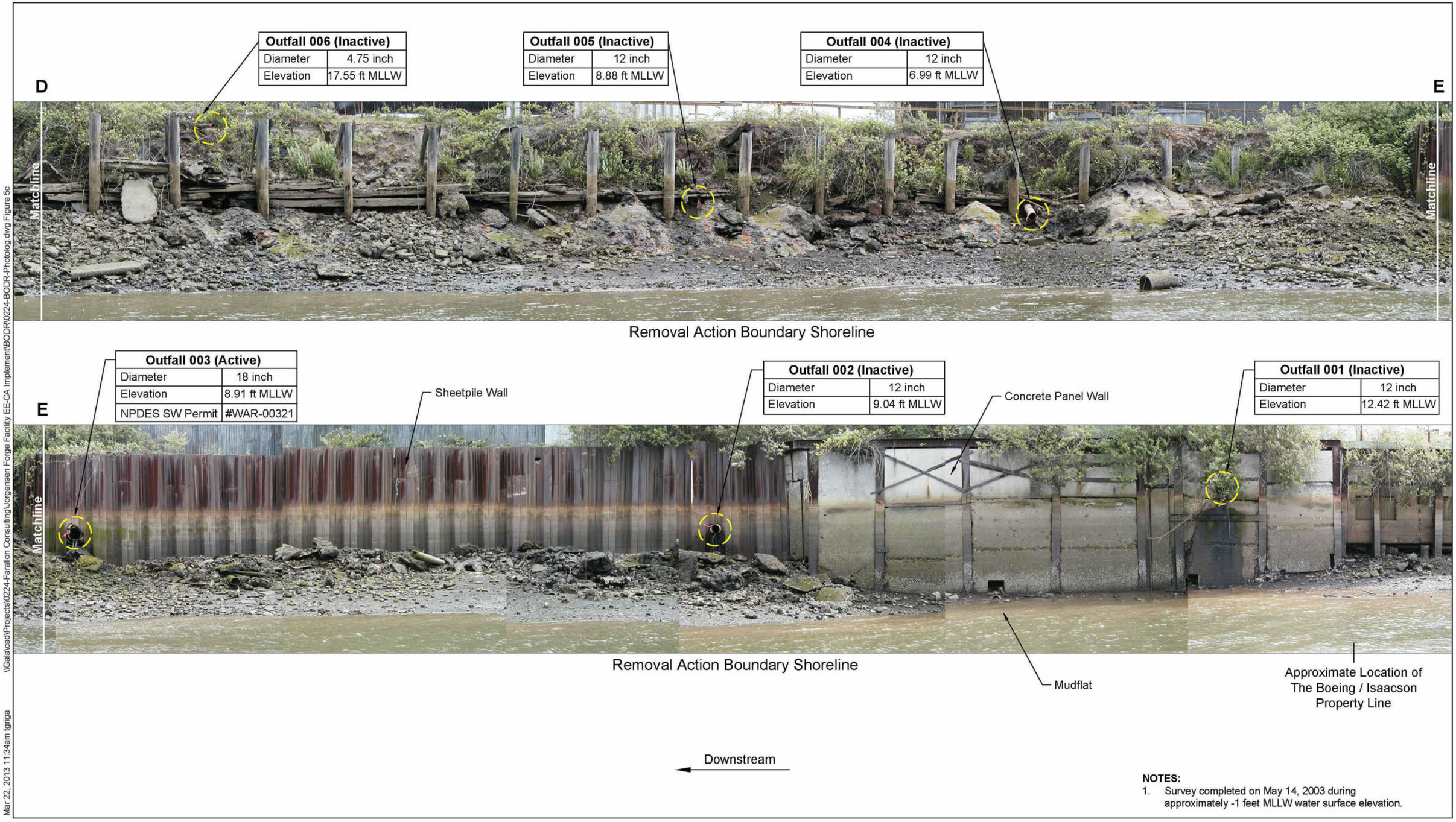
NOTES:

1. Survey completed on May 14, 2003 during approximately -1 feet MLLW water surface elevation.

Mar 22, 2013 11:34am tgriga \\Gala\cad\Projects\0224-Farallon Consulting\Jorgensen Forge Facility EE-CA Implement\BODR\0224-BODR-Photolog.dwg Figure 5b

ANCHOR QEA

Figure 5b
Outfall and Shoreline Reconnaissance Photolog - Central Shoreline
Basis of Design Report
Jorgensen Forge Early Action Area

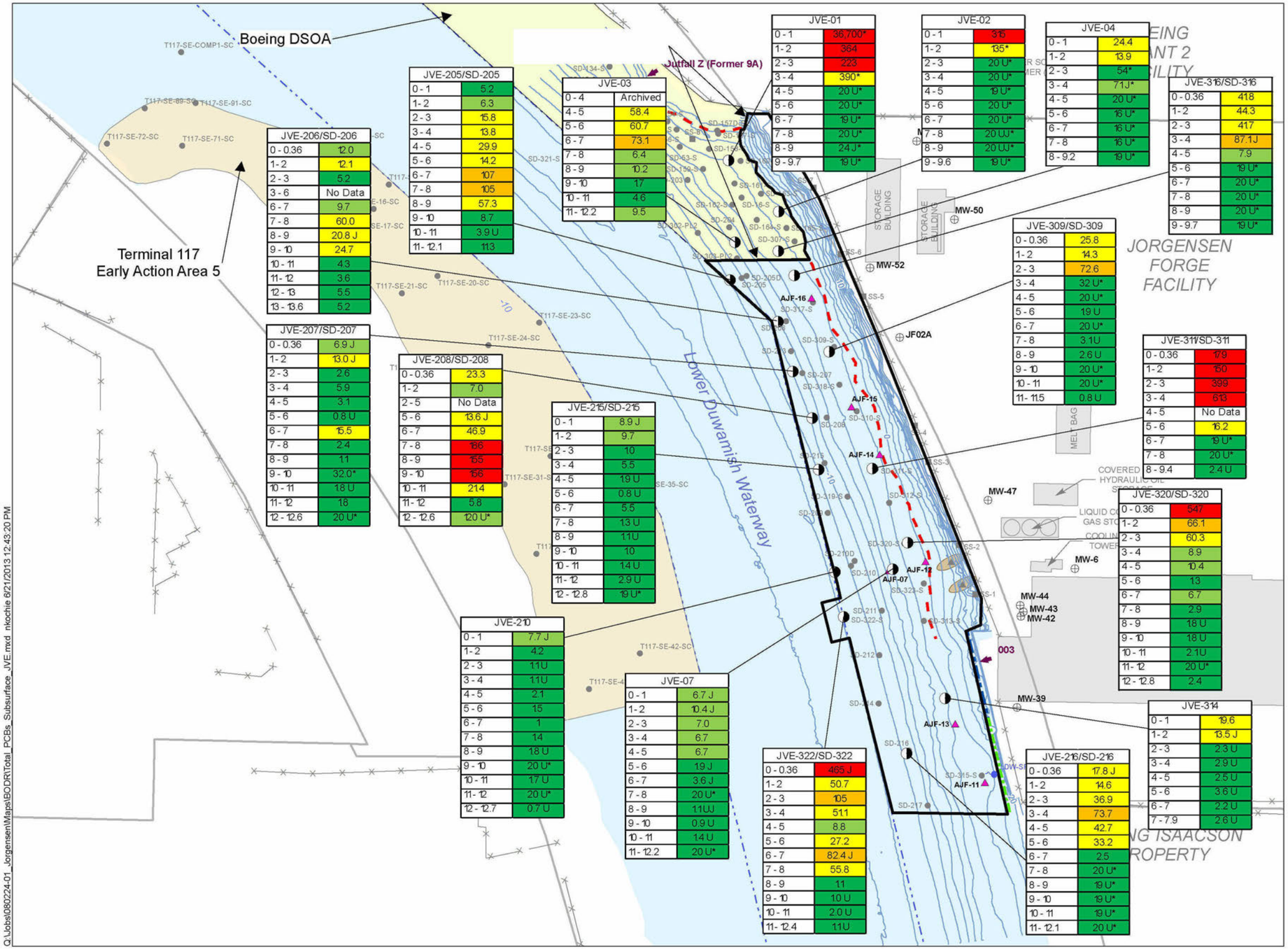


NOTES:
1. Survey completed on May 14, 2003 during approximately -1 feet MLLW water surface elevation.

Mar 22, 2013 11:34am tgriga \\Galatcad\Projects\0224-Farallon Consulting\Jorgensen Forge Facility EE-CA Implement\BODR\0224-BODR-Photolog.dwg Figure 5c

ANCHOR QEA

Figure 5c
Outfall and Shoreline Reconnaissance Photolog - Southern Shoreline
Basis of Design Report
Jorgensen Forge Early Action Area



Total PCBs[1]

- Less than 0.5x SQS/ LAET
- Between 0.5x SQS/ LAET to SQS/ LAET
- Between SQS/ LAET to CSL/ LAET
- Between CSL/ LAET to 2x CSL/ LAET
- Greater than 2x CSL/ LAET
- Non-detected Concentrations greater than SQS

JVE-04	
0 - 1	24.4
1 - 2	13.9
2 - 3	54*
3 - 4	71*

Subsurface Core Station ID

PCB Concentration (mg/kg-OC)

* PCB Concentration (µg/kg) for TOC value was greater than 0.5% or less than 3%

Depth Interval in feet

LEGEND

- Vertical Extent Sampling Location (Anchor, 2011)
- Subsurface Samples (Anchor, 2005)
- Subsurface Sampling Locations (others)
- Shoreline (0-2 ft) Bank Samples (Farallon, 2004)
- Debris Pile Samples (Farallon, 2004)
- Seep Sampling Location (Windward, 2004b)
- Groundwater Monitoring Well
- Active Outfall
- Existing Concrete Panel Wall
- Toe of Existing Riprap
- Existing Sheetpile Wall
- Fences
- Federal Channel
- Removal Action Boundary
- Debris Pile
- Property Boundaries
- Boeing DSOA
- Terminal 117 Early Action Area 5 Boundary

NOTES:

1. Sediment samples were OC-normalized and compared to SQS and CSL Total PCBs criteria. Sediment samples with TOC <0.5% or TOC >3% were not OC-normalized and were compared to LAET and 2LAET Total PCBs criteria. *TOC value was <0.5% or > 3%; reported in µg/kg dry weight.

2. Bathymetric survey by eTrac dated February 8, 2012. Additional back survey by AEC Consultants, Inc. dated February 21, 2012. Bathymetric and bank survey merged with upland survey by PLS, Inc. dated January 24, 2012.

3. Outfall locations field identified on May 14, 2003.

4. The toe of existing riprap slope was surveyed during a low tide on August 28, 2008.

5. The Boeing-EMJ/Jorgensen cleanup boundaries are identified in the Memorandum of Understanding between Boeing and EMJ/Jorgensen Forge, dated August 2007 (EMJ et al. 2007).

6. Sediment Quality Standard (SQS) = 12 mg/kg-OC.

7. Lower Apparent Effects Threshold (LAET) = 0.13 mg/kg.

8. Cleanup Screening Level (CSL) = 65 mg/kg-OC.

9. Second Lower Apparent Effects Threshold (2LAET) = 1 mg/kg.

10. U = Compound analyzed, but not detected above detection limit.

11. J = Estimated value.

12. UJ = Compound analyzed, but not detected above estimated detection limit.

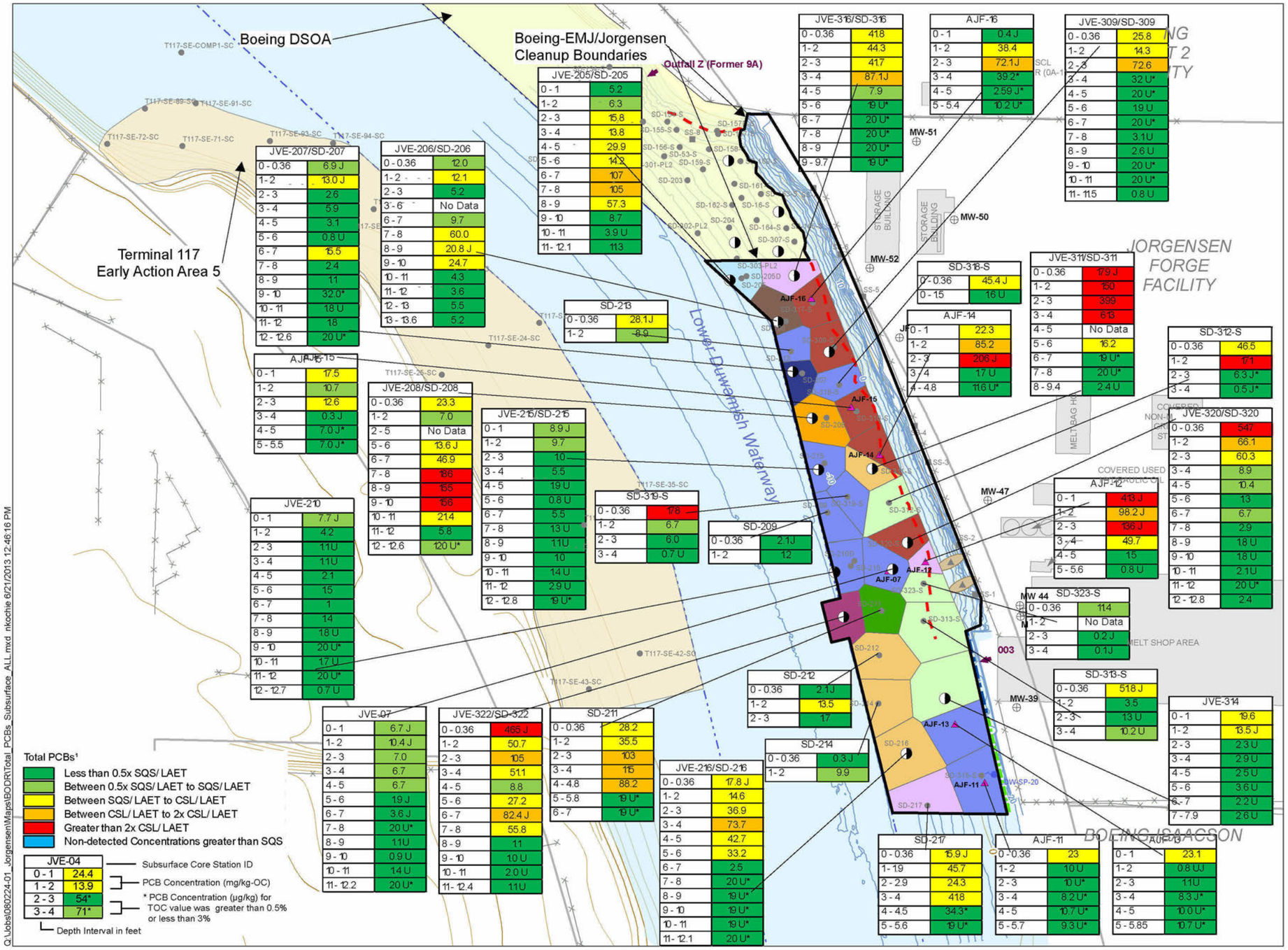
Q:\Jobs\080224-01_Jorgensen\Maps\BODR\Total_PCBs_Subsurface_JVE.mxd nkochie 6/21/2013 12:43:20 PM

ANCHOR QEA

Feet
0 50 100 150 200

Figure 6
Subsurface Total PCB Concentrations at Additional Design Sampling Locations
Basis of Design Report
Jorgensen Forge Early Action Area

EMJ014198



LEGEND

- Vertical Extent Sampling Location (Anchor, 2011)
- Subsurface Samples (Anchor, 2005)
- Subsurface Sampling Locations (others)
- Shoreline (0-2 ft) Bank Samples (Farallon, 2004)
- Debris Pile Samples (Farallon, 2004)
- Seep Sampling Location (Windward, 2004b)
- Groundwater Monitoring Well
- Active Outfall
- Concrete Panel Wall
- Toe of Riprap
- Sheetpile Wall
- Fences
- Federal Channel
- Removal Action Boundary
- Debris Pile
- Property Boundaries
- Boeing DSOA
- Terminal 117 Early Action Area 5 Boundary

Thiessen Polygon Depth of Contamination[2]

- 1 ft below mudline
- 2 ft below mudline
- 3 ft below mudline
- 4 ft below mudline
- 5 ft below mudline
- 6 ft below mudline
- 7 ft below mudline
- 8 ft below mudline
- 9 ft below mudline
- 10 ft below mudline
- 11 ft below mudline

NOTES:

1. Sediment samples were OC-normalized and compared to SQS and CSL Total PCBs criteria. Sediment samples with TOC <0.5% or TOC >3% were not OC-normalized and were compared to LAET and 2LAET Total PCBs criteria.
*TOC value was <0.5% or > 3%; reported in µg/kg dry weight.

2. The depth of contamination was determined based on exceedances of the Total PCB Removal Action Level (RvAL), which EPA identified as the SQS concentration.

3. Bathymetric survey by eTrac dated February 8, 2012. Additional back survey by AEC Consultants, Inc. dated February 21, 2012. Bathymetric and bank survey merged with upland survey by PLS, Inc. dated January 24, 2012.

4. Outfall locations field identified on May 14, 2003.

5. The toe of riprap slope was surveyed during a low tide on August 28, 2008.

6. The Boeing-EMJ/Jorgensen cleanup boundaries are identified in the Memorandum of Understanding between Boeing and EMJ/Jorgensen Forge, dated August 2007 (EMJ et al. 2007).

7. Sediment Quality Standard (SQS) = 12 mg/kg-OC.

8. Lower Apparent Effects Threshold (LAET) = 0.13 mg/kg.

9. Cleanup Screening Level (CSL) = 65 mg/kg-OC.

10. Second Lower Apparent Effects Threshold (2LAET) = 1 mg/kg.

11. U = Compound analyzed, but not detected above detection limit.

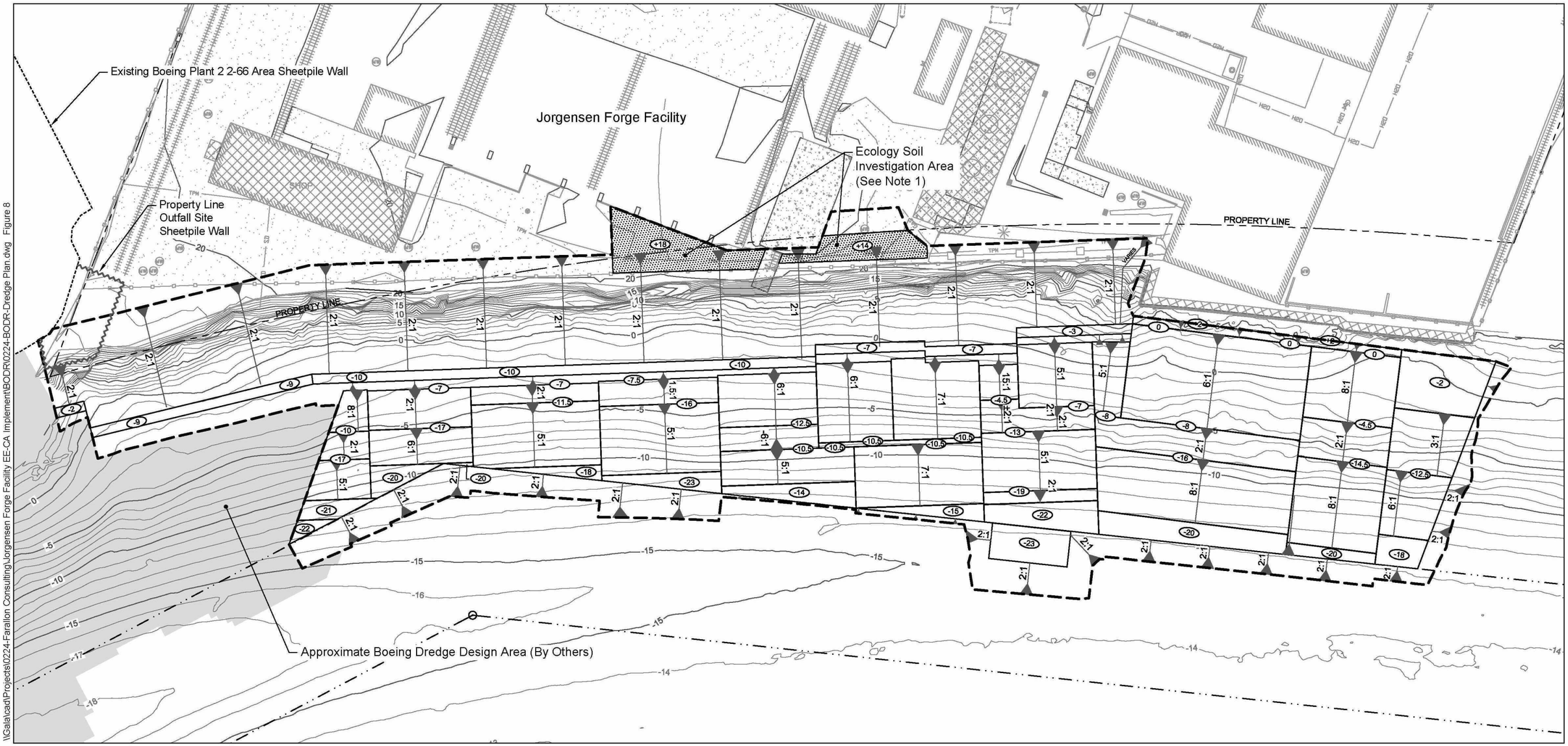
12. J = Estimated value.

13. UJ = Compound analyzed, but not detected above estimated detection limit.

ANCHOR QEA

Feet
0 50 100 150 200

Figure 7
Subsurface Total PCB Concentrations & Depth of Contamination
Basis of Design Report
Jorgensen Forge Early Action Area



HORIZONTAL DATUM: Washington State Plane North, NAD83.
VERTICAL DATUM: Mean Lower Low Water (MLLW).
NOTES:

1. Jorgensen Forge is removing additional soil and backfilling along the top of bank area surrounding soil borings SB-3 and SB-4 to remove relatively elevated concentrations of polychlorinated biphenyls. This work is not being performed under the EPA scope of work but rather as an Independent Action under the existing Ecology Agreed Order (No. DE 4127) at the facility.

LEGEND:

- Navigation Channel
- Existing Bathymetry (1 ft interval)
- Existing Fence Line
- Required Dredge Elevation (ft MLLW)
- Top of Side Slope
- Final Grade
- Dredge Boundary
- Dredge/Excavation Limits
- Slope Arrow
- Structures to Preserve and Protect Adjacent to Dredge/Excavation Limits

0 50
Scale in Feet

\\Galavcad\Projects\0224-Farallon Consulting\Jorgensen Forge Facility EE-CA Implement\BODR\0224-BODR-Dredge Plan.dwg Figure 8
Mar 22, 2013 11:56am tgriga

ANCHOR QEA

Figure 8
Dredge Plan
Basis of Design Report
Jorgensen Forge Early Action Area

EMJ014200

HORIZONTAL DATUM: Washington State Plane North, NAD83.
VERTICAL DATUM: Mean Lower Low Water (MLLW).
NOTE: Existing Topography created from a merge of survey data by Anchor QEA including upland survey by PLS Inc. (1/24/12), bathymetric survey by eTrac (2/8/12), bank survey by AEC Consultants Inc (2/21/12), and additional bank survey by Duane Hartman & Associates, Inc. (10/25/20).

* Depth of contamination based on PCB exceedances of the removal action level (12 mg/kg-OC)

LEGEND:

- Navigation Channel
- Existing Bathymetry (1 ft interval)
- Existing Fence Line
- Required Dredge Elevation (ft MLLW) (-13)
- Top of Side Slope
- Final Grade
- Dredge Boundary (-17.5)
- Dredge/Excavation Limits
- Slope Arrow
- Structures to Preserve and Protect Adjacent to Dredge/Excavation Limits
- JVE-322 Subsurface Sampling Location

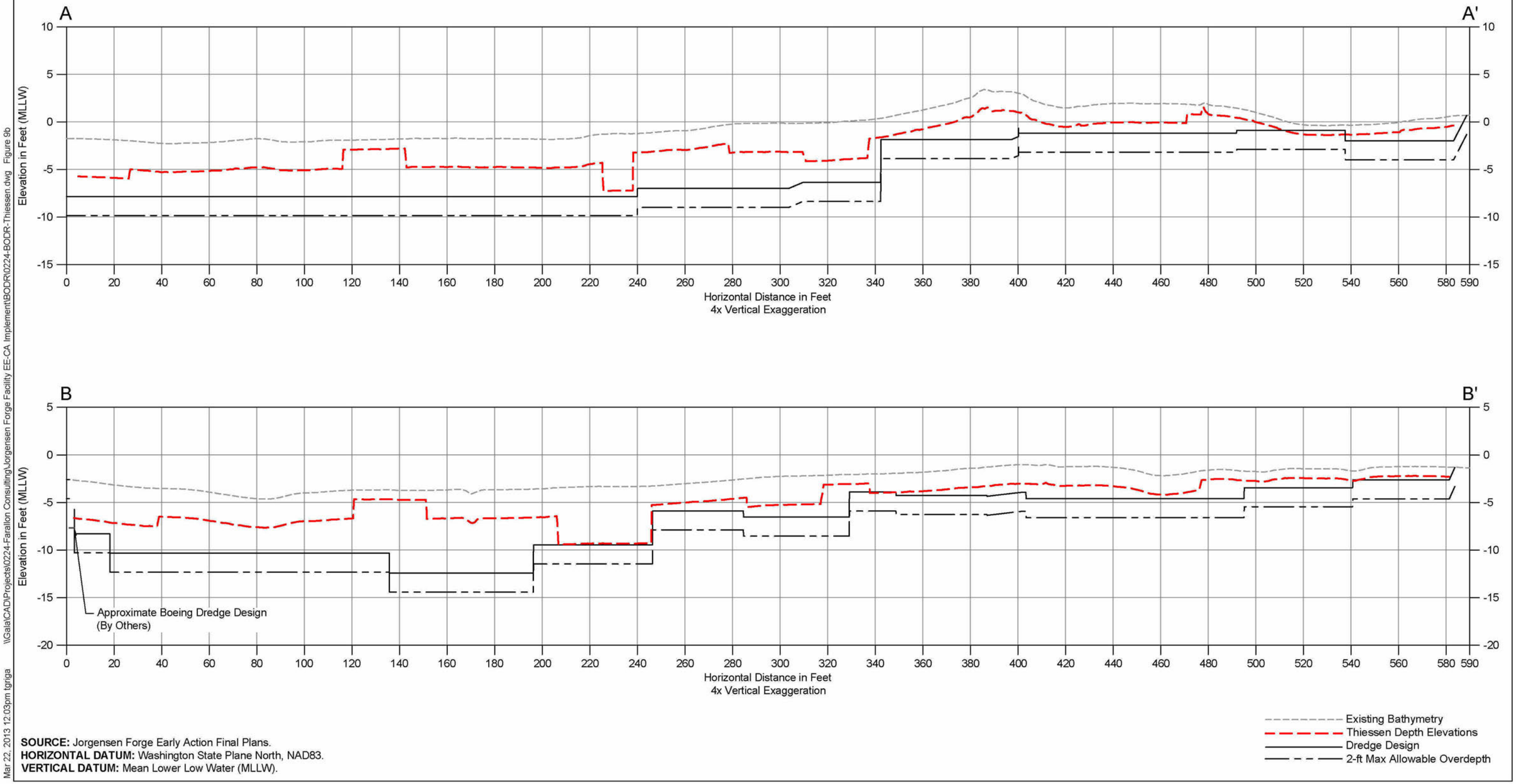
0 50
Scale in Feet

K:\Projects\0224-Farallon Consulting\Jorgensen Forge Facility EE-CA Implement\BODR\0224-BODR-Thiessen.dwg Figure 9a
Jun 07, 2013 3:47pm tgriga

ANCHOR QEA

Figure 9a
Thiessen Polygon Minimum Removal Depths
Basis of Design Report
Jorgensen Forge Early Action Area

EMJ014201



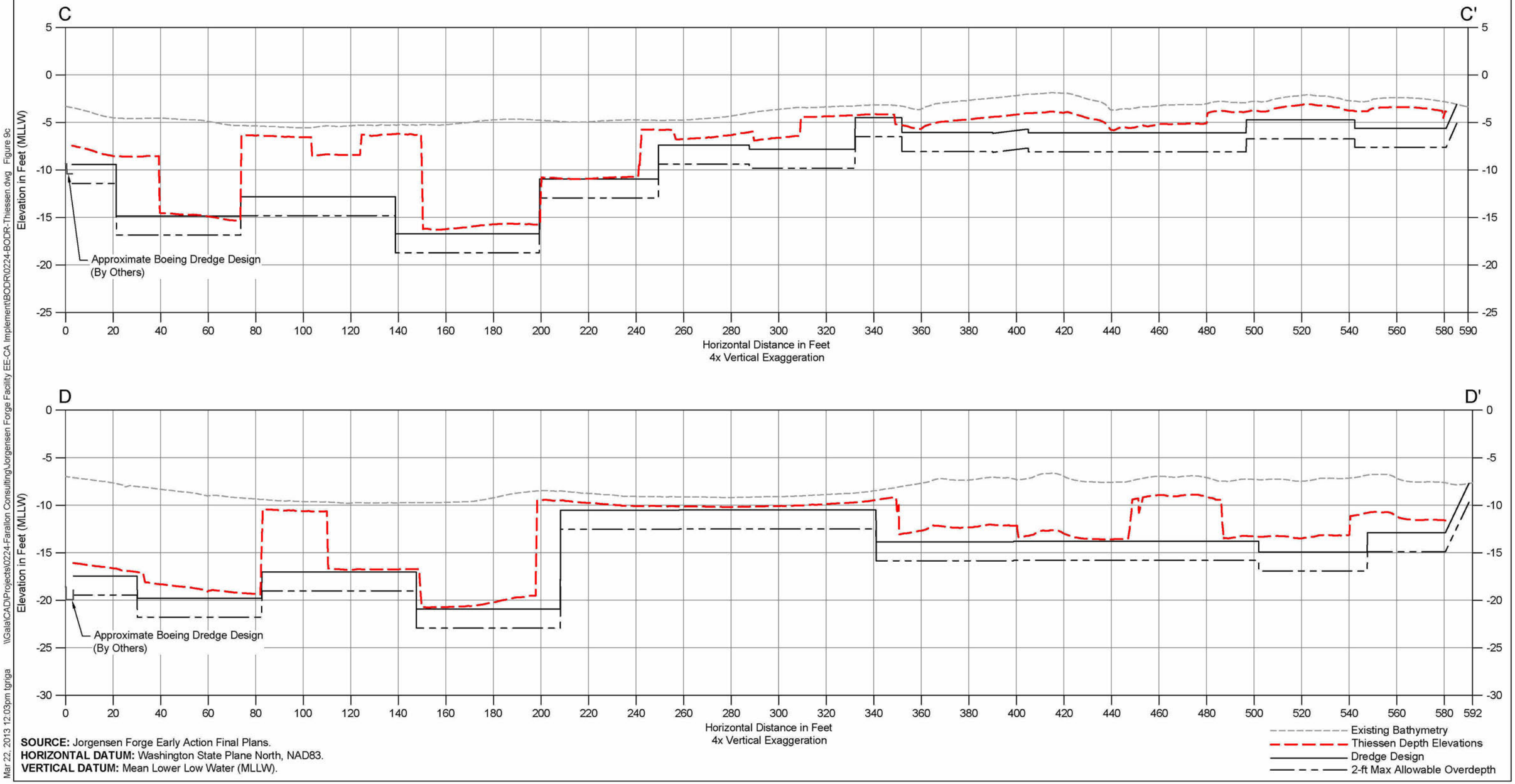
SOURCE: Jorgensen Forge Early Action Final Plans.
HORIZONTAL DATUM: Washington State Plane North, NAD83.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

Mar 22, 2013 12:03pm tgriga \\Gala\CAD\Projects\0224-Farallon Consulting\Jorgensen Forge Facility EE-CA Implement\BODR\0224-BODR-Thiessen.dwg Figure 9b

ANCHOR QEA

Figure 9b
Dredge Design Surface and Thiessen Removal Depth Cross Sections
Basis of Design Report
Jorgensen Forge Early Action Area

EMJ014202

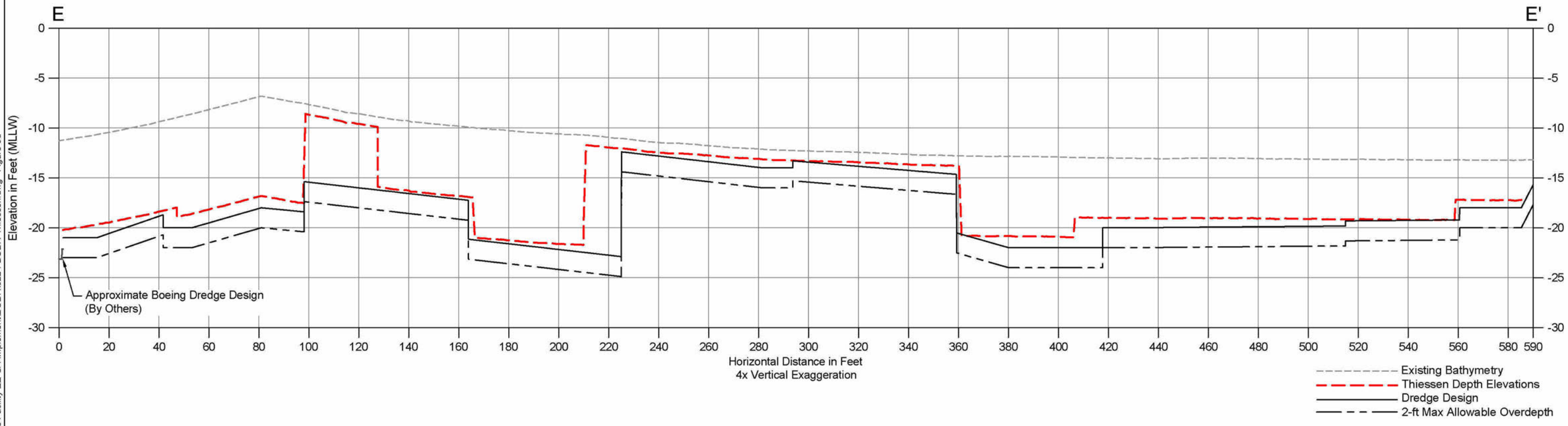


SOURCE: Jorgensen Forge Early Action Final Plans.
HORIZONTAL DATUM: Washington State Plane North, NAD83.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

Mar 22, 2013 12:03pm tgriga \\Gala\CAD\Projects\0224-Farallon Consulting\Jorgensen Forge Facility EE-CA Implement\BODR\0224-BODR-Thiessen.dwg Figure 9c

ANCHOR QEA

Figure 9c
Dredge Design Surface and Thiessen Removal Depth Cross Sections
Basis of Design Report
Jorgensen Forge Early Action Area

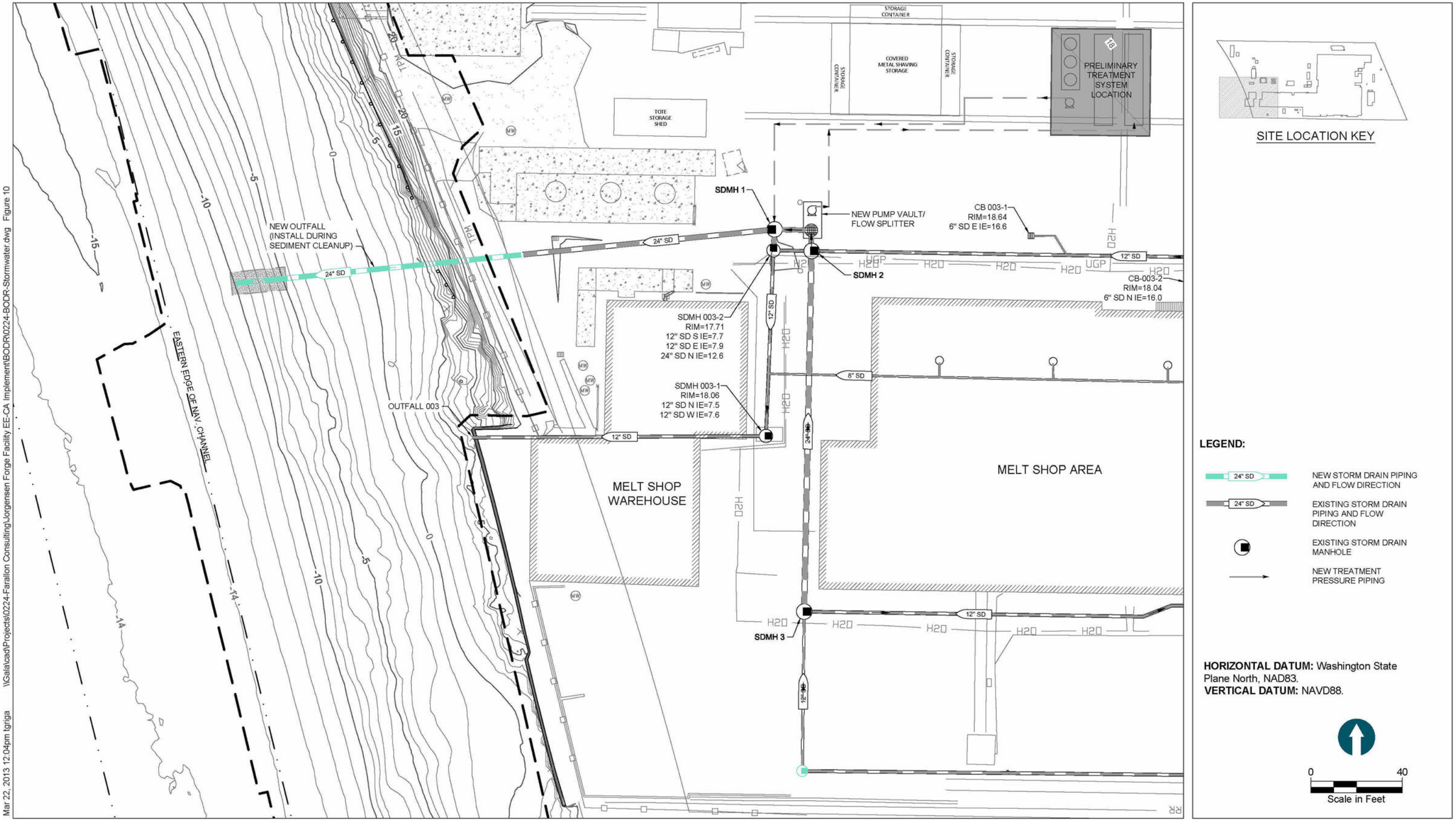


SOURCE: Jorgensen Forge Early Action Final Plans.
HORIZONTAL DATUM: Washington State Plane North, NAD83.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

Mar 22, 2013 12:03pm tgriga \\Gala\CAD\Projects\0224-Farallon Consulting\Jorgensen Forge Facility EE-CA Implement\BODR\0224-BODR-Thiessen.dwg Figure 9d

ANCHOR QEA

Figure 9d
Dredge Design Surface and Thiessen Removal Depth Cross Sections
Basis of Design Report
Jorgensen Forge Early Action Area



Mar 22, 2013 12:04pm tgriga \\Gala\cad\Projects\0224-Farallon Consulting\Jorgensen Forge Facility EE-CA Implement\BODR\0224-BODR-Stormwater.dwg Figure 10

ANCHOR QEA

Figure 10
Outfall Relocation Plan
Basis of Design Report
Jorgensen Forge Early Action Area

APPENDIX A
DESIGN SUBSURFACE SEDIMENT CHARACTERIZATION SUPPORTING DOCUMENTS

Index of Attachments

Attachment 1 – Chain of Custody Forms

Attachment 2 – Core Collection Forms

Attachment 3 – Core Processing Forms

Attachment 4 – Organics Analysis Data Sheets

PCBs

TS/TOC

Attachment 5 – Validation Reports

25302

25449

25647

25671

25729

26059

26099

26214

26289

EMJ014207

Chain of Cust[illegible] Record & Laboratory Analysis Request

COC#

ANCHOR QEA

Date: 11021 6 Feb 16, 2011
Laboratory : ARI
Project Name: Jorgensen Sediment Characterization (vertical extents)
Project Number: 080224-01.01
Project Manager: Ryan Barth
Phone Number: 206.719.3605
Shipment Method: Hand Delivery

Analytical Parameters

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	TS/TOC	PCBs	Archive -10°C	Comments
1	JVE-215SC-0001-11021 6	11021 6 1130	SED	3			X	
2	JVE-215SC-0102-11021 6	11021 6 1132	SED	3			X	
3	JVE-215SC-0203-11021 6	11021 6 1135	SED	3	X	X	X	Push - 48 hrs
4	JVE-215SC-0304-11021 6	11021 6 1138	SED	3	X	X	X	
5	JVE-215SC-0405-11021 6	11021 6 1140	SED	3	X	X	X	
6	JVE-215SC-0506-11021 6	11021 6 1145	SED	3	X	X	X	
7	JVE-215SC-0607-11021 6	11021 6 1150	SED	3	X	X	X	
8	JVE-215SC-0708-11021 6	11021 6 1155	SED	3	X	X	X	
9	JVE-215SC-0809-11021 6	11021 6 1200	SED	3	X	X	X	
10	JVE-215SC-0910-11021 6	11021 6 1205	SED	3	X	X	X	
11	JVE-215SC-1011-11021 6	11021 6 1210	SED	3	X	X	X	
12	JVE-215SC-1112-11021 6	11021 6 ~~1220~~ 1215	SED	3	X	X	X	

1 See SAP for analyte lists and required methods and reporting limits
2 email sample confirmation report to labdata@anchorqea.com
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Additional notes/comments:

Relinquished By:	Company: Anchor QEA LLC.	Received By: [signature] / C. Oretko	Company: ARI
[signature] / Joy Dunay	2/16/2011 1615		2/16/11 1615
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

Chain of Custody Record & Laboratory Analysis Request

COC#

ANCHOR QEA

Date: 1102 16
Laboratory : ARI
Project Name: Jorgensen Sediment Characterization (vertical extents)
Project Number: 080224-01.01
Project Manager: Ryan Barth
Phone Number: 206.719.3605
Shipment Method: Hand Delivery

Analytical Parameters

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	TS/TOC	PCBs	Archive -10°C	Comments
1	JVE-215SC-~~1213~~ 1208-1102 16	1102 16 1220	SED	3	X	X	X	Rush
2	~~JVE-215SC-13__-1102~~	~~1102__~~	~~SED~~					
3	JVE-1215SC-0607-110216	1153		2	X	X		Rush
4								
5								
6								
7								
8								
9								
10								
11								
12								

1 See SAP for analyte lists and required methods and reporting limits
2 email sample confirmation report to labdata@anchorqea.com
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Additional notes/comments:

Relinquished By:	Company: Anchor QEA LLC.	Received By:	Company: ARL
Joy Dunning / Joy Dunning	2/16/2011 1615		2/16/11 1642
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

EMJ014209

Chain of Custo[illegible] [illegible]ecord & Laboratory Analysis Request COC#

ANCHOR QEA

Date: 1102 Feb 16 2011
Laboratory : ARI
Project Name: Jorgensen Sediment Characterization (vertical extents)
Project Number: 080224-01.01
Project Manager: Ryan Barth
Phone Number: 206.719.3605
Shipment Method: Hand Delivery

Analytical Parameters

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	TS/TOC	PCBs	Archive -10°C	Comments
1	JVE-210SC-0001-110216	110216 0930	SED	3			X	
2	JVE-210SC-0102-110216	110216 0940	SED	3			X	
3	JVE-210SC-0203-110216	110216 0950	SED	3	X	X	X	Rush 48 hr
4	JVE-210SC-0304-110216	110216 0955	SED	3	X	X	X	
5	JVE-210SC-0405-110216	110216 1000	SED	3	X	X	X	
6	JVE-210SC-0506-110216	110216 1001	SED	3	X	X	X	
7	JVE-210SC-0607-110216	110216 1005	SED	3	X	X	X	
8	JVE-210SC-0708-110216	110216 1010	SED	3	X	X	X	
9	JVE-210SC-0809-110216	110216 1015	SED	3	X	X	X	
10	JVE-~~205~~ 210SC-0910-110216	110216 1020	SED	3	X	X	X	
11	JVE-210SC-1011-110216	110216 1025	SED	3	X	X	X	
12	JVE-~~205~~ 210SC-1112-110216	110216 1030	SED	3	X	X	X	

1 See SAP for analyte lists and required methods and reporting limits
2 email sample confirmation report to labdata@anchorqea.com
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Additional notes/comments:

Relinquished By:	Company: Anchor QEA LLC.	Received By: [signature] / C. CREIRO	Company: ARI 1615
[signature] / Joy Duray 2/16/2011	1615		2/16/11 1615
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

EMJ014210

Chain of Custody Record & Laboratory Analysis Request COC#

Date: 1102 16 Feb 16th 2011
Laboratory : ARI
Project Name: Jorgensen Sediment Characterization (vertical extents)
Project Number: 080224-01.01
Project Manager: Ryan Barth
Phone Number: 206.719.3605
Shipment Method: Hand Delivery

ANCHOR QEA

Analytical Parameters

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	TS/TOC	PCBs	Archive -10°C	Comments
1	JVE-210SC-~~1213~~ 1212.5 1102 16	1102 16 1035	SED	3	X	X	X	Rush 48 hr.
2	~~JVE-210SC-13 1102~~	1102	SED					
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

1 See SAP for analyte lists and required methods and reporting limits
2 email sample confirmation report to labdata@anchorqea.com
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Additional notes/comments:

Relinquished By:	Company: Anchor QEA LLC.	Received By:	Company: ARI
Joy Dunay 2/16/2011 1615		2/16/11 1615	
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

EMJ014211

Chain of Custody Record & Laboratory Analysis Request COC#

ANCHOR QEA

Date: ~~1102~~ Feb 16, 2011
Laboratory : ARI
Project Name: Jorgensen Sediment Characterization (vertical extents)
Project Number: 080224-01.01
Project Manager: Ryan Barth
Phone Number: 206.719.3605
Shipment Method: Hand Delivery

Analytical Parameters

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	TS/TOC	PCBs	Archive -10°C	Comments
1	JVE-207SC-0001-110216	110216 1435	SED	3			X	
2	JVE-207SC-0102-110216	110216 1440	SED				X	
3	JVE-207SC-0203-110216	110216 1445	SED		X	X	X	Rush 48 hr
4	JVE-207SC-0304-110216	110216 1450	SED		X	X	X	
5	JVE-207SC-0405-110216	110216 1455	SED		X	X	X	
6	JVE-207SC-0506-110216	110216 1500	SED		X	X	X	
7	JVE-207SC-0607-110216	110216 1505	SED		X	X	X	
8	JVE-207SC-0708-110216	110216 1510	SED		X	X	X	
9	JVE-207SC-0809-110216	110216 1515	SED		X	X	X	
10	JVE-207SC-0910-110216	110216 1520	SED		X	X	X	
11	JVE-207SC-1011-110216	110216 1525	SED		X	X	X	
12	JVE-207SC-1112-110216	110216 1530	SED		X	X	X	
	JVE-207SC-1212.6-110216	110216 1535	SED		X	X	X	

1 See SAP for analyte lists and required methods and reporting limits
2 email sample confirmation report to labdata@anchorqea.com
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Additional notes/comments:

Relinquished By:	Company: Anchor QEA LLC.	Received By:	Company: ARI
Joy Dunay / Joy Dunay	2/16/2011 1615	[signature] / C. Cerrito	2/16/11 16:15
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

EMJ014212

Chain of Custo ecord & Laboratory Analysis Request

COC#

ANCHOR QEA

Date: ~~1102~~ Feb 17, 2011
Laboratory : ARI
Project Name: Jorgensen Sediment Characterization (vertical extents)
Project Number: 080224-01.01
Project Manager: Ryan Barth
Phone Number: 206.719.3605
Shipment Method: Hand Delivery

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	TS/TOC	PCBs	Archive -10°C	Comments
1	JVE-205SC-0001-1102 17	1102 17 0840	SED	3			X	
2	JVE-205SC-0102-1102	1102 0842	SED				X	
3	JVE-205SC-0203-1102	1102 0845	SED		X	X	X	Rush 48hrs
4	JVE-205SC-0304-1102	1102 0848	SED		X	X	X	
5	JVE-205SC-0405-1102	1102 0850	SED		X	X	X	
6	JVE-205SC-0506-1102	1102 0855	SED		X	X	X	
7	JVE-205SC-0607-1102	1102 0900	SED		X	X	X	
8	JVE-205SC-0708-1102	1102 0905	SED		X	X	X	
9	JVE-205SC-0809-1102	1102 0910	SED		X	X	X	
10	JVE-205SC-0910-1102	1102 0915	SED		X	X	X	
11	JVE-205SC-1011-1102	1102 0920	SED		X	X	X	
12	JVE-205SC-~~1112~~ 1102-1102 2	1102 0925	SED	1	X	X	X	

Analytical Parameters

1 See SAP for analyte lists and required methods and reporting limits
2 email sample confirmation report to labdata@anchorqea.com
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Additional notes/comments:

Relinquished By:	Company: Anchor QEA LLC.	Received By:	Company: ARI
Joy Dunay	2/17/11 1440		2/17/11 1440
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

Page _____ of _____

EMJ014213

Chain of Custo .ecord & Laboratory Analysis Request

COC#

ANCHOR QEA

Date: ~~1102~~ Feb 17th
Laboratory : ARI
Project Name: Jorgensen Sediment Characterization (vertical extents)
Project Number: 080224-01.01
Project Manager: Ryan Barth
Phone Number: 206.719.3605
Shipment Method: Hand Delivery

Analytical Parameters

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	TS/TOC	PCBs	Archive -10°C	Comments
1	JVE-309SC-0001-1102 17	1102 17	SED	3			X	
2	JVE-309SC-0102-1102 17	1102	SED				X	
3	JVE-309SC-0203-1102 17	1102	SED				X	
4	JVE-309SC-0304-1102 17	1102	SED				X	
5	JVE-309SC-0405-1102 17	1102	SED				X	
6	JVE-309SC-0506-1102 17	1102	SED		X	X	X	Rush 48 hr
7	JVE-309SC-0607-1102 17	1102	SED		X	X	X	
8	JVE-309SC-0708-1102 17	1102	SED		X	X	X	
9	JVE-309SC-0809-1102 17	1102	SED		X	X	X	
10	JVE-309SC-0910-1102 17	1102	SED		X	X	X	
11	JVE-309SC-1011-110217	1102			X	X	X	
12	JVE-309SC-1111.5-110217	1102			X	X	X	

1 See SAP for analyte lists and required methods and reporting limits
2 email sample confirmation report to labdata@anchorqea.com
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Additional notes/comments:

Relinquished By:	Company: Anchor QEA LLC.	Received By:	Company: ARI
Jorgen Dunay / Jay Dunay 2/17/11 1440		2/17/11 1440	
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

Page _____ of _____

EMJ014214

Chain of Custo[illegible] [illegible]ecord & Laboratory Analysis Request

COC#

ANCHOR QEA

Date: ~~1102~~ Feb 17, 2011
Laboratory : ARI
Project Name: Jorgensen Sediment Characterization (vertical extents)
Project Number: 080224-01.01
Project Manager: Ryan Barth
Phone Number: 206.719.3605
Shipment Method: Hand Delivery

Analytical Parameters

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	TS/TOC	PCBs	Archive -10°C	Comments
1	JVE-1205SC-0203-110217	2/17/11 0846	SED	2	X	X		Rush
2	JVE-1309SC-0910-110217	1 1218	1	2	X	X		
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

1 See SAP for analyte lists and required methods and reporting limits
2 email sample confirmation report to labdata@anchorqea.com
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Additional notes/comments:

Relinquished By:	Company: Anchor QEA LLC.	Received By:	Company: ARI
Jorgen Dunay / Joy Dunay	2/17/2011 1440	[signature]	2/17/11 1440
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

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EMJ014215

Chain of Custo .ecord & Laboratory Analysis Request

COC#

ANCHOR QEA

Date: ~~1102~~ Feb 17, 2011
Laboratory : ARI
Project Name: Jorgensen Sediment Characterization (vertical extents)
Project Number: 080224-01.01
Project Manager: Ryan Barth
Phone Number: 206.719.3605
Shipment Method: Hand Delivery

Analytical Parameters

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	TS/TOC	PCBs	Archive -10°C	Comments
1	JVE-311SC-0001-1102~~17~~	1102~~17~~ 1340	SED	3			X	
2	JVE-311SC-0102-1102~~17~~	1102 1345	SED				X	
3	JVE-311SC-0203-1102~~17~~	1102 1350	SED				X	
4	JVE-311SC-0304-1102~~17~~	1102 1355	SED				X	
5	JVE-311SC-0405-1102~~17~~	1102 1400	SED				X	
6	JVE-311SC-0506-1102~~17~~	1102 1405	SED		X	X	X	Rush 48 hr
7	JVE-311SC-0607-1102~~17~~	1102 1410	SED		X	X	X	
8	JVE-311SC-0708-1102~~17~~	1102 1415	SED		X	X	X	
9	JVE-311SC-~~0809~~ 0909-1102~~17~~	1102 1420	SED		X	X	X	
10	~~JVE-311SC-0910-1102~~	~~1102~~	~~SED~~					
11								
12								

1 See SAP for analyte lists and required methods and reporting limits
2 email sample confirmation report to labdata@anchorqea.com
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Additional notes/comments:

Relinquished By:	Company: Anchor QEA LLC.	Received By:	Company: ARI
Signature/Printed Name: Joy Dunning	Date/Time: 2/17/2011 1440	Signature/Printed Name:	Date/Time: 2/17/11 1440

Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

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EMJ014216

Chain of Custody Record & Laboratory Analysis Request

COC#

ANCHOR QEA

Date: ~~1102~~ Feb 17, 2011
Laboratory : ARI
Project Name: Jorgensen Sediment Characterization (vertical extents)
Project Number: 080224-01.01
Project Manager: Ryan Barth
Phone Number: 206.719.3605
Shipment Method: Hand Delivery

Analytical Parameters

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	TS/TOC	PCBs	Archive -10°c	Comments
1	JVE-320SC-0001-110217	110217 1500	SED	3			X	
2	JVE-320SC-0102-110217	1102 1505	SED				X	
3	JVE-320SC-0203-110217	1102 1510	SED				X	
4	JVE-320SC-0304-110217	1102 1515	SED				X	
5	JVE-320SC-0405-110217	1102 1520	SED				X	
6	JVE-320SC-0506-110217	1102 1525	SED		X	X	X	Rush 48 hr
7	JVE-320SC-0607-110217	1102 1530	SED		X	X	X	
8	JVE-320SC-0708-110217	1102 1535	SED		X	X	X	
9	JVE-320SC-0809-110217	1102 1540	SED		X	X	X	
10	JVE-320SC-0910-110217	1102 1545	SED		X	X	X	
11	JVE-320SC-1011-110217	1550			X	X	X	
12	JVE-320SC-1112-110217	1555			X	X	X	

1 See SAP for analyte lists and required methods and reporting limits

2 email sample confirmation report to labdata@anchorqea.com

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Additional notes/comments:

Relinquished By:	Company: Anchor QEA LLC.	Received By:	Company: ARI
Signature/Printed Name: Jon Dunay	Date/Time: 2/17/2011 1628	Signature/Printed Name:	Date/Time: 2/17/11 1628

Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

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EMJ014217

Chain of Custody Record & Laboratory Analysis Request

COC#

ANCHOR QEA

Date: ~~1102~~ Feb 17, 2011
Laboratory : ARI
Project Name: Jorgensen Sediment Characterization (vertical extents)
Project Number: 080224-01.01
Project Manager: Ryan Barth
Phone Number: 206.719.3605
Shipment Method: Hand Delivery

Analytical Parameters

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	TS/TOC	PCBs	Archive -10°C	Comments
1	JVE-3205C-1212.9-110217	2/17/11 1600	SFD	3	X	X	X	Rush 48 hrs
2	JVE-1320SC-0304-110217	⊥ 1517	⊥	2			X	
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

1 See SAP for analyte lists and required methods and reporting limits
2 email sample confirmation report to labdata@anchorqea.com
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Additional notes/comments:

Relinquished By:	Company: Anchor QEA LLC.	Received By:	Company: ARI
Jorgensen Dunay / Joy Dunay	2/17/2011 1628	[signature]	2/17/11 1628
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

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EMJ014218

Chain of Custo ecord & Laboratory Analysis Request

COC#

ANCHOR QEA

Date: ~~1102~~ Feb 17, 2011
Laboratory : ARI
Project Name: Jorgensen Sediment Characterization (vertical extents)
Project Number: 080224-01.01
Project Manager: Ryan Barth
Phone Number: 206.719.3605
Shipment Method: Hand Delivery

Analytical Parameters

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	TS/TOC	PCBs	Archive -10°C	Comments
1	JVE-316SC-0001-1102 17	1102 17 1005	SED	3			✓	
2	JVE-316SC-0102-1102 17	1102 1010	SED				X	
3	JVE-316SC-0203-1102 17	1102 1015	SED				X	
4	JVE-316SC-0304-1102 17	1102 1020	SED				X	
5	JVE-316SC-0405-1102 17	1102 1025	SED				X	
6	JVE-316SC-0506-1102 17	1102 1030	SED		X	X	✓	Rush - 48hrs
7	JVE-316SC-0607-1102 17	1102 1035	SED		X	X	✓	
8	JVE-316SC-0708-1102 17	1102 1040	SED		X	X	X	
9	JVE-316SC-0809-1102 17	1102 1045	SED		X	X	X	
10	JVE-316SC-~~0910~~ 0910-1102 17	1102 1050	SED		X	X	X	
11								
12								

1 See SAP for analyte lists and required methods and reporting limits
2 email sample confirmation report to labdata@anchorqea.com
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Additional notes/comments:

Relinquished By:	Company: Anchor QEA LLC.	Received By:	Company: ARI
Signature/Printed Name: Jorgen Ovrum / Jay Dunaway	Date/Time: 2/17/2011 1440	Signature/Printed Name:	Date/Time: 2/17/11 1440

Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

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EMJ014219

Chain of Custody Record & Laboratory Analysis Request COC#

ANCHOR QEA

Date: ~~1102~~ Feb 18, 2011
Laboratory : ARI
Project Name: Jorgensen Sediment Characterization (vertical extents)
Project Number: 080224-01.01
Project Manager: Ryan Barth
Phone Number: 206.719.3605
Shipment Method: Hand Delivery

Analytical Parameters

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	TS/TOC	PCBs	Archive -10°C	Comments
1	JVE-314SC-0001-1102 18	1102 18 0840	SED	3			X	
2	JVE-314SC-0102-1102 18	1102 0845	SED				X	
3	JVE-314SC-0203-1102 18	1102 0850	SED				X	
4	JVE-314SC-0304-1102 18	1102 0855	SED				X	
5	JVE-314SC-0405-1102 18	1102 0900	SED				X	
6	JVE-314SC-0506-1102 18	1102 0905	SED		X	X	X	Rush
7	JVE-314SC-0607-1102 18	1102 0910	SED		X	X	X	
8	JVE-314SC-~~0708~~ 0709-1102 18	1102 0915	SED		X	X	X	
9	~~JVE-314SC-0809-1102~~	1102	SED					
10	~~JVE-314SC-0910-1102~~	1102	SED					
11	JVE-BKHSC-0506-110218	110218 0905	SED		X	X		Rush
12								

1 See SAP for analyte lists and required methods and reporting limits
2 email sample confirmation report to labdata@anchorqea.com
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Additional notes/comments:

Relinquished By:	Company: Anchor QEA LLC.	Received By:	Company: ARI
Signature/Printed Name: [illegible]	Date/Time: 2/18/11 1200	Signature/Printed Name: A. Voggardsen	Date/Time: 2/18/11 1200

Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

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EMJ014220

Chain of Custody Record & Laboratory Analysis Request

COC#

ANCHOR QEA

Date: 1102 Feb 18, 2011
Laboratory : ARI
Project Name: Jorgensen Sediment Characterization (vertical extents)
Project Number: 080224-01.01
Project Manager: Ryan Barth
Phone Number: 206.719.3605
Shipment Method: Hand Delivery

Analytical Parameters

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	TS/TOC	PCBs	Archive -10°C	Comments
1	JVE-216SC-0001-1102 18	1102 18 0940	SED	3			X	
2	JVE-216SC-0102-1102	1102 0945	SED				X	
3	JVE-216SC-0203-1102	1102 0950	SED				X	
4	JVE-216SC-0304-1102	1102 0955	SED				X	
5	JVE-216SC-0405-1102	1102 1000	SED				X	
6	JVE-216SC-0506-1102	1102 1005	SED				X	
7	JVE-216SC-0607-1102	1102 1010	SED				X	
8	JVE-216SC-0708-1102	1102 1015	SED				X	
9	JVE-216SC-0809-1102	1102 1020	SED				X	
10	JVE-216SC-0910-1102	1102 1025	SED				X	
11	JVE-216SC-1011-110218	1020			X	X	X	Rush
12	JVE-216SC-1112.1-110218	1025			X	X	X	

1 See SAP for analyte lists and required methods and reporting limits
2 email sample confirmation report to labdata@anchorqea.com
3
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Additional notes/comments:

Relinquished By:	Company: Anchor QEA LLC.	Received By:	Company: ARI
Signature/Printed Name: Jay Dunney	Date/Time: 2/18/11 1200	Signature/Printed Name: A Volgardsen	Date/Time: 2/18/11 1200

Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

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EMJ014221

Chain of Custod_ _cord & Laboratory Analysis Request COC#

ANCHOR QEA

Date: ~~1102~~ Feb 18, 2011
Laboratory : ARI
Project Name: Jorgensen Sediment Characterization (vertical extents)
Project Number: 080224-01.01
Project Manager: Ryan Barth
Phone Number: 206.719.3605
Shipment Method: Hand Delivery

Analytical Parameters

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	TS/TOC	PCBs	Archive -10°C	Comments
1	JVE-322SC-0001-1102 18	1102 18 1050	SED	3			X	
2	JVE-322SC-0102-1102 18	1102 1055	SED				X	
3	JVE-322SC-0203-1102 18	1102 1100	SED				X	
4	JVE-322SC-0304-1102 18	1102 1105	SED				X	
5	JVE-322SC-0405-1102 18	1102 1110	SED				X	
6	JVE-322SC-0506-1102 18	1102 1115	SED				X	
7	JVE-322SC-0607-1102 18	1102 1120	SED				X	
8	JVE-322SC-0708-1102 18	1102 1125	SED				X	
9	JVE-322SC-0809-1102 18	1102 1130	SED		X	X	X	Rush
10	JVE-322SC-0910-1102 18	1102 1135	SED		X	X	X	
11	JVE-322SC-1011-1102 18	1102 1140	SED		X	X	X	
12	JVE-322SC-1112.4-1102 18	1102 1145	SED		X	X	X	

1 See SAP for analyte lists and required methods and reporting limits
2 email sample confirmation report to labdata@anchorqea.com
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Additional notes/comments:

Relinquished By:	Company: Anchor QEA LLC.	Received By:	Company: ARI
Joyce Dunay / Joy Dunay	2/18/11 12	[signature] Avdgardsen	2/18/11 1200
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

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EMJ014222

Chain of Custody ,ord & Laboratory Analysis Request COC#

ANCHOR QEA

Date: ~~1102~~ Feb 18, 2011
Laboratory : ARI
Project Name: Jorgensen Sediment Characterization (vertical extents)
Project Number: 080224-01.01
Project Manager: Ryan Barth
Phone Number: 206.719.3605
Shipment Method: Hand Delivery

Analytical Parameters

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	TS/TOC	PCBs	Archive -10°C																Comments
1	JVE-13225C-0708-110218	2/18/11 1128	SED	2			X																
2																							
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							
11																							
12																							

1 See SAP for analyte lists and required methods and reporting limits
2 email sample confirmation report to labdata@anchorqea.com
3
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Additional notes/comments:

Relinquished By:	Company: Anchor QEA LLC.	Received By:	Company: ARI
Joyce Dunny / Joy Dunny 2/18/11	1200	A Vogardsen 2/18/11	1200
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

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EMJ014223

Chain of Custody Record & Laboratory Analysis Request COC#

ANCHOR QEA

Date: ~~1102~~ Feb 18, 2011
Laboratory : ARI
Project Name: Jorgensen Sediment Characterization (vertical extents)
Project Number: 080224-01.01
Project Manager: Ryan Barth
Phone Number: 206.719.3605
Shipment Method: Hand Delivery

Analytical Parameters

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	TS/TOC	PCBs	Archive -10°C	Comments
1	JVE-07SC-0001-1102 18	1102 18 1330	SED	3			X	
2	JVE-07SC-0102-1102 18	1102 1335	SED	3			X	
3	JVE-07SC-0203-1102 18	1102 1340	SED	3			X	
4	JVE-07SC-0304-1102 18	1102 1345	SED	3			X	
5	JVE-07SC-0405-1102 18	1102 1350	SED	3			X	
6	JVE-07SC-0506-1102 18	1102 1355	SED	3			X	
7	JVE-07SC-0607-1102 18	1102 1400	SED	3			X	
8	JVE-07SC-0708-1102 18	1102 1405	SED	3			X	
9	JVE-07SC-0809-1102 18	1102 1410	SED	3			X	
10	JVE-07SC-0910-1102 18	1102 1415	SED	3	X	X	X	Rush - 48hr
11	JVE-07SC-1011-1102 18	1102 1420		3	X	X	X	
12	JVE-07SC-1112.2-110218	1102 1425		3	X	X	X	

1 See SAP for analyte lists and required methods and reporting limits
2 email sample confirmation report to labdata@anchorqea.com
3
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Additional notes/comments:

Relinquished By:	Company: Anchor QEA LLC.	Received By:	Company: ARI
Joy Dunay 2/18/11 1605		2/18/11 1605	
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

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EMJ014224

Chain of Cust Record & Laboratory Analysis Request

COC#

ANCHOR QEA

Date: 1102 Feb 18, 2011
Laboratory : ARI
Project Name: Jorgensen Sediment Characterization (vertical extents)
Project Number: 080224-01.01
Project Manager: Ryan Barth
Phone Number: 206.719.3605
Shipment Method: Hand Delivery

Analytical Parameters

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	TS/TOC	PCBs	Archive -10°C	Comments
1	JVE-1007SC-0910-110218	2/18/11 1417	2	2	X	X		Bush - 48 hrs
2	JVE-RB-110218	1550	1	1		X		STD Turn
3	JVE-FR-110218	1555	1	1		X		
4								
5								
6								
7								
8								
9								
10								
11								
12								

1 See SAP for analyte lists and required methods and reporting limits
2 email sample confirmation report to labdata@anchorqea.com
3
4

Additional notes/comments:

Relinquished By:	Company: Anchor QEA LLC.	Received By:	Company: ARI
Signature/Printed Name: Joy Dunning	Date/Time: 2/18/11 1605	Signature/Printed Name:	Date/Time: 2/18/11 1605

Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

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EMJ014225

Chain of Custody Record & Laboratory Analysis Request COC#

ANCHOR QEA

Date: ~~1102~~ Feb 18, 2011
Laboratory : ARI
Project Name: Jorgensen Sediment Characterization (vertical extents)
Project Number: 080224-01.01
Project Manager: Ryan Barth
Phone Number: 206.719.3605
Shipment Method: Hand Delivery

Analytical Parameters

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	TS/TOC	PCBs	Archive -10°C	Comments
1	JVE-01SC-0001-1102 18	1102 18 1500	SED	2			X	
2	JVE-01SC-0102-1102 18	1102 18 1505	SED	1			X	
3	JVE-01SC-0203-1102 18	1102 18 1510.	SED	1			X	
4	JVE-01SC-0304-1102 18	1102 18 1515	SED	1			X	
5	JVE-01SC-0405-1102 18	1102 18 1520	SED	1			X	
6	JVE-01SC-0506-1102 18	1102 18 1525	SED	1			X	
7	JVE-01SC-0607-1102 18	1102 18 1530	SED	1			X	
8	JVE-01SC-0708-1102 18	1102 18 1535	SED	1			X	
9	JVE-01SC-0809-1102 18	1102 18 1540	SED	1			X	
10	JVE-01SC-~~0910~~ 0907-1102 18	1102 18 1545	SED	1	X	X	X	Rush 48 hr
11								
12								

1 See SAP for analyte lists and required methods and reporting limits
2 email sample confirmation report to labdata@anchorqea.com
3
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Additional notes/comments:

Relinquished By:	Company: Anchor QEA LLC.	Received By:	Company: ARI
[signature] / Joy Dunay	2/18/11 1605	[signature]	2/18/11 1605
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

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Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

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Chain of Custo ecord & Laboratory Analysis Request COC#

ANCHOR QEA

Date: 1102 Feb 21, 2011
Laboratory : ARI
Project Name: Jorgensen Sediment Characterization (vertical extents)
Project Number: 080224-01.01
Project Manager: Ryan Barth
Phone Number: 206.719.3605
Shipment Method: Hand Delivery

Analytical Parameters

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	TS/TOC	PCBs	Archive -10°C	Comments
1	JVE-02SC-0001-110221	110221 0830	SED	2			X	
2	JVE-02SC-0102-110221	110221 0835	SED				X	
3	JVE-02SC-0203-110221	110221 0840	SED				X	
4	JVE-02SC-0304-110221	110221 0845	SED				X	
5	JVE-02SC-0405-110221	110221 0850	SED				X	
6	JVE-02SC-0506-110221	110221 0855	SED				X	
7	JVE-02SC-0607-110221	110221 900	SED				X	
8	JVE-02SC-0708-110221	110221 905	SED				X	
9	JVE-02SC-0809-110221	110221 910	SED				X	
10	JVE-02SC-~~0910~~ 0996-110221	110221 915	SED		X	X	X	rush - 48 hrs
11	JVE-1002SC-0203-110221	110221 0842	SED	1			X	
12								

1 See SAP for analyte lists and required methods and reporting limits
2 email sample confirmation report to labdata@anchorqea.com
3
4

Additional notes/comments:

Relinquished By:	Company: Anchor QEA LLC.	Received By:	Company: ARI
Joy Dunay / Joy Dunay	2/21/11 1220	[signature]	2/21/11 1220
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

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Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

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Chain of Custody Record & Laboratory Analysis Request COC#

ANCHOR QEA

Date: ~~1102~~ Feb 21, 2011
Laboratory : ARI
Project Name: Jorgensen Sediment Characterization (vertical extents)
Project Number: 080224-01.01
Project Manager: Ryan Barth
Phone Number: 206.719.3605
Shipment Method: Hand Delivery

Analytical Parameters

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	TS/TOC	PCBs	Archive -10°C	Comments
1	JVE-03SC-0001-110221	110221 0945	SED	2			X	
2	JVE-03SC-0102-110221	110221 0950	SED	1			X	
3	JVE-03SC-0203-110221	110221 0955	SED	1			X	
4	JVE-03SC-0304-110221	110221 1000	SED	1			X	
5	JVE-03SC-0405-110221	110221 1005	SED	1			X	
6	JVE-03SC-0506-110221	110221 1010	SED	1			X	
7	JVE-03SC-0607-110221	110221 1015	SED	1			X	
8	JVE-03SC-0708-110221	110221 1020	SED	1			X	
9	JVE-03SC-0809-110221	110221 1025	SED	1			X	
10	JVE-03SC-0910-110221	110221 1030	SED	1			X	
11	JVE-03SC-1011-110221	110221 1035	SED	1			X	
	~~JVE-03SC-11-12-110221~~	~~110221 1040~~		~~2~~	X	X	X	PUSH 48 HRS
12	JVE-100SC-0708-110221	110221 1023		1			X	

1 See SAP for analyte lists and required methods and reporting limits
2 email sample confirmation report to labdata@anchorqea.com
3
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Additional notes/comments:

Relinquished By:	Company: Anchor QEA LLC.	Received By:	Company:
Signature/Printed Name: Joy Dinney	Date/Time: 2/21/2011 1220	Signature/Printed Name:	Date/Time: 1220

Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

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Chain of Cus / Record & Laboratory Analysis Request COC#

ANCHOR QEA

Date: ~~1102~~ Feb 21, 2011
Laboratory: ARI
Project Name: Jorgensen Sediment Characterization (vertical extents)
Project Number: 080224-01.01
Project Manager: Ryan Barth
Phone Number: 206.719.3605
Shipment Method: Hand Delivery

Analytical Parameters

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	TS/TOC	PCBs	Archive -10°c	Comments
1	JVE-04SC-0001-1102 21	1102 21 1115	SED	2			X	
2	JVE-04SC-0102-1102 21	1102 21 1120	SED				X	
3	JVE-04SC-0203-1102	1102 21 1125	SED				X	
4	JVE-04SC-0304-1102	1102 21 1130	SED				X	
5	JVE-04SC-0405-1102	1102 21 1135	SED				X	
6	JVE-04SC-0506-1102	1102 21 1140	SED				X	
7	JVE-04SC-0607-1102	1102 21 1145	SED				X	
8	JVE-04SC-0708-1102	1102 21 1150	SED				X	
9	JVE-04SC-~~0809~~ 0809.2-1102 21	1102 21 1155	SED	1	X	X	X	Dup. 4 8 WL
10	~~JVE-04SC-0910-1102~~	1102	SED					
11	JVE-1004SC-0607-110221	110221 1148	SED	1			X	
12								

1 See SAP for analyte lists and required methods and reporting limits
2 email sample confirmation report to labdata@anchorqea.com
3
4

Additional notes/comments:

Relinquished By:	Company:	Received By:	Company:
Joy Duperry 2/21/2011 1220	Anchor QEA LLC.	[illegible]	ARI 2/21/11 1220
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

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EMJ014229

ANCHOR QEA

Sediment Core Collection Log

Job: Jorgensen Subsurface Sed. Characterization
Station ID: JVE-210
Job No: 080224-01.01
Attempt No. 1 of 1
Field Staff: DG JJ
Date: 2/15/11
Contractor: MSS
Logged By: DG
Vertical Datum: MLLW
Horizontal Datum: NAD83

Field Collection Coordinates:
Lat/Northing: 47 37.5592
Long/Easting: 122 18.5382

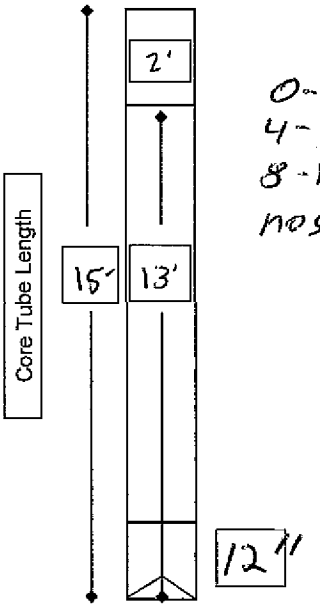
A. Water Depth
DTM Depth Sounder:
DTM Lead Line: -23.0'

B. Water Level Measurements
Time: 1010
Stage: 7.6'
Source: NOAA
Actual: 8.1'

C. Mudline Elevation
-15.4'
Actual = 14.9'

Core Collection Recovery Details:
Core Accepted: Yes / No
Core Tube Length: 15'
Drive Penetration: 14'
Headspace Measurement: 2'
Recovery Measurement: 13'
Recovery Percentage: 92.8%
Total Length of Core To Process:

Recovery Measurements (prior to cuts)



0-4 A
4-8 B
8-12 C
nose 12" length

Drive Notes:
7 ft free fall
full penetration easy to 14'

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota.

nose - clean moist dark SAND in nose - no odor
4' moist moderate stiff SILT with fine sand - no odor
8' Dark olive moist fine SAND with silt - no odor
12' Dark gray SAND with few wood - no odor

Notes:

EMJ014230

ANCHOR QEA

Sediment Core Collection Log

Job: Jorgensen Subsurface Sed. Characterization
Job No: 080224-01.01
Field Staff: DG JJ
Contractor: MSS
Vertical Datum: MLLW

Station ID: JVE 215
Attempt No. 1 of 1
Date: 2/15/11
Logged By: DG
Horizontal Datum: NAD83

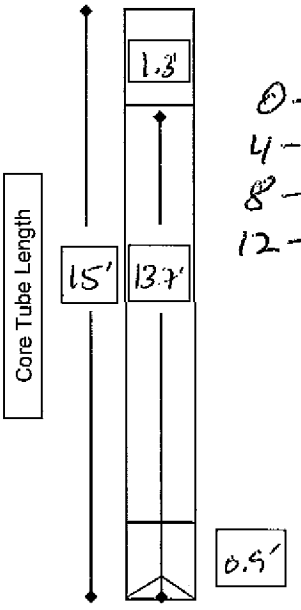
Field Collection Coordinates:
Lat/Northing: 47 31.5756
Long/Easting: 122 18.5425 @1058

A. Water Depth
DTM Depth Sounder:
DTM Lead Line: -22.1'

B. Water Level Measurements
Time: 1055
Stage: 8.2'
Source: NOAA
Actual = 8.7'

C. Mudline Elevation
-13.9'
Actual = -13.4'
Recovery Measurements (prior to cuts)

Core Collection Recovery Details:
Core Accepted: (Yes) No
Core Tube Length: 15'
Drive Penetration: 14'
Headspace Measurement: 1.3'
Recovery Measurement: 13.7'
Recovery Percentage: 98%
Total Length of Core To Process:



0-4 A
4-8 - B
8-12 - C
12-12.8

Drive Notes:
5 ft easy, free fall
stiff to 6'
easy to 14'
full penetration

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

0 - Soft wet olive silt, no odor
4 - moist mod dense dark olive SILT with sand, no odor
8 - moist mod dense dark olive SILT with fine sand no odor
12 - moist SAND, no odor

6" void in Bottom of core above fingers
12.8 damp clean coarse fine SAND

nose - coarse SAND

Notes:
last 8" capped separately without core nose
core nose not retained as there was a void behind fingers - last 8" section represents Bottom of core.
clean sand

EMJ014231

ANCHOR QEA

Sediment Core Collection Log

Job: Jorgensen Subsurface Sed. Characterization
Job No: 080224-01.01
Field Staff: DG JJ
Contractor: MSS
Vertical Datum: MLLW

Station ID: JVE-207
Attempt No. 1 of 1
Date: 2/15/11
Logged By: DG
Horizontal Datum: NAD83

Field Collection Coordinates:
Lat/Northing: 47.31.5914
Long/Easting: 122 18.5492 1151

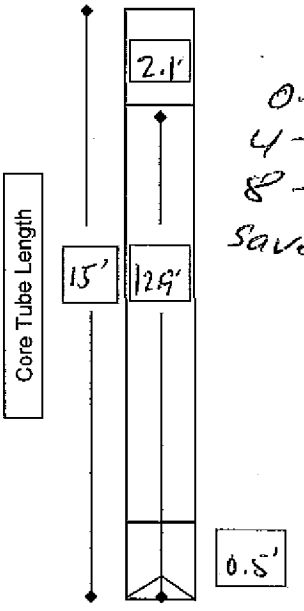
A. Water Depth
DTM Depth Sounder:
DTM Lead Line: -21.0'

B. Water Level Measurements
Time: 1150
Stage: 9.1'
Source: NOAA
Actual = 9.5'

C. Mudline Elevation
-11.9'
Actual = -11.5'

Core Collection Recovery Details:
Core Accepted: (Yes) No
Core Tube Length: 15'
Drive Penetration: 14'
Headspace Measurement: 2.1'
Recovery Measurement: 12.9'
Recovery Percentage: 92%
Total Length of Core To Process:

Recovery Measurements (prior to cuts)



0-4 A
4-8 B
8-12.4 C
Saved 6" of nose

Drive Notes:
easy penetration to full
at 12' hit something hard

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

0- Soft Brown wet SILT no odor no sheen
4- med stiff SILT slight H_2S odor dark olive
8- Same as above very slight H_2S
12- Damp gray SAND

Notes:
nose retained for 6"

EMJ014232

ANCHOR QEA

Sediment Core Collection Log

Job: Jorgensen Subsurface Sed. Characterization	Station ID: JVE-205
Job No: 080224-01.01	Attempt No. 1 of 1
Field Staff: DG JJ	Date: 2/15/11
Contractor: MSS	Logged By: DG
Vertical Datum: MLLW	Horizontal Datum: NAD83

Field Collection Coordinates:
Lat/Northing: 47 31.6060 Long/Easting: 122 18.5646 @ 1255

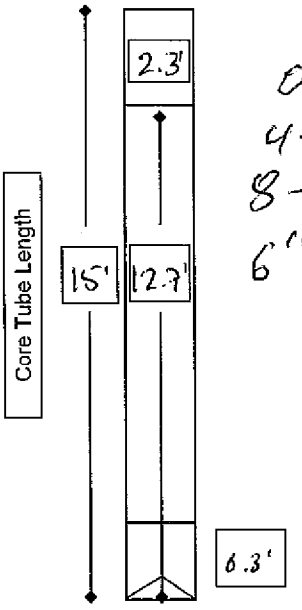
A. Water Depth
DTM Depth Sounder:
DTM Lead Line: -23.1'

B. Water Level Measurements
Time: 1250
Stage: 9.8'
Source: NOAA
Actual = 10.3'

C. Mudline Elevation
-13.3'
Actual = 12.8'

Core Collection Recovery Details:
Core Accepted: (Yes) No
Core Tube Length: 15'
Drive Penetration: 14'
Headspace Measurement: 2.3'
Recovery Measurement: 12.7'
Recovery Percentage: 90.7
Total Length of Core To Process:

Recovery Measurements (prior to cuts)



0-4 A
4-8 B
8-12.4 C
6" of nose

Drive Notes:
7' free fall
7-10 mod
10' hit something hard
~~refusal at 11'~~ hit debris
Broke through to 11'
penetration

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

nose full
0- Soft wet Brown SILT no odor
4- Stiffer olive SILT Damp with Fine Sand
8- moist silty Fine SAND - slight Petrol. odor
12.4- stiff moist dark olive SILT with F. Sand

Notes:
kept 6" of material in nose

ANCHOR QEA

Sediment Core Collection Log

Job: Jorgensen Subsurface Sed. Characterization		Station ID: JVE 316	
Job No: 080224-01.01		Attempt No. 1 of 1	
Field Staff: DG JJ		Date: 2/15/11	
Contractor:	MSS	Logged By: DG	
Vertical Datum:	MLLW	Horizontal Datum:	NAD83

Field Collection Coordinates:
Lat/Northing: 47. 31.6069 Long/Easting: 122 18.5493 @ 1336

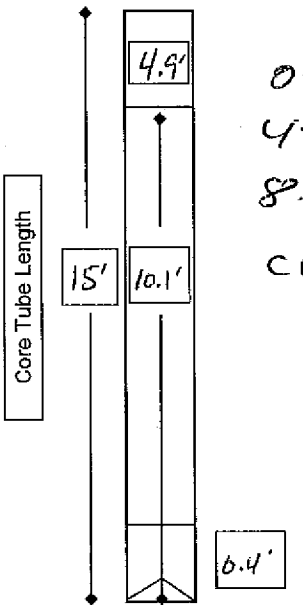
A. Water Depth
DTM Depth Sounder:
DTM Lead Line: -14.8'

B. Water Level Measurements
Time: 1335
Stage: 10.0'
Source: NOAA
Actual = 10.5'

C. Mudline Elevation
-4.8'
Actual = -4.3'
Recovery Measurements (prior to cuts)

4.

Core Collection Recovery Details:
Core Accepted: Yes / No
Core Tube Length: 15'
Drive Penetration: ~~14~~ 13.6'
Headspace Measurement: 4.9'
Recovery Measurement: 10.1'
Recovery Percentage: 75%
Total Length of Core To Process:



0-4
4-8
8-9.7
cut 6" off end.

Drive Notes:
3' free fall,
hit hard at 12'
slow drive to 14'
full penetration

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

nose is empty upon retrieval
0- Soft wet Brown silt slight hydrocarbon odor
slight sheen
4- moist SAND Gray no odor
8- Gray medium SAND no odor
9.7 ~~corse~~ clean SAND with chunks of Sand Stone
no odor

Notes:
No material in nose above Below fingers
9.7 is Bottom of core recovery

EMJ014234

ANCHOR QEA

Sediment Core Collection Log

Job: Jorgensen Subsurface Sed. Characterization
Job No: 080224-01.01
Field Staff: DD- JJ
Contractor: MSS
Vertical Datum: MLLW

Station ID: JVE 309
Attempt No. 1 of 1
Date: 2/15/11
Logged By: DG
Horizontal Datum: NAD83

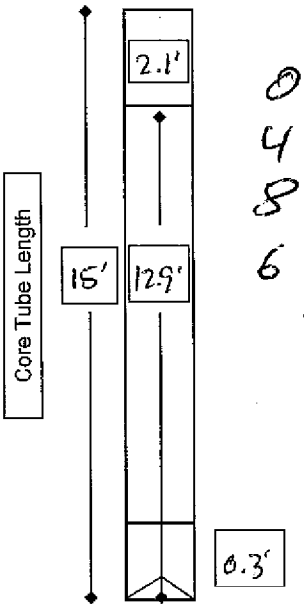
Field Collection Coordinates:
Lat/Northing: 47 31.5947
Long/Easting: 122 18.5406 @ 1421

A. Water Depth
DTM Depth Sounder:
DTM Lead Line: -14.5'

B. Water Level Measurements
Time: 1420
Stage: 9.7'
Source: NOAA
Actual = 10.3'

C. Mudline Elevation
-4.8'
Actual = -4.2'
Recovery Measurements (prior to cuts)

Core Collection Recovery Details:
Core Accepted: (Yes) No
Core Tube Length: 15'
Drive Penetration: 14'
Headspace Measurement: 2.1'
Recovery Measurement: 12.9'
Recovery Percentage: 92%
Total Length of Core To Process:



0-4 A
4-8 B
8-12.6 C
6" of nose full of material

Drive Notes:
2' freefall
easy penetration to 14'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

0- wet Sdy Brown Silt, no odor
4- wet sand no odor
8- wet SAND no odor
12.6- wet silty SAND. fingers closed. nose full

Notes:
nose full silty Sand. (below fingers)

EMJ014235

ANCHOR QEA

Sediment Core Collection Log

Job: Jorgensen Subsurface Sed. Characterization		Station ID: JVE-311	
Job No: 080224-01.01		Attempt No. 1 of 1	
Field Staff:		Date: 3/15/11	
Contractor:	MSS	Logged By:	
Vertical Datum:	MLLW	Horizontal Datum:	NAD83

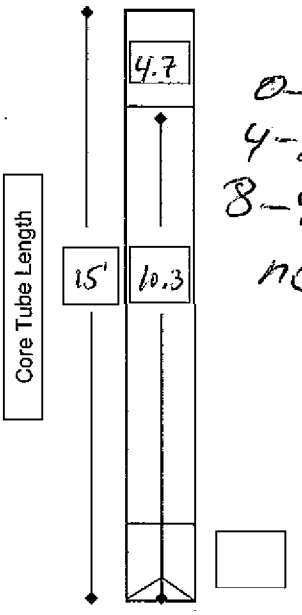
Field Collection Coordinates:
Lat/Northing: 473.5760 Long/Easting: 122 18.5297 @ 1504

A. Water Depth
DTM Depth Sounder:
DTM Lead Line: -13.5'

B. Water Level Measurements
Time: 1505
Stage: 9.0'
Source: NOAA
Actual: 9.5'

C. Mudline Elevation
-4.5'
Actual = -4.0'
Recovery Measurements (prior to cuts)

Core Collection Recovery Details:
Core Accepted: Yes / No
Core Tube Length: 15'
Drive Penetration: 13.6'
Headspace Measurement: 57"
Recovery Measurement: 10.3'
Recovery Percentage: 75.7%
Total Length of Core To Process:



0-4 A
4-8 B
8-9.10" C
no material in nosp

Drive Notes:
2.5' freefall
resistance at 2.5
easy penetration to 14'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

0- Soft wet Brown Silt no odor no sheen
4- Black sand, wet, few larger angular 1-2" gravel slight odor and sheen.
8

Notes:
nose empty below fingers

EMJ014236

ANCHOR QEA

Sediment Core Collection Log

Job: Jorgensen Subsurface Sed. Characterization
Job No: 080224-01.01
Field Staff: DG JJ
Contractor: MSS
Vertical Datum: MLLW

Station ID: JVE 320
Attempt No. 1 of 1
Date: 2/15/11
Logged By: DG
Horizontal Datum: NAD83

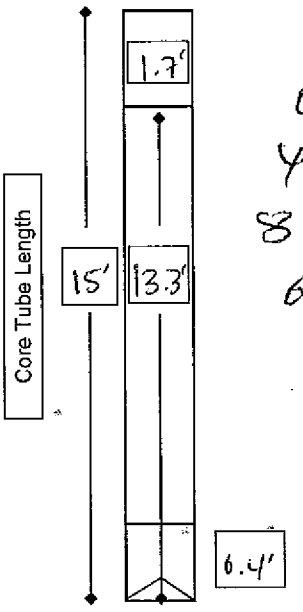
Field Collection Coordinates:
Lat/Northing: 47 31.5641
Long/Easting: 122 18.5210 @ 1541

A. Water Depth
DTM Depth Sounder:
DTM Lead Line: -11.2'

B. Water Level Measurements
Time: 1540
Stage: 8.2'
Source: NOAA
Actual = 8.6'

C. Mudline Elevation
-3.0'
Actual = -2.6'
Recovery Measurements (prior to cuts)

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 15'
Drive Penetration: 14'
Headspace Measurement: 1.7'
Recovery Measurement: 13.3'
Recovery Percentage: 95%
Total Length of Core To Process:



0-4
4-8
8-12.9'
6" at nose

Drive Notes:
easy penetration all the way to 14'

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

0- Soft wet Brown Silt, no odor, sheen
4- Very Silty moist Fine SAND, no odor or sheen
8- Same
12.9 Same

Notes:
Nose full Dark olive Silty fine SAND moist

EMJ014237

ANCHOR QEA

Sediment Core Collection Log

Job: Jorgensen Subsurface Sed. Characterization
Job No: 080224-01.01
Field Staff: DG JJ
Contractor: MSS
Vertical Datum: MLLW

Station ID: JVE-07
Attempt No. 1 of 1
Date: 2/16/11
Logged By: DG
Horizontal Datum: NAD83

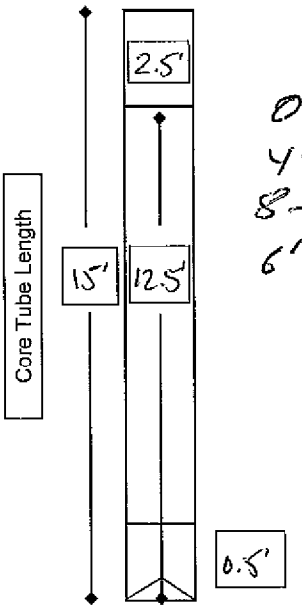
Field Collection Coordinates:
Lat/Northing: 47 31.5598
Long/Easting: 122 18.5244 @ 0829

A. Water Depth
DTM Depth Sounder:
DTM Lead Line: -13.3'

B. Water Level Measurements
Time: 0825
Stage: 6.8'
Source: NOAA
Actual: 7.3'

C. Mudline Elevation
-6.5'
Actual = -6.0'
Recovery Measurements (prior to cuts)

Core Collection Recovery Details:
Core Accepted: Yes / No
Core Tube Length: 15'
Drive Penetration: 14'
Headspace Measurement: 2.5'
Recovery Measurement: 12.5'
Recovery Percentage: 89%
Total Length of Core To Process:



0-4 A
4-8 B
8-12 C
6" of nose retained

Drive Notes:
3 ft of free
Steady penetration to full.

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

nose full of woody chunks and sand.
0 - Soft wet brown SILT
4 - moist mod stiff dark olive silty FINE SAND
no odor no sheen
8 - ~~Same~~ Olive wet medium SAND no odor
12 - Same

Notes:

EMJ014238

ANCHOR QEA

Sediment Core Collection Log

Job: Jorgensen Subsurface Sed. Characterization
Job No: 080224-01.01
Field Staff: DG JJ
Contractor: MSS
Vertical Datum: MLLW

Station ID: JVE 314
Attempt No. 1 of 1
Date: 2/16/11
Logged By: DG
Horizontal Datum: NAD83

Field Collection Coordinates:
Lat/Northing: 47 31.5391
Long/Easting: 122 18.5113 @0950

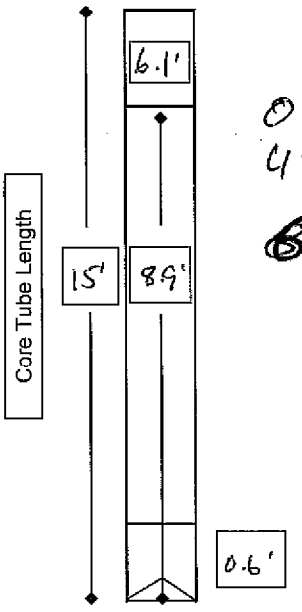
A. Water Depth
DTM Depth Sounder:
DTM Lead Line: -10.9'

B. Water Level Measurements
Time: 0950
Stage: 6.3'
Source: NOAA
Actual: 6.8'

C. Mudline Elevation
-4.6
Actual = -4.1'

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 15'
Drive Penetration: 9.5'
Headspace Measurement: 6.1'
Recovery Measurement: 8.9'
Recovery Percentage: 94%
Total Length of Core To Process:

Recovery Measurements (prior to cuts)



0-4 A
4-8.3 B
6" nose

Drive Notes:
2 ft free fall
easy to 9.5 hit hard
at refusal

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

nose with medium wet SAND few wood debris
0- Soft wet Brown SILT no odor no sheen
4- medium gray SAND
8.4- medium SAND no odor
6" of nose the same with wood chips in nose

Notes:

EMJ014239

ANCHOR QEA

Sediment Core Collection Log

Job: Jorgensen Subsurface Sed. Characterization	Station ID: JVE-322
Job No: 080224-01.01	Attempt No. 1 of 1
Field Staff: DG JS	Date: 2/16/11
Contractor: MSS	Logged By: DG
Vertical Datum: MLLW	Horizontal Datum: NAD83

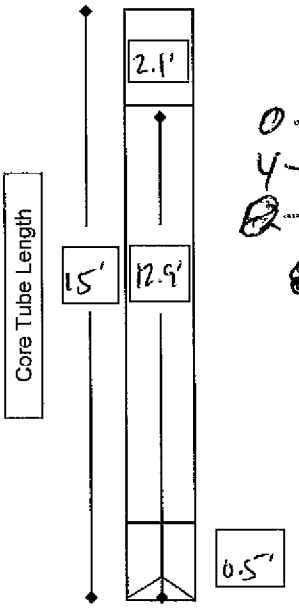
Field Collection Coordinates:
Lat/Northing: 47 31.5519 Long/Easting: 122 18.5359 @ 0911

A. Water Depth
DTM Depth Sounder:
DTM Lead Line: -22.2'

B. Water Level Measurements
Time: 0910
Stage: 6.5'
Source: NOAA
Actual = 6.8'

C. Mudline Elevation
15.7'
Actual = -15.4'
Recovery Measurements (prior to cuts)

Core Collection Recovery Details:
Core Accepted: Yes / No
Core Tube Length: 15'
Drive Penetration: 14'
Headspace Measurement: 2.1'
Recovery Measurement: 12.9'
Recovery Percentage: 92%
Total Length of Core To Process:



0-4
4-8
8-12.4"
8" of nose

Drive Notes:
7' free fall
easy to 10'
hard 10-14

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

nose full of medium SAND
0- mod stiff wet sandy SILT no odor no sheen
4- wet stiff silty SAND
8- moist very silty fine SAND no odor no sheen
12.4 medium wet SAND

8" of nose retained

Notes:

EMJ014240

ANCHOR QEA

Sediment Core Collection Log

Job: Jorgensen Subsurface Sed. Characterization	Station ID: JVE 216
Job No: 080224-01.01	Attempt No. 1 of 1
Field Staff: DG JJ	Date: 2/16/11
Contractor: MSS	Logged By: DG
Vertical Datum: MLLW	Horizontal Datum: NAD83

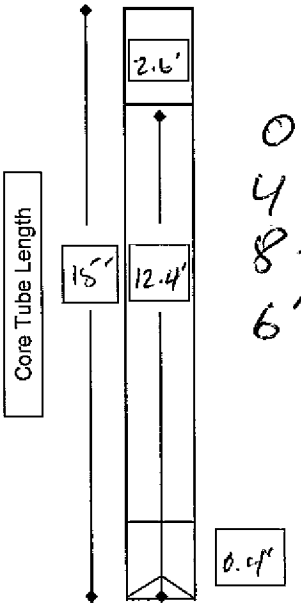
Field Collection Coordinates:
Lat/Northing: 47 31.5300 Long/Easting: 122 18.5203

A. Water Depth
DTM Depth Sounder:
DTM Lead Line: -20.5'

B. Water Level Measurements
Time: 1025
Stage: 6.5'
Source: NOAA
Actual: -7.0'

C. Mudline Elevation
-14'
Actual = -13.5'
Recovery Measurements (prior to cuts)

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 15'
Drive Penetration: 14'
Headspace Measurement: 2.6'
Recovery Measurement: 12.4'
Recovery Percentage: 89%
Total Length of Core To Process:



0-4 A
4-8 B
8-12 C
6" nose

Drive Notes:
4 feet free fall
4-10 easy
at 10 harder to full

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

nose full of fine Sand with organic matter
0 - Soft wet Brown SILT
4 - medium wet SAND
8 - Poorly Sorted medium SAND
12 - fine SAND with organic silt. Stiff moist no odor

Notes:

EMJ014241

ANCHOR QEA

Sediment Core Collection Log

Job: Jorgensen Subsurface Sed. Characterization		Station ID: JVE-01	
Job No: 080224-01.01		Attempt No. 2 of 2	
Field Staff: DG JJ		Date: 2/16/11	
Contractor: MSS		Logged By: DG	
Vertical Datum: MLLW		Horizontal Datum: NAD83	

Field Collection Coordinates:

Lat/Northing: 47 31.6264 #1
47 31.6254 #2

Long/Easting: 122 18.5650 #1
122 18.5655 #2

A. Water Depth	#1	#2
DTM Depth Sounder:		
DTM Lead Line:	-10.0'	-11.5'

B. Water Level Measurements	#1	#2
Time:	1125	1145
Stage:	7.5'	7.7'
Source:	NOAA	

C. Mudline Elevation	#1	#2
	-2.7'	-3.8'

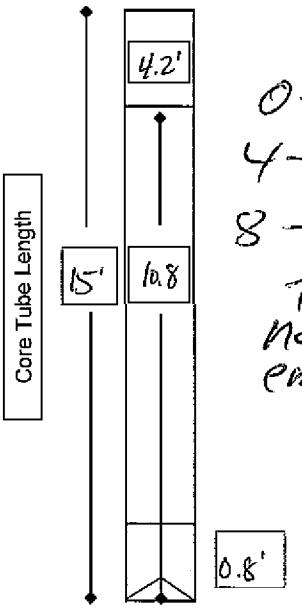
Actual = -3.2'

Core Collection Recovery Details:

	#1	#2
Core Accepted: Yes / No	No	Yes
Core Tube Length:	15'	15'
Drive Penetration:	12.2'	14.'
Headspace Measurement:	8.0'	4.2'
Recovery Measurement:	7.0'	10.8'
Recovery Percentage:	57%	77%
Total Length of Core To Process:		

Actual = 8.3

Recovery Measurements (prior to cuts)



0-4
4-8
8-10
7" of nose not retained empty

Drive Notes:

#1 easy penetration to 12.2 refusal at 12.2

#2 2.5 free fall easy to 13 then stiff to full

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

#1 nose full of sand - Reject

#2 nose full medium coarse SAND - Accept #2
Some loss out nose
0 - Wet Brown Silt with some wood material
slight odor and slight sheen
4 - Gray wet fine SAND
8 - Gray wet SAND
10 - Same

Notes:

Material in nose ran out prior to processing - lost 6" of SAND as above

ANCHOR QEA

Sediment Core Collection Log

Job: Jorgensen Subsurface Sed. Characterization		Station ID:	JVE-02
Job No: 080224-01.01		Attempt No.	2 of 2
Field Staff:	DG JJ	Date:	2/16/11
Contractor:	MSS	Logged By:	DG
Vertical Datum:	MLLW	Horizontal Datum:	NAD83

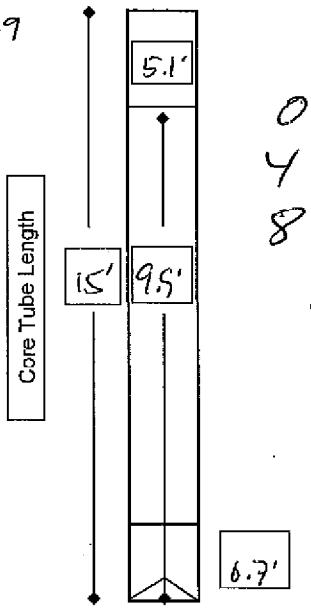
Field Collection Coordinates:

Lat/Northing: 47 31.6167 #1
47 31.6172 #2

Long/Easting: 122 18.5547 #1 1251
122 18.5532 #2 1447

A. Water Depth		**B. Water Level Measurements**		**C. Mudline Elevation**		
DTM Depth Sounder:	#2	Time:	1300 / 1450		-3.1 / -2.3	
DTM Lead Line:	-12.4 / -12.5	Stage:	9.3 / 10.2		#2 Actual = -1.6	
		Source:	NOAA #2 Actual = 10.9		Recovery Measurements (prior to cuts)	

Core Collection Recovery Details:	#1	#2
Core Accepted: Yes / No		Yes
Core Tube Length:	15'	15'
Drive Penetration:	14'	13.7'
Headspace Measurement:	5.9'	5.1'
Recovery Measurement:	9'	9.9'
Recovery Percentage:	65%	72.3%
Total Length of Core To Process:		



0-4
4-8
8-9.2
6" nose

Drive Notes:

#2 2 ft free fall easy to 10' then slow to 13.7'

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

#1 nose full of coarse sand Reject

#2 nose full of SAND - Processed.
0- Soft wet Brown SILT no odor
4- Moist mod Stiff SAND no odor

Notes:

ANCHOR QEA

Sediment Core Collection Log

Job: Jorgensen Subsurface Sed. Characterization	Station ID: JVE-03
Job No: 080224-01.01	Attempt No. 1 of 1
Field Staff: DG JJ	Date: ~~DG~~ 2/16/11
Contractor: MSS	Logged By: DG
Vertical Datum: MLLW	Horizontal Datum: NAD83

Field Collection Coordinates:
Lat/Northing: 47 31.6121 Long/Easting: 122 18.5636 @1317

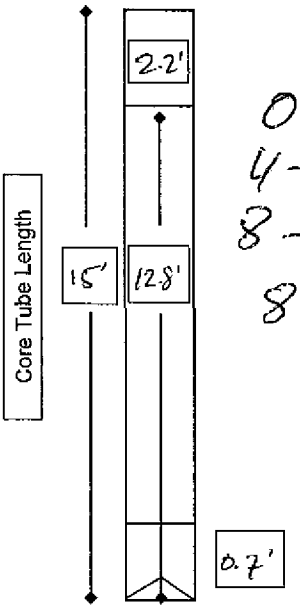
A. Water Depth
DTM Depth Sounder:
DTM Lead Line: 18.5'

B. Water Level Measurements
Time: 1315
Stage: 9.5'
Source: NOAA
Actual = 10.2'

C. Mudline Elevation
-9.0'
Actual = -8.3'

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 15'
Drive Penetration: 14'
Headspace Measurement: 2.2'
Recovery Measurement: 12.8'
Recovery Percentage: 91%
Total Length of Core To Process:

Recovery Measurements (prior to cuts)



0-4 A
4-8 B
8-12.7 C
8" nose

Drive Notes:
7' feet fall to stiff and then easy penetration to full

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

nose full of Brown SAND
0- Soft wet Brown silt slight hydrocarbon odor, no sheen
4- moist sandy silt Slight H_2S odor
8- moist silty SAND Slight Hydrocarbon odor
12- mix of SAND (Gray) and Brown sand no odor

Notes:

EMJ014244

ANCHOR QEA

Sediment Core Collection Log

Job: Jorgensen Subsurface Sed. Characterization
Job No: 080224-01.01
Field Staff: DG JJ
Contractor: MSS
Vertical Datum: MLLW

Station ID: JVE 04
Attempt No. 1 of 1
Date: 2/16/11
Logged By: DG
Horizontal Datum: NAD83

Field Collection Coordinates:
Lat/Northing: 47 31.6108
Long/Easting: 122 18.5532 @ 1354

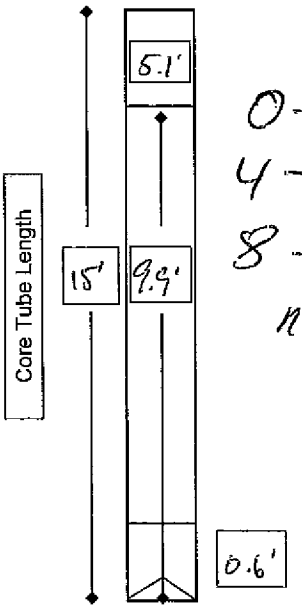
A. Water Depth
DTM Depth Sounder:
DTM Lead Line: -13.5

B. Water Level Measurements
Time: 1350
Stage: 10.2
Source: NOAA
Actual: 10.7

C. Mudline Elevation
-3.3
Actual = -2.8'
Recovery Measurements (prior to cuts)

Core Collection Recovery Details:
Core Accepted: (Yes) / No
Core Tube Length: 15'
Drive Penetration: 11.8'
Headspace Measurement: 5.1'
Recovery Measurement: 9.9'
Recovery Percentage: 84%
Total Length of Core To Process:

Drive Notes: 1' free fall
easy penetration to 10 foot. Slow to 11.8



0-4
4-8
8-9.3
nose 6"

Core Field Observations and Description:
Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

0 - Soft wet olive SILT, few Blebs of sheen no odor.
4 - Dark olive moist fine SAND
8 - Sand no odor no sheen
9.3 - Poorly sorted medium SAND no odor
same in nose section

Notes:

EMJ014245

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-210 ~~SC-1102~~
Job No. 080224-01.01	Date/Time: 1102 11/6 0900
No. of Sections: 3 + Nose	Core Logged By: JD
Drive Length: 14'	Attempt #: 1
Recovery: ~~13~~ 12.7'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 98%	Diameter of Core (inches) 4"
Notes: lab recovery ~~13~~ 12.7'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
1				moist, soft, SILT, dark grey,			JVE-210 SC-0001	
							JVE-210 SC-0102	
2				@2-6.8' dark grey, moist, mediumdense SILT with trace fine sand			JVE-210 SC-0203	
3							JVE-210 SC-0304	
4							JVE-210 SC-0405	
5								

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-210 ~~SC-1102~~
Job No. 080224-01.01	Date/Time: 1102 16 0500
No. of Sections: 3+ nose	Core Logged By: JD
Drive Length: 14'	Attempt #: 1
Recovery: 12.7'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 93%	Diameter of Core (inches) 4"
Notes: lab recovery = 12.7'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				Same as above			JVE-210 SC-0506	
6							JVE210 SC-0607	
				@ 6.6' fibrous sheet of material				
7				6.8-11.1 Dark grey, damp, medium dense, fine to medium SAND, slightly silty, slight H_2S odor. SAND grains are multi colored @ 7.3-7.6 scattered wood debris @ 7.7-7.9 interbed of SILT			JVE-210 SC-0708	
8							JVE-210 SC-0809	
9							JVE-210 SC-0910	
10								

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-210 ~~SC-1102~~
Job No. 080224-01.01	Date/Time: 1102 16 0900
No. of Sections: 3 + nose	Core Logged By: JD
Drive Length: 14'	Attempt #: 1
Recovery: 12.7'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 93%	Diameter of Core (inches) 4"
Notes: lab recovery 12.7'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				Same as above			JVE-210 SC-1011	
				@10.3-10.35 interbed of SILT				
11				@10.9-11.1 SAND grades to fine SAND				
				@11.1-12.7 Wood Waste, ~~with fine SAND with~~ with fine SAND, olive grey, sticks and twigs. Wood pieces up to .3 ft x .1 ft (60% W 40% S)			JVE-210 SC-1112	
12							JVE-210 SC-1212.7	
				End of Core @ 12.7'				
13								
14								
15								

Sediment Core Processing Log

ANCHOR QEA

Job:	Jorgensen Sed. Charac.	Station ID:	JVE215
Job No.	080224-01.01	Date/Time:	2/16/11 1100
No. of Sections:	3	Core Logged By:	J.P
Drive Length:	14'	Attempt #:	1
Recovery:	13.7'	Type of Core	☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery:	98%	Diameter of Core (inches)	4"
Notes:	lab recovery = 12.8'	Core Quality	☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				dark grey, moist, soft SILT 0-3 ft			JVE-215SC 0001	
1							JVE-215 SC-0102	
2							JVE-215 SC0203	
3				3'-8.9' Dark grey, moist, medium stiff, SILT with trace fine sand			JVE-215 SC-0304	
4							JVE-215 SC-0405	
5								

EMJ014249

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sed. Characterization	Station ID: JVE-215
Job No. 080224-01.01	Date/Time: 2/16/11 1100
No. of Sections: 3	Core Logged By: JD
Drive Length: 14'	Attempt #: 1
Recovery: 13.7'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 98%	Diameter of Core (inches) 4
Notes: Lab recovery = 12.8'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				SAME AS above			JVE-215 SC-0506	
6							JVE-215 SC-0607	
7				7.1 ~~increases~~ grades to slightly ~~sat~~ ~~STUDY~~ sandy SILT			JVE-215 SC-0708	
8							JVE-215 SC-0809	
9				8.9-9.9' Olive grey, damp, ~~medium~~ stiff clayey SILT with trace fine sand			JVE-215 SC-0910	
10				9.9-12.8' Damp, dense, slightly silty fine to medium SAND. sand grains are multi colored. Dark Grey, with interbeds of silt.				

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sed. Charac.	Station ID: JVE - 215
Job No. 080224-01.01	Date/Time: 2/16/11 1100
No. of Sections: 3	Core Logged By: JD
Drive Length: 14'	Attempt #: 1
Recovery: 13.7'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 98%	Diameter of Core (inches) 4
Notes: lab recovery = 12.8'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
11				SAA			JVE-215 SC-1011	
							JVE-215 SC-1112	
12				@ 12ft trace wood Debris			JVE-215 SC-1212.8	
13				End of Core @ 12.8 (Nose not retained)				
14								
15								

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-207SC-1102 16
Job No. 080224-01.01	Date/Time: 1102 16 Feb. 1430
No. of Sections: 3 + Nose	Core Logged By: JMD
Drive Length: 14'	Attempt #: 1
Recovery: 12.9'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 92%	Diameter of Core (inches) 4"
Notes: lab recovery = 12.6'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				Dark grey, moist, soft, SILT ~~OF~~ (0-8')			JVE-207 SC-0001	
1				@ 1-2 ft organic fibers			JVE-207 SC-0102	
2			with	@ 2' Trace Fine Sand ~~SAME AS ABOVE WITH~~			JVE-207 SC-0203	
3							JVE-207 SC-0304	
4				@4 feet grades to medium stiff			JVE-207 SC-0405	
5								

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-207 SC-110216
Job No. 080224-01.01	Date/Time: 110216 1430
No. of Sections: 3 + nose	Core Logged By: JMD
Drive Length: 14'	Attempt #: 1
Recovery: 12.9'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 92%	Diameter of Core (inches) 4
Notes: lab recovery = 12.6'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				SAA			JVE-207 SC-0506	
6							JVE-207 SC-0607	
7							JVE-207 SC-0708	
8				@8 - 8.4' Olive grey, damp, stiff, SILT, with trace fine sand			JVE-207 SC-0809	
				@8.4 - 10 Olive grey, damp, stiff, clayey SILT				
9							JVE-207 SC-0910	
10								

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-207 ~~SC-1102~~
Job No. 080224-01.01	Date/Time: 1102 16
No. of Sections: 3+ nose	Core Logged By: JMD
Drive Length: 14'	Attempt #: 1
Recovery: 12.9'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 92%	Diameter of Core (inches) 4
Notes: lab recovery = 12.6'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				11.8' @10ft Dry, Dense, olive grey, silty very Fine SAND			JVE-207 SC-1011	
11				@10.8 interbed of SILT @11 interbed of ~~silt~~ SILT @11.3 interbed of ~~silt~~ SILT			JVE207 SC-1112	
				12.6' @11.8 Dark grey, Damp, medium dense, fine to medium SAND with Trace silt.			JVE207 SC-1212.6	
13				@ ~~Core~~ End of Core 12.6 ~~+ 0.2 Nose~~				
14								
15								

EMJ014254

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization		Station ID:	JVE-205 ~~SC-1102~~
Job No. 080224-01.01		Date/Time:	~~1102~~ 2/17/2011 0830
No. of Sections:	3+ more	Core Logged By:	JD
Drive Length:	14'	Attempt #:	1
Recovery:	12.7'	Type of Core	☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery:	91%	Diameter of Core (inches)	4"
Notes:	lab recovery = 12.1'	Core Quality	☐ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				Dark grey, moist, SOFT, SILT trace organic fibers up until 2 ft. 0-9.2'			JVE-205 SC-0001	
1							JVE-205 SC-0102	
2							JVE-205 SC-0203 JVE-1205 SC-0203	
				@2.6 ~~same as above but~~ becomes medium stiff ~~and~~ with trace sand				
3							JVE-205 SC-0304	
4							JVE-205 SC-0405	
5								

EMJ014255

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-205 ~~SG-1102~~
Job No. 080224-01.01	Date/Time: ~~1102~~ 2/17/11 0830
No. of Sections: 3 + nose	Core Logged By: JMD
Drive Length: 14'	Attempt #: 1
Recovery: 12.7'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 91%	Diameter of Core (inches) 4
Notes: lab recovery = 12.1'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				SAA			JVE-205 SC-0506	
6							JVE-205 SC-0607	
7							JVE-205 SC-0708	
				9.2' @7.5 grades to slighty sandy SLT ~~all else is the same as 2-6~~				
8							JVE-205 SC-0809	
				@8.5 very slight HC-like? odor				
9				~~@9.0 Slight petroleum odor~~			JVE-205 SC-0910	
				9.7' @9.2 Dark grey, damp, loose, sandy WOOD layer. wood is decaying in small fragments ... 1 large (.3ft) x (.1ft) piece				
				11.7' @9.7 Dark grey, Damp, Dense, silty VF-SAND				
10				@9.9 grades to fine medium sand				

EMJ014256

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-205 ~~SC-1102~~
Job No. 080224-01.01	Date/Time: ~~1102~~ 2/17/11 0830
No. of Sections: 3 + nose	Core Logged By: JMD
Drive Length: 14'	Attempt #: 1
Recovery: 12.7'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 91%	Diameter of Core (inches) 4
Notes: lab recovery = 12.1'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				same as above			JVE-205 SC-1011	
				@10.6 ~~same as 9.7~~ grades back to VF-SAND				
11							JVE-205 SC-1112.1	
				@11.7 - 12.1 Dark grey, damp, stiff clayey SILT with trace very fine sand.				
12								
				core ends @ 12.1				
13								
14								
15								

EMJ014257

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-316 ~~SC-1102~~
Job No. 080224-01.01	Date/Time: ~~1102~~ Feb 17, 2011 1000
No. of Sections: 3	Core Logged By: JD
Drive Length: 13.6'	Attempt #: 1
Recovery: 10.1'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 75%	Diameter of Core (inches) 4"
Notes: lab recovery = 9.7'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				Olive Grey, wet, very soft, SILT (0-0.5')			JVE-316 #SC-0001	
				@ .5 - 2.0' Dark Grey, moist, soft ~~stiff~~ SILT trace organic fibers				
1							JVE-316 SC-0102	
2				@ 2ft - 3' Dark grey to olive grey, moist medium stiff, SILT with trace fine sand.			JVE-316 SC-0203	
3				@ 3ft - 3.5' Olive Grey, Moist, medium stiff, sandy SILT, sand grains medium coarse with trace fine and coarse gravel. Piece of glass found @ 3.2ft (.3 x .1 ft. glass)			JVE-316 SC-0304	
4				@ 3.5 Olive Grey, medium dense, fine to medium ~~sand~~ SAND with trace silt. Sand grains are multi colored. Damp 3.5-9.7'			JVE-316 SC-0405	
5								

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-316 ~~SC-1102~~
Job No. 080224-01.01	Date/Time: ~~1102~~ Feb 17, 2011 1000
No. of Sections: 3	Core Logged By: JD
Drive Length: 13.6'	Attempt #: 1
Recovery: 10.1'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 75%	Diameter of Core (inches) 4
Notes: lab recovery = 9.7'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				Same as above			JVE-316 SC-~~0607~~ 0506	
6				@6-6.3 pocket of ~~olive~~ light grey, damp, medium stiff, slightly clayey SILT			JVE-316 SC-~~0708~~ 0607	
7				@7ft grades to medium SAND			JVE-316 ~~0800~~ SC-0708	
8				@8ft same as 7 with trace coarse SAND			JVE-316 SC-0809	
9				@9.4-9.7 along the inner wall of the liner ~~of the core tube~~ core is a white to light grey hard material, dry, which easily breaks to medium grains			JVE-316 SC-0909.7	
				@9.7 Core Ends (Nose not retained)				
10								

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-309 ~~SC-1102~~
Job No. 080224-01.01	Date/Time: ~~1102~~ Feb 17, 2011 ~~1330~~ 1120
No. of Sections: 3 + Nose	Core Logged By: JD
Drive Length: 14'	Attempt #: 1
Recovery: 12.9'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 92%	Diameter of Core (inches) 4"
Notes: lab recovery = 11.5'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				olive grey to dark grey, moist, soft, SILT 0-1.2'			JVE-309 SC-0001	
1				@1.0' @1ft ~~moist, soft, same color as above,~~ SILT with trace sand			JVE-309 SC-0102	
				@1.2ft-1.6' medium coarsed grained sandy SILT, moist, soft, dark/olive grey (dashed line) @1.3 ~~trace of gravel~~ trace gravel				
		1.6-1.9		@1.6ft moist, loose, silty medium sand with trace ~~few~~ gravel				
2		1.9 10.5		@1.9 Damp, moist, medium dense, fine to medium ~~fine~~ SAND with trace silt. Sand grains are multi colored - trace coarse sand from 1.9 to 3ft.			JVE-309 SC-0203	
3							JVE-309 SC-0304	
4							JVE-309 SC-0405	
5								

EMJ014260

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-309 ~~SC-1102~~
Job No. 080224-01.01	Date/Time: ~~1102~~ Feb 17, 2011
No. of Sections: 3 + nose	Core Logged By: JD
Drive Length: 14'	Attempt #: 1
Recovery: 12.9'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 92%	Diameter of Core (inches) 4
Notes: lab recovery = 11.5'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				Same as above			JVE-309 SC 0506	
6							JVE-309 SC-0607	
7							JVE-309 SC-0708	
				@7.6 grades to very fine silty SAND				
				@7.9-8.0 Interbed of silt.				
8							JVE-309 0809	
				@8.3-8.4 layered wood waste. wood is small decayed pieces				
				@8.4 ~~same as 1.9~~ back to f-m. SAND				
9							JVE-309 SC-0910	
10								

EMJ014261

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE- 309 ~~SC-1102~~
Job No. 080224-01.01	Date/Time: 1102 Feb 17, 2011
No. of Sections: 3 + nose	Core Logged By: JD
Drive Length: 14'	Attempt #: 1
Recovery: 12.9'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 92%	Diameter of Core (inches) 4
Notes: lab recovery = 11.5'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				Same as above			JVE 309 SC-1011	
				@10.5-10.7 dark grey, moist, stiff, very fine sandy silt.				
				@10.7 ~~returns to silt~~ Same as 1.9' - 11.0'				
11				@11-11.5 Damp, stiff, dark grey, clayey silt with trace sand			JVE-309 SC-1111.5	
				Core Ends @11.5				
12				→ Adjusted due to void spaces @ 3.5-3.7 @ 7.5-7.9				
13								
14								

EMJ014262

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-311 ~~SC-1102~~
Job No. 080224-01.01	Date/Time: ~~1102~~ Feb 17, 2011 1330
No. of Sections: 3	Core Logged By: JD
Drive Length: 13.6'	Attempt #: 1
Recovery: 10.'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: ~~76% 75%~~ 76%	Diameter of Core (inches) 4"
Notes: lab recovery = 9.4'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				wet, very soft SILT, Brown (0-0.5)			JVE-311-SC 0001	
				@.5 2.0' moist, soft, dark grey SILT				
1							JVE-311 SC-0102	
2				@2ft 3ft dark grey moist, medium stiff, SILT with trace fine sand			JVE-311 SC-0203	
3				@3ft 4.2' dark grey, moist, medium dense silty medium coarse SAND with 15% gravel with 1 cobble			JVE-311 SC-0304	
				@3.6 moisture changes to damp				
4				@4.2 4.9' damp, dark grey, medium dense fine SAND with trace coarse sand			JVE-311 SC-0405	
				@4.4 ~~3ft x 2ft cobble~~ 3ft x .2ft cobble				
				@4.5 layer of fiber-like material with a spot of rainbow sheen on it.				
5				@4.9 dark grey, damp, dense, very fine SAND				

4.9-9.4 ft

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-311 ~~SC-1102~~
Job No. 080224-01.01	Date/Time: ~~1102~~ Feb. 17th, 2011
No. of Sections: 3	Core Logged By: JD
Drive Length: 13.6'	Attempt #: 1
Recovery: 10'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 76%	Diameter of Core (inches) 4
Notes: Tub recovery = 9.4'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

	Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
					Same as above			JVE-311 SC-0506	
					@5ft small silt pocket 2cm x 2cm ~~0.5ft~~				
6					@6 two ~~inte~~ layers of silt, 5mm each			JVE-311 SC-0607	
7								JVE-311 SC-0708	
8					@7.7 sand grains grade to medium sand grains multi-colored			JVE-311 SC-089.4	
9					@9.1 ft - 2cm band of clayey silt				
					core ends @9.4 ft				

Nose not retained (empty)

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-320 ~~SC-1102~~
Job No. 080224-01.01	Date/Time: ~~1102~~ Feb, 17, 2011 1445
No. of Sections: 3 + Nose	Core Logged By: JD
Drive Length: 14'	Attempt #: 1
Recovery: 13.3'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 95%	Diameter of Core (inches) 4"
Notes: lab recovery = 12.9'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
		@0-0.1		Wet, Brown, very soft, SILT			JVE-320 SC-0001	
		@0.1-1.0'		@0.1 moist, soft, dark grey SILT with trace medium sand				
1				@1-5 ft slight HC-like odor				
				@1-1.5 dark grey, moist, soft, ~~SILT~~ slightly medium ~~sand~~ coarse grained sandy SILT			JVE-320 SC-0102	
				@1.5-3.9 ft dark grey, moist, medium stiff SILT with trace sand				
2							JVE-320 SC-0203	
				@2.4 1cm layer of material from 1-1.5				
				@2.6 1cm layer of material 1-1.5				
				@2.8 1cm layer of material from 1-1.5				
3				(in 3.4' sample sheen noted - metallic)			JVE-320 SC-0304	
				@3.4-3.9 1cm interbeds of material from 1-1.5			JVE-1320 SC-0304	
4				@3.9-10.3 dark grey, damp, medium stiff ~~clayey~~ ~~silt~~ SILT with trace sand and trace clay with small (2mm) interbeds of ~~sand~~ SANDY SILT			JVE-320 SC-0405	
5								

EMJ014265

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-320 ~~SC-1102~~
Job No. 080224-01.01	Date/Time: ~~1102~~ Feb 17, 2011
No. of Sections: 3 + nose	Core Logged By: JD
Drive Length: 14'	Attempt #: 1
Recovery: 13.3'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 95%	Diameter of Core (inches) 4
Notes: lab recovery = 12.9'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				Same as above			JVE-320 SC-0506	
6							JVE-320 SC-0607	
7							JVE-320 SC-0708	
8				@ 8-8.2 void			JVE-320 SC-0809	
9							JVE-320 SC-0910	
10								

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-320 ~~SC-1102~~
Job No. 080224-01.01	Date/Time: ~~1102~~ Feb 17, 2011
No. of Sections: 3 + nose	Core Logged By: JD
Drive Length: 14'	Attempt #: 1
Recovery: 13.3'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 95%	Diameter of Core (inches) 4
Notes: lab recovery = 12.9'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				same as above			JVE-320 SC-1011	
				@10.3-10.6 Dark grey, damp, medium dense, medium ~~sand~~ SAND with trace silt				
				@10.6-10.7 same as 3.9				
				same as 10.3'				
11							JVE-320 SC-1112	
				@11.95 a 2cm layer of SILT				
12							JVE-320 SC-1212.9	
				@12.3 12.9' Dark grey, damp, stiff clayey SILT, trace sand				
13				Core ends at 12.9				
14								
15								

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization		Station ID:	JVE-314 ~~SC-1102~~
Job No. 080224-01.01		Date/Time:	~~1102~~ Feb 18, 2011 0830
No. of Sections: 2 ~~+ Nose~~ + Nose		Core Logged By:	JD
Drive Length: 9.5'		Attempt #:	1
Recovery: 8.9'		Type of Core	☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 94%		Diameter of Core (inches)	4"
Notes: lab recovery = 7.9'		Core Quality	☐ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
1				@0-.2 Damp, soft, SILT with trace sand Brown			JVE-314-SC-0001	
				@.2-0.6 Damp, soft, ~~sil SILT with trace fine sand~~ slightly medium sandy SILT with trace Gravel, Dark grey				
				@.6-2ft Moist, medium stiff, medium sandy SILT, scattered wood debris throughout the interval Dark grey				
				@1.1 moderate wood fibers up to .2ft in length			JVE-314 SC-0102	
2				@2ft Dark grey, moist, loose, slightly silty medium SAND			JVE-314 SC-0203	
				@2.7 SILT Pocket				
3				@3.1 SILT pocket			JVE-314 SC-0304	
				@3.3 SILT Pocket				
4				@4ft SILT Pocket			JVE-314 SC-0405	
5				@5ft SILT Pocket				

EMJ014268

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-314-SC-1102
Job No. 080224-01.01	Date/Time: 1102 Feb 18, 2011
No. of Sections: 2 + nose	Core Logged By: JD
Drive Length: 9.5'	Attempt #: 1
Recovery: 8.9'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 94%	Diameter of Core (inches) 4"
Notes: lab recovery = 7.9'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				SAME as above			JVE-314-SC-0506	
				@5.4 SILT Pocket				
				@5.7 Trace coarse SAND				
6				Same as above with			JVE-314 SC-0607	
				@6.7 SILT Pocket				
7				@7.2 SILT pocket			JVE-314 SC-0779	
8				End of Core @7.9 ft				
				Nose empty				
9								
10								

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-216 ~~SC-1102~~
Job No. 080224-01.01	Date/Time: ~~1102~~ Feb 18, 2011 0930
No. of Sections: 3 + Nose	Core Logged By: JD
Drive Length: 14'	Attempt #: 1
Recovery: 12.4'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 89%	Diameter of Core (inches) 4"
Notes: Lab recovery = 12.1'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
1				@0-1.8 Dark grey, moist, soft, SILT			JVE-216 SC-0001	
							JVE-216 SC-0102	
2				@1.8 Dark grey, moist, medium stiff, SILT with trace medium sand			JVE-216 SC-0203	
3							JVE-216 SC-0304	
4				@3.5-4.2 Dark grey, moist, medium dense, ~~sfu~~ silty fine ~~grain~~ to medium grained SAND, sand grains are multi colored @3.9 Interbed of SILT			JVE-216 SC-0405	
5				@4.2 same as 1.8				

EMJ014270

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-216 ~~SC-1102~~
Job No. 080224-01.01	Date/Time: ~~1102~~
No. of Sections: 3+ nose	Core Logged By: JD
Drive Length: 14'	Attempt #: 1
Recovery: 12.4'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 89%	Diameter of Core (inches) 4
Notes: lab recovery = 12.1'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				SAME as above			JVE-216 SC-0306	
				@5.6-6ft same as 3.5'				
6				@6-6.5ft same as 1.8 except damp and stiff			JVE-216 SC-0607	
				@6.5-11.6 Dark grey, moist loose, medium ~~Coa~~ to coarse ~~sand~~ SAND with trace silt, Sand grains are multi-colored,				
7							JVE-216 SC-0708	
				@				
8							JVE-216 SC-0809	
9							JVE-216 SC-0910	
10								

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-216 ~~SC-1102~~
Job No. 080224-01.01	Date/Time: 1102
No. of Sections: 3+ nose	Core Logged By: JD
Drive Length: 14'	Attempt #: 1
Recovery: 12.4'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 89%	Diameter of Core (inches) 4
Notes: lab recovery = 12.1'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				Same as above			JVE-216 SC-1011	
				@10.6 large gravel				
11				@ 11.1 ~~cobbel~~ cobble			JVE-216 SC11-12.1	
12				@11.6 - 12.1 Damp, light grey, medium dense, slightly silty V.F SAND, occasional wood debris, pieces up to .15 ft in length & interbeds of silt				
				End of Core 12.1				
13								
14								
15								

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-~~322 SC-1102~~
Job No. 080224-01.01	Date/Time: ~~1102~~ Feb 18 1045
No. of Sections: 3 + Nose	Core Logged By: JD
Drive Length: 14'	Attempt #: 1
Recovery: 12.9'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 92%	Diameter of Core (inches) 4
Notes: lab recovery = 12.4'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
1				@0-2' moist, dark grey, soft SILT			JVE-322 SC-0001	
							JVE-322 SC-0102	
2				@2ft-3ft Damp, medium stiff, SILT, dark grey			JVE-322 SC-0203	
3				@3-8ft Dark grey, damp, medium stiff SILT with trace fine ~~sand~~ sand			JVE-322 SC-0304	
				@3.8 – 3.9 layer of sandy SILT				
4							JVE-322 SC-0405	
5								

EMJ014273

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-322~~SC-1102~~
Job No. 080224-01.01	Date/Time: ~~1102~~ 2/18/11 1045
No. of Sections: 3 + nose	Core Logged By: JD
Drive Length: 14'	Attempt #: 1
Recovery: 12.9'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 92%	Diameter of Core (inches) 4
Notes: lab recovery = 12.4'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				Same as Above			JVE-322 SC-0506	
6				@6.1-6.2 Layer of Sandy SILT			JVE-322 SC-0607	
7							JVE-322 SC-0708	
8				@8.7 ft Dark grey, Damp, medium dense, slightly silty very fine to fine SAND with moderate decayed wood fragments. @8.3 no more wood fragments @8.4 Large SILT pocket.			JVE-322 SC-0809	
9				@8.7-9.5 Dark grey, Damp, dense, VF to F. SAND with trace silt. Sand grains are multi colored @9.2-9.4 Large SILT pocket @9.5-10.5 Sand grades to medium			JVE-322 SC0910	
10								

EMJ014274

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-322 ~~SC-1102~~
Job No. 080224-01.01	Date/Time: ~~1102~~ 2/18/11 1045
No. of Sections: 3+ nose	Core Logged By: JD
Drive Length: 14'	Attempt #: 1
Recovery: 12.9'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 92%	Diameter of Core (inches) 4
Notes: lab recovery = 12.4'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				Same as Above @10.2 SILT pocket			JVE-322 SC-1011	
				@10.5 - 11.8 ~~Sand~~ SAND grains become medium with trace Coarse-SAND				
11				@11-12 Scattered decayed wood			JVE-322 SC-1112.4	
12				@11.8 - 12.4 Same as 8.7				
				Core Ends @12.4				
13								
14								
15								

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE- 07 ~~SC-1102~~
Job No. 080224-01.01	Date/Time: ~~1102~~ Feb 18, 2011 1315
No. of Sections: 3 + N	Core Logged By: JD
Drive Length: 14'	Attempt #: 1
Recovery: 12.5'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 89 %	Diameter of Core (inches) 4"
Notes: lab recovery = 12.2'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				0-2.8' Dark grey, moist, soft SILT			JVE-07 SC-0001	
				0-1' Slight HC-like odor				
				worm present at top of core				
1							JVE-07 SC-0102	
2				@2 ft becomes medium stiff			JVE-07 SC-0203	
3				@2.8-6.0' Dark grey, ~~moist~~, damp, medium stiff, SILT, with trace sand.			JVE-07 SC-0304	
4				@4-5' Slight HC-like odor			JVE-07 SC-0405	
5								

EMJ014276

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-07 ~~SC-1102~~
Job No. 080224-01.01	Date/Time: ~~1102~~ Feb. 18, 2011 1315
No. of Sections: 3+ nose	Core Logged By: JD
Drive Length: 14'	Attempt #: 1
Recovery: 12.5'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 89%	Diameter of Core (inches) 4
Notes: lab recovery = 12.2'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				SAME as Above			JVE-07 SC-0506	
6				@6-6.7' ~~6.7 Layer of~~ interchanging layers of very fine SAND and sandy SILT @6.7' slight HC-like odor			JVE-07 SC-0607	
7		@7.1-11.7		@6.7-7.1' Dark grey, damp, Dense, silty fine SAND @7.1-11.7 Dark grey, damp, medium dense, medium SAND, with trace silt. Sand grains are multi coloured.			JVE-07 SC-0708	
8				@8.6 trace wood debris (decayed)			JVE-07 SC-0809	
9				@9.6-9.7 moderate wood debris @9.9 moderate wood debris			JVE-07 SC-0910 and JVE1007-SC-0910	
10								

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-07 ~~SC-1102~~
Job No. 080224-01.01	Date/Time: ~~1102~~ Feb. 18, 2011 1315
No. of Sections: 3+ max	Core Logged By: JD
Drive Length: 14'	Attempt #: 1
Recovery: 12.5'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 89%	Diameter of Core (inches) 4
Notes: lab recovery = 12.2'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				same as Above			JVE-07 SC-1011	
				@10.3-10.6 occasional wood debris				
11							JVE-07 SC-11-12.2	
				@11.3 .05 ft layer of woody SILT				
				@11.7-12.2 Dark grey - damp medium dense fine SAND with trace silt and occasional wood debris				
12								
				Core Ends @ 12.2				
13								
14								
15								

EMJ014278

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sed. Char.	Station ID: ~~JVE0~~ JVE-01
Job No. 080224-01.01	Date/Time: Feb 18, 2011 1445
No. of Sections: 3	Core Logged By: JD
Drive Length: 14'	Attempt #: 2
Recovery: 10.8'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 77%	Diameter of Core (inches) 4"
Notes: lab recovery = 9.7'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				0.0 - .4 Brown, wet, very soft, SILT with trace sand and occasional wood fragments			JVE-01 SC0001	
1				@.4 - 1.7 Dark grey, moist, soft slightly sandy SILT with moderate wood debris (twigs) up to .3 ft long			JVE-01 SC-0102	
				0 - 6.5 ft slight HC-like odor @1.2 strong HC-like odor				
2				@1.7 - 3.7 Dark grey, moist, dense, gravelly fine ~~sa~~ SAND with trace silt and cobble			JVE-01 SC-0203	
3							JVE-01 SC-0304	
				@3.7 No gravel or cobble				
4							JVE-01 SC-0405	
5								

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sed. Charac.	Station ID: JVE-01
Job No. 080224-01.01	Date/Time: Feb. 18, 2011 1445
No. of Sections: 3	Core Logged By: JD
Drive Length: 14'	Attempt #: 2
Recovery: 10.8'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 77%	Diameter of Core (inches) 4
Notes: lab recovery = 9.7'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				Same as above			JVE-01 SC-0506	
6							JVE-01 SC-0607	
7							JVE-01 SC-0708	
8				8.1 – 9.7 dark grey, damp, m. dense, m-SAND with trace gravel and cobble (Note: void space from 8.1 – 8.6 was adjusted b/c sand sloughed down core tube. loss of material was noted on core collection log)			JVE-01 SC-0809	
9							JVE-01 SC-099.7	
10				CORE ENDS @ 9.7				

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization		Station ID:	JVE-02 ~~SC-1102~~
Job No. 080224-01.01		Date/Time:	~~1102~~ Feb 21, 2011 0820
No. of Sections: 3 + Nose		Core Logged By:	JD
Drive Length: 13.7'		Attempt #:	2
Recovery: 9.9'		Type of Core	☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 72%		Diameter of Core (inches)	4"
Notes: lab recovery = 9.6'		Core Quality	☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				@0-.5 ~~Rust colored~~ Light brown, Damp, medium stiff, ~~tan~~ sandy SILT with trace gravel. rust odor			JVE-02 SC-0001	
				@.5-1.3 Light brown, Dry, medium dense, fine to medium SAND, trace silt. slight rust odor			JVE-02 SC-0102	
				@1.3-3.4 Color changes to dark grey, no odor. Sand grains are multi colored.			JVE-02 SC-0203	
							X No Line	
							JVE-1002 SC-0203	
							JVE-02 SC-0304	
				@3.4-7 Sand grades to medium			JVE-02 SC-0405	

1 2 3 4 5

EMJ014281

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-02-~~SC-1102~~
Job No. 080224-01.01	Date/Time: ~~1402~~ Feb. 21, 2011 0820
No. of Sections: 3 + nose	Core Logged By: JD
Drive Length: 13.7'	Attempt #: 2
Recovery: 9.9'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 72%	Diameter of Core (inches) 4
Notes: lab recovery = 9.6'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				Same as Above			JVE-02 SC-0506	
6							JVE-02 SC-0607	
7				7-9.6 Same as 3.4 with trace coarse SAND			JVE-02 SC-0708	
8							JVE-02 SC-0809	
9							JVE-02 SC-099.6	
				END OF CORE @ 9.6'				
10								

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization		Station ID:	JVE-03 ~~SC-1102~~
Job No. 080224-01.01		Date/Time:	~~1102~~ Feb 21, 2011 0940
No. of Sections: 3+ Nose		Core Logged By:	JD
Drive Length: 14'		Attempt #:	1
Recovery: 12.8'		Type of Core	☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 91%		Diameter of Core (inches)	4"
Notes: lab recovery = 12.2'		Core Quality	☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				@0-2.9 Dark grey, moist, soft SILT slight ~~H2S~~ H_2S odor			JVE-03 SC-0001	
1				X No Line			JVE-03 SC-0102	
2							JVE-03 SC-0203	
3				@2.9-7.8 Dark grey, moist, medium stiff, SILT with trace sand slight H_2S odor			JVE-03 SC-0304	
4							JVE-03 SC-0405	
5								

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-03 ~~SG-1102~~
Job No. 080224-01.01	Date/Time: ~~1102~~ Feb. 21, 2011 0940
No. of Sections: 3+ nose	Core Logged By: JD
Drive Length: 14'	Attempt #: 1
Recovery: 12.8'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 91%	Diameter of Core (inches) 4
Notes: lab recovery = 12.2'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				SAME as Above			JVE-03 SC-0506	
6							JVE-03 SC-0607	
7							JVE-03 SC-0708	
							JVE-1003 SC-0708	
8				@7.8-9.5 Dark grey, Damp, medium dense, slightly silty fine to medium SAND with silt pockets slight H_2S odor 8-8.4 VOID			JVE-03 SC-0809	
9				@9.3-9.5 occasional wood debris			JVE-03 SC-0910	
10				@9.5-11.7 Dark grey, moist, medium dense, medium SAND with trace silt, with interbeds of silt. Slight H_2S odor Sand grains are multi colored.				

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-03 ~~SC-1102~~
Job No. 080224-01.01	Date/Time: ~~1102~~ Feb. 21, 2011 0940
No. of Sections: 3 + nose	Core Logged By: JD
Drive Length: 14'	Attempt #: 1
Recovery: 12.8'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 91%	Diameter of Core (inches) 4
Notes: lab recovery = 12.2'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				same as above			JVE-03 SC-1011	
11							JVE-03 SC-1112.2	
12				@11.7 same as 9.5 with trace coarse sand.			X No line	
				End of core @ 12.2				
13								
14								
15								

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization		Station ID:	JVE-04 ~~SC-1102~~
Job No. 080224-01.01		Date/Time:	~~1102~~ Feb 21, 2011 1100
No. of Sections: 3 + Nose		Core Logged By:	JD
Drive Length: 11.8'		Attempt #:	1
Recovery: 9.9'		Type of Core	☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 84%		Diameter of Core (inches)	4"
Notes: lab recovery = 9.2		Core Quality	☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
1				@0-0.2 Brown, wet, very soft, SILT slight H_2S odor @0.2-1.2 Dark grey, moist, soft, slightly sandy SILT with slight H_2S odor			JVE-04 SC-0001	
2				@1.2-5.4 Dark grey, moist, medium dense, fine to medium SAND with trace silt.			JVE-04 SC-0102 JVE-04 SC-0203	
3				@3 ft moisture changes to Damp			JVE-04 SC-0304	
4				@4-5 ft Trace gravel present ~~@4.0 piece of gravel~~			JVE-04 SC-0405	
5								

Sediment Core Processing Log

ANCHOR QEA

Job: Jorgensen Sediment Characterization	Station ID: JVE-04 ~~SC-1102~~
Job No. 080224-01.01	Date/Time: ~~1102~~ Feb. 21, 2011 1100
No. of Sections: 3 + nose	Core Logged By: JD
Drive Length: 11.8'	Attempt #: 1
Recovery: 9.9'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 84%	Diameter of Core (inches) 4
Notes: lab recovery = 9.2'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				same as above			JVE-04 SC-0506	
				@5.4 SAND grades to medium with trace coarse sand, sand grains are multi colored				
6							JVE-04 SC-0607	
							JVE-1004 SC-0607	
7							JVE-04 SC-0708	
8								
							JVE-04 089.2	
9								
				core ends @ 9.2'				
10								

Sediment Core Processing Log

ANCHOR QEA

Job: ~~DSI Sediment RI~~ Jorgensen Forge VE	Station ID: JVE-206SC
Job No. ~~080444-01~~	Date/Time: 3/16/11
No. of Sections: 3 and shoe	Core Logged By: Delaney Peterson, Julia Labidae
Drive Length: 14'	Attempt #: 1 of
Recovery: 13.9'	Type of Core: ☐ Mudmole ☒ Vibracore ☐ Diver Core
% Recovery: 99%	Diameter of Core (inches) 4"
Notes: lab recovery = 13.6'	Core Quality: ☒ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
0.5	-	0	100	Very soft, ~~very~~ wet, dark grey SILT ~~Grades to 1~~			JVE-206SC-0-1	
1.0								
1.5							JVE-206SC-1-2	
2.0				~~@2.2~~				
2.5				@2.5- shell fragment.			JVE-206SC-2-3	
3.0	-	5	95	@3- Grades to medium stiff, dark grey SILT, trace vf sand.			JVE-206SC-3-4	
3.5								
4.0							JVE-206SC-4-5	
4.5								

EMJ014288

Sediment Core Processing Log

ANCHOR QEA

Job: ~~DSI Sediment RI~~ Jorgensen	Station ID: JVE-206SC cont.
Job No. 080~~111-01~~ Forge VE	Date/Time: 3/16/11
No. of Sections: 3 + shoe	Core Logged By: DP, JL
Drive Length: 14'	Attempt #: 1
Recovery: 13.9'	Type of Core: ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 99%	Diameter of Core (inches) 4
Notes: lab recovery = 13.6'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				Same as above @ 3'			JVE-206SC-	
5.5								
6.0							5-6	
							JVE 206SC-	
6.5		0	100	@6.4 - Grades to medium stiff, moist, dark grey SILT, trace clay.				
							6-7	
7.0				@7. Grades to medium stiff, moist, dark grey SILT, trace vf sand. Trace wood fibers.			JVE-206SC-	
	-	5	95					
7.5							7-8	
8.0							JVE-206SC-	
8.5								
9.0							8-9	
							JVE-206SC-	
9.5		30	70	@9.4 - Grades to stiff, dark grey, moist, f-sandy SILT.				
		5	95	@9.8 - grades to stiff, moist, dark grey, SILT, trace vf-sand, trace clay.			9-10	

Sediment Core Processing Log

ANCHOR QEA

Job: ~~DGI Sediment RI~~ Jorgensen	Station ID: JVE-206SC cont.
Job No. ~~080111-01~~ Forge VE	Date/Time: 3/16/11
No. of Sections: 3	Core Logged By: DP, JD, JL
Drive Length: 14'	Attempt #: 1
Recovery: 13.9'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 99%	Diameter of Core (inches) 4
Notes: Lab recovery = 13.6'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
				@ 10.1 - 1" bed of dense, moist, grey f-SAND.			JVE-206SC	
10.5	-	90	10					
		(95)	(5)					
11.0	-	(0)	(100)	@ 11 - moderate laminated beds of dense, moist, grey f-SAND			10-11	
							JVE-206SC	
11.5								
							11-12	
12				@ 12 - one stratified bed of dense, grey, f-M SAND. Grains are multicolored				
							JVE-206SC	
12.5								
							12-13	
13							JVE-206SC	
13.5							13-13.6	
	-	100	0	@ 13.5 - Dense, moist, grey, f-M SAND - Grains are multicolored.				
				@ 13.6 - End of core				
				Shoe contains same material as above @ 13.5				

Sediment Core Processing Log

ANCHOR QEA

Job: [redacted] Jorgensen		Station ID: JVE-2085C	
Job No. [redacted] Forge VE		Date/Time: 3/16/11	
No. of Sections: 3 and Shoe		Core Logged By: ~~Delaney Petersen~~, Dana Giffen + Julia Labadie	
Drive Length: 14'		Attempt #: 1 of 1	
Recovery: 13'		Type of Core ☐ Mudmole ☒ Vibracore ☐ Diver Core	
% Recovery: 93%		Diameter of Core (inches) 4"	
Notes: No recovery = 12.7'		Core Quality ☒ Good ☐ Fair ☐ Poor ☐ Disturbed	

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
		5	95	@0-0.7: Very soft, wet, dark gray, SILT, trace vf sand.			JVE-2085C	
0.5								
	-	-	-	@0.7 Grades to soft.			0-1	
1								
							JVE-2085E	
1.5								
							1-2	
2	-	-	-	@2 Grades to medium stiff, moist, dark gray slightly vf-f sandy SILT.				
		10	90				JVE-2085C	
2.5								
							2-3	
3								
							JVE-2085E	
3.5								
							3-4	
4		(5)	(95)	@4.5: Grades to medium stiff, moist, dark gray SILT, trace vf sand.				
							JVE-2085C	
4.5		-	-	- -				
							4-5	

EMJ014291

Sediment Core Processing Log

ANCHOR QEA

Job: ~~DSI Sediment RI~~ Jorgensen	Station ID: JVE-208SC cont.
Job No. ~~080111-01~~ Forge VE	Date/Time: 3/16/11
No. of Sections: 3 + shoe	Core Logged By: DG, JL
Drive Length: 14'	Attempt #: 1
Recovery: 13'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 93%	Diameter of Core (inches) 4
Notes: lab recovery = 12.7'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
5				Same as above @4.5'			JVE-208SC	
5.5								
		0	100	@5.8'-5.9': Medium stiff, moist, olive gray SILT.			5-6	
6				@5.9': Same as above at 4.5'			JVE-208SC	
6.5								
				@6.8' slight H_2S like odor.			6-7	
7				@7.2' Grades to stiff. 3" long x 1" wide stick.			JVE-208SC	
7.5								
							7-8	
8							JVE-208SC	
8.5								
							8-9	
9							JVE-208SC	
9.5								
							9-10	

EMJ014292

Sediment Core Processing Log

ANCHOR QEA

Job: ~~DSI Sediment RI~~ Jorgensen VE	Station ID: JVE-208sc cont...
Job No. ~~080111-01~~ 080224-01.01	Date/Time: 3/16/11
No. of Sections: 3 + shoe	Core Logged By: DG, JL
Drive Length: 14'	Attempt #: 1
Recovery: 13'	Type of Core ☐ Mudmole ☑ Vibracore ☐ Diver Core
% Recovery: 93%	Diameter of Core (inches) 4
Notes: lab recovery = 12.7'	Core Quality ☑ Good ☐ Fair ☐ Poor ☐ Disturbed

Recovered Length (ft)	Size % G	Size % S	Size % F	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	PID	Sample	Summary Sketch
10							JVE-208sc 10-11	
10.5		10	90	@10.3': Grades to stiff damp, dark gray slightly vf-f sandy SILT.				
11							JVE-208sc void 11-12	
11.5				11.3-11.8: VOID				
12		100	0	@11.8': Dense, moist, dark gray vf-f SAND. Grains are multicolored.			JVE-208sc 12-12.5	
12.5				End of core (@12.7' w/shoe (0.2')			~~12-13~~	
13								

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-215SC-0203-110216
SAMPLE

Lab Sample ID: SJ34C
LIMS ID: 11-3385
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ34-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 09:03
Instrument/Analyst: ECD5/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.2 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 46.4%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	**Aroclor 1254**	**20**	**22**
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	93.4%
Tetrachlorometaxylene	91.6%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-215SC-0304-110216
SAMPLE

Lab Sample ID: SJ34D
LIMS ID: 11-3386
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ34-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 09:21
Instrument/Analyst: ECD5/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.6 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 41.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	32	< 32 Y
11097-69-1	**Aroclor 1254**	**20**	**48**
11096-82-5	**Aroclor 1260**	**20**	**53**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	98.4%
Tetrachlorometaxylene	93.9%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-215SC-0405-110216
SAMPLE

Lab Sample ID: SJ34E
LIMS ID: 11-3387
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ34-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 09:40
Instrument/Analyst: ECD5/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.5 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 42.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	97.4%
Tetrachlorometaxylene	96.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-215SC-0506-110216
SAMPLE

Lab Sample ID: SJ34F
LIMS ID: 11-3388
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ34-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 09:59
Instrument/Analyst: ECD5/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.7 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 40.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	104%
Tetrachlorometaxylene	103%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-215SC-0607-110216
SAMPLE

Lab Sample ID: SJ34G
LIMS ID: 11-3389
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ34-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 10:18
Instrument/Analyst: ECD5/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.8 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 37.9%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	35	< 35 Y
11097-69-1	**Aroclor 1254**	**19**	**66**
11096-82-5	**Aroclor 1260**	**19**	**21**
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	97.8%
Tetrachlorometaxylene	88.6%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-215SC-0708-110216
SAMPLE

Lab Sample ID: SJ34H
LIMS ID: 11-3390
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ34-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 10:37
Instrument/Analyst: ECD5/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.8 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 34.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	95.4%
Tetrachlorometaxylene	95.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-215SC-0809-110216
SAMPLE

Lab Sample ID: SJ34I
LIMS ID: 11-3391
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ34-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 10:55
Instrument/Analyst: ECD5/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.7 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 37.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	96.4%
Tetrachlorometaxylene	96.4%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-215SC-0910-110216
SAMPLE

Lab Sample ID: SJ34J
LIMS ID: 11-3392
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ34-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 11:52
Instrument/Analyst: ECD5/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.3 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 35.9%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	**Aroclor 1254**	**20**	**20**
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	99.5%
Tetrachlorometaxylene	92.9%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-215SC-1011-110216
SAMPLE

Lab Sample ID: SJ34K
LIMS ID: 11-3393
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ34-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 12:11
Instrument/Analyst: ECD5/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.7 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 29.1%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	94.6%
Tetrachlorometaxylene	87.4%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-215SC-1112-110216
SAMPLE

Lab Sample ID: SJ34L
LIMS ID: 11-3394
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ34-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 12:30
Instrument/Analyst: ECD5/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.8 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 24.8%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	89.2%
Tetrachlorometaxylene	81.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-215SC-1212.8-110216
SAMPLE

Lab Sample ID: SJ34M
LIMS ID: 11-3395
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ34-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 12:48
Instrument/Analyst: ECD5/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.9 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 23.9%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	83.9%
Tetrachlorometaxylene	76.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-1215SC-0607-110216
SAMPLE

Lab Sample ID: SJ34N
LIMS ID: 11-3396
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ34-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 13:45
Instrument/Analyst: ECD5/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 26.0 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 37.8%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	22	< 22 Y
11097-69-1	**Aroclor 1254**	**19**	**40**
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	93.6%
Tetrachlorometaxylene	89.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-210SC-0203-110216
SAMPLE

Lab Sample ID: SJ35C
LIMS ID: 11-3399
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ35-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 13:20
Instrument/Analyst: ECD7/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.1 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 43.1%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	96.8%
Tetrachlorometaxylene	84.1%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-210SC-0304-110216
SAMPLE

Lab Sample ID: SJ35D
LIMS ID: 11-3400
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ35-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 13:44
Instrument/Analyst: ECD7/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 47.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	101%
Tetrachlorometaxylene	89.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-210SC-0405-110216
SAMPLE

Lab Sample ID: SJ35E
LIMS ID: 11-3401
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ35-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 14:08
Instrument/Analyst: ECD7/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 43.8%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	**Aroclor 1254**	**20**	**29**
11096-82-5	**Aroclor 1260**	**20**	**21**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	97.0%
Tetrachlorometaxylene	85.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-210SC-0506-110216
SAMPLE

Lab Sample ID: SJ35F
LIMS ID: 11-3402
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ35-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 14:32
Instrument/Analyst: ECD7/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.2 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 42.7%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	**Aroclor 1254**	**20**	**30**
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	101%
Tetrachlorometaxylene	97.4%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-210SC-0607-110216
SAMPLE

Lab Sample ID: SJ35G
LIMS ID: 11-3403
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ35-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 14:55
Instrument/Analyst: ECD7/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.5 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 34.9%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	**Aroclor 1254**	**20**	**24**
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	102%
Tetrachlorometaxylene	90.4%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-210SC-0708-110216
SAMPLE

Lab Sample ID: SJ35H
LIMS ID: 11-3404
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ35-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 15:19
Instrument/Analyst: ECD7/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 31.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	**Aroclor 1254**	**20**	**38**
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	108%
Tetrachlorometaxylene	94.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-210SC-0809-110216
SAMPLE

Lab Sample ID: SJ35I
LIMS ID: 11-3405
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ35-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 15:43
Instrument/Analyst: ECD7/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 23.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	101%
Tetrachlorometaxylene	88.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-210SC-0910-110216
SAMPLE

Lab Sample ID: SJ35J
LIMS ID: 11-3406
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ35-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 16:55
Instrument/Analyst: ECD7/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.7 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 18.0%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	101%
Tetrachlorometaxylene	86.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-210SC-1011-110216
SAMPLE

Lab Sample ID: SJ35K
LIMS ID: 11-3407
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ35-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 18:06
Instrument/Analyst: ECD7/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.5 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 20.7%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	100%
Tetrachlorometaxylene	89.9%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-210SC-1112-110216
SAMPLE

Lab Sample ID: SJ35L
LIMS ID: 11-3408
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ35-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 18:30
Instrument/Analyst: ECD7/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.2 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 34.1%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	95.1%
Tetrachlorometaxylene	83.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-210SC-1212.7-110216
SAMPLE

Lab Sample ID: SJ35M
LIMS ID: 11-3409
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ35-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 18:54
Instrument/Analyst: ECD7/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 36.7%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	102%
Tetrachlorometaxylene	90.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-207SC-0203-110216
SAMPLE

Lab Sample ID: SJ36C
LIMS ID: 11-3412
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ36-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 20:53
Instrument/Analyst: ECD7/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.6 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 45.9%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	31	< 31 Y
11097-69-1	**Aroclor 1254**	**20**	**45**
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	89.0%
Tetrachlorometaxylene	80.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-207SC-0304-110216
SAMPLE

Lab Sample ID: SJ36D
LIMS ID: 11-3413
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ36-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 21:17
Instrument/Analyst: ECD7/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.2 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 47.8%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	35	< 35 Y
11097-69-1	**Aroclor 1254**	**20**	**67**
11096-82-5	**Aroclor 1260**	**20**	**55**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	99.8%
Tetrachlorometaxylene	86.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-207SC-0405-110216
SAMPLE

Lab Sample ID: SJ36E
LIMS ID: 11-3414
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ36-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 21:41
Instrument/Analyst: ECD7/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.3 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 47.7%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	**Aroclor 1254**	**20**	**35**
11096-82-5	**Aroclor 1260**	**20**	**52**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	89.4%
Tetrachlorometaxylene	83.6%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-207SC-0506-110216
SAMPLE

Lab Sample ID: SJ36F
LIMS ID: 11-3415
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ36-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 22:05
Instrument/Analyst: ECD7/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.5 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 48.1%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	89.5%
Tetrachlorometaxylene	77.4%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-207SC-0607-110216
SAMPLE

Lab Sample ID: SJ36G
LIMS ID: 11-3416
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ36-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 22:29
Instrument/Analyst: ECD7/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 45.1%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	**Aroclor 1248**	**20**	**150**
11097-69-1	**Aroclor 1254**	**20**	**170**
11096-82-5	**Aroclor 1260**	**20**	**50**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	95.6%
Tetrachlorometaxylene	85.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-207SC-0708-110216
SAMPLE

Lab Sample ID: SJ36H
LIMS ID: 11-3417
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ36-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 22:53
Instrument/Analyst: ECD7/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.8 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 29.9%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	31	< 31 Y
11097-69-1	**Aroclor 1254**	**19**	**46**
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	89.5%
Tetrachlorometaxylene	80.4%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-207SC-0809-110216
SAMPLE

Lab Sample ID: SJ36I
LIMS ID: 11-3418
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ36-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 23:16
Instrument/Analyst: ECD7/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.5 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 38.2%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	**Aroclor 1254**	**20**	**25**
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	88.1%
Tetrachlorometaxylene	78.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-207SC-0910-110216
SAMPLE

Lab Sample ID: SJ36J
LIMS ID: 11-3419
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ36-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/18/11 23:40
Instrument/Analyst: ECD7/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.2 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 37.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	**Aroclor 1260**	**20**	**32**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	84.4%
Tetrachlorometaxylene	73.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-207SC-1011-110216
SAMPLE

Lab Sample ID: SJ36K
LIMS ID: 11-3420
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ36-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/19/11 00:52
Instrument/Analyst: ECD7/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 26.1 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 28.7%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	90.0%
Tetrachlorometaxylene	80.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-207SC-1112-110216
SAMPLE

Lab Sample ID: SJ36L
LIMS ID: 11-3421
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ36-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/19/11 01:15
Instrument/Analyst: ECD7/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.8 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 27.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	**Aroclor 1254**	**19**	**26**
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	84.6%
Tetrachlorometaxylene	78.4%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-207SC-1212.6-110216
SAMPLE

Lab Sample ID: SJ36M
LIMS ID: 11-3422
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ36-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 02/17/11
Date Analyzed: 02/19/11 01:39
Instrument/Analyst: ECD7/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.5 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 18.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	88.2%
Tetrachlorometaxylene	73.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-205SC-0203-110217
SAMPLE

Lab Sample ID: SJ57C
LIMS ID: 11-3504
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ57-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 15:53
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 47.7%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	**Aroclor 1248**	**20**	**51**
11097-69-1	**Aroclor 1254**	**20**	**100**
11096-82-5	**Aroclor 1260**	**20**	**94**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	86.5%
Tetrachlorometaxylene	78.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-205SC-0304-110217
SAMPLE

Lab Sample ID: SJ57D
LIMS ID: 11-3505
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ57-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 16:17
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.6 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 46.1%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	**Aroclor 1248**	**20**	**72**
11097-69-1	**Aroclor 1254**	**20**	**130**
11096-82-5	**Aroclor 1260**	**20**	**64**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	80.8%
Tetrachlorometaxylene	79.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-205SC-0405-110217
SAMPLE

Lab Sample ID: SJ57E
LIMS ID: 11-3506
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ57-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 16:41
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.3 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 47.3%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	**Aroclor 1248**	**20**	**180**
11097-69-1	**Aroclor 1254**	**20**	**300**
11096-82-5	**Aroclor 1260**	**20**	**110**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	82.2%
Tetrachlorometaxylene	69.1%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-205SC-0506-110217
SAMPLE

Lab Sample ID: SJ57F
LIMS ID: 11-3507
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ57-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 17:05
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 49.4%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	**Aroclor 1248**	**20**	**110**
11097-69-1	**Aroclor 1254**	**20**	**160**
11096-82-5	**Aroclor 1260**	**20**	**54**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	70.6%
Tetrachlorometaxylene	63.6%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-205SC-0607-110217
SAMPLE

Lab Sample ID: SJ57G
LIMS ID: 11-3508
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ57-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/21/11 09:56
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.7 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 25.0
Silica Gel: No

Percent Moisture: 47.2%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	97	< 97 U
53469-21-9	**Aroclor 1242**	**97**	**1,300**
12672-29-6	Aroclor 1248	97	< 97 U
11097-69-1	**Aroclor 1254**	**97**	**1,100**
11096-82-5	**Aroclor 1260**	**97**	**360**
11104-28-2	Aroclor 1221	97	< 97 U
11141-16-5	Aroclor 1232	97	< 97 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	99.4%
Tetrachlorometaxylene	91.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-205SC-0708-110217
SAMPLE

Lab Sample ID: SJ57H
LIMS ID: 11-3509
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ57-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 17:53
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.9 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 39.2%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	**Aroclor 1242**	**19**	**880**
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	**Aroclor 1254**	**19**	**740**
11096-82-5	**Aroclor 1260**	**19**	**160**
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	94.0%
Tetrachlorometaxylene	66.1%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-205SC-0809-110217
SAMPLE

Lab Sample ID: SJ57I
LIMS ID: 11-3510
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ57-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 19:04
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.6 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 38.7%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	**Aroclor 1242**	**20**	**580**
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	**Aroclor 1254**	**20**	**800**
11096-82-5	**Aroclor 1260**	**20**	**150**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	76.4%
Tetrachlorometaxylene	67.9%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-205SC-0910-110217
SAMPLE

Lab Sample ID: SJ57J
LIMS ID: 11-3511
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ57-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 19:28
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 38.7%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	**Aroclor 1248**	**20**	**27**
11097-69-1	**Aroclor 1254**	**20**	**36**
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	79.5%
Tetrachlorometaxylene	76.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-205SC-1011-110217
SAMPLE

Lab Sample ID: SJ57K
LIMS ID: 11-3512
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ57-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 19:52
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 21.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	72.2%
Tetrachlorometaxylene	67.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-205SC-1112.1-110217
SAMPLE

Lab Sample ID: SJ57L
LIMS ID: 11-3513
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ57-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 20:16
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.7 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 30.2%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	29	< 29 Y
11096-82-5	**Aroclor 1260**	**19**	**93**
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	69.4%
Tetrachlorometaxylene	67.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-311SC-0506-110217
SAMPLE

Lab Sample ID: SJ58F
LIMS ID: 11-3519
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ58-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 20:40
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.1 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 24.1%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	30	< 30 Y
11097-69-1	**Aroclor 1254**	**20**	**98**
11096-82-5	**Aroclor 1260**	**20**	**21**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	79.5%
Tetrachlorometaxylene	77.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-311SC-0607-110217
SAMPLE

Lab Sample ID: SJ58G
LIMS ID: 11-3520
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ58-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 21:03
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 26.0 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 22.8%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	68.8%
Tetrachlorometaxylene	63.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-311SC-0708-110217
SAMPLE

Lab Sample ID: SJ58H
LIMS ID: 11-3521
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ58-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 21:27
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.2 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 19.1%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	81.0%
Tetrachlorometaxylene	79.6%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-311SC-089.4-110217
SAMPLE

Lab Sample ID: SJ58I
LIMS ID: 11-3522
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ58-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 21:51
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.6 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 18.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	76.6%
Tetrachlorometaxylene	74.4%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-320SC-0506-110217
SAMPLE

Lab Sample ID: SJ61A
LIMS ID: 11-3548
Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

QC Report No: SJ61-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 19:33
Instrument/Analyst: ECD5/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.8 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 43.2%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	**Aroclor 1260**	**19**	**34**
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	72.1%
Tetrachlorometaxylene	66.9%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-320SC-0607-110217
SAMPLE

Lab Sample ID: SJ61B
LIMS ID: 11-3549
Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

QC Report No: SJ61-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 19:52
Instrument/Analyst: ECD5/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 44.2%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	39	< 39 Y
11096-82-5	**Aroclor 1260**	**20**	**150**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	81.4%
Tetrachlorometaxylene	72.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-320SC-0708-110217
SAMPLE

Lab Sample ID: SJ61C
LIMS ID: 11-3550
Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

QC Report No: SJ61-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 20:11
Instrument/Analyst: ECD5/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.6 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 44.0%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	**Aroclor 1260**	**20**	**67**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	76.8%
Tetrachlorometaxylene	70.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-320SC-0809-110217
SAMPLE

Lab Sample ID: SJ61D
LIMS ID: 11-3551
Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

QC Report No: SJ61-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 20:30
Instrument/Analyst: ECD5/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.5 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 21.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	70.9%
Tetrachlorometaxylene	68.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-320SC-0910-110217
SAMPLE

Lab Sample ID: SJ61E
LIMS ID: 11-3552
Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

QC Report No: SJ61-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 20:48
Instrument/Analyst: ECD5/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.5 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 33.3%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	80.4%
Tetrachlorometaxylene	81.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-320SC-1011-110217
SAMPLE

Lab Sample ID: SJ61F
LIMS ID: 11-3553
Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

QC Report No: SJ61-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 21:45
Instrument/Analyst: ECD5/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.2 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 26.2%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	77.0%
Tetrachlorometaxylene	72.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-320SC-1112-110217
SAMPLE

Lab Sample ID: SJ61G
LIMS ID: 11-3554
Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

QC Report No: SJ61-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 22:04
Instrument/Analyst: ECD5/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 18.3%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	87.5%
Tetrachlorometaxylene	80.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-320SC-1212.9-110217
SAMPLE

Lab Sample ID: SJ61H
LIMS ID: 11-3555
Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

QC Report No: SJ61-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 23:00
Instrument/Analyst: ECD5/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 33.7%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	**Aroclor 1260**	**20**	**64**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	73.0%
Tetrachlorometaxylene	69.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-316SC-0506-110217
SAMPLE

Lab Sample ID: SJ62F
LIMS ID: 11-3529
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ62-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 23:19
Instrument/Analyst: ECD5/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.9 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 20.7%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	65.9%
Tetrachlorometaxylene	64.4%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-316SC-0607-110217
SAMPLE

Lab Sample ID: SJ62G
LIMS ID: 11-3530
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ62-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 23:37
Instrument/Analyst: ECD5/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 19.1%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	77.6%
Tetrachlorometaxylene	99.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-316SC-0708-110217
SAMPLE

Lab Sample ID: SJ62H
LIMS ID: 11-3531
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ62-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 23:56
Instrument/Analyst: ECD5/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.3 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 16.4%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	81.2%
Tetrachlorometaxylene	73.9%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-316SC-0809-110217
SAMPLE

Lab Sample ID: SJ62I
LIMS ID: 11-3532
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ62-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/20/11 00:15
Instrument/Analyst: ECD5/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.7 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 15.0%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	76.8%
Tetrachlorometaxylene	76.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-316SC-099.7-110217
SAMPLE

Lab Sample ID: SJ62J
LIMS ID: 11-3533
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ62-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/20/11 00:34
Instrument/Analyst: ECD5/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.9 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 17.1%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	79.5%
Tetrachlorometaxylene	81.8%

FORM I

SAMPLE RESULTS-CONVENTIONALS
SJ61-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-320SC-0506-110217
ARI ID: 11-3548 SJ61A

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	56.80
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	2.58

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ61-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-320SC-0607-110217
ARI ID: 11-3549 SJ61B

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	55.90
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	2.23

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ61-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-320SC-0708-110217
ARI ID: 11-3550 SJ61C

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	56.10
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	2.29

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ61-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-320SC-0809-110217
ARI ID: 11-3551 SJ61D

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	65.70
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	1.13

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ61-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-320SC-0910-110217
ARI ID: 11-3552 SJ61E

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	67.00
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	1.10

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ61-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-320SC-1011-110217
ARI ID: 11-3553 SJ61F

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	72.40
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	0.949

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ61-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-320SC-1112-110217
ARI ID: 11-3554 SJ61G

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	83.70
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	0.317

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ61-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-320SC-1212.9-110217
ARI ID: 11-3555 SJ61H

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	67.80
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	2.69

RL Analytical reporting limit
U Undetected at reported detection limit

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-309SC-0506-110217
SAMPLE

Lab Sample ID: SJ63F
LIMS ID: 11-3539
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ63-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 14:51
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.2 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 18.7%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	78.4%
Tetrachlorometaxylene	76.1%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-309SC-0607-110217
SAMPLE

Lab Sample ID: SJ63G
LIMS ID: 11-3540
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ63-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 15:48
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.6 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 20.4%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	89.1%
Tetrachlorometaxylene	84.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-309SC-0708-110217
SAMPLE

Lab Sample ID: SJ63H
LIMS ID: 11-3541
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ63-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 16:06
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.9 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 24.9%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	90.2%
Tetrachlorometaxylene	109%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-309SC-0809-110217
SAMPLE

Lab Sample ID: SJ63I
LIMS ID: 11-3542
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ63-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 16:25
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.1 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 26.4%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	84.9%
Tetrachlorometaxylene	80.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-309SC-0910-110217
SAMPLE

Lab Sample ID: SJ63J
LIMS ID: 11-3543
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ63-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 16:44
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.5 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 20.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	88.6%
Tetrachlorometaxylene	87.4%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-309SC-1011-110217
SAMPLE

Lab Sample ID: SJ63K
LIMS ID: 11-3544
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ63-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 17:03
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 23.0%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	82.6%
Tetrachlorometaxylene	78.4%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-309SC-1111.5-110217
SAMPLE

Lab Sample ID: SJ63L
LIMS ID: 11-3545
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ63-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 17:59
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 41.1%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	91.0%
Tetrachlorometaxylene	83.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-1205SC-0203-110217
SAMPLE

Lab Sample ID: SJ63M
LIMS ID: 11-3546
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ63-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 18:18
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.3 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 47.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	87.9%
Tetrachlorometaxylene	85.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-1309SC-0910-110217
SAMPLE

Lab Sample ID: SJ63N
LIMS ID: 11-3547
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SJ63-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Date Extracted: 02/18/11
Date Analyzed: 02/19/11 18:37
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 21.0%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	83.8%
Tetrachlorometaxylene	82.4%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-322SC-0809-110218
SAMPLE

Lab Sample ID: SJ81A
LIMS ID: 11-3624
Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

QC Report No: SJ81-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 02/19/11
Date Analyzed: 02/21/11 21:42
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.8 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 27.3%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	**Aroclor 1254**	**19**	**21**
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	76.2%
Tetrachlorometaxylene	70.4%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-322SC-0910-110218
SAMPLE

Lab Sample ID: SJ81B
LIMS ID: 11-3625
Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

QC Report No: SJ81-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 02/19/11
Date Analyzed: 02/21/11 22:01
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.6 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 18.3%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	68.8%
Tetrachlorometaxylene	61.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-322SC-1011-110218
SAMPLE

Lab Sample ID: SJ81C
LIMS ID: 11-3626
Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

QC Report No: SJ81-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 02/19/11
Date Analyzed: 02/21/11 22:19
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.8 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 18.1%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	76.9%
Tetrachlorometaxylene	69.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-322SC-1112.4-110218
SAMPLE

Lab Sample ID: SJ81D
LIMS ID: 11-3627
Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

QC Report No: SJ81-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 02/19/11
Date Analyzed: 02/21/11 22:38
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 21.3%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	92.6%
Tetrachlorometaxylene	77.4%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-216SC-1011-110218
SAMPLE

Lab Sample ID: SJ82A
LIMS ID: 11-3637
Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

QC Report No: SJ82-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 02/19/11
Date Analyzed: 02/21/11 22:57
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.8 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 14.9%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	87.9%
Tetrachlorometaxylene	78.1%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-216SC-1112.1-110218
SAMPLE

Lab Sample ID: SJ82B
LIMS ID: 11-3638
Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

QC Report No: SJ82-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 02/19/11
Date Analyzed: 02/21/11 23:53
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 18.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	88.4%
Tetrachlorometaxylene	77.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-314SC-0506-110218
SAMPLE

Lab Sample ID: SJ83F
LIMS ID: 11-3654
Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

QC Report No: SJ83-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 02/19/11
Date Analyzed: 02/22/11 00:50
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.7 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 14.8%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	87.6%
Tetrachlorometaxylene	74.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-314SC-0607-110218
SAMPLE

Lab Sample ID: SJ83G
LIMS ID: 11-3655
Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

QC Report No: SJ83-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 02/19/11
Date Analyzed: 02/22/11 01:09
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 15.7%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	86.0%
Tetrachlorometaxylene	77.6%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-314SC-0707.9-110218
SAMPLE

Lab Sample ID: SJ83H
LIMS ID: 11-3656
Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

QC Report No: SJ83-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 02/19/11
Date Analyzed: 02/22/11 01:27
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.8 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 21.3%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	76.9%
Tetrachlorometaxylene	66.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-1314SC-0506-110218
SAMPLE

Lab Sample ID: SJ83I
LIMS ID: 11-3657
Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

QC Report No: SJ83-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 02/19/11
Date Analyzed: 02/22/11 01:46
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.9 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 15.2%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	82.4%
Tetrachlorometaxylene	72.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-01SC-099.7-110218
SAMPLE

Lab Sample ID: SJ90A
LIMS ID: 11-3662
Matrix: Sediment
Data Release Authorized:
Reported: 02/23/11

QC Report No: SJ90-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 02/21/11
Date Analyzed: 02/22/11 14:30
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 26.0 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 17.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	84.6%
Tetrachlorometaxylene	71.6%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-1007SC-0910-110218
SAMPLE

Lab Sample ID: SJ91A
LIMS ID: 11-3687
Matrix: Sediment
Data Release Authorized:
Reported: 02/23/11

QC Report No: SJ91-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 02/21/11
Date Analyzed: 02/22/11 15:42
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 26.2 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 22.3%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	76.6%
Tetrachlorometaxylene	77.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-07SC-0910-110218
SAMPLE

Lab Sample ID: SJ91B
LIMS ID: 11-3688
Matrix: Sediment
Data Release Authorized:
Reported: 02/23/11

QC Report No: SJ91-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 02/21/11
Date Analyzed: 02/22/11 16:06
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 21.1%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	72.6%
Tetrachlorometaxylene	65.9%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-07SC-1011-110218
SAMPLE

Lab Sample ID: SJ91C
LIMS ID: 11-3689
Matrix: Sediment
Data Release Authorized:
Reported: 02/23/11

QC Report No: SJ91-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 02/21/11
Date Analyzed: 02/22/11 16:29
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.3 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 23.4%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	88.6%
Tetrachlorometaxylene	80.4%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-07SC-1112.2-110218
SAMPLE

Lab Sample ID: SJ91D
LIMS ID: 11-3690
Matrix: Sediment
Data Release Authorized:
Reported: 02/23/11

QC Report No: SJ91-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 02/21/11
Date Analyzed: 02/22/11 16:53
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.5 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 25.2%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	53.9%
Tetrachlorometaxylene	52.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: JVE-RB-110218
SAMPLE

Lab Sample ID: SJ92A
LIMS ID: 11-3700
Matrix: Water
Data Release Authorized:
Reported: 03/01/11

QC Report No: SJ92-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 02/22/11
Date Analyzed: 02/23/11 20:47
Instrument/Analyst: ECD5/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes

Sample Amount: 500 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No
Acid Cleanup: Yes

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1.0	< 1.0 U
53469-21-9	Aroclor 1242	1.0	< 1.0 U
12672-29-6	Aroclor 1248	1.0	< 1.0 U
11097-69-1	Aroclor 1254	1.0	< 1.0 U
11096-82-5	Aroclor 1260	1.0	< 1.0 U
11104-28-2	Aroclor 1221	1.0	< 1.0 U
11141-16-5	Aroclor 1232	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	65.8%
Tetrachlorometaxylene	66.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: JVE-FB-110218
SAMPLE

Lab Sample ID: SJ92B
LIMS ID: 11-3701
Matrix: Water
Data Release Authorized:
Reported: 03/01/11

QC Report No: SJ92-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 02/22/11
Date Analyzed: 02/23/11 21:06
Instrument/Analyst: ECD5/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes

Sample Amount: 500 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No
Acid Cleanup: Yes

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1.0	< 1.0 U
53469-21-9	Aroclor 1242	1.0	< 1.0 U
12672-29-6	Aroclor 1248	1.0	< 1.0 U
11097-69-1	Aroclor 1254	1.0	< 1.0 U
11096-82-5	Aroclor 1260	1.0	< 1.0 U
11104-28-2	Aroclor 1221	1.0	< 1.0 U
11141-16-5	Aroclor 1232	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	70.8%
Tetrachlorometaxylene	66.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-02SC-099.6-110221
SAMPLE

Lab Sample ID: SJ99A
LIMS ID: 11-3728
Matrix: Sediment
Data Release Authorized:
Reported: 02/23/11

QC Report No: SJ99-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 02/22/11
Date Analyzed: 02/22/11 15:03
Instrument/Analyst: ECD5/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.9 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 14.3%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	108%
Tetrachlorometaxylene	87.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-03SC-11-12.2-110221
SAMPLE

Lab Sample ID: SK00A
LIMS ID: 11-3739
Matrix: Sediment
Data Release Authorized:
Reported: 02/23/11

QC Report No: SK00-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 02/22/11
Date Analyzed: 02/22/11 16:00
Instrument/Analyst: ECD5/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 23.2%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	**Aroclor 1254**	**20**	**82**
11096-82-5	**Aroclor 1260**	**20**	**32**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	87.9%
Tetrachlorometaxylene	82.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-04SC-089.2-110221
SAMPLE

Lab Sample ID: SK01A
LIMS ID: 11-3752
Matrix: Sediment
Data Release Authorized:
Reported: 02/23/11

QC Report No: SK01-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 02/22/11
Date Analyzed: 02/22/11 16:18
Instrument/Analyst: ECD5/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.9 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 13.9%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	92.9%
Tetrachlorometaxylene	79.9%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-207SC-0607-110216
SAMPLE

Lab Sample ID: SL49A
LIMS ID: 11-4486
Matrix: Sediment
Data Release Authorized:
Reported: 03/07/11

QC Report No: SL49-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Date Extracted: 03/04/11
Date Analyzed: 03/05/11 16:39
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 22.5 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 43.8%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	22	< 22 U
53469-21-9	**Aroclor 1242**	**22**	**410**
12672-29-6	Aroclor 1248	22	< 22 U
11097-69-1	**Aroclor 1254**	**22**	**460**
11096-82-5	**Aroclor 1260**	**22**	**140**
11104-28-2	Aroclor 1221	22	< 22 U
11141-16-5	Aroclor 1232	22	< 22 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	90.6%
Tetrachlorometaxylene	69.9%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-03SC-0708-110221
SAMPLE

Lab Sample ID: SL71A
LIMS ID: 11-4607
Matrix: Sediment
Data Release Authorized:
Reported: 03/09/11

QC Report No: SL71-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 03/07/11
Date Analyzed: 03/09/11 07:51
Instrument/Analyst: ECD7/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.1 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 39.0%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	16	< 16 U
53469-21-9	Aroclor 1242	16	< 16 U
12672-29-6	Aroclor 1248	40	< 40 Y
11097-69-1	**Aroclor 1254**	**16**	**79**
11096-82-5	**Aroclor 1260**	**16**	**17**
11104-28-2	Aroclor 1221	16	< 16 U
11141-16-5	Aroclor 1232	16	< 16 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	91.5%
Tetrachlorometaxylene	85.4%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-03SC-0809-110221
SAMPLE

Lab Sample ID: SL71B
LIMS ID: 11-4608
Matrix: Sediment
Data Release Authorized:
Reported: 03/09/11

QC Report No: SL71-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 03/07/11
Date Analyzed: 03/09/11 08:15
Instrument/Analyst: ECD7/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.8 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 24.4%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	16	< 16 U
53469-21-9	Aroclor 1242	16	< 16 U
12672-29-6	Aroclor 1248	62	< 62 Y
11097-69-1	**Aroclor 1254**	**16**	**96**
11096-82-5	**Aroclor 1260**	**16**	**38**
11104-28-2	Aroclor 1221	16	< 16 U
11141-16-5	Aroclor 1232	16	< 16 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	78.5%
Tetrachlorometaxylene	63.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-03SC-0910-110221
SAMPLE

Lab Sample ID: SL71C
LIMS ID: 11-4609
Matrix: Sediment
Data Release Authorized:
Reported: 03/09/11

QC Report No: SL71-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 03/07/11
Date Analyzed: 03/09/11 08:39
Instrument/Analyst: ECD7/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 26.0 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 24.8%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	15	< 15 U
53469-21-9	Aroclor 1242	15	< 15 U
12672-29-6	Aroclor 1248	15	< 15 U
11097-69-1	**Aroclor 1254**	**15**	**22**
11096-82-5	Aroclor 1260	15	< 15 U
11104-28-2	Aroclor 1221	15	< 15 U
11141-16-5	Aroclor 1232	15	< 15 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	90.9%
Tetrachlorometaxylene	85.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-03SC-1011-110221
SAMPLE

Lab Sample ID: SL71D
LIMS ID: 11-4610
Matrix: Sediment
Data Release Authorized:
Reported: 03/09/11

QC Report No: SL71-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 03/07/11
Date Analyzed: 03/09/11 09:03
Instrument/Analyst: ECD7/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.6 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 25.1%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	16	< 16 U
53469-21-9	Aroclor 1242	16	< 16 U
12672-29-6	Aroclor 1248	31	< 31 Y
11097-69-1	**Aroclor 1254**	**16**	**44**
11096-82-5	**Aroclor 1260**	**16**	**20**
11104-28-2	Aroclor 1221	16	< 16 U
11141-16-5	Aroclor 1232	16	< 16 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	98.9%
Tetrachlorometaxylene	91.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-04SC-0506-110221
SAMPLE

Lab Sample ID: SL71E
LIMS ID: 11-4611
Matrix: Sediment
Data Release Authorized:
Reported: 03/09/11

QC Report No: SL71-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 03/07/11
Date Analyzed: 03/09/11 09:27
Instrument/Analyst: ECD7/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.1 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 16.4%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	16	< 16 U
53469-21-9	Aroclor 1242	16	< 16 U
12672-29-6	Aroclor 1248	16	< 16 U
11097-69-1	Aroclor 1254	16	< 16 U
11096-82-5	Aroclor 1260	16	< 16 U
11104-28-2	Aroclor 1221	16	< 16 U
11141-16-5	Aroclor 1232	16	< 16 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	112%
Tetrachlorometaxylene	96.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-04SC-0607-110221
SAMPLE

Lab Sample ID: SL71F
LIMS ID: 11-4612
Matrix: Sediment
Data Release Authorized:
Reported: 03/09/11

QC Report No: SL71-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 03/07/11
Date Analyzed: 03/09/11 09:50
Instrument/Analyst: ECD7/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 12.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	16	< 16 U
53469-21-9	Aroclor 1242	16	< 16 U
12672-29-6	Aroclor 1248	16	< 16 U
11097-69-1	Aroclor 1254	16	< 16 U
11096-82-5	Aroclor 1260	16	< 16 U
11104-28-2	Aroclor 1221	16	< 16 U
11141-16-5	Aroclor 1232	16	< 16 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	106%
Tetrachlorometaxylene	93.9%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-04SC-0708-110221
SAMPLE

Lab Sample ID: SL71G
LIMS ID: 11-4613
Matrix: Sediment
Data Release Authorized:
Reported: 03/09/11

QC Report No: SL71-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 03/07/11
Date Analyzed: 03/09/11 10:14
Instrument/Analyst: ECD7/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 12.8%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	16	< 16 U
53469-21-9	Aroclor 1242	16	< 16 U
12672-29-6	Aroclor 1248	16	< 16 U
11097-69-1	Aroclor 1254	16	< 16 U
11096-82-5	Aroclor 1260	16	< 16 U
11104-28-2	Aroclor 1221	16	< 16 U
11141-16-5	Aroclor 1232	16	< 16 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	118%
Tetrachlorometaxylene	104%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-1004SC-0607-110221
SAMPLE

Lab Sample ID: SL72A
LIMS ID: 11-4614
Matrix: Sediment
Data Release Authorized:
Reported: 03/10/11

QC Report No: SL72-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 03/08/11
Date Analyzed: 03/09/11 18:35
Instrument/Analyst: ECD7/JLW
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 12.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	98.6%
Tetrachlorometaxylene	83.9%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-03SC-0607-110221
SAMPLE

Lab Sample ID: SM77A
LIMS ID: 11-5308
Matrix: Sediment
Data Release Authorized:
Reported: 03/14/11

QC Report No: SM77-Anchor QEA
Project: Joregnsen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 03/12/11
Date Analyzed: 03/14/11 09:53
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 10.0
Silica Gel: No

Percent Moisture: 38.1%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	80	< 80 U
53469-21-9	Aroclor 1242	80	< 80 U
12672-29-6	Aroclor 1248	1,000	< 1,000 Y
11097-69-1	**Aroclor 1254**	**80**	**1,000**
11096-82-5	**Aroclor 1260**	**80**	**360**
11104-28-2	Aroclor 1221	80	< 80 U
11141-16-5	Aroclor 1232	80	< 80 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	85.5%
Tetrachlorometaxylene	74.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-04SC-0405-110221
SAMPLE

Lab Sample ID: SM77B
LIMS ID: 11-5309
Matrix: Sediment
Data Release Authorized:
Reported: 03/14/11

QC Report No: SM77-Anchor QEA
Project: Joregnsen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 03/12/11
Date Analyzed: 03/14/11 10:11
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.1 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 13.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	96.2%
Tetrachlorometaxylene	87.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-206SC-0607-110316
SAMPLE

Lab Sample ID: SN49A
LIMS ID: 11-5862
Matrix: Sediment
Data Release Authorized:
Reported: 03/23/11

QC Report No: SN49-Anchor QEA
Project: Jorgensen VE

Date Sampled: 03/16/11
Date Received: 03/16/11

Date Extracted: 03/21/11
Date Analyzed: 03/22/11 09:42
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.7 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 48.0%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	**Aroclor 1248**	**20**	**110**
11097-69-1	**Aroclor 1254**	**20**	**100**
11096-82-5	**Aroclor 1260**	**20**	**31**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	94.5%
Tetrachlorometaxylene	86.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-206SC-0708-110316
SAMPLE

Lab Sample ID: SN49B
LIMS ID: 11-5863
Matrix: Sediment
Data Release Authorized:
Reported: 03/23/11

QC Report No: SN49-Anchor QEA
Project: Jorgensen VE

Date Sampled: 03/16/11
Date Received: 03/16/11

Date Extracted: 03/21/11
Date Analyzed: 03/22/11 15:40
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.3 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 25.0
Silica Gel: No

Percent Moisture: 44.3%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	99	< 99 U
53469-21-9	Aroclor 1242	99	< 99 U
12672-29-6	Aroclor 1248	990	< 990 Y
11097-69-1	**Aroclor 1254**	**99**	**920**
11096-82-5	**Aroclor 1260**	**99**	**340**
11104-28-2	Aroclor 1221	99	< 99 U
11141-16-5	Aroclor 1232	99	< 99 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	119%
Tetrachlorometaxylene	75.6%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-206SC-0809-110316
SAMPLE

Lab Sample ID: SN49C
LIMS ID: 11-5864
Matrix: Sediment
Data Release Authorized:
Reported: 03/23/11

QC Report No: SN49-Anchor QEA
Project: Jorgensen VE

Date Sampled: 03/16/11
Date Received: 03/16/11

Date Extracted: 03/21/11
Date Analyzed: 03/22/11 10:29
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 20.6 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 41.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	24	< 24 U
53469-21-9	Aroclor 1242	24	< 24 U
12672-29-6	Aroclor 1248	610	< 610 Y
11097-69-1	**Aroclor 1254**	**24**	**360 P**
11096-82-5	**Aroclor 1260**	**24**	**96**
11104-28-2	Aroclor 1221	24	< 24 U
11141-16-5	Aroclor 1232	24	< 24 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	69.4%
Tetrachlorometaxylene	61.3%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-206SC-0910-110316
SAMPLE

Lab Sample ID: SN49D
LIMS ID: 11-5865
Matrix: Sediment
Data Release Authorized:
Reported: 03/23/11

QC Report No: SN49-Anchor QEA
Project: Jorgensen VE

Date Sampled: 03/16/11
Date Received: 03/16/11

Date Extracted: 03/21/11
Date Analyzed: 03/22/11 10:53
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.5 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 38.3%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	490	< 490 Y
11097-69-1	**Aroclor 1254**	**20**	**350**
11096-82-5	**Aroclor 1260**	**20**	**85**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	114%
Tetrachlorometaxylene	84.4%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-206SC-1011-110316
SAMPLE

Lab Sample ID: SN49E
LIMS ID: 11-5866
Matrix: Sediment
Data Release Authorized: B
Reported: 03/23/11

QC Report No: SN49-Anchor QEA
Project: Jorgensen VE

Date Sampled: 03/16/11
Date Received: 03/16/11

Date Extracted: 03/21/11
Date Analyzed: 03/22/11 11:17
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.6 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 32.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	24	< 24 Y
11097-69-1	**Aroclor 1254**	**20**	**33**
11096-82-5	**Aroclor 1260**	**20**	**33**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	74.9%
Tetrachlorometaxylene	71.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-206SC-1112-110316
SAMPLE

Lab Sample ID: SN49F
LIMS ID: 11-5867
Matrix: Sediment
Data Release Authorized:
Reported: 03/23/11

QC Report No: SN49-Anchor QEA
Project: Jorgensen VE

Date Sampled: 03/16/11
Date Received: 03/16/11

Date Extracted: 03/21/11
Date Analyzed: 03/22/11 11:41
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.3 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 34.2%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	**Aroclor 1254**	**20**	**42**
11096-82-5	**Aroclor 1260**	**20**	**39**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	75.5%
Tetrachlorometaxylene	66.1%

FORM I

SN49:00026

EMJ014408

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-206SC-1213-110316
SAMPLE

Lab Sample ID: SN49G
LIMS ID: 11-5868
Matrix: Sediment
Data Release Authorized:
Reported: 03/23/11

QC Report No: SN49-Anchor QEA
Project: Jorgensen VE

Date Sampled: 03/16/11
Date Received: 03/16/11

Date Extracted: 03/21/11
Date Analyzed: 03/22/11 12:05
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.6 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 31.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	34	< 34 Y
11097-69-1	**Aroclor 1254**	**20**	**57**
11096-82-5	**Aroclor 1260**	**20**	**41**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	76.8%
Tetrachlorometaxylene	85.9%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-206SC-1313.6-110316
SAMPLE

Lab Sample ID: SN49H
LIMS ID: 11-5869
Matrix: Sediment
Data Release Authorized:
Reported: 03/23/11

QC Report No: SN49-Anchor QEA
Project: Jorgensen VE

Date Sampled: 03/16/11
Date Received: 03/16/11

Date Extracted: 03/21/11
Date Analyzed: 03/22/11 12:29
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 30.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	30	< 30 Y
11097-69-1	**Aroclor 1254**	**20**	**52**
11096-82-5	**Aroclor 1260**	**20**	**35**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	84.6%
Tetrachlorometaxylene	85.2%

FORM I

SN49 : 00028

EMJ014410

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-1206SC-1011-110316
SAMPLE

Lab Sample ID: SN49I
LIMS ID: 11-5870
Matrix: Sediment
Data Release Authorized:
Reported: 03/23/11

QC Report No: SN49-Anchor QEA
Project: Jorgensen VE

Date Sampled: 03/16/11
Date Received: 03/16/11

Date Extracted: 03/21/11
Date Analyzed: 03/22/11 12:53
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.7 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 32.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	24	< 24 Y
11097-69-1	**Aroclor 1254**	**19**	**42**
11096-82-5	**Aroclor 1260**	**19**	**40**
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	91.4%
Tetrachlorometaxylene	88.5%

FORM I

SN49:00029

EMJ014411

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-210SC-0102-110216
SAMPLE

Lab Sample ID: SP67A
LIMS ID: 11-7113
Matrix: Sediment
Data Release Authorized: MW
Reported: 04/08/11

QC Report No: SP67-Anchor QEA
Project: Jorgensen Sediment Charaterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 03/31/11

Date Extracted: 04/04/11
Date Analyzed: 04/05/11 20:13
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.6 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 51.1%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	**Aroclor 1248**	**20**	**27**
11097-69-1	**Aroclor 1254**	**20**	**38**
11096-82-5	**Aroclor 1260**	**20**	**24**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	79.0%
Tetrachlorometaxylene	73.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-215SC-0102-110216
SAMPLE

Lab Sample ID: SP67B
LIMS ID: 11-7114
Matrix: Sediment
Data Release Authorized: MW
Reported: 04/08/11

QC Report No: SP67-Anchor QEA
Project: Jorgensen Sediment Charaterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 03/31/11

Date Extracted: 04/04/11
Date Analyzed: 04/07/11 15:20
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.1 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 50.9%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	**Aroclor 1248**	**20**	**48**
11097-69-1	**Aroclor 1254**	**20**	**61**
11096-82-5	**Aroclor 1260**	**20**	**39**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	106%
Tetrachlorometaxylene	97.9%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-309SC-0405-110217
SAMPLE

Lab Sample ID: SP67C
LIMS ID: 11-7115
Matrix: Sediment
Data Release Authorized:
Reported: 04/08/11

QC Report No: SP67-Anchor QEA
Project: Jorgensen Sediment Charaterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 03/31/11

Date Extracted: 04/04/11
Date Analyzed: 04/05/11 20:51
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.3 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 16.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	83.5%
Tetrachlorometaxylene	75.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-316SC-0405-110217
SAMPLE

Lab Sample ID: SP67D
LIMS ID: 11-7116
Matrix: Sediment
Data Release Authorized: MW
Reported: 04/08/11

QC Report No: SP67-Anchor QEA
Project: Jorgensen Sediment Charaterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 03/31/11

Date Extracted: 04/04/11
Date Analyzed: 04/05/11 21:10
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.7 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 20.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	**Aroclor 1260**	**20**	**58**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	76.5%
Tetrachlorometaxylene	64.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-320SC-0405-110217
SAMPLE

Lab Sample ID: SP67E
LIMS ID: 11-7117
Matrix: Sediment
Data Release Authorized: MW
Reported: 04/08/11

QC Report No: SP67-Anchor QEA
Project: Jorgensen Sediment Charaterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 03/31/11

Date Extracted: 04/04/11
Date Analyzed: 04/05/11 21:28
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.7 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 39.4%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	58	< 58 Y
11097-69-1	**Aroclor 1254**	**20**	**110**
11096-82-5	**Aroclor 1260**	**20**	**98**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	51.2%
Tetrachlorometaxylene	34.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-314SC-0405-110218
SAMPLE

Lab Sample ID: SP67F
LIMS ID: 11-7118
Matrix: Sediment
Data Release Authorized:
Reported: 04/08/11

QC Report No: SP67-Anchor QEA
Project: Jorgensen Sediment Charaterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 03/31/11

Date Extracted: 04/04/11
Date Analyzed: 04/05/11 22:25
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.2 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 7.0%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	77.2%
Tetrachlorometaxylene	69.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-216SC-0910-110218
SAMPLE

Lab Sample ID: SP67G
LIMS ID: 11-7119
Matrix: Sediment
Data Release Authorized: MW
Reported: 04/08/11

QC Report No: SP67-Anchor QEA
Project: Jorgensen Sediment Charaterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 03/31/11

Date Extracted: 04/04/11
Date Analyzed: 04/05/11 23:21
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.8 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 17.2%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	83.8%
Tetrachlorometaxylene	83.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-322SC-0708-110218
SAMPLE

Lab Sample ID: SP67H
LIMS ID: 11-7120
Matrix: Sediment
Data Release Authorized: MW
Reported: 04/08/11

QC Report No: SP67-Anchor QEA
Project: Jorgensen Sediment Charaterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 03/31/11

Date Extracted: 04/04/11
Date Analyzed: 04/07/11 11:11
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.2 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 10.0
Silica Gel: No

Percent Moisture: 37.3%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	40	< 40 U
53469-21-9	Aroclor 1242	40	< 40 U
12672-29-6	**Aroclor 1248**	**40**	**590**
11097-69-1	**Aroclor 1254**	**40**	**450**
11096-82-5	**Aroclor 1260**	**40**	**110**
11104-28-2	Aroclor 1221	40	< 40 U
11141-16-5	Aroclor 1232	40	< 40 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	111%
Tetrachlorometaxylene	84.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-07SC-0809-110218
SAMPLE

Lab Sample ID: SP67I
LIMS ID: 11-7121
Matrix: Sediment
Data Release Authorized: [illegible]
Reported: 04/08/11

QC Report No: SP67-Anchor QEA
Project: Jorgensen Sediment Charaterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 03/31/11

Date Extracted: 04/04/11
Date Analyzed: 04/05/11 23:59
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.8 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 16.9%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	83.5%
Tetrachlorometaxylene	94.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-01SC-0708-110218
SAMPLE

Lab Sample ID: SP67J
LIMS ID: 11-7122
Matrix: Sediment
Data Release Authorized: MW
Reported: 04/08/11

QC Report No: SP67-Anchor QEA
Project: Jorgensen Sediment Charaterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 03/31/11

Date Extracted: 04/04/11
Date Analyzed: 04/06/11 00:55
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.5 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 15.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	86.8%
Tetrachlorometaxylene	85.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-01SC-0809-110218
SAMPLE

Lab Sample ID: SP67K
LIMS ID: 11-7123
Matrix: Sediment
Data Release Authorized:
Reported: 04/08/11

QC Report No: SP67-Anchor QEA
Project: Jorgensen Sediment Charaterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 03/31/11

Date Extracted: 04/04/11
Date Analyzed: 04/06/11 01:14
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.3 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 10.4%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	**Aroclor 1254**	**20**	**24**
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	84.8%
Tetrachlorometaxylene	84.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-02SC-0708-110221
SAMPLE

Lab Sample ID: SP67L
LIMS ID: 11-7124
Matrix: Sediment
Data Release Authorized:
Reported: 04/08/11

QC Report No: SP67-Anchor QEA
Project: Jorgensen Sediment Charaterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 03/31/11

Date Extracted: 04/04/11
Date Analyzed: 04/06/11 01:33
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.7 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 12.0%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	83.8%
Tetrachlorometaxylene	81.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-02SC-0809-110221
SAMPLE

Lab Sample ID: SP67M
LIMS ID: 11-7125
Matrix: Sediment
Data Release Authorized:
Reported: 04/08/11

QC Report No: SP67-Anchor QEA
Project: Jorgensen Sediment Charaterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 03/31/11

Date Extracted: 04/04/11
Date Analyzed: 04/06/11 01:52
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.3 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 13.2%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	82.8%
Tetrachlorometaxylene	78.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-04SC-0304-110221
SAMPLE

Lab Sample ID: SP67N
LIMS ID: 11-7126
Matrix: Sediment
Data Release Authorized: MW
Reported: 04/08/11

QC Report No: SP67-Anchor QEA
Project: Jorgensen Sediment Charaterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 03/31/11

Date Extracted: 04/04/11
Date Analyzed: 04/06/11 02:10
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.8 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 17.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	**Aroclor 1260**	**19**	**71**
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	72.5%
Tetrachlorometaxylene	69.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-01SC-0203-110218
SAMPLE

Lab Sample ID: SR99C
LIMS ID: 11-8263
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SR99-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 04/16/11
Date Analyzed: 04/20/11 19:31
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 20.7 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 10.0
Silica Gel: Yes

Percent Moisture: 17.3%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	48	< 48 U
53469-21-9	Aroclor 1242	48	< 48 U
12672-29-6	Aroclor 1248	360	< 360 Y
11097-69-1	**Aroclor 1254**	**48**	**1,000**
11096-82-5	**Aroclor 1260**	**48**	**180**
11104-28-2	Aroclor 1221	48	< 48 U
11141-16-5	Aroclor 1232	48	< 48 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	62.8%
Tetrachlorometaxylene	48.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-01SC-0304-110218
SAMPLE

Lab Sample ID: SR99D
LIMS ID: 11-8264
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SR99-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 04/16/11
Date Analyzed: 04/20/11 19:51
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 18.7%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	98	< 98 Y
11097-69-1	**Aroclor 1254**	**20**	**270**
11096-82-5	**Aroclor 1260**	**20**	**120**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	83.1%
Tetrachlorometaxylene	80.1%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-01SC-0405-110218
SAMPLE

Lab Sample ID: SR99E
LIMS ID: 11-8265
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SR99-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 04/16/11
Date Analyzed: 04/20/11 20:11
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.6 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 6.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	76.5%
Tetrachlorometaxylene	72.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-01SC-0506-110218
SAMPLE

Lab Sample ID: SR99F
LIMS ID: 11-8266
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SR99-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 04/16/11
Date Analyzed: 04/20/11 20:31
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.6 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 12.7%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	66.8%
Tetrachlorometaxylene	59.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-01SC-0607-110218
SAMPLE

Lab Sample ID: SR99G
LIMS ID: 11-8267
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SR99-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 04/16/11
Date Analyzed: 04/20/11 20:51
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.9 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 16.8%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	68.5%
Tetrachlorometaxylene	63.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-02SC-0001-110221
SAMPLE

Lab Sample ID: SR99H
LIMS ID: 11-8268
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SR99-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 04/16/11
Date Analyzed: 04/20/11 21:11
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.3 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 200
Silica Gel: Yes

Percent Moisture: 23.4%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	790	< 790 U
53469-21-9	Aroclor 1242	790	< 790 U
12672-29-6	Aroclor 1248	5,900	< 5,900 Y
11097-69-1	**Aroclor 1254**	**790**	**8,100**
11096-82-5	Aroclor 1260	990	< 990 Y
11104-28-2	Aroclor 1221	790	< 790 U
11141-16-5	Aroclor 1232	790	< 790 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	D
Tetrachlorometaxylene	D

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-02SC-0102-110221
SAMPLE

Lab Sample ID: SR99I
LIMS ID: 11-8269
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SR99-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 04/16/11
Date Analyzed: 04/20/11 21:31
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.6 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 17.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	**Aroclor 1248**	**20**	**96**
11097-69-1	**Aroclor 1254**	**20**	**39**
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	76.2%
Tetrachlorometaxylene	68.6%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-02SC-0203-110221
SAMPLE

Lab Sample ID: SR99J
LIMS ID: 11-8270
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SR99-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 04/16/11
Date Analyzed: 04/20/11 21:51
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.3 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 19.0%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	74.8%
Tetrachlorometaxylene	70.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-02SC-0304-110221
SAMPLE

Lab Sample ID: SR99K
LIMS ID: 11-8271
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SR99-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 04/16/11
Date Analyzed: 04/20/11 22:11
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.6 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 15.1%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	70.8%
Tetrachlorometaxylene	70.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-02SC-0405-110221
SAMPLE

Lab Sample ID: SR99L
LIMS ID: 11-8272
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SR99-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 04/16/11
Date Analyzed: 04/20/11 23:11
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 26.0 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 7.7%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	73.0%
Tetrachlorometaxylene	69.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-02SC-0506-110221
SAMPLE

Lab Sample ID: SR99M
LIMS ID: 11-8273
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SR99-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 04/16/11
Date Analyzed: 04/20/11 23:31
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.2 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 10.2%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	72.0%
Tetrachlorometaxylene	68.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-02SC-0607-110221
SAMPLE

Lab Sample ID: SR99N
LIMS ID: 11-8274
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SR99-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 04/16/11
Date Analyzed: 04/21/11 00:31
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.6 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 12.4%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	73.2%
Tetrachlorometaxylene	67.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-04SC-0001-110221
SAMPLE

Lab Sample ID: SR99O
LIMS ID: 11-8275
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SR99-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 04/16/11
Date Analyzed: 04/21/11 00:51
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.2 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 47.7%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	200	< 200 Y
11097-69-1	**Aroclor 1254**	**20**	**470**
11096-82-5	**Aroclor 1260**	**20**	**150**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	98.2%
Tetrachlorometaxylene	85.9%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-04SC-0102-110221
SAMPLE

Lab Sample ID: SR99P
LIMS ID: 11-8276
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SR99-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 04/16/11
Date Analyzed: 04/21/11 01:11
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.2 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 21.7%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	99	< 99 Y
11097-69-1	**Aroclor 1254**	**20**	**160**
11096-82-5	**Aroclor 1260**	**20**	**70**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	82.1%
Tetrachlorometaxylene	81.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-04SC-0203-110221
SAMPLE

Lab Sample ID: SR99Q
LIMS ID: 11-8277
Matrix: Sediment
Data Release Authorized: B
Reported: 04/21/11

QC Report No: SR99-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 04/16/11
Date Analyzed: 04/21/11 01:30
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.8 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 17.0%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	**Aroclor 1254**	**19**	**22**
11096-82-5	**Aroclor 1260**	**19**	**32**
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	78.1%
Tetrachlorometaxylene	74.6%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-03SC-0405-110221
SAMPLE

Lab Sample ID: SR99R
LIMS ID: 11-8278
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SR99-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 04/16/11
Date Analyzed: 04/21/11 01:50
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 48.4%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	**Aroclor 1248**	**20**	**480**
11097-69-1	**Aroclor 1254**	**20**	**600**
11096-82-5	**Aroclor 1260**	**20**	**210**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	99.5%
Tetrachlorometaxylene	71.6%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-03SC-0506-110221
SAMPLE

Lab Sample ID: SR99S
LIMS ID: 11-8279
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SR99-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Date Extracted: 04/16/11
Date Analyzed: 04/21/11 02:10
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.3 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 49.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	**Aroclor 1248**	**20**	**590**
11097-69-1	**Aroclor 1254**	**20**	**700**
11096-82-5	**Aroclor 1260**	**20**	**210**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	96.9%
Tetrachlorometaxylene	70.6%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-207SC-0102-110216
SAMPLE

Lab Sample ID: SS00A
LIMS ID: 11-8282
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SS00-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 04/15/11

Date Extracted: 04/16/11
Date Analyzed: 04/20/11 14:17
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.5 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 52.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	**Aroclor 1248**	**20**	**80**
11097-69-1	**Aroclor 1254**	**20**	**120**
11096-82-5	**Aroclor 1260**	**20**	**64**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	86.2%
Tetrachlorometaxylene	74.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-215SC-0001-110216
SAMPLE

Lab Sample ID: SS00B
LIMS ID: 11-8283
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SS00-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 04/15/11

Date Extracted: 04/16/11
Date Analyzed: 04/20/11 14:41
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.5 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 53.2%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	59	< 59 Y
11097-69-1	**Aroclor 1254**	**20**	**140**
11096-82-5	**Aroclor 1260**	**20**	**62**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	86.8%
Tetrachlorometaxylene	77.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-210SC-0001-110216
SAMPLE

Lab Sample ID: SS00C
LIMS ID: 11-8284
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SS00-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/16/11
Date Received: 04/15/11

Date Extracted: 04/16/11
Date Analyzed: 04/20/11 15:05
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.1 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 52.8%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	**Aroclor 1248**	**20**	**50**
11097-69-1	**Aroclor 1254**	**20**	**87**
11096-82-5	**Aroclor 1260**	**20**	**64**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	81.0%
Tetrachlorometaxylene	71.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-07SC-0506-110218
SAMPLE

Lab Sample ID: SS00D
LIMS ID: 11-8285
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SS00-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 04/15/11

Date Extracted: 04/16/11
Date Analyzed: 04/20/11 15:29
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.9 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 33.3%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	**Aroclor 1260**	**19**	**27**
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	87.8%
Tetrachlorometaxylene	72.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-07SC-0607-110218
SAMPLE

Lab Sample ID: SS00E
LIMS ID: 11-8286
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SS00-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 04/15/11

Date Extracted: 04/16/11
Date Analyzed: 04/20/11 15:53
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.4 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 26.1%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	**Aroclor 1260**	**20**	**30**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	90.8%
Tetrachlorometaxylene	78.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-07SC-0708-110218
SAMPLE

Lab Sample ID: SS00F
LIMS ID: 11-8287
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SS00-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 04/15/11

Date Extracted: 04/16/11
Date Analyzed: 04/20/11 17:04
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.6 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 21.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	87.5%
Tetrachlorometaxylene	75.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-322SC-0607-110218
SAMPLE

Lab Sample ID: SS00G
LIMS ID: 11-8288
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SS00-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 04/15/11

Date Extracted: 04/16/11
Date Analyzed: 04/21/11 12:48
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.1 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 20.0
Silica Gel: Yes

Percent Moisture: 38.9%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	400	< 400 U
53469-21-9	Aroclor 1242	400	< 400 U
12672-29-6	**Aroclor 1248**	**400**	**1,300**
11097-69-1	**Aroclor 1254**	**400**	**1,000**
11096-82-5	Aroclor 1260	400	< 400 U
11104-28-2	Aroclor 1221	400	< 400 U
11141-16-5	Aroclor 1232	400	< 400 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	156%
Tetrachlorometaxylene	92.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-216SC-0708-110218
SAMPLE

Lab Sample ID: SS00H
LIMS ID: 11-8289
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SS00-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 04/15/11

Date Extracted: 04/16/11
Date Analyzed: 04/20/11 17:52
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.6 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 12.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	20	< 20 U
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	90.0%
Tetrachlorometaxylene	76.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-216SC-0809-110218
SAMPLE

Lab Sample ID: SS00I
LIMS ID: 11-8290
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SS00-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 04/15/11

Date Extracted: 04/16/11
Date Analyzed: 04/20/11 18:16
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 26.3 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 14.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	86.8%
Tetrachlorometaxylene	69.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-320SC-0304-110217
SAMPLE

Lab Sample ID: SS00J
LIMS ID: 11-8291
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SS00-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 04/15/11

Date Extracted: 04/16/11
Date Analyzed: 04/20/11 19:28
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.5 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 33.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	29	< 29 Y
11097-69-1	**Aroclor 1254**	**20**	**86**
11096-82-5	**Aroclor 1260**	**20**	**84**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	90.8%
Tetrachlorometaxylene	66.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-01SC-0001-110218
SAMPLE

Lab Sample ID: SR99A
LIMS ID: 11-8261
Matrix: Sediment
Data Release Authorized:
Reported: 04/21/11

QC Report No: SR99-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 04/18/11
Date Analyzed: 04/21/11 03:50
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 2.61 g-dry-wt
Final Extract Volume: 40 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 48.2%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1,500	< 1,500 U
53469-21-9	Aroclor 1242	1,500	< 1,500 U
12672-29-6	Aroclor 1248	12,000	< 12,000 Y
11097-69-1	**Aroclor 1254**	**1,500**	**32,000**
11096-82-5	**Aroclor 1260**	**1,500**	**4,700**
11104-28-2	Aroclor 1221	1,500	< 1,500 U
11141-16-5	Aroclor 1232	1,500	< 1,500 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	102%
Tetrachlorometaxylene	95.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-01SC-0102-110218
SAMPLE

Lab Sample ID: SR99B
LIMS ID: 11-8262
Matrix: Sediment
Data Release Authorized: MW
Reported: 04/22/11

QC Report No: SR99-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 04/18/11
Date Analyzed: 04/21/11 16:49
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 2.95 g-dry-wt
Final Extract Volume: 40 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 41.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1,400	< 1,400 U
53469-21-9	Aroclor 1242	1,400	< 1,400 U
12672-29-6	**Aroclor 1248**	**1,400**	**4,000**
11097-69-1	**Aroclor 1254**	**1,400**	**5,100**
11096-82-5	Aroclor 1260	1,400	< 1,400 U
11104-28-2	Aroclor 1221	1,400	< 1,400 U
11141-16-5	Aroclor 1232	1,400	< 1,400 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	99.2%
Tetrachlorometaxylene	95.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-309SC-0304-110217
SAMPLE

Lab Sample ID: SS00K
LIMS ID: 11-8292
Matrix: Sediment
Data Release Authorized: MW
Reported: 04/22/11

QC Report No: SS00-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 04/15/11

Date Extracted: 04/18/11
Date Analyzed: 04/21/11 17:09
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 4.21 g-dry-wt
Final Extract Volume: 40 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 16.1%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	950	< 950 U
53469-21-9	Aroclor 1242	950	< 950 U
12672-29-6	Aroclor 1248	950	< 950 U
11097-69-1	Aroclor 1254	950	< 950 U
11096-82-5	Aroclor 1260	950	< 950 U
11104-28-2	Aroclor 1221	950	< 950 U
11141-16-5	Aroclor 1232	950	< 950 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	92.1%
Tetrachlorometaxylene	88.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-316SC-0304-110217
SAMPLE

Lab Sample ID: SS00L
LIMS ID: 11-8293
Matrix: Sediment
Data Release Authorized: MW
Reported: 04/22/11

QC Report No: SS00-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 04/15/11

Date Extracted: 04/18/11
Date Analyzed: 04/21/11 17:28
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 3.57 g-dry-wt
Final Extract Volume: 40 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 28.8%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1,100	< 1,100 U
53469-21-9	Aroclor 1242	1,100	< 1,100 U
12672-29-6	Aroclor 1248	1,100	< 1,100 U
11097-69-1	Aroclor 1254	1,100	< 1,100 U
11096-82-5	Aroclor 1260	1,100	< 1,100 U
11104-28-2	Aroclor 1221	1,100	< 1,100 U
11141-16-5	Aroclor 1232	1,100	< 1,100 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	93.5%
Tetrachlorometaxylene	91.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-309SC-0304-110217
SAMPLE

Lab Sample ID: SS00K
LIMS ID: 11-8292
Matrix: Sediment
Data Release Authorized:
Reported: 04/28/11

QC Report No: SS00-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 04/15/11

Date Extracted: 04/27/11
Date Analyzed: 04/27/11 21:54
Instrument/Analyst: ECD5/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.6 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 16.1%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	32	< 32 U
53469-21-9	Aroclor 1242	32	< 32 U
12672-29-6	Aroclor 1248	32	< 32 U
11097-69-1	Aroclor 1254	32	< 32 U
11096-82-5	Aroclor 1260	32	< 32 U
11104-28-2	Aroclor 1221	32	< 32 U
11141-16-5	Aroclor 1232	32	< 32 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	69.0%
Tetrachlorometaxylene	67.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-316SC-0304-110217
SAMPLE

Lab Sample ID: SS00L
LIMS ID: 11-8293
Matrix: Sediment
Data Release Authorized:
Reported: 04/28/11

QC Report No: SS00-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 04/15/11

Date Extracted: 04/27/11
Date Analyzed: 04/28/11 12:33
Instrument/Analyst: ECD5/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.3 g-dry-wt
Final Extract Volume: 4.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 28.8%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	160	< 160 U
53469-21-9	Aroclor 1242	160	< 160 U
12672-29-6	**Aroclor 1248**	**160**	**560 P**
11097-69-1	**Aroclor 1254**	**160**	**730**
11096-82-5	**Aroclor 1260**	**160**	**260**
11104-28-2	Aroclor 1221	160	< 160 U
11141-16-5	Aroclor 1232	160	< 160 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	70.8%
Tetrachlorometaxylene	48.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-309SC-0203-110217
SAMPLE

Lab Sample ID: ST93A
LIMS ID: 11-9362
Matrix: Sediment
Data Release Authorized:
Reported: 05/04/11

QC Report No: ST93-Anchor QEA, LLC
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/18/11

Date Extracted: 04/30/11
Date Analyzed: 05/03/11 16:55
Instrument/Analyst: ECD7/YZ
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.9 g-dry-wt
Final Extract Volume: 2.5 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 21.8%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	150	< 150 Y
11097-69-1	**Aroclor 1254**	**19**	**300**
11096-82-5	**Aroclor 1260**	**19**	**100**
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	88.0%
Tetrachlorometaxylene	80.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-320SC-0203-110217
SAMPLE

Lab Sample ID: ST93B
LIMS ID: 11-9363
Matrix: Sediment
Data Release Authorized:
Reported: 05/04/11

QC Report No: ST93-Anchor QEA, LLC
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/18/11

Date Extracted: 04/30/11
Date Analyzed: 05/03/11 17:19
Instrument/Analyst: ECD7/YZ
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.9 g-dry-wt
Final Extract Volume: 2.5 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 44.3%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	290	< 290 Y
11097-69-1	**Aroclor 1254**	**19**	**970**
11096-82-5	**Aroclor 1260**	**19**	**810**
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	115%
Tetrachlorometaxylene	76.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-314SC-0304-110218
SAMPLE

Lab Sample ID: ST93C
LIMS ID: 11-9364
Matrix: Sediment
Data Release Authorized:
Reported: 05/04/11

QC Report No: ST93-Anchor QEA, LLC
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 04/30/11
Date Analyzed: 05/03/11 17:42
Instrument/Analyst: ECD7/YZ
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 13.2 g-dry-wt
Final Extract Volume: 2.5 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 14.9%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	67.0%
Tetrachlorometaxylene	66.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-216SC-0607-110218
SAMPLE

Lab Sample ID: ST93D
LIMS ID: 11-9365
Matrix: Sediment
Data Release Authorized:
Reported: 05/04/11

QC Report No: ST93-Anchor QEA, LLC
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 04/30/11
Date Analyzed: 05/03/11 18:54
Instrument/Analyst: ECD7/YZ
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.9 g-dry-wt
Final Extract Volume: 2.5 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 29.4%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	**Aroclor 1260**	**19**	**41**
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	44.9%
Tetrachlorometaxylene	46.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-07SC-0405-110218
SAMPLE

Lab Sample ID: ST93E
LIMS ID: 11-9366
Matrix: Sediment
Data Release Authorized:
Reported: 05/04/11

QC Report No: ST93-Anchor QEA, LLC
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 04/30/11
Date Analyzed: 05/03/11 19:17
Instrument/Analyst: ECD7/YZ
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 13.2 g-dry-wt
Final Extract Volume: 2.5 mL
Dilution Factor: 5.00
Silica Gel: Yes

Percent Moisture: 36.7%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	**Aroclor 1260**	**19**	**87**
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	48.9%
Tetrachlorometaxylene	42.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-216SC-0506-110218
SAMPLE

Lab Sample ID: SX21A
LIMS ID: 11-11070
Matrix: Sediment
Data Release Authorized:
Reported: 06/01/11

QC Report No: SX21-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 05/27/11
Date Analyzed: 05/31/11 12:31
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 13.2 g-dry-wt
Final Extract Volume: 12.5 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 34.7%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	**Aroclor 1248**	**19**	**210**
11097-69-1	**Aroclor 1254**	**19**	**340**
11096-82-5	**Aroclor 1260**	**19**	**130**
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	63.0%
Tetrachlorometaxylene	74.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-314SC-0203-110218
SAMPLE

Lab Sample ID: SX21B
LIMS ID: 11-11071
Matrix: Sediment
Data Release Authorized:
Reported: 06/01/11

QC Report No: SX21-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 05/27/11
Date Analyzed: 05/31/11 12:54
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.9 g-dry-wt
Final Extract Volume: 2.50 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 20.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	59.8%
Tetrachlorometaxylene	71.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-07SC-0304-110218
SAMPLE

Lab Sample ID: SX21C
LIMS ID: 11-11072
Matrix: Sediment
Data Release Authorized:
Reported: 06/01/11

QC Report No: SX21-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 05/27/11
Date Analyzed: 05/31/11 13:17
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.8 g-dry-wt
Final Extract Volume: 2.50 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 44.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	20	< 20 U
11097-69-1	Aroclor 1254	39	< 39 Y
11096-82-5	**Aroclor 1260**	**20**	**170**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	48.8%
Tetrachlorometaxylene	48.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-314SC-0001-110218
SAMPLE

Lab Sample ID: SZ26A
LIMS ID: 11-12241
Matrix: Sediment
Data Release Authorized:
Reported: 06/08/11

QC Report No: SZ26-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 06/06/11
Date Analyzed: 06/08/11 07:13
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.8 g-dry-wt
Final Extract Volume: 25.0 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 36.2%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	39	< 39 U
53469-21-9	Aroclor 1242	39	< 39 U
12672-29-6	Aroclor 1248	98	< 98 Y
11097-69-1	**Aroclor 1254**	**39**	**230**
11096-82-5	**Aroclor 1260**	**39**	**150**
11104-28-2	Aroclor 1221	39	< 39 U
11141-16-5	Aroclor 1232	39	< 39 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	74.2%
Tetrachlorometaxylene	71.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-314SC-0102-110218
SAMPLE

Lab Sample ID: SZ26B
LIMS ID: 11-12242
Matrix: Sediment
Data Release Authorized:
Reported: 06/08/11

QC Report No: SZ26-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 06/06/11
Date Analyzed: 06/07/11 12:44
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 13.0 g-dry-wt
Final Extract Volume: 2.50 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 32.8%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	3.8	< 3.8 U
53469-21-9	Aroclor 1242	3.8	< 3.8 U
12672-29-6	Aroclor 1248	17	< 17 Y
11097-69-1	Aroclor 1254	23	< 23 Y
11096-82-5	**Aroclor 1260**	**3.8**	**140**
11104-28-2	Aroclor 1221	3.8	< 3.8 U
11141-16-5	Aroclor 1232	3.8	< 3.8 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	77.8%
Tetrachlorometaxylene	63.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-07SC-0203-110218
SAMPLE

Lab Sample ID: SZ26C
LIMS ID: 11-12243
Matrix: Sediment
Data Release Authorized:
Reported: 06/08/11

QC Report No: SZ26-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 06/06/11
Date Analyzed: 06/07/11 13:41
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.8 g-dry-wt
Final Extract Volume: 2.50 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 39.7%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	3.9	< 3.9 U
53469-21-9	Aroclor 1242	3.9	< 3.9 U
12672-29-6	Aroclor 1248	16	< 16 Y
11097-69-1	Aroclor 1254	29	< 29 Y
11096-82-5	**Aroclor 1260**	**3.9**	**120**
11104-28-2	Aroclor 1221	3.9	< 3.9 U
11141-16-5	Aroclor 1232	3.9	< 3.9 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	52.2%
Tetrachlorometaxylene	53.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-07SC-0304-110218
SAMPLE

Lab Sample ID: SZ26D
LIMS ID: 11-12244
Matrix: Sediment
Data Release Authorized:
Reported: 06/08/11

QC Report No: SZ26-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 06/06/11
Date Analyzed: 06/08/11 07:32
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 13.1 g-dry-wt
Final Extract Volume: 25.0 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 43.4%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	38	< 38 U
53469-21-9	Aroclor 1242	38	< 38 U
12672-29-6	Aroclor 1248	38	< 38 U
11097-69-1	Aroclor 1254	38	< 38 U
11096-82-5	**Aroclor 1260**	**38**	**280**
11104-28-2	Aroclor 1221	38	< 38 U
11141-16-5	Aroclor 1232	38	< 38 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	71.0%
Tetrachlorometaxylene	54.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-07SC-0001-110218
SAMPLE

Lab Sample ID: TA19A
LIMS ID: 11-12627
Matrix: Sediment
Data Release Authorized: MW
Reported: 06/14/11

QC Report No: TA19-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 06/11/11
Date Analyzed: 06/13/11 11:31
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 13.1 g-dry-wt
Final Extract Volume: 2.50 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 45.7%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	57	< 57 Y
11097-69-1	**Aroclor 1254**	**19**	**100**
11096-82-5	**Aroclor 1260**	**19**	**62**
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	51.5%
Tetrachlorometaxylene	54.5%

FORM I

TA19:00010

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-07SC-0102-110218
SAMPLE

Lab Sample ID: TA19B
LIMS ID: 11-12628
Matrix: Sediment
Data Release Authorized:
Reported: 06/14/11

QC Report No: TA19-Anchor QEA
Project: Jorgensen Sediment Characterization 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Date Extracted: 06/11/11
Date Analyzed: 06/13/11 09:56
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 13.2 g-dry-wt
Final Extract Volume: 2.50 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 43.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	38	< 38 Y
11097-69-1	**Aroclor 1254**	**19**	**75**
11096-82-5	**Aroclor 1260**	**19**	**99**
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	91.2%
Tetrachlorometaxylene	89.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-208SC-0506-110316
SAMPLE

Lab Sample ID: TH07A
LIMS ID: 11-16902
Matrix: Sediment
Data Release Authorized:
Reported: 08/09/11

QC Report No: TH07-Anchor QEA
Project: Jorgensen VE

Date Sampled: 03/16/11
Date Received: 03/16/11

Date Extracted: 08/06/11
Date Analyzed: 08/09/11 08:30
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.7 g-dry-wt
Final Extract Volume: 2.50 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: 51.4%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	**Aroclor 1248**	**20**	**120**
11097-69-1	**Aroclor 1254**	**20**	**140**
11096-82-5	**Aroclor 1260**	**20**	**48**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	42.8%
Tetrachlorometaxylene	53.6%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-208SC-0607-110316
SAMPLE

Lab Sample ID: TH07B
LIMS ID: 11-16903
Matrix: Sediment
Data Release Authorized:
Reported: 08/09/11

QC Report No: TH07-Anchor QEA
Project: Jorgensen VE

Date Sampled: 03/16/11
Date Received: 03/16/11

Date Extracted: 08/06/11
Date Analyzed: 08/09/11 08:49
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.6 g-dry-wt
Final Extract Volume: 2.50 mL
Dilution Factor: 10.0
Silica Gel: No

Percent Moisture: 47.7%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	40	< 40 U
53469-21-9	Aroclor 1242	40	< 40 U
12672-29-6	**Aroclor 1248**	**40**	**420**
11097-69-1	**Aroclor 1254**	**40**	**530**
11096-82-5	**Aroclor 1260**	**40**	**180**
11104-28-2	Aroclor 1221	40	< 40 U
11141-16-5	Aroclor 1232	40	< 40 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	51.2%
Tetrachlorometaxylene	50.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-208SC-0708-110316
SAMPLE

Lab Sample ID: TH07C
LIMS ID: 11-16904
Matrix: Sediment
Data Release Authorized:
Reported: 08/09/11

QC Report No: TH07-Anchor QEA
Project: Jorgensen VE

Date Sampled: 03/16/11
Date Received: 03/16/11

Date Extracted: 08/06/11
Date Analyzed: 08/09/11 09:08
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.8 g-dry-wt
Final Extract Volume: 2.50 mL
Dilution Factor: 100
Silica Gel: No

Percent Moisture: 44.8%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	390	< 390 U
53469-21-9	Aroclor 1242	390	< 390 U
12672-29-6	**Aroclor 1248**	**390**	**2,200**
11097-69-1	**Aroclor 1254**	**390**	**2,400**
11096-82-5	**Aroclor 1260**	**390**	**430**
11104-28-2	Aroclor 1221	390	< 390 U
11141-16-5	Aroclor 1232	390	< 390 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	D
Tetrachlorometaxylene	D

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-208SC-0809-110316
SAMPLE

Lab Sample ID: TI28A
LIMS ID: 11-17624
Matrix: Sediment
Data Release Authorized:
Reported: 08/17/11

QC Report No: TI28-Anchor QEA
Project: Jorgensen VE

Date Sampled: 03/16/11
Date Received: 03/16/11

Date Extracted: 08/15/11
Date Analyzed: 08/16/11 10:41
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 13.0 g-dry-wt
Final Extract Volume: 2.50 mL
Dilution Factor: 25.0
Silica Gel: No

Percent Moisture: 43.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	96	< 96 U
53469-21-9	**Aroclor 1242**	**96**	**2,800**
12672-29-6	Aroclor 1248	96	< 96 U
11097-69-1	**Aroclor 1254**	**96**	**1,200**
11096-82-5	**Aroclor 1260**	**96**	**300**
11104-28-2	Aroclor 1221	96	< 96 U
11141-16-5	Aroclor 1232	96	< 96 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	80.6%
Tetrachlorometaxylene	102%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-208SC-0910-110316
SAMPLE

Lab Sample ID: TI28B
LIMS ID: 11-17625
Matrix: Sediment
Data Release Authorized:
Reported: 08/17/11

QC Report No: TI28-Anchor QEA
Project: Jorgensen VE

Date Sampled: 03/16/11
Date Received: 03/16/11

Date Extracted: 08/15/11
Date Analyzed: 08/16/11 11:00
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.9 g-dry-wt
Final Extract Volume: 2.50 mL
Dilution Factor: 25.0
Silica Gel: No

Percent Moisture: 44.3%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	97	< 97 U
53469-21-9	**Aroclor 1242**	**97**	**2,400**
12672-29-6	Aroclor 1248	97	< 97 U
11097-69-1	**Aroclor 1254**	**97**	**1,600**
11096-82-5	**Aroclor 1260**	**97**	**360**
11104-28-2	Aroclor 1221	97	< 97 U
11141-16-5	Aroclor 1232	97	< 97 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	104%
Tetrachlorometaxylene	104%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-208SC-1011-110316
SAMPLE

Lab Sample ID: TL06A
LIMS ID: 11-19126
Matrix: Sediment
Data Release Authorized: VD
Reported: 09/09/11

QC Report No: TL06-Anchor QEA
Project: Jorgensen VE

Date Sampled: 03/16/11
Date Received: 03/16/11

Date Extracted: 09/08/11
Date Analyzed: 09/09/11 11:52
Instrument/Analyst: ECD5/PKC
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 13.0 g-dry-wt
Final Extract Volume: 2.50 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 35.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	**Aroclor 1242**	**19**	**190**
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	**Aroclor 1254**	**19**	**180**
11096-82-5	**Aroclor 1260**	**19**	**110**
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	69.2%
Tetrachlorometaxylene	77.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-208SC-1112-110316
SAMPLE

Lab Sample ID: TL06B
LIMS ID: 11-19127
Matrix: Sediment
Data Release Authorized: VD
Reported: 09/09/11

QC Report No: TL06-Anchor QEA
Project: Jorgensen VE

Date Sampled: 03/16/11
Date Received: 03/16/11

Date Extracted: 09/08/11
Date Analyzed: 09/09/11 12:11
Instrument/Analyst: ECD5/PKC
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.8 g-dry-wt
Final Extract Volume: 2.50 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 32.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	20	< 20 U
53469-21-9	Aroclor 1242	20	< 20 U
12672-29-6	Aroclor 1248	39	< 39 Y
11097-69-1	**Aroclor 1254**	**20**	**87**
11096-82-5	**Aroclor 1260**	**20**	**31**
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	67.2%
Tetrachlorometaxylene	68.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD

Sample ID: JVE-208SC-1212.5-110316
SAMPLE

Lab Sample ID: TM04A
LIMS ID: 11-19868
Matrix: Sediment
Data Release Authorized:
Reported: 09/16/11

QC Report No: TM04-Anchor QEA
Project: Jorgensen VE

Date Sampled: 03/16/11
Date Received: 03/16/11

Date Extracted: 09/14/11
Date Analyzed: 09/15/11 11:34
Instrument/Analyst: ECD5/AAR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 13.1 g-dry-wt
Final Extract Volume: 2.50 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 19.6%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	Aroclor 1248	19	< 19 U
11097-69-1	Aroclor 1254	19	< 19 U
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	120	< 120 Y

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	93.8%
Tetrachlorometaxylene	68.5%

FORM I

SAMPLE RESULTS-CONVENTIONALS
SJ34-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-215SC-0203-110216
ARI ID: 11-3385 SJ34C

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	53.80
Total Organic Carbon	02/17/11 021711#1	Plumb,1981	Percent	0.020	2.11

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ34-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-215SC-0304-110216
ARI ID: 11-3386 SJ34D

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	57.70
Total Organic Carbon	02/17/11 021711#1	Plumb,1981	Percent	0.020	1.82

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ34-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-215SC-0405-110216
ARI ID: 11-3387 SJ34E

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	58.00
Total Organic Carbon	02/17/11 021711#1	Plumb,1981	Percent	0.020	1.06

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ34-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-215SC-0506-110216
ARI ID: 11-3388 SJ34F

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	59.10
Total Organic Carbon	02/17/11 021711#1	Plumb,1981	Percent	0.020	2.50

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ34-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-215SC-0607-110216
ARI ID: 11-3389 SJ34G

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	62.60
Total Organic Carbon	02/17/11 021711#1	Plumb,1981	Percent	0.020	1.58

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ34-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-215SC-0708-110216
ARI ID: 11-3390 SJ34H

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	65.40
Total Organic Carbon	02/17/11 021711#1	Plumb,1981	Percent	0.020	1.52

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ34-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-215SC-0809-110216
ARI ID: 11-3391 SJ34I

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	63.00
Total Organic Carbon	02/17/11 021711#1	Plumb,1981	Percent	0.020	1.78

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ34-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-215SC-0910-110216
ARI ID: 11-3392 SJ34J

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	61.20
Total Organic Carbon	02/17/11 021711#1	Plumb,1981	Percent	0.020	1.95

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ34-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-215SC-1011-110216
ARI ID: 11-3393 SJ34K

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	70.10
Total Organic Carbon	02/17/11 021711#1	Plumb,1981	Percent	0.020	1.40

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ34-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-215SC-1112-110216
ARI ID: 11-3394 SJ34L

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	74.70
Total Organic Carbon	02/17/11 021711#1	Plumb,1981	Percent	0.020	0.649

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ34-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-215SC-1212.8-110216
ARI ID: 11-3395 SJ34M

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	75.60
Total Organic Carbon	02/17/11 021711#1	Plumb,1981	Percent	0.020	0.390

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ34-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-1215SC-0607-110216
ARI ID: 11-3396 SJ34N

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	62.50
Total Organic Carbon	02/17/11 021711#1	Plumb,1981	Percent	0.020	2.08

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ35-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-210SC-0203-110216
ARI ID: 11-3399 SJ35C

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	56.10
Total Organic Carbon	02/18/11 021811#1	Plumb,1981	Percent	0.020	1.77

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ35-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-210SC-0304-110216
ARI ID: 11-3400 SJ35D

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	52.70
Total Organic Carbon	02/18/11 021811#1	Plumb,1981	Percent	0.020	1.85

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ35-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-210SC-0405-110216
ARI ID: 11-3401 SJ35E

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	56.30
Total Organic Carbon	02/18/11 021811#1	Plumb,1981	Percent	0.020	2.39

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ35-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-210SC-0506-110216
ARI ID: 11-3402 SJ35F

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	56.80
Total Organic Carbon	02/18/11 021811#1	Plumb,1981	Percent	0.020	2.04

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ35-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-210SC-0607-110216
ARI ID: 11-3403 SJ35G

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	64.90
Total Organic Carbon	02/18/11 021811#1	Plumb,1981	Percent	0.020	2.33

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ35-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-210SC-0708-110216
ARI ID: 11-3404 SJ35H

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	66.20
Total Organic Carbon	02/18/11 021811#1	Plumb,1981	Percent	0.020	2.64

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ35-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-210SC-0809-110216
ARI ID: 11-3405 SJ35I

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	77.30
Total Organic Carbon	02/18/11 021811#1	Plumb,1981	Percent	0.020	1.14

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ35-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-210SC-0910-110216
ARI ID: 11-3406 SJ35J

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	82.90
Total Organic Carbon	02/18/11 021811#1	Plumb,1981	Percent	0.020	0.272

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ35-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-210SC-1011-110216
ARI ID: 11-3407 SJ35K

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	80.70
Total Organic Carbon	02/18/11 021811#1	Plumb,1981	Percent	0.020	1.19

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ35-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-210SC-1112-110216
ARI ID: 11-3408 SJ35L

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	66.30
Total Organic Carbon	02/18/11 021811#1	Plumb,1981	Percent	0.020	4.51

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ35-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-210SC-1212.7-110216
ARI ID: 11-3409 SJ35M

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	63.50
Total Organic Carbon	02/18/11 021811#1	Plumb,1981	Percent	0.020	2.70

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ36-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-207SC-0203-110216
ARI ID: 11-3412 SJ36C

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	54.30
Total Organic Carbon	02/17/11 021711#1	Plumb,1981	Percent	0.020	1.73

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ36-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-207SC-0304-110216
ARI ID: 11-3413 SJ36D

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	51.80
Total Organic Carbon	02/17/11 021711#1	Plumb,1981	Percent	0.020	2.06

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ36-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-207SC-0405-110216
ARI ID: 11-3414 SJ36E

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	52.30
Total Organic Carbon	02/17/11 021711#1	Plumb,1981	Percent	0.020	2.77

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ36-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-207SC-0506-110216
ARI ID: 11-3415 SJ36F

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	52.10
Total Organic Carbon	02/17/11 021711#1	Plumb,1981	Percent	0.020	2.53

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ36-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-207SC-0607-110216
ARI ID: 11-3416 SJ36G

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	55.00
Total Organic Carbon	02/17/11 021711#1	Plumb,1981	Percent	0.020	2.38

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ36-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-207SC-0708-110216
ARI ID: 11-3417 SJ36H

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	60.30
Total Organic Carbon	02/17/11 021711#1	Plumb,1981	Percent	0.020	1.88

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ36-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-207SC-0809-110216
ARI ID: 11-3418 SJ36I

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	62.60
Total Organic Carbon	02/17/11 021711#1	Plumb,1981	Percent	0.020	2.23

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ36-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-207SC-0910-110216
ARI ID: 11-3419 SJ36J

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	62.20
Total Organic Carbon	02/17/11 021711#1	Plumb,1981	Percent	0.020	3.46

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ36-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-207SC-1011-110216
ARI ID: 11-3420 SJ36K

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	70.20
Total Organic Carbon	02/17/11 021711#1	Plumb,1981	Percent	0.020	1.06

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ36-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-207SC-1112-110216
ARI ID: 11-3421 SJ36L

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	71.50
Total Organic Carbon	02/17/11 021711#1	Plumb,1981	Percent	0.020	1.47

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ36-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-207SC-1212.6-110216
ARI ID: 11-3422 SJ36M

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/16/11 021611#1	EPA 160.3	Percent	0.01	80.80
Total Organic Carbon	02/17/11 021711#1	Plumb,1981	Percent	0.020	0.095

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ57-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-205SC-0203-110217
ARI ID: 11-3504 SJ57C

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	52.40
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	1.55

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ57-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-205SC-0304-110217
ARI ID: 11-3505 SJ57D

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	53.70
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	1.93

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ57-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-205SC-0405-110217
ARI ID: 11-3506 SJ57E

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	51.90
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	1.97

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ57-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-205SC-0506-110217
ARI ID: 11-3507 SJ57F

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	50.50
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	2.28

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ57-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-205SC-0607-110217
ARI ID: 11-3508 SJ57G

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	53.00
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	2.58

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ57-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-205SC-0708-110217
ARI ID: 11-3509 SJ57H

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	60.60
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	1.69

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ57-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-205SC-0809-110217
ARI ID: 11-3510 SJ57I

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	61.50
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	2.67

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ57-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-205SC-0910-110217
ARI ID: 11-3511 SJ57J

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	59.20
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	0.724

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ57-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-205SC-1011-110217
ARI ID: 11-3512 SJ57K

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	78.30
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	0.511

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ57-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-205SC-1112.1-110217
ARI ID: 11-3513 SJ57L

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	69.00
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	0.821

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ58-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-311SC-0506-110217
ARI ID: 11-3519 SJ58F

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	77.20
Total Organic Carbon	02/18/11 021811#1	Plumb,1981	Percent	0.020	0.734

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ58-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-311SC-0607-110217
ARI ID: 11-3520 SJ58G

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	77.70
Total Organic Carbon	02/18/11 021811#1	Plumb,1981	Percent	0.020	0.304

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ58-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-311SC-0708-110217
ARI ID: 11-3521 SJ58H

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	82.90
Total Organic Carbon	02/18/11 021811#1	Plumb,1981	Percent	0.020	0.113

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ58-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-311SC-089.4-110217
ARI ID: 11-3522 SJ58I

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	84.70
Total Organic Carbon	02/18/11 021811#1	Plumb,1981	Percent	0.020	0.829

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ62-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-316SC-0506-110217
ARI ID: 11-3529 SJ62F

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	82.30
Total Organic Carbon	02/18/11 021811#1	Plumb,1981	Percent	0.020	0.254

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ62-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-316SC-0607-110217
ARI ID: 11-3530 SJ62G

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	77.40
Total Organic Carbon	02/18/11 021811#1	Plumb,1981	Percent	0.020	0.323

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ62-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-316SC-0708-110217
ARI ID: 11-3531 SJ62H

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	83.50
Total Organic Carbon	02/18/11 021811#1	Plumb,1981	Percent	0.020	0.111

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ62-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-316SC-0809-110217
ARI ID: 11-3532 SJ62I

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	85.70
Total Organic Carbon	02/18/11 021811#1	Plumb,1981	Percent	0.020	0.151

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ62-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-316SC-099.7-110217
ARI ID: 11-3533 SJ62J

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	81.50
Total Organic Carbon	02/18/11 021811#1	Plumb,1981	Percent	0.020	0.119

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ63-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-309SC-0506-110217
ARI ID: 11-3539 SJ63F

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	81.10
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	1.03

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ63-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-309SC-0607-110217
ARI ID: 11-3540 SJ63G

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	80.20
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	0.131

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ63-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-309SC-0708-110217
ARI ID: 11-3541 SJ63H

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	75.20
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	0.617

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ63-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-309SC-0809-110217
ARI ID: 11-3542 SJ63I

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	73.70
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	0.767

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ63-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-309SC-0910-110217
ARI ID: 11-3543 SJ63J

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	78.70
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	0.185

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ63-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-309SC-1011-110217
ARI ID: 11-3544 SJ63K

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	76.20
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	0.376

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ63-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-309SC-1111.5-110217
ARI ID: 11-3545 SJ63L

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	60.20
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	2.55

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ63-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-1205SC-0203-110217
ARI ID: 11-3546 SJ63M

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	52.30
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	1.66

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ63-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/17/11

Client ID: JVE-1309SC-0910-110217
ARI ID: 11-3547 SJ63N

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/17/11 021711#1	EPA 160.3	Percent	0.01	79.40
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	0.138

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ81-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/23/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-322SC-0809-110218
ARI ID: 11-3624 SJ81A

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/18/11 021811#1	EPA 160.3	Percent	0.01	72.10
Total Organic Carbon	02/22/11 022211#1	Plumb,1981	Percent	0.020	1.86

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ81-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/23/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-322SC-0910-110218
ARI ID: 11-3625 SJ81B

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/18/11 021811#1	EPA 160.3	Percent	0.01	80.10
Total Organic Carbon	02/22/11 022211#1	Plumb,1981	Percent	0.020	1.94

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ81-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/23/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-322SC-1011-110218
ARI ID: 11-3626 SJ81C

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/18/11 021811#1	EPA 160.3	Percent	0.01	86.40
Total Organic Carbon	02/22/11 022211#1	Plumb,1981	Percent	0.020	0.932

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ81-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/23/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-322SC-1112.4-110218
ARI ID: 11-3627 SJ81D

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/18/11 021811#1	EPA 160.3	Percent	0.01	77.10
Total Organic Carbon	02/22/11 022211#1	Plumb,1981	Percent	0.020	1.88

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ82-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-216SC-1011-110218
ARI ID: 11-3637 SJ82A

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/18/11 021811#1	EPA 160.3	Percent	0.01	86.20
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	0.240

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ82-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-216SC-1112.1-110218
ARI ID: 11-3638 SJ82B

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/18/11 021811#1	EPA 160.3	Percent	0.01	80.20
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	0.327

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ83-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-314SC-0506-110218
ARI ID: 11-3654 SJ83F

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/18/11 021811#1	EPA 160.3	Percent	0.01	86.10
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	0.527

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ83-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-314SC-0607-110218
ARI ID: 11-3655 SJ83G

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/18/11 021811#1	EPA 160.3	Percent	0.01	84.70
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	0.916

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ83-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-314SC-0707.9-110218
ARI ID: 11-3656 SJ83H

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/18/11 021811#1	EPA 160.3	Percent	0.01	80.20
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	0.726

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ83-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-1314SC-0506-110218
ARI ID: 11-3657 SJ83I

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/18/11 021811#1	EPA 160.3	Percent	0.01	85.00
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	0.581

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ90-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/22/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-01SC-099.7-110218
ARI ID: 11-3662 SJ90A

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/18/11 021811#1	EPA 160.3	Percent	0.01	81.80
Total Organic Carbon	02/21/11 022111#1	Plumb,1981	Percent	0.020	0.068

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ91-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/23/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-1007SC-0910-110218
ARI ID: 11-3687 SJ91A

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/18/11 021811#1	EPA 160.3	Percent	0.01	77.10
Total Organic Carbon	02/22/11 022211#1	Plumb,1981	Percent	0.020	3.98

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ91-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/23/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-07SC-0910-110218
ARI ID: 11-3688 SJ91B

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/18/11 021811#1	EPA 160.3	Percent	0.01	78.10
Total Organic Carbon	02/22/11 022211#1	Plumb,1981	Percent	0.020	2.23

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ91-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/23/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-07SC-1011-110218
ARI ID: 11-3689 SJ91C

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/18/11 021811#1	EPA 160.3	Percent	0.01	76.70
Total Organic Carbon	02/22/11 022211#1	Plumb,1981	Percent	0.020	1.39

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ91-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/23/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-07SC-1112.2-110218
ARI ID: 11-3690 SJ91D

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/18/11 021811#1	EPA 160.3	Percent	0.01	76.00
Total Organic Carbon	02/22/11 022211#1	Plumb,1981	Percent	0.020	4.39

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SJ99-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/23/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-02SC-099.6-110221
ARI ID: 11-3728 SJ99A

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/21/11 022111#1	EPA 160.3	Percent	0.01	84.50
Total Organic Carbon	02/22/11 022211#1	Plumb,1981	Percent	0.020	0.072

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SK00-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized
Reported: 02/23/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-03SC-11-12.2-110221
ARI ID: 11-3739 SK00A

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/21/11 022111#1	EPA 160.3	Percent	0.01	76.40
Total Organic Carbon	02/22/11 022211#1	Plumb,1981	Percent	0.020	1.20

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SK01-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 02/23/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-04SC-089.2-110221
ARI ID: 11-3752 SK01A

Analyte	Date	Method	Units	RL	Sample
Total Solids	02/21/11 022111#1	EPA 160.3	Percent	0.01	86.20
Total Organic Carbon	02/22/11 022211#1	Plumb,1981	Percent	0.020	0.104

RL Analytical reporting limit
U Undetected at reported detection limit

SJ99:00062

EMJ014560

SAMPLE RESULTS-CONVENTIONALS
SL49-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 03/09/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 02/16/11

Client ID: JVE-207SC-0607-110216
ARI ID: 11-4486 SL49A

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/07/11 030711#1	EPA 160.3	Percent	0.01	55.50
Total Organic Carbon	03/08/11 030811#1	Plumb,1981	Percent	0.020	2.32

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SL71-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 03/09/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-03SC-0708-110221
ARI ID: 11-4607 SL71A

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/07/11 030711#1	EPA 160.3	Percent	0.01	59.60
Total Organic Carbon	03/08/11 030811#1	Plumb,1981	Percent	0.020	1.49

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SL71-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 03/09/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-03SC-0809-110221
ARI ID: 11-4608 SL71B

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/07/11 030711#1	EPA 160.3	Percent	0.01	75.20
Total Organic Carbon	03/08/11 030811#1	Plumb,1981	Percent	0.020	1.31

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SL71-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 03/09/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-03SC-0910-110221
ARI ID: 11-4609 SL71C

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/07/11 030711#1	EPA 160.3	Percent	0.01	74.80
Total Organic Carbon	03/08/11 030811#1	Plumb,1981	Percent	0.020	1.33

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SL71-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 03/09/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-03SC-1011-110221
ARI ID: 11-4610 SL71D

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/07/11 030711#1	EPA 160.3	Percent	0.01	74.10
Total Organic Carbon	03/08/11 030811#1	Plumb,1981	Percent	0.020	1.38

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SL71-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 03/09/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-04SC-0506-110221
ARI ID: 11-4611 SL71E

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/07/11 030711#1	EPA 160.3	Percent	0.01	81.40
Total Organic Carbon	03/08/11 030811#1	Plumb,1981	Percent	0.020	0.142

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SL71-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 03/09/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-04SC-0607-110221
ARI ID: 11-4612 SL71F

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/07/11 030711#1	EPA 160.3	Percent	0.01	84.30
Total Organic Carbon	03/08/11 030811#1	Plumb,1981	Percent	0.020	0.085

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SL71-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 03/09/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-04SC-0708-110221
ARI ID: 11-4613 SL71G

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/07/11 030711#1	EPA 160.3	Percent	0.01	85.00
Total Organic Carbon	03/08/11 030811#1	Plumb,1981	Percent	0.020	0.138

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SL72-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 03/09/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-1004SC-0607-110221
ARI ID: 11-4614 SL72A

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/07/11 030711#1	EPA 160.3	Percent	0.01	86.10
Total Organic Carbon	03/08/11 030811#1	Plumb,1981	Percent	0.020	0.110

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SM77-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 03/15/11

Project: Joregnsen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-03SC-0607-110221
ARI ID: 11-5308 SM77A

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/11/11 031111#1	EPA 160.3	Percent	0.01	63.00
Total Organic Carbon	03/14/11 031411#1	Plumb,1981	Percent	0.020	1.86

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SM77-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 03/15/11

Project: Joregnsen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-04SC-0405-110221
ARI ID: 11-5309 SM77B

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/11/11 031111#1	EPA 160.3	Percent	0.01	86.10
Total Organic Carbon	03/14/11 031411#1	Plumb,1981	Percent	0.020	0.114

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SN49-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 03/21/11

Project: Jorgensen VE
Event: NA
Date Sampled: 03/16/11
Date Received: 03/16/11

Client ID: JVE-206SC-0607-110316
ARI ID: 11-5862 SN49A

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/16/11 031611#1	EPA 160.3	Percent	0.01	52.70
Total Organic Carbon	03/18/11 031811#1	Plumb,1981	Percent	0.020	2.48

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SN49-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 03/21/11

Project: Jorgensen VE
Event: NA
Date Sampled: 03/16/11
Date Received: 03/16/11

Client ID: JVE-206SC-0708-110316
ARI ID: 11-5863 SN49B

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/16/11 031611#1	EPA 160.3	Percent	0.01	56.30
Total Organic Carbon	03/18/11 031811#1	Plumb,1981	Percent	0.020	2.10

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SN49-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 03/21/11

Project: Jorgensen VE
Event: NA
Date Sampled: 03/16/11
Date Received: 03/16/11

Client ID: JVE-206SC-0809-110316
ARI ID: 11-5864 SN49C

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/16/11 031611#1	EPA 160.3	Percent	0.01	58.90
Total Organic Carbon	03/18/11 031811#1	Plumb,1981	Percent	0.020	2.19

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SN49-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 03/21/11

Project: Jorgensen VE
Event: NA
Date Sampled: 03/16/11
Date Received: 03/16/11

Client ID: JVE-206SC-0910-110316
ARI ID: 11-5865 SN49D

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/16/11 031611#1	EPA 160.3	Percent	0.01	62.30
Total Organic Carbon	03/18/11 031811#1	Plumb,1981	Percent	0.020	1.76

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SN49-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 03/21/11

Project: Jorgensen VE
Event: NA
Date Sampled: 03/16/11
Date Received: 03/16/11

Client ID: JVE-206SC-1011-110316
ARI ID: 11-5866 SN49E

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/16/11 031611#1	EPA 160.3	Percent	0.01	68.00
Total Organic Carbon	03/18/11 031811#1	Plumb,1981	Percent	0.020	1.54

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SN49-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 03/21/11

Project: Jorgensen VE
Event: NA
Date Sampled: 03/16/11
Date Received: 03/16/11

Client ID: JVE-206SC-1112-110316
ARI ID: 11-5867 SN49F

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/16/11 031611#1	EPA 160.3	Percent	0.01	66.80
Total Organic Carbon	03/18/11 031811#1	Plumb,1981	Percent	0.020	2.24

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SN49-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 03/21/11

Project: Jorgensen VE
Event: NA
Date Sampled: 03/16/11
Date Received: 03/16/11

Client ID: JVE-206SC-1213-110316
ARI ID: 11-5868 SN49G

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/16/11 031611#1	EPA 160.3	Percent	0.01	69.20
Total Organic Carbon	03/18/11 031811#1	Plumb,1981	Percent	0.020	1.78

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SN49-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 03/21/11

Project: Jorgensen VE
Event: NA
Date Sampled: 03/16/11
Date Received: 03/16/11

Client ID: JVE-206SC-1313.6-110316
ARI ID: 11-5869 SN49H

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/16/11 031611#1	EPA 160.3	Percent	0.01	70.10
Total Organic Carbon	03/18/11 031811#1	Plumb,1981	Percent	0.020	1.67

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SN49-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 03/21/11

Project: Jorgensen VE
Event: NA
Date Sampled: 03/16/11
Date Received: 03/16/11

Client ID: JVE-1206SC-1011-110316
ARI ID: 11-5870 SN49I

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/16/11 031611#1	EPA 160.3	Percent	0.01	68.20
Total Organic Carbon	03/18/11 031811#1	Plumb,1981	Percent	0.020	1.69

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SP67-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/05/11

Project: Jorgensen Sediment Charateri
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 03/31/11

Client ID: JVE-210SC-0102-110216
ARI ID: 11-7113 SP67A

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/31/11 033111#1	EPA 160.3	Percent	0.01	50.00
Total Organic Carbon	04/04/11 040411#1	Plumb,1981	Percent	0.020	2.11

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SP67-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/05/11

Project: Jorgensen Sediment Charateri
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 03/31/11

Client ID: JVE-215SC-0102-110216
ARI ID: 11-7114 SP67B

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/31/11 033111#1	EPA 160.3	Percent	0.01	51.50
Total Organic Carbon	04/04/11 040411#1	Plumb,1981	Percent	0.020	1.53

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SP67-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/05/11

Project: Jorgensen Sediment Charateri
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 03/31/11

Client ID: JVE-309SC-0405-110217
ARI ID: 11-7115 SP67C

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/31/11 033111#1	EPA 160.3	Percent	0.01	81.60
Total Organic Carbon	04/04/11 040411#1	Plumb,1981	Percent	0.020	0.137

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SP67-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/05/11

Project: Jorgensen Sediment Charateri
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 03/31/11

Client ID: JVE-316SC-0405-110217
ARI ID: 11-7116 SP67D

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/31/11 033111#1	EPA 160.3	Percent	0.01	80.70
Total Organic Carbon	04/04/11 040411#1	Plumb,1981	Percent	0.020	0.734

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SP67-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/05/11

Project: Jorgensen Sediment Charateri
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 03/31/11

Client ID: JVE-320SC-0405-110217
ARI ID: 11-7117 SP67E

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/31/11 033111#1	EPA 160.3	Percent	0.01	59.60
Total Organic Carbon	04/04/11 040411#1	Plumb,1981	Percent	0.020	2.00

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SP67-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/05/11

Project: Jorgensen Sediment Charateri
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 03/31/11

Client ID: JVE-314SC-0405-110218
ARI ID: 11-7118 SP67F

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/31/11 033111#1	EPA 160.3	Percent	0.01	93.00
Total Organic Carbon	04/04/11 040411#1	Plumb,1981	Percent	0.020	0.795

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SP67-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized
Reported: 04/05/11

Project: Jorgensen Sediment Charateri
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 03/31/11

Client ID: JVE-216SC-0910-110218
ARI ID: 11-7119 SP67G

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/31/11 033111#1	EPA 160.3	Percent	0.01	83.80
Total Organic Carbon	04/04/11 040411#1	Plumb,1981	Percent	0.020	0.127

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SP67-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/05/11

Project: Jorgensen Sediment Charateri
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 03/31/11

Client ID: JVE-322SC-0708-110218
ARI ID: 11-7120 SP67H

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/31/11 033111#1	EPA 160.3	Percent	0.01	62.70
Total Organic Carbon	04/04/11 040411#1	Plumb,1981	Percent	0.020	2.06

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SP67-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/05/11

Project: Jorgensen Sediment Charateri
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 03/31/11

Client ID: JVE-07SC-0809-110218
ARI ID: 11-7121 SP67I

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/31/11 033111#1	EPA 160.3	Percent	0.01	83.40
Total Organic Carbon	04/04/11 040411#1	Plumb,1981	Percent	0.020	1.69

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SP67-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/05/11

Project: Jorgensen Sediment Charateri
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 03/31/11

Client ID: JVE-01SC-0708-110218
ARI ID: 11-7122 SP67J

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/31/11 033111#1	EPA 160.3	Percent	0.01	83.50
Total Organic Carbon	04/04/11 040411#1	Plumb,1981	Percent	0.020	0.315

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SP67-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/05/11

Project: Jorgensen Sediment Charateri
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 03/31/11

Client ID: JVE-01SC-0809-110218
ARI ID: 11-7123 SP67K

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/31/11 033111#1	EPA 160.3	Percent	0.01	87.90
Total Organic Carbon	04/04/11 040411#1	Plumb,1981	Percent	0.020	0.048

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SP67-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/05/11

Project: Jorgensen Sediment Charateri
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 03/31/11

Client ID: JVE-02SC-0708-110221
ARI ID: 11-7124 SP67L

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/31/11 033111#1	EPA 160.3	Percent	0.01	87.00
Total Organic Carbon	04/04/11 040411#1	Plumb,1981	Percent	0.020	0.044

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SP67-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/05/11

Project: Jorgensen Sediment Charateri
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 03/31/11

Client ID: JVE-02SC-0809-110221
ARI ID: 11-7125 SP67M

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/31/11 033111#1	EPA 160.3	Percent	0.01	82.80
Total Organic Carbon	04/04/11 040411#1	Plumb,1981	Percent	0.020	0.096

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SP67-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/05/11

Project: Jorgensen Sediment Charateri
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 03/31/11

Client ID: JVE-04SC-0304-110221
ARI ID: 11-7126 SP67N

Analyte	Date	Method	Units	RL	Sample
Total Solids	03/31/11 033111#1	EPA 160.3	Percent	0.01	81.60
Total Organic Carbon	04/04/11 040411#1	Plumb,1981	Percent	0.020	0.357

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SR99-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-01SC-0001-110218
ARI ID: 11-8261 SR99A

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	47.80
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	3.21

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SR99-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-01SC-0102-110218
ARI ID: 11-8262 SR99B

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	59.40
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	2.50

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SR99-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-01SC-0203-110218
ARI ID: 11-8263 SR99C

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	80.90
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	0.528

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SR99-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-01SC-0304-110218
ARI ID: 11-8264 SR99D

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	80.70
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	0.347

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SR99-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-01SC-0405-110218
ARI ID: 11-8265 SR99E

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	93.40
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	0.118

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SR99-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-01SC-0506-110218
ARI ID: 11-8266 SR99F

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	85.90
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	0.292

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SR99-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-01SC-0607-110218
ARI ID: 11-8267 SR99G

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	80.60
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	0.467

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SR99-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-02SC-0001-110221
ARI ID: 11-8268 SR99H

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	76.60
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	2.57

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SR99-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-02SC-0102-110221
ARI ID: 11-8269 SR99I

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	80.90
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	0.153

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SR99-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-02SC-0203-110221
ARI ID: 11-8270 SR99J

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	79.50
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	0.114

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SR99-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-02SC-0304-110221
ARI ID: 11-8271 SR99K

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	84.50
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	0.081

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SR99-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-02SC-0405-110221
ARI ID: 11-8272 SR99L

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	91.90
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	0.101

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SR99-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-02SC-0506-110221
ARI ID: 11-8273 SR99M

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	87.00
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	0.110

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SR99-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-02SC-0607-110221
ARI ID: 11-8274 SR99N

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	85.20
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	0.071

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SR99-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-04SC-0001-110221
ARI ID: 11-8275 SR99O

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	53.80
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	2.54

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SR99-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-04SC-0102-110221
ARI ID: 11-8276 SR99P

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	77.80
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	1.66

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SR99-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-04SC-0203-110221
ARI ID: 11-8277 SR99Q

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	81.90
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	0.167

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SR99-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-03SC-0405-110221
ARI ID: 11-8278 SR99R

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	53.00
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	2.21

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SR99-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/21/11
Date Received: 02/21/11

Client ID: JVE-03SC-0506-110221
ARI ID: 11-8279 SR99S

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	51.10
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	2.47

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SS00-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 04/15/11

Client ID: JVE-207SC-0102-110216
ARI ID: 11-8282 SS00A

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	48.00
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	2.03

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SS00-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 04/15/11

Client ID: JVE-215SC-0001-110216
ARI ID: 11-8283 SS00B

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	47.50
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	2.26

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SS00-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/16/11
Date Received: 04/15/11

Client ID: JVE-210SC-0001-110216
ARI ID: 11-8284 SS00C

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	47.60
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	2.62

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SS00-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 04/15/11

Client ID: JVE-07SC-0506-110218
ARI ID: 11-8285 SS00D

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	66.00
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	1.44

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SS00-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 04/15/11

Client ID: JVE-07SC-0607-110218
ARI ID: 11-8286 SS00E

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	73.10
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	0.825

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SS00-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 04/15/11

Client ID: JVE-07SC-0708-110218
ARI ID: 11-8287 SS00F

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	79.10
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	0.396

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SS00-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 04/15/11

Client ID: JVE-322SC-0607-110218
ARI ID: 11-8288 SS00G

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	61.20
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	2.79

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SS00-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 04/15/11

Client ID: JVE-216SC-0708-110218
ARI ID: 11-8289 SS00H

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	86.90
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	0.120

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SS00-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 04/15/11

Client ID: JVE-216SC-0809-110218
ARI ID: 11-8290 SS00I

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	85.20
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	0.160

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SS00-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 04/15/11

Client ID: JVE-320SC-0304-110217
ARI ID: 11-8291 SS00J

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	66.40
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	1.91

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SS00-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 04/15/11

Client ID: JVE-309SC-0304-110217
ARI ID: 11-8292 SS00K

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	84.60
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	0.206

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SS00-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 04/19/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 04/15/11

Client ID: JVE-316SC-0304-110217
ARI ID: 11-8293 SS00L

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/15/11 041511#1	EPA 160.3	Percent	0.01	72.30
Total Organic Carbon	04/18/11 041811#1	Plumb,1981	Percent	0.020	1.78

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
ST93-Anchor QEA, LLC

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 05/04/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/18/11

Client ID: JVE-309SC-0203-110217
ARI ID: 11-9362 ST93A

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/28/11 042811#1	EPA 160.3	Percent	0.01	77.90
Total Organic Carbon	05/03/11 050311#1	Plumb,1981	Percent	0.020	0.551

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
ST93-Anchor QEA, LLC

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 05/04/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/17/11
Date Received: 02/18/11

Client ID: JVE-320SC-0203-110217
ARI ID: 11-9363 ST93B

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/28/11 042811#1	EPA 160.3	Percent	0.01	57.60
Total Organic Carbon	05/03/11 050311#1	Plumb,1981	Percent	0.020	2.95

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
ST93-Anchor QEA, LLC

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 05/04/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-314SC-0304-110218
ARI ID: 11-9364 ST93C

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/28/11 042811#1	EPA 160.3	Percent	0.01	85.70
Total Organic Carbon	05/03/11 050311#1	Plumb,1981	Percent	0.020	0.659

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
ST93-Anchor QEA, LLC

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 05/04/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-216SC-0607-110218
ARI ID: 11-9365 ST93D

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/28/11 042811#1	EPA 160.3	Percent	0.01	70.90
Total Organic Carbon	05/03/11 050311#1	Plumb,1981	Percent	0.020	1.63

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
ST93-Anchor QEA, LLC

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 05/04/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-07SC-0405-110218
ARI ID: 11-9366 ST93E

Analyte	Date	Method	Units	RL	Sample
Total Solids	04/28/11 042811#1	EPA 160.3	Percent	0.01	59.50
Total Organic Carbon	05/03/11 050311#1	Plumb,1981	Percent	0.020	1.29

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SX21-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 05/25/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-216SC-0506-110218
ARI ID: 11-11070 SX21A

Analyte	Date	Method	Units	RL	Sample
Total Solids	05/18/11 051811#1	EPA 160.3	Percent	0.01	65.00
Total Organic Carbon	05/20/11 052011#1	Plumb,1981	Percent	0.020	2.05

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SX21-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 05/25/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-314SC-0203-110218
ARI ID: 11-11071 SX21B

Analyte	Date	Method	Units	RL	Sample
Total Solids	05/18/11 051811#1	EPA 160.3	Percent	0.01	77.20
Total Organic Carbon	05/20/11 052011#1	Plumb,1981	Percent	0.020	0.815

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SX21-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 05/25/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-07SC-0304-110218
ARI ID: 11-11072 SX21C

Analyte	Date	Method	Units	RL	Sample
Total Solids	05/18/11 051811#1	EPA 160.3	Percent	0.01	55.80
Total Organic Carbon	05/20/11 052011#1	Plumb,1981	Percent	0.020	2.55

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SZ26-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/08/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-314SC-0001-110218
ARI ID: 11-12241 SZ26A

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/06/11 060611#1	EPA 160.3	Percent	0.01	61.70
Total Organic Carbon	06/07/11 060711#1	Plumb,1981	Percent	0.020	1.94

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SZ26-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/08/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-314SC-0102-110218
ARI ID: 11-12242 SZ26B

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/06/11 060611#1	EPA 160.3	Percent	0.01	66.40
Total Organic Carbon	06/07/11 060711#1	Plumb,1981	Percent	0.020	1.04

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SZ26-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/08/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-07SC-0203-110218
ARI ID: 11-12243 SZ26C

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/06/11 060611#1	EPA 160.3	Percent	0.01	58.10
Total Organic Carbon	06/07/11 060711#1	Plumb,1981	Percent	0.020	1.72

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
SZ26-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/08/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-07SC-0304-110218
ARI ID: 11-12244 SZ26D

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/06/11 060611#1	EPA 160.3	Percent	0.01	56.50
Total Organic Carbon	06/07/11 060711#1	Plumb,1981	Percent	0.020	3.22

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
TA19-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/15/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-07SC-0001-110218
ARI ID: 11-12627 TA19A

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/13/11 061311#1	EPA 160.3	Percent	0.01	55.10
Total Organic Carbon	06/14/11 061411#1	Plumb,1981	Percent	0.020	2.43

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
TA19-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/15/11

Project: Jorgensen Sediment Character
Event: 080224-01.01
Date Sampled: 02/18/11
Date Received: 02/18/11

Client ID: JVE-07SC-0102-110218
ARI ID: 11-12628 TA19B

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/13/11 061311#1	EPA 160.3	Percent	0.01	56.50
Total Organic Carbon	06/14/11 061411#1	Plumb,1981	Percent	0.020	1.68

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
TH07-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 08/11/11

Project: Jorgensen VE
Event: NA
Date Sampled: 03/16/11
Date Received: 03/16/11

Client ID: JVE-208SC-0506-110316
ARI ID: 11-16902 TH07A

Analyte	Date	Method	Units	RL	Sample
Total Solids	08/08/11 080811#1	EPA 160.3	Percent	0.01	50.90
Total Organic Carbon	08/09/11 080911#1	Plumb,1981	Percent	0.020	2.27

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
TH07-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 08/11/11

Project: Jorgensen VE
Event: NA
Date Sampled: 03/16/11
Date Received: 03/16/11

Client ID: JVE-208SC-0607-110316
ARI ID: 11-16903 TH07B

Analyte	Date	Method	Units	RL	Sample
Total Solids	08/08/11 080811#1	EPA 160.3	Percent	0.01	52.90
Total Organic Carbon	08/09/11 080911#1	Plumb,1981	Percent	0.020	2.41

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
TH07-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 08/11/11

Project: Jorgensen VE
Event: NA
Date Sampled: 03/16/11
Date Received: 03/16/11

Client ID: JVE-208SC-0708-110316
ARI ID: 11-16904 TH07C

Analyte	Date	Method	Units	RL	Sample
Total Solids	08/08/11 080811#1	EPA 160.3	Percent	0.01	55.10
Total Organic Carbon	08/09/11 080911#1	Plumb,1981	Percent	0.020	2.71

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
TI28-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 08/18/11

Project: Jorgensen VE
Event: NA
Date Sampled: 03/16/11
Date Received: 03/16/11

Client ID: JVE-208SC-0809-110316
ARI ID: 11-17624 TI28A

Analyte	Date	Method	Units	RL	Sample
Total Solids	08/12/11 081211#1	EPA 160.3	Percent	0.01	55.20
Total Organic Carbon	08/16/11 081611#1	Plumb,1981	Percent	0.020	2.78

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
TI28-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 08/18/11

Project: Jorgensen VE
Event: NA
Date Sampled: 03/16/11
Date Received: 03/16/11

Client ID: JVE-208SC-0910-110316
ARI ID: 11-17625 TI28B

Analyte	Date	Method	Units	RL	Sample
Total Solids	08/12/11 081211#1	EPA 160.3	Percent	0.01	55.40
Total Organic Carbon	08/16/11 081611#1	Plumb,1981	Percent	0.020	2.79

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
TL06-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 09/09/11

Project: Jorgensen VE
Event: NA
Date Sampled: 03/16/11
Date Received: 03/16/11

Client ID: JVE-208SC-1011-110316
ARI ID: 11-19126 TL06A

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/07/11 090711#1	EPA 160.3	Percent	0.01	64.30
Total Organic Carbon	09/08/11 090811#1	Plumb,1981	Percent	0.020	2.24

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
TL06-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 09/09/11

Project: Jorgensen VE
Event: NA
Date Sampled: 03/16/11
Date Received: 03/16/11

Client ID: JVE-208SC-1112-110316
ARI ID: 11-19127 TL06B

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/07/11 090711#1	EPA 160.3	Percent	0.01	66.00
Total Organic Carbon	09/08/11 090811#1	Plumb,1981	Percent	0.020	2.02

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
TM04-Anchor QEA

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 09/15/11

Project: Jorgensen VE
Event: NA
Date Sampled: 03/16/11
Date Received: 03/16/11

Client ID: JVE-208SC-1212.5-110316
ARI ID: 11-19868 TM04A

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/13/11 091311#1	EPA 160.3	Percent	0.01	81.70
Total Organic Carbon	09/14/11 091411#1	Plumb,1981	Percent	0.020	0.110

RL Analytical reporting limit
U Undetected at reported detection limit

Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 **Web** www.lab-data.com **Fax** 760.634.0439

Anchor QEA, LLC
720 Olive Way, Suite 900
Seattle, WA 98101
ATTN: Ms. Delaney Peterson

April 28, 2011

SUBJECT: Jorgensen Forge Facility, Data Validation

Dear Ms. Peterson,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on April 15, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 25302:

SDG #	Fraction
SJ34/SJ35/SJ36, SJ57/SJ58, SJ61/SJ62, SJ63, SJ81/SJ82/SJ83 SJ90/SJ91, SJ92, SJ99/SK00/SK01, SL49, SL71/SL72, SN49, SM77, SP67	Polychlorinated Biphenyls, Wet Chemistry

The data validation was performed under EPA Level II & IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Stella Cuenco

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

V:\LOGIN\Anchor\Jorgensen\25302COV.wpd

EDD 90/10

LDC #25302 (Anchor Environmental-Seattle WA /Jorgensen Forge Facility)

LDC	SDG#	DATE REC'D	(3) DATE DUE	PCBs (8082)		TOC (Plumb)		Total Solids (160.3)																															
Matrix:	Water/Sediment			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	SJ34/SJ35/SJ36	04/15/11	05/06/11	0	34	0	34	0	34																														
B	SJ57/SJ58	04/15/11	05/06/11	0	14	0	14	0	14																														
C	SJ61/SJ62	04/15/11	05/06/11	0	13	0	13	0	13																														
D	SJ63	04/15/11	05/06/11	0	9	0	9	0	9																														
E	SJ81/SJ82/SJ83	04/15/11	05/06/11	0	10	0	10	0	10																														
F	SJ90/SJ91	04/15/11	05/06/11	0	5	0	5	0	5																														
G	SJ92	04/15/11	05/06/11	2	0	-	-	-	-																														
H	SJ99/SK00/SK01	04/15/11	05/06/11	0	3	0	3	0	3																														
I	SL49	04/15/11	05/06/11	0	1	0	1	0	1																														
J	SL71/SL72	04/15/11	05/06/11	0	8	0	8	0	8																														
K	SN49	04/15/11	05/06/11	0	9	0	9	0	9																														
L	SM77	04/15/11	05/06/11	0	2	0	2	0	2																														
M	SP67	04/15/11	05/06/11	0	14	0	14	0	14																														
Total	T/SC			2	122	0	122	0	122	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	366

Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS, MSD, or DUP's.

25302ST.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Jorgensen Forge Facility

Collection Date: February 16, 2011

LDC Report Date: April 22, 2011

Matrix: Sediment

Parameters: Polychlorinated Biphenyls

Validation Level: EPA Level III

Laboratory: Analytical Resources, Inc.

Sample Delivery Group (SDG): SJ34/SJ35/SJ36

Sample Identification

JVE-215SC-0203-110216	JVE-210SC-1011-110216
JVE-215SC-0304-110216	JVE-210SC-1112-110216
JVE-215SC-0405-110216	JVE-210SC-1212.7-110216
JVE-215SC-0506-110216	JVE-207SC-0203-110216
JVE-215SC-0607-110216	JVE-207SC-0304-110216
JVE-215SC-0708-110216	JVE-207SC-0405-110216
JVE-215SC-0809-110216	JVE-207SC-0506-110216
JVE-215SC-0910-110216	JVE-207SC-0607-110216
JVE-215SC-1011-110216	JVE-207SC-0708-110216
JVE-215SC-1112-110216	JVE-207SC-0809-110216
JVE-215SC-1212.8-110216	JVE-207SC-0910-110216
JVE-1215SC-0607-110216	JVE-207SC-1011-110216
JVE-210SC-0203-110216	JVE-207SC-1112-110216
JVE-210SC-0304-110216	JVE-207SC-1212.6-110216
JVE-210SC-0405-110216	JVE-215SC-1212.8-110216MS
JVE-210SC-0506-110216	JVE-215SC-1212.8-110216MSD
JVE-210SC-0607-110216	JVE-210SC-0910-110216MS
JVE-210SC-0708-110216	JVE-210SC-0910-110216MSD
JVE-210SC-0809-110216	JVE-207SC-1212.6-110216MS
JVE-210SC-0910-110216	JVE-207SC-1212.6-110216MSD

Introduction

This data review covers 40 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

All internal standard areas and retention times were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

XI. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XII. Target Compound Identification

Raw data were not reviewed for this SDG.

XIII. Compound Quantitation and Reported CRQLs

Raw data were not reviewed for this SDG.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

XV. Field Duplicates

Samples JVE-215SC-0607-110216 and JVE-1215SC-0607-110216 were identified as field duplicates. No polychlorinated biphenyls were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)
	JVE-215SC-0607-110216	JVE-1215SC-0607-110216	
Aroclor-1254	66	19	110 (≤50)
Aroclor-1260	21	19U	200 (≤50)

XV. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Polychlorinated Biphenyls - Data Qualification Summary - SDG SJ34/SJ35/SJ36

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG SJ34/SJ35/SJ36

No Sample Data Qualified in this SDG

LDC #: 25302A3b

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4-21-11

SDG #: SJ34/SJ35/SJ36

Page: 1 of 1

Laboratory: Analytical Resources, Inc.

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/16/11
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	%RSD ≤ 20
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 20 %
V.	Blanks	A	
VI.	Surrogate spikes TCS	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	N	
XIII.	Compound quantitation and reported CRQLs	N	
XIV.	Overall assessment of data	A	
XV.	Field duplicates	SW	FD = 5+12
XVI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: All sediment

1	JVE-215SC-0203-110216	11	JVE-215SC-1212.8-110216	21	JVE-210SC-1011-110216	31	JVE-207SC-0910-110216
2	JVE-215SC-0304-110216	12	JVE-1215SC-0607-110216	22	JVE-210SC-1112-110216	32	JVE-207SC-1011-110216
3	JVE-215SC-0405-110216	13	JVE-210SC-0203-110216	23	JVE-210SC-1212.7-110216	33	JVE-207SC-1112-110216
4	JVE-215SC-0506-110216	14	JVE-210SC-0304-110216	24	JVE-207SC-0203-110216	34	JVE-207SC-1212.6-110216
5	JVE-215SC-0607-110216	15	JVE-210SC-0405-110216	25	JVE-207SC-0304-110216	35	JVE-215SC-1212.8-110216MS
6	JVE-215SC-0708-110216	16	JVE-210SC-0506-110216	26	JVE-207SC-0405-110216	36	JVE-215SC-1212.8-110216MSD
7	JVE-215SC-0809-110216	17	JVE-210SC-0607-110216	27	JVE-207SC-0506-110216	37	JVE-210SC-0910-110216MS
8	JVE-215SC-0910-110216	18	JVE-210SC-0708-110216	28	JVE-207SC-0607-110216	38	JVE-210SC-0910-110216MSD
9	JVE-215SC-1011-110216	19	JVE-210SC-0809-110216	29	JVE-207SC-0708-110216	39	JVE-207SC-1212.6-110216MS
10	JVE-215SC-1112-110216	20	JVE-210SC-0910-110216	30	JVE-207SC-0809-110216	40	JVE-207SC-1212.6-110216MSD

021711-BLK 1
021711-BLK 2
021711-BLK 3

PCBS-SW.wpd

LDC #: 25302A26
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: KT
2nd reviewer: [illegible]

METHOD: X GC __ HPLC

(N) N N/A Were field duplicate pairs identified in this SDG?
(Y) N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (ug/kg)		%RPD Limit 50	Qualification Parent only / All Samples
	5	12		
Aroclor 1254	66	19	110	
Aroclor 1260	21	19U	200	

Compound	Concentration ( )		%RPD Limit _____	Qualification Parent only / All Samples

FLDUPNew wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 17, 2011
LDC Report Date:	April 26, 2011
Matrix:	Sediment
Parameters:	Polychlorinated Biphenyls
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SJ57/SJ58

Sample Identification

JVE-205SC-0203-110217
JVE-205SC-0304-110217
JVE-205SC-0405-110217
JVE-205SC-0506-110217
JVE-205SC-0607-110217
JVE-205SC-0708-110217
JVE-205SC-0809-110217
JVE-205SC-0910-110217
JVE-205SC-1011-110217
JVE-205SC-1112.1-110217
JVE-311SC-0506-110217
JVE-311SC-0607-110217
JVE-311SC-0708-110217
JVE-311SC-089.4-110217
JVE-205SC-1011-110217MS
JVE-205SC-1011-110217MSD

Introduction

This data review covers 16 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. Cooler temperatures for samples in this SDG were reported at 13.8°C upon receipt by the laboratory. Samples received the same day that they were collected, time did not allow for sufficient cooling of the samples, therefore no data were qualified.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

All internal standard areas and retention times were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

XI. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XII. Target Compound Identification

Raw data were not reviewed for this SDG.

XIII. Compound Quantitation and Reported CRQLs

Raw data were not reviewed for this SDG.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

XV. Field Duplicates

Samples JVE-205SC-0203-110217 and JVE-1205SC-0203-110217 (from SDG SJ63) were identified as field duplicates. No polychlorinated biphenyls were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)
	JVE-205SC-0203-110217	JVE-1205SC-0203-110217	
Aroclor-1248	51	20U	200 (≤50)
Aroclor-1254	100	20U	200 (≤50)
Aroclor-1260	94	20U	200 (≤50)

XV. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Polychlorinated Biphenyls - Data Qualification Summary - SDG SJ57/SJ58

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG SJ57/SJ58

No Sample Data Qualified in this SDG

LDC #: 25302B3b

VALIDATION COMPLETENESS WORKSHEET

Level III

SDG #: SJ57/SJ58

Laboratory: Analytical Resources, Inc.

Date: 4-21-11

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/17/11 Temp = 13.8°C (insufficient time to cool)
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	%RSD ≤ 20
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes / IS	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	N	
XIII.	Compound quantitation and reported CRQLs	N	
XIV.	Overall assessment of data	A	
XV.	Field duplicates	SW	(1, JVE-1205SC-0203-110217 (SDG: SJ63))
XVI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: All Sediment

1	JVE-205SC-0203-110217	11	JVE-311SC-0506-110217	21		31	021811-BLK
2	JVE-205SC-0304-110217	12	JVE-311SC-0607-110217	22		32	
3	JVE-205SC-0405-110217	13	JVE-311SC-0708-110217	23		33	
4	JVE-205SC-0506-110217	14	JVE-311SC-089.4-110217	24		34	
5	JVE-205SC-0607-110217	15	JVE-205SC-1011-110217MS	25		35	
6	JVE-205SC-0708-110217	16	JVE-205SC-1011-110217MSD	26		36	
7	JVE-205SC-0809-110217	17		27		37	
8	JVE-205SC-0910-110217	18		28		38	
9	JVE-205SC-1011-110217	19		29		39	
10	JVE-205SC-1112.1-110217	20		30		40	

LDC #: 25302B3b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: ☒ GC ___ HPLC

(Y) N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (ug/kg)		%RPD Limit 50	Qualification Parent only / All Samples
	1	JVE-12055c-0203-110217		
Aroclor 1248	51	20 U	200	
Aroclor 1254	100	20 U	200	
Aroclor 1260	94	20 U	200	

Compound	Concentration ( )		%RPD Limit ____	Qualification Parent only / All Samples

FLDUPNew wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 17, 2011
LDC Report Date:	April 22, 2011
Matrix:	Sediment
Parameters:	Polychlorinated Biphenyls
Validation Level:	EPA Level IV
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SJ61/SJ62

Sample Identification

JVE-320SC-0506-110217
JVE-320SC-0607-110217
JVE-320SC-0708-110217
JVE-320SC-0809-110217
JVE-320SC-0910-110217
JVE-320SC-1011-110217
JVE-320SC-1112-110217
JVE-320SC-1212.9-110217
JVE-316SC-0506-110217
JVE-316SC-0607-110217
JVE-316SC-0708-110217
JVE-316SC-0809-110217
JVE-316SC-099.7-110217
JVE-320SC-1112-110217MS
JVE-320SC-1112-110217MSD

Introduction

This data review covers 15 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. Cooler temperatures for samples in this SDG were reported at 9.1°C upon receipt by the laboratory. Samples received the same day that they were collected, time did not allow for sufficient cooling of the samples, therefore no data were qualified.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

All internal standard areas and retention times were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

XI. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XII. Target Compound Identification

All target compound identifications were within validation criteria.

XIII. Compound Quantitation and Reported CRQLs

All compound quantitation and CRQLs were within validation criteria.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

XV. Field Duplicates

No field duplicates were identified in this SDG.

XV. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Polychlorinated Biphenyls - Data Qualification Summary - SDG SJ61/SJ62

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG SJ61/SJ62

No Sample Data Qualified in this SDG

LDC #: 25302C3b

SDG #: SJ61/SJ62

Laboratory: Analytical Resources, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 4-22-11

Page: 1 of 1

Reviewer:

2nd Reviewer:

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/17/11 Temp = 9.1°C (insufficient time to cool)
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	%RSD ≤ 20
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes IS	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	A	
XIII.	Compound quantitation and reported CRQLs	A	
XIV.	Overall assessment of data	A	
XV.	Field duplicates	N	
XVI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: All sediment

1	JVE-320SC-0506-110217	11 ND	JVE-316SC-0708-110217	21		31	021811-Rdk
2 ND	JVE-320SC-0607-110217	12 ND	JVE-316SC-0809-110217	22		32	
3 67	JVE-320SC-0708-110217	13 ND	JVE-316SC-099.7-110217	23		33	
4 ND	JVE-320SC-0809-110217	14	JVE-320SC-1112-110217MS	24		34	
5 ND	JVE-320SC-0910-110217	15	JVE-320SC-1112-110217MSD	25		35	
6 ND	JVE-320SC-1011-110217	16		26		36	
7 ND	JVE-320SC-1112-110217	17		27		37	
8 61	JVE-320SC-1212.9-110217	18		28		38	
9 ND	JVE-316SC-0506-110217	19		29		39	
10 ND	JVE-316SC-0607-110217	20		30		40	

LDC #: 25302c2b
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: VP
2nd Reviewer: L

Method: Pesticides/PCBs (EPA SW 846 Method 8081/8082)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/ECD instrument performance check				
Was the instrument performance found to be acceptable?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		✓		
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
Were the required standard concentrations analyzed in the initial calibration?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ✓ %D or ____%R				
Were Evaluation mix standards analyzed prior to the initial calibration and sample analysis?			✓	
Were endrin and 4,4'-DDT breakdowns ≤ 15% for individual breakdown in the Evaluation mix standards?			✓	
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 20% or percent recovieries 80-120%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Were extract cleanup blanks analyzed with every batch requiring clean-up?	✓			
Was there contamination in the method blanks or clean-up blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				

LDC #: 25302C2b
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: [illegible]
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions, dry weight factors, and clean-up activities applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target compounds were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target compounds were detected in the field blanks.			✓	

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	GG. Chlordane
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	HH Chlordane (Technical)
C. delta-BHC	K. Endrin	S alpha-Chlordane	AA Aroclor-1254	II.
D gamma-BHC	L Endosulfan II	T gamma-Chlordane	BB Aroclor-1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC 2,4'-DDD	KK.
F. Aldrin	N. Endosulfan sulfate	V Aroclor-1016	DD 2,4'-DDE	LL.
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE. 2,4'-DDT	MM.
H. Endosulfan I	P Methoxychlor	X Aroclor-1232	FF Hexachlorobenzene	NN.

Notes:_____

LDC #: 25302086
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: M
2nd Reviewer: L

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

The calibration factors (CF) and relative standard deviation (%RSD) were recalculated using the following calculations:

CF = A/C
Average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where: A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported CF (0.1 std)	Recalculated CF (0.1 std)	Reported CF (Initial)	Recalculated CF (Intial)	Reported %RSD	Recalculated %RSD
1	ICAL	1/5/11	BB (ZB5, Peak 1)	0.0445	0.0445	0.0415	0.0415	11.7	11.7
			N (ZB5, Peak 1)	0.0443	0.0443	0.0417	0.0417	13.1	13.1
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

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LDC #: 25302C36
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

Percent difference (%D) = 100 * (N - C)/N

Where: N = __ Initial Calibration Factor or __ Nominal Amount (ng)
C = __ Calibration Factor from Continuing Calibration Standard or __ Calculated Amount (ng)

#	Standard ID	Calibration Date/Time	Compound	Average CF/ CCV Conc	Reported CF/Conc CCV	Recalculated CF/Conc CCV	Reported %D	Recalculated %D
1	0219B017-D	2/19/11	BB (ZB5, Peak 1)	250.0	252.7	252.9	1.1	1.1
	17:40		↓	250.0	256.8	256.9	2.7	2.8
	0219B029-D	2/19/11	BB (ZB5 Peak 1)	250.0	255.8	256.1	2.3	2.4
2	2526		↓ (ZB5, Peak 1)	250.0	259.3	259.5	3.7	3.8
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

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LDC #: 25302C3b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID:

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene	A	7.92	5.3	66.9	66.9	0
Tetrachloro-m-xylene						
Decachlorobiphenyl	A	7.92	5.8	72.1	73.2	1.1
Decachlorobiphenyl						

Sample ID:

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Sample ID:

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Sample ID:

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Notes:

LDC #: 25302086
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: WT
2nd Reviewer: L

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA Where SSC = Spiked sample concentration SC = Sample concentration
SA = Spike added
RPD =(((SSCMS - SSCMSD) * 2) / (SSCMS + SSCMSD))*100 MS = Matrix spike MSD = Matrix spike duplicate

MS/MSD samples: 14/15

Compound	Spike Added (ug/kg)		Sample Conc. (ug/kg)	Spike Sample Concentration (ug/kg)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	---	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gamma-BHC											
4,4'-DDT											
Aroclor 1260	97.2	97.0	ND	79.7	77.0	82.0	82.0	79.4	79.4	3.4	3.4

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

MSDCLCNew.wpd_pest.wpd

LDC #: 25302C26
SDG #: [illegible]

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

The percent recoveries (%R) and Relative Percent difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100* (SSC-SC)/SA

Where: SSC = Spiked sample concentration
SA = Spike added
SC = Concentration

RPD = | LCS - LCSD | * 2/(LCS + LCSD)

LCS = Laboratory control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: 021811-LCS

Compound	Spike Added (ug/kg)		Spiked Sample Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
gamma-BHC										
4,4'-DDT										
Aroclor 1260	100	n/a	81.4	n/a	81.4	81.4				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 25302C3b
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: VH
2nd reviewer: [illegible]

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Example:

Sample I.D. 1 BB : (ch 8B35)

Conc. = $\frac{(1822152)(80)}{(101582243)(0.0417)}$

= 34.4 (Peak 1)

+ 22.6 + 32.4 + 49.4 => ÷ 4 = Ave = 34.7

$\frac{(34.7)(5mL)(5X)}{(45.46g)(.568)}$

= 34 ug/kg ✓

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

Note:

C:\Users\rthompson\Desktop\RECALC_pest.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 17, 2011
LDC Report Date:	April 22, 2011
Matrix:	Sediment
Parameters:	Polychlorinated Biphenyls
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SJ63

Sample Identification

JVE-309SC-0506-110217
JVE-309SC-0607-110217
JVE-309SC-0708-110217
JVE-309SC-0809-110217
JVE-309SC-0910-110217
JVE-309SC-1011-110217
JVE-309SC-1111.5-110217
JVE-1205SC-0203-110217
JVE-1309SC-0910-110217
JVE-309SC-0506-110217MS
JVE-309SC-0506-110217MSD

Introduction

This data review covers 11 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

All internal standard areas and retention times were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

XI. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XII. Target Compound Identification

Raw data were not reviewed for this SDG.

XIII. Compound Quantitation and Reported CRQLs

Raw data were not reviewed for this SDG.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

XV. Field Duplicates

Samples JVE-309SC-0910-110217 and JVE-1309SC-0910-110217 and samples JVE-1205SC-0203-110217 and JVE-205SC-0203-110217 (from SDG SJ57) were identified as field duplicates. No polychlorinated biphenyls were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)
	JVE-1205SC-0203-110217	JVE-205SC-0203-110217	
Aroclor-1248	20U	51	200 (≤50)
Aroclor-1254	20U	100	200 (≤50)

Compound	Concentration (ug/Kg)		RPD (Limits)
	JVE-1205SC-0203-110217	JVE-205SC-0203-110217	
Aroclor-1260	20U	94	200 (≤50)

XV. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Polychlorinated Biphenyls - Data Qualification Summary - SDG SJ63

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG SJ63

No Sample Data Qualified in this SDG

LDC #: 25302D3b

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4-21-11

SDG #: SJ63

Page: 1 of 1

Laboratory: Analytical Resources, Inc.

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/17/11
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	%RSD ≤ 20
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes / IS	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	N	
XIII.	Compound quantitation and reported CRQLs	N	
XIV.	Overall assessment of data	A	
XV.	Field duplicates SL	~~A~~	FD = 5+9, 8 + JVE-2055C-0203-110217 (SDG SJ57)
XVI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

All sediment

1	JVE-309SC-0506-110217	11	JVE-309SC-0506-110217MSD	21		31	021811-BLK
2	JVE-309SC-0607-110217	12		22		32	
3	JVE-309SC-0708-110217	13		23		33	
4	JVE-309SC-0809-110217	14		24		34	
5	JVE-309SC-0910-110217	15		25		35	
6	JVE-309SC-1011-110217	16		26		36	
7	JVE-309SC-1111.5-110217	17		27		37	
8	JVE-1205SC-0203-110217	18		28		38	
9	JVE-1309SC-0910-110217	19		29		39	
10	JVE-309SC-0506-110217MS	20		30		40	

LDC #: 25302D3b
SDG #: Eco Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: X GC ___ HPLC

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (ug/kg)		%RPD Limit 50	Qualification Parent only / All Samples
	8	JVE-205SC-0203-110217		
Aroclor 1248	20U	51	200	
1254	20U	100	200	
1260	20U	94	200	

Compound	Concentration ( )		%RPD Limit _____	Qualification Parent only / All Samples

FLDUPNew wpd

EMJ014688

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 18, 2011
LDC Report Date:	April 22, 2011
Matrix:	Sediment
Parameters:	Polychlorinated Biphenyls
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SJ81/SJ82/SJ83

Sample Identification

JVE-322SC-0809-110218
JVE-322SC-0910-110218
JVE-322SC-1011-110218
JVE-322SC-1112.4-110218
JVE-216SC-1011-110218
JVE-216SC-1112.1-110218
JVE-314SC-0506-110218
JVE-314SC-0607-110218
JVE-314SC-0707.9-110218
JVE-1314SC-0506-110218
JVE-216SC-1011-110218MS
JVE-216SC-1011-110218MSD

Introduction

This data review covers 12 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. Cooler temperatures for samples in this SDG were reported at 6.8°C upon receipt by the laboratory. Samples received the same day that they were collected, time did not allow for sufficient cooling of the samples, therefore no data were qualified.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

All internal standard areas and retention times were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

XI. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XII. Target Compound Identification

Raw data were not reviewed for this SDG.

XIII. Compound Quantitation and Reported CRQLs

Raw data were not reviewed for this SDG.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

XV. Field Duplicates

Samples JVE-314SC-0506-110218 and JVE-1314SC-0506-110218 were identified as field duplicates. No polychlorinated biphenyls were detected in any of the samples.

XV. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Polychlorinated Biphenyls - Data Qualification Summary - SDG SJ81/SJ82/SJ83

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG SJ81/SJ82/SJ83

No Sample Data Qualified in this SDG

LDC #: 25302E3b

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4-21-11

SDG #: SJ81/SJ82/SJ83

Page: 1 of 1

Laboratory: Analytical Resources, Inc.

Reviewer:

2nd Reviewer:

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/18/11 Temp=6.8°C insufficient time to cool
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	%RSD ≤ 20
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes / IS	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	N	
XIII.	Compound quantitation and reported CRQLs	N	
XIV.	Overall assessment of data	A	
XV.	Field duplicates	ND	FD=7+10
XVI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: All Sediment

1	JVE-322SC-0809-110218	11	JVE-216SC-1011-110218MS	21		31	021911-BLK
2	JVE-322SC-0910-110218	12	JVE-216SC-1011-110218MSD	22		32	
3	JVE-322SC-1011-110218	13		23		33	
4	JVE-322SC-1112.4-110218	14		24		34	
5	JVE-216SC-1011-110218	15		25		35	
6	JVE-216SC-1112.1-110218	16		26		36	
7	JVE-314SC-0506-110218	17		27		37	
8	JVE-314SC-0607-110218	18		28		38	
9	JVE-314SC-0707.9-110218	19		29		39	
10	JVE-1314SC-0506-110218	20		30		40	

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 18, 2011
LDC Report Date:	April 22, 2011
Matrix:	Sediment
Parameters:	Polychlorinated Biphenyls
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SJ90/SJ91

Sample Identification

JVE-01SC-099.7-110218
JVE-1007SC-0910-110218
JVE-07SC-0910-110218
JVE-07SC-1011-110218
JVE-07SC-1112.2-110218
JVE-01SC-099.7-110218MS
JVE-01SC-099.7-110218MSD

Introduction

This data review covers 7 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

All internal standard areas and retention times were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

XI. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XII. Target Compound Identification

Raw data were not reviewed for this SDG.

XIII. Compound Quantitation and Reported CRQLs

Raw data were not reviewed for this SDG.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

XV. Field Duplicates

Samples JVE-07SC-0910-110218 and JVE-1007SC-0910-110218 were identified as field duplicates. No polychlorinated biphenyls were detected in any of the samples.

XV. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Polychlorinated Biphenyls - Data Qualification Summary - SDG SJ90/SJ91

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG SJ90/SJ91

No Sample Data Qualified in this SDG

LDC #: 25302F3b

SDG #: SJ90/SJ91

Laboratory: Analytical Resources, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4-21-11

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/18/11
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	%RSD ≤ 20
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes / IS	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	N	
XIII.	Compound quantitation and reported CRQLs	N	
XIV.	Overall assessment of data	A	
XV.	Field duplicates	ND	FD=3+2
XVI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ALL sediment

1	JVE-01SC-099.7-110218	11		21		31	022111-BLK
2	JVE-1007SC-0910-110218	12		22		32	
3	JVE-07SC-0910-110218	13		23		33	
4	JVE-07SC-1011-110218	14		24		34	
5	JVE-07SC-1112.2-110218	15		25		35	
6	JVE-01SC-099.7-110218MS	16		26		36	
7	JVE-01SC-099.7-110218MSD	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 18, 2011
LDC Report Date:	April 26, 2011
Matrix:	Water
Parameters:	Polychlorinated Biphenyls
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SJ92

Sample Identification

JVE-RB-110218
JVE-FB-110218

Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

All internal standard areas and retention times were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

XI. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XII. Target Compound Identification

Raw data were not reviewed for this SDG.

XIII. Compound Quantitation and Reported CRQLs

Raw data were not reviewed for this SDG.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

XV. Field Duplicates

No field duplicates were identified in this SDG.

XV. Field Blanks

Sample JVE-FB-110218 was identified as a field blank. No polychlorinated biphenyl contaminants were found in this blank.

Sample JVE-RB-110218 was identified as a rinsate blank. No polychlorinated biphenyl contaminants were found in this blank .

Jorgensen Forge Facility
Polychlorinated Biphenyls - Data Qualification Summary - SDG SJ92

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG SJ92

No Sample Data Qualified in this SDG

LDC #: 25302G3b

VALIDATION COMPLETENESS WORKSHEET

Level III

SDG #: SJ92

Laboratory: Analytical Resources, Inc.

Date: 4-21-11

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/18/11
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	%RSD ≤ 20
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes IDS	A	
VII.	Matrix spike/Matrix spike duplicates	N	client specified
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	N	
XIII.	Compound quantitation and reported CRQLs	N	
XIV.	Overall assessment of data	A	
XV.	Field duplicates	N	
XVI.	Field blanks	ND	RB = 1 FB22

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; RB = Rinse Blank

Validated Samples: All H2O

1	JVE-RB-110218	11		21		31	022211-Blk
2	JVE-FB-110218	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 21, 2011
LDC Report Date:	April 22, 2011
Matrix:	Sediment
Parameters:	Polychlorinated Biphenyls
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SJ99/SK00/SK01

Sample Identification

JVE-02SC-099.6-110221
JVE-03SC-11-12.2-110221
JVE-04SC-089.2-110221
JVE-02SC-099.6-110221MS
JVE-02SC-099.6-110221MSD

Introduction

This data review covers 5 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

All internal standard areas and retention times were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

XI. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XII. Target Compound Identification

Raw data were not reviewed for this SDG.

XIII. Compound Quantitation and Reported CRQLs

Raw data were not reviewed for this SDG.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

XV. Field Duplicates

No field duplicates were identified in this SDG.

XV. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Polychlorinated Biphenyls - Data Qualification Summary - SDG SJ99/SK00/SK01

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG SJ99/SK00/SK01

No Sample Data Qualified in this SDG

LDC #: 25302H3b

VALIDATION COMPLETENESS WORKSHEET

Level III

SDG #: SJ99/SK00/SK01

Laboratory: Analytical Resources, Inc.

Date: 4-21-11

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/21/11
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	%RSD ≤ 20
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes / IS	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	N	
XIII.	Compound quantitation and reported CRQLs	N	
XIV.	Overall assessment of data	A	
XV.	Field duplicates	N	
XVI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: All Sediment

1	JVE-02SC-099.6-110221	11		21		31	022211-BLK
2	JVE-03SC-11-12.2-110221	12		22		32	
3	JVE-04SC-089.2-110221	13		23		33	
4	JVE-02SC-099.6-110221MS	14		24		34	
5	JVE-02SC-099.6-110221MSD	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 16, 2011
LDC Report Date:	April 22, 2011
Matrix:	Sediment
Parameters:	Polychlorinated Biphenyls
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SL49

Sample Identification

JVE-207SC-0607-110216

Introduction

This data review covers one sediment sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

All internal standard areas and retention times were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

XI. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XII. Target Compound Identification

Raw data were not reviewed for this SDG.

XIII. Compound Quantitation and Reported CRQLs

Raw data were not reviewed for this SDG.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

XV. Field Duplicates

No field duplicates were identified in this SDG.

XV. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Polychlorinated Biphenyls - Data Qualification Summary - SDG SL49

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG SL49

No Sample Data Qualified in this SDG

LDC #: 25302I3b

SDG #: SL49

Laboratory: Analytical Resources, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4-21-11

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/16/11
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	%RSD ≤ 20
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes /IS	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client Specified
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	N	
XIII.	Compound quantitation and reported CRQLs	N	
XIV.	Overall assessment of data	A	
XV.	Field duplicates	N	
XVI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: All sediment

1	JVE-207SC-0607-110216	11		21		31	030411-BLK
2		12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 21, 2011
LDC Report Date:	April 22, 2011
Matrix:	Sediment
Parameters:	Polychlorinated Biphenyls
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SL71/SL72

Sample Identification

JVE-03SC-0708-110221
JVE-03SC-0809-110221
JVE-03SC-0910-110221
JVE-03SC-1011-110221
JVE-04SC-0506-110221
JVE-04SC-0607-110221
JVE-04SC-0708-110221
JVE-1004SC-0607-110221
JVE-04SC-0708-110221MS
JVE-04SC-0708-110221MSD

Introduction

This data review covers 10 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

All internal standard areas and retention times were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

XI. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XII. Target Compound Identification

Raw data were not reviewed for this SDG.

XIII. Compound Quantitation and Reported CRQLs

Raw data were not reviewed for this SDG.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

XV. Field Duplicates

Samples JVE-04SC-0607-110221 and JVE-1004SC-0607-110221 were identified as field duplicates. No polychlorinated biphenyls were detected in any of the samples.

XV. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Polychlorinated Biphenyls - Data Qualification Summary - SDG SL71/SL72

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG SL71/SL72

No Sample Data Qualified in this SDG

LDC #: 25302J3b

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4-21-11

SDG #: SL71/SL72

Page: 1 of 1

Laboratory: Analytical Resources, Inc.

Reviewer:

2nd Reviewer:

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 02/21/11
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	%RSD ≤ 20
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 20 %
V.	Blanks	A	
VI.	Surrogate spikes /IS	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	N	
XIII.	Compound quantitation and reported CRQLs	N	
XIV.	Overall assessment of data	A	
XV.	Field duplicates	ND	FD = 6+8
XVI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: All Sediment

1	JVE-03SC-0708-110221	11		21		31	030711-BLK
2	JVE-03SC-0809-110221	12		22		32	030811-BLK
3	JVE-03SC-0910-110221	13		23		33	
4	JVE-03SC-1011-110221	14		24		34	
5	JVE-04SC-0506-110221	15		25		35	
ND 6	JVE-04SC-0607-110221	16		26		36	
7	JVE-04SC-0708-110221	17		27		37	
ND 8	JVE-1004SC-0607-110221	18		28		38	
9	JVE-04SC-0708-110221MS	19		29		39	
10	JVE-04SC-0708-110221MSD	20		30		40	

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	March 16, 2011
LDC Report Date:	April 22, 2011
Matrix:	Sediment
Parameters:	Polychlorinated Biphenyls
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SN49

Sample Identification

JVE-206SC-0607-110316
JVE-206SC-0708-110316
JVE-206SC-0809-110316
JVE-206SC-0910-110316
JVE-206SC-1011-110316
JVE-206SC-1112-110316
JVE-206SC-1213-110316
JVE-206SC-1313.6-110316
JVE-1206SC-1011-110316
JVE-206SC-1011-110316MS
JVE-206SC-1011-110316MSD

Introduction

This data review covers 11 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

All internal standard areas and retention times were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were not within the QC limits. Since the samples were diluted out, no data were qualified.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

XI. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XII. Target Compound Identification

Raw data were not reviewed for this SDG.

XIII. Compound Quantitation and Reported CRQLs

Raw data were not reviewed for this SDG.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

XV. Field Duplicates

Samples JVE-206SC-1011-110316 and JVE-1206SC-1011-110316 were identified as field duplicates. No polychlorinated biphenyls were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)
	JVE-206SC-1011-110316	JVE-1206SC-1011-110316	
Aroclor-1254	33	42	24 (≤50)
Aroclor-1260	33	40	19 (≤50)

XV. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Polychlorinated Biphenyls - Data Qualification Summary - SDG SN49

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG SN49

No Sample Data Qualified in this SDG

LDC #: 25302K3b

VALIDATION COMPLETENESS WORKSHEET

Level III

SDG #: SN49

Laboratory: Analytical Resources, Inc.

Date: 4-21-11

Page: 1 of 7

Reviewer:

2nd Reviewer:

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/16/11
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	%RSD ≤ 20
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes TCS	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	N	
XIII.	Compound quantitation and reported CRQLs	N	
XIV.	Overall assessment of data	A	
XV.	Field duplicates	SW	FD25F9
XVI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: All Sediment

1	JVE-206SC-0607-110316	11	JVE-206SC-1011-110316MSD	21		31	032411-BLK
2	JVE-206SC-0708-110316	12		22		32	
3	JVE-206SC-0809-110316	13		23		33	
4	JVE-206SC-0910-110316	14		24		34	
5	JVE-206SC-1011-110316	15		25		35	
6	JVE-206SC-1112-110316	16		26		36	
7	JVE-206SC-1213-110316	17		27		37	
8	JVE-206SC-1313.6-110316	18		28		38	
9	JVE-1206SC-1011-110316	19		29		39	
10	JVE-206SC-1011-110316MS	20		30		40	

LDC #: 25302k36
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: MT
2nd Reviewer: [illegible]

METHOD: X GC __ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?

Y N N/A Was an MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

Y N N/A Were the MS/MSD percent recoveries (%R) and relative percent differences (RPD) within QC limits?

#	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	10/11	BB	41.2 (50-140)	46.8 (50-140)	( )	5	no qual, dil ≥ 5x
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
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			( )	( )	( )		

MSDNew.wpd

LDC #: 25302K86
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: X GC __ HPLC

~~Y~~ N N/A Were field duplicate pairs identified in this SDG?
Y/ N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (ug/kg)		%RPD Limit 50	Qualification Parent only / All Samples
	5	9		
Aroclor 1254	33	42	24	
Aroclor 1260	33	40	19	

Compound	Concentration ( )		%RPD Limit _____	Qualification Parent only / All Samples

FLDUPNew wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 21, 2011
LDC Report Date:	April 22, 2011
Matrix:	Sediment
Parameters:	Polychlorinated Biphenyls
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SM77

Sample Identification

JVE-03SC-0607-110221
JVE-04SC-0405-110221
JVE-04SC-0405-110221DUP

Introduction

This data review covers 3 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

All internal standard areas and retention times were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

XI. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XII. Target Compound Identification

Raw data were not reviewed for this SDG.

XIII. Compound Quantitation and Reported CRQLs

Raw data were not reviewed for this SDG.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

XV. Field Duplicates

No field duplicates were identified in this SDG.

XV. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Polychlorinated Biphenyls - Data Qualification Summary - SDG SM77

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG SM77

No Sample Data Qualified in this SDG

LDC #: 25302L3b

VALIDATION COMPLETENESS WORKSHEET

Level III

SDG #: SM77

Laboratory: Analytical Resources, Inc.

Date: 4-21-11

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 02/21/11
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	%RSD ≤ 20
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates / Dup	N/A	Client Specified
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	N	
XIII.	Compound quantitation and reported CRQLs	N	
XIV.	Overall assessment of data	A	
XV.	Field duplicates	N	
XVI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: All sediment

1	JVE-03SC-0607-110221	11		21		31	031211-BLK
2	JVE-04SC-0405-110221	12		22		32	
3	JVE-04SC-0405-110221DUP	13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 16 through February 21, 2011
LDC Report Date:	April 22, 2011
Matrix:	Sediment
Parameters:	Polychlorinated Biphenyls
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SP67

Sample Identification

JVE-210SC-0102-110216
JVE-215SC-0102-110216
JVE-309SC-0405-110217
JVE-316SC-0405-110217
JVE-320SC-0405-110217
JVE-314-SC-0405-110218
JVE-216SC-0910-110218
JVE-322SC-0708-110218
JVE-07SC-0809-110218
JVE-01SC-0708-110218
JVE-01SC-0809-110218
JVE-02SC-0708-110221
JVE-02SC-0809-110221
JVE-04SC-0304-110221
JVE-314-SC-0405-110218MS
JVE-314-SC-0405-110218MSD

Introduction

This data review covers 16 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. Cooler temperatures for all samples in this SDG were reported between 6.8°C and 9.1°C upon receipt by the laboratory. Since the samples were received the same day that they were collected, time did not allow for sufficient cooling of the samples, therefore no data were qualified.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

All internal standard areas and retention times were within QC limits with the following exceptions:

Sample	Internal Standard	Column	Area (Limits)	Compound	Flag	A or P
JVE-216SC-0910-110218	1-Bromo-z-nitrobenzene Hexabromobiphenyl 1-Bromo-z-nitrobenzene Hexabromobiphenyl	ZB5 ZB5 ZB35 ZB35	77954881 (17494402-69977608) 78197857 (16290162-65160648) 153153283 (36745772-146983090) 126187327 (26243986-104975944)	Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260	J (all detects) UJ (all non-detects)	P
JVE-07SC-0809-110218	Hexabromobiphenyl Hexabromobiphenyl	ZB5 ZB35	65938196 (16290162-65160648) 120830383 (26243986-104975944)	Aroclor-1260	J (all detects) UJ (all non-detects)	P
JVE-01SC-0708-110218	Hexabromobiphenyl Hexabromobiphenyl	ZB5 ZB35	81745241 (20228585-80914342) 135662433 (31429169-125716676)	Aroclor-1260	J (all detects) UJ (all non-detects)	P
JVE-01SC-0809-110218	Hexabromobiphenyl Hexabromobiphenyl	ZB5 ZB35	82614322 (20228585-80914342) 136466655 (31429169-125716676)	Aroclor-1260	J (all detects) UJ (all non-detects)	P
JVE-02SC-0708-110221	1-Bromo-z-nitrobenzene Hexabromobiphenyl 1-Bromo-z-nitrobenzene Hexabromobiphenyl	ZB5 ZB5 ZB35 ZB35	79319342 (18498599-73994396) 85858876 (20228585-80914342) 158865968 (38580156-154320626) 140698970 (31429169-125716676)	Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260	J (all detects) UJ (all non-detects)	P
JVE-02SC-0809-110221	1-Bromo-z-nitrobenzene Hexabromobiphenyl 1-Bromo-z-nitrobenzene Hexabromobiphenyl	ZB5 ZB5 ZB35 ZB35	79992210 (18498599-73994396) 89118095 (20228585-80914342) 161888833 (38580156-154320626) 145076800 (31429169-125716676)	Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260	J (all detects) UJ (all non-detects)	P
JVE-04SC-0304-110221	1-Bromo-z-nitrobenzene 1-Bromo-z-nitrobenzene	ZB5 ZB35	77161715 (18498599-73994396) 154982604 (38580156-154320626)	Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254	J (all detects) UJ (all non-detects)	P

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

XI. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XII. Target Compound Identification

Raw data were not reviewed for this SDG.

XIII. Compound Quantitation and Reported CRQLs

Raw data were not reviewed for this SDG.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

XV. Field Duplicates

No field duplicates were identified in this SDG.

XV. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Polychlorinated Biphenyls - Data Qualification Summary - SDG SP67

SDG	Sample	Compound	Flag	A or P	Reason
SP67	JVE-216SC-0910-110218	Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260	J (all detects) UJ (all non-detects)	P	Internal standards (area)
SP67	JVE-07SC-0809-110218	Aroclor-1260	J (all detects) UJ (all non-detects)	P	Internal standards (area)
SP67	JVE-01SC-0708-110218	Aroclor-1260	J (all detects) UJ (all non-detects)	P	Internal standards (area)
SP67	JVE-01SC-0809-110218	Aroclor-1260	J (all detects) UJ (all non-detects)	P	Internal standards (area)
SP67	JVE-02SC-0708-110221	Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260	J (all detects) UJ (all non-detects)	P	Internal standards (area)
SP67	JVE-02SC-0809-110221	Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260	J (all detects) UJ (all non-detects)	P	Internal standards (area)
SP67	JVE-04SC-0304-110221	Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254	J (all detects) UJ (all non-detects)	P	Internal standards (area)

Jorgensen Forge Facility
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG SP67

No Sample Data Qualified in this SDG

LDC #: 25302M3b **VALIDATION COMPLETENESS WORKSHEET** Date: 4-21-11
SDG #: SP67 Level III Page: 1 of 1
Laboratory: Analytical Resources, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/16-18/11, 2/21/11 Temp = 9.1°C 6.8°C (insufficient time for cooling)
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	%RSD ≤ 20
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes / IS	SW	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	N	
XIII.	Compound quantitation and reported CRQLs	N	
XIV.	Overall assessment of data	A	
XV.	Field duplicates	N	
XVI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: All sediment

1	JVE-210SC-0102-110216	11	JVE-01SC-0809-110218	21		31	040411-BLK
2	JVE-215SC-0102-110216	12	JVE-02SC-0708-110221	22		32	
3	JVE-309SC-0405-110217	13	JVE-02SC-0809-110221	23		33	
4	JVE-316SC-0405-110217	14	JVE-04SC-0304-110221	24		34	
5	JVE-320SC-0405-110217	15	JVE-314-SC-0405-110218MS	25		35	
6	JVE-314-SC-0405-110218	16	JVE-314-SC-0405-110218MSD	26		36	
7	JVE-216SC-0910-110218	17		27		37	
8	JVE-322SC-0708-110218	18		28		38	
9	JVE-07SC-0809-110218	19		29		39	
10	JVE-01SC-0708-110218	20		30		40	

VALIDATION FINDINGS WORKSHEET

IS associations

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y Aroclor-1242	GG Chlordane
B beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z Aroclor-1248	HH Chlordane (Technical)
C delta-BHC	K. Endrin	S alpha-Chlordane	AA Aroclor-1254	II.
D gamma-BHC	L Endosulfan II	T gamma-Chlordane	BB Aroclor-1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC 2,4'-DDD	KK.
F Aldrin	N. Endosulfan sulfate	V Aroclor-1016	DD 2,4'-DDE	LL
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE. 2,4'-DDT	MM.
H Endosulfan I	P Methoxychlor	X Aroclor-1232	FF Hexachlorobenzene	NN

1-Bromo-2-nitrobenzene

Hexabromobiphenyl

Notes:

C:\Users\rthompson\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content Outlook\365E0K9Q\COMPLST-3S.wpd

LDC #: 25302M3b
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Internal Standards

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: _____

METHOD: GC PCBS EPA 8082

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all internal standard area counts within -50 to +100% of the associated calibration standard?

Y N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Lab ID/~~Reference~~ Column	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		7 (ZB5)	1	77954881	(17494402-69977608)	~~J dets (A~~ J/UJ/P
		↓	2	78197857	(16290162-65160648)	
		(ZB35)	1	153153283	(36745772-146983090)	(See
		↓	2	126187327	(26243986-104975944)	attached
		9 (ZB5)	2	65938196	(16290162-65160648)	for compound
		(ZB35)	2	120830383	(26243986-104975944)	associations)
		10 (ZB5)	2	81745241	(20228585-80914342)	
		(ZB35)	2	135662433	(31429169-125716676)	
		11 (ZB5)	2	82614322	(20228585-80914342)	
		(ZB35)	2	136466655	(31429169-125716676)	
		12 (ZB5)	1	79319342	(18498599-73994396)	
		↓	2	85858876	(20228585-80914342)	
		(ZB35)	1	158865968	(38580156-154320626)	
		↓	2	140698970	(31429169-125716676)	
		13 (ZB5)	1	79992210	(18498599-73994396)	
		↓	2	89118095	(20228585-80914342)	
		(ZB35)	1	161888833	(38580156-154320626)	
		↓	2	145076800	(31429169-125716676)	
		14 (ZB5)	1	77161715	(18498599-73994396)	
		(ZB35)	1	154982604	(38580156-154320626)	

(BCM) = Bromochloromethane
(DFB) = 1,4-Difluorobenzene
(CBZ) = Chlorobenzene-d5
(PFB) = Pentafluorobenzene
(4DCB) = 1,4-Dichlorobenzene-d4
(2DCB) = 1,2-Dichlorobenzene-d4
(FBZ) = Fluorobenzene

1) 1-Bromo-2-Nitrobenzene
2) Hexabromobiphenyl

INTST.1S

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 16, 2011
LDC Report Date:	April 21, 2011
Matrix:	Sediment
Parameters:	Wet Chemistry
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SJ34/SJ35/SJ36

Sample Identification

JVE-215SC-0203-110216	JVE-210SC-1011-110216
JVE-215SC-0304-110216	JVE-210SC-1112-110216
JVE-215SC-0405-110216	JVE-210SC-1212.7-110216
JVE-215SC-0506-110216	JVE-207SC-0203-110216
JVE-215SC-0607-110216	JVE-207SC-0304-110216
JVE-215SC-0708-110216	JVE-207SC-0405-110216
JVE-215SC-0809-110216	JVE-207SC-0506-110216
JVE-215SC-0910-110216	JVE-207SC-0607-110216
JVE-215SC-1011-110216	JVE-207SC-0708-110216
JVE-215SC-1112-110216	JVE-207SC-0809-110216
JVE-215SC-1212.8-110216	JVE-207SC-0910-110216
JVE-1215SC-0607-110216	JVE-207SC-1011-110216
JVE-210SC-0203-110216	JVE-207SC-1112-110216
JVE-210SC-0304-110216	JVE-207SC-1212.6-110216
JVE-210SC-0405-110216	JVE-215SC-0203-110216MS
JVE-210SC-0506-110216	JVE-215SC-0203-110216DUP
JVE-210SC-0607-110216	JVE-210SC-0910-110216MS
JVE-210SC-0708-110216	JVE-210SC-0910-110216DUP
JVE-210SC-0809-110216	JVE-215SC-0203-110216TRP
JVE-210SC-0910-110216	JVE-210SC-0910-110216TRP

Introduction

This data review covers 40 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per PLUMB Method for Total Organic Carbons and EPA Method 160.3 for Total Solids.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates/Triplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

Triplicate (TRP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

IX. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

X. Field Duplicates

Samples JVE-215SC-0607-110216 and JVE-1215SC-0607-110216 were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration (%)		RPD (Limits)
	JVE-215SC-0607-110216	JVE-1215SC-0607-110216	
Total solids	62.60	62.50	0 (≤50)
Total organic carbon	1.58	2.08	27 (≤50)

XI. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Wet Chemistry - Data Qualification Summary - SDG SJ34/SJ35/SJ36

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG SJ34/SJ35/SJ36

No Sample Data Qualified in this SDG

LDC #: 25302A6 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/20/11
SDG #: SJ34/SJ35/SJ36 Level III Page: 1 of 1
Laboratory: Analytical Resources, Inc. Reviewer: MR
2nd Reviewer: V

METHOD: (Analyte) TOC (PLUMB Method), Total Solids (EPA Method 160.3)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/16/11
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS
VI.	Duplicates triplicated	A	Dup, TRP
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(5,12)
XI	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment

1	JVE-215SC-0203-110216	11	JVE-215SC-1212.8-110216	21	JVE-210SC-1011-110216	31	JVE-207SC-0910-110216
2	JVE-215SC-0304-110216	12	JVE-1215SC-0607-110216	22	JVE-~~210~~ 205 210SC-1112-110216	32	JVE-207SC-1011-110216
3	JVE-215SC-0405-110216	13	JVE-210SC-0203-110216	23	JVE-210SC-1212.7-110216	33	JVE-207SC-1112-110216
4	JVE-215SC-0506-110216	14	JVE-210SC-0304-110216	24	JVE-207SC-0203-110216	34	JVE-207SC-1212.6-110216
5	JVE-215SC-0607-110216	15	JVE-210SC-0405-110216	25	JVE-207SC-0304-110216	35	JVE-215SC-0203-110216MS
6	JVE-215SC-0708-110216	16	JVE-210SC-0506-110216	26	JVE-207SC-0405-110216	36	JVE-215SC-0203-110216DUP
7	JVE-215SC-0809-110216	17	JVE-210SC-0607-110216	27	JVE-207SC-0506-110216	37	JVE-210SC-0910-110216MS
8	JVE-215SC-0910-110216	18	JVE-210SC-0708-110216	28	JVE-207SC-0607-110216	38	JVE-210SC-0910-110216DUP
9	JVE-215SC-1011-110216	19	JVE-210SC-0809-110216	29	JVE-207SC-0708-110216	39	(X 1) TRP
10	JVE-215SC-1112-110216	20	JVE-~~210~~ 205 210SC-0910-110216	30	JVE-207SC-0809-110216	40	(X 20) TRP

Notes:

25302A6W.wpd

LDC #: 25302A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-34		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC-35		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4
36		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
37		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4
38		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
39		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
40		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

METHODS.6

LDC# 25302A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

Inorganics, Method See Cover

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (%)		RPD (≤50)	
	5	12		
Total Solids	62.60	62.50	0	
Total Organic Carbon	1.58	2.08	27	

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Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 17, 2011
LDC Report Date:	April 21, 2011
Matrix:	Sediment
Parameters:	Wet Chemistry
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SJ57/SJ58

Sample Identification

JVE-205SC-0203-110217
JVE-205SC-0304-110217
JVE-205SC-0405-110217
JVE-205SC-0506-110217
JVE-205SC-0607-110217
JVE-205SC-0708-110217
JVE-205SC-0809-110217
JVE-205SC-0910-110217
JVE-205SC-1011-110217
JVE-205SC-1112.1-110217
JVE-311SC-0506-110217
JVE-311SC-0607-110217
JVE-311SC-0708-110217
JVE-311SC-089.4-110217
JVE-205SC-0203-110217MS
JVE-205SC-0203-110217DUP
JVE-205SC-0203-110217TRP

Introduction

This data review covers 17 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per PLUMB Method for Total Organic Carbons and EPA Method 160.3 for Total Solids.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates/Triplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

Triplicate (TRP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

IX. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

X. Field Duplicates

Samples JVE-205SC-0203-110217 and JVE-1205SC-0203-110217 (from SDG SJ63) were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration (%)		RPD (Limits)
	JVE-205SC-0203-110217	JVE-1205SC-0203-110217	
Total solids	52.40	52.30	0 (≤50)
Total organic carbon	1.55	1.66	7 (≤50)

XI. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Wet Chemistry - Data Qualification Summary - SDG SJ57/SJ58

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG SJ57/SJ58

No Sample Data Qualified in this SDG

LDC #: 25302B6 **VALIDATION COMPLETENESS WORKSHEET** Date: 4-20-11
SDG #: SJ57/SJ58 Level III Page: 1 of 1
Laboratory: Analytical Resources, Inc. Reviewer: CR
2nd Reviewer: ✓

METHOD: (Analyte) TOC (PLUMB Method), Total Solids (EPA Method 160.3)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/17/11
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS
VI.	Duplicates TRP	A	DUP, TRP
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(1, JVE-205SC-0203-110217 (SD6: SJ63))
XI	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: Sediment

1	JVE-205SC-0203-110217	11	JVE-311SC-0506-110217	21		31	PB35
2	JVE-205SC-0304-110217	12	JVE-311SC-0607-110217	22		32	
3	JVE-205SC-0405-110217	13	JVE-311SC-0708-110217	23		33	
4	JVE-205SC-0506-110217	14	JVE-311SC-089.4-110217	24		34	
5	JVE-205SC-0607-110217	15	JVE-205SC-0203-110217MS	25		35	
6	JVE-205SC-0708-110217	16	JVE-205SC-0203-110217DUP	26		36	
7	JVE-205SC-0809-110217	17	✓ TRP	27		37	
8	JVE-205SC-0910-110217	18		28		38	
9	JVE-205SC-1011-110217	19		29		39	
10	JVE-205SC-1112.1-110217	20		30		40	

Notes:

LDC #: 25302B6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: 1

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-14		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC-15		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4
16,17		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

METHODS.6

LDC# 25302B6

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Page: 1 of ___
Reviewer: OR
2nd Reviewer: [illegible]

Inorganics, Method See Cover

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (%)		RPD (≤50)	
	1	JVE-1205SC-0203-110217		
Total Solids	52.40	52.30	0	
Total Organic Carbon	1.55	1.66	7	

V:\FIELD DUPLICATES\FD_inorganic\25302B6.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 17, 2011
LDC Report Date:	April 21, 2011
Matrix:	Sediment
Parameters:	Wet Chemistry
Validation Level:	EPA Level IV
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SJ61/SJ62

Sample Identification

JVE-320SC-0506-110217
JVE-320SC-0607-110217
JVE-320SC-0708-110217
JVE-320SC-0809-110217
JVE-320SC-0910-110217
JVE-320SC-1011-110217
JVE-320SC-1112-110217
JVE-320SC-1212.9-110217
JVE-316SC-0506-110217
JVE-316SC-0607-110217
JVE-316SC-0708-110217
JVE-316SC-0809-110217
JVE-316SC-099.7-110217
JVE-320SC-0506-110217MS
JVE-320SC-0506-110217DUP
JVE-320SC-0506-110217TRP

Introduction

This data review covers 16 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per PLUMB Method for Total Organic Carbons and EPA Method 160.3 for Total Solids.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates/Triplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

Triplicate (TRP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Sample Result Verification

All sample result verifications were acceptable.

IX. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Wet Chemistry - Data Qualification Summary - SDG SJ61/SJ62

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG SJ61/SJ62

No Sample Data Qualified in this SDG

LDC #: 25302C6

SDG #: SJ61/SJ62

Laboratory: Analytical Resources, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 4/20/11

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: (Analyte) TOC (PLUMB Method), Total Solids (EPA Method 160.3)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/17/11
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS
VI.	Duplicates	A	D, R, TRP
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment

1	JVE-320SC-0506-110217	11	JVE-316SC-0708-110217	21		31	PBS
2	JVE-320SC-0607-110217	12	JVE-316SC-0809-110217	22		32	
3	JVE-320SC-0708-110217	13	JVE-316SC-099.7-110217	23		33	
4	JVE-320SC-0809-110217	14	JVE-320SC-0506-110217MS	24		34	
5	JVE-320SC-0910-110217	15	JVE-320SC-0506-110217DUP	25		35	
6	JVE-320SC-1011-110217	16	↓ TRP	26		36	
7	JVE-320SC-1112-110217	17		27		37	
8	JVE-320SC-1212.9-110217	18		28		38	
9	JVE-316SC-0506-110217	19		29		39	
10	JVE-316SC-0607-110217	20		30		40	

Notes:

LDC #: 25302C6

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients > 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)	✓			
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 25302C6

VALIDATION FINDINGS CHECKLIST

Reviewer:
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 253026

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-13		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC-14		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4
15,16		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

METHODS.6

LDC #: 25302C6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd Reviewer: L

Method: Inorganics, Method see cover

The correlation coefficient (r) for the calibration of TOC was recalculated.Calibration date: 2/14/11

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found X 100 / True

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. ~~(ug/l)~~ ppm	Absorbance	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	TOC	s1	8.00	2021830	0.99976	0.99939	Y
		s2	20.00	4950858			
		s3	40.00	10091127			
		s4	100.00	26698352			
Calibration verification		ICV	1000	1006	100.6	100.6	
Calibration verification		CCV		983	98.3	98.3	
Calibration verification				1035	103.5	103.5	

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 25302C6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: QR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$$\%R = \frac{Found}{True} \times 100$$

Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$

Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S ~~(units)~~ %	True / D ~~(units)~~ %	Recalculated %R / ~~RPD~~ RSD	Reported %R / ~~RPD~~ RSD	Acceptable (Y/N)
~~LCS~~ CR 14	~~Laboratory control~~ CR sample Matrix spike	TOC	3.4	3.3	103.0	102.9	Y
14 LCS	~~Matrix spike~~ CR sample Laboratory control	↓	(SSR-SR) 0.101	0.1	101	101	Y
15	~~Duplicate~~ sample Triplicate	TS	2.58	2.13 2.46	9.7	9.7	Y

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.6

LDC #: 253026

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

METHOD: Inorganics, Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for TOC/TS reported with a positive detect were recalculated and verified using the following equation:

Concentration =

$TOC = \frac{Area(1.45405) + 0.00000371)}{TS}$

$TS = \frac{Dry\,wt - Tare}{Wet\,wt - Tare} \times 100$

Recalculation: 1: $TOC = \frac{24399.246(1.45405) + 0.00000371}{0.6006} = 2.57\%$

$TS = \frac{5.5407 - 1.0908}{6.4959 - 1.0908} \times 100 = 82.3\%$

#	Sample ID	Analyte	Reported Concentration (%)	Calculated Concentration (%)	Acceptable (Y/N)
	1	TS	56.80	56.80	Y
		TOC	2.58	2.57	
	9	TS	82.30	82.30	
		TOC	0.254	0.254	

Note:

RECALC.6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 17, 2011
LDC Report Date:	April 21, 2011
Matrix:	Sediment
Parameters:	Wet Chemistry
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SJ63

Sample Identification

JVE-309SC-0506-110217
JVE-309SC-0607-110217
JVE-309SC-0708-110217
JVE-309SC-0809-110217
JVE-309SC-0910-110217
JVE-309SC-1011-110217
JVE-309SC-1111.5-110217
JVE-1205SC-0203-110217
JVE-1309SC-0910-110217

Introduction

This data review covers 9 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per PLUMB Method for Total Organic Carbons and EPA Method 160.3 for Total Solids.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates/Triplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

Triplicate (TRP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

IX. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

X. Field Duplicates

Samples JVE-1205SC-0203-110217 and JVE-205SC-0203-110217 (from SDG SJ57) and samples JVE-309SC-0910-110217 and JVE-1309SC-0910-110217 were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration (%)		RPD (Limits)
	JVE-205SC-0203-110217	JVE-1205SC-0203-110217	
Total solids	52.40	52.30	0 (≤50)
Total organic carbon	1.55	1.66	7 (≤50)

Analyte	Concentration (%)		RPD (Limits)
	JVE-309SC-0910-110217	JVE-1309SC-0910-110217	
Total solids	78.70	79.40	1 (≤50)
Total organic carbon	0.185	0.138	29 (≤50)

XI. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Wet Chemistry - Data Qualification Summary - SDG SJ63

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG SJ63

No Sample Data Qualified in this SDG

LDC #: 25302D6 **VALIDATION COMPLETENESS WORKSHEET** Date: 4/20/11
SDG #: SJ63 Level III Page: 1 of 1
Laboratory: Analytical Resources, Inc. Reviewer: CR
2nd Reviewer: ✓

METHOD: (Analyte) TOC (PLUMB Method), Total Solids (EPA Method 160.3)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/17/11
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS (SDG: SJ61)
VI.	Duplicates	A	D & Trip ✓
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(8, JVE-205SC-0203-110217 (SDG: SJ57)), (5, 9)
XI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: Sediment

1	JVE-309SC-0506-110217	11		21	PBS	31	
2	JVE-309SC-0607-110217	12		22		32	
3	JVE-309SC-0708-110217	13		23		33	
4	JVE-309SC-0809-110217	14		24		34	
5	JVE-309SC-0910-110217	15		25		35	
6	JVE-309SC-1011-110217	16		26		36	
7	JVE-309SC-1111.5-110217	17		27		37	
8	JVE-1205SC-0203-110217	18		28		38	
9	JVE-1309SC-0910-110217	19		29		39	
10		20		30		40	

Notes:

LDC #: 25302D6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-9		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

METHODS.6

LDC# 25302D6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer:
2nd Reviewer:

Inorganics, Method See Cover

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (%)		RPD (≤50)	
	JVE-205SC-0203-110217	8		
Total Solids	52.40	52.30	0	
Total Organic Carbon	1.55	1.66	7	

Analyte	Concentration (%)		RPD (≤50)	
	5	9		
Total Solids	78.70	79.40	1	
Total Organic Carbon	0.185	0.138	29	

V:\FIELD DUPLICATES\FD_inorganic\25302D6.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 18, 2011
LDC Report Date:	April 21, 2011
Matrix:	Sediment
Parameters:	Wet Chemistry
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SJ81/SJ82/SJ83

Sample Identification

JVE-322SC-0809-110218
JVE-322SC-0910-110218
JVE-322SC-1011-110218
JVE-322SC-1112.4-110218
JVE-216SC-1011-110218
JVE-216SC-1112.1-110218
JVE-314SC-0506-110218
JVE-314SC-0607-110218
JVE-314SC-0707.9-110218
JVE-1314SC-0506-110218
JVE-322SC-0809-110218MS
JVE-322SC-0809-110218DUP
JVE-322SC-0809-110218TRP

Introduction

This data review covers 13 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per PLUMB Method for Total Organic Carbons and EPA Method 160.3 for Total Solids.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates/Triplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

Triplicate (TRP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

IX. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

X. Field Duplicates

Samples JVE-314SC-0506-110218 and JVE-1314SC-0506-110218 were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration (%)		RPD (Limits)
	JVE-314SC-0506-110218	JVE-1314SC-0506-110218	
Total solids	86.10	52.00	49 (≤50)
Total organic carbon	0.527	0.581	10 (≤50)

XI. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Wet Chemistry - Data Qualification Summary - SDG SJ81/SJ82/SJ83

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG SJ81/SJ82/SJ83

No Sample Data Qualified in this SDG

LDC #: 25302E6 **VALIDATION COMPLETENESS WORKSHEET** Date: 4-20-11
SDG #: SJ81/SJ82/SJ83 Level III Page: 1 of 1
Laboratory: Analytical Resources, Inc. Reviewer: OR
2nd Reviewer: [illegible]

METHOD: (Analyte) TOC (PLUMB Method), Total Solids (EPA Method 160.3)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/18/11
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS
VI.	Duplicates	A	Dup, Trip
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(7,10)
XI	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment

1	JVE-322SC-0809-110218	11	JVE-322SC-0809-110218MS	21		31	PBS
2	JVE-322SC-0910-110218	12	JVE-322SC-0809-110218DUP	22		32	
3	JVE-322SC-1011-110218	13	Trip	23		33	
4	JVE-322SC-1112.4-110218	14		24		34	
5	JVE-216SC-1011-110218	15		25		35	
6	JVE-216SC-1112.1-110218	16		26		36	
7	JVE-314SC-0506-110218	17		27		37	
8	JVE-314SC-0607-110218	18		28		38	
9	JVE-314SC-~~0707~~ 0707.9-110218	19		29		39	
10	JVE-1314SC-0506-110218	20		30		40	

Notes:

25302E6W.wpd

LDC #: 25302E6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-10		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC-11		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4
12,13		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

LDC# 25302E6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: OR
2nd Reviewer: [illegible]

Inorganics, Method See Cover

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (%)		RPD (≤50)	
	7	10		
Total Solids	86.10	52.00	49	
Total Organic Carbon	0.527	0.581	10	

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Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 18, 2011
LDC Report Date:	April 21, 2011
Matrix:	Sediment
Parameters:	Wet Chemistry
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SJ90/SJ91

Sample Identification

JVE-01SC-099.7-110218
JVE-1007SC-0910-110218
JVE-07SC-0910-110218
JVE-07SC-1011-110218
JVE-07SC-1112.2-110218

Introduction

This data review covers 5 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per PLUMB Method for Total Organic Carbons and EPA Method 160.3 for Total Solids.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates/Triplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

Triplicate (TRP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

IX. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

X. Field Duplicates

Samples JVE-1007SC-0910-110218 and JVE-07SC-0910-110218 were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration (%)		RPD (Limits)
	JVE-1007SC-0910-110218	JVE-07SC-0910-110218	
Total solids	77.10	78.10	1 (≤50)
Total organic carbon	3.98	2.23	56 (≤50)

XI. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Wet Chemistry - Data Qualification Summary - SDG SJ90/SJ91

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG SJ90/SJ91

No Sample Data Qualified in this SDG

LDC #: 25302F6

SDG #: SJ90/SJ91

Laboratory: Analytical Resources, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4-20-11

Page: 1 of

Reviewer:

2nd Reviewer:

METHOD: (Analyte) TOC (PLUMB Method), Total Solids (EPA Method 160.3)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/18/11
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS (SDG: SJ81)
VI.	Duplicates	A	Dup, TBP ↓
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(2,3)
XI	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment

1	JVE-01SC-099.7-110218	11	PBS	21		31	
2	JVE-1007SC-0910-110218	12		22		32	
3	JVE-07SC-0910-110218	13		23		33	
4	JVE-07SC-1011-110218	14		24		34	
5	JVE-07SC-1112.2-110218	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 25302F6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-S		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

METHODS.6

LDC# 25302F6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

Inorganics, Method See Cover

Y/N NA Were field duplicate pairs identified in this SDG?
Y/N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (%)		RPD (≤50)	
	2	3		
Total Solids	77.10	78.10	1	
Total Organic Carbon	3.98	2.23	56	

V:\FIELD DUPLICATES\FD_inorganic\25302F6.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 21, 2011
LDC Report Date:	April 21, 2011
Matrix:	Sediment
Parameters:	Wet Chemistry
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SJ99/SK100

Sample Identification

JVE-02SC-099.6-110221
JVE-03SC-11-12.2-110221
JVE-04SC-089.2-110221
JVE-02SC-099.6-110221MS
JVE-02SC-099.6-110221DUP
JVE-02SC-099.6-110221TRP

Introduction

This data review covers 6 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per PLUMB Method for Total Organic Carbons and EPA Method 160.3 for Total Solids.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates/Triplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

Triplicate (TRP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

IX. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Wet Chemistry - Data Qualification Summary - SDG SJ99/SK100

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG SJ99/SK100

No Sample Data Qualified in this SDG

LDC #: 25302H6 **VALIDATION COMPLETENESS WORKSHEET** Date: 4-2011
SDG #: SJ99/SK00 Level III Page: 1 of 1
Laboratory: Analytical Resources, Inc. Reviewer: OR
2nd Reviewer: [illegible]

METHOD: (Analyte) TOC (PLUMB Method), Total Solids (EPA Method 160.3)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/21/11
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS
VI.	Duplicates	A	DUP, TRP
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment

1	JVE-02SC-099.6-110221	11		21		31	
2	JVE-03SC-11-12.2-110221	12		22		32	
3	JVE-04SC-089.2-110221	13		23		33	
4	JVE-02SC-099.6-110221MS	14		24		34	
5	JVE-02SC-099.6-110221DUP	15		25		35	
6	TRP	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 25302H6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-3		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
QC4		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4
5,6		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 16, 2011
LDC Report Date:	April 21, 2011
Matrix:	Sediment
Parameters:	Wet Chemistry
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SL49

Sample Identification

JVE-207SC-0607-110216

Introduction

This data review covers one sediment sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per PLUMB Method for Total Organic Carbons and EPA Method 160.3 for Total Solids.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates/Triplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

Triplicate (TRP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

IX. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Wet Chemistry - Data Qualification Summary - SDG SL49

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG SL49

No Sample Data Qualified in this SDG

LDC #: 2530216

SDG #: SL49

Laboratory: Analytical Resources, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4/2011

Page: 1 of 1

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: (Analyte) TOC (PLUMB Method), Total Solids (EPA Method 160.3)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/16/11
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS ↑
VI.	Duplicates	A	Dup, Trip (SDG: SL71)
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment

1	JVE-207SC-0607-110216	11		21		31	
2		12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 25302F6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 21, 2011
LDC Report Date:	April 21, 2011
Matrix:	Sediment
Parameters:	Wet Chemistry
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SL71/SL72

Sample Identification

JVE-03SC-0708-110221
JVE-03SC-0809-110221
JVE-03SC-0910-110221
JVE-03SC-1011-110221
JVE-04SC-0506-110221
JVE-04SC-0607-110221
JVE-04SC-0708-110221
JVE-1004SC-0607-110221
JVE-03SC-0708-110221MS
JVE-03SC-0708-110221DUP
JVE-03SC-0708-110221TRP

Introduction

This data review covers 11 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per PLUMB Method for Total Organic Carbons and EPA Method 160.3 for Total Solids.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates/Triplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

Triplicate (TRP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

IX. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

X. Field Duplicates

Samples JVE-04SC-0607-110221 and JVE-1004SC-0607-110221 were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration (%)		RPD (Limits)
	JVE-04SC-0607-110221	JVE-1004SC-0607-110221	
Total solids	84.30	86.10	2 (≤50)
Total organic carbon	0.085	0.110	26 (≤50)

XI. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Wet Chemistry - Data Qualification Summary - SDG SL71/SL72

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG SL71/SL72

No Sample Data Qualified in this SDG

LDC #: 25302J6

SDG #: SL71/SL72

Laboratory: Analytical Resources, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4-20-11

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: (Analyte) TOC (PLUMB Method), Total Solids (EPA Method 160.3)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/21/11
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS
VI.	Duplicates	A	D, RJ, TRP
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(6,8)
XI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: Sediment

1	JVE-03SC-0708-110221	11	(#1) TRP	21	PBS	31	
2	JVE-03SC-0809-110221	12		22		32	
3	JVE-03SC-0910-110221	13		23		33	
4	JVE-03SC-1011-110221	14		24		34	
5	JVE-04SC-0506-110221	15		25		35	
6	JVE-04SC-0607-110221	16		26		36	
7	JVE-04SC-0708-110221	17		27		37	
8	JVE-1004SC-0607-110221	18		28		38	
9	JVE-03SC-0708-110221MS	19		29		39	
10	JVE-03SC-0708-110221DUP	20		30		40	

Notes:

LDC #: 25302J6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-8		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC-9		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4
10,11		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

METHODS.6

LDC# 25302J6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of
Reviewer:
2nd Reviewer:

Inorganics, Method See Cover

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (%)		RPD (≤50)	
	6	8		
Total Solids	84.30	86.10	2	
Total Organic Carbon	0.085	0.110	26	

V:\FIELD DUPLICATES\FD_inorganic\25302J6.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	March 16, 2011
LDC Report Date:	April 26, 2011
Matrix:	Sediment
Parameters:	Wet Chemistry
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SN49

Sample Identification

JVE-206SC-0607-110316
JVE-206SC-0708-110316
JVE-206SC-0809-110316
JVE-206SC-0910-110316
JVE-206SC-1011-110316
JVE-206SC-1112-110316
JVE-206SC-1213-110316
JVE-206SC-1313.6-110316
JVE-1206SC-1011-110316
JVE-206SC-0607-110316MS
JVE-206SC-0607-110316DUP
JVE-206SC-0607-110316TRP

Introduction

This data review covers 12 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per PLUMB Method for Total Organic Carbons and EPA Method 160.3 for Total Solids.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates/Triplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

Triplicate (TRP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

IX. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

X. Field Duplicates

Samples JVE-206SC-1011-110316 and JVE-1206SC-1011-110316 were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration (%)		RPD (Limits)
	JVE-206SC-1011-110316	JVE-1206SC-1011-110316	
Total solids	68.00	68.20	0 (≤50)
Total organic carbon	1.54	1.69	9 (≤50)

XI. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Wet Chemistry - Data Qualification Summary - SDG SN49

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG SN49

No Sample Data Qualified in this SDG

LDC #: 25302K6 **VALIDATION COMPLETENESS WORKSHEET** Date: 4-20-11
SDG #: SN49 Level III Page: 1 of
Laboratory: Analytical Resources, Inc. Reviewer:
2nd Reviewer:

METHOD: (Analyte) TOC (PLUMB Method), Total Solids (EPA Method 160.3)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/16/11
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS
VI.	Duplicates	A	DUP, TRP
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(5,9)
XI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment

1	JVE-206SC-0607-110316	11	JVE-206SC-0607-110316DUP	21		31	
2	JVE-206SC-0708-110316	12	J TRP	22		32	
3	JVE-206SC-0809-110316	13		23		33	
4	JVE-206SC-0910-110316	14		24		34	
5	JVE-206SC-1011-110316	15		25		35	
6	JVE-206SC-1112-110316	16		26		36	
7	JVE-206SC-1213-110316	17		27		37	
8	JVE-206SC-1313.6-110316	18		28		38	
9	JVE-1206SC-1011-110316	19		29		39	
10	JVE-206SC-0607-110316MS	20		30		40	

Notes:

LDC #: 25302K6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-9		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC-10		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4
11,12		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

LDC# 25302K6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer:
2nd Reviewer:

Inorganics, Method See Cover

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (%)		RPD (≤50)	
	5	9		
Total Solids	68.00	68.20	0	
Total Organic Carbon	1.54	1.69	9	

V:\FIELD DUPLICATES\FD_inorganic\25302K6.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 21, 2011
LDC Report Date:	April 21, 2011
Matrix:	Sediment
Parameters:	Wet Chemistry
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SM77

Sample Identification

JVE-03SC-0607-110221
JVE-04SC-0405-110221
JVE-03SC-0607-110221MS
JVE-03SC-0607-110221DUP
JVE-03SC-0607-110221TRP

Introduction

This data review covers 5 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per PLUMB Method for Total Organic Carbons and EPA Method 160.3 for Total Solids.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates/Triplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

Triplicate (TRP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

IX. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Wet Chemistry - Data Qualification Summary - SDG SM77

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG SM77

No Sample Data Qualified in this SDG

LDC #: 25302L6

SDG #: SM77

Laboratory: Analytical Resources, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4/2011

Page: 1 of 1

Reviewer: CR

2nd Reviewer: h

METHOD: (Analyte) TOC (PLUMB Method), Total Solids (EPA Method 160.3)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/21/11
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS
VI.	Duplicates	A	DUP, TRP
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment

1	JVE-03SC-0607-110221	11		21		31	
2	JVE-04SC-0405-110221	12		22		32	
3	JVE-03SC-0607-110221MS	13		23		33	
4	JVE-03SC-0607-110221DUP	14		24		34	
5	J TRP	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 2530246

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1,2		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC:3		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4
4,5		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

METHODS.6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 16 through February 21, 2011
LDC Report Date:	April 21, 2011
Matrix:	Sediment
Parameters:	Wet Chemistry
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SP67

Sample Identification

JVE-210SC-0102-110216
JVE-215SC-0102-110216
JVE-309SC-0405-110217
JVE-316SC-0405-110217
JVE-320SC-0405-110217
JVE-314-SC-0405-110218
JVE-216SC-0910-110218
JVE-322SC-0708-110218
JVE-07SC-0809-110218
JVE-01SC-0708-110218
JVE-01SC-0809-110218
JVE-02SC-0708-110221
JVE-02SC-0809-110221
JVE-04SC-0304-110221
JVE-210SC-0102-110216MS
JVE-210SC-0102-110216DUP
JVE-210SC-0102-110216TRP

Introduction

This data review covers 17 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per PLUMB Method for Total Organic Carbons and EPA Method 160.3 for Total Solids.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates/Triplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

Triplicate (TRP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

IX. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Wet Chemistry - Data Qualification Summary - SDG SP67

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG SP67

No Sample Data Qualified in this SDG

LDC #: 25302M6 **VALIDATION COMPLETENESS WORKSHEET** Date: 4-20-11
SDG #: SP67 Level III Page: 1 of 1
Laboratory: Analytical Resources, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: (Analyte) TOC (PLUMB Method), Total Solids (EPA Method 160.3)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/16-21/11
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS
VI.	Duplicates	A	RR, TRP
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment

1	JVE-210SC-0102-110216	11	JVE-01SC-0809-110218	21		31	RRS
2	JVE-215SC-0102-110216	12	JVE-02SC-0708-110221	22		32	
3	JVE-309SC-0405-110217	13	JVE-02SC-0809-110221	23		33	
4	JVE-316SC-0405-110217	14	JVE-04SC-0304-110221	24		34	
5	JVE-320SC-0405-110217	15	JVE-210SC-0102-110216MS	25		35	
6	JVE-314-SC-0405-110218	16	JVE-210SC-0102-110216DUP	26		36	
7	JVE-216SC-0910-110218	17	↓ TRP	27		37	
8	JVE-322SC-0708-110218	18		28		38	
9	JVE-07SC-0809-110218	19		29		39	
10	JVE-01SC-0708-110218	20		30		40	

Notes:

LDC #: 25302M6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-14		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC:1S		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4
16,17		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

METHODS.6

Jorgensen Forge Facility - LDC 25302

SDG: SJ34

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-1215SC-0607-110216	11-3396-SJ34N	Total solids	2/16/2011	62.5		Yes	Y				0.01		pct
JVE-215SC-0203-110216	11-3385-SJ34C	Total solids	2/16/2011	53.8		Yes	Y				0.01		pct
JVE-215SC-0304-110216	11-3386-SJ34D	Total solids	2/16/2011	57.7		Yes	Y				0.01		pct
JVE-215SC-0405-110216	11-3387-SJ34E	Total solids	2/16/2011	58		Yes	Y				0.01		pct
JVE-215SC-0506-110216	11-3388-SJ34F	Total solids	2/16/2011	59.1		Yes	Y				0.01		pct
JVE-215SC-0607-110216	11-3389-SJ34G	Total solids	2/16/2011	62.6		Yes	Y				0.01		pct
JVE-215SC-0708-110216	11-3390-SJ34H	Total solids	2/16/2011	65.4		Yes	Y				0.01		pct
JVE-215SC-0809-110216	11-3391-SJ34I	Total solids	2/16/2011	63		Yes	Y				0.01		pct
JVE-215SC-0910-110216	11-3392-SJ34J	Total solids	2/16/2011	61.2		Yes	Y				0.01		pct
JVE-215SC-1011-110216	11-3393-SJ34K	Total solids	2/16/2011	70.1		Yes	Y				0.01		pct
JVE-215SC-1112-110216	11-3394-SJ34L	Total solids	2/16/2011	74.7		Yes	Y				0.01		pct
JVE-215SC-1212.8-11021	11-3395-SJ34M	Total solids	2/16/2011	75.6		Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-1215SC-0607-110216	11-3396-SJ34N	Total organic carbon	2/17/2011	2.08		Yes	Y				0.020	0.00290	pct
JVE-215SC-0203-110216	11-3385-SJ34C	Total organic carbon	2/17/2011	2.11		Yes	Y				0.020	0.00290	pct
JVE-215SC-0304-110216	11-3386-SJ34D	Total organic carbon	2/17/2011	1.82		Yes	Y				0.020	0.00290	pct
JVE-215SC-0405-110216	11-3387-SJ34E	Total organic carbon	2/17/2011	1.06		Yes	Y				0.020	0.00290	pct
JVE-215SC-0506-110216	11-3388-SJ34F	Total organic carbon	2/17/2011	2.5		Yes	Y				0.020	0.00290	pct
JVE-215SC-0607-110216	11-3389-SJ34G	Total organic carbon	2/17/2011	1.58		Yes	Y				0.020	0.00290	pct
JVE-215SC-0708-110216	11-3390-SJ34H	Total organic carbon	2/17/2011	1.52		Yes	Y				0.020	0.00290	pct
JVE-215SC-0809-110216	11-3391-SJ34I	Total organic carbon	2/17/2011	1.78		Yes	Y				0.020	0.00290	pct
JVE-215SC-0910-110216	11-3392-SJ34J	Total organic carbon	2/17/2011	1.95		Yes	Y				0.020	0.00290	pct
JVE-215SC-1011-110216	11-3393-SJ34K	Total organic carbon	2/17/2011	1.4		Yes	Y				0.020	0.00290	pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-215SC-1112-110216	11-3394-SJ34L	Total organic carbon	2/17/2011	0.649	Yes	Y				0.020	0.00290	pct
JVE-215SC-1212.8-11021	11-3395-SJ34M	Total organic carbon	2/17/2011	0.39	Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-1215SC-0607-110216	11-3396-SJ34N	Aroclor 1232	2/18/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-1215SC-0607-110216	11-3396-SJ34N	Aroclor 1242	2/18/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-1215SC-0607-110216	11-3396-SJ34N	Aroclor 1016	2/18/2011	19	Yes	N	U			19	4.9	ug/kg
JVE-1215SC-0607-110216	11-3396-SJ34N	Aroclor 1260	2/18/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-1215SC-0607-110216	11-3396-SJ34N	Aroclor 1248	2/18/2011	22	Yes	N	Y			22	6.5	ug/kg
JVE-1215SC-0607-110216	11-3396-SJ34N	Aroclor 1221	2/18/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-1215SC-0607-110216	11-3396-SJ34N	Aroclor 1254	2/18/2011	40	Yes	Y				19	6.5	ug/kg
JVE-215SC-0203-110216	11-3385-SJ34C	Aroclor 1248	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-215SC-0203-110216	11-3385-SJ34C	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-215SC-0203-110216	11-3385-SJ34C	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-215SC-0203-110216	11-3385-SJ34C	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-215SC-0203-110216	11-3385-SJ34C	Aroclor 1260	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-215SC-0203-110216	11-3385-SJ34C	Aroclor 1254	2/18/2011	22	Yes	Y				20	6.7	ug/kg
JVE-215SC-0203-110216	11-3385-SJ34C	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.1	ug/kg
JVE-215SC-0304-110216	11-3386-SJ34D	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-215SC-0304-110216	11-3386-SJ34D	Aroclor 1254	2/18/2011	48	Yes	Y				20	6.6	ug/kg
JVE-215SC-0304-110216	11-3386-SJ34D	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-215SC-0304-110216	11-3386-SJ34D	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-215SC-0304-110216	11-3386-SJ34D	Aroclor 1248	2/18/2011	32	Yes	N	Y			32	6.6	ug/kg
JVE-215SC-0304-110216	11-3386-SJ34D	Aroclor 1260	2/18/2011	53	Yes	Y				20	6.6	ug/kg
JVE-215SC-0304-110216	11-3386-SJ34D	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.6	ug/kg

SDG: SJ34

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-215SC-0405-110216	11-3387-SJ34E	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-215SC-0405-110216	11-3387-SJ34E	Aroclor 1248	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-215SC-0405-110216	11-3387-SJ34E	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-215SC-0405-110216	11-3387-SJ34E	Aroclor 1254	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-215SC-0405-110216	11-3387-SJ34E	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-215SC-0405-110216	11-3387-SJ34E	Aroclor 1260	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-215SC-0405-110216	11-3387-SJ34E	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-215SC-0506-110216	11-3388-SJ34F	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-215SC-0506-110216	11-3388-SJ34F	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-215SC-0506-110216	11-3388-SJ34F	Aroclor 1248	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-215SC-0506-110216	11-3388-SJ34F	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-215SC-0506-110216	11-3388-SJ34F	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-215SC-0506-110216	11-3388-SJ34F	Aroclor 1254	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-215SC-0506-110216	11-3388-SJ34F	Aroclor 1260	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-215SC-0607-110216	11-3389-SJ34G	Aroclor 1248	2/18/2011	35	Yes	N	Y			35	6.6	ug/kg
JVE-215SC-0607-110216	11-3389-SJ34G	Aroclor 1242	2/18/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-215SC-0607-110216	11-3389-SJ34G	Aroclor 1260	2/18/2011	21	Yes	Y				19	6.6	ug/kg
JVE-215SC-0607-110216	11-3389-SJ34G	Aroclor 1232	2/18/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-215SC-0607-110216	11-3389-SJ34G	Aroclor 1221	2/18/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-215SC-0607-110216	11-3389-SJ34G	Aroclor 1254	2/18/2011	66	Yes	Y				19	6.6	ug/kg
JVE-215SC-0607-110216	11-3389-SJ34G	Aroclor 1016	2/18/2011	19	Yes	N	U			19	4.9	ug/kg
JVE-215SC-0708-110216	11-3390-SJ34H	Aroclor 1242	2/18/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-215SC-0708-110216	11-3390-SJ34H	Aroclor 1260	2/18/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-215SC-0708-110216	11-3390-SJ34H	Aroclor 1254	2/18/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-215SC-0708-110216	11-3390-SJ34H	Aroclor 1221	2/18/2011	19	Yes	N	U			19	6.6	ug/kg

SDG: SJ34

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-215SC-0708-110216	11-3390-SJ34H	Aroclor 1232	2/18/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-215SC-0708-110216	11-3390-SJ34H	Aroclor 1248	2/18/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-215SC-0708-110216	11-3390-SJ34H	Aroclor 1016	2/18/2011	19	Yes	N	U			19	5.0	ug/kg
JVE-215SC-0809-110216	11-3391-SJ34I	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-215SC-0809-110216	11-3391-SJ34I	Aroclor 1260	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-215SC-0809-110216	11-3391-SJ34I	Aroclor 1254	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-215SC-0809-110216	11-3391-SJ34I	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-215SC-0809-110216	11-3391-SJ34I	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-215SC-0809-110216	11-3391-SJ34I	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-215SC-0809-110216	11-3391-SJ34I	Aroclor 1248	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-215SC-0910-110216	11-3392-SJ34J	Aroclor 1260	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-215SC-0910-110216	11-3392-SJ34J	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-215SC-0910-110216	11-3392-SJ34J	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-215SC-0910-110216	11-3392-SJ34J	Aroclor 1248	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-215SC-0910-110216	11-3392-SJ34J	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-215SC-0910-110216	11-3392-SJ34J	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-215SC-0910-110216	11-3392-SJ34J	Aroclor 1254	2/18/2011	20	Yes	Y				20	6.7	ug/kg
JVE-215SC-1011-110216	11-3393-SJ34K	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-215SC-1011-110216	11-3393-SJ34K	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-215SC-1011-110216	11-3393-SJ34K	Aroclor 1248	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-215SC-1011-110216	11-3393-SJ34K	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-215SC-1011-110216	11-3393-SJ34K	Aroclor 1254	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-215SC-1011-110216	11-3393-SJ34K	Aroclor 1260	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-215SC-1011-110216	11-3393-SJ34K	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-215SC-1112-110216	11-3394-SJ34L	Aroclor 1260	2/18/2011	19	Yes	N	U			19	6.6	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-215SC-1112-110216	11-3394-SJ34L	Aroclor 1254	2/18/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-215SC-1112-110216	11-3394-SJ34L	Aroclor 1221	2/18/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-215SC-1112-110216	11-3394-SJ34L	Aroclor 1232	2/18/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-215SC-1112-110216	11-3394-SJ34L	Aroclor 1248	2/18/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-215SC-1112-110216	11-3394-SJ34L	Aroclor 1016	2/18/2011	19	Yes	N	U			19	4.9	ug/kg
JVE-215SC-1112-110216	11-3394-SJ34L	Aroclor 1242	2/18/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-215SC-1212.8-11021	11-3395-SJ34M	Aroclor 1254	2/18/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-215SC-1212.8-11021	11-3395-SJ34M	Aroclor 1260	2/18/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-215SC-1212.8-11021	11-3395-SJ34M	Aroclor 1242	2/18/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-215SC-1212.8-11021	11-3395-SJ34M	Aroclor 1016	2/18/2011	19	Yes	N	U			19	4.9	ug/kg
JVE-215SC-1212.8-11021	11-3395-SJ34M	Aroclor 1248	2/18/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-215SC-1212.8-11021	11-3395-SJ34M	Aroclor 1232	2/18/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-215SC-1212.8-11021	11-3395-SJ34M	Aroclor 1221	2/18/2011	19	Yes	N	U			19	6.6	ug/kg

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-210SC-0203-110216	11-3399-SJ35C	Total solids	2/16/2011	56.1		Yes	Y				0.01		pct
JVE-210SC-0304-110216	11-3400-SJ35D	Total solids	2/16/2011	52.7		Yes	Y				0.01		pct
JVE-210SC-0405-110216	11-3401-SJ35E	Total solids	2/16/2011	56.3		Yes	Y				0.01		pct
JVE-210SC-0506-110216	11-3402-SJ35F	Total solids	2/16/2011	56.8		Yes	Y				0.01		pct
JVE-210SC-0607-110216	11-3403-SJ35G	Total solids	2/16/2011	64.9		Yes	Y				0.01		pct
JVE-210SC-0708-110216	11-3404-SJ35H	Total solids	2/16/2011	66.2		Yes	Y				0.01		pct
JVE-210SC-0809-110216	11-3405-SJ35I	Total solids	2/16/2011	77.3		Yes	Y				0.01		pct
JVE-210SC-0910-110216	11-3406-SJ35J	Total solids	2/16/2011	82.9		Yes	Y				0.01		pct
JVE-210SC-1011-110216	11-3407-SJ35K	Total solids	2/16/2011	80.7		Yes	Y				0.01		pct
JVE-210SC-1112-110216	11-3408-SJ35L	Total solids	2/16/2011	66.3		Yes	Y				0.01		pct
JVE-210SC-1212.7-11021	11-3409-SJ35M	Total solids	2/16/2011	63.5		Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-210SC-0203-110216	11-3399-SJ35C	Total organic carbon	2/18/2011	1.77		Yes	Y				0.020	0.00290	pct
JVE-210SC-0304-110216	11-3400-SJ35D	Total organic carbon	2/18/2011	1.85		Yes	Y				0.020	0.00290	pct
JVE-210SC-0405-110216	11-3401-SJ35E	Total organic carbon	2/18/2011	2.39		Yes	Y				0.020	0.00290	pct
JVE-210SC-0506-110216	11-3402-SJ35F	Total organic carbon	2/18/2011	2.04		Yes	Y				0.020	0.00290	pct
JVE-210SC-0607-110216	11-3403-SJ35G	Total organic carbon	2/18/2011	2.33		Yes	Y				0.020	0.00290	pct
JVE-210SC-0708-110216	11-3404-SJ35H	Total organic carbon	2/18/2011	2.64		Yes	Y				0.020	0.00290	pct
JVE-210SC-0809-110216	11-3405-SJ35I	Total organic carbon	2/18/2011	1.14		Yes	Y				0.020	0.00290	pct
JVE-210SC-0910-110216	11-3406-SJ35J	Total organic carbon	2/18/2011	0.272		Yes	Y				0.020	0.00290	pct
JVE-210SC-1011-110216	11-3407-SJ35K	Total organic carbon	2/18/2011	1.19		Yes	Y				0.020	0.00290	pct
JVE-210SC-1112-110216	11-3408-SJ35L	Total organic carbon	2/18/2011	4.51		Yes	Y				0.020	0.00290	pct
JVE-210SC-1212.7-11021	11-3409-SJ35M	Total organic carbon	2/18/2011	2.7		Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-210SC-0203-110216	11-3399-SJ35C	Aroclor 1260	2/18/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-210SC-0203-110216	11-3399-SJ35C	Aroclor 1254	2/18/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-210SC-0203-110216	11-3399-SJ35C	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-210SC-0203-110216	11-3399-SJ35C	Aroclor 1248	2/18/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-210SC-0203-110216	11-3399-SJ35C	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.1	ug/kg
JVE-210SC-0203-110216	11-3399-SJ35C	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-210SC-0203-110216	11-3399-SJ35C	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-210SC-0304-110216	11-3400-SJ35D	Aroclor 1260	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0304-110216	11-3400-SJ35D	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-210SC-0304-110216	11-3400-SJ35D	Aroclor 1248	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0304-110216	11-3400-SJ35D	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0304-110216	11-3400-SJ35D	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0304-110216	11-3400-SJ35D	Aroclor 1254	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0304-110216	11-3400-SJ35D	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0405-110216	11-3401-SJ35E	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0405-110216	11-3401-SJ35E	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0405-110216	11-3401-SJ35E	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-210SC-0405-110216	11-3401-SJ35E	Aroclor 1248	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0405-110216	11-3401-SJ35E	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0405-110216	11-3401-SJ35E	Aroclor 1254	2/18/2011	29	Yes	Y				20	6.7	ug/kg
JVE-210SC-0405-110216	11-3401-SJ35E	Aroclor 1260	2/18/2011	21	Yes	Y				20	6.7	ug/kg
JVE-210SC-0506-110216	11-3402-SJ35F	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0506-110216	11-3402-SJ35F	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.1	ug/kg
JVE-210SC-0506-110216	11-3402-SJ35F	Aroclor 1260	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0506-110216	11-3402-SJ35F	Aroclor 1254	2/18/2011	30	Yes	Y				20	6.7	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-210SC-0506-110216	11-3402-SJ35F	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0506-110216	11-3402-SJ35F	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0506-110216	11-3402-SJ35F	Aroclor 1248	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0607-110216	11-3403-SJ35G	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0607-110216	11-3403-SJ35G	Aroclor 1260	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0607-110216	11-3403-SJ35G	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0607-110216	11-3403-SJ35G	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-210SC-0607-110216	11-3403-SJ35G	Aroclor 1248	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0607-110216	11-3403-SJ35G	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0607-110216	11-3403-SJ35G	Aroclor 1254	2/18/2011	24	Yes	Y				20	6.7	ug/kg
JVE-210SC-0708-110216	11-3404-SJ35H	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-210SC-0708-110216	11-3404-SJ35H	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0708-110216	11-3404-SJ35H	Aroclor 1248	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0708-110216	11-3404-SJ35H	Aroclor 1260	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0708-110216	11-3404-SJ35H	Aroclor 1254	2/18/2011	38	Yes	Y				20	6.7	ug/kg
JVE-210SC-0708-110216	11-3404-SJ35H	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0708-110216	11-3404-SJ35H	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0809-110216	11-3405-SJ35I	Aroclor 1260	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0809-110216	11-3405-SJ35I	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0809-110216	11-3405-SJ35I	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0809-110216	11-3405-SJ35I	Aroclor 1248	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0809-110216	11-3405-SJ35I	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0809-110216	11-3405-SJ35I	Aroclor 1254	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-0809-110216	11-3405-SJ35I	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-210SC-0910-110216	11-3406-SJ35J	Aroclor 1248	2/18/2011	20	Yes	N	U			20	6.6	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-210SC-0910-110216	11-3406-SJ35J	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-210SC-0910-110216	11-3406-SJ35J	Aroclor 1260	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-210SC-0910-110216	11-3406-SJ35J	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-210SC-0910-110216	11-3406-SJ35J	Aroclor 1254	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-210SC-0910-110216	11-3406-SJ35J	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-210SC-0910-110216	11-3406-SJ35J	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-210SC-1011-110216	11-3407-SJ35K	Aroclor 1260	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-1011-110216	11-3407-SJ35K	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-1011-110216	11-3407-SJ35K	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-1011-110216	11-3407-SJ35K	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-210SC-1011-110216	11-3407-SJ35K	Aroclor 1248	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-1011-110216	11-3407-SJ35K	Aroclor 1254	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-1011-110216	11-3407-SJ35K	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-1112-110216	11-3408-SJ35L	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-210SC-1112-110216	11-3408-SJ35L	Aroclor 1260	2/18/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-210SC-1112-110216	11-3408-SJ35L	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-210SC-1112-110216	11-3408-SJ35L	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-210SC-1112-110216	11-3408-SJ35L	Aroclor 1248	2/18/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-210SC-1112-110216	11-3408-SJ35L	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.1	ug/kg
JVE-210SC-1112-110216	11-3408-SJ35L	Aroclor 1254	2/18/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-210SC-1212.7-11021	11-3409-SJ35M	Aroclor 1254	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-1212.7-11021	11-3409-SJ35M	Aroclor 1248	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-1212.7-11021	11-3409-SJ35M	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-210SC-1212.7-11021	11-3409-SJ35M	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-1212.7-11021	11-3409-SJ35M	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.7	ug/kg

SDG: SJ35

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-210SC-1212.7-11021	11-3409-SJ35M	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-210SC-1212.7-11021	11-3409-SJ35M	Aroclor 1260	2/18/2011	20	Yes	N	U			20	6.7	ug/kg

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-207SC-0203-110216	11-3412-SJ36C	Total solids	2/16/2011	54.3	Yes	Y				0.01		pct
JVE-207SC-0304-110216	11-3413-SJ36D	Total solids	2/16/2011	51.8	Yes	Y				0.01		pct
JVE-207SC-0405-110216	11-3414-SJ36E	Total solids	2/16/2011	52.3	Yes	Y				0.01		pct
JVE-207SC-0506-110216	11-3415-SJ36F	Total solids	2/16/2011	52.1	Yes	Y				0.01		pct
JVE-207SC-0607-110216	11-3416-SJ36G	Total solids	2/16/2011	55	Yes	Y				0.01		pct
JVE-207SC-0708-110216	11-3417-SJ36H	Total solids	2/16/2011	60.3	Yes	Y				0.01		pct
JVE-207SC-0809-110216	11-3418-SJ36I	Total solids	2/16/2011	62.6	Yes	Y				0.01		pct
JVE-207SC-0910-110216	11-3419-SJ36J	Total solids	2/16/2011	62.2	Yes	Y				0.01		pct
JVE-207SC-1011-110216	11-3420-SJ36K	Total solids	2/16/2011	70.2	Yes	Y				0.01		pct
JVE-207SC-1112-110216	11-3421-SJ36L	Total solids	2/16/2011	71.5	Yes	Y				0.01		pct
JVE-207SC-1212.6-11021	11-3422-SJ36M	Total solids	2/16/2011	80.8	Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-207SC-0203-110216	11-3412-SJ36C	Total organic carbon	2/17/2011	1.73	Yes	Y				0.020	0.00290	pct
JVE-207SC-0304-110216	11-3413-SJ36D	Total organic carbon	2/17/2011	2.06	Yes	Y				0.020	0.00290	pct
JVE-207SC-0405-110216	11-3414-SJ36E	Total organic carbon	2/17/2011	2.77	Yes	Y				0.020	0.00290	pct
JVE-207SC-0506-110216	11-3415-SJ36F	Total organic carbon	2/17/2011	2.53	Yes	Y				0.020	0.00290	pct
JVE-207SC-0607-110216	11-3416-SJ36G	Total organic carbon	2/17/2011	2.38	Yes	Y				0.020	0.00290	pct
JVE-207SC-0708-110216	11-3417-SJ36H	Total organic carbon	2/17/2011	1.88	Yes	Y				0.020	0.00290	pct
JVE-207SC-0809-110216	11-3418-SJ36I	Total organic carbon	2/17/2011	2.23	Yes	Y				0.020	0.00290	pct
JVE-207SC-0910-110216	11-3419-SJ36J	Total organic carbon	2/17/2011	3.46	Yes	Y				0.020	0.00290	pct
JVE-207SC-1011-110216	11-3420-SJ36K	Total organic carbon	2/17/2011	1.06	Yes	Y				0.020	0.00290	pct
JVE-207SC-1112-110216	11-3421-SJ36L	Total organic carbon	2/17/2011	1.47	Yes	Y				0.020	0.00290	pct
JVE-207SC-1212.6-11021	11-3422-SJ36M	Total organic carbon	2/17/2011	0.095	Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-207SC-0203-110216	11-3412-SJ36C	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0203-110216	11-3412-SJ36C	Aroclor 1254	2/18/2011	45	Yes	Y				20	6.7	ug/kg
JVE-207SC-0203-110216	11-3412-SJ36C	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-207SC-0203-110216	11-3412-SJ36C	Aroclor 1248	2/18/2011	31	Yes	N	Y			31	6.7	ug/kg
JVE-207SC-0203-110216	11-3412-SJ36C	Aroclor 1260	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0203-110216	11-3412-SJ36C	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0203-110216	11-3412-SJ36C	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0304-110216	11-3413-SJ36D	Aroclor 1254	2/18/2011	67	Yes	Y				20	6.7	ug/kg
JVE-207SC-0304-110216	11-3413-SJ36D	Aroclor 1260	2/18/2011	55	Yes	Y				20	6.7	ug/kg
JVE-207SC-0304-110216	11-3413-SJ36D	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0304-110216	11-3413-SJ36D	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0304-110216	11-3413-SJ36D	Aroclor 1248	2/18/2011	35	Yes	N	Y			35	6.7	ug/kg
JVE-207SC-0304-110216	11-3413-SJ36D	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0304-110216	11-3413-SJ36D	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.1	ug/kg
JVE-207SC-0405-110216	11-3414-SJ36E	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0405-110216	11-3414-SJ36E	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0405-110216	11-3414-SJ36E	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-207SC-0405-110216	11-3414-SJ36E	Aroclor 1260	2/18/2011	52	Yes	Y				20	6.7	ug/kg
JVE-207SC-0405-110216	11-3414-SJ36E	Aroclor 1248	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0405-110216	11-3414-SJ36E	Aroclor 1254	2/18/2011	35	Yes	Y				20	6.7	ug/kg
JVE-207SC-0405-110216	11-3414-SJ36E	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0506-110216	11-3415-SJ36F	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0506-110216	11-3415-SJ36F	Aroclor 1260	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0506-110216	11-3415-SJ36F	Aroclor 1254	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0506-110216	11-3415-SJ36F	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.7	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-207SC-0506-110216	11-3415-SJ36F	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0506-110216	11-3415-SJ36F	Aroclor 1248	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0506-110216	11-3415-SJ36F	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-207SC-0607-110216	11-3416-SJ36G	Aroclor 1260	2/18/2011	50	Yes	Y				20	6.7	ug/kg
JVE-207SC-0607-110216	11-3416-SJ36G	Aroclor 1254	2/18/2011	170	Yes	Y				20	6.7	ug/kg
JVE-207SC-0607-110216	11-3416-SJ36G	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0607-110216	11-3416-SJ36G	Aroclor 1248	2/18/2011	150	Yes	Y				20	6.7	ug/kg
JVE-207SC-0607-110216	11-3416-SJ36G	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-207SC-0607-110216	11-3416-SJ36G	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0607-110216	11-3416-SJ36G	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0708-110216	11-3417-SJ36H	Aroclor 1260	2/18/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-207SC-0708-110216	11-3417-SJ36H	Aroclor 1254	2/18/2011	46	Yes	Y				19	6.6	ug/kg
JVE-207SC-0708-110216	11-3417-SJ36H	Aroclor 1221	2/18/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-207SC-0708-110216	11-3417-SJ36H	Aroclor 1232	2/18/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-207SC-0708-110216	11-3417-SJ36H	Aroclor 1248	2/18/2011	31	Yes	N	Y			31	6.6	ug/kg
JVE-207SC-0708-110216	11-3417-SJ36H	Aroclor 1016	2/18/2011	19	Yes	N	U			19	4.9	ug/kg
JVE-207SC-0708-110216	11-3417-SJ36H	Aroclor 1242	2/18/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-207SC-0809-110216	11-3418-SJ36I	Aroclor 1248	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0809-110216	11-3418-SJ36I	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0809-110216	11-3418-SJ36I	Aroclor 1260	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0809-110216	11-3418-SJ36I	Aroclor 1254	2/18/2011	25	Yes	Y				20	6.7	ug/kg
JVE-207SC-0809-110216	11-3418-SJ36I	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0809-110216	11-3418-SJ36I	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-207SC-0809-110216	11-3418-SJ36I	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0910-110216	11-3419-SJ36J	Aroclor 1221	2/18/2011	20	Yes	N	U			20	6.7	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-207SC-0910-110216	11-3419-SJ36J	Aroclor 1232	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0910-110216	11-3419-SJ36J	Aroclor 1242	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0910-110216	11-3419-SJ36J	Aroclor 1016	2/18/2011	20	Yes	N	U			20	5.1	ug/kg
JVE-207SC-0910-110216	11-3419-SJ36J	Aroclor 1260	2/18/2011	32	Yes	Y				20	6.7	ug/kg
JVE-207SC-0910-110216	11-3419-SJ36J	Aroclor 1248	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-0910-110216	11-3419-SJ36J	Aroclor 1254	2/18/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-1011-110216	11-3420-SJ36K	Aroclor 1242	2/19/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-207SC-1011-110216	11-3420-SJ36K	Aroclor 1221	2/19/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-207SC-1011-110216	11-3420-SJ36K	Aroclor 1254	2/19/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-207SC-1011-110216	11-3420-SJ36K	Aroclor 1232	2/19/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-207SC-1011-110216	11-3420-SJ36K	Aroclor 1016	2/19/2011	19	Yes	N	U			19	4.9	ug/kg
JVE-207SC-1011-110216	11-3420-SJ36K	Aroclor 1260	2/19/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-207SC-1011-110216	11-3420-SJ36K	Aroclor 1248	2/19/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-207SC-1112-110216	11-3421-SJ36L	Aroclor 1260	2/19/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-207SC-1112-110216	11-3421-SJ36L	Aroclor 1016	2/19/2011	19	Yes	N	U			19	4.9	ug/kg
JVE-207SC-1112-110216	11-3421-SJ36L	Aroclor 1232	2/19/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-207SC-1112-110216	11-3421-SJ36L	Aroclor 1254	2/19/2011	26	Yes	Y				19	6.6	ug/kg
JVE-207SC-1112-110216	11-3421-SJ36L	Aroclor 1221	2/19/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-207SC-1112-110216	11-3421-SJ36L	Aroclor 1242	2/19/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-207SC-1112-110216	11-3421-SJ36L	Aroclor 1248	2/19/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-207SC-1212.6-11021	11-3422-SJ36M	Aroclor 1254	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-1212.6-11021	11-3422-SJ36M	Aroclor 1260	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-1212.6-11021	11-3422-SJ36M	Aroclor 1016	2/19/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-207SC-1212.6-11021	11-3422-SJ36M	Aroclor 1221	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-1212.6-11021	11-3422-SJ36M	Aroclor 1232	2/19/2011	20	Yes	N	U			20	6.7	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-207SC-1212.6-11021	11-3422-SJ36M	Aroclor 1242	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-207SC-1212.6-11021	11-3422-SJ36M	Aroclor 1248	2/19/2011	20	Yes	N	U			20	6.7	ug/kg

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-205SC-0203-110217	11-3504-SJ57C	Total solids	2/17/2011	52.4	Yes	Y				0.01		pct
JVE-205SC-0304-110217	11-3505-SJ57D	Total solids	2/17/2011	53.7	Yes	Y				0.01		pct
JVE-205SC-0405-110217	11-3506-SJ57E	Total solids	2/17/2011	51.9	Yes	Y				0.01		pct
JVE-205SC-0506-110217	11-3507-SJ57F	Total solids	2/17/2011	50.5	Yes	Y				0.01		pct
JVE-205SC-0607-110217	11-3508-SJ57G	Total solids	2/17/2011	53	Yes	Y				0.01		pct
JVE-205SC-0708-110217	11-3509-SJ57H	Total solids	2/17/2011	60.6	Yes	Y				0.01		pct
JVE-205SC-0809-110217	11-3510-SJ57I	Total solids	2/17/2011	61.5	Yes	Y				0.01		pct
JVE-205SC-0910-110217	11-3511-SJ57J	Total solids	2/17/2011	59.2	Yes	Y				0.01		pct
JVE-205SC-1011-110217	11-3512-SJ57K	Total solids	2/17/2011	78.3	Yes	Y				0.01		pct
JVE-205SC-1112.1-11021	11-3513-SJ57L	Total solids	2/17/2011	69	Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-205SC-0203-110217	11-3504-SJ57C	Total organic carbon	2/21/2011	1.55	Yes	Y				0.020	0.00290	pct
JVE-205SC-0304-110217	11-3505-SJ57D	Total organic carbon	2/21/2011	1.93	Yes	Y				0.020	0.00290	pct
JVE-205SC-0405-110217	11-3506-SJ57E	Total organic carbon	2/21/2011	1.97	Yes	Y				0.020	0.00290	pct
JVE-205SC-0506-110217	11-3507-SJ57F	Total organic carbon	2/21/2011	2.28	Yes	Y				0.020	0.00290	pct
JVE-205SC-0607-110217	11-3508-SJ57G	Total organic carbon	2/21/2011	2.58	Yes	Y				0.020	0.00290	pct
JVE-205SC-0708-110217	11-3509-SJ57H	Total organic carbon	2/21/2011	1.69	Yes	Y				0.020	0.00290	pct
JVE-205SC-0809-110217	11-3510-SJ57I	Total organic carbon	2/21/2011	2.67	Yes	Y				0.020	0.00290	pct
JVE-205SC-0910-110217	11-3511-SJ57J	Total organic carbon	2/21/2011	0.724	Yes	Y				0.020	0.00290	pct
JVE-205SC-1011-110217	11-3512-SJ57K	Total organic carbon	2/21/2011	0.511	Yes	Y				0.020	0.00290	pct
JVE-205SC-1112.1-11021	11-3513-SJ57L	Total organic carbon	2/21/2011	0.821	Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-205SC-0203-110217	11-3504-SJ57C	Aroclor 1016	2/19/2011	20	Yes	N	U			20	5.0	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-205SC-0203-110217	11-3504-SJ57C	Aroclor 1254	2/19/2011	100		Yes	Y				20	6.7	ug/kg
JVE-205SC-0203-110217	11-3504-SJ57C	Aroclor 1221	2/19/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-205SC-0203-110217	11-3504-SJ57C	Aroclor 1232	2/19/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-205SC-0203-110217	11-3504-SJ57C	Aroclor 1260	2/19/2011	94		Yes	Y				20	6.7	ug/kg
JVE-205SC-0203-110217	11-3504-SJ57C	Aroclor 1242	2/19/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-205SC-0203-110217	11-3504-SJ57C	Aroclor 1248	2/19/2011	51		Yes	Y				20	6.7	ug/kg
JVE-205SC-0304-110217	11-3505-SJ57D	Aroclor 1221	2/19/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-205SC-0304-110217	11-3505-SJ57D	Aroclor 1242	2/19/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-205SC-0304-110217	11-3505-SJ57D	Aroclor 1254	2/19/2011	130		Yes	Y				20	6.7	ug/kg
JVE-205SC-0304-110217	11-3505-SJ57D	Aroclor 1016	2/19/2011	20		Yes	N	U			20	5.0	ug/kg
JVE-205SC-0304-110217	11-3505-SJ57D	Aroclor 1248	2/19/2011	72		Yes	Y				20	6.7	ug/kg
JVE-205SC-0304-110217	11-3505-SJ57D	Aroclor 1260	2/19/2011	64		Yes	Y				20	6.7	ug/kg
JVE-205SC-0304-110217	11-3505-SJ57D	Aroclor 1232	2/19/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-205SC-0405-110217	11-3506-SJ57E	Aroclor 1248	2/19/2011	180		Yes	Y				20	6.7	ug/kg
JVE-205SC-0405-110217	11-3506-SJ57E	Aroclor 1260	2/19/2011	110		Yes	Y				20	6.7	ug/kg
JVE-205SC-0405-110217	11-3506-SJ57E	Aroclor 1232	2/19/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-205SC-0405-110217	11-3506-SJ57E	Aroclor 1016	2/19/2011	20		Yes	N	U			20	5.0	ug/kg
JVE-205SC-0405-110217	11-3506-SJ57E	Aroclor 1242	2/19/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-205SC-0405-110217	11-3506-SJ57E	Aroclor 1254	2/19/2011	300		Yes	Y				20	6.7	ug/kg
JVE-205SC-0405-110217	11-3506-SJ57E	Aroclor 1221	2/19/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-205SC-0506-110217	11-3507-SJ57F	Aroclor 1221	2/19/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-205SC-0506-110217	11-3507-SJ57F	Aroclor 1248	2/19/2011	110		Yes	Y				20	6.7	ug/kg
JVE-205SC-0506-110217	11-3507-SJ57F	Aroclor 1260	2/19/2011	54		Yes	Y				20	6.7	ug/kg
JVE-205SC-0506-110217	11-3507-SJ57F	Aroclor 1254	2/19/2011	160		Yes	Y				20	6.7	ug/kg
JVE-205SC-0506-110217	11-3507-SJ57F	Aroclor 1242	2/19/2011	20		Yes	N	U			20	6.7	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-205SC-0506-110217	11-3507-SJ57F	Aroclor 1232	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-205SC-0506-110217	11-3507-SJ57F	Aroclor 1016	2/19/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-205SC-0607-110217	11-3508-SJ57G	Aroclor 1232	2/21/2011	97	Yes	N	U			97	33	ug/kg
JVE-205SC-0607-110217	11-3508-SJ57G	Aroclor 1248	2/21/2011	97	Yes	N	U			97	33	ug/kg
JVE-205SC-0607-110217	11-3508-SJ57G	Aroclor 1016	2/21/2011	97	Yes	N	U			97	25	ug/kg
JVE-205SC-0607-110217	11-3508-SJ57G	Aroclor 1242	2/21/2011	1300	Yes	Y				97	33	ug/kg
JVE-205SC-0607-110217	11-3508-SJ57G	Aroclor 1260	2/21/2011	360	Yes	Y				97	33	ug/kg
JVE-205SC-0607-110217	11-3508-SJ57G	Aroclor 1254	2/21/2011	1100	Yes	Y				97	33	ug/kg
JVE-205SC-0607-110217	11-3508-SJ57G	Aroclor 1221	2/21/2011	97	Yes	N	U			97	33	ug/kg
JVE-205SC-0708-110217	11-3509-SJ57H	Aroclor 1260	2/19/2011	160	Yes	Y				19	6.6	ug/kg
JVE-205SC-0708-110217	11-3509-SJ57H	Aroclor 1254	2/19/2011	740	Yes	Y				19	6.6	ug/kg
JVE-205SC-0708-110217	11-3509-SJ57H	Aroclor 1221	2/19/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-205SC-0708-110217	11-3509-SJ57H	Aroclor 1248	2/19/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-205SC-0708-110217	11-3509-SJ57H	Aroclor 1016	2/19/2011	19	Yes	N	U			19	4.9	ug/kg
JVE-205SC-0708-110217	11-3509-SJ57H	Aroclor 1242	2/19/2011	880	Yes	Y				19	6.6	ug/kg
JVE-205SC-0708-110217	11-3509-SJ57H	Aroclor 1232	2/19/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-205SC-0809-110217	11-3510-SJ57I	Aroclor 1221	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-205SC-0809-110217	11-3510-SJ57I	Aroclor 1260	2/19/2011	150	Yes	Y				20	6.7	ug/kg
JVE-205SC-0809-110217	11-3510-SJ57I	Aroclor 1016	2/19/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-205SC-0809-110217	11-3510-SJ57I	Aroclor 1248	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-205SC-0809-110217	11-3510-SJ57I	Aroclor 1232	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-205SC-0809-110217	11-3510-SJ57I	Aroclor 1242	2/19/2011	580	Yes	Y				20	6.7	ug/kg
JVE-205SC-0809-110217	11-3510-SJ57I	Aroclor 1254	2/19/2011	800	Yes	Y				20	6.7	ug/kg
JVE-205SC-0910-110217	11-3511-SJ57J	Aroclor 1242	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-205SC-0910-110217	11-3511-SJ57J	Aroclor 1016	2/19/2011	20	Yes	N	U			20	5.0	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-205SC-0910-110217	11-3511-SJ57J	Aroclor 1248	2/19/2011	27	Yes	Y				20	6.7	ug/kg
JVE-205SC-0910-110217	11-3511-SJ57J	Aroclor 1232	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-205SC-0910-110217	11-3511-SJ57J	Aroclor 1260	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-205SC-0910-110217	11-3511-SJ57J	Aroclor 1254	2/19/2011	36	Yes	Y				20	6.7	ug/kg
JVE-205SC-0910-110217	11-3511-SJ57J	Aroclor 1221	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-205SC-1011-110217	11-3512-SJ57K	Aroclor 1254	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-205SC-1011-110217	11-3512-SJ57K	Aroclor 1016	2/19/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-205SC-1011-110217	11-3512-SJ57K	Aroclor 1221	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-205SC-1011-110217	11-3512-SJ57K	Aroclor 1232	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-205SC-1011-110217	11-3512-SJ57K	Aroclor 1242	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-205SC-1011-110217	11-3512-SJ57K	Aroclor 1260	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-205SC-1011-110217	11-3512-SJ57K	Aroclor 1248	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-205SC-1112.1-11021	11-3513-SJ57L	Aroclor 1248	2/19/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-205SC-1112.1-11021	11-3513-SJ57L	Aroclor 1016	2/19/2011	19	Yes	N	U			19	5.0	ug/kg
JVE-205SC-1112.1-11021	11-3513-SJ57L	Aroclor 1242	2/19/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-205SC-1112.1-11021	11-3513-SJ57L	Aroclor 1232	2/19/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-205SC-1112.1-11021	11-3513-SJ57L	Aroclor 1221	2/19/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-205SC-1112.1-11021	11-3513-SJ57L	Aroclor 1254	2/19/2011	29	Yes	N	Y			29	6.6	ug/kg
JVE-205SC-1112.1-11021	11-3513-SJ57L	Aroclor 1260	2/19/2011	93	Yes	Y				19	6.6	ug/kg

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-311SC-0506-110217	11-3519-SJ58F	Total solids	2/17/2011	77.2	Yes	Y				0.01		pct
JVE-311SC-0607-110217	11-3520-SJ58G	Total solids	2/17/2011	77.7	Yes	Y				0.01		pct
JVE-311SC-0708-110217	11-3521-SJ58H	Total solids	2/17/2011	82.9	Yes	Y				0.01		pct
JVE-311SC-089.4-110217	11-3522-SJ58I	Total solids	2/17/2011	84.7	Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-311SC-0506-110217	11-3519-SJ58F	Total organic carbon	2/18/2011	0.734	Yes	Y				0.020	0.00290	pct
JVE-311SC-0607-110217	11-3520-SJ58G	Total organic carbon	2/18/2011	0.304	Yes	Y				0.020	0.00290	pct
JVE-311SC-0708-110217	11-3521-SJ58H	Total organic carbon	2/18/2011	0.113	Yes	Y				0.020	0.00290	pct
JVE-311SC-089.4-110217	11-3522-SJ58I	Total organic carbon	2/18/2011	0.829	Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-311SC-0506-110217	11-3519-SJ58F	Aroclor 1221	2/19/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-311SC-0506-110217	11-3519-SJ58F	Aroclor 1242	2/19/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-311SC-0506-110217	11-3519-SJ58F	Aroclor 1254	2/19/2011	98	Yes	Y				20	6.8	ug/kg
JVE-311SC-0506-110217	11-3519-SJ58F	Aroclor 1232	2/19/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-311SC-0506-110217	11-3519-SJ58F	Aroclor 1260	2/19/2011	21	Yes	Y				20	6.8	ug/kg
JVE-311SC-0506-110217	11-3519-SJ58F	Aroclor 1016	2/19/2011	20	Yes	N	U			20	5.1	ug/kg
JVE-311SC-0506-110217	11-3519-SJ58F	Aroclor 1248	2/19/2011	30	Yes	N	Y			30	6.8	ug/kg
JVE-311SC-0607-110217	11-3520-SJ58G	Aroclor 1242	2/19/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-311SC-0607-110217	11-3520-SJ58G	Aroclor 1260	2/19/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-311SC-0607-110217	11-3520-SJ58G	Aroclor 1254	2/19/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-311SC-0607-110217	11-3520-SJ58G	Aroclor 1221	2/19/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-311SC-0607-110217	11-3520-SJ58G	Aroclor 1232	2/19/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-311SC-0607-110217	11-3520-SJ58G	Aroclor 1248	2/19/2011	19	Yes	N	U			19	6.5	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-311SC-0607-110217	11-3520-SJ58G	Aroclor 1016	2/19/2011	19		Yes	N	U			19	4.9	ug/kg
JVE-311SC-0708-110217	11-3521-SJ58H	Aroclor 1242	2/19/2011	20		Yes	N	U			20	6.8	ug/kg
JVE-311SC-0708-110217	11-3521-SJ58H	Aroclor 1260	2/19/2011	20		Yes	N	U			20	6.8	ug/kg
JVE-311SC-0708-110217	11-3521-SJ58H	Aroclor 1254	2/19/2011	20		Yes	N	U			20	6.8	ug/kg
JVE-311SC-0708-110217	11-3521-SJ58H	Aroclor 1221	2/19/2011	20		Yes	N	U			20	6.8	ug/kg
JVE-311SC-0708-110217	11-3521-SJ58H	Aroclor 1232	2/19/2011	20		Yes	N	U			20	6.8	ug/kg
JVE-311SC-0708-110217	11-3521-SJ58H	Aroclor 1016	2/19/2011	20		Yes	N	U			20	5.1	ug/kg
JVE-311SC-0708-110217	11-3521-SJ58H	Aroclor 1248	2/19/2011	20		Yes	N	U			20	6.8	ug/kg
JVE-311SC-089.4-110217	11-3522-SJ58I	Aroclor 1260	2/19/2011	20		Yes	N	U			20	6.6	ug/kg
JVE-311SC-089.4-110217	11-3522-SJ58I	Aroclor 1242	2/19/2011	20		Yes	N	U			20	6.6	ug/kg
JVE-311SC-089.4-110217	11-3522-SJ58I	Aroclor 1016	2/19/2011	20		Yes	N	U			20	5.0	ug/kg
JVE-311SC-089.4-110217	11-3522-SJ58I	Aroclor 1248	2/19/2011	20		Yes	N	U			20	6.6	ug/kg
JVE-311SC-089.4-110217	11-3522-SJ58I	Aroclor 1232	2/19/2011	20		Yes	N	U			20	6.6	ug/kg
JVE-311SC-089.4-110217	11-3522-SJ58I	Aroclor 1221	2/19/2011	20		Yes	N	U			20	6.6	ug/kg
JVE-311SC-089.4-110217	11-3522-SJ58I	Aroclor 1254	2/19/2011	20		Yes	N	U			20	6.6	ug/kg

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-320SC-0506-110217	11-3548-SJ61A	Total solids	2/17/2011	56.8	Yes	Y				0.01		pct
JVE-320SC-0607-110217	11-3549-SJ61B	Total solids	2/17/2011	55.9	Yes	Y				0.01		pct
JVE-320SC-0708-110217	11-3550-SJ61C	Total solids	2/17/2011	56.1	Yes	Y				0.01		pct
JVE-320SC-0809-110217	11-3551-SJ61D	Total solids	2/17/2011	65.7	Yes	Y				0.01		pct
JVE-320SC-0910-110217	11-3552-SJ61E	Total solids	2/17/2011	67	Yes	Y				0.01		pct
JVE-320SC-1011-110217	11-3553-SJ61F	Total solids	2/17/2011	72.4	Yes	Y				0.01		pct
JVE-320SC-1112-110217	11-3554-SJ61G	Total solids	2/17/2011	83.7	Yes	Y				0.01		pct
JVE-320SC-1212.9-11021	11-3555-SJ61H	Total solids	2/17/2011	67.8	Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-320SC-0506-110217	11-3548-SJ61A	Total organic carbon	2/21/2011	2.58	Yes	Y				0.020	0.00290	pct
JVE-320SC-0607-110217	11-3549-SJ61B	Total organic carbon	2/21/2011	2.23	Yes	Y				0.020	0.00290	pct
JVE-320SC-0708-110217	11-3550-SJ61C	Total organic carbon	2/21/2011	2.29	Yes	Y				0.020	0.00290	pct
JVE-320SC-0809-110217	11-3551-SJ61D	Total organic carbon	2/21/2011	1.13	Yes	Y				0.020	0.00290	pct
JVE-320SC-0910-110217	11-3552-SJ61E	Total organic carbon	2/21/2011	1.1	Yes	Y				0.020	0.00290	pct
JVE-320SC-1011-110217	11-3553-SJ61F	Total organic carbon	2/21/2011	0.949	Yes	Y				0.020	0.00290	pct
JVE-320SC-1112-110217	11-3554-SJ61G	Total organic carbon	2/21/2011	0.317	Yes	Y				0.020	0.00290	pct
JVE-320SC-1212.9-11021	11-3555-SJ61H	Total organic carbon	2/21/2011	2.69	Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-320SC-0506-110217	11-3548-SJ61A	Aroclor 1260	2/19/2011	34	Yes	Y				19	6.6	ug/kg
JVE-320SC-0506-110217	11-3548-SJ61A	Aroclor 1254	2/19/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-320SC-0506-110217	11-3548-SJ61A	Aroclor 1221	2/19/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-320SC-0506-110217	11-3548-SJ61A	Aroclor 1232	2/19/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-320SC-0506-110217	11-3548-SJ61A	Aroclor 1248	2/19/2011	19	Yes	N	U			19	6.6	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-320SC-0506-110217	11-3548-SJ61A	Aroclor 1016	2/19/2011	19	Yes	N	U			19	4.9	ug/kg
JVE-320SC-0506-110217	11-3548-SJ61A	Aroclor 1242	2/19/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-320SC-0607-110217	11-3549-SJ61B	Aroclor 1016	2/19/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-320SC-0607-110217	11-3549-SJ61B	Aroclor 1260	2/19/2011	150	Yes	Y				20	6.7	ug/kg
JVE-320SC-0607-110217	11-3549-SJ61B	Aroclor 1254	2/19/2011	39	Yes	N	Y			39	6.7	ug/kg
JVE-320SC-0607-110217	11-3549-SJ61B	Aroclor 1221	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-0607-110217	11-3549-SJ61B	Aroclor 1248	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-0607-110217	11-3549-SJ61B	Aroclor 1242	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-0607-110217	11-3549-SJ61B	Aroclor 1232	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-0708-110217	11-3550-SJ61C	Aroclor 1248	2/19/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-320SC-0708-110217	11-3550-SJ61C	Aroclor 1254	2/19/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-320SC-0708-110217	11-3550-SJ61C	Aroclor 1242	2/19/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-320SC-0708-110217	11-3550-SJ61C	Aroclor 1016	2/19/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-320SC-0708-110217	11-3550-SJ61C	Aroclor 1221	2/19/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-320SC-0708-110217	11-3550-SJ61C	Aroclor 1260	2/19/2011	67	Yes	Y				20	6.6	ug/kg
JVE-320SC-0708-110217	11-3550-SJ61C	Aroclor 1232	2/19/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-320SC-0809-110217	11-3551-SJ61D	Aroclor 1232	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-0809-110217	11-3551-SJ61D	Aroclor 1260	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-0809-110217	11-3551-SJ61D	Aroclor 1254	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-0809-110217	11-3551-SJ61D	Aroclor 1221	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-0809-110217	11-3551-SJ61D	Aroclor 1016	2/19/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-320SC-0809-110217	11-3551-SJ61D	Aroclor 1242	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-0809-110217	11-3551-SJ61D	Aroclor 1248	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-0910-110217	11-3552-SJ61E	Aroclor 1248	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-0910-110217	11-3552-SJ61E	Aroclor 1232	2/19/2011	20	Yes	N	U			20	6.7	ug/kg

SDG: SJ61

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-320SC-0910-110217	11-3552-SJ61E	Aroclor 1016	2/19/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-320SC-0910-110217	11-3552-SJ61E	Aroclor 1242	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-0910-110217	11-3552-SJ61E	Aroclor 1221	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-0910-110217	11-3552-SJ61E	Aroclor 1254	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-0910-110217	11-3552-SJ61E	Aroclor 1260	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-1011-110217	11-3553-SJ61F	Aroclor 1221	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-1011-110217	11-3553-SJ61F	Aroclor 1232	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-1011-110217	11-3553-SJ61F	Aroclor 1016	2/19/2011	20	Yes	N	U			20	5.1	ug/kg
JVE-320SC-1011-110217	11-3553-SJ61F	Aroclor 1254	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-1011-110217	11-3553-SJ61F	Aroclor 1260	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-1011-110217	11-3553-SJ61F	Aroclor 1242	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-1011-110217	11-3553-SJ61F	Aroclor 1248	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-1112-110217	11-3554-SJ61G	Aroclor 1221	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-1112-110217	11-3554-SJ61G	Aroclor 1242	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-1112-110217	11-3554-SJ61G	Aroclor 1016	2/19/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-320SC-1112-110217	11-3554-SJ61G	Aroclor 1248	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-1112-110217	11-3554-SJ61G	Aroclor 1232	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-1112-110217	11-3554-SJ61G	Aroclor 1254	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-1112-110217	11-3554-SJ61G	Aroclor 1260	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-1212.9-11021	11-3555-SJ61H	Aroclor 1248	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-1212.9-11021	11-3555-SJ61H	Aroclor 1232	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-1212.9-11021	11-3555-SJ61H	Aroclor 1221	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-1212.9-11021	11-3555-SJ61H	Aroclor 1016	2/19/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-320SC-1212.9-11021	11-3555-SJ61H	Aroclor 1242	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-320SC-1212.9-11021	11-3555-SJ61H	Aroclor 1260	2/19/2011	64	Yes	Y				20	6.7	ug/kg

SDG: SJ61

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-320SC-1212.9-11021	11-3555-SJ61H	Aroclor 1254	2/19/2011	20		Yes	N	U			20	6.7	ug/kg

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-316SC-0506-110217	11-3529-SJ62F	Total solids	2/17/2011	82.3		Yes	Y				0.01		pct
JVE-316SC-0607-110217	11-3530-SJ62G	Total solids	2/17/2011	77.4		Yes	Y				0.01		pct
JVE-316SC-0708-110217	11-3531-SJ62H	Total solids	2/17/2011	83.5		Yes	Y				0.01		pct
JVE-316SC-0809-110217	11-3532-SJ62I	Total solids	2/17/2011	85.7		Yes	Y				0.01		pct
JVE-316SC-099.7-110217	11-3533-SJ62J	Total solids	2/17/2011	81.5		Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-316SC-0506-110217	11-3529-SJ62F	Total organic carbon	2/18/2011	0.254		Yes	Y				0.020	0.00290	pct
JVE-316SC-0607-110217	11-3530-SJ62G	Total organic carbon	2/18/2011	0.323		Yes	Y				0.020	0.00290	pct
JVE-316SC-0708-110217	11-3531-SJ62H	Total organic carbon	2/18/2011	0.111		Yes	Y				0.020	0.00290	pct
JVE-316SC-0809-110217	11-3532-SJ62I	Total organic carbon	2/18/2011	0.151		Yes	Y				0.020	0.00290	pct
JVE-316SC-099.7-110217	11-3533-SJ62J	Total organic carbon	2/18/2011	0.119		Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-316SC-0506-110217	11-3529-SJ62F	Aroclor 1254	2/19/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-316SC-0506-110217	11-3529-SJ62F	Aroclor 1221	2/19/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-316SC-0506-110217	11-3529-SJ62F	Aroclor 1232	2/19/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-316SC-0506-110217	11-3529-SJ62F	Aroclor 1248	2/19/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-316SC-0506-110217	11-3529-SJ62F	Aroclor 1016	2/19/2011	19		Yes	N	U			19	4.9	ug/kg
JVE-316SC-0506-110217	11-3529-SJ62F	Aroclor 1242	2/19/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-316SC-0506-110217	11-3529-SJ62F	Aroclor 1260	2/19/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-316SC-0607-110217	11-3530-SJ62G	Aroclor 1248	2/19/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-316SC-0607-110217	11-3530-SJ62G	Aroclor 1232	2/19/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-316SC-0607-110217	11-3530-SJ62G	Aroclor 1254	2/19/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-316SC-0607-110217	11-3530-SJ62G	Aroclor 1016	2/19/2011	20		Yes	N	U			20	5.0	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-316SC-0607-110217	11-3530-SJ62G	Aroclor 1242	2/19/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-316SC-0607-110217	11-3530-SJ62G	Aroclor 1260	2/19/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-316SC-0607-110217	11-3530-SJ62G	Aroclor 1221	2/19/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-316SC-0708-110217	11-3531-SJ62H	Aroclor 1254	2/19/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-316SC-0708-110217	11-3531-SJ62H	Aroclor 1221	2/19/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-316SC-0708-110217	11-3531-SJ62H	Aroclor 1260	2/19/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-316SC-0708-110217	11-3531-SJ62H	Aroclor 1242	2/19/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-316SC-0708-110217	11-3531-SJ62H	Aroclor 1016	2/19/2011	20		Yes	N	U			20	5.0	ug/kg
JVE-316SC-0708-110217	11-3531-SJ62H	Aroclor 1248	2/19/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-316SC-0708-110217	11-3531-SJ62H	Aroclor 1232	2/19/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-316SC-0809-110217	11-3532-SJ62I	Aroclor 1232	2/20/2011	20		Yes	N	U			20	6.6	ug/kg
JVE-316SC-0809-110217	11-3532-SJ62I	Aroclor 1221	2/20/2011	20		Yes	N	U			20	6.6	ug/kg
JVE-316SC-0809-110217	11-3532-SJ62I	Aroclor 1260	2/20/2011	20		Yes	N	U			20	6.6	ug/kg
JVE-316SC-0809-110217	11-3532-SJ62I	Aroclor 1254	2/20/2011	20		Yes	N	U			20	6.6	ug/kg
JVE-316SC-0809-110217	11-3532-SJ62I	Aroclor 1016	2/20/2011	20		Yes	N	U			20	5.0	ug/kg
JVE-316SC-0809-110217	11-3532-SJ62I	Aroclor 1248	2/20/2011	20		Yes	N	U			20	6.6	ug/kg
JVE-316SC-0809-110217	11-3532-SJ62I	Aroclor 1242	2/20/2011	20		Yes	N	U			20	6.6	ug/kg
JVE-316SC-099.7-110217	11-3533-SJ62J	Aroclor 1242	2/20/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-316SC-099.7-110217	11-3533-SJ62J	Aroclor 1260	2/20/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-316SC-099.7-110217	11-3533-SJ62J	Aroclor 1254	2/20/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-316SC-099.7-110217	11-3533-SJ62J	Aroclor 1221	2/20/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-316SC-099.7-110217	11-3533-SJ62J	Aroclor 1232	2/20/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-316SC-099.7-110217	11-3533-SJ62J	Aroclor 1016	2/20/2011	19		Yes	N	U			19	4.9	ug/kg
JVE-316SC-099.7-110217	11-3533-SJ62J	Aroclor 1248	2/20/2011	19		Yes	N	U			19	6.6	ug/kg

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-1205SC-0203-110217	11-3546-SJ63M	Total solids	2/17/2011	52.3	Yes	Y				0.01		pct
JVE-1309SC-0910-110217	11-3547-SJ63N	Total solids	2/17/2011	79.4	Yes	Y				0.01		pct
JVE-309SC-0506-110217	11-3539-SJ63F	Total solids	2/17/2011	81.1	Yes	Y				0.01		pct
JVE-309SC-0607-110217	11-3540-SJ63G	Total solids	2/17/2011	80.2	Yes	Y				0.01		pct
JVE-309SC-0708-110217	11-3541-SJ63H	Total solids	2/17/2011	75.2	Yes	Y				0.01		pct
JVE-309SC-0809-110217	11-3542-SJ63I	Total solids	2/17/2011	73.7	Yes	Y				0.01		pct
JVE-309SC-0910-110217	11-3543-SJ63J	Total solids	2/17/2011	78.7	Yes	Y				0.01		pct
JVE-309SC-1011-110217	11-3544-SJ63K	Total solids	2/17/2011	76.2	Yes	Y				0.01		pct
JVE-309SC-1111.5-11021	11-3545-SJ63L	Total solids	2/17/2011	60.2	Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-1205SC-0203-110217	11-3546-SJ63M	Total organic carbon	2/21/2011	1.66	Yes	Y				0.020	0.00290	pct
JVE-1309SC-0910-110217	11-3547-SJ63N	Total organic carbon	2/21/2011	0.138	Yes	Y				0.020	0.00290	pct
JVE-309SC-0506-110217	11-3539-SJ63F	Total organic carbon	2/21/2011	1.03	Yes	Y				0.020	0.00290	pct
JVE-309SC-0607-110217	11-3540-SJ63G	Total organic carbon	2/21/2011	0.131	Yes	Y				0.020	0.00290	pct
JVE-309SC-0708-110217	11-3541-SJ63H	Total organic carbon	2/21/2011	0.617	Yes	Y				0.020	0.00290	pct
JVE-309SC-0809-110217	11-3542-SJ63I	Total organic carbon	2/21/2011	0.767	Yes	Y				0.020	0.00290	pct
JVE-309SC-0910-110217	11-3543-SJ63J	Total organic carbon	2/21/2011	0.185	Yes	Y				0.020	0.00290	pct
JVE-309SC-1011-110217	11-3544-SJ63K	Total organic carbon	2/21/2011	0.376	Yes	Y				0.020	0.00290	pct
JVE-309SC-1111.5-11021	11-3545-SJ63L	Total organic carbon	2/21/2011	2.55	Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-1205SC-0203-110217	11-3546-SJ63M	Aroclor 1260	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-1205SC-0203-110217	11-3546-SJ63M	Aroclor 1254	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-1205SC-0203-110217	11-3546-SJ63M	Aroclor 1221	2/19/2011	20	Yes	N	U			20	6.7	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-1205SC-0203-110217	11-3546-SJ63M	Aroclor 1232	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-1205SC-0203-110217	11-3546-SJ63M	Aroclor 1248	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-1205SC-0203-110217	11-3546-SJ63M	Aroclor 1242	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-1205SC-0203-110217	11-3546-SJ63M	Aroclor 1016	2/19/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-1309SC-0910-110217	11-3547-SJ63N	Aroclor 1016	2/19/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-1309SC-0910-110217	11-3547-SJ63N	Aroclor 1260	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-1309SC-0910-110217	11-3547-SJ63N	Aroclor 1232	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-1309SC-0910-110217	11-3547-SJ63N	Aroclor 1248	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-1309SC-0910-110217	11-3547-SJ63N	Aroclor 1254	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-1309SC-0910-110217	11-3547-SJ63N	Aroclor 1242	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-1309SC-0910-110217	11-3547-SJ63N	Aroclor 1221	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-309SC-0506-110217	11-3539-SJ63F	Aroclor 1260	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-309SC-0506-110217	11-3539-SJ63F	Aroclor 1254	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-309SC-0506-110217	11-3539-SJ63F	Aroclor 1221	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-309SC-0506-110217	11-3539-SJ63F	Aroclor 1232	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-309SC-0506-110217	11-3539-SJ63F	Aroclor 1248	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-309SC-0506-110217	11-3539-SJ63F	Aroclor 1016	2/19/2011	20	Yes	N	U			20	5.1	ug/kg
JVE-309SC-0506-110217	11-3539-SJ63F	Aroclor 1242	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-309SC-0607-110217	11-3540-SJ63G	Aroclor 1221	2/19/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-309SC-0607-110217	11-3540-SJ63G	Aroclor 1260	2/19/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-309SC-0607-110217	11-3540-SJ63G	Aroclor 1016	2/19/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-309SC-0607-110217	11-3540-SJ63G	Aroclor 1242	2/19/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-309SC-0607-110217	11-3540-SJ63G	Aroclor 1232	2/19/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-309SC-0607-110217	11-3540-SJ63G	Aroclor 1254	2/19/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-309SC-0607-110217	11-3540-SJ63G	Aroclor 1248	2/19/2011	20	Yes	N	U			20	6.6	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-309SC-0708-110217	11-3541-SJ63H	Aroclor 1248	2/19/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-309SC-0708-110217	11-3541-SJ63H	Aroclor 1016	2/19/2011	19	Yes	N	U			19	4.9	ug/kg
JVE-309SC-0708-110217	11-3541-SJ63H	Aroclor 1242	2/19/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-309SC-0708-110217	11-3541-SJ63H	Aroclor 1221	2/19/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-309SC-0708-110217	11-3541-SJ63H	Aroclor 1232	2/19/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-309SC-0708-110217	11-3541-SJ63H	Aroclor 1260	2/19/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-309SC-0708-110217	11-3541-SJ63H	Aroclor 1254	2/19/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-309SC-0809-110217	11-3542-SJ63I	Aroclor 1260	2/19/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-309SC-0809-110217	11-3542-SJ63I	Aroclor 1254	2/19/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-309SC-0809-110217	11-3542-SJ63I	Aroclor 1221	2/19/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-309SC-0809-110217	11-3542-SJ63I	Aroclor 1232	2/19/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-309SC-0809-110217	11-3542-SJ63I	Aroclor 1248	2/19/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-309SC-0809-110217	11-3542-SJ63I	Aroclor 1242	2/19/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-309SC-0809-110217	11-3542-SJ63I	Aroclor 1016	2/19/2011	20	Yes	N	U			20	5.1	ug/kg
JVE-309SC-0910-110217	11-3543-SJ63J	Aroclor 1221	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-309SC-0910-110217	11-3543-SJ63J	Aroclor 1232	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-309SC-0910-110217	11-3543-SJ63J	Aroclor 1248	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-309SC-0910-110217	11-3543-SJ63J	Aroclor 1016	2/19/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-309SC-0910-110217	11-3543-SJ63J	Aroclor 1242	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-309SC-0910-110217	11-3543-SJ63J	Aroclor 1254	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-309SC-0910-110217	11-3543-SJ63J	Aroclor 1260	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-309SC-1011-110217	11-3544-SJ63K	Aroclor 1242	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-309SC-1011-110217	11-3544-SJ63K	Aroclor 1260	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-309SC-1011-110217	11-3544-SJ63K	Aroclor 1254	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-309SC-1011-110217	11-3544-SJ63K	Aroclor 1221	2/19/2011	20	Yes	N	U			20	6.7	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-309SC-1011-110217	11-3544-SJ63K	Aroclor 1016	2/19/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-309SC-1011-110217	11-3544-SJ63K	Aroclor 1248	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-309SC-1011-110217	11-3544-SJ63K	Aroclor 1232	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-309SC-1111.5-11021	11-3545-SJ63L	Aroclor 1254	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-309SC-1111.5-11021	11-3545-SJ63L	Aroclor 1232	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-309SC-1111.5-11021	11-3545-SJ63L	Aroclor 1248	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-309SC-1111.5-11021	11-3545-SJ63L	Aroclor 1016	2/19/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-309SC-1111.5-11021	11-3545-SJ63L	Aroclor 1242	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-309SC-1111.5-11021	11-3545-SJ63L	Aroclor 1221	2/19/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-309SC-1111.5-11021	11-3545-SJ63L	Aroclor 1260	2/19/2011	20	Yes	N	U			20	6.7	ug/kg

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-322SC-0809-110218	11-3624-SJ81A	Total solids	2/18/2011	72.1		Yes	Y				0.01		pct
JVE-322SC-0910-110218	11-3625-SJ81B	Total solids	2/18/2011	80.1		Yes	Y				0.01		pct
JVE-322SC-1011-110218	11-3626-SJ81C	Total solids	2/18/2011	86.4		Yes	Y				0.01		pct
JVE-322SC-1112.4-11021	11-3627-SJ81D	Total solids	2/18/2011	77.1		Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-322SC-0809-110218	11-3624-SJ81A	Total organic carbon	2/22/2011	1.86		Yes	Y				0.020	0.00290	pct
JVE-322SC-0910-110218	11-3625-SJ81B	Total organic carbon	2/22/2011	1.94		Yes	Y				0.020	0.00290	pct
JVE-322SC-1011-110218	11-3626-SJ81C	Total organic carbon	2/22/2011	0.932		Yes	Y				0.020	0.00290	pct
JVE-322SC-1112.4-11021	11-3627-SJ81D	Total organic carbon	2/22/2011	1.88		Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-322SC-0809-110218	11-3624-SJ81A	Aroclor 1254	2/21/2011	21		Yes	Y				19	6.6	ug/kg
JVE-322SC-0809-110218	11-3624-SJ81A	Aroclor 1221	2/21/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-322SC-0809-110218	11-3624-SJ81A	Aroclor 1232	2/21/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-322SC-0809-110218	11-3624-SJ81A	Aroclor 1248	2/21/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-322SC-0809-110218	11-3624-SJ81A	Aroclor 1016	2/21/2011	19		Yes	N	U			19	4.9	ug/kg
JVE-322SC-0809-110218	11-3624-SJ81A	Aroclor 1242	2/21/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-322SC-0809-110218	11-3624-SJ81A	Aroclor 1260	2/21/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-322SC-0910-110218	11-3625-SJ81B	Aroclor 1232	2/21/2011	20		Yes	N	U			20	6.6	ug/kg
JVE-322SC-0910-110218	11-3625-SJ81B	Aroclor 1260	2/21/2011	20		Yes	N	U			20	6.6	ug/kg
JVE-322SC-0910-110218	11-3625-SJ81B	Aroclor 1221	2/21/2011	20		Yes	N	U			20	6.6	ug/kg
JVE-322SC-0910-110218	11-3625-SJ81B	Aroclor 1242	2/21/2011	20		Yes	N	U			20	6.6	ug/kg
JVE-322SC-0910-110218	11-3625-SJ81B	Aroclor 1016	2/21/2011	20		Yes	N	U			20	5.0	ug/kg
JVE-322SC-0910-110218	11-3625-SJ81B	Aroclor 1248	2/21/2011	20		Yes	N	U			20	6.6	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-322SC-0910-110218	11-3625-SJ81B	Aroclor 1254	2/21/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-322SC-1011-110218	11-3626-SJ81C	Aroclor 1260	2/21/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-322SC-1011-110218	11-3626-SJ81C	Aroclor 1242	2/21/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-322SC-1011-110218	11-3626-SJ81C	Aroclor 1016	2/21/2011	19	Yes	N	U			19	4.9	ug/kg
JVE-322SC-1011-110218	11-3626-SJ81C	Aroclor 1254	2/21/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-322SC-1011-110218	11-3626-SJ81C	Aroclor 1221	2/21/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-322SC-1011-110218	11-3626-SJ81C	Aroclor 1232	2/21/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-322SC-1011-110218	11-3626-SJ81C	Aroclor 1248	2/21/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-322SC-1112.4-11021	11-3627-SJ81D	Aroclor 1232	2/21/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-322SC-1112.4-11021	11-3627-SJ81D	Aroclor 1260	2/21/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-322SC-1112.4-11021	11-3627-SJ81D	Aroclor 1254	2/21/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-322SC-1112.4-11021	11-3627-SJ81D	Aroclor 1221	2/21/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-322SC-1112.4-11021	11-3627-SJ81D	Aroclor 1248	2/21/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-322SC-1112.4-11021	11-3627-SJ81D	Aroclor 1016	2/21/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-322SC-1112.4-11021	11-3627-SJ81D	Aroclor 1242	2/21/2011	20	Yes	N	U			20	6.7	ug/kg

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-216SC-1011-110218	11-3637-SJ82A	Total solids	2/18/2011	86.2	Yes	Y				0.01		pct
JVE-216SC-1112.1-11021	11-3638-SJ82B	Total solids	2/18/2011	80.2	Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-216SC-1011-110218	11-3637-SJ82A	Total organic carbon	2/21/2011	0.24	Yes	Y				0.020	0.00290	pct
JVE-216SC-1112.1-11021	11-3638-SJ82B	Total organic carbon	2/21/2011	0.327	Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-216SC-1011-110218	11-3637-SJ82A	Aroclor 1242	2/21/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-216SC-1011-110218	11-3637-SJ82A	Aroclor 1254	2/21/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-216SC-1011-110218	11-3637-SJ82A	Aroclor 1221	2/21/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-216SC-1011-110218	11-3637-SJ82A	Aroclor 1016	2/21/2011	19	Yes	N	U			19	4.9	ug/kg
JVE-216SC-1011-110218	11-3637-SJ82A	Aroclor 1260	2/21/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-216SC-1011-110218	11-3637-SJ82A	Aroclor 1232	2/21/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-216SC-1011-110218	11-3637-SJ82A	Aroclor 1248	2/21/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-216SC-1112.1-11021	11-3638-SJ82B	Aroclor 1232	2/21/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-216SC-1112.1-11021	11-3638-SJ82B	Aroclor 1254	2/21/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-216SC-1112.1-11021	11-3638-SJ82B	Aroclor 1221	2/21/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-216SC-1112.1-11021	11-3638-SJ82B	Aroclor 1248	2/21/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-216SC-1112.1-11021	11-3638-SJ82B	Aroclor 1016	2/21/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-216SC-1112.1-11021	11-3638-SJ82B	Aroclor 1242	2/21/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-216SC-1112.1-11021	11-3638-SJ82B	Aroclor 1260	2/21/2011	20	Yes	N	U			20	6.7	ug/kg

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-1314SC-0506-110218	11-3657-SJ83I	Total solids	2/18/2011	85		Yes	Y				0.01		pct
JVE-314SC-0506-110218	11-3654-SJ83F	Total solids	2/18/2011	86.1		Yes	Y				0.01		pct
JVE-314SC-0607-110218	11-3655-SJ83G	Total solids	2/18/2011	84.7		Yes	Y				0.01		pct
JVE-314SC-077.9-110218	11-3656-SJ83H	Total solids	2/18/2011	80.2		Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-1314SC-0506-110218	11-3657-SJ83I	Total organic carbon	2/21/2011	0.581		Yes	Y				0.020	0.00290	pct
JVE-314SC-0506-110218	11-3654-SJ83F	Total organic carbon	2/21/2011	0.527		Yes	Y				0.020	0.00290	pct
JVE-314SC-0607-110218	11-3655-SJ83G	Total organic carbon	2/21/2011	0.916		Yes	Y				0.020	0.00290	pct
JVE-314SC-077.9-110218	11-3656-SJ83H	Total organic carbon	2/21/2011	0.726		Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-1314SC-0506-110218	11-3657-SJ83I	Aroclor 1232	2/22/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-1314SC-0506-110218	11-3657-SJ83I	Aroclor 1254	2/22/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-1314SC-0506-110218	11-3657-SJ83I	Aroclor 1260	2/22/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-1314SC-0506-110218	11-3657-SJ83I	Aroclor 1242	2/22/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-1314SC-0506-110218	11-3657-SJ83I	Aroclor 1221	2/22/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-1314SC-0506-110218	11-3657-SJ83I	Aroclor 1248	2/22/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-1314SC-0506-110218	11-3657-SJ83I	Aroclor 1016	2/22/2011	19		Yes	N	U			19	4.9	ug/kg
JVE-314SC-0506-110218	11-3654-SJ83F	Aroclor 1232	2/22/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-314SC-0506-110218	11-3654-SJ83F	Aroclor 1242	2/22/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-314SC-0506-110218	11-3654-SJ83F	Aroclor 1254	2/22/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-314SC-0506-110218	11-3654-SJ83F	Aroclor 1248	2/22/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-314SC-0506-110218	11-3654-SJ83F	Aroclor 1016	2/22/2011	19		Yes	N	U			19	5.0	ug/kg
JVE-314SC-0506-110218	11-3654-SJ83F	Aroclor 1260	2/22/2011	19		Yes	N	U			19	6.6	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-314SC-0506-110218	11-3654-SJ83F	Aroclor 1221	2/22/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-314SC-0607-110218	11-3655-SJ83G	Aroclor 1232	2/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-314SC-0607-110218	11-3655-SJ83G	Aroclor 1242	2/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-314SC-0607-110218	11-3655-SJ83G	Aroclor 1248	2/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-314SC-0607-110218	11-3655-SJ83G	Aroclor 1221	2/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-314SC-0607-110218	11-3655-SJ83G	Aroclor 1254	2/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-314SC-0607-110218	11-3655-SJ83G	Aroclor 1260	2/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-314SC-0607-110218	11-3655-SJ83G	Aroclor 1016	2/22/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-314SC-077.9-110218	11-3656-SJ83H	Aroclor 1248	2/22/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-314SC-077.9-110218	11-3656-SJ83H	Aroclor 1232	2/22/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-314SC-077.9-110218	11-3656-SJ83H	Aroclor 1221	2/22/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-314SC-077.9-110218	11-3656-SJ83H	Aroclor 1260	2/22/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-314SC-077.9-110218	11-3656-SJ83H	Aroclor 1254	2/22/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-314SC-077.9-110218	11-3656-SJ83H	Aroclor 1016	2/22/2011	19	Yes	N	U			19	4.9	ug/kg
JVE-314SC-077.9-110218	11-3656-SJ83H	Aroclor 1242	2/22/2011	19	Yes	N	U			19	6.6	ug/kg

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-01SC-099.7-110218	11-3662-SJ90A	Total solids	2/18/2011	81.8	Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-01SC-099.7-110218	11-3662-SJ90A	Total organic carbon	2/21/2011	0.068	Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-01SC-099.7-110218	11-3662-SJ90A	Aroclor 1242	2/22/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-01SC-099.7-110218	11-3662-SJ90A	Aroclor 1248	2/22/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-01SC-099.7-110218	11-3662-SJ90A	Aroclor 1260	2/22/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-01SC-099.7-110218	11-3662-SJ90A	Aroclor 1016	2/22/2011	19	Yes	N	U			19	4.9	ug/kg
JVE-01SC-099.7-110218	11-3662-SJ90A	Aroclor 1232	2/22/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-01SC-099.7-110218	11-3662-SJ90A	Aroclor 1221	2/22/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-01SC-099.7-110218	11-3662-SJ90A	Aroclor 1254	2/22/2011	19	Yes	N	U			19	6.5	ug/kg

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-07SC-0910-110218	11-3688-SJ91B	Total solids	2/18/2011	78.1		Yes	Y				0.01		pct
JVE-07SC-1011-110218	11-3689-SJ91C	Total solids	2/18/2011	76.7		Yes	Y				0.01		pct
JVE-07SC-1112.2-110218	11-3690-SJ91D	Total solids	2/18/2011	76		Yes	Y				0.01		pct
JVE-1007SC-0910-110218	11-3687-SJ91A	Total solids	2/18/2011	77.1		Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-07SC-0910-110218	11-3688-SJ91B	Total organic carbon	2/22/2011	2.23		Yes	Y				0.020	0.00290	pct
JVE-07SC-1011-110218	11-3689-SJ91C	Total organic carbon	2/22/2011	1.39		Yes	Y				0.020	0.00290	pct
JVE-07SC-1112.2-110218	11-3690-SJ91D	Total organic carbon	2/22/2011	4.39		Yes	Y				0.020	0.00290	pct
JVE-1007SC-0910-110218	11-3687-SJ91A	Total organic carbon	2/22/2011	3.98		Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-07SC-0910-110218	11-3688-SJ91B	Aroclor 1242	2/22/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-07SC-0910-110218	11-3688-SJ91B	Aroclor 1232	2/22/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-07SC-0910-110218	11-3688-SJ91B	Aroclor 1254	2/22/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-07SC-0910-110218	11-3688-SJ91B	Aroclor 1260	2/22/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-07SC-0910-110218	11-3688-SJ91B	Aroclor 1248	2/22/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-07SC-0910-110218	11-3688-SJ91B	Aroclor 1016	2/22/2011	20		Yes	N	U			20	5.0	ug/kg
JVE-07SC-0910-110218	11-3688-SJ91B	Aroclor 1221	2/22/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-07SC-1011-110218	11-3689-SJ91C	Aroclor 1242	2/22/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-07SC-1011-110218	11-3689-SJ91C	Aroclor 1016	2/22/2011	20		Yes	N	U			20	5.0	ug/kg
JVE-07SC-1011-110218	11-3689-SJ91C	Aroclor 1248	2/22/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-07SC-1011-110218	11-3689-SJ91C	Aroclor 1260	2/22/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-07SC-1011-110218	11-3689-SJ91C	Aroclor 1254	2/22/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-07SC-1011-110218	11-3689-SJ91C	Aroclor 1221	2/22/2011	20		Yes	N	U			20	6.7	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-07SC-1011-110218	11-3689-SJ91C	Aroclor 1232	2/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-07SC-1112.2-110218	11-3690-SJ91D	Aroclor 1232	2/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-07SC-1112.2-110218	11-3690-SJ91D	Aroclor 1242	2/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-07SC-1112.2-110218	11-3690-SJ91D	Aroclor 1248	2/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-07SC-1112.2-110218	11-3690-SJ91D	Aroclor 1221	2/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-07SC-1112.2-110218	11-3690-SJ91D	Aroclor 1254	2/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-07SC-1112.2-110218	11-3690-SJ91D	Aroclor 1260	2/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-07SC-1112.2-110218	11-3690-SJ91D	Aroclor 1016	2/22/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-1007SC-0910-110218	11-3687-SJ91A	Aroclor 1221	2/22/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-1007SC-0910-110218	11-3687-SJ91A	Aroclor 1254	2/22/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-1007SC-0910-110218	11-3687-SJ91A	Aroclor 1232	2/22/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-1007SC-0910-110218	11-3687-SJ91A	Aroclor 1248	2/22/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-1007SC-0910-110218	11-3687-SJ91A	Aroclor 1016	2/22/2011	19	Yes	N	U			19	4.9	ug/kg
JVE-1007SC-0910-110218	11-3687-SJ91A	Aroclor 1242	2/22/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-1007SC-0910-110218	11-3687-SJ91A	Aroclor 1260	2/22/2011	19	Yes	N	U			19	6.5	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-FB-110218	11-3701-SJ92B	Aroclor 1242	2/23/2011	1	Yes	N	U			1.0	0.12	ug/L
JVE-FB-110218	11-3701-SJ92B	Aroclor 1254	2/23/2011	1	Yes	N	U			1.0	0.12	ug/L
JVE-FB-110218	11-3701-SJ92B	Aroclor 1221	2/23/2011	1	Yes	N	U			1.0	0.12	ug/L
JVE-FB-110218	11-3701-SJ92B	Aroclor 1232	2/23/2011	1	Yes	N	U			1.0	0.12	ug/L
JVE-FB-110218	11-3701-SJ92B	Aroclor 1248	2/23/2011	1	Yes	N	U			1.0	0.12	ug/L
JVE-FB-110218	11-3701-SJ92B	Aroclor 1016	2/23/2011	1	Yes	N	U			1.0	0.12	ug/L
JVE-FB-110218	11-3701-SJ92B	Aroclor 1260	2/23/2011	1	Yes	N	U			1.0	0.079	ug/L
JVE-RB-110218	11-3700-SJ92A	Aroclor 1232	2/23/2011	1	Yes	N	U			1.0	0.12	ug/L
JVE-RB-110218	11-3700-SJ92A	Aroclor 1248	2/23/2011	1	Yes	N	U			1.0	0.12	ug/L
JVE-RB-110218	11-3700-SJ92A	Aroclor 1016	2/23/2011	1	Yes	N	U			1.0	0.12	ug/L
JVE-RB-110218	11-3700-SJ92A	Aroclor 1221	2/23/2011	1	Yes	N	U			1.0	0.12	ug/L
JVE-RB-110218	11-3700-SJ92A	Aroclor 1242	2/23/2011	1	Yes	N	U			1.0	0.12	ug/L
JVE-RB-110218	11-3700-SJ92A	Aroclor 1260	2/23/2011	1	Yes	N	U			1.0	0.079	ug/L
JVE-RB-110218	11-3700-SJ92A	Aroclor 1254	2/23/2011	1	Yes	N	U			1.0	0.12	ug/L

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-02SC-099.6-110221	11-3728-SJ99A	Total solids	2/21/2011	84.5		Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-02SC-099.6-110221	11-3728-SJ99A	Total organic carbon	2/22/2011	0.072		Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-02SC-099.6-110221	11-3728-SJ99A	Aroclor 1260	2/22/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-02SC-099.6-110221	11-3728-SJ99A	Aroclor 1254	2/22/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-02SC-099.6-110221	11-3728-SJ99A	Aroclor 1232	2/22/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-02SC-099.6-110221	11-3728-SJ99A	Aroclor 1221	2/22/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-02SC-099.6-110221	11-3728-SJ99A	Aroclor 1016	2/22/2011	19		Yes	N	U			19	4.9	ug/kg
JVE-02SC-099.6-110221	11-3728-SJ99A	Aroclor 1242	2/22/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-02SC-099.6-110221	11-3728-SJ99A	Aroclor 1248	2/22/2011	19		Yes	N	U			19	6.6	ug/kg

SDG: SK00

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-03SC-1112.2-110221	11-3739-SK00A	Total solids	2/21/2011	76.4		Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-03SC-1112.2-110221	11-3739-SK00A	Total organic carbon	2/22/2011	1.2		Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-03SC-1112.2-110221	11-3739-SK00A	Aroclor 1221	2/22/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-03SC-1112.2-110221	11-3739-SK00A	Aroclor 1260	2/22/2011	32		Yes	Y				20	6.7	ug/kg
JVE-03SC-1112.2-110221	11-3739-SK00A	Aroclor 1248	2/22/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-03SC-1112.2-110221	11-3739-SK00A	Aroclor 1242	2/22/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-03SC-1112.2-110221	11-3739-SK00A	Aroclor 1016	2/22/2011	20		Yes	N	U			20	5.0	ug/kg
JVE-03SC-1112.2-110221	11-3739-SK00A	Aroclor 1254	2/22/2011	82		Yes	Y				20	6.7	ug/kg
JVE-03SC-1112.2-110221	11-3739-SK00A	Aroclor 1232	2/22/2011	20		Yes	N	U			20	6.7	ug/kg

SDG: SK01

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-04SC-089.2-110221	11-3752-SK01A	Total solids	2/21/2011	86.2		Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-04SC-089.2-110221	11-3752-SK01A	Total organic carbon	2/22/2011	0.104		Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-04SC-089.2-110221	11-3752-SK01A	Aroclor 1221	2/22/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-04SC-089.2-110221	11-3752-SK01A	Aroclor 1242	2/22/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-04SC-089.2-110221	11-3752-SK01A	Aroclor 1016	2/22/2011	19		Yes	N	U			19	4.9	ug/kg
JVE-04SC-089.2-110221	11-3752-SK01A	Aroclor 1232	2/22/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-04SC-089.2-110221	11-3752-SK01A	Aroclor 1254	2/22/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-04SC-089.2-110221	11-3752-SK01A	Aroclor 1260	2/22/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-04SC-089.2-110221	11-3752-SK01A	Aroclor 1248	2/22/2011	19		Yes	N	U			19	6.6	ug/kg

SDG: SL49

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-207SC-0607-110216	11-4486-SL49A	Total solids	3/7/2011	55.5		Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-207SC-0607-110216	11-4486-SL49A	Total organic carbon	3/8/2011	2.32		Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-207SC-0607-110216	11-4486-SL49A	Aroclor 1248	3/5/2011	22		Yes	N	U			22	7.6	ug/kg
JVE-207SC-0607-110216	11-4486-SL49A	Aroclor 1242	3/5/2011	410		Yes	Y				22	7.6	ug/kg
JVE-207SC-0607-110216	11-4486-SL49A	Aroclor 1221	3/5/2011	22		Yes	N	U			22	7.6	ug/kg
JVE-207SC-0607-110216	11-4486-SL49A	Aroclor 1254	3/5/2011	460		Yes	Y				22	7.6	ug/kg
JVE-207SC-0607-110216	11-4486-SL49A	Aroclor 1232	3/5/2011	22		Yes	N	U			22	7.6	ug/kg
JVE-207SC-0607-110216	11-4486-SL49A	Aroclor 1260	3/5/2011	140		Yes	Y				22	7.6	ug/kg
JVE-207SC-0607-110216	11-4486-SL49A	Aroclor 1016	3/5/2011	22		Yes	N	U			22	5.7	ug/kg

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-03SC-0708-110221	11-4607-SL71A	Total solids	3/7/2011	59.6	Yes	Y				0.01		pct
JVE-03SC-0809-110221	11-4608-SL71B	Total solids	3/7/2011	75.2	Yes	Y				0.01		pct
JVE-03SC-0910-110221	11-4609-SL71C	Total solids	3/7/2011	74.8	Yes	Y				0.01		pct
JVE-03SC-1011-110221	11-4610-SL71D	Total solids	3/7/2011	74.1	Yes	Y				0.01		pct
JVE-04SC-0506-110221	11-4611-SL71E	Total solids	3/7/2011	81.4	Yes	Y				0.01		pct
JVE-04SC-0607-110221	11-4612-SL71F	Total solids	3/7/2011	84.3	Yes	Y				0.01		pct
JVE-04SC-0708-110221	11-4613-SL71G	Total solids	3/7/2011	85	Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-03SC-0708-110221	11-4607-SL71A	Total organic carbon	3/8/2011	1.49	Yes	Y				0.020	0.00290	pct
JVE-03SC-0809-110221	11-4608-SL71B	Total organic carbon	3/8/2011	1.31	Yes	Y				0.020	0.00290	pct
JVE-03SC-0910-110221	11-4609-SL71C	Total organic carbon	3/8/2011	1.33	Yes	Y				0.020	0.00290	pct
JVE-03SC-1011-110221	11-4610-SL71D	Total organic carbon	3/8/2011	1.38	Yes	Y				0.020	0.00290	pct
JVE-04SC-0506-110221	11-4611-SL71E	Total organic carbon	3/8/2011	0.142	Yes	Y				0.020	0.00290	pct
JVE-04SC-0607-110221	11-4612-SL71F	Total organic carbon	3/8/2011	0.085	Yes	Y				0.020	0.00290	pct
JVE-04SC-0708-110221	11-4613-SL71G	Total organic carbon	3/8/2011	0.138	Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-03SC-0708-110221	11-4607-SL71A	Aroclor 1242	3/9/2011	16	Yes	N	U			16	5.9	ug/kg
JVE-03SC-0708-110221	11-4607-SL71A	Aroclor 1232	3/9/2011	16	Yes	N	U			16	5.9	ug/kg
JVE-03SC-0708-110221	11-4607-SL71A	Aroclor 1260	3/9/2011	17	Yes	Y				16	5.9	ug/kg
JVE-03SC-0708-110221	11-4607-SL71A	Aroclor 1254	3/9/2011	79	Yes	Y				16	5.9	ug/kg
JVE-03SC-0708-110221	11-4607-SL71A	Aroclor 1221	3/9/2011	16	Yes	N	U			16	5.9	ug/kg
JVE-03SC-0708-110221	11-4607-SL71A	Aroclor 1248	3/9/2011	40	Yes	N	Y			40	5.9	ug/kg
JVE-03SC-0708-110221	11-4607-SL71A	Aroclor 1016	3/9/2011	16	Yes	N	U			16	4.8	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-03SC-0809-110221	11-4608-SL71B	Aroclor 1221	3/9/2011	16	Yes	N	U			16	5.7	ug/kg
JVE-03SC-0809-110221	11-4608-SL71B	Aroclor 1254	3/9/2011	96	Yes	Y				16	5.7	ug/kg
JVE-03SC-0809-110221	11-4608-SL71B	Aroclor 1260	3/9/2011	38	Yes	Y				16	5.7	ug/kg
JVE-03SC-0809-110221	11-4608-SL71B	Aroclor 1016	3/9/2011	16	Yes	N	U			16	4.7	ug/kg
JVE-03SC-0809-110221	11-4608-SL71B	Aroclor 1232	3/9/2011	16	Yes	N	U			16	5.7	ug/kg
JVE-03SC-0809-110221	11-4608-SL71B	Aroclor 1242	3/9/2011	16	Yes	N	U			16	5.7	ug/kg
JVE-03SC-0809-110221	11-4608-SL71B	Aroclor 1248	3/9/2011	62	Yes	N	Y			62	5.7	ug/kg
JVE-03SC-0910-110221	11-4609-SL71C	Aroclor 1248	3/9/2011	15	Yes	N	U			15	5.7	ug/kg
JVE-03SC-0910-110221	11-4609-SL71C	Aroclor 1260	3/9/2011	15	Yes	N	U			15	5.7	ug/kg
JVE-03SC-0910-110221	11-4609-SL71C	Aroclor 1242	3/9/2011	15	Yes	N	U			15	5.7	ug/kg
JVE-03SC-0910-110221	11-4609-SL71C	Aroclor 1254	3/9/2011	22	Yes	Y				15	5.7	ug/kg
JVE-03SC-0910-110221	11-4609-SL71C	Aroclor 1221	3/9/2011	15	Yes	N	U			15	5.7	ug/kg
JVE-03SC-0910-110221	11-4609-SL71C	Aroclor 1232	3/9/2011	15	Yes	N	U			15	5.7	ug/kg
JVE-03SC-0910-110221	11-4609-SL71C	Aroclor 1016	3/9/2011	15	Yes	N	U			15	4.7	ug/kg
JVE-03SC-1011-110221	11-4610-SL71D	Aroclor 1232	3/9/2011	16	Yes	N	U			16	5.8	ug/kg
JVE-03SC-1011-110221	11-4610-SL71D	Aroclor 1221	3/9/2011	16	Yes	N	U			16	5.8	ug/kg
JVE-03SC-1011-110221	11-4610-SL71D	Aroclor 1254	3/9/2011	44	Yes	Y				16	5.8	ug/kg
JVE-03SC-1011-110221	11-4610-SL71D	Aroclor 1242	3/9/2011	16	Yes	N	U			16	5.8	ug/kg
JVE-03SC-1011-110221	11-4610-SL71D	Aroclor 1016	3/9/2011	16	Yes	N	U			16	4.8	ug/kg
JVE-03SC-1011-110221	11-4610-SL71D	Aroclor 1260	3/9/2011	20	Yes	Y				16	5.8	ug/kg
JVE-03SC-1011-110221	11-4610-SL71D	Aroclor 1248	3/9/2011	31	Yes	N	Y			31	5.8	ug/kg
JVE-04SC-0506-110221	11-4611-SL71E	Aroclor 1016	3/9/2011	16	Yes	N	U			16	4.9	ug/kg
JVE-04SC-0506-110221	11-4611-SL71E	Aroclor 1248	3/9/2011	16	Yes	N	U			16	5.9	ug/kg
JVE-04SC-0506-110221	11-4611-SL71E	Aroclor 1242	3/9/2011	16	Yes	N	U			16	5.9	ug/kg
JVE-04SC-0506-110221	11-4611-SL71E	Aroclor 1232	3/9/2011	16	Yes	N	U			16	5.9	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-04SC-0506-110221	11-4611-SL71E	Aroclor 1221	3/9/2011	16	Yes	N	U			16	5.9	ug/kg
JVE-04SC-0506-110221	11-4611-SL71E	Aroclor 1254	3/9/2011	16	Yes	N	U			16	5.9	ug/kg
JVE-04SC-0506-110221	11-4611-SL71E	Aroclor 1260	3/9/2011	16	Yes	N	U			16	5.9	ug/kg
JVE-04SC-0607-110221	11-4612-SL71F	Aroclor 1016	3/9/2011	16	Yes	N	U			16	4.8	ug/kg
JVE-04SC-0607-110221	11-4612-SL71F	Aroclor 1260	3/9/2011	16	Yes	N	U			16	5.8	ug/kg
JVE-04SC-0607-110221	11-4612-SL71F	Aroclor 1232	3/9/2011	16	Yes	N	U			16	5.8	ug/kg
JVE-04SC-0607-110221	11-4612-SL71F	Aroclor 1254	3/9/2011	16	Yes	N	U			16	5.8	ug/kg
JVE-04SC-0607-110221	11-4612-SL71F	Aroclor 1248	3/9/2011	16	Yes	N	U			16	5.8	ug/kg
JVE-04SC-0607-110221	11-4612-SL71F	Aroclor 1221	3/9/2011	16	Yes	N	U			16	5.8	ug/kg
JVE-04SC-0607-110221	11-4612-SL71F	Aroclor 1242	3/9/2011	16	Yes	N	U			16	5.8	ug/kg
JVE-04SC-0708-110221	11-4613-SL71G	Aroclor 1221	3/9/2011	16	Yes	N	U			16	5.8	ug/kg
JVE-04SC-0708-110221	11-4613-SL71G	Aroclor 1254	3/9/2011	16	Yes	N	U			16	5.8	ug/kg
JVE-04SC-0708-110221	11-4613-SL71G	Aroclor 1232	3/9/2011	16	Yes	N	U			16	5.8	ug/kg
JVE-04SC-0708-110221	11-4613-SL71G	Aroclor 1248	3/9/2011	16	Yes	N	U			16	5.8	ug/kg
JVE-04SC-0708-110221	11-4613-SL71G	Aroclor 1016	3/9/2011	16	Yes	N	U			16	4.8	ug/kg
JVE-04SC-0708-110221	11-4613-SL71G	Aroclor 1242	3/9/2011	16	Yes	N	U			16	5.8	ug/kg
JVE-04SC-0708-110221	11-4613-SL71G	Aroclor 1260	3/9/2011	16	Yes	N	U			16	5.8	ug/kg

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-1004SC-0607-110221	11-4614-SL72A	Total solids	3/7/2011	86.1		Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-1004SC-0607-110221	11-4614-SL72A	Total organic carbon	3/8/2011	0.11		Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-1004SC-0607-110221	11-4614-SL72A	Aroclor 1221	3/9/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-1004SC-0607-110221	11-4614-SL72A	Aroclor 1232	3/9/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-1004SC-0607-110221	11-4614-SL72A	Aroclor 1260	3/9/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-1004SC-0607-110221	11-4614-SL72A	Aroclor 1254	3/9/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-1004SC-0607-110221	11-4614-SL72A	Aroclor 1248	3/9/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-1004SC-0607-110221	11-4614-SL72A	Aroclor 1016	3/9/2011	20		Yes	N	U			20	5.0	ug/kg
JVE-1004SC-0607-110221	11-4614-SL72A	Aroclor 1242	3/9/2011	20		Yes	N	U			20	6.7	ug/kg

SDG: SM77

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-03SC-0607-110221	11-5308-SM77A	Total solids	3/11/2011	63	Yes	Y				0.01		pct
JVE-04SC-0405-110221	11-5309-SM77B	Total solids	3/11/2011	86.1	Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-03SC-0607-110221	11-5308-SM77A	Total organic carbon	3/14/2011	1.86	Yes	Y				0.020	0.00290	pct
JVE-04SC-0405-110221	11-5309-SM77B	Total organic carbon	3/14/2011	0.114	Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-03SC-0607-110221	11-5308-SM77A	Aroclor 1232	3/14/2011	80	Yes	N	U			80	27	ug/kg
JVE-03SC-0607-110221	11-5308-SM77A	Aroclor 1242	3/14/2011	80	Yes	N	U			80	27	ug/kg
JVE-03SC-0607-110221	11-5308-SM77A	Aroclor 1016	3/14/2011	80	Yes	N	U			80	21	ug/kg
JVE-03SC-0607-110221	11-5308-SM77A	Aroclor 1248	3/14/2011	1000	Yes	N	Y			1000	27	ug/kg
JVE-03SC-0607-110221	11-5308-SM77A	Aroclor 1254	3/14/2011	1000	Yes	Y				80	27	ug/kg
JVE-03SC-0607-110221	11-5308-SM77A	Aroclor 1221	3/14/2011	80	Yes	N	U			80	27	ug/kg
JVE-03SC-0607-110221	11-5308-SM77A	Aroclor 1260	3/14/2011	360	Yes	Y				80	27	ug/kg
JVE-04SC-0405-110221	11-5309-SM77B	Aroclor 1242	3/14/2011	20	Yes	N	U			20	1.4	ug/kg
JVE-04SC-0405-110221	11-5309-SM77B	Aroclor 1232	3/14/2011	20	Yes	N	U			20	1.4	ug/kg
JVE-04SC-0405-110221	11-5309-SM77B	Aroclor 1221	3/14/2011	20	Yes	N	U			20	1.4	ug/kg
JVE-04SC-0405-110221	11-5309-SM77B	Aroclor 1254	3/14/2011	20	Yes	N	U			20	1.4	ug/kg
JVE-04SC-0405-110221	11-5309-SM77B	Aroclor 1260	3/14/2011	20	Yes	N	U			20	1.4	ug/kg
JVE-04SC-0405-110221	11-5309-SM77B	Aroclor 1248	3/14/2011	20	Yes	N	U			20	1.4	ug/kg
JVE-04SC-0405-110221	11-5309-SM77B	Aroclor 1016	3/14/2011	20	Yes	N	U			20	1.0	ug/kg

SDG: SN49

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-1206SC-1011-110316	11-5870-SN49I	Total solids	3/16/2011	68.2	Yes	Y				0.01		pct
JVE-206SC-0607-110316	11-5862-SN49A	Total solids	3/16/2011	52.7	Yes	Y				0.01		pct
JVE-206SC-0708-110316	11-5863-SN49B	Total solids	3/16/2011	56.3	Yes	Y				0.01		pct
JVE-206SC-0809-110316	11-5864-SN49C	Total solids	3/16/2011	58.9	Yes	Y				0.01		pct
JVE-206SC-0910-110316	11-5865-SN49D	Total solids	3/16/2011	62.3	Yes	Y				0.01		pct
JVE-206SC-1011-110316	11-5866-SN49E	Total solids	3/16/2011	68	Yes	Y				0.01		pct
JVE-206SC-1112-110316	11-5867-SN49F	Total solids	3/16/2011	66.8	Yes	Y				0.01		pct
JVE-206SC-1213-110316	11-5868-SN49G	Total solids	3/16/2011	69.2	Yes	Y				0.01		pct
JVE-206SC-1313.6-11031	11-5869-SN49H	Total solids	3/16/2011	70.1	Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-1206SC-1011-110316	11-5870-SN49I	Total organic carbon	3/18/2011	1.69	Yes	Y				0.020	0.00290	pct
JVE-206SC-0607-110316	11-5862-SN49A	Total organic carbon	3/18/2011	2.48	Yes	Y				0.020	0.00290	pct
JVE-206SC-0708-110316	11-5863-SN49B	Total organic carbon	3/18/2011	2.1	Yes	Y				0.020	0.00290	pct
JVE-206SC-0809-110316	11-5864-SN49C	Total organic carbon	3/18/2011	2.19	Yes	Y				0.020	0.00290	pct
JVE-206SC-0910-110316	11-5865-SN49D	Total organic carbon	3/18/2011	1.76	Yes	Y				0.020	0.00290	pct
JVE-206SC-1011-110316	11-5866-SN49E	Total organic carbon	3/18/2011	1.54	Yes	Y				0.020	0.00290	pct
JVE-206SC-1112-110316	11-5867-SN49F	Total organic carbon	3/18/2011	2.24	Yes	Y				0.020	0.00290	pct
JVE-206SC-1213-110316	11-5868-SN49G	Total organic carbon	3/18/2011	1.78	Yes	Y				0.020	0.00290	pct
JVE-206SC-1313.6-11031	11-5869-SN49H	Total organic carbon	3/18/2011	1.67	Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-1206SC-1011-110316	11-5870-SN49I	Aroclor 1260	3/22/2011	40	Yes	Y				19	6.6	ug/kg
JVE-1206SC-1011-110316	11-5870-SN49I	Aroclor 1254	3/22/2011	42	Yes	Y				19	6.6	ug/kg
JVE-1206SC-1011-110316	11-5870-SN49I	Aroclor 1016	3/22/2011	19	Yes	N	U			19	5.0	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-1206SC-1011-110316	11-5870-SN49I	Aroclor 1242	3/22/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-1206SC-1011-110316	11-5870-SN49I	Aroclor 1232	3/22/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-1206SC-1011-110316	11-5870-SN49I	Aroclor 1221	3/22/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-1206SC-1011-110316	11-5870-SN49I	Aroclor 1248	3/22/2011	24	Yes	N	Y			24	6.6	ug/kg
JVE-206SC-0607-110316	11-5862-SN49A	Aroclor 1242	3/22/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-206SC-0607-110316	11-5862-SN49A	Aroclor 1248	3/22/2011	110	Yes	Y				20	6.6	ug/kg
JVE-206SC-0607-110316	11-5862-SN49A	Aroclor 1232	3/22/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-206SC-0607-110316	11-5862-SN49A	Aroclor 1221	3/22/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-206SC-0607-110316	11-5862-SN49A	Aroclor 1016	3/22/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-206SC-0607-110316	11-5862-SN49A	Aroclor 1260	3/22/2011	31	Yes	Y				20	6.6	ug/kg
JVE-206SC-0607-110316	11-5862-SN49A	Aroclor 1254	3/22/2011	100	Yes	Y				20	6.6	ug/kg
JVE-206SC-0708-110316	11-5863-SN49B	Aroclor 1221	3/22/2011	99	Yes	N	U			99	34	ug/kg
JVE-206SC-0708-110316	11-5863-SN49B	Aroclor 1242	3/22/2011	99	Yes	N	U			99	34	ug/kg
JVE-206SC-0708-110316	11-5863-SN49B	Aroclor 1016	3/22/2011	99	Yes	N	U			99	25	ug/kg
JVE-206SC-0708-110316	11-5863-SN49B	Aroclor 1248	3/22/2011	990	Yes	N	Y			990	34	ug/kg
JVE-206SC-0708-110316	11-5863-SN49B	Aroclor 1232	3/22/2011	99	Yes	N	U			99	34	ug/kg
JVE-206SC-0708-110316	11-5863-SN49B	Aroclor 1260	3/22/2011	340	Yes	Y				99	34	ug/kg
JVE-206SC-0708-110316	11-5863-SN49B	Aroclor 1254	3/22/2011	920	Yes	Y				99	34	ug/kg
JVE-206SC-0809-110316	11-5864-SN49C	Aroclor 1232	3/22/2011	24	Yes	N	U			24	8.3	ug/kg
JVE-206SC-0809-110316	11-5864-SN49C	Aroclor 1260	3/22/2011	96	Yes	Y				24	8.3	ug/kg
JVE-206SC-0809-110316	11-5864-SN49C	Aroclor 1221	3/22/2011	24	Yes	N	U			24	8.3	ug/kg
JVE-206SC-0809-110316	11-5864-SN49C	Aroclor 1248	3/22/2011	610	Yes	N	Y			610	8.3	ug/kg
JVE-206SC-0809-110316	11-5864-SN49C	Aroclor 1016	3/22/2011	24	Yes	N	U			24	6.2	ug/kg
JVE-206SC-0809-110316	11-5864-SN49C	Aroclor 1242	3/22/2011	24	Yes	N	U			24	8.3	ug/kg
JVE-206SC-0809-110316	11-5864-SN49C	Aroclor 1254	3/22/2011	360	Yes	Y	P			24	8.3	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-206SC-0910-110316	11-5865-SN49D	Aroclor 1016	3/22/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-206SC-0910-110316	11-5865-SN49D	Aroclor 1221	3/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-206SC-0910-110316	11-5865-SN49D	Aroclor 1242	3/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-206SC-0910-110316	11-5865-SN49D	Aroclor 1260	3/22/2011	85	Yes	Y				20	6.7	ug/kg
JVE-206SC-0910-110316	11-5865-SN49D	Aroclor 1254	3/22/2011	350	Yes	Y				20	6.7	ug/kg
JVE-206SC-0910-110316	11-5865-SN49D	Aroclor 1248	3/22/2011	490	Yes	N	Y			490	6.7	ug/kg
JVE-206SC-0910-110316	11-5865-SN49D	Aroclor 1232	3/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-206SC-1011-110316	11-5866-SN49E	Aroclor 1248	3/22/2011	24	Yes	N	Y			24	6.6	ug/kg
JVE-206SC-1011-110316	11-5866-SN49E	Aroclor 1232	3/22/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-206SC-1011-110316	11-5866-SN49E	Aroclor 1221	3/22/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-206SC-1011-110316	11-5866-SN49E	Aroclor 1016	3/22/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-206SC-1011-110316	11-5866-SN49E	Aroclor 1254	3/22/2011	33	Yes	Y				20	6.6	ug/kg
JVE-206SC-1011-110316	11-5866-SN49E	Aroclor 1260	3/22/2011	33	Yes	Y				20	6.6	ug/kg
JVE-206SC-1011-110316	11-5866-SN49E	Aroclor 1242	3/22/2011	20	Yes	N	U			20	6.6	ug/kg
JVE-206SC-1112-110316	11-5867-SN49F	Aroclor 1260	3/22/2011	39	Yes	Y				20	6.7	ug/kg
JVE-206SC-1112-110316	11-5867-SN49F	Aroclor 1242	3/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-206SC-1112-110316	11-5867-SN49F	Aroclor 1016	3/22/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-206SC-1112-110316	11-5867-SN49F	Aroclor 1248	3/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-206SC-1112-110316	11-5867-SN49F	Aroclor 1232	3/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-206SC-1112-110316	11-5867-SN49F	Aroclor 1221	3/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-206SC-1112-110316	11-5867-SN49F	Aroclor 1254	3/22/2011	42	Yes	Y				20	6.7	ug/kg
JVE-206SC-1213-110316	11-5868-SN49G	Aroclor 1248	3/22/2011	34	Yes	N	Y			34	6.7	ug/kg
JVE-206SC-1213-110316	11-5868-SN49G	Aroclor 1242	3/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-206SC-1213-110316	11-5868-SN49G	Aroclor 1221	3/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-206SC-1213-110316	11-5868-SN49G	Aroclor 1254	3/22/2011	57	Yes	Y				20	6.7	ug/kg

SDG: SN49

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-206SC-1213-110316	11-5868-SN49G	Aroclor 1232	3/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-206SC-1213-110316	11-5868-SN49G	Aroclor 1016	3/22/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-206SC-1213-110316	11-5868-SN49G	Aroclor 1260	3/22/2011	41	Yes	Y				20	6.7	ug/kg
JVE-206SC-1313.6-11031	11-5869-SN49H	Aroclor 1221	3/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-206SC-1313.6-11031	11-5869-SN49H	Aroclor 1260	3/22/2011	35	Yes	Y				20	6.7	ug/kg
JVE-206SC-1313.6-11031	11-5869-SN49H	Aroclor 1254	3/22/2011	52	Yes	Y				20	6.7	ug/kg
JVE-206SC-1313.6-11031	11-5869-SN49H	Aroclor 1242	3/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-206SC-1313.6-11031	11-5869-SN49H	Aroclor 1232	3/22/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-206SC-1313.6-11031	11-5869-SN49H	Aroclor 1248	3/22/2011	30	Yes	N	Y			30	6.7	ug/kg
JVE-206SC-1313.6-11031	11-5869-SN49H	Aroclor 1016	3/22/2011	20	Yes	N	U			20	5.0	ug/kg

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-01SC-0708-110218	11-7122-SP67J	Total solids	3/31/2011	83.5		Yes	Y				0.01		pct
JVE-01SC-0809-110218	11-7123-SP67K	Total solids	3/31/2011	87.9		Yes	Y				0.01		pct
JVE-02SC-0708-110221	11-7124-SP67L	Total solids	3/31/2011	87		Yes	Y				0.01		pct
JVE-02SC-0809-110221	11-7125-SP67M	Total solids	3/31/2011	82.8		Yes	Y				0.01		pct
JVE-04SC-0304-110221	11-7126-SP67N	Total solids	3/31/2011	81.6		Yes	Y				0.01		pct
JVE-07SC-0809-110218	11-7121-SP67I	Total solids	3/31/2011	83.4		Yes	Y				0.01		pct
JVE-210SC-0102-110216	11-7113-SP67A	Total solids	3/31/2011	50		Yes	Y				0.01		pct
JVE-215SC-0102-110216	11-7114-SP67B	Total solids	3/31/2011	51.5		Yes	Y				0.01		pct
JVE-216SC-0910-110218	11-7119-SP67G	Total solids	3/31/2011	83.8		Yes	Y				0.01		pct
JVE-309SC-0405-110217	11-7115-SP67C	Total solids	3/31/2011	81.6		Yes	Y				0.01		pct
JVE-314SC-0405-110218	11-7118-SP67F	Total solids	3/31/2011	93		Yes	Y				0.01		pct
JVE-316SC-0405-110217	11-7116-SP67D	Total solids	3/31/2011	80.7		Yes	Y				0.01		pct
JVE-320SC-0405-110217	11-7117-SP67E	Total solids	3/31/2011	59.6		Yes	Y				0.01		pct
JVE-322SC-0708-110218	11-7120-SP67H	Total solids	3/31/2011	62.7		Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-01SC-0708-110218	11-7122-SP67J	Total organic carbon	4/4/2011	0.315		Yes	Y				0.020	0.00290	pct
JVE-01SC-0809-110218	11-7123-SP67K	Total organic carbon	4/4/2011	0.048		Yes	Y				0.020	0.00290	pct
JVE-02SC-0708-110221	11-7124-SP67L	Total organic carbon	4/4/2011	0.044		Yes	Y				0.020	0.00290	pct
JVE-02SC-0809-110221	11-7125-SP67M	Total organic carbon	4/4/2011	0.096		Yes	Y				0.020	0.00290	pct
JVE-04SC-0304-110221	11-7126-SP67N	Total organic carbon	4/4/2011	0.357		Yes	Y				0.020	0.00290	pct
JVE-07SC-0809-110218	11-7121-SP67I	Total organic carbon	4/4/2011	1.69		Yes	Y				0.020	0.00290	pct
JVE-210SC-0102-110216	11-7113-SP67A	Total organic carbon	4/4/2011	2.11		Yes	Y				0.020	0.00290	pct
JVE-215SC-0102-110216	11-7114-SP67B	Total organic carbon	4/4/2011	1.53		Yes	Y				0.020	0.00290	pct
JVE-216SC-0910-110218	11-7119-SP67G	Total organic carbon	4/4/2011	0.127		Yes	Y				0.020	0.00290	pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-309SC-0405-110217	11-7115-SP67C	Total organic carbon	4/4/2011	0.137		Yes	Y				0.020	0.00290	pct
JVE-314SC-0405-110218	11-7118-SP67F	Total organic carbon	4/4/2011	0.795		Yes	Y				0.020	0.00290	pct
JVE-316SC-0405-110217	11-7116-SP67D	Total organic carbon	4/4/2011	0.734		Yes	Y				0.020	0.00290	pct
JVE-320SC-0405-110217	11-7117-SP67E	Total organic carbon	4/4/2011	2		Yes	Y				0.020	0.00290	pct
JVE-322SC-0708-110218	11-7120-SP67H	Total organic carbon	4/4/2011	2.06		Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-01SC-0708-110218	11-7122-SP67J	Aroclor 1260	4/6/2011	20		Yes	N	U	UJ	19	20	1.3	ug/kg
JVE-01SC-0708-110218	11-7122-SP67J	Aroclor 1242	4/6/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-01SC-0708-110218	11-7122-SP67J	Aroclor 1016	4/6/2011	20		Yes	N	U			20	1.0	ug/kg
JVE-01SC-0708-110218	11-7122-SP67J	Aroclor 1248	4/6/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-01SC-0708-110218	11-7122-SP67J	Aroclor 1232	4/6/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-01SC-0708-110218	11-7122-SP67J	Aroclor 1221	4/6/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-01SC-0708-110218	11-7122-SP67J	Aroclor 1254	4/6/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-01SC-0809-110218	11-7123-SP67K	Aroclor 1221	4/6/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-01SC-0809-110218	11-7123-SP67K	Aroclor 1242	4/6/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-01SC-0809-110218	11-7123-SP67K	Aroclor 1260	4/6/2011	20		Yes	N	U	UJ	19	20	1.3	ug/kg
JVE-01SC-0809-110218	11-7123-SP67K	Aroclor 1016	4/6/2011	20		Yes	N	U			20	1.0	ug/kg
JVE-01SC-0809-110218	11-7123-SP67K	Aroclor 1254	4/6/2011	24		Yes	Y				20	1.3	ug/kg
JVE-01SC-0809-110218	11-7123-SP67K	Aroclor 1248	4/6/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-01SC-0809-110218	11-7123-SP67K	Aroclor 1232	4/6/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-02SC-0708-110221	11-7124-SP67L	Aroclor 1248	4/6/2011	20		Yes	N	U	UJ	19	20	1.3	ug/kg
JVE-02SC-0708-110221	11-7124-SP67L	Aroclor 1016	4/6/2011	20		Yes	N	U	UJ	19	20	0.99	ug/kg
JVE-02SC-0708-110221	11-7124-SP67L	Aroclor 1254	4/6/2011	20		Yes	N	U	UJ	19	20	1.3	ug/kg
JVE-02SC-0708-110221	11-7124-SP67L	Aroclor 1260	4/6/2011	20		Yes	N	U	UJ	19	20	1.3	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-02SC-0708-110221	11-7124-SP67L	Aroclor 1221	4/6/2011	20	Yes	N	U	UJ	19	20	1.3	ug/kg
JVE-02SC-0708-110221	11-7124-SP67L	Aroclor 1242	4/6/2011	20	Yes	N	U	UJ	19	20	1.3	ug/kg
JVE-02SC-0708-110221	11-7124-SP67L	Aroclor 1232	4/6/2011	20	Yes	N	U	UJ	19	20	1.3	ug/kg
JVE-02SC-0809-110221	11-7125-SP67M	Aroclor 1254	4/6/2011	20	Yes	N	U	UJ	19	20	1.3	ug/kg
JVE-02SC-0809-110221	11-7125-SP67M	Aroclor 1242	4/6/2011	20	Yes	N	U	UJ	19	20	1.3	ug/kg
JVE-02SC-0809-110221	11-7125-SP67M	Aroclor 1221	4/6/2011	20	Yes	N	U	UJ	19	20	1.3	ug/kg
JVE-02SC-0809-110221	11-7125-SP67M	Aroclor 1232	4/6/2011	20	Yes	N	U	UJ	19	20	1.3	ug/kg
JVE-02SC-0809-110221	11-7125-SP67M	Aroclor 1260	4/6/2011	20	Yes	N	U	UJ	19	20	1.3	ug/kg
JVE-02SC-0809-110221	11-7125-SP67M	Aroclor 1016	4/6/2011	20	Yes	N	U	UJ	19	20	1.0	ug/kg
JVE-02SC-0809-110221	11-7125-SP67M	Aroclor 1248	4/6/2011	20	Yes	N	U	UJ	19	20	1.3	ug/kg
JVE-04SC-0304-110221	11-7126-SP67N	Aroclor 1232	4/6/2011	19	Yes	N	U	UJ	19	19	1.3	ug/kg
JVE-04SC-0304-110221	11-7126-SP67N	Aroclor 1221	4/6/2011	19	Yes	N	U	UJ	19	19	1.3	ug/kg
JVE-04SC-0304-110221	11-7126-SP67N	Aroclor 1248	4/6/2011	19	Yes	N	U	UJ	19	19	1.3	ug/kg
JVE-04SC-0304-110221	11-7126-SP67N	Aroclor 1016	4/6/2011	19	Yes	N	U	UJ	19	19	0.99	ug/kg
JVE-04SC-0304-110221	11-7126-SP67N	Aroclor 1242	4/6/2011	19	Yes	N	U	UJ	19	19	1.3	ug/kg
JVE-04SC-0304-110221	11-7126-SP67N	Aroclor 1260	4/6/2011	71	Yes	Y				19	1.3	ug/kg
JVE-04SC-0304-110221	11-7126-SP67N	Aroclor 1254	4/6/2011	19	Yes	N	U	UJ	19	19	1.3	ug/kg
JVE-07SC-0809-110218	11-7121-SP67I	Aroclor 1242	4/5/2011	19	Yes	N	U			19	1.3	ug/kg
JVE-07SC-0809-110218	11-7121-SP67I	Aroclor 1232	4/5/2011	19	Yes	N	U			19	1.3	ug/kg
JVE-07SC-0809-110218	11-7121-SP67I	Aroclor 1016	4/5/2011	19	Yes	N	U			19	0.99	ug/kg
JVE-07SC-0809-110218	11-7121-SP67I	Aroclor 1248	4/5/2011	19	Yes	N	U			19	1.3	ug/kg
JVE-07SC-0809-110218	11-7121-SP67I	Aroclor 1260	4/5/2011	19	Yes	N	U	UJ	19	19	1.3	ug/kg
JVE-07SC-0809-110218	11-7121-SP67I	Aroclor 1254	4/5/2011	19	Yes	N	U			19	1.3	ug/kg
JVE-07SC-0809-110218	11-7121-SP67I	Aroclor 1221	4/5/2011	19	Yes	N	U			19	1.3	ug/kg
JVE-210SC-0102-110216	11-7113-SP67A	Aroclor 1254	4/5/2011	38	Yes	Y				20	1.3	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-210SC-0102-110216	11-7113-SP67A	Aroclor 1242	4/5/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-210SC-0102-110216	11-7113-SP67A	Aroclor 1016	4/5/2011	20	Yes	N	U			20	1.0	ug/kg
JVE-210SC-0102-110216	11-7113-SP67A	Aroclor 1248	4/5/2011	27	Yes	Y				20	1.3	ug/kg
JVE-210SC-0102-110216	11-7113-SP67A	Aroclor 1221	4/5/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-210SC-0102-110216	11-7113-SP67A	Aroclor 1260	4/5/2011	24	Yes	Y				20	1.3	ug/kg
JVE-210SC-0102-110216	11-7113-SP67A	Aroclor 1232	4/5/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-215SC-0102-110216	11-7114-SP67B	Aroclor 1221	4/7/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-215SC-0102-110216	11-7114-SP67B	Aroclor 1248	4/7/2011	48	Yes	Y				20	6.8	ug/kg
JVE-215SC-0102-110216	11-7114-SP67B	Aroclor 1260	4/7/2011	39	Yes	Y				20	6.8	ug/kg
JVE-215SC-0102-110216	11-7114-SP67B	Aroclor 1254	4/7/2011	61	Yes	Y				20	6.8	ug/kg
JVE-215SC-0102-110216	11-7114-SP67B	Aroclor 1232	4/7/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-215SC-0102-110216	11-7114-SP67B	Aroclor 1016	4/7/2011	20	Yes	N	U			20	5.1	ug/kg
JVE-215SC-0102-110216	11-7114-SP67B	Aroclor 1242	4/7/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-216SC-0910-110218	11-7119-SP67G	Aroclor 1232	4/5/2011	19	Yes	N	U	UJ	19	19	1.3	ug/kg
JVE-216SC-0910-110218	11-7119-SP67G	Aroclor 1221	4/5/2011	19	Yes	N	U	UJ	19	19	1.3	ug/kg
JVE-216SC-0910-110218	11-7119-SP67G	Aroclor 1260	4/5/2011	19	Yes	N	U	UJ	19	19	1.3	ug/kg
JVE-216SC-0910-110218	11-7119-SP67G	Aroclor 1248	4/5/2011	19	Yes	N	U	UJ	19	19	1.3	ug/kg
JVE-216SC-0910-110218	11-7119-SP67G	Aroclor 1016	4/5/2011	19	Yes	N	U	UJ	19	19	0.99	ug/kg
JVE-216SC-0910-110218	11-7119-SP67G	Aroclor 1242	4/5/2011	19	Yes	N	U	UJ	19	19	1.3	ug/kg
JVE-216SC-0910-110218	11-7119-SP67G	Aroclor 1254	4/5/2011	19	Yes	N	U	UJ	19	19	1.3	ug/kg
JVE-309SC-0405-110217	11-7115-SP67C	Aroclor 1232	4/5/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-309SC-0405-110217	11-7115-SP67C	Aroclor 1221	4/5/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-309SC-0405-110217	11-7115-SP67C	Aroclor 1254	4/5/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-309SC-0405-110217	11-7115-SP67C	Aroclor 1248	4/5/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-309SC-0405-110217	11-7115-SP67C	Aroclor 1260	4/5/2011	20	Yes	N	U			20	1.3	ug/kg

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-309SC-0405-110217	11-7115-SP67C	Aroclor 1242	4/5/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-309SC-0405-110217	11-7115-SP67C	Aroclor 1016	4/5/2011	20	Yes	N	U			20	1.0	ug/kg
JVE-314SC-0405-110218	11-7118-SP67F	Aroclor 1242	4/5/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-314SC-0405-110218	11-7118-SP67F	Aroclor 1016	4/5/2011	20	Yes	N	U			20	1.0	ug/kg
JVE-314SC-0405-110218	11-7118-SP67F	Aroclor 1221	4/5/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-314SC-0405-110218	11-7118-SP67F	Aroclor 1260	4/5/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-314SC-0405-110218	11-7118-SP67F	Aroclor 1254	4/5/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-314SC-0405-110218	11-7118-SP67F	Aroclor 1248	4/5/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-314SC-0405-110218	11-7118-SP67F	Aroclor 1232	4/5/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-316SC-0405-110217	11-7116-SP67D	Aroclor 1221	4/5/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-316SC-0405-110217	11-7116-SP67D	Aroclor 1254	4/5/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-316SC-0405-110217	11-7116-SP67D	Aroclor 1232	4/5/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-316SC-0405-110217	11-7116-SP67D	Aroclor 1242	4/5/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-316SC-0405-110217	11-7116-SP67D	Aroclor 1016	4/5/2011	20	Yes	N	U			20	0.99	ug/kg
JVE-316SC-0405-110217	11-7116-SP67D	Aroclor 1248	4/5/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-316SC-0405-110217	11-7116-SP67D	Aroclor 1260	4/5/2011	58	Yes	Y				20	1.3	ug/kg
JVE-320SC-0405-110217	11-7117-SP67E	Aroclor 1248	4/5/2011	58	Yes	N	Y			58	1.3	ug/kg
JVE-320SC-0405-110217	11-7117-SP67E	Aroclor 1016	4/5/2011	20	Yes	N	U			20	0.99	ug/kg
JVE-320SC-0405-110217	11-7117-SP67E	Aroclor 1232	4/5/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-320SC-0405-110217	11-7117-SP67E	Aroclor 1221	4/5/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-320SC-0405-110217	11-7117-SP67E	Aroclor 1254	4/5/2011	110	Yes	Y				20	1.3	ug/kg
JVE-320SC-0405-110217	11-7117-SP67E	Aroclor 1260	4/5/2011	98	Yes	Y				20	1.3	ug/kg
JVE-320SC-0405-110217	11-7117-SP67E	Aroclor 1242	4/5/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-322SC-0708-110218	11-7120-SP67H	Aroclor 1260	4/7/2011	110	Yes	Y				40	13	ug/kg
JVE-322SC-0708-110218	11-7120-SP67H	Aroclor 1254	4/7/2011	450	Yes	Y				40	13	ug/kg

SDG: SP67

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-322SC-0708-110218	11-7120-SP67H	Aroclor 1221	4/7/2011	40	Yes	N	U			40	13	ug/kg
JVE-322SC-0708-110218	11-7120-SP67H	Aroclor 1232	4/7/2011	40	Yes	N	U			40	13	ug/kg
JVE-322SC-0708-110218	11-7120-SP67H	Aroclor 1248	4/7/2011	590	Yes	Y				40	13	ug/kg
JVE-322SC-0708-110218	11-7120-SP67H	Aroclor 1016	4/7/2011	40	Yes	N	U			40	10	ug/kg
JVE-322SC-0708-110218	11-7120-SP67H	Aroclor 1242	4/7/2011	40	Yes	N	U			40	13	ug/kg

Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 **Web** www.lab-data.com **Fax** 760.634.0439

Anchor QEA, LLC
720 Olive Way, Suite 900
Seattle, WA 98101
ATTN: Ms. Delaney Peterson

May 27, 2011

SUBJECT: Jorgensen Forge Facility, Data Validation

Dear Ms. Peterson,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on May 10, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 25449:

SDG #	**Fraction**
SR99/SS00, ST93	Polychlorinated Biphenyls, Wet Chemistry

The data validation was performed under EPA Level III & IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Stella Cuenco

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

V:\LOGIN\Anchor\Jorgensen\25449COV.wpd

254 pages-EX

Attachment 1

EDD 90/10

LDC #25449 (Anchor Environmental-Seattle WA /Jorgensen Forge Facility)

LDC	SDG#	DATE REC'D	(3) DATE DUE	PCBs (8082)		TOC (Plumb)		Total Solids (160.3)																													
Matrix:	Water/Sediment			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	SR99/SS00	05/10/11	06/01/11	0	27	0	31	0	31																												
B	ST93	05/10/11	06/01/11	0	2	0	2	0	2																												
B	ST93	05/10/11	06/01/11	0	3	0	3	0	3																												
Total	A/SC			0	32	0	36	0	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	104

Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS, MSD, or DUP's.

25449ST.wpd

EMJ014905

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Jorgensen Forge Facility

Collection Date: February 16 through February 21, 2011

LDC Report Date: May 27, 2011

Matrix: Sediment

Parameters: Polychlorinated Biphenyls

Validation Level: EPA Level III

Laboratory: Analytical Resources, Inc.

Sample Delivery Group (SDG): SR99/SS00

Sample Identification

JVE-01SC-0203-110218
JVE-01SC-0304-110218
JVE-01SC-0405-110218
JVE-01SC-0506-110218
JVE-01SC-0607-110218
JVE-02SC-0001-110221
JVE-02SC-0102-110221
JVE-02SC-0203-110221
JVE-02SC-0304-110221
JVE-02SC-0405-110221
JVE-02SC-0506-110221
JVE-02SC-0607-110221
JVE-04SC-0001-110221
JVE-04SC-0102-110221
JVE-04SC-0203-110221
JVE-03SC-0405-110221
JVE-03SC-0506-110221
JVE-207SC-0102-110216
JVE-215SC-0001-110216
JVE-210SC-0001-110216
JVE-07SC-0506-110218
JVE-07SC-0607-110218
JVE-07SC-0708-110218
JVE-322SC-0607-110218
JVE-216SC-0708-110218
JVE-216SC-0809-110218
JVE-320SC-0304-110217
JVE-02SC-0506-110221MS
JVE-02SC-0506-110221MSD
JVE-216SC-0809-110218MS
JVE-216SC-0809-110218MSD
JVE-01SC-0001-110218
JVE-01SC-0102-110218
JVE-309SC-0304-110217
JVE-316SC-0304-110217
JVE-01SC-0001-110218MS
JVE-01SC-0001-110218MSD

Introduction

This data review covers 37 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. Cooler temperatures were reported at 6.8°C for sample JVE-322SC-0607-110218 and 9.1°C for sample JVE-320SC-0304-110217 upon receipt by the laboratory. Since the samples were received the same day that they were collected, time did not allow for sufficient cooling of the samples, therefore no data were qualified.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits with the following exceptions:

Date	Column	Compound	%D	Associated Samples	Affected Compound	Flag	A or P
4/20/11	ZB5	Aroclor-1260	21.2	JVE-207SC-0102-110216 JVE-215SC-0001-110216 JVE-210SC-0001-110216 JVE-07SC-0506-110218 JVE-07SC-0607-110218 MB-041611-1	Aroclor-1242 Aroclor-1248 Aroclor-1260	J (all detects) UJ (all non-detects)	A
4/21/11	ZB5	Aroclor-1260	22.6	JVE-322SC-0607-110218	Aroclor-1242 Aroclor-1254 Aroclor-1260	J (all detects) UJ (all non-detects)	A

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. Surrogate recoveries (%R) were not within QC limits for sample JVE-02SC-0001-110221. Since the sample was diluted out, no data were qualified.

All internal standard areas and retention times were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

XI. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XII. Target Compound Identification

Raw data were not reviewed for this SDG.

XIII. Compound Quantitation and Reported CRQLs

Raw data were not reviewed for this SDG.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to calibration %D, data were qualified as estimated in six samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the Level III data validation all other results are considered valid and usable for all purposes.

Data flags are summarized at the end of this report if data has been qualified.

XV. Field Duplicates

No field duplicates were identified in this SDG.

XV. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Polychlorinated Biphenyls - Data Qualification Summary - SDG SR99/SS00

SDG	Sample	Compound	Flag	A or P	Reason
SR99/SS00	JVE-207SC-0102-110216 JVE-215SC-0001-110216 JVE-210SC-0001-110216 JVE-07SC-0506-110218 JVE-07SC-0607-110218	Aroclor-1242 Aroclor-1248 Aroclor-1260	J (all detects) UJ (all non-detects)	A	Continuing calibration (%D)
SR99/SS00	JVE-322SC-0607-110218	Aroclor-1242 Aroclor-1254 Aroclor-1260	J (all detects) UJ (all non-detects)	A	Continuing calibration (%D)

Jorgensen Forge Facility
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG SR99/SS00

No Sample Data Qualified in this SDG

LDC #: 25449A3b **VALIDATION COMPLETENESS WORKSHEET** Date: 5/23/11
SDG #: SR99/SS00 Level III Page: 1 of 1
Laboratory: Analytical Resources, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 2/16 – 2/21/11
II.	GC/ECD Instrument Performance Check	NA	
III.	Initial calibration	A	% RSD ≤ 20
IV.	Continuing calibration/ICV	SW	ICV/CCV ≤ 20
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	N	
XIII.	Compound quantitation and reported CRQLs	N	Acceptable IS
XIV.	Overall assessment of data	A	
XV.	Field duplicates	N	
XVI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediments

1 +	JVE-01SC-0203-110218	11 −	JVE-02SC-0506-110221	21 +	JVE-07SC-0506-110218	31	JVE-216SC-0809-110218MSD
2 +	JVE-01SC-0304-110218	12 −	JVE-02SC-0607-110221	22 +	JVE-07SC-0607-110218	32	
3 −	JVE-01SC-0405-110218	13 +	JVE-04SC-0001-110221	23 −	JVE-07SC-0708-110218	33	MB-041811
4 −	JVE-01SC-0506-110218	14 +	JVE-04SC-0102-110221	24 +	JVE-322SC-0607-110218	34 −	MB-041611-1
5 −	JVE-01SC-0607-110218	15 +	JVE-04SC-0203-110221	25 −	JVE-216SC-0708-110218	35	MB-041611-2
6 +	JVE-02SC-0001-110221	16 +	JVE-03SC-0405-110221	26 −	JVE-216SC-0809-110218	36	MB-042711
7 +	JVE-02SC-0102-110221	17 +	JVE-03SC-0506-110221	27 +	JVE-320SC-0304-110217	37	JVE-01SC-0001-110218
8 −	JVE-02SC-0203-110221	18 + 2	JVE-207SC-0102-110216	28 1	JVE-02SC-0506-110221MS	38	JVE-01SC-0102-110218
9 −	JVE-02SC-0304-110221	19 +	JVE-215SC-0001-110216	29 1	JVE-02SC-0506-110221MSD	39	JVE-309SC-0304-110217
10 −	JVE-02SC-0405-110221	20 +	JVE-210SC-0001-110216	30	JVE-216SC-0809-110218MS	40	JVE-316SC-0304-110217

41 #37 MS
42 #37 MSD

25449A3bW.wpd

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	GG.
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	HH.
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254	II.
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. Aroclor-1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Aldrin	N. Endosulfan sulfate	V. Aroclor-1016	DD. DB 1701	LL.
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE.	MM.
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	FF.	NN.

Notes:

EMJ014913

LDC #: 2549A3b

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: FT
2nd Reviewer: [illegible]

All circled dates have exceeded the technical holding times.
Y N N/A Were all cooler temperatures within validation criteria?

METHOD: GC HPLC

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
27	soil	cooler	temp = 9.1	not	enough time	to cool	down
		↓			↓		
24		↓	= 6.8		↓		

TECHNICAL HOLDING TIME CRITERIA

VOLATILES:
- Water unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.
- Water preserved: Both within 14 days of sample collection.
- Soils: Both within 14 days of sample collection.

EXTRACTABLES:
- Water: Extracted within 7 days, analyzed within 40 days.
- Soil: Extracted within 14 days, analyzed within 40 days.

HTNew.wpd

LDC #: 25449A3b

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: FT
2nd Reviewer: [illegible]

METHOD: ✓ GC ___ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
What type of continuing calibration calculation was performed? ___%D or ___RPD
Y N N/A Were continuing calibration standards analyzed at the required frequencies?
Y N N/A Did the continuing calibration standards meet the %D / RPD validation criteria of ~~≤15.0%~~ 20?
Level IV Only
Y N N/A Were the retention times for all calibrated compounds within their respective acceptance windows?

#	Date	Standard ID	Detector/ Column	Compound	%D / RPD (Limit ~~≤15.0~~ 20)	RT (limit)	Associated Samples	Qualifications
	4/20/11	CCV	ZB5	BB	21.2	( )	MB-041611-1, 1-22	J/UJ/A
	11:53					( )		qual Y, Z, BB
						( )		
						( )		
						( )		
						( )		
	4/21/11	CCV	ZB5	BB	22.6	( )	24	J/UJ/A
	10:56					( )		qual Y, AA, BB
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		

CONCALNew.wpd

EMJ014915

LDC #: 25449A3b

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

Page: 1 of 1
Reviewer: FT
2nd Reviewer: [illegible]

METHOD: ✓ GC __ HPLC

Are surrogates required by the method? Yes____ or No____.

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Were surrogates spiked into all samples and blanks?

Y (N) N/A Did all surrogate recoveries (%R) meet the QC limits?

#	Sample ID	Detector/ Column	Surrogate Compound	%R (Limits)	Qualifications
	6	surrogate	outside	limit w ( )	no qual 200X DL
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

	Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound		
A	Chlorobenzene (CBZ)	G	Octacosane	M	Benzo(e)Pyrene	S	1-Chloro-3-Nitrobenzene	Y	Tetrachloro-m- xylene
B	4-Bromofluorobenzene (BFB)	H	Ortho-Terphenyl	N	Terphenyl-D14	T	3,4-Dinitrotoluene		
C	a,a,a-Trifluorotoluene	I	Fluorobenzene (FBZ)	O	Decachlorobiphenyl (DCB)	U	Tripentyltin		
D	Bromochlorobenene	J	n-Triacontane	P	1-methylnaphthalene	V	Tri-n-propyltin		
E	1,4-Dichlorobutane	K	Hexacosane	Q	Dichlorophenyl Acetic Acid (DCAA)	W	Tributyl Phosphate		
F	1,4-Difluorobenzene (DFB)	L	Bromobenzene	R	4-Nitrophenol	X	Triphenyl Phosphate		

LDC #: 25449 A3

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: FT
2nd Reviewer:

METHOD: ✓ GC __ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?
Y N N/A Was an MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed?
Y N N/A Were the MS/MSD percent recoveries (%R) and relative percent differences (RPD) within QC limits?

#	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	41 + 42	BB	( )	146 (50-140)	( )	37	no qual SX DL
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		

MSDNew.wpd

EMJ014917

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 16 through February 21, 2011
LDC Report Date:	May 19, 2011
Matrix:	Sediment
Parameters:	Wet Chemistry
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SR99/SS00

Sample Identification

JVE-01SC-0001-110218
JVE-01SC-0102-110218
JVE-01SC-0203-110218
JVE-01SC-0304-110218
JVE-01SC-0405-110218
JVE-01SC-0506-110218
JVE-01SC-0607-110218
JVE-02SC-0001-110221
JVE-02SC-0102-110221
JVE-02SC-0203-110221
JVE-02SC-0304-110221
JVE-02SC-0405-110221
JVE-02SC-0506-110221
JVE-02SC-0607-110221
JVE-04SC-0001-110221
JVE-04SC-0102-110221
JVE-04SC-0203-110221
JVE-03SC-0405-110221
JVE-03SC-0506-110221
JVE-207SC-0102-110216
JVE-215SC-0001-110216
JVE-210SC-0001-110216
JVE-07SC-0506-110218
JVE-07SC-0607-110218
JVE-07SC-0708-110218
JVE-322SC-0607-110218
JVE-216SC-0708-110218
JVE-216SC-0809-110218
JVE-320SC-0304-110217
JVE-309SC-0304-110217
JVE-316SC-0304-110217
JVE-01SC-0001-110218MS
JVE-01SC-0001-110218DUP
JVE-01SC-0001-110218TRP
JVE-207SC-0102-110216MS
JVE-207SC-0102-110216DUP
JVE-207SC-0102-110216TRP

Introduction

This data review covers 37 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per PLUMB Method for Total Organic Carbons and EPA Method 160.3 for Total Solids.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates/Triplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

Triplicate (TRP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

IX. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Wet Chemistry - Data Qualification Summary - SDG SR99/SS00

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG SR99/SS00

No Sample Data Qualified in this SDG

LDC #: 25449A6 **VALIDATION COMPLETENESS WORKSHEET** Date: 5-19-11
SDG #: SR99/SS00 Level III Page: 1 of 1
Laboratory: Analytical Resources, Inc. Reviewer: CR
2nd Reviewer: ✓

METHOD: (Analyte) TOC (PLUMB Method), Total Solids (EPA Method 160.3)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/16-21/11
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A ~~MSD~~	MS
VI.	Duplicates Triplicated	A	DUP, TRP
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: sediment

1	JVE-01SC-0001-110218	11	JVE-02SC-0304-110221	21	JVE-215SC-0001-110216	31	JVE-316SC-0304-110217
2	JVE-01SC-0102-110218	12	JVE-02SC-0405-110221	22	JVE-210SC-0001-110216	32	JVE-01SC-0001-110218MS
3	JVE-01SC-0203-110218	13	JVE-02SC-0506-110221	23	JVE-07SC-0506-110218	33	JVE-01SC-0001-110218~~MSD~~ DUP
4	JVE-01SC-0304-110218	14	JVE-02SC-0607-110221	24	JVE-07SC-0607-110218	34	JVE-01SC-0001-110218~~DUP~~ TRP
5	JVE-01SC-0405-110218	15	JVE-04SC-0001-110221	25	JVE-07SC-0708-110218	35	JVE-207SC-0102-110216MS
6	JVE-01SC-0506-110218	16	JVE-04SC-0102-110221	26	JVE-322SC-0607-110218	36	JVE-207SC-0102-110216~~MSD~~ DUP
7	JVE-01SC-0607-110218	17	JVE-04SC-0203-110221	27	JVE-216SC-0708-110218	37	JVE-207SC-0102-110216~~DUP~~ TRP
8	JVE-02SC-0001-110221	18	JVE-03SC-0405-110221	28	JVE-216SC-0809-110218	38	
9	JVE-02SC-0102-110221	19	JVE-03SC-0506-110221	29	JVE-320SC-0304-110217	39	
10	JVE-02SC-0203-110221	20	JVE-207SC-0102-110216	30	JVE-309SC-0304-110217	40	

Notes:

LDC #: 25449A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-31		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC: 32,35		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4
33,34,36,37		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

METHODS.6

Jorgensen Forge Facility - LDC 25449

SDG: SR99

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-01SC-0001-110218	11-8261-SR99A	Total solids	4/15/2011	47.8		Yes	Y				0.01		pct
JVE-01SC-0102-110218	11-8262-SR99B	Total solids	4/15/2011	59.4		Yes	Y				0.01		pct
JVE-01SC-0203-110218	11-8263-SR99C	Total solids	4/15/2011	80.9		Yes	Y				0.01		pct
JVE-01SC-0304-110218	11-8264-SR99D	Total solids	4/15/2011	80.7		Yes	Y				0.01		pct
JVE-01SC-0405-110218	11-8265-SR99E	Total solids	4/15/2011	93.4		Yes	Y				0.01		pct
JVE-01SC-0506-110218	11-8266-SR99F	Total solids	4/15/2011	85.9		Yes	Y				0.01		pct
JVE-01SC-0607-110218	11-8267-SR99G	Total solids	4/15/2011	80.6		Yes	Y				0.01		pct
JVE-02SC-0001-110221	11-8268-SR99H	Total solids	4/15/2011	76.6		Yes	Y				0.01		pct
JVE-02SC-0102-110221	11-8269-SR99I	Total solids	4/15/2011	80.9		Yes	Y				0.01		pct
JVE-02SC-0203-110221	11-8270-SR99J	Total solids	4/15/2011	79.5		Yes	Y				0.01		pct
JVE-02SC-0304-110221	11-8271-SR99K	Total solids	4/15/2011	84.5		Yes	Y				0.01		pct
JVE-02SC-0405-110221	11-8272-SR99L	Total solids	4/15/2011	91.9		Yes	Y				0.01		pct
JVE-02SC-0506-110221	11-8273-SR99M	Total solids	4/15/2011	87		Yes	Y				0.01		pct
JVE-02SC-0607-110221	11-8274-SR99N	Total solids	4/15/2011	85.2		Yes	Y				0.01		pct
JVE-03SC-0405-110221	11-8278-SR99R	Total solids	4/15/2011	53		Yes	Y				0.01		pct
JVE-03SC-0506-110221	11-8279-SR99S	Total solids	4/15/2011	51.1		Yes	Y				0.01		pct
JVE-04SC-0001-110221	11-8275-SR99O	Total solids	4/15/2011	53.8		Yes	Y				0.01		pct
JVE-04SC-0102-110221	11-8276-SR99P	Total solids	4/15/2011	77.8		Yes	Y				0.01		pct
JVE-04SC-0203-110221	11-8277-SR99Q	Total solids	4/15/2011	81.9		Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-01SC-0001-110218	11-8261-SR99A	Total organic carbon	4/18/2011	3.21		Yes	Y				0.020	0.00290	pct
JVE-01SC-0102-110218	11-8262-SR99B	Total organic carbon	4/18/2011	2.5		Yes	Y				0.020	0.00290	pct
JVE-01SC-0203-110218	11-8263-SR99C	Total organic carbon	4/18/2011	0.528		Yes	Y				0.020	0.00290	pct

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Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-01SC-0304-110218	11-8264-SR99D	Total organic carbon	4/18/2011	0.347	Yes	Y				0.020	0.00290	pct
JVE-01SC-0405-110218	11-8265-SR99E	Total organic carbon	4/18/2011	0.118	Yes	Y				0.020	0.00290	pct
JVE-01SC-0506-110218	11-8266-SR99F	Total organic carbon	4/18/2011	0.292	Yes	Y				0.020	0.00290	pct
JVE-01SC-0607-110218	11-8267-SR99G	Total organic carbon	4/18/2011	0.467	Yes	Y				0.020	0.00290	pct
JVE-02SC-0001-110221	11-8268-SR99H	Total organic carbon	4/18/2011	2.57	Yes	Y				0.020	0.00290	pct
JVE-02SC-0102-110221	11-8269-SR99I	Total organic carbon	4/18/2011	0.153	Yes	Y				0.020	0.00290	pct
JVE-02SC-0203-110221	11-8270-SR99J	Total organic carbon	4/18/2011	0.114	Yes	Y				0.020	0.00290	pct
JVE-02SC-0304-110221	11-8271-SR99K	Total organic carbon	4/18/2011	0.081	Yes	Y				0.020	0.00290	pct
JVE-02SC-0405-110221	11-8272-SR99L	Total organic carbon	4/18/2011	0.101	Yes	Y				0.020	0.00290	pct
JVE-02SC-0506-110221	11-8273-SR99M	Total organic carbon	4/18/2011	0.11	Yes	Y				0.020	0.00290	pct
JVE-02SC-0607-110221	11-8274-SR99N	Total organic carbon	4/18/2011	0.071	Yes	Y				0.020	0.00290	pct
JVE-03SC-0405-110221	11-8278-SR99R	Total organic carbon	4/18/2011	2.21	Yes	Y				0.020	0.00290	pct
JVE-03SC-0506-110221	11-8279-SR99S	Total organic carbon	4/18/2011	2.47	Yes	Y				0.020	0.00290	pct
JVE-04SC-0001-110221	11-8275-SR99O	Total organic carbon	4/18/2011	2.54	Yes	Y				0.020	0.00290	pct
JVE-04SC-0102-110221	11-8276-SR99P	Total organic carbon	4/18/2011	1.66	Yes	Y				0.020	0.00290	pct
JVE-04SC-0203-110221	11-8277-SR99Q	Total organic carbon	4/18/2011	0.167	Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-01SC-0001-110218	11-8261-SR99A	Aroclor 1248	4/21/2011	12000	Yes	N	Y			12000	520	ug/kg
JVE-01SC-0001-110218	11-8261-SR99A	Aroclor 1232	4/21/2011	1500	Yes	N	U			1500	520	ug/kg
JVE-01SC-0001-110218	11-8261-SR99A	Aroclor 1016	4/21/2011	1500	Yes	N	U			1500	390	ug/kg
JVE-01SC-0001-110218	11-8261-SR99A	Aroclor 1260	4/21/2011	4700	Yes	Y				1500	520	ug/kg
JVE-01SC-0001-110218	11-8261-SR99A	Aroclor 1242	4/21/2011	1500	Yes	N	U			1500	520	ug/kg
JVE-01SC-0001-110218	11-8261-SR99A	Aroclor 1254	4/21/2011	32000	Yes	Y				1500	520	ug/kg
JVE-01SC-0001-110218	11-8261-SR99A	Aroclor 1221	4/21/2011	1500	Yes	N	U			1500	520	ug/kg

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SDG: SR99

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-01SC-0102-110218	11-8262-SR99B	Aroclor 1248	4/21/2011	4000		Yes	Y				1400	460	ug/kg
JVE-01SC-0102-110218	11-8262-SR99B	Aroclor 1016	4/21/2011	1400		Yes	N	U			1400	350	ug/kg
JVE-01SC-0102-110218	11-8262-SR99B	Aroclor 1232	4/21/2011	1400		Yes	N	U			1400	460	ug/kg
JVE-01SC-0102-110218	11-8262-SR99B	Aroclor 1221	4/21/2011	1400		Yes	N	U			1400	460	ug/kg
JVE-01SC-0102-110218	11-8262-SR99B	Aroclor 1254	4/21/2011	5100		Yes	Y				1400	460	ug/kg
JVE-01SC-0102-110218	11-8262-SR99B	Aroclor 1260	4/21/2011	1400		Yes	N	U			1400	460	ug/kg
JVE-01SC-0102-110218	11-8262-SR99B	Aroclor 1242	4/21/2011	1400		Yes	N	U			1400	460	ug/kg
JVE-01SC-0203-110218	11-8263-SR99C	Aroclor 1260	4/20/2011	180		Yes	Y				48	16	ug/kg
JVE-01SC-0203-110218	11-8263-SR99C	Aroclor 1242	4/20/2011	48		Yes	N	U			48	16	ug/kg
JVE-01SC-0203-110218	11-8263-SR99C	Aroclor 1016	4/20/2011	48		Yes	N	U			48	12	ug/kg
JVE-01SC-0203-110218	11-8263-SR99C	Aroclor 1248	4/20/2011	360		Yes	N	Y			360	16	ug/kg
JVE-01SC-0203-110218	11-8263-SR99C	Aroclor 1232	4/20/2011	48		Yes	N	U			48	16	ug/kg
JVE-01SC-0203-110218	11-8263-SR99C	Aroclor 1221	4/20/2011	48		Yes	N	U			48	16	ug/kg
JVE-01SC-0203-110218	11-8263-SR99C	Aroclor 1254	4/20/2011	1000		Yes	Y				48	16	ug/kg
JVE-01SC-0304-110218	11-8264-SR99D	Aroclor 1260	4/20/2011	120		Yes	Y				20	6.7	ug/kg
JVE-01SC-0304-110218	11-8264-SR99D	Aroclor 1221	4/20/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-01SC-0304-110218	11-8264-SR99D	Aroclor 1232	4/20/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-01SC-0304-110218	11-8264-SR99D	Aroclor 1248	4/20/2011	98		Yes	N	Y			98	6.7	ug/kg
JVE-01SC-0304-110218	11-8264-SR99D	Aroclor 1016	4/20/2011	20		Yes	N	U			20	5.0	ug/kg
JVE-01SC-0304-110218	11-8264-SR99D	Aroclor 1242	4/20/2011	20		Yes	N	U			20	6.7	ug/kg
JVE-01SC-0304-110218	11-8264-SR99D	Aroclor 1254	4/20/2011	270		Yes	Y				20	6.7	ug/kg
JVE-01SC-0405-110218	11-8265-SR99E	Aroclor 1254	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-01SC-0405-110218	11-8265-SR99E	Aroclor 1221	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-01SC-0405-110218	11-8265-SR99E	Aroclor 1248	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-01SC-0405-110218	11-8265-SR99E	Aroclor 1242	4/20/2011	20		Yes	N	U			20	1.3	ug/kg

EMJ014927

SDG: SR99

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-01SC-0405-110218	11-8265-SR99E	Aroclor 1232	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-01SC-0405-110218	11-8265-SR99E	Aroclor 1016	4/20/2011	20		Yes	N	U			20	1.0	ug/kg
JVE-01SC-0405-110218	11-8265-SR99E	Aroclor 1260	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-01SC-0506-110218	11-8266-SR99F	Aroclor 1221	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-01SC-0506-110218	11-8266-SR99F	Aroclor 1016	4/20/2011	20		Yes	N	U			20	1.0	ug/kg
JVE-01SC-0506-110218	11-8266-SR99F	Aroclor 1242	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-01SC-0506-110218	11-8266-SR99F	Aroclor 1232	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-01SC-0506-110218	11-8266-SR99F	Aroclor 1254	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-01SC-0506-110218	11-8266-SR99F	Aroclor 1260	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-01SC-0506-110218	11-8266-SR99F	Aroclor 1248	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-01SC-0607-110218	11-8267-SR99G	Aroclor 1242	4/20/2011	19		Yes	N	U			19	1.3	ug/kg
JVE-01SC-0607-110218	11-8267-SR99G	Aroclor 1232	4/20/2011	19		Yes	N	U			19	1.3	ug/kg
JVE-01SC-0607-110218	11-8267-SR99G	Aroclor 1221	4/20/2011	19		Yes	N	U			19	1.3	ug/kg
JVE-01SC-0607-110218	11-8267-SR99G	Aroclor 1254	4/20/2011	19		Yes	N	U			19	1.3	ug/kg
JVE-01SC-0607-110218	11-8267-SR99G	Aroclor 1260	4/20/2011	19		Yes	N	U			19	1.3	ug/kg
JVE-01SC-0607-110218	11-8267-SR99G	Aroclor 1016	4/20/2011	19		Yes	N	U			19	0.98	ug/kg
JVE-01SC-0607-110218	11-8267-SR99G	Aroclor 1248	4/20/2011	19		Yes	N	U			19	1.3	ug/kg
JVE-02SC-0001-110221	11-8268-SR99H	Aroclor 1254	4/20/2011	8100		Yes	Y				790	270	ug/kg
JVE-02SC-0001-110221	11-8268-SR99H	Aroclor 1221	4/20/2011	790		Yes	N	U			790	270	ug/kg
JVE-02SC-0001-110221	11-8268-SR99H	Aroclor 1232	4/20/2011	790		Yes	N	U			790	270	ug/kg
JVE-02SC-0001-110221	11-8268-SR99H	Aroclor 1248	4/20/2011	5900		Yes	N	Y			5900	270	ug/kg
JVE-02SC-0001-110221	11-8268-SR99H	Aroclor 1016	4/20/2011	790		Yes	N	U			790	200	ug/kg
JVE-02SC-0001-110221	11-8268-SR99H	Aroclor 1242	4/20/2011	790		Yes	N	U			790	270	ug/kg
JVE-02SC-0001-110221	11-8268-SR99H	Aroclor 1260	4/20/2011	990		Yes	N	Y			990	270	ug/kg
JVE-02SC-0102-110221	11-8269-SR99I	Aroclor 1242	4/20/2011	20		Yes	N	U			20	6.6	ug/kg

EMJ014928

SDG: SR99

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-02SC-0102-110221	11-8269-SR99I	Aroclor 1016	4/20/2011	20		Yes	N	U			20	5.0	ug/kg
JVE-02SC-0102-110221	11-8269-SR99I	Aroclor 1260	4/20/2011	20		Yes	N	U			20	6.6	ug/kg
JVE-02SC-0102-110221	11-8269-SR99I	Aroclor 1254	4/20/2011	39		Yes	Y				20	6.6	ug/kg
JVE-02SC-0102-110221	11-8269-SR99I	Aroclor 1232	4/20/2011	20		Yes	N	U			20	6.6	ug/kg
JVE-02SC-0102-110221	11-8269-SR99I	Aroclor 1221	4/20/2011	20		Yes	N	U			20	6.6	ug/kg
JVE-02SC-0102-110221	11-8269-SR99I	Aroclor 1248	4/20/2011	96		Yes	Y				20	6.6	ug/kg
JVE-02SC-0203-110221	11-8270-SR99J	Aroclor 1248	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-02SC-0203-110221	11-8270-SR99J	Aroclor 1016	4/20/2011	20		Yes	N	U			20	1.0	ug/kg
JVE-02SC-0203-110221	11-8270-SR99J	Aroclor 1254	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-02SC-0203-110221	11-8270-SR99J	Aroclor 1260	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-02SC-0203-110221	11-8270-SR99J	Aroclor 1232	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-02SC-0203-110221	11-8270-SR99J	Aroclor 1221	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-02SC-0203-110221	11-8270-SR99J	Aroclor 1242	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-02SC-0304-110221	11-8271-SR99K	Aroclor 1221	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-02SC-0304-110221	11-8271-SR99K	Aroclor 1254	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-02SC-0304-110221	11-8271-SR99K	Aroclor 1232	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-02SC-0304-110221	11-8271-SR99K	Aroclor 1248	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-02SC-0304-110221	11-8271-SR99K	Aroclor 1016	4/20/2011	20		Yes	N	U			20	1.0	ug/kg
JVE-02SC-0304-110221	11-8271-SR99K	Aroclor 1242	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-02SC-0304-110221	11-8271-SR99K	Aroclor 1260	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-02SC-0405-110221	11-8272-SR99L	Aroclor 1254	4/20/2011	19		Yes	N	U			19	1.3	ug/kg
JVE-02SC-0405-110221	11-8272-SR99L	Aroclor 1221	4/20/2011	19		Yes	N	U			19	1.3	ug/kg
JVE-02SC-0405-110221	11-8272-SR99L	Aroclor 1232	4/20/2011	19		Yes	N	U			19	1.3	ug/kg
JVE-02SC-0405-110221	11-8272-SR99L	Aroclor 1248	4/20/2011	19		Yes	N	U			19	1.3	ug/kg
JVE-02SC-0405-110221	11-8272-SR99L	Aroclor 1016	4/20/2011	19		Yes	N	U			19	0.98	ug/kg

EMJ014929

SDG: SR99

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-02SC-0405-110221	11-8272-SR99L	Aroclor 1242	4/20/2011	19	Yes	N	U			19	1.3	ug/kg
JVE-02SC-0405-110221	11-8272-SR99L	Aroclor 1260	4/20/2011	19	Yes	N	U			19	1.3	ug/kg
JVE-02SC-0506-110221	11-8273-SR99M	Aroclor 1260	4/20/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-02SC-0506-110221	11-8273-SR99M	Aroclor 1248	4/20/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-02SC-0506-110221	11-8273-SR99M	Aroclor 1232	4/20/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-02SC-0506-110221	11-8273-SR99M	Aroclor 1016	4/20/2011	20	Yes	N	U			20	1.0	ug/kg
JVE-02SC-0506-110221	11-8273-SR99M	Aroclor 1242	4/20/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-02SC-0506-110221	11-8273-SR99M	Aroclor 1221	4/20/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-02SC-0506-110221	11-8273-SR99M	Aroclor 1254	4/20/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-02SC-0607-110221	11-8274-SR99N	Aroclor 1242	4/21/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-02SC-0607-110221	11-8274-SR99N	Aroclor 1232	4/21/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-02SC-0607-110221	11-8274-SR99N	Aroclor 1248	4/21/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-02SC-0607-110221	11-8274-SR99N	Aroclor 1016	4/21/2011	20	Yes	N	U			20	0.99	ug/kg
JVE-02SC-0607-110221	11-8274-SR99N	Aroclor 1221	4/21/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-02SC-0607-110221	11-8274-SR99N	Aroclor 1254	4/21/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-02SC-0607-110221	11-8274-SR99N	Aroclor 1260	4/21/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-03SC-0405-110221	11-8278-SR99R	Aroclor 1016	4/21/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-03SC-0405-110221	11-8278-SR99R	Aroclor 1248	4/21/2011	480	Yes	Y				20	6.7	ug/kg
JVE-03SC-0405-110221	11-8278-SR99R	Aroclor 1232	4/21/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-03SC-0405-110221	11-8278-SR99R	Aroclor 1221	4/21/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-03SC-0405-110221	11-8278-SR99R	Aroclor 1254	4/21/2011	600	Yes	Y				20	6.7	ug/kg
JVE-03SC-0405-110221	11-8278-SR99R	Aroclor 1260	4/21/2011	210	Yes	Y				20	6.7	ug/kg
JVE-03SC-0405-110221	11-8278-SR99R	Aroclor 1242	4/21/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-03SC-0506-110221	11-8279-SR99S	Aroclor 1260	4/21/2011	210	Yes	Y				20	6.7	ug/kg
JVE-03SC-0506-110221	11-8279-SR99S	Aroclor 1254	4/21/2011	700	Yes	Y				20	6.7	ug/kg

EMJ014930

SDG: SR99

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-03SC-0506-110221	11-8279-SR99S	Aroclor 1221	4/21/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-03SC-0506-110221	11-8279-SR99S	Aroclor 1232	4/21/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-03SC-0506-110221	11-8279-SR99S	Aroclor 1248	4/21/2011	590	Yes	Y				20	6.7	ug/kg
JVE-03SC-0506-110221	11-8279-SR99S	Aroclor 1016	4/21/2011	20	Yes	N	U			20	5.0	ug/kg
JVE-03SC-0506-110221	11-8279-SR99S	Aroclor 1242	4/21/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-04SC-0001-110221	11-8275-SR99O	Aroclor 1221	4/21/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-04SC-0001-110221	11-8275-SR99O	Aroclor 1232	4/21/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-04SC-0001-110221	11-8275-SR99O	Aroclor 1254	4/21/2011	470	Yes	Y				20	6.7	ug/kg
JVE-04SC-0001-110221	11-8275-SR99O	Aroclor 1016	4/21/2011	20	Yes	N	U			20	5.1	ug/kg
JVE-04SC-0001-110221	11-8275-SR99O	Aroclor 1260	4/21/2011	150	Yes	Y				20	6.7	ug/kg
JVE-04SC-0001-110221	11-8275-SR99O	Aroclor 1242	4/21/2011	20	Yes	N	U			20	6.7	ug/kg
JVE-04SC-0001-110221	11-8275-SR99O	Aroclor 1248	4/21/2011	200	Yes	N	Y			200	6.7	ug/kg
JVE-04SC-0102-110221	11-8276-SR99P	Aroclor 1016	4/21/2011	20	Yes	N	U			20	5.1	ug/kg
JVE-04SC-0102-110221	11-8276-SR99P	Aroclor 1232	4/21/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-04SC-0102-110221	11-8276-SR99P	Aroclor 1248	4/21/2011	99	Yes	N	Y			99	6.8	ug/kg
JVE-04SC-0102-110221	11-8276-SR99P	Aroclor 1260	4/21/2011	70	Yes	Y				20	6.8	ug/kg
JVE-04SC-0102-110221	11-8276-SR99P	Aroclor 1221	4/21/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-04SC-0102-110221	11-8276-SR99P	Aroclor 1254	4/21/2011	160	Yes	Y				20	6.8	ug/kg
JVE-04SC-0102-110221	11-8276-SR99P	Aroclor 1242	4/21/2011	20	Yes	N	U			20	6.8	ug/kg
JVE-04SC-0203-110221	11-8277-SR99Q	Aroclor 1248	4/21/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-04SC-0203-110221	11-8277-SR99Q	Aroclor 1232	4/21/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-04SC-0203-110221	11-8277-SR99Q	Aroclor 1221	4/21/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-04SC-0203-110221	11-8277-SR99Q	Aroclor 1254	4/21/2011	22	Yes	Y				19	6.6	ug/kg
JVE-04SC-0203-110221	11-8277-SR99Q	Aroclor 1242	4/21/2011	19	Yes	N	U			19	6.6	ug/kg
JVE-04SC-0203-110221	11-8277-SR99Q	Aroclor 1016	4/21/2011	19	Yes	N	U			19	4.9	ug/kg

EMJ014931

SDG: SR99

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-04SC-0203-110221	11-8277-SR99Q	Aroclor 1260	4/21/2011	32	Yes	Y				19	6.6	ug/kg

EMJ014932

SDG: SS00

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-07SC-0506-110218	11-8285-SS00D	Total solids	4/15/2011	66	Yes	Y				0.01		pct
JVE-07SC-0607-110218	11-8286-SS00E	Total solids	4/15/2011	73.1	Yes	Y				0.01		pct
JVE-07SC-0708-110218	11-8287-SS00F	Total solids	4/15/2011	79.1	Yes	Y				0.01		pct
JVE-207SC-0102-110216	11-8282-SS00A	Total solids	4/15/2011	48	Yes	Y				0.01		pct
JVE-210SC-0001-110216	11-8284-SS00C	Total solids	4/15/2011	47.6	Yes	Y				0.01		pct
JVE-215SC-0001-110216	11-8283-SS00B	Total solids	4/15/2011	47.5	Yes	Y				0.01		pct
JVE-216SC-0708-110218	11-8289-SS00H	Total solids	4/15/2011	86.9	Yes	Y				0.01		pct
JVE-216SC-0809-110218	11-8290-SS00I	Total solids	4/15/2011	85.2	Yes	Y				0.01		pct
JVE-309SC-0304-110217	11-8292-SS00K	Total solids	4/15/2011	84.6	Yes	Y				0.01		pct
JVE-316SC-0304-110217	11-8293-SS00L	Total solids	4/15/2011	72.3	Yes	Y				0.01		pct
JVE-320SC-0304-110217	11-8291-SS00J	Total solids	4/15/2011	66.4	Yes	Y				0.01		pct
JVE-322SC-0607-110218	11-8288-SS00G	Total solids	4/15/2011	61.2	Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-07SC-0506-110218	11-8285-SS00D	Total organic carbon	4/18/2011	1.44	Yes	Y				0.020	0.00290	pct
JVE-07SC-0607-110218	11-8286-SS00E	Total organic carbon	4/18/2011	0.825	Yes	Y				0.020	0.00290	pct
JVE-07SC-0708-110218	11-8287-SS00F	Total organic carbon	4/18/2011	0.396	Yes	Y				0.020	0.00290	pct
JVE-207SC-0102-110216	11-8282-SS00A	Total organic carbon	4/18/2011	2.03	Yes	Y				0.020	0.00290	pct
JVE-210SC-0001-110216	11-8284-SS00C	Total organic carbon	4/18/2011	2.62	Yes	Y				0.020	0.00290	pct
JVE-215SC-0001-110216	11-8283-SS00B	Total organic carbon	4/18/2011	2.26	Yes	Y				0.020	0.00290	pct
JVE-216SC-0708-110218	11-8289-SS00H	Total organic carbon	4/18/2011	0.12	Yes	Y				0.020	0.00290	pct
JVE-216SC-0809-110218	11-8290-SS00I	Total organic carbon	4/18/2011	0.16	Yes	Y				0.020	0.00290	pct
JVE-309SC-0304-110217	11-8292-SS00K	Total organic carbon	4/18/2011	0.206	Yes	Y				0.020	0.00290	pct
JVE-316SC-0304-110217	11-8293-SS00L	Total organic carbon	4/18/2011	1.78	Yes	Y				0.020	0.00290	pct
JVE-320SC-0304-110217	11-8291-SS00J	Total organic carbon	4/18/2011	1.91	Yes	Y				0.020	0.00290	pct

EMJ014933

SDG: SS00

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-322SC-0607-110218	11-8288-SS00G	Total organic carbon	4/18/2011	2.79		Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-07SC-0506-110218	11-8285-SS00D	Aroclor 1248	4/20/2011	19		Yes	N	U	UJ	5	19	1.3	ug/kg
JVE-07SC-0506-110218	11-8285-SS00D	Aroclor 1016	4/20/2011	19		Yes	N	U			19	0.98	ug/kg
JVE-07SC-0506-110218	11-8285-SS00D	Aroclor 1221	4/20/2011	19		Yes	N	U			19	1.3	ug/kg
JVE-07SC-0506-110218	11-8285-SS00D	Aroclor 1254	4/20/2011	19		Yes	N	U			19	1.3	ug/kg
JVE-07SC-0506-110218	11-8285-SS00D	Aroclor 1260	4/20/2011	27		Yes	Y		J	5	19	1.3	ug/kg
JVE-07SC-0506-110218	11-8285-SS00D	Aroclor 1242	4/20/2011	19		Yes	N	U	UJ	5	19	1.3	ug/kg
JVE-07SC-0506-110218	11-8285-SS00D	Aroclor 1232	4/20/2011	19		Yes	N	U			19	1.3	ug/kg
JVE-07SC-0607-110218	11-8286-SS00E	Aroclor 1016	4/20/2011	20		Yes	N	U			20	1.0	ug/kg
JVE-07SC-0607-110218	11-8286-SS00E	Aroclor 1242	4/20/2011	20		Yes	N	U	UJ	5	20	1.3	ug/kg
JVE-07SC-0607-110218	11-8286-SS00E	Aroclor 1248	4/20/2011	20		Yes	N	U	UJ	5	20	1.3	ug/kg
JVE-07SC-0607-110218	11-8286-SS00E	Aroclor 1232	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-07SC-0607-110218	11-8286-SS00E	Aroclor 1221	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-07SC-0607-110218	11-8286-SS00E	Aroclor 1254	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-07SC-0607-110218	11-8286-SS00E	Aroclor 1260	4/20/2011	30		Yes	Y		J	5	20	1.3	ug/kg
JVE-07SC-0708-110218	11-8287-SS00F	Aroclor 1260	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-07SC-0708-110218	11-8287-SS00F	Aroclor 1254	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-07SC-0708-110218	11-8287-SS00F	Aroclor 1221	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-07SC-0708-110218	11-8287-SS00F	Aroclor 1232	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-07SC-0708-110218	11-8287-SS00F	Aroclor 1248	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-07SC-0708-110218	11-8287-SS00F	Aroclor 1016	4/20/2011	20		Yes	N	U			20	1.0	ug/kg
JVE-07SC-0708-110218	11-8287-SS00F	Aroclor 1242	4/20/2011	20		Yes	N	U			20	1.3	ug/kg
JVE-207SC-0102-110216	11-8282-SS00A	Aroclor 1221	4/20/2011	20		Yes	N	U			20	1.3	ug/kg

EMJ014934

SDG: SS00

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-207SC-0102-110216	11-8282-SS00A	Aroclor 1232	4/20/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-207SC-0102-110216	11-8282-SS00A	Aroclor 1248	4/20/2011	80	Yes	Y		J	5	20	1.3	ug/kg
JVE-207SC-0102-110216	11-8282-SS00A	Aroclor 1016	4/20/2011	20	Yes	N	U			20	1.0	ug/kg
JVE-207SC-0102-110216	11-8282-SS00A	Aroclor 1242	4/20/2011	20	Yes	N	U	UJ	5	20	1.3	ug/kg
JVE-207SC-0102-110216	11-8282-SS00A	Aroclor 1254	4/20/2011	120	Yes	Y				20	1.3	ug/kg
JVE-207SC-0102-110216	11-8282-SS00A	Aroclor 1260	4/20/2011	64	Yes	Y		J	5	20	1.3	ug/kg
JVE-210SC-0001-110216	11-8284-SS00C	Aroclor 1260	4/20/2011	64	Yes	Y		J	5	20	1.4	ug/kg
JVE-210SC-0001-110216	11-8284-SS00C	Aroclor 1254	4/20/2011	87	Yes	Y				20	1.4	ug/kg
JVE-210SC-0001-110216	11-8284-SS00C	Aroclor 1221	4/20/2011	20	Yes	N	U			20	1.4	ug/kg
JVE-210SC-0001-110216	11-8284-SS00C	Aroclor 1232	4/20/2011	20	Yes	N	U			20	1.4	ug/kg
JVE-210SC-0001-110216	11-8284-SS00C	Aroclor 1248	4/20/2011	50	Yes	Y		J	5	20	1.4	ug/kg
JVE-210SC-0001-110216	11-8284-SS00C	Aroclor 1016	4/20/2011	20	Yes	N	U			20	1.0	ug/kg
JVE-210SC-0001-110216	11-8284-SS00C	Aroclor 1242	4/20/2011	20	Yes	N	U	UJ	5	20	1.4	ug/kg
JVE-215SC-0001-110216	11-8283-SS00B	Aroclor 1248	4/20/2011	59	Yes	N	Y	UJ	5	59	1.3	ug/kg
JVE-215SC-0001-110216	11-8283-SS00B	Aroclor 1016	4/20/2011	20	Yes	N	U			20	1.0	ug/kg
JVE-215SC-0001-110216	11-8283-SS00B	Aroclor 1260	4/20/2011	62	Yes	Y		J	5	20	1.3	ug/kg
JVE-215SC-0001-110216	11-8283-SS00B	Aroclor 1221	4/20/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-215SC-0001-110216	11-8283-SS00B	Aroclor 1254	4/20/2011	140	Yes	Y				20	1.3	ug/kg
JVE-215SC-0001-110216	11-8283-SS00B	Aroclor 1242	4/20/2011	20	Yes	N	U	UJ	5	20	1.3	ug/kg
JVE-215SC-0001-110216	11-8283-SS00B	Aroclor 1232	4/20/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-216SC-0708-110218	11-8289-SS00H	Aroclor 1242	4/20/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-216SC-0708-110218	11-8289-SS00H	Aroclor 1260	4/20/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-216SC-0708-110218	11-8289-SS00H	Aroclor 1016	4/20/2011	20	Yes	N	U			20	0.99	ug/kg
JVE-216SC-0708-110218	11-8289-SS00H	Aroclor 1248	4/20/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-216SC-0708-110218	11-8289-SS00H	Aroclor 1232	4/20/2011	20	Yes	N	U			20	1.3	ug/kg

EMJ014935

SDG: SS00

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-216SC-0708-110218	11-8289-SS00H	Aroclor 1221	4/20/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-216SC-0708-110218	11-8289-SS00H	Aroclor 1254	4/20/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-216SC-0809-110218	11-8290-SS00I	Aroclor 1254	4/20/2011	19	Yes	N	U			19	1.3	ug/kg
JVE-216SC-0809-110218	11-8290-SS00I	Aroclor 1016	4/20/2011	19	Yes	N	U			19	0.97	ug/kg
JVE-216SC-0809-110218	11-8290-SS00I	Aroclor 1221	4/20/2011	19	Yes	N	U			19	1.3	ug/kg
JVE-216SC-0809-110218	11-8290-SS00I	Aroclor 1232	4/20/2011	19	Yes	N	U			19	1.3	ug/kg
JVE-216SC-0809-110218	11-8290-SS00I	Aroclor 1248	4/20/2011	19	Yes	N	U			19	1.3	ug/kg
JVE-216SC-0809-110218	11-8290-SS00I	Aroclor 1242	4/20/2011	19	Yes	N	U			19	1.3	ug/kg
JVE-216SC-0809-110218	11-8290-SS00I	Aroclor 1260	4/20/2011	19	Yes	N	U			19	1.3	ug/kg
JVE-309SC-0304-110217	11-8292-SS00K	Aroclor 1248	4/21/2011	950	No	N	U			950	320	ug/kg
JVE-309SC-0304-110217	11-8292-SS00K	Aroclor 1016	4/21/2011	950	No	N	U			950	240	ug/kg
JVE-309SC-0304-110217	11-8292-SS00K	Aroclor 1232	4/21/2011	950	No	N	U			950	320	ug/kg
JVE-309SC-0304-110217	11-8292-SS00K	Aroclor 1221	4/21/2011	950	No	N	U			950	320	ug/kg
JVE-309SC-0304-110217	11-8292-SS00K	Aroclor 1254	4/21/2011	950	No	N	U			950	320	ug/kg
JVE-309SC-0304-110217	11-8292-SS00K	Aroclor 1260	4/21/2011	950	No	N	U			950	320	ug/kg
JVE-309SC-0304-110217	11-8292-SS00K	Aroclor 1242	4/21/2011	950	No	N	U			950	320	ug/kg
JVE-309SC-0304-110217	11-8292-SS00K	Aroclor 1242	4/27/2011	32	Yes	N	U			32	2.4	ug/kg
JVE-309SC-0304-110217	11-8292-SS00K	Aroclor 1016	4/27/2011	32	Yes	N	U			32	1.9	ug/kg
JVE-309SC-0304-110217	11-8292-SS00K	Aroclor 1248	4/27/2011	32	Yes	N	U			32	2.4	ug/kg
JVE-309SC-0304-110217	11-8292-SS00K	Aroclor 1232	4/27/2011	32	Yes	N	U			32	2.4	ug/kg
JVE-309SC-0304-110217	11-8292-SS00K	Aroclor 1221	4/27/2011	32	Yes	N	U			32	2.4	ug/kg
JVE-309SC-0304-110217	11-8292-SS00K	Aroclor 1254	4/27/2011	32	Yes	N	U			32	2.4	ug/kg
JVE-309SC-0304-110217	11-8292-SS00K	Aroclor 1260	4/27/2011	32	Yes	N	U			32	2.4	ug/kg
JVE-316SC-0304-110217	11-8293-SS00L	Aroclor 1248	4/21/2011	1100	No	N	U			1100	380	ug/kg
JVE-316SC-0304-110217	11-8293-SS00L	Aroclor 1016	4/21/2011	1100	No	N	U			1100	290	ug/kg

EMJ014936

SDG: SS00

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-316SC-0304-110217	11-8293-SS00L	Aroclor 1260	4/21/2011	1100	No	N	U			1100	380	ug/kg
JVE-316SC-0304-110217	11-8293-SS00L	Aroclor 1254	4/21/2011	1100	No	N	U			1100	380	ug/kg
JVE-316SC-0304-110217	11-8293-SS00L	Aroclor 1221	4/21/2011	1100	No	N	U			1100	380	ug/kg
JVE-316SC-0304-110217	11-8293-SS00L	Aroclor 1232	4/21/2011	1100	No	N	U			1100	380	ug/kg
JVE-316SC-0304-110217	11-8293-SS00L	Aroclor 1242	4/21/2011	1100	No	N	U			1100	380	ug/kg
JVE-316SC-0304-110217	11-8293-SS00L	Aroclor 1254	4/28/2011	730	Yes	Y				160	12	ug/kg
JVE-316SC-0304-110217	11-8293-SS00L	Aroclor 1221	4/28/2011	160	Yes	N	U			160	12	ug/kg
JVE-316SC-0304-110217	11-8293-SS00L	Aroclor 1232	4/28/2011	160	Yes	N	U			160	12	ug/kg
JVE-316SC-0304-110217	11-8293-SS00L	Aroclor 1016	4/28/2011	160	Yes	N	U			160	9.9	ug/kg
JVE-316SC-0304-110217	11-8293-SS00L	Aroclor 1242	4/28/2011	160	Yes	N	U			160	12	ug/kg
JVE-316SC-0304-110217	11-8293-SS00L	Aroclor 1260	4/28/2011	260	Yes	Y				160	12	ug/kg
JVE-316SC-0304-110217	11-8293-SS00L	Aroclor 1248	4/28/2011	560	Yes	Y	P			160	12	ug/kg
JVE-320SC-0304-110217	11-8291-SS00J	Aroclor 1248	4/20/2011	29	Yes	N	Y			29	1.3	ug/kg
JVE-320SC-0304-110217	11-8291-SS00J	Aroclor 1232	4/20/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-320SC-0304-110217	11-8291-SS00J	Aroclor 1016	4/20/2011	20	Yes	N	U			20	1.0	ug/kg
JVE-320SC-0304-110217	11-8291-SS00J	Aroclor 1242	4/20/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-320SC-0304-110217	11-8291-SS00J	Aroclor 1254	4/20/2011	86	Yes	Y				20	1.3	ug/kg
JVE-320SC-0304-110217	11-8291-SS00J	Aroclor 1260	4/20/2011	84	Yes	Y				20	1.3	ug/kg
JVE-320SC-0304-110217	11-8291-SS00J	Aroclor 1221	4/20/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-322SC-0607-110218	11-8288-SS00G	Aroclor 1254	4/21/2011	1000	Yes	Y		J	5	400	27	ug/kg
JVE-322SC-0607-110218	11-8288-SS00G	Aroclor 1221	4/21/2011	400	Yes	N	U			400	27	ug/kg
JVE-322SC-0607-110218	11-8288-SS00G	Aroclor 1232	4/21/2011	400	Yes	N	U			400	27	ug/kg
JVE-322SC-0607-110218	11-8288-SS00G	Aroclor 1248	4/21/2011	1300	Yes	Y		J	5	400	27	ug/kg
JVE-322SC-0607-110218	11-8288-SS00G	Aroclor 1016	4/21/2011	400	Yes	N	U			400	20	ug/kg
JVE-322SC-0607-110218	11-8288-SS00G	Aroclor 1242	4/21/2011	400	Yes	N	U			400	27	ug/kg

EMJ014937

SDG: SS00

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-322SC-0607-110218	11-8288-SS00G	Aroclor 1260	4/21/2011	400	Yes	N	U	UJ	5	400	27	ug/kg

EMJ014938

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 17 through February 18, 2011
LDC Report Date:	May 24, 2011
Matrix:	Sediments
Parameters:	Polychlorinated Biphenyls
Validation Level:	EPA Level III & IV
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	ST93

Sample Identification

JVE-309SC-0203-110217**
JVE-320SC-0203-110217
JVE-314SC-0304-110218**
JVE-216SC-0607-110218
JVE-07SC-0405-110218**
JVE-314SC-0304-110218MS
JVE-314SC-0304-110218MSD

**Indicates sample underwent EPA Level IV review.

Introduction

This data review covers 7 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Samples indicated by a double asterisk on the front cover underwent an EPA Level IV review. An EPA Level III review was performed on all other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

Retention time windows were evaluated and considered technically acceptable for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples on which a Level III review was performed.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

Retention times (RT) of all compounds in the calibration standards were within QC limits for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples on which a Level III review was performed.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

All internal standard areas and retention times were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

XI. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XII. Target Compound Identification

All target compound identifications were within validation criteria for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XIII. Compound Quantitation and Reported CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III and Level IV data validation all results are considered valid and usable for all purposes.

Jorgensen Forge Facility
Polychlorinated Biphenyls - Data Qualification Summary - SDG ST93

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG ST93

No Sample Data Qualified in this SDG

LDC #: 25449B3b

SDG #: ST93

Laboratory: Analytical Resources, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III/IV

Date: 5/23/11

Page: 1 of 1

Reviewer:

2nd Reviewer:

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/17 — 2/18/11
II.	GC/ECD Instrument Performance Check	NA	
III.	Initial calibration	A	% RSD ≤ 20
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 20
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	A	Not reviewed for Level III validation.
XIII.	Compound quantitation and reported CRQLs	A	Not reviewed for Level III validation. Acceptable IS.
XIV.	Overall assessment of data	A	
XV.	Field duplicates	N	
XVI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:** Indicates sample underwent Level IV validation

Sediments

1 +	JVE-309SC-0203-110217**	11	MB-043011	21		31	
2 +	JVE-320SC-0203-110217	12		22		32	
3	JVE-314SC-0304-110218**	13		23		33	
4 +	JVE-216SC-0607-110218	14		24		34	
5 +	JVE-07SC-0405-110218**	15		25		35	
6	JVE-314SC-0304-110218MS	16		26		36	
7	JVE-314SC-0304-110218MSD	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 25449B3b
SDG #: per cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: FT
2nd Reviewer: K

Method: ✓ GC ____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation?		✓		
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 20%.0 or percent recoveries 80-120%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 25449B3b
SDG #: per cover

VALIDATION FINDINGS CHECKLIST

Reviewer: FZ
2nd Reviewer: A

Validation Area	Yes	No	NA	Findings/Comments
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target compounds were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target compounds were detected in the field blanks.			✓	

LDC #: 25449B3b
SDG #: per cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: PJ
2nd Reviewer: [illegible]

METHOD: GC ✓ HPLC ____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (0.25 std)	Recalculated CF (0.25 std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	4/18/11	Aroclor-1260-1 ZB5	0.0880	0.0880	0.0844	0.0844	3.4	3.4
			↓ ZB35	0.0550	0.0550	0.0593	0.0593	12.2	12.2
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

INICI C ISB

EMJ014947

LDC #: 35449B3b
SDG #: w conn

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: EJ
2nd Reviewer: K

METHOD: GC ✓ HPLC ____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	CCV	5/3/11	Aroclor 1260 - 1 ZB5	250.0	260.0	260.0	4.0	4.0
	14:32		↓ ZB35	250.0	228.6	228.6	8.6	8.6
2								
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CONCLC.1S

EMJ014948

LDC #: 44783B

SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1

Reviewer: FT

2nd reviewer: [illegible]

METHOD: ~~GC~~ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #1 5X

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
DCB	ZB5	40	35	88.0	88.0	0
TCMX	ZB35	40	32	80.5	80.0	0

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

SURRCALCNew.wpd

EMJ014949

LDC #: 25 74 2009
SDG #: [illegible]

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: ___ GC ___ HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA Where SSC = Spiked sample concentration SC = Sample concentration
SA = Spike added
RPD =(((SSCMS - SSCMSD) * 2) / (SSCMS + SSCMSD))*100 MS = Matrix spike MSD = Matrix spike duplicate

MS/MSD samples: 6 + 7

Compound	Spike Added (ug/kg)		Sample Conc. (ug/kg)	Spike Sample Concentration (ug/kg)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	---	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											
Aroclor 1260	94.0	94.3	ND	94.0	94.3	79.5	79.5	74.5	74.5	6.1	6.1

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

MSDCLCNew.wpd

LDC #: 25449B3b
SDG #: pu cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: ✓ GC __HPLC

The percent recoveries (%R) and Relative Percent difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100* (SSC-SC)/SA
RPD = I LCS - LCSD I * 2/(LCS + LCSD)

Where: SSC = Spiked sample concentration
SA = Spike added
LCS = Laboratory control sample percent recovery
SC = Concentration
LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: lcs-043011

Compound	Spike Added (ug/kg)		Spiked Sample Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)										
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)										
2,4,6-Trinitrotoluene (8330)										
Aroclor 1260	101	NA	85.9	NA	85.0	85.0				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

V:\Validation Worksheets\GC\LCSDCLC_GC.wpd

EMJ014951

LDC #: 25449B3b
SDG #: [illegible]

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: ___ GC ___ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= (A)(Fv)(Df) / (RF)(Vs or Ws)(%S/100)

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound in the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. #1 Compound Name Aroclor 1260

Final Concentration = (107)(2.5)(5) / (12.9)

= 103.7 ug/kg

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications
	ZB35	Aroclor 1260-1 = (477562)(80) / (6004808)(0.0593)		= 107.3	
	Aroclor - 1260	-1 = 107.3			
		-3 = 103.2			
		4 = 110.4			
		Ave = 107			

Comments:

SAMPCALew.wpd

EMJ014952

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 17 through February 18, 2011
LDC Report Date:	May 27, 2011
Matrix:	Sediment
Parameters:	Wet Chemistry
Validation Level:	EPA Level III & IV
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	ST93

Sample Identification

JVE-309SC-0203-110217**
JVE-320SC-0203-110217
JVE-314SC-0304-110218**
JVE-216SC-0607-110218
JVE-07SC-0405-110218**
JVE-309SC-0203-110217MS
JVE-309SC-0203-110217DUP
JVE-309SC-0203-110217TRP

**Indicates sample underwent EPA Level IV review

Introduction

This data review covers 8 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per PLUMB Method for Total Organic Carbons and EPA Method 160.3 for Total Solids.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Samples indicated by a double asterisk on the front cover underwent an EPA Level IV review. An EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates/Triplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

Triplicate (TRP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Sample Result Verification

All sample result verifications were acceptable for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

IX. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III and Level IV data validation all results are considered valid and usable for all purposes.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Wet Chemistry - Data Qualification Summary - SDG ST93

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG ST93

No Sample Data Qualified in this SDG

LDC #: 25449B6

SDG #: ST93

Laboratory: Analytical Resources, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III /IV

Date: 5-17-11

Page: 1 of 1

Reviewer: CL

2nd Reviewer: [illegible]

METHOD: (Analyte) TOC (PLUMB Method), Total Solids (EPA Method 160.3)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/17/11 - 2/18/11
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS
VI.	Duplicates /Triplicates	A	DUP, TRP
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	A	Not reviewed for Level III validation.
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:** Indicates sample underwent Level IV validation

1	JVE-309SC-0203-110217** (Sediment)	11		21	PBS	31	
2	JVE-320SC-0203-110217	12		22		32	
3	JVE-314SC-0304-110218**	13		23		33	
4	JVE-216SC-0607-110218	14		24		34	
5	JVE-07SC-0405-110218**	15		25		35	
6	JVE-309SC-0203-110217MS	16		26		36	
7	JVE-309SC-0203-110217~~MSD~~ DUP	17		27		37	
8	JVE-309SC-0203-110217~~DUP~~ TRP	18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

25449B6W.wpd

LDC #: 25449B6

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: CC
2nd Reviewer: [illegible]

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients > 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)	✓			
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 25449B6

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: W

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 25449B6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-5		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC 6		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4
7		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
8		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

METHODS.6

LDC #: 25449B6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: GR
2nd Reviewer: [illegible]

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of TOC was recalculated. Calibration date: 4/19/11

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (ug/C)	Response	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	TOC	s1	0	30053	0.99955	0.99955	Y
		s2	8.00	1996979			
		s3	20.00	6459582			
		s4	40.00	12427234			
		s5	100.00	31033376			
Calibration verification		ICV	1000	960	96	96.00	
Calibration verification		CCV		956	95.6	95.60	
Calibration verification							

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

EMJ014962

LDC #: 25449B6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: QR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (~~units~~) %	True / D (~~units~~) %	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	TOC	2.73	2.99	91.3	91.3	Y
6	Matrix spike sample	TOC	(SSR-SR) 0.503	0.653	77.9	77.9	↓
8	~~Duplicate~~ sample Triplicate	TS	77.90	78.10 79.20	0.9	0.9	↓

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.6

EMJ014963

LDC #: 25449B6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

METHOD: Inorganics, Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for TS reported with a positive detect were recalculated and verified using the following equation:

Concentration =

$$\frac{\text{Dry} - \text{Tare}}{\text{Sample} - \text{Tare}} \times 100$$

Recalculation:

$$\frac{4.2494g - 1.0901g}{5.1467g - 1.0901g} \times 100 = 77.88\%$$

#	Sample ID	Analyte	Reported Concentration (%)	Calculated Concentration (%)	Acceptable (Y/N)
	1	TS	77.90	77.90	Y
		TOC	0.551	0.551	↓

Note:

RECALC.6

Jorgensen Forge Facility - LDC 25449

SDG: ST93

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-07SC-0405-110218	11-9366-ST93E	Total solids	4/28/2011	59.5		Yes	Y				0.01		pct
JVE-216SC-0607-110218	11-9365-ST93D	Total solids	4/28/2011	70.9		Yes	Y				0.01		pct
JVE-309SC-0203-110217	11-9362-ST93A	Total solids	4/28/2011	77.9		Yes	Y				0.01		pct
JVE-314SC-0304-110218	11-9364-ST93C	Total solids	4/28/2011	85.7		Yes	Y				0.01		pct
JVE-320SC-0203-110217	11-9363-ST93B	Total solids	4/28/2011	57.6		Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-07SC-0405-110218	11-9366-ST93E	Total organic carbon	5/3/2011	1.29		Yes	Y				0.020	0.00290	pct
JVE-216SC-0607-110218	11-9365-ST93D	Total organic carbon	5/3/2011	1.63		Yes	Y				0.020	0.00290	pct
JVE-309SC-0203-110217	11-9362-ST93A	Total organic carbon	5/3/2011	0.551		Yes	Y				0.020	0.00290	pct
JVE-314SC-0304-110218	11-9364-ST93C	Total organic carbon	5/3/2011	0.659		Yes	Y				0.020	0.00290	pct
JVE-320SC-0203-110217	11-9363-ST93B	Total organic carbon	5/3/2011	2.95		Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-07SC-0405-110218	11-9366-ST93E	Aroclor 1232	5/3/2011	19		Yes	N	U			19	6.4	ug/kg
JVE-07SC-0405-110218	11-9366-ST93E	Aroclor 1242	5/3/2011	19		Yes	N	U			19	6.4	ug/kg
JVE-07SC-0405-110218	11-9366-ST93E	Aroclor 1248	5/3/2011	19		Yes	N	U			19	6.4	ug/kg
JVE-07SC-0405-110218	11-9366-ST93E	Aroclor 1221	5/3/2011	19		Yes	N	U			19	6.4	ug/kg
JVE-07SC-0405-110218	11-9366-ST93E	Aroclor 1016	5/3/2011	19		Yes	N	U			19	4.8	ug/kg
JVE-07SC-0405-110218	11-9366-ST93E	Aroclor 1254	5/3/2011	19		Yes	N	U			19	6.4	ug/kg
JVE-07SC-0405-110218	11-9366-ST93E	Aroclor 1260	5/3/2011	87		Yes	Y				19	6.4	ug/kg
JVE-216SC-0607-110218	11-9365-ST93D	Aroclor 1254	5/3/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-216SC-0607-110218	11-9365-ST93D	Aroclor 1221	5/3/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-216SC-0607-110218	11-9365-ST93D	Aroclor 1232	5/3/2011	19		Yes	N	U			19	6.6	ug/kg

EMJ014965

SDG: ST93

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-216SC-0607-110218	11-9365-ST93D	Aroclor 1248	5/3/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-216SC-0607-110218	11-9365-ST93D	Aroclor 1260	5/3/2011	41		Yes	Y				19	6.6	ug/kg
JVE-216SC-0607-110218	11-9365-ST93D	Aroclor 1016	5/3/2011	19		Yes	N	U			19	4.9	ug/kg
JVE-216SC-0607-110218	11-9365-ST93D	Aroclor 1242	5/3/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-309SC-0203-110217	11-9362-ST93A	Aroclor 1242	5/3/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-309SC-0203-110217	11-9362-ST93A	Aroclor 1016	5/3/2011	19		Yes	N	U			19	4.9	ug/kg
JVE-309SC-0203-110217	11-9362-ST93A	Aroclor 1248	5/3/2011	150		Yes	N	Y			150	6.6	ug/kg
JVE-309SC-0203-110217	11-9362-ST93A	Aroclor 1232	5/3/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-309SC-0203-110217	11-9362-ST93A	Aroclor 1221	5/3/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-309SC-0203-110217	11-9362-ST93A	Aroclor 1260	5/3/2011	100		Yes	Y				19	6.6	ug/kg
JVE-309SC-0203-110217	11-9362-ST93A	Aroclor 1254	5/3/2011	300		Yes	Y				19	6.6	ug/kg
JVE-314SC-0304-110218	11-9364-ST93C	Aroclor 1232	5/3/2011	19		Yes	N	U			19	6.5	ug/kg
JVE-314SC-0304-110218	11-9364-ST93C	Aroclor 1260	5/3/2011	19		Yes	N	U			19	6.5	ug/kg
JVE-314SC-0304-110218	11-9364-ST93C	Aroclor 1221	5/3/2011	19		Yes	N	U			19	6.5	ug/kg
JVE-314SC-0304-110218	11-9364-ST93C	Aroclor 1248	5/3/2011	19		Yes	N	U			19	6.5	ug/kg
JVE-314SC-0304-110218	11-9364-ST93C	Aroclor 1016	5/3/2011	19		Yes	N	U			19	4.8	ug/kg
JVE-314SC-0304-110218	11-9364-ST93C	Aroclor 1242	5/3/2011	19		Yes	N	U			19	6.5	ug/kg
JVE-314SC-0304-110218	11-9364-ST93C	Aroclor 1254	5/3/2011	19		Yes	N	U			19	6.5	ug/kg
JVE-320SC-0203-110217	11-9363-ST93B	Aroclor 1254	5/3/2011	970		Yes	Y				19	6.6	ug/kg
JVE-320SC-0203-110217	11-9363-ST93B	Aroclor 1260	5/3/2011	810		Yes	Y				19	6.6	ug/kg
JVE-320SC-0203-110217	11-9363-ST93B	Aroclor 1221	5/3/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-320SC-0203-110217	11-9363-ST93B	Aroclor 1232	5/3/2011	19		Yes	N	U			19	6.6	ug/kg
JVE-320SC-0203-110217	11-9363-ST93B	Aroclor 1248	5/3/2011	290		Yes	N	Y			290	6.6	ug/kg
JVE-320SC-0203-110217	11-9363-ST93B	Aroclor 1016	5/3/2011	19		Yes	N	U			19	5.0	ug/kg
JVE-320SC-0203-110217	11-9363-ST93B	Aroclor 1242	5/3/2011	19		Yes	N	U			19	6.6	ug/kg

EMJ014966

Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 **Web** www.lab-data.com **Fax** 760.634.0439

Anchor QEA, LLC
720 Olive Way, Suite 900
Seattle, WA 98101
ATTN: Ms. Delaney Peterson

June 23, 2011

SUBJECT: Jorgensen Forge Facility, Data Validation

Dear Ms. Peterson,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on June 10, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 25647:

SDG #	**Fraction**
SX21	Polychlorinated Biphenyls, Wet Chemistry

The data validation was performed under EPA Level III guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

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0 pages-EX

Attachment 1

EDD 90/10

LDC #25647 (Anchor Environmental-Seattle WA /Jorgensen Forge Facility)

LDC	SDG#	DATE REC'D	(3) DATE DUE	PCBs (8082B)		TOC (Plumb)		Total Solids (160.3)																													
Matrix:	Water/Sediment			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	SX21	06/10/11	07/01/11	0	3	0	3	0	3																												
Total	A/SC			0	3	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9

Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS, MSD, or DUP's.

25647ST.wpd

EMJ014968

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 18, 2011
LDC Report Date:	June 16, 2011
Matrix:	Sediment
Parameters:	Polychlorinated Biphenyls
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SX21

Sample Identification

JVE-216SC-0506-110218
JVE-314SC-0203-110218
JVE-07SC-0304-110218
JVE-314SC-0203-110218MS
JVE-314SC-0203-110218MSD

Introduction

This data review covers 5 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082B for Polychlorinated Biphenyls.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

All internal standard areas and retention times were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

XI. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XII. Target Compound Identification

Raw data were not reviewed for this SDG.

XIII. Compound Quantitation and Reported CRQLs

Raw data were not reviewed for this SDG.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

XV. Field Duplicates

No field duplicates were identified in this SDG.

XV. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Polychlorinated Biphenyls - Data Qualification Summary - SDG SX21

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG SX21

No Sample Data Qualified in this SDG

LDC #: 25647A3b

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 6-16-11

SDG #: SX21

Page: 1 of 1

Laboratory: Analytical Resources, Inc.

Reviewer:

2nd Reviewer:

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082) B

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/18/11
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	%RSD ≤ 20
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes / IS	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	N	
XIII.	Compound quantitation and reported CRQLs	N	
XIV.	Overall assessment of data	A	
XV.	Field duplicates	N	
XVI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: All sediment

1	JVE-216SC-0506-110218	11		21		31	052711-BLK
2	JVE-314SC-0203-110218	12		22		32	
3	JVE-07SC-0304-110218	13		23		33	
4	JVE-314SC-0203-110218MS	14		24		34	
5	JVE-314SC-0203-110218MSD	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 18, 2011
LDC Report Date:	June 15, 2011
Matrix:	Sediment
Parameters:	Wet Chemistry
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SX21

Sample Identification

JVE-216SC-0506-110218
JVE-314SC-0203-110218
JVE-07SC-0304-110218
JVE-216SC-0506-110218MS
JVE-216SC-0506-110218DUP
JVE-216SC-0506-110218TRP

Introduction

This data review covers 6 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per Plumb Method for Total Organic Carbon and EPA Method 160.3 for Total Solids.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates/Triplicates

Duplicate (DUP) and triplicate (TRP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

IX. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Wet Chemistry - Data Qualification Summary - SDG SX21

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG SX21

No Sample Data Qualified in this SDG

LDC #: 25647A6 **VALIDATION COMPLETENESS WORKSHEET** Date: 6/14/11

SDG #: SX21 Level III Page: 1 of 1

Laboratory: Analytical Resources, Inc. Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: (Analyte) TOC (PLUMB Method), Total Solids (EPA Method 160.3)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/18/11
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS
VI.	Duplicates/Triplicates	A	Dup, Trip
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: Sediment

1	JVE-216SC-0506-110218	11		21	PBS	31	
2	JVE-314SC-0203-110218	12		22		32	
3	JVE-07SC-0304-110218	13		23		33	
4	JVE-216SC-0506-110218MS	14		24		34	
5	JVE-216SC-0506-110218~~MSD~~ DUP	15		25		35	
6	JVE-216SC-0506-110218~~DUP~~ TRP	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 25667A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-3		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 TS
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC: 4		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
5,6		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 TS
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

METHODS.6

Jorgensen Forge Facility - LDC 25647

SDG: SX21

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-07SC-0304-110218	11-11072-SX21C	Total solids	5/18/2011	55.8	Yes	Y				0.01		pct
JVE-216SC-0506-110218	11-11070-SX21A	Total solids	5/18/2011	65	Yes	Y				0.01		pct
JVE-314SC-0203-110218	11-11071-SX21B	Total solids	5/18/2011	77.2	Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-07SC-0304-110218	11-11072-SX21C	Total organic carbon	5/20/2011	2.55	Yes	Y				0.020	0.00290	pct
JVE-216SC-0506-110218	11-11070-SX21A	Total organic carbon	5/20/2011	2.05	Yes	Y				0.020	0.00290	pct
JVE-314SC-0203-110218	11-11071-SX21B	Total organic carbon	5/20/2011	0.815	Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-07SC-0304-110218	11-11072-SX21C	Aroclor 1016	5/31/2011	20	Yes	N	U			20	0.99	ug/kg
JVE-07SC-0304-110218	11-11072-SX21C	Aroclor 1248	5/31/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-07SC-0304-110218	11-11072-SX21C	Aroclor 1232	5/31/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-07SC-0304-110218	11-11072-SX21C	Aroclor 1221	5/31/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-07SC-0304-110218	11-11072-SX21C	Aroclor 1254	5/31/2011	39	Yes	N	Y			39	1.3	ug/kg
JVE-07SC-0304-110218	11-11072-SX21C	Aroclor 1260	5/31/2011	170	Yes	Y				20	1.3	ug/kg
JVE-07SC-0304-110218	11-11072-SX21C	Aroclor 1242	5/31/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-216SC-0506-110218	11-11070-SX21A	Aroclor 1232	5/31/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-216SC-0506-110218	11-11070-SX21A	Aroclor 1260	5/31/2011	130	Yes	Y				19	6.5	ug/kg
JVE-216SC-0506-110218	11-11070-SX21A	Aroclor 1221	5/31/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-216SC-0506-110218	11-11070-SX21A	Aroclor 1248	5/31/2011	210	Yes	Y				19	6.5	ug/kg
JVE-216SC-0506-110218	11-11070-SX21A	Aroclor 1016	5/31/2011	19	Yes	N	U			19	4.8	ug/kg
JVE-216SC-0506-110218	11-11070-SX21A	Aroclor 1242	5/31/2011	19	Yes	N	U			19	6.5	ug/kg
JVE-216SC-0506-110218	11-11070-SX21A	Aroclor 1254	5/31/2011	340	Yes	Y				19	6.5	ug/kg

EMJ014982

SDG: SX21

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-314SC-0203-110218	11-11071-SX21B	Aroclor 1242	5/31/2011	19	Yes	N	U			19	1.3	ug/kg
JVE-314SC-0203-110218	11-11071-SX21B	Aroclor 1016	5/31/2011	19	Yes	N	U			19	0.99	ug/kg
JVE-314SC-0203-110218	11-11071-SX21B	Aroclor 1248	5/31/2011	19	Yes	N	U			19	1.3	ug/kg
JVE-314SC-0203-110218	11-11071-SX21B	Aroclor 1232	5/31/2011	19	Yes	N	U			19	1.3	ug/kg
JVE-314SC-0203-110218	11-11071-SX21B	Aroclor 1221	5/31/2011	19	Yes	N	U			19	1.3	ug/kg
JVE-314SC-0203-110218	11-11071-SX21B	Aroclor 1254	5/31/2011	19	Yes	N	U			19	1.3	ug/kg
JVE-314SC-0203-110218	11-11071-SX21B	Aroclor 1260	5/31/2011	19	Yes	N	U			19	1.3	ug/kg

EMJ014983

Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 **Web** www.lab-data.com **Fax** 760.634.0439

Anchor QEA, LLC
720 Olive Way, Suite 900
Seattle, WA 98101
ATTN: Ms. Delaney Peterson

June 24, 2011

SUBJECT: Jorgensen Forge Facility, Data Validation

Dear Ms. Peterson,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on June 15, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 25671:

SDG #	**Fraction**
SZ26	Polychlorinated Biphenyls, Wet Chemistry

The data validation was performed under EPA Level III guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

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Attachment 1

EDD 90/10

LDC #25671 (Anchor Environmental-Seattle WA /Jorgensen Forge Facility)

LDC	SDG#	DATE REC'D	(3) DATE DUE	PCBs (8082B)		TOC (Plumb)		Total Solids (160.3)																													
Matrix:	Water/Sediment			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	SZ26	06/15/11	07/06/11	0	4	0	4	0	4																												
Total	A/SC			0	4	0	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12

Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS, MSD, or DUP's.

25671ST.wpd

EMJ014985

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 18, 2011
LDC Report Date:	June 17, 2011
Matrix:	Sediment
Parameters:	Polychlorinated Biphenyls
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SZ26

Sample Identification

JVE-314SC-0001-110218
JVE-314SC-0102-110218
JVE-07SC-0203-110218
JVE-07SC-0304-110218
JVE-314SC-0102-110218MS
JVE-314SC-0102-110218MSD

Introduction

This data review covers 6 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082B for Polychlorinated Biphenyls.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

All internal standard areas and retention times were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Affected Compound	Flag	A or P
JVE-314SC-0102-110218MS/MSD (JVE-314SC-0102-110218)	Aroclor-1260	31.2 (50-140)	43.3 (50-140)	-	Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260	J (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

XI. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XII. Target Compound Identification

Raw data were not reviewed for this SDG.

XIII. Compound Quantitation and Reported CRQLs

Raw data were not reviewed for this SDG.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to MS/MSD %R problems, data were qualified as estimated in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the Level III data validation all other results are considered valid and usable for all purposes.

Data flags are summarized at the end of this report if data has been qualified.

XV. Field Duplicates

No field duplicates were identified in this SDG.

XV. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Polychlorinated Biphenyls - Data Qualification Summary - SDG SZ26

SDG	Sample	Compound	Flag	A or P	Reason
SZ26	JVE-314SC-0102-110218	Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)

Jorgensen Forge Facility
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG SZ26

No Sample Data Qualified in this SDG

LDC #: 25671A3b **VALIDATION COMPLETENESS WORKSHEET** Date: 6-17-11
SDG #: SZ26 Level III Page: 1 of 1
Laboratory: Analytical Resources, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082) B

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/18/11
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	%RSD ≤ 20
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes /IS	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	N	
XIII.	Compound quantitation and reported CRQLs	N	
XIV.	Overall assessment of data	A	
XV.	Field duplicates	N	
XVI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: All sediment

1	JVE-314SC-~~001~~ 0001-110218	11		21		31	060611-BLK
2	JVE-314SC-0102-110218	12		22		32	
3	JVE-07SC-0203-110218	13		23		33	
4	JVE-07SC-0304-110218	14		24		34	
5	JVE-314SC-0102-110218MS	15		25		35	
6	JVE-314SC-0102-110218MSD	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	GG Chlordane
B beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	HH Chlordane (Technical)
C delta-BHC	K. Endrin	S alpha-Chlordane	AA Aroclor-1254	II.
D gamma-BHC	L Endosulfan II	T gamma-Chlordane	BB Aroclor-1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC 2,4'-DDD	KK.
F. Aldrin	N. Endosulfan sulfate	V Aroclor-1016	DD 2,4'-DDE	LL
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE. 2,4'-DDT	MM.
H Endosulfan I	P Methoxychlor	X Aroclor-1232	FF. Hexachlorobenzene	NN.

Notes:

EMJ014993

LDC #: 25671A3b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: TM
2nd Reviewer: [illegible]

METHOD: X GC __ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?
Y N N/A Was an MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed?
Y N N/A Were the MS/MSD percent recoveries (%R) and relative percent differences (RPD) within QC limits?

#	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	5/6	Aroclor 1260	31.2 (50-140)	43.3 (50-140)	( )	2	J/UJ/A
			( )	( )	( )		(also qual Y, Z, AA)
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
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			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		

MSDNew.wpd

EMJ014994

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 18, 2011
LDC Report Date:	June 22, 2011
Matrix:	Sediment
Parameters:	Wet Chemistry
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	SZ26

Sample Identification

JVE-314SC-0001-110218
JVE-314SC-0102-110218
JVE-07SC-0203-110218
JVE-07SC-0304-110218
JVE-07SC-0304-110218MS
JVE-07SC-0304-110218DUP
JVE-07SC-0304-110218TRP

Introduction

This data review covers 7 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per Plumb Method for Total Organic Carbon and EPA Method 160.3 for Total Solids.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates/Triplicates

Duplicate (DUP) and Triplicate (TRP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

IX. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Wet Chemistry - Data Qualification Summary - SDG SZ26

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG SZ26

No Sample Data Qualified in this SDG

LDC #: 25671A6 **VALIDATION COMPLETENESS WORKSHEET** Date: 6/20/11
SDG #: SZ26 Level III Page: 1 of 1
Laboratory: Analytical Resources, Inc. Reviewer: CR
2nd Reviewer: [illegible]

METHOD: (Analyte) TOC (PLUMB Method), Total Solids (EPA Method 160.3)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/18/11
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS
VI.	Duplicates triplicates	A	DUP, TRP
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: Sediment

1	JVE-314SC-~~001~~ 0001-110218	11		21	PBS	31	
2	JVE-314SC-0102-110218	12		22		32	
3	JVE-07SC-0203-110218	13		23		33	
4	JVE-07SC-0304-110218	14		24		34	
5	JVE-07SC-0304-110218MS	15		25		35	
6	JVE-07SC-0304-110218~~MSD~~ DUP	16		26		36	
7	JVE-07SC-0304-110218~~DUP~~ TRP	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

25671A6W.wpd

LDC #: 28671A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: [illegible]
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-4		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
MB		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC: 5		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4
6,7		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

METHODS.6

Jorgensen Forge Facility - LDC 25671

SDG: SZ26

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-07SC-0203-110218	11-12243-SZ26C	Total solids	6/6/2011	58.1		Yes	Y				0.01		pct
JVE-07SC-0304-110218	11-12244-SZ26D	Total solids	6/6/2011	56.5		Yes	Y				0.01		pct
JVE-314SC-0001-110218	11-12241-SZ26A	Total solids	6/6/2011	61.7		Yes	Y				0.01		pct
JVE-314SC-0102-110218	11-12242-SZ26B	Total solids	6/6/2011	66.4		Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-07SC-0203-110218	11-12243-SZ26C	Total organic carbon	6/7/2011	1.72		Yes	Y				0.020	0.00290	pct
JVE-07SC-0304-110218	11-12244-SZ26D	Total organic carbon	6/7/2011	3.22		Yes	Y				0.020	0.00290	pct
JVE-314SC-0001-110218	11-12241-SZ26A	Total organic carbon	6/7/2011	1.94		Yes	Y				0.020	0.00290	pct
JVE-314SC-0102-110218	11-12242-SZ26B	Total organic carbon	6/7/2011	1.04		Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-07SC-0203-110218	11-12243-SZ26C	Aroclor 1254	6/7/2011	29		Yes	N	Y			29	1.3	ug/kg
JVE-07SC-0203-110218	11-12243-SZ26C	Aroclor 1221	6/7/2011	3.9		Yes	N	U			3.9	1.3	ug/kg
JVE-07SC-0203-110218	11-12243-SZ26C	Aroclor 1260	6/7/2011	120		Yes	Y				3.9	1.3	ug/kg
JVE-07SC-0203-110218	11-12243-SZ26C	Aroclor 1242	6/7/2011	3.9		Yes	N	U			3.9	1.3	ug/kg
JVE-07SC-0203-110218	11-12243-SZ26C	Aroclor 1016	6/7/2011	3.9		Yes	N	U			3.9	0.99	ug/kg
JVE-07SC-0203-110218	11-12243-SZ26C	Aroclor 1248	6/7/2011	16		Yes	N	Y			16	1.3	ug/kg
JVE-07SC-0203-110218	11-12243-SZ26C	Aroclor 1232	6/7/2011	3.9		Yes	N	U			3.9	1.3	ug/kg
JVE-07SC-0304-110218	11-12244-SZ26D	Aroclor 1248	6/8/2011	38		Yes	N	U			38	13	ug/kg
JVE-07SC-0304-110218	11-12244-SZ26D	Aroclor 1260	6/8/2011	280		Yes	Y				38	13	ug/kg
JVE-07SC-0304-110218	11-12244-SZ26D	Aroclor 1254	6/8/2011	38		Yes	N	U			38	13	ug/kg
JVE-07SC-0304-110218	11-12244-SZ26D	Aroclor 1232	6/8/2011	38		Yes	N	U			38	13	ug/kg
JVE-07SC-0304-110218	11-12244-SZ26D	Aroclor 1016	6/8/2011	38		Yes	N	U			38	9.7	ug/kg

EMJ015002

SDG: SZ26

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-07SC-0304-110218	11-12244-SZ26D	Aroclor 1242	6/8/2011	38	Yes	N	U			38	13	ug/kg
JVE-07SC-0304-110218	11-12244-SZ26D	Aroclor 1221	6/8/2011	38	Yes	N	U			38	13	ug/kg
JVE-314SC-0001-110218	11-12241-SZ26A	Aroclor 1260	6/8/2011	150	Yes	Y				39	13	ug/kg
JVE-314SC-0001-110218	11-12241-SZ26A	Aroclor 1254	6/8/2011	230	Yes	Y				39	13	ug/kg
JVE-314SC-0001-110218	11-12241-SZ26A	Aroclor 1221	6/8/2011	39	Yes	N	U			39	13	ug/kg
JVE-314SC-0001-110218	11-12241-SZ26A	Aroclor 1232	6/8/2011	39	Yes	N	U			39	13	ug/kg
JVE-314SC-0001-110218	11-12241-SZ26A	Aroclor 1248	6/8/2011	98	Yes	N	Y			98	13	ug/kg
JVE-314SC-0001-110218	11-12241-SZ26A	Aroclor 1242	6/8/2011	39	Yes	N	U			39	13	ug/kg
JVE-314SC-0001-110218	11-12241-SZ26A	Aroclor 1016	6/8/2011	39	Yes	N	U			39	10	ug/kg
JVE-314SC-0102-110218	11-12242-SZ26B	Aroclor 1242	6/7/2011	3.8	Yes	N	U	UJ	8	3.8	1.3	ug/kg
JVE-314SC-0102-110218	11-12242-SZ26B	Aroclor 1016	6/7/2011	3.8	Yes	N	U			3.8	0.98	ug/kg
JVE-314SC-0102-110218	11-12242-SZ26B	Aroclor 1260	6/7/2011	140	Yes	Y		J	8	3.8	1.3	ug/kg
JVE-314SC-0102-110218	11-12242-SZ26B	Aroclor 1254	6/7/2011	23	Yes	N	Y	UJ	8	23	1.3	ug/kg
JVE-314SC-0102-110218	11-12242-SZ26B	Aroclor 1221	6/7/2011	3.8	Yes	N	U			3.8	1.3	ug/kg
JVE-314SC-0102-110218	11-12242-SZ26B	Aroclor 1232	6/7/2011	3.8	Yes	N	U			3.8	1.3	ug/kg
JVE-314SC-0102-110218	11-12242-SZ26B	Aroclor 1248	6/7/2011	17	Yes	N	Y	UJ	8	17	1.3	ug/kg

EMJ015003

Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 **Web** www.lab-data.com **Fax** 760.634.0439

Anchor QEA, LLC
720 Olive Way, Suite 900
Seattle, WA 98101
ATTN: Ms. Delaney Peterson

July 5, 2011

SUBJECT: Jorgensen Forge Facility, Data Validation

Dear Ms. Peterson,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on June 23, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 25729:

SDG #	**Fraction**
TA19	Polychlorinated Biphenyls, Wet Chemistry

The data validation was performed under EPA Level III guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

ERauto for

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

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Attachment 1

EDD 90/10

LDC #25729 (Anchor Environmental-Seattle WA /Jorgensen Forge Facility)

LDC	SDG#	DATE REC'D	(3) DATE DUE	PCBs (8082)		TOC (Plumb)		Total Solids (160.3)																													
Matrix:	Water/Sediment			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	TA19	06/23/11	07/14/11	0	2	0	2	0	2																												
Total	A/SC			0	2	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6

Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS, MSD, or DUP's.

25729ST.wpd

EMJ015005

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 18, 2011
LDC Report Date:	June 29, 2011
Matrix:	Sediment
Parameters:	Polychlorinated Biphenyls
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	TA19

Sample Identification

JVE-07SC-0001-110218
JVE-07SC-0102-110218
JVE-07SC-0001-110218MS
JVE-07SC-0001-110218MSD

Introduction

This data review covers 4 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Affected Compound	Flag	A or P
6/13/11	0613B002.d	ZB35	Aroclor-1260	21.2	All samples in SDG TA19	Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260	J (all detects) UJ (all non-detects)	A

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

All internal standard areas and retention times were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Affected Compound	Flag	A or P
JVE-07SC-0001-110218MS/MSD (JVE-07SC-0001-110218)	Aroclor-1016 Aroclor-1260	49.6 (50-140) -	35.5 (50-140) 19.9 (50-140)	- -	All TCL compounds	J (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

XI. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XII. Target Compound Identification

Raw data were not reviewed for this SDG.

XIII. Compound Quantitation and Reported CRQLs

Raw data were not reviewed for this SDG.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to calibration %D and MS/MSD %R problems, data were qualified as estimated in two samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the Level III data validation all other results are considered valid and usable for all purposes.

Data flags are summarized at the end of this report if data has been qualified.

XV. Field Duplicates

No field duplicates were identified in this SDG.

XV. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Polychlorinated Biphenyls - Data Qualification Summary - SDG TA19

SDG	Sample	Compound	Flag	A or P	Reason
TA19	JVE-07SC-0001-110218 JVE-07SC-0102-110218	Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260	J (all detects) UJ (all non-detects)	A	Continuing calibration (%D)
TA19	JVE-07SC-0001-110218	All TCL compounds	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)

Jorgensen Forge Facility
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG TA19

No Sample Data Qualified in this SDG

LDC #: 25729A3b

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 6-28-11

SDG #: TA19

Page: 1 of 1

Laboratory: Analytical Resources, Inc.

Reviewer: AK

2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/18/4
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	10 RSDs 20
IV.	Continuing calibration/ICV	SW	ICV/CCV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes / IS	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	N	
XIII.	Compound quantitation and reported CRQLs	N	
XIV.	Overall assessment of data	A	
XV.	Field duplicates	N	
XVI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: All sediment

1	JVE-07SC-0001-110218	11		21		31	061111-Blk
2	JVE-07SC-0102-110218	12		22		32	
3	JVE-07SC-0001-110218MS	13		23		33	
4	JVE-07SC-0001-110218MSD	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	GG Chlordane
B beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	HH Chlordane (Technical)
C delta-BHC	K. Endrin	S alpha-Chlordane	AA Aroclor-1254	II.
D gamma-BHC	L Endosulfan II	T gamma-Chlordane	BB Aroclor-1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC 2,4'-DDD	KK.
F. Aldrin	N. Endosulfan sulfate	V Aroclor-1016	DD 2,4'-DDE	LL
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE. 2,4'-DDT	MM.
H Endosulfan I	P Methoxychlor	X Aroclor-1232	FF Hexachlorobenzene	NN.

Notes:

EMJ015013

LDC #: 25729A36
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: [illegible]

METHOD: X GC __ HPLC

2nd Reviewer: [illegible]

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
What type of continuing calibration calculation was performed? X %D or __RPD

Y N N/A Were continuing calibration standards analyzed at the required frequencies?

Y N N/A Did the continuing calibration standards meet the %D / RPD validation criteria of ≤20.0%?

Level IV Only

Y N N/A Were the retention times for all calibrated compounds within their respective acceptance windows?

#	Date	Standard ID	Detector/ Column	Compound	%D (Limit ≤ 20)	RT (limit)	Associated Samples	Qualifications
	6/13/11	06138002-d	ZB35	BB	21.2	( )	ALL	J/UJ/A
						( )		
						( )		(Also qual
						( )		Y,Z,AA)
						( )		
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CONCALNew wpd

EMJ015014

LDC #: 40T49A56
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: __ GC __ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?

Y N N/A Was an MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

Y N N/A Were the MS/MSD percent recoveries (%R) and relative percent differences (RPD) within QC limits?

#	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	3/4	V	49.6 (50-140)	35.5 (50-140)	( )	/	J/UJ/A (Qual/SX also)
		BB	( )	19.9 (50-140)	( )		✓ (Qual Y, Z, AA also)
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		ALL TCL
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
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			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		

MSDNew.wpd

EMJ015015

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	February 18, 2011
LDC Report Date:	June 28, 2011
Matrix:	Sediment
Parameters:	Wet Chemistry
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	TA19

Sample Identification

JVE-07SC-0001-110218
JVE-07SC-0102-110218
JVE-07SC-0001-110218MS
JVE-07SC-0001-110218DUP
JVE-07SC-0001-110218TRP

Introduction

This data review covers 5 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per Plumb Method for Total Organic Carbon and EPA Method 160.3 for Total Solids.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates/Triplicates

Duplicate (DUP) and Triplicate (TRP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

IX. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Wet Chemistry - Data Qualification Summary - SDG TA19

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG TA19

No Sample Data Qualified in this SDG

LDC #: 25729A6 **VALIDATION COMPLETENESS WORKSHEET** Date: 6/24/11
SDG #: TA19 Level III Page: 1 of 1
Laboratory: Analytical Resources, Inc. Reviewer: CS
2nd Reviewer: L

METHOD: (Analyte) TOC (PLUMB Method), Total Solids (EPA Method 160.3)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/18/11
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS
VI.	Duplicates ~~Triplicates~~	A	DUP TRP
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment

1	JVE-07SC-0001-110218	11	PBS	21		31	
2	JVE-07SC-0102-110218	12		22		32	
3	JVE-07SC-0001-110218MS	13		23		33	
4	JVE-07SC-0001-110218~~MSD~~ DUP	14		24		34	
5	JVE-07SC-0001-110218~~DUP~~ TRP	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 25729A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1,2		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
RC: 3		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4
4,5		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

METHODS.6

Jorgensen Forge Facility - LDC 25729

SDG: TA19

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-07SC-0001-110218	11-12627-TA19A	Total solids	6/13/2011	55.1	Yes	Y				0.01		pct
JVE-07SC-0102-110218	11-12628-TA19B	Total solids	6/13/2011	56.5	Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-07SC-0001-110218	11-12627-TA19A	Total organic carbon	6/14/2011	2.43	Yes	Y				0.020	0.00290	pct
JVE-07SC-0102-110218	11-12628-TA19B	Total organic carbon	6/14/2011	1.68	Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-07SC-0001-110218	11-12627-TA19A	Aroclor 1016	6/13/2011	19	Yes	N	U	UJ	8	19	0.97	ug/kg
JVE-07SC-0001-110218	11-12627-TA19A	Aroclor 1248	6/13/2011	57	Yes	N	Y	UJ	5,8	57	1.3	ug/kg
JVE-07SC-0001-110218	11-12627-TA19A	Aroclor 1232	6/13/2011	19	Yes	N	U	UJ	8	19	1.3	ug/kg
JVE-07SC-0001-110218	11-12627-TA19A	Aroclor 1221	6/13/2011	19	Yes	N	U	UJ	8	19	1.3	ug/kg
JVE-07SC-0001-110218	11-12627-TA19A	Aroclor 1254	6/13/2011	100	Yes	Y		J	5,8	19	1.3	ug/kg
JVE-07SC-0001-110218	11-12627-TA19A	Aroclor 1260	6/13/2011	62	Yes	Y		J	5,8	19	1.3	ug/kg
JVE-07SC-0001-110218	11-12627-TA19A	Aroclor 1242	6/13/2011	19	Yes	N	U	UJ	5,8	19	1.3	ug/kg
JVE-07SC-0102-110218	11-12628-TA19B	Aroclor 1232	6/13/2011	19	Yes	N	U			19	1.3	ug/kg
JVE-07SC-0102-110218	11-12628-TA19B	Aroclor 1221	6/13/2011	19	Yes	N	U			19	1.3	ug/kg
JVE-07SC-0102-110218	11-12628-TA19B	Aroclor 1254	6/13/2011	75	Yes	Y		J	5	19	1.3	ug/kg
JVE-07SC-0102-110218	11-12628-TA19B	Aroclor 1260	6/13/2011	99	Yes	Y		J	5	19	1.3	ug/kg
JVE-07SC-0102-110218	11-12628-TA19B	Aroclor 1248	6/13/2011	38	Yes	N	Y	UJ	5	38	1.3	ug/kg
JVE-07SC-0102-110218	11-12628-TA19B	Aroclor 1016	6/13/2011	19	Yes	N	U			19	0.96	ug/kg
JVE-07SC-0102-110218	11-12628-TA19B	Aroclor 1242	6/13/2011	19	Yes	N	U	UJ	5	19	1.3	ug/kg

EMJ015023

Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 **Web** www.lab-data.com **Fax** 760.634.0439

Anchor QEA, LLC
720 Olive Way, Suite 900
Seattle, WA 98101
ATTN: Ms. Delaney Peterson

September 6, 2011

SUBJECT: Jorgensen Forge Facility, Data Validation

Dear Ms. Peterson,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on August 17, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 26059:

SDG #	**Fraction**
TH07	Polychlorinated Biphenyls, Wet Chemistry

The data validation was performed under EPA Level III guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

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0 pages-EX

Attachment 1

EDD 90/10

LDC #26059 (Anchor Environmental-Seattle WA /Jorgensen Forge Facility)

LDC	SDG#	DATE REC'D	(3) DATE DUE	PCBs (8082)		TOC (Plumb)		Total Solids (160.3)																													
Matrix:	Water/Sediment			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	TH07	08/17/11	09/08/11	0	3	0	3	0	3																												
Total	A/SC			0	3	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9

Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS, MSD, or DUP's.

26059ST.wpd

EMJ015025

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	March 16, 2011
LDC Report Date:	August 30, 2011
Matrix:	Sediment
Parameters:	Polychlorinated Biphenyls
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	TH07

Sample Identification

JVE-208SC-0506-110316
JVE-208SC-0607-110316
JVE-208SC-0708-110316
JVE-208SC-0506-110316MS
JVE-208SC-0506-110316MSD

Introduction

This data review covers 5 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. Surrogate recoveries (%R) were not within QC limits for sample JVE-208SC-0708-110316. Since the sample was diluted out, no data were qualified.

All internal standard areas and retention times were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Affected Compound	Flag	A or P
JVE-208SC-0506-110316MS/MSD (JVE-208SC-0506-110316)	Aroclor-1260	44.9 (50-140)	25.4 (50-140)	-	Aroclor-1260 Aroclor-1242 Aroclor-1248 Aroclor-1254	J (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

XI. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XII. Target Compound Identification

Raw data were not reviewed for this SDG.

XIII. Compound Quantitation and Reported RLs

Raw data were not reviewed for this SDG.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to MS/MSD %R problems, data were qualified as estimated in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the Level III data validation all other results are considered valid and usable for all purposes.

Data flags are summarized at the end of this report if data has been qualified.

XV. Field Duplicates

No field duplicates were identified in this SDG.

XV. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Polychlorinated Biphenyls - Data Qualification Summary - SDG TH07

SDG	Sample	Compound	Flag	A or P	Reason
TH07	JVE-208SC-0506-110316	Aroclor-1260 Aroclor-1242 Aroclor-1248 Aroclor-1254	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)

Jorgensen Forge Facility
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG TH07

No Sample Data Qualified in this SDG

LDC #: 26059A3b

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 8-23-11

SDG #: TH07

Page: 1 of 1

Laboratory: Analytical Resources, Inc.

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/16/11
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	0/0 RSD ≤ 20
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes / IS	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	N	
XIII.	Compound quantitation/RL/LOQ/LODs	N	
XIV.	Overall assessment of data	A	
XV.	Field duplicates	N	
XVI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: All Sediment

1	JVE-208SC-0506-110316	11		21		31	080611-BLK
2	JVE-208SC-0607-110316	12		22		32	
3	JVE-208SC-0708-110316	13		23		33	
4	JVE-208SC-0506-110316MS	14		24		34	
5	JVE-208SC-0506-110316MSD	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	GG Chlordane
B beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	HH Chlordane (Technical)
C delta-BHC	K. Endrin	S alpha-Chlordane	AA Aroclor-1254	II.
D gamma-BHC	L Endosulfan II	T gamma-Chlordane	BB Aroclor-1260	JJ.
E. Heplachlor	M. 4,4'-DDD	U. Toxaphene	CC 2,4'-DDD	KK.
F. Aldrin	N. Endosulfan sulfate	V Aroclor-1016	DD 2,4'-DDE	LL
G. Heplachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE. 2,4'-DDT	MM.
H Endosulfan I	P Methoxychlor	X Aroclor-1232	FF. Hexachlorobenzene	NN.

Notes:

C:\Users\rthompson\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content Outlook\366E0K9Q\COMPLST-3S.wpd

LDC #: 26059A3b
SDG #: See Cover

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: ___ GC EPA 8081/8082 Pesticides/PCB's

Are surrogates required by the method? Yes X or No____.

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Were surrogates spiked into all samples and blanks?

Y (N) N/A Did all surrogate recoveries (%R) meet the QC limits?

#	Date	Lab ID/Reference	Column	Surrogate Compound	%R (Limits)		Qualifications
		3 (100x)	NS	A	DO	(46-113)	no qual, dil 25x
			↓	B	DO	(40-130)	↓
						( )	
						( )	
						( )	
						( )	
						( )	
						( )	
						( )	
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						( )	
						( )	

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	Tetrachloro-m-xylene			
B	Decachlorobiphenyl			

V:\Validation Worksheets\GC\SUR.GC

LDC #: 46UJ7A70
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: KA
2nd Reviewer: K

METHOD: ☑ GC ___ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?
Y N N/A Was an MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed?
Y N N/A Were the MS/MSD percent recoveries (%R) and relative percent differences (RPD) within QC limits?

#	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	4/5	BB	44.9 (50-140)	25.4 (50-140)	( )	/	J/UJ/A
			( )	( )	( )		
			( )	( )	( )		also qual
			( )	( )	( )		
			( )	( )	( )		Y, Z, AA
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
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			( )	( )	( )		

MSDNew.wpd

EMJ015035

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	March 16, 2011
LDC Report Date:	August 30, 2011
Matrix:	Sediment
Parameters:	Wet Chemistry
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	TH07

Sample Identification

JVE-208SC-0506-110316
JVE-208SC-0607-110316
JVE-208SC-0708-110316
JVE-208SC-0506-110316MS
JVE-208SC-0506-110316DUP
JVE-208SC-0506-110316TRP

Introduction

This data review covers 6 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per Plumb Method for Total Organic Carbons and EPA Method 160.3 for Total Solids.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates/Triplicates

Duplicate (DUP) and triplicate (TRP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

IX. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Wet Chemistry - Data Qualification Summary - SDG TH07

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG TH07

No Sample Data Qualified in this SDG

LDC #: 26059A6

SDG #: TH07

Laboratory: Analytical Resources, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 8-25-11

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: (Analyte) TOC (PLUMB Method), Total Solids (EPA Method 160.3)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/16/11
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS
VI.	Duplicates ~~Triplicates~~	A	Dup/Trip
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: Sediment

1	JVE-208SC-0506-110316	11		21	PBS	31	
2	JVE-208SC-0607-110316	12		22		32	
3	JVE-208SC-0708-110316	13		23		33	
4	JVE-208SC-0506-110316MS	14		24		34	
5	JVE-208SC-0506-110316~~MSD~~ Dup	15		25		35	
6	JVE-208SC-0506-110316~~DUP~~ Trip	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 26059A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-3		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC:4		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4
5,6		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

METHODS.6

LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Anchor QEA, LLC
720 Olive Way, Suite 900
Seattle, WA 98101
ATTN: Ms. Delaney Peterson

September 12, 2011

SUBJECT: Jorgensen Forge Facility, Data Validation

Dear Ms. Peterson,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on August 25, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 26099:

SDG #	Fraction
TI28	Polychlorinated Biphenyls, Wet Chemistry

The data validation was performed under EPA Level III guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

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0 pages-EX

Attachment 1

EDD 90/10

LDC #26099 (Anchor Environmental-Seattle WA /Jorgensen Forge Facility)

LDC	SDG#	DATE REC'D	(3) DATE DUE	PCBs (8082)		TOC (Plumb)		Total Solids (160.3)																													
Matrix:	Water/Sediment			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	TI28	08/25/11	09/16/11	0	2	0	2	0	2																												
Total	A/SC			0	2	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6

Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS, MSD, or DUP's.

26099ST.wpd

EMJ015044

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	March 16, 2011
LDC Report Date:	September 7, 2011
Matrix:	Sediment
Parameters:	Polychlorinated Biphenyls
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	TI28

Sample Identification

JVE-208SC-0809-110316
JVE-208SC-0910-110316
JVE-208SC-0910-110316MS
JVE-208SC-0910-110316MSD

Introduction

This data review covers 4 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082B for Polychlorinated Biphenyls.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

All internal standard areas and retention times were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were not within QC limits. Since the samples were diluted out, no data were qualified.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

XI. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XII. Target Compound Identification

Raw data were not reviewed for this SDG.

XIII. Compound Quantitation and Reported CRQLs

Raw data were not reviewed for this SDG.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

XV. Field Duplicates

No field duplicates were identified in this SDG.

XV. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Polychlorinated Biphenyls - Data Qualification Summary - SDG TI28

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG TI28

No Sample Data Qualified in this SDG

LDC #: 26099A3b **VALIDATION COMPLETENESS WORKSHEET** Date: 9-7-11

SDG #: TJ28 Level III Page: 1 of 1

Laboratory: Analytical Resources, Inc. Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/16/11
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	%RSD ≤ 20
IV.	Continuing calibration/ICV	~~A SW~~	ICV/CCV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes /IS	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	N	
XIII.	Compound quantitation/RL/LOQ/LODs	N	
XIV.	Overall assessment of data	A	
XV.	Field duplicates	N	
XVI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: All sediment

1	JVE-208SC-0809-110316	11		21		31	08/511-BLK
2	JVE-208SC-0910-110316	12		22		32	
3	JVE-208SC-0910-110316MS	13		23		33	
4	JVE-208SC-0910-110316MSD	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	GG Chlordane
B beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	HH Chlordane (Technical)
C delta-BHC	K. Endrin	S alpha-Chlordane	AA Aroclor-1254	II.
D gamma-BHC	L Endosulfan II	T gamma-Chlordane	BB Aroclor-1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC 2.4'-DDD	KK.
F. Aldrin	N. Endosulfan sulfate	V Aroclor-1016	DD 2.4'-DDE	LL
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE. 2.4'-DDT	MM.
H Endosulfan I	P Methoxychlor	X Aroclor-1232	FF Hexachlorobenzene	NN.

Notes:

EMJ015051

LDC #: 26099A8D
SDG #: Ecl Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of
Reviewer: VAJ
2nd Reviewer: [illegible]

METHOD: X GC __ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?
Y N N/A Was an MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed?
Y N N/A Were the MS/MSD percent recoveries (%R) and relative percent differences (RPD) within QC limits?

#	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	3/4	V	1870 (50-140)	1630 (50-140)	( )	2	~~J 0.0/5/A~~
		BB	155 (50-140)	( )	( )		✓
			( )	( )	( )		~~(ALL TOL)~~
			( )	( )	( )		
			( )	( )	( )		no qual
			( )	( )	( )		dil = 25x
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
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			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		

EMJ015052

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	March 16, 2011
LDC Report Date:	September 6, 2011
Matrix:	Sediment
Parameters:	Wet Chemistry
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	TI28

Sample Identification

JVE-208SC-0809-110316
JVE-208SC-0910-110316
JVE-208SC-0809-110316MS
JVE-208SC-0809-110316DUP
JVE-208SC-0809-110316TRP

Introduction

This data review covers 5 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per Plumb Method for Total Organic Carbons and EPA Method 160.3 for Total Solids.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates/Triplicates

Duplicate (DUP) and triplicate (TRP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

IX. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

Jorgensen Forge Facility
Wet Chemistry - Data Qualification Summary - SDG TI28

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG TI28

No Sample Data Qualified in this SDG

LDC #: 26099A6

SDG #: TJ28

Laboratory: Analytical Resources, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 8-26-11

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: (Analyte) TOC (PLUMB Method), Total Solids (EPA Method 160.3)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/16/11
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS
VI.	Duplicates	A	Dup, Trip
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment

1	JVE-208SC-0809-110316	11		21		31	
2	JVE-208SC-0910-110316	12		22		32	
3	JVE-208SC-0809-110316MS	13		23		33	
4	JVE-208SC-0809-110316~~MSD~~ Dup	14		24		34	
5	JVE-208SC-0809-110316~~DUP~~ Trip	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 26099A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1,2		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC: 3		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4
4,5		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

METHODS.6

Jorgensen Forge Facility - LDC 26099

SDG: TI28

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-208SC-0809-110316	11-17624-TI28A	Total solids	8/12/2011	55.2	Yes	Y				0.01		pct
JVE-208SC-0910-110316	11-17625-TI28B	Total solids	8/12/2011	55.4	Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-208SC-0809-110316	11-17624-TI28A	Total organic carbon	8/16/2011	2.78	Yes	Y				0.020	0.00290	pct
JVE-208SC-0910-110316	11-17625-TI28B	Total organic carbon	8/16/2011	2.79	Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-208SC-0809-110316	11-17624-TI28A	Aroclor 1260	8/16/2011	300	Yes	Y				96	33	ug/kg
JVE-208SC-0809-110316	11-17624-TI28A	Aroclor 1254	8/16/2011	1200	Yes	Y				96	33	ug/kg
JVE-208SC-0809-110316	11-17624-TI28A	Aroclor 1221	8/16/2011	96	Yes	N	U			96	33	ug/kg
JVE-208SC-0809-110316	11-17624-TI28A	Aroclor 1232	8/16/2011	96	Yes	N	U			96	33	ug/kg
JVE-208SC-0809-110316	11-17624-TI28A	Aroclor 1248	8/16/2011	96	Yes	N	U			96	33	ug/kg
JVE-208SC-0809-110316	11-17624-TI28A	Aroclor 1242	8/16/2011	2800	Yes	Y				96	33	ug/kg
JVE-208SC-0809-110316	11-17624-TI28A	Aroclor 1016	8/16/2011	96	Yes	N	U			96	24	ug/kg
JVE-208SC-0910-110316	11-17625-TI28B	Aroclor 1242	8/16/2011	2400	Yes	Y				97	33	ug/kg
JVE-208SC-0910-110316	11-17625-TI28B	Aroclor 1260	8/16/2011	360	Yes	Y				97	33	ug/kg
JVE-208SC-0910-110316	11-17625-TI28B	Aroclor 1254	8/16/2011	1600	Yes	Y				97	33	ug/kg
JVE-208SC-0910-110316	11-17625-TI28B	Aroclor 1221	8/16/2011	97	Yes	N	U			97	33	ug/kg
JVE-208SC-0910-110316	11-17625-TI28B	Aroclor 1232	8/16/2011	97	Yes	N	U			97	33	ug/kg
JVE-208SC-0910-110316	11-17625-TI28B	Aroclor 1248	8/16/2011	97	Yes	N	U			97	33	ug/kg
JVE-208SC-0910-110316	11-17625-TI28B	Aroclor 1016	8/16/2011	97	Yes	N	U			97	25	ug/kg

EMJ015059

LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Anchor QEA, LLC
720 Olive Way, Suite 900
Seattle, WA 98101
ATTN: Ms. Delaney Peterson

September 27, 2011

SUBJECT: Jorgensen Forge Facility, Data Validation

Dear Ms. Peterson,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on September 13, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 26214:

SDG #	Fraction
TL06	Polychlorinated Biphenyls, Wet Chemistry

The data validation was performed under EPA Level III guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

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Attachment 1

EDD 90/10

LDC #26214 (Anchor Environmental-Seattle WA /Jorgensen Forge Facility)

LDC	SDG#.	DATE REC'D	(3) DATE DUE	PCBs (8082)		TOC (Plumb)		Total Solids (160.3)																													
Matrix:	Water/Sediment			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	TL06	09/13/11	10/04/11	0	2	0	2	0	2																												
Total	A/SC			0	2	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6

Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS, MSD, or DUP's.

26214ST.wpd

EMJ015061

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	March 16, 2011
LDC Report Date:	September 16, 2011
Matrix:	Sediment
Parameters:	Polychlorinated Biphenyls
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	TL06

Sample Identification

JVE-208SC-1011-110316
JVE-208SC-1112-110316
JVE-208SC-1112-110316MS
JVE-208SC-1112-110316MSD

Introduction

This data review covers 4 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

All internal standard areas and retention times were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

XI. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XII. Target Compound Identification

Raw data were not reviewed for this SDG.

XIII. Compound Quantitation and RLs

Raw data were not reviewed for this SDG.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

XV. Field Duplicates

No field duplicates were identified in this SDG.

XV. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Polychlorinated Biphenyls - Data Qualification Summary - SDG TL06

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG TL06

No Sample Data Qualified in this SDG

LDC #: 26214A3b

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 9-15-11

SDG #: TL06

Page: 1 of 1

Laboratory: Analytical Resources, Inc.

Reviewer: MJ

2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/16/11
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	%RSD ≤ 20
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes / IS	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	N	
XIII.	Compound quantitation/RL/LOQ/LODs	N	
XIV.	Overall assessment of data	A	
XV.	Field duplicates	N	
XVI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: All sediment

1	JVE-208SC-1011-110316	11		21		31	090811-BLK
2	JVE-208SC-1112-110316	12		22		32	
3	JVE-208SC-1112-110316MS	13		23		33	
4	JVE-208SC-1112-110316MSD	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	March 16, 2011
LDC Report Date:	September 22, 2011
Matrix:	Sediment
Parameters:	Wet Chemistry
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.

Sample Delivery Group (SDG): TL06

Sample Identification

JVE-208SC-1011-110316
JVE-208SC-1112-110316
JVE-208SC-1112-110316MS
JVE-208SC-1112-110316DUP
JVE-208SC-1112-110316TRP

Introduction

This data review covers 5 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per Plumb Method for Total Organic Carbons and EPA Method 160.3 for Total Solids.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of the presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates/Triplicates

Duplicate (DUP) and triplicate (TRP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

IX. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Wet Chemistry - Data Qualification Summary - SDG TL06

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG TL06

No Sample Data Qualified in this SDG

LDC #: 26214A6 **VALIDATION COMPLETENESS WORKSHEET** Date: 9-21-11
SDG #: TL06 Level III Page: 1 of 1
Laboratory: Analytical Resources, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: (Analyte) TOC (PLUMB Method), Total Solids (EPA Method 160.3)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/16/11
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS
VI.	Duplicates	A	DUP, TRP
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: Sediment

1	JVE-208SC-1011-110316	11		21		31	
2	JVE-208SC-1112-110316	12		22		32	
3	JVE-208SC-1112-110316MS	13		23		33	
4	JVE-208SC-1112-110316~~MSD~~ DUP	14		24		34	
5	JVE-208SC-1112-110316~~DUP~~ TRP	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 26214A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: V

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1,2		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC: 3		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4
4,5		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (TS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

METHODS.6

Jorgensen Forge Facility - LDC 26214

SDG: TL06

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-208SC-1011-110316	11-19126-TL06A	Total solids	9/7/2011	64.3	Yes	Y				0.01		pct
JVE-208SC-1112-110316	11-19127-TL06B	Total solids	9/7/2011	66	Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-208SC-1011-110316	11-19126-TL06A	Total organic carbon	9/8/2011	2.24	Yes	Y				0.020	0.00290	pct
JVE-208SC-1112-110316	11-19127-TL06B	Total organic carbon	9/8/2011	2.02	Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-208SC-1011-110316	11-19126-TL06A	Aroclor 1260	9/9/2011	110	Yes	Y				19	1.3	ug/kg
JVE-208SC-1011-110316	11-19126-TL06A	Aroclor 1254	9/9/2011	180	Yes	Y				19	1.3	ug/kg
JVE-208SC-1011-110316	11-19126-TL06A	Aroclor 1221	9/9/2011	19	Yes	N	U			19	1.3	ug/kg
JVE-208SC-1011-110316	11-19126-TL06A	Aroclor 1232	9/9/2011	19	Yes	N	U			19	1.3	ug/kg
JVE-208SC-1011-110316	11-19126-TL06A	Aroclor 1248	9/9/2011	19	Yes	N	U			19	1.3	ug/kg
JVE-208SC-1011-110316	11-19126-TL06A	Aroclor 1242	9/9/2011	190	Yes	Y				19	1.3	ug/kg
JVE-208SC-1011-110316	11-19126-TL06A	Aroclor 1016	9/9/2011	19	Yes	N	U			19	0.98	ug/kg
JVE-208SC-1112-110316	11-19127-TL06B	Aroclor 1242	9/9/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-208SC-1112-110316	11-19127-TL06B	Aroclor 1260	9/9/2011	31	Yes	Y				20	1.3	ug/kg
JVE-208SC-1112-110316	11-19127-TL06B	Aroclor 1254	9/9/2011	87	Yes	Y				20	1.3	ug/kg
JVE-208SC-1112-110316	11-19127-TL06B	Aroclor 1221	9/9/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-208SC-1112-110316	11-19127-TL06B	Aroclor 1232	9/9/2011	20	Yes	N	U			20	1.3	ug/kg
JVE-208SC-1112-110316	11-19127-TL06B	Aroclor 1248	9/9/2011	39	Yes	N	Y			39	1.3	ug/kg
JVE-208SC-1112-110316	11-19127-TL06B	Aroclor 1016	9/9/2011	20	Yes	N	U			20	0.99	ug/kg

EMJ015075

Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 **Web** www.lab-data.com **Fax** 760.634.0439

Anchor QEA, LLC
720 Olive Way, Suite 900
Seattle, WA 98101
ATTN: Ms. Delaney Peterson

October 11, 2011

SUBJECT: Jorgensen Forge Facility, Data Validation

Dear Ms. Peterson,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on September 26, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 26289:

SDG #	**Fraction**
TM04	Polychlorinated Biphenyls, Wet Chemistry

The data validation was performed under EPA Level III guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

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Attachment 1

EDD 90/10

LDC #26289 (Anchor Environmental-Seattle WA /Jorgensen Forge Facility)

LDC	SDG#	DATE REC'D	(3) DATE DUE	PCBs (8082)		TOC (Plumb)		Total Solids (160.3)																													
Matrix:	Water/Sediment			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	TM04	09/26/11	10/17/11	0	1	0	1	0	1																												
Total	A/SC			0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3

Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS, MSD, or DUP's.

26289ST.wpd

EMJ015077

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	March 16, 2011
LDC Report Date:	September 30, 2011
Matrix:	Sediment
Parameters:	Polychlorinated Biphenyls
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	TM04

Sample Identification

JVE-208SC-1212.5-110316
JVE-208SC-1212.5-110316MS
JVE-208SC-1212.5-110316MSD

Introduction

This data review covers 3 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

All internal standard areas and retention times were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

XI. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XII. Target Compound Identification

Raw data were not reviewed for this SDG.

XIII. Compound Quantitation and RLs

Raw data were not reviewed for this SDG.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

XV. Field Duplicates

No field duplicates were identified in this SDG.

XV. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Polychlorinated Biphenyls - Data Qualification Summary - SDG TM04

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG TM04

No Sample Data Qualified in this SDG

LDC #: 26289A3b

VALIDATION COMPLETENESS WORKSHEET

Level III

SDG #: TM04

Laboratory: Analytical Resources, Inc.

Date: 9-28-11

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/16/4
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	%RSD ≤ 20
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes / IS	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
X.	Florisil cartridge check	N	
XI.	GPC Calibration	N	
XII.	Target compound identification	N	
XIII.	Compound quantitation/RL/LOQ/LODs	N	
XIV.	Overall assessment of data	A	
XV.	Field duplicates	N	
XVI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

1	JVE-208SC-1212.5-110316	11		21		31	091411-BLK
2	JVE-208SC-1212.5-110316MS	12		22		32	
3	JVE-208SC-1212.5-110316MSD	13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Jorgensen Forge Facility
Collection Date:	March 16, 2011
LDC Report Date:	October 10, 2011
Matrix:	Sediment
Parameters:	Wet Chemistry
Validation Level:	EPA Level III
Laboratory:	Analytical Resources, Inc.
Sample Delivery Group (SDG):	TM04

Sample Identification

JVE-208SC-1212.5-110316
JVE-208SC-1212.5-110316MS
JVE-208SC-1212.5-110316TRIP
JVE-208SC-1212.5-110316DUP

Introduction

This data review covers 4 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per Plumb Method for Total Organic Carbons and EPA Method 160.3 for Total Solids.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates/Triplicates

Duplicate (DUP) and triplicate (TRP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

IX. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the Level III data validation all results are considered valid and usable for all purposes.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Field Blanks

No field blanks were identified in this SDG.

Jorgensen Forge Facility
Wet Chemistry - Data Qualification Summary - SDG TM04

No Sample Data Qualified in this SDG

Jorgensen Forge Facility
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG TM04

No Sample Data Qualified in this SDG

LDC #: 26289A6

SDG #: TM04

Laboratory: Analytical Resources, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 10-6-11

Page: 1 of 1

Reviewer: MG

2nd Reviewer: ✓

METHOD: (Analyte) TOC (PLUMB Method), Total Solids (EPA Method 160.3)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3-16-11
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS
VI.	Duplicates	A	Trip
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: Sed

1	JVE-208SC-1212.5-110316	11		21		31	
2	JVE-208SC-1212.5-110316MS	12		22		32	
3	JVE-208SC-1212.5-110316~~MSD~~ TRIP	13	9M.A.	23		33	
4	JVE-208SC-1212.5-110316DUP	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20	PBS	30		40	

Notes:

LDC #: 26289A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: M.G
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1	Sed	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (Tot Solid) ____
QC 2	↓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 ____ ____
↓ 3, 4	↓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (Tot Solid) ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____

Comments:

METHODS.6

Jorgensen Forge Facility - LDC 26289

SDG: TM04

Analytical Method E160.3

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-208SC-1212.5-11031	11-19868-TM04A	Total solids	9/13/2011	81.7		Yes	Y				0.01		pct

Analytical Method Plumb 1981

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-208SC-1212.5-11031	11-19868-TM04A	Total organic carbon	9/14/2011	0.11		Yes	Y				0.020	0.00290	pct

Analytical Method SW8082

Sample ID	Lab Sample ID	Chemical Name	Anal Date	Result	Mod Res	Report	Detect	Lab Qual	Val Qual	Reason	RL	MDL	Units
JVE-208SC-1212.5-11031	11-19868-TM04A	Aroclor 1242	9/15/2011	19		Yes	N	U			19	1.3	ug/kg
JVE-208SC-1212.5-11031	11-19868-TM04A	Aroclor 1016	9/15/2011	19		Yes	N	U			19	0.98	ug/kg
JVE-208SC-1212.5-11031	11-19868-TM04A	Aroclor 1248	9/15/2011	19		Yes	N	U			19	1.3	ug/kg
JVE-208SC-1212.5-11031	11-19868-TM04A	Aroclor 1232	9/15/2011	120		Yes	N	Y			120	1.3	ug/kg
JVE-208SC-1212.5-11031	11-19868-TM04A	Aroclor 1221	9/15/2011	19		Yes	N	U			19	1.3	ug/kg
JVE-208SC-1212.5-11031	11-19868-TM04A	Aroclor 1254	9/15/2011	19		Yes	N	U			19	1.3	ug/kg
JVE-208SC-1212.5-11031	11-19868-TM04A	Aroclor 1260	9/15/2011	19		Yes	N	U			19	1.3	ug/kg

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APPENDIX B
EROSION ANALYSIS

APPENDIX B
EROSION ANALYSIS
BASIS OF DESIGN REPORT
JORGENSEN FORGE EARLY ACTION AREA

Prepared for

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March 2013

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LIST OF ACRONYMS AND ABBREVIATIONS

ACES	Automated Coastal Engineering System
AOC	Administrative Order on Consent
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cf/s	cubic feet per second
cm/s	centimeter per second
EAA	Early Action Area
Em	Engineering Manual
EMJ	Earle M. Jorgensen Company
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FIS	Flood Insurance Study
ft/s	feet per second
H:V	horizontal to vertical
Jorgensen Forge	Jorgensen Forge Corporation
LDW	Lower Duwamish Waterway
MLLW	mean lower low water
mm	millimeter
MSL	mean sea level
NAVD88	North American Vertical Datum of 1988
NGVD	National Geodetic Vertical Datum
NOAA	National Oceanic and Atmospheric Administration
NTCRA	non-time-critical removal action
Owner	EMJ and Jorgensen Forge
psi	Pounds per square inch
psf	Pounds per square foot
RAB	removal action boundary
RM	river mile
Site	Jorgensen Forge project site
SOW	Statement of Work

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STAR	Sediment Transport Analysis Report
STM	Sediment Transport Modeling Report
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
WSDOT	Washington State Department of Transportation

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1 INTRODUCTION

This Erosion Analysis Report was prepared on behalf of Earle M. Jorgensen Company (EMJ) and Jorgensen Forge Corporation (Jorgensen Forge; herein referred to collectively as the Owner) pursuant to the Administrative Settlement Agreement and Order on Consent for Removal Action Implementation (AOC; U.S. Environmental Protection Agency [EPA] Region X Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] Docket No. 10-2012-0032) and attached Statement of Work (SOW). This Erosion Analysis Report is an appendix to the Basis of Design Report (BODR) Final Design submittal for the cleanup of contaminated sediments and associated bank soils in a portion of the Lower Duwamish Waterway (LDW) Superfund Site adjacent to the Jorgensen Forge facility (Facility) located in Tukwila, King County, Washington (see Figure 1 of the BODR; Jorgensen Forge Early Action Area [EAA]). The cleanup will be conducted as a non-time-critical removal action (NTCRA) in accordance with EPA's selected cleanup alternative documented in the *Action Memorandum for a Non-Time-Critical Removal Action at the Jorgensen Forge Early Action Area of the Lower Duwamish Waterway Superfund Site in Seattle, Washington* (Action Memo; EPA 2011) and detailed in the *Final Engineering Evaluation/Cost Analysis [EE/CA]– Jorgensen Forge Facility, 8531 East Marginal Way South, Seattle, Washington* (Anchor QEA 2011). The Jorgensen Forge EAA is located near River Miles (RMs) 3.6 to 3.7 on the east bank of the LDW.

The limits of the Jorgensen Forge EAA (herein referred to as the removal action boundary [RAB]) extend from the top of the bank at approximately 19 to 20 feet mean lower low water (MLLW) (or top of the sheetpile/concrete panel on the southern portion of the Facility) to the federal navigation channel. The RAB is bounded to the north by The Boeing Company Plant 2 Duwamish Sediment Other Area and Southwest Bank Corrective Measure EAA cleanup area, as specified in the EPA-approved Memorandum of Understanding (EMJ et al. 2007). EPA identified this cleanup area as the northern portion of the Jorgensen Forge EAA.

As detailed in the BODR, the EPA-approved removal action alternative selected for the Jorgensen Forge EAA involves the removal of impacted sediments and placement of backfill material within the RAB. The purpose for the backfill material placement is to return the mudline to approximately the original grade. The shoreline bank within the RAB will also

be reconfigured and stabilized to contain the underlying soils and minimize the potential for erosion.

The potential for erosion of the in-water backfill material and armoring layers on the shoreline bank depends on the following erosive processes that are likely to occur in the LDW:

- Waves generated by passing vessels
- Localized propeller wash from vessels
- Currents in the river

Each of the potential erosion forces identified was evaluated independently to determine the design requirements for the backfill and shoreline bank armoring protection being required. Based on a review of the LDW shoreline geometry in the RAB, significant wind-generated waves are not expected due to the limited fetch distances.

This appendix details the evaluation of the potential erosive forces on the shoreline and on the backfill. Recommendations on grain size are made from an analysis of these erosive forces.

The appendix is organized as follows:

- Section 2 presents the vessel wake analysis
- Section 3 presents the propeller wash analysis
- Section 4 presents the current analysis
- Section 5 presents a summary of the recommended materials

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2 VESSEL WAKE EVALUATION

This section describes the analysis used to determine the stable particle sizes along the shoreline necessary to resist vessel-generated wakes from recreational and commercial vessels that operate near the RAB.

Vessel-generated waves from vessels transiting along this reach of the LDW were computed using the methods presented in Sorensen (1997). The selection of the design vessels identified and the operating criteria stated previously was based on previous studies conducted around the RAB, which evaluated vessel traffic within this specific reach of the LDW, primarily AMEC (2011) and LDW Group Sediment Transport Analysis Report (Windward and QEA 2008). The following vessels were selected for the evaluation:

- Island Tug and Barge Company Tugboat *Patricia S*
- Foss Maritime Tugboat *Wedell Foss*
- Olympic Tug and Barge *Tugboat J.T. Quigg*
- Manson Construction *Derrick Barge* #24
- Recreational Vessels: Yachts varying in length range from 100 to 160 feet

The physical characteristics of these vessels are listed in Table 1.

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Table 1
Summary of Design Vessel Characteristics

Vessel	Vessel Length (feet)	Vessel Beam (feet)	Vessel Draft (feet)	Vessel Displacement (lbs)
Tug Boat Patricia S	92	25	9	20,700
Tug Boat Wendell Foss	93.6	36	16.5	55,598
Tug Boat J.T. Quigg	98	29.5	12.3	35,559
Barge Mason Derrick #24	200	84	6	100,800
Yacht - 100-foot	100	24	8	19,200
Yacht - 160-foot (Trinity Euphoria 168 feet)	168	28	7.6	35,750

Note:
lbs = pounds

The design criteria selected for the vessel wake analysis is as follows:

- Design high water level (mean higher high water [MHHW]) = 11 feet MLLW Vertical Datum
- Design low water level (MLLW) = -5 feet MLLW
- Federal navigation channel depth = -15 feet MLLW
- Distance from sailing line to edge of shoreline = 100 feet
- Vessel design speed = 7 knots (posted speed limit per AMEC and Floyd Snider 2011)

The predicted vessel-generated wave heights expected to be generated near the Site ranged between 0.5 feet to 1.5 feet with periods of approximately 2 seconds, as shown in Table 2. These results were compared to similar analysis conducted for sites near the RAB (AMEC and Floyd Snider 2011; Windward and QEA 2008) and are consistent with those findings.

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An example of the vessel wake calculations for the tugboat *Patricia S* (including design parameters and assumptions) are included as Attachment A. The results are summarized in Table 2 as follows.

Table 2
Summary of Design Vessel-Generated Wakes

Vessel	Water Depth (feet)	Vessel-Generated Wave Height (feet)	Vessel-Generated Wave Period (s)
Tug Boat *Patricia S*	15	1.4	1.9
	26	1.4	1.9
Tug Boat *Wendell Foss*	--	-	-
	26	1.0	1.9
Tug Boat *J.T. Quigg*	15	1.3	1.9
	26	1.2	1.9
Barge *Mason Derrick #24*	15	0.7	1.9
	26	0.6	1.9
Yacht – 100-foot	15	0.5	1.9
	26	0.5	1.9
Yacht - 160-foot (*Trinity Euphoria* 168-foot)	15	0.4	1.9
	26	0.4	1.9

Note:
The *Wendell Foss* cannot travel past the RAB at low tide due to draft limitations.
s = seconds

The Automated Coastal Engineering System (ACES) Rubble Mound Revetment Design Module was used to compute the armor stone gradation and thickness required on the shoreline to protect against the 1.5-foot, 2-second vessel-generated wake. ACES is a computer program developed by the U.S. Army Corps of Engineers (USACE) in 1992 and is an accepted worldwide reference for modeling water wave mechanics and properties and sizing coastal design structure (USACE 1992). This particular design module of ACES assumes that the waves would propagate and break on the slope of the armor layer.

The computed stable stone size and required filter layer for a restored shoreline slope of 2 Horizontal: 1 Vertical (2H:1V) results in a stable stone size of 0.4 feet and 0.05 feet,

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respectively, as presented in Table 3. The armor stone calculations (including design parameters and assumptions) are included as Attachment A to this appendix.

Table 3
Summary of Shoreline Armor Stone and Filter Layer Sizing for Vessel-Generated Wakes

Armor Layer			Filter Layer		
Thickness percent less than by weight	Weight (lb)	Dimension (feet)	Thickness (percent less than by weight)	Weight (lb)	Dimension (feet)
0 (minimum)	1.3	0.2	0 (minimum)	0.00	0.03
15	4.1	0.3	15	0.01	0.03
50	10.2	0.4	50	0.02	0.05
85	20.0	0.5	85	0.06	0.07
100 (maximum)	40.8	0.6	100 (maximum)	0.11	0.09
Thickness = 0.8 feet			Thickness = 1.0 feet		

Notes:
lb = pound

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3 PROPELLER WASH EVALUATION

This section describes the analysis used to determine the stable particle sizes for the backfill material necessary to withstand the erosive forces associated with propeller wash from commercial vessels that operate within the federal navigation channel adjacent to the RAB.

The propeller wash analysis was conducted based upon the methods presented in EPA's "Armor Layer Design for the Guidance for In-Situ Subaqueous Capping of Contaminated Sediment" (Maynord 1998). The Maynord method is based on the relationships developed by Blaauw and van de Kaa (1978) and Verhey (1983). This method considers the physical vessel characteristics (e.g., propeller diameter, depth of propeller shaft, and total engine horsepower) and the operating/site conditions (e.g., applied horsepower and water depth) to estimate the propeller-induced bottom velocities at various distances behind the propeller.

Using the transient vessels identified as frequenting this reach of the LDW during the vessel-generated wake analysis (Section 2), the propeller wash analysis was conducted using the vessel characteristics for the vessel with the highest bottom velocity operating over the backfill placement. In this analysis, the tugboat *Patricia S* was identified as the design vessel.

The vessel characteristics in Table 1 were used in this analysis with the following additional design criteria:

- The vessel would be maneuvering directly over the placed backfill material in the RAB
- Distance to the propeller shaft to the channel bottom = 7 feet at design low water (MLLW= 0 feet); 18 feet at design high water (MHHW = 11 feet)
- Engine horsepower = twin 2400 horsepower engines
- Applied engine horsepower = operating at 25 percent applied power during maneuvering conditions
- Propeller diameter = 6.3 feet
- Propeller system = ducted propeller

This analysis indicates that the efflux jet velocity exiting the propeller is 15.1 feet per second (ft/s).

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The distribution of jet velocity from the propellers was also analyzed to determine the propeller wash velocity at the toe of shoreline slope. The methods of Blaauw and van de Kaa (1978) were used for this analysis purpose. The results indicate that at a distance of 60 feet, the jet velocity acting on the toe of the shoreline slope is negligible.

To determine the stable sediment size required to protect against the jet velocity, the guidance presented in Chapter 3 of the EM 1110-2-1601 manual (USACE 1994) and modified by Maynord was used. The modified approach, which using a gradation factor and bases stone size on D_{50}, relates velocity to stone size (Palermo et al. 1998).

The predicted 15.1 ft/s design jet velocity results in a stable rock size with a D_{50} of 0.9 feet when the vessel is operating during low water and a D_{50} of 0.1 feet when the tugboat is operating during a high tide.

Propeller wash calculations for low water and high water operations for the *Patricia S* (including design parameters and assumptions) are included as Attachment B.

Additionally, the estimates of potential surface sediment mixing and scour depths due to propwash forces based on the design vessels and operating parameters for coarse grain sand backfill material was determined. It is worth noting that "mixing" and "scour" are related concepts and the extent to which a particular force of the sediment will cause mixing of existing sediments or scour and movement of those sediments to another location has primarily to do with other aspects of the long-term hydrodynamic and sedimentation regime present in any particular area. For example, mixing may be the predominant outcome of propwash forces in relatively quiescent areas where the disturbed sediment essentially falls back to the sediment bed at or near its previous location. Likewise, a dynamic balance or equilibrium of these conditions may exist over time in some areas. To recognize these more complex aspects of propwash effects on surface sediment, the term "disturbance" is used here.

The Hamill (1988) method was used to predict the disturbance and mixing depth. This method is based on the clearance of the propeller tip above the bed, the diameter of the

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propeller, jet velocity at the bed, sediment grain size, and time of exposure to the propeller wash (a time rate of scour). For this method, an exposure time of 120 seconds (2 minutes) and 300 seconds (5 minutes) was used.

For the design vessel, tugboat *Patricia S*, the results indicate that for a coarse grain sand (D_{50} = 0.2 millimeters [mm]) at an exposure time of 120 seconds, there is a 1.5-inch scour potential and at an exposure time of 300 seconds, the scour potential is 1.9 inches. Therefore, the use of a coarse sand with the proposed backfill placement thickness ranging from 1 to 9.5 feet would provide a sufficient residual mixing layer and meet the substrate conditions of the existing riverbed.

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4 DETERMINATION OF RIVER CURRENTS

The following section summarizes the hydrodynamic and sediment transport characteristics of the LDW in the vicinity of the RAB (approximately RMs 3.6 to 3.7; where RM 0 is at the confluence of the East and West Waterways) during a 100-year return period event. This study was based on information provided in the King County, Washington Flood Insurance Study (FIS) (FEMA 2005) and the Sediment Transport Analysis Report (STAR) (QEA and Windward 2008) and Sediment Transport Modeling Report (STM) (QEA 2008). No additional modeling has been completed for this evaluation.

4.1 High-flow Events in the Green River

Table 4 shows the flow rates for the 2-, 10-, and 100-year return period events for the Green River (taken from Table 3-1 of the STM). The 100-year flow is 12,000 cubic feet per second (cfs).

Table 4
High-flow events in the Green River

Return Period (year)	Peak Flow Rate (cfs)
2	8,400
10	10,800
100	12,000

Note:
cfs = cubic feet per second

4.2 Water Surface Elevations

The 100-year base flood elevation at RM 3.6 is 8.5 feet National Geodetic Vertical Datum (NGVD) 29 (Panel 19P of the FEMA FIS for King County, Washington). This corresponds to 12.0 feet North American Vertical Datum of 1988 (NAVD88) and 14.3 feet MLLW based on tidal datum information from National Oceanic and Atmospheric Administration (NOAA) Station 9447130 at Seattle, Washington. Other return periods are not shown; however, because the magnitudes of the 2-year and 10-year flow rates are 70 percent and 90 percent,

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respectively, of the magnitude of the 100-year flow rate; given similar tidal conditions, the lower return period events likely have a similar base flood elevation.

4.3 Bottom Shear Stress and Stable Grain Sizes in the Channel (Off-Slope)

Calculated maximum bottom shear stresses due to skin friction from the LDW model are found in STM Figures E-6 through E-8 for the 2-, 10-, and 100-year return period flows. The maximum of the range of values was extracted from the model cells between RM 3.6 and 3.7. The corresponding cell depths were taken from STM Figure 2-3 (the modified grid). The shear stress/grain size relationships presented in Table 7 of Scientific Investigations Report 2008–5093 (USGS 2008) was used to relate shear stress to stable grain size. Table 5 presents these values for the model cells in rows 2 and 3 (in the upstream/downstream direction) from the eastern boundary of the grid between RM 3.6 and 3.7. As a conservative measure, grain sizes were rounded up to the next millimeter.

Table 5
Bottom elevation, maximum bed shear, and calculated stable grain sizes adjacent to site

Event Return Period (year)	Range of bottom elevations (feet MLLW)	Maximum bed shear stress (psf)	Stable grain size (mm)
2	-3.4 to -8.4	0.04	3.0
10	-3.4 to -8.4	0.06	5.0
100	-3.4 to -8.4	0.06	5.0
100	-13.4 to -18.4	0.08	6.0

Notes:
psf = pounds per square foot
mm = millimeter
MLLW = mean lower low water

Bed shear stresses and stable grain sizes provided in Table 5 are applicable to all areas (in channel and off-slope) within the extent of proposed dredging and backfilling. The resolution of the existing hydrodynamic model in the project vicinity is too coarse to develop separate design criteria for each sub-area. Therefore, the largest bed shear stress predicted by the existing model in the RAB was used to develop the stable grain sizes listed in Table 5.

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4.4 Bottom Velocities Adjacent to RAB

Figure E-22 of the STM shows the near-bottom velocities and shear stresses during a 100-year flood event at a model cell close to shore in the vicinity of RM 3.5 (see STM Figure E-18). The velocity peaks at around 2.8 to 3.0 ft/s, while bed shear shows a maximum value of about 0.07 psf.

To validate the velocities taken directly from STM Figure E-18, another method to estimate velocities near the RAB was employed. This entails calculating the velocity magnitude from the shear stresses presented in Table 5, using Equations A-2 through A-4 in Appendix A of the STM. Details of the calculation are shown in Attachment C.

Table B-6 of the STM shows that the D_{90} of the cohesive sediment on the eastern bench near the RAB is 940 microns. From Table 2, the range of bottom elevations is -3.4 to -18.4 feet MLLW, and Figure E-4 of the STM shows the range of water surface elevations to be from -2.36 feet to 12.64 feet MLLW. Given the potential range of water depths from 1 foot to 31 feet, there is significant variation in the resulting calculations of bottom velocity based on the given shear stresses. Table 6 shows the results of the velocity calculations, which range from 1.6 ft/s to 4.1 ft/s; encompassing the values shown in STM Figure 3-18.

In summary, the maximum bottom velocity in the vicinity of the RAB ranges from 2.8 ft/s for the 2-year event to 4.1 ft/s for the 100-year event. These values are within the range of velocities that were read from STM Figure E-18, and provides an additional line of evidence for estimating near bed velocities adjacent to the RAB.

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Table 6
Calculated Bottom Velocities (from Predictions of Maximum Bed Shear) Adjacent to RAB

Event Return Period (year)	Maximumbed shear stress (psf)	Bottom elevation (feet MLLW)	Bottom Calculated Velocity (ft/s)
2	0.04	-3.4	1.6
		-8.4	2.8
10	0.06	-3.4	2.0
		-8.4	3.4
100	0.06	-3.4	2.0
		-8.4	3.4
100	0.08	-13.4	3.6
		-18.4	4.1

Notes:
psf = pounds per square foot
ft/s = feet per second
MLLW = mean lower low water

4.5 Estimated Depth-averaged Velocities

To determine the necessary riprap stone size to prevent erosion of the shoreline bank, the depth-averaged velocity in the federal navigation channel must be determined. The velocities calculated in the previous section represent near-bottom current velocities which were used to evaluate stable grain sizes for in-channel, off-slope areas. For sizing armor along the shoreline bank, a depth-averaged velocity over the entire water column is more appropriate. The depth-averaged velocity can be estimated using the "law of the wall", in which an idealized logarithmic velocity is developed from the bottom shear stress and the flow and sediment characteristics (Dingman 2009); calculations are detailed in Attachment C.

As before, D_{90} is equal to 940 microns. Velocity profiles were calculated for two 100-year scenarios; one with a total water depth of 21 feet and a bottom shear stress of 0.06 psf, and the second for a depth of 31 feet and a bottom shear of 0.08 psf. These conditions correspond to two separate model cells adjacent to the RAB as taken from the STM. Table 7 presents the

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depth-averaged velocities calculated using this method. The maximum depth-averaged velocity for the 100-year event 5.7 ft/s.

Table 7
Depth-Averaged Velocities Calculated Using the 'Law Of The Wall'

Event Return Period (year)	Maximum bed shear stress (psi)	Total water depth (feet)	Near-bottom velocity (ft/s)	Depth-averaged Velocity (ft/s)
100	0.06	21	3.4	4.7
100	0.08	31	4.1	5.7

Note:
ft/s = feet per second
psi = pounds per square inch

4.6 Riprap Stone Size Calculations

The Maynord formulation (Appendix A of Palermo et al. 1998) was used to estimate a median riprap diameter and weight based on the largest 100-year depth-averaged velocity in Table 7 of 5.7 ft/s. The formula is detailed in Attachment C. Since site-specific hydrodynamic modeling was not performed in support of this evaluation, there is some uncertainty in the magnitude of the 100-year depth-averaged current velocity in the LDW adjacent to the RAB. Therefore, a safety factor of 2.0 was applied to calculations of stone sizing for the banks.

Stone size calculations were carried out for a shoreline slope of 2H:1V and depths from 0.1 feet to 30 feet. Table 8 summarizes the results of the analysis at a depth of 1 foot.

Table 8
Median armor weights and diameter for shoreline slope at a depth of 1 foot

Shoreline Slope (H:V)	Median Diameter[1] (feet)	Median Weight[1] (lb)
2H:1V	0.9	114

Note:
1 = Safety factor of 2 applied to 100-year depth averaged velocities

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The Washington State Department of Transportation (WSDOT) material gradation best meeting the shoreline armor layer material requirements is the specification for light, loose riprap material (Table 9).

Table 9
WSDOT Light Loose Riprap Gradation Specification

Size Range	Maximum Size
20% to 90%	300 lbs to 1 ton (2 cubic feet to 1/2 cubic yards)
15% to 80%	50 lbs to 1 ton (1/3 cubic feet to 1/2 cubic yards)
10% to 20%	50 lbs (spalls)

4.7 Filter Material Calculations

It is recommended that a filter layer material be placed between the regraded shoreline slope and the new shoreline armor material to prevent migration of fine soil particles, distribute the weight of the armor units, provide more uniform settlement, and permit relief of hydrostatic pressure within the soils (USACE 1995).

Using guidance presented in Engineering Manual (EM) 1110-2-1614 (USACE 1995), the selected filter layer must satisfy requirements pertaining to both the armor-to-filter relation as well as filter-to-underlying soil relation as defined by the following three equations:

$$\frac{D_{15(\text{armor})}}{D_{85(\text{filter})}} < 4 \qquad \text{(Equation 1)}$$

$$\frac{D_{15(\text{filter})}}{D_{85(\text{soil})}} < 4 \; to \; 5 \qquad \text{(Equation 2)}$$

$$4 \text{ to } 5 < \frac{D_{15(\text{filter})}}{D_{15(\text{soil})}} \qquad \text{(Equation 3)}$$

Equation 1 provides a margin against variations in void sizes that may occur as the armor layer shifts under wave action. Equation 2 is intended to prevent vertical migration of the

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underlying soil through the filter (often referred to as "piping"). Equation 3 provides for adequate permeability for structural bedding layers (USACE 1995).

Table 10 presents the material gradation specification for the proposed filter layer material.

Table 10
Filter Material Gradation Specification

U.S. Standard Sieve Size	Percent Passing by Weight
4 inch	90 - 100
3/4 inch	50 - 75
No. 4	35 - 55
No. 10	25 - 45
No. 40	10 – 25
No. 200	0 – 4 (wet sieve)

Figures 1, 2, and 3 depicts the filter layer requirements based on Equations 1 through 3 and the proposed filter layer material gradation specification outlined in Table 10. As seen on the figures, the range for D_{85} in the filter material specification meets or exceeds the required range based on the relationship to the D_{15} of the armor layer material specification (Equation 1). The range for D_{15} in the filter material specification exceeds the range based on the relationship to the underlying soil (Equation 2). Generally, the D_{15} in the filter material specification meets the range for permeability based on the underlying soil (Equation 3), with the exception of locations coarser-grained sediment is present.

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5 CONCLUSIONS

Based on the analysis of the erosive forces expected at the RAB (vessel-generated wakes, propeller wash, river currents), the following protective material is recommended for the backfill and shoreline armoring:

Backfill

- The controlling long-term erosive force on the backfill is river currents.
- To protect against river current material with a D_{50} of 6 mm should be used at least in the upper foot of backfill, if not throughout.
- This backfill grain size should address temporary transient propeller wash forces.

Shoreline Armoring

The 100-year river current event is the dominate erosive force expected within the RAB. A rock gradation with a D_{50} of 0.9 foot is recommended to provide the appropriate protection the full height of the 2H:1V slope.

The use of a filter layer is recommended to prevent migration of fine soil particles, to distribute the weight of the armor units, to provide more uniform settlement, and to permit relief of hydrostatic pressure within the soils.

EMJ015113

6 REFERENCES

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FIGURES

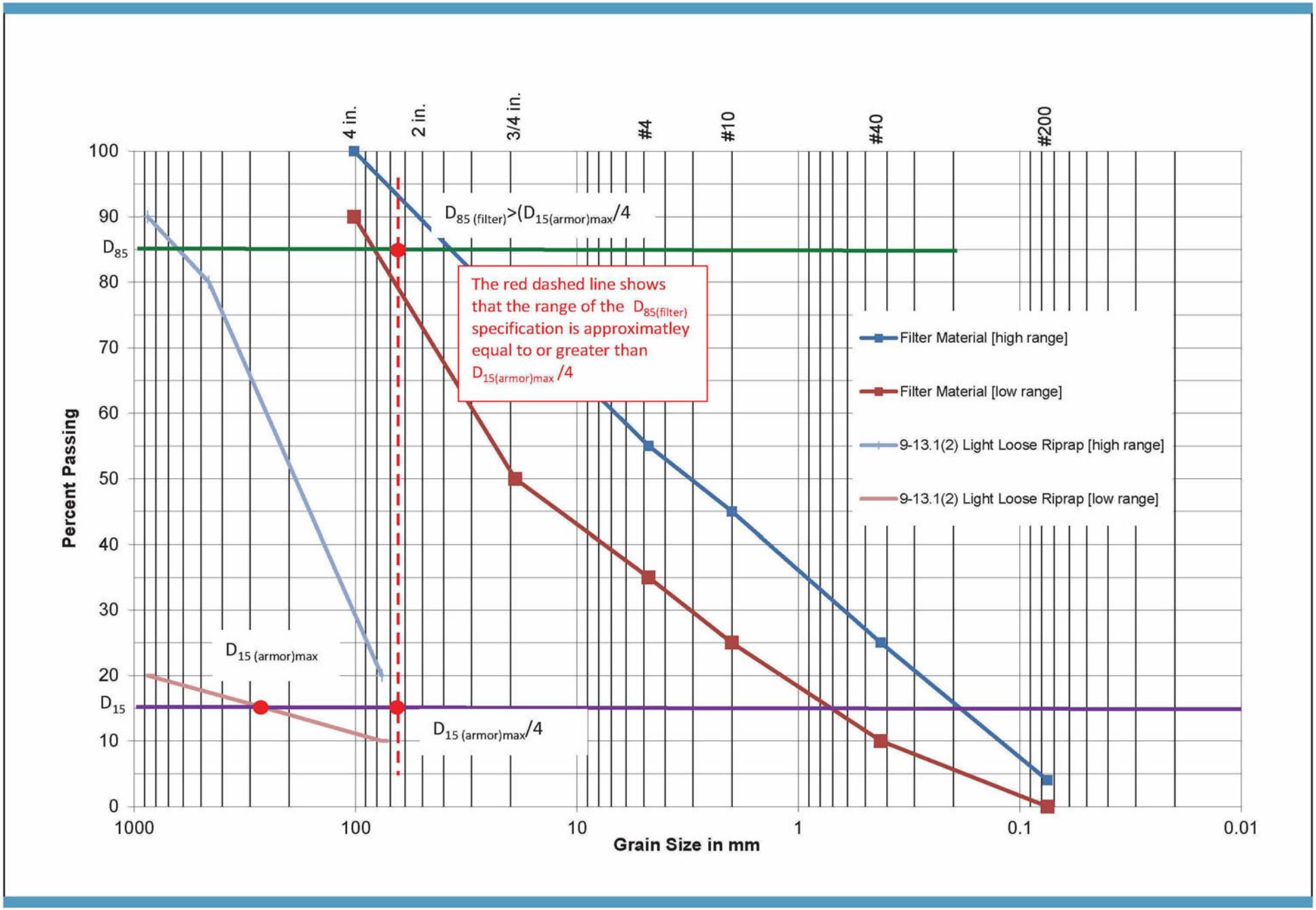

Figure 1
Filter Material Design Criteria for Void Variation Sizes
Erosion Analysis
Jorgensen Forge Early Action Area

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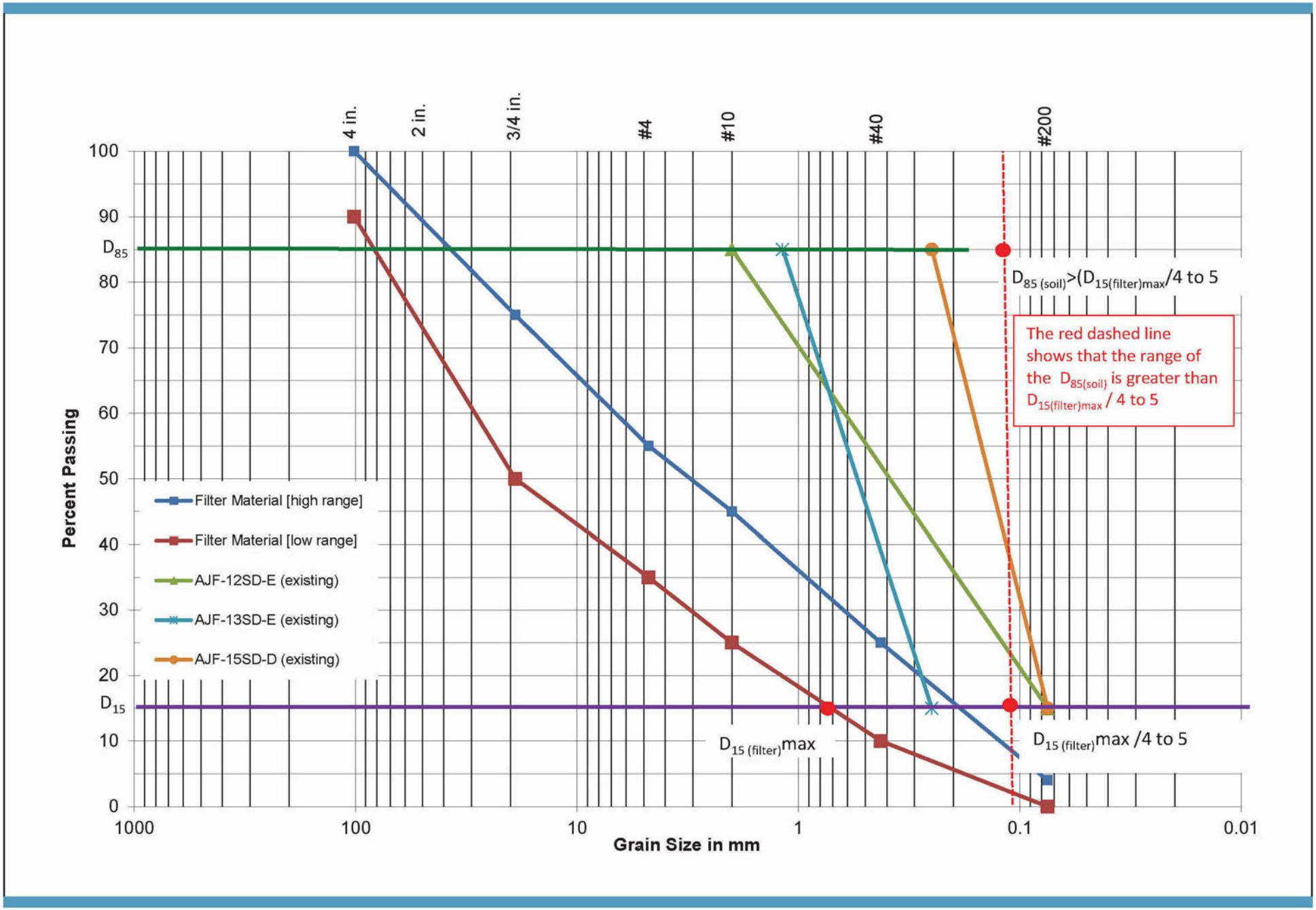

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Figure 2
Filter Material Design Criteria for Vertical Migration
Erosion Analysis
Jorgensen Forge Early Action Area

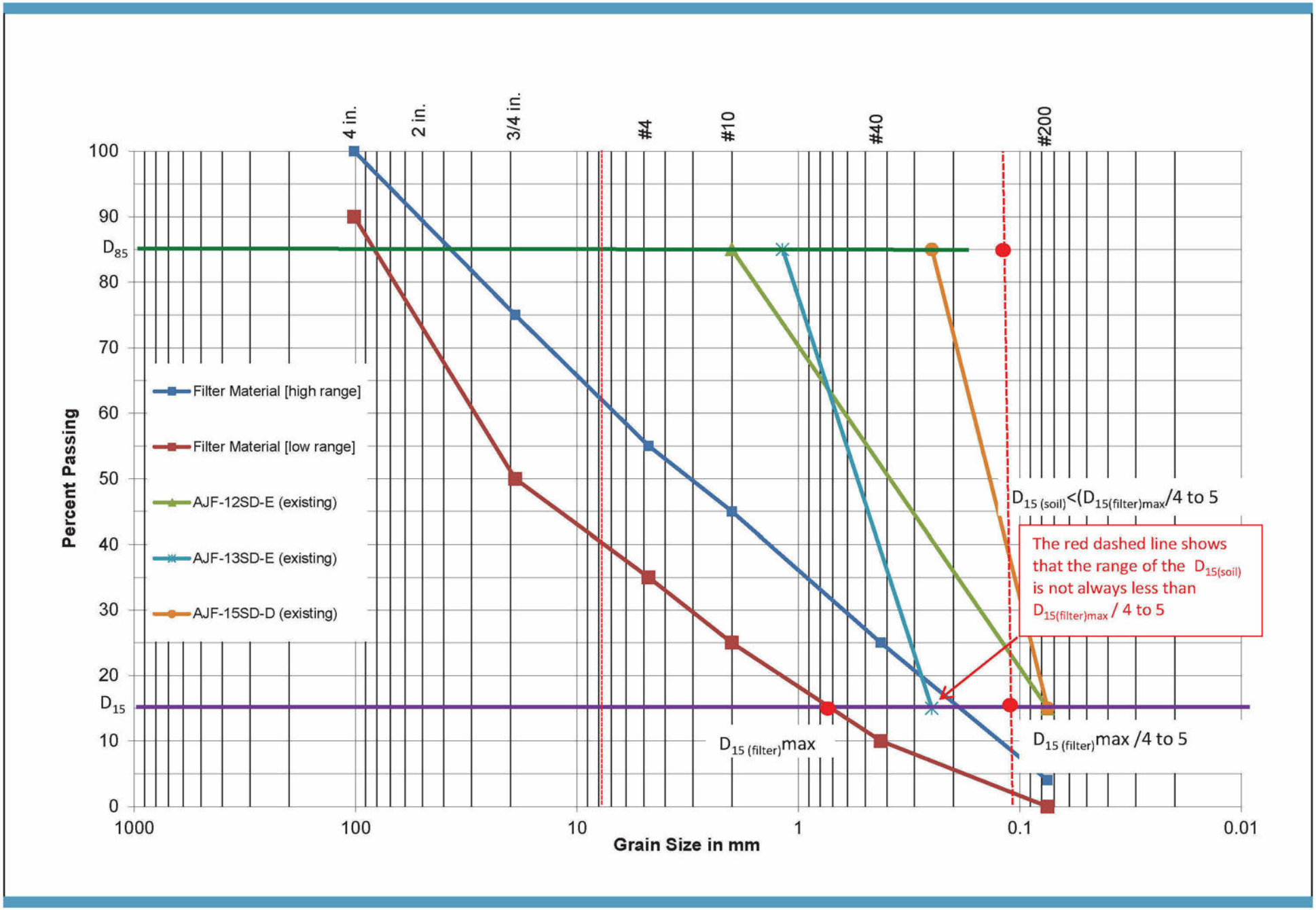

Figure 3
Filter Material Design Criteria for Permeability
Erosion Analysis
Jorgensen Forge Early Action Area

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ATTACHMENT 1
VESSEL WAKE ANALYSIS FOR ARMOR LAYER DESIGNS – EXAMPLE CALCULATION

Objective: To determine the wave height and period generated by a vessel traveling through the Jorgensen Forge Project site

References:

Windward and QEA, 2008. Final Lower Duwamish Waterway Sediment Transport Analysis Report. Prepared for the Lower Duwamish Waterway Group. January 24.

AMEC Floyd Snider, 2011. Appendix I – Vessel Propeller Wash And Wake Scour Analysis. Prepared for The Boeing Company.

Weggel, J.R. and R.M. Sorensen. 1986. "Ship wave prediction for port and channel design." Proceedings of the Ports '86 Conference, Oakland, CA, May 19-21, 1986. Paul H. Sorensen, ed., American Society of Civil Engineers, New York, pp. 797-814.

Determination of wake wave height and period for a tugboat: The following presents a detailed summary and example calculation to determine the wave height and period of a wake wave generated by a tugboat traversing the Duwamish River. The approach was developed by Weggel and Sorensen (1986) and Sorensen and Weggel (1984). The numbered list below outlines the general approach used for the calculation and defines specific parameters used in the calculations.

1. Obtain vessel characteristics (model input parameters) for the vessel in question, in this case the *Patricia S*, a tugboat operated by Island Tug and Barge. Also, determine water depth and distance to sailing line, where wave characteristics will be assessed. These parameters are provided in the following table:

Table A-1
Vessel Characteristics and Input Parameters (Tugboat)

Parameter	Value	Units
Length	93	feet
Vessel Displacement	20,700	cubic feet
Vessel Speed	8.1	mph
Water Depth	15	feet

2. Relating maximum wave height, Hm, to the vessel speed, distance from the sailing line, water depth, and the vessel displacement yields four dimensionless variables (equations 1 through 4) with their corresponding values for this calculation:

$$F = \frac{V}{\sqrt{gd}}$$

$$x^* = \frac{x}{W^{0.33}}$$

$$d^* = \frac{d}{W^{0.33}}$$

$$H_m^* = \frac{H_m}{W^{0.33}}$$

Where
F = Froude number
V = vessel speed
g = acceleration of gravity
d^* = dimensionless water depth
d = water depth
x^* = dimensionless distance from vessel sailing line to point of interest
x = distance from vessel sailing line to point of interest measured perpendicular to the sailing line
W = vessel displacement
H_m^* = dimensionless maximum wave height
H_m = maximum wave height in a vessel wave record

3. The basic initial model, in terms of these dimensionless variables, is given by (equation 5):

$$H_m^* = \alpha (x^*)^n$$

Where α and *n* are a function of the Froude number and dimensionless depth as follows (equation 6):

$$n = \beta (d^*)^\delta$$

Where (equation 7):

$$\beta = -0.342 \qquad 0.55 < F < 0.8$$
$$\beta = -0.225\, F^{-0.699} \qquad 0.2 < F < 0.55$$

$$\delta = -0.146 \qquad 0.55 < F < 0.8$$
$$\delta = -0.118\, F^{-0.356} \qquad 0.2 < F < 0.55$$

and (equation 8):

$$\log(\alpha) = a + b \log(d^*) + c \log^2(d^*)$$

Where (equation 9):

$$a = \frac{-0.6}{F}$$

$$b = 0.75F^{-1.125}$$

$$c = 2.653F - 1.95$$

Where:
a,b, c, β, and δ = Dimensionless coefficients

4. Using Equations 5 through 9, H_m can be determined given the vessel speed, displacement, water depth, and distance from the sailing line. These equations are valid for vessel Froude numbers from 0.2 to 0.8, which are common for most vessel operations, and in this case is 0.54 as defined in equation 1 above (and shown in the calculation below).

$$F = \frac{V}{\sqrt{gd}} = \frac{8.1\frac{\text{miles}}{\text{hr}} \times 5{,}280\frac{\text{ft}}{\text{mile}} \times \frac{1}{3{,}600}\frac{\text{hr}}{\text{sec}}}{\sqrt{32.2\frac{\text{ft}}{\text{s}^2} \times 15\,\text{ft}}} = 0.54$$

Where:
V = 8.1 miles per hour
g = 32.2 ft/s^2
d = 15 feet

Given F = 0.54, β = -0.35 and δ = -0.15 and the value of Hm = 0.5 ft

equation 2:

$$x^* = \frac{x}{W^{1/3}} = \frac{100\text{ ft}}{\left(20{,}700\text{ ft}^3\right)^{1/3}} = 3.64$$

equation 3:

$$d^* = \frac{d}{W^{1/3}} = \frac{15\text{ ft}}{\left(20{,}700\text{ ft}^3\right)^{1/3}} = 0.55$$

equation 4:

$$H_m{}^* = \frac{H_m}{W^{1/3}} \Rightarrow H_m = \left(H_m{}^*\right)\left(W^{1/3}\right) = 0.02 \times \left(20{,}700\text{ ft}^3\right)^{1/3} = 0.5\text{ ft}$$

equation 5:

$$H_m{}^* = \alpha(x^*)^n = 0.03 \times (3.64)^{-0.3} = 0.02$$

equation 6:

$$n = \beta(d^*)^{\delta} = -0.35 \times (0.55)^{-0.146} = -0.38$$

Equation 8:

$$\log(\alpha) = a + b\log(d^*) + c\log^2(d^*) = -1.1 + 1.5 * \log(0.55) + -0.52 * \log^2(0.55) = -1.52$$

$$\alpha = 10^{-1.52} = 0.03$$

Equation 9:

$$a = \frac{-0.6}{F} = \frac{-0.6}{0.54} = -1.1$$

$$b = 0.75F^{-1.125} = 0.75(0.54)^{-1.125} = 1.5$$

$$c = 2.653F - 1.95 = 2.653 \times 0.54 - 1.95 = -0.52$$

Where:
F = 0.54 (per equation 1 above)
V = miles per hour
g = 32.2 ft/s^2
d = 15 feet
x = = 100 feet
W = 20,700 ft^3

5. The wave height is subsequently adjusted by modifying the value of H_m by the following relationship (equation 10):

$$H_m = A'H_m - B' = 3.30 \times 0.5\,\text{ft} - 0.145 = 1.5\,\text{ft}$$

Where,
A' and B' = coefficients to account for hull geometry = 3.30 and 0.145 (Table 2 of Weggel and Sorensen 1986; Kurata & Oda[1984] tugboat)

6. In order to determine the wave period, the diverging wave direction is determined with respect to the sailing line, by the following equation (equation 15):

$$\theta = 35.27 - 35.27e^{(12F-12)} \qquad F<1$$

$$\theta = a\sin\left(\frac{1}{F}\right) \qquad F>1$$

In this example calculation where F= 0.54:

$$\theta = 35.27 - 35.27e^{(12*0.54-12)} = 35.13 \text{ degrees, or } 0.61 \text{ radians}$$

And the diverging wave celerity, C is determined by the following (equation 16):

$$C = V\cos(\theta) = 8.1\frac{\text{miles}}{\text{hr}} \times 5{,}280\frac{\text{ft}}{\text{mile}} \times \frac{1}{3{,}600}\frac{\text{hr}}{\text{sec}} \times \cos(35.13) = 9.7\frac{ft}{\text{sec}}$$

Where
V = 8.1 mph

And the period is calculated as (equation 17):

$$T = 2\pi(C/g) \qquad \text{F<0.7}$$

$$T = \frac{L^*}{C} \qquad \text{F>0.7}$$

Where
L* is determined through an iterative process, to equate C with C^*, where C* is defined as (equation 18):

$$C^* = \sqrt{\frac{gL^*}{2\pi}\tanh\left(\frac{2\pi d}{L^*}\right)}$$

In this example F < 0.7, and the first part of equation 17 is used to determine T:

$$T = 2\pi\left(\frac{9.7\frac{ft}{\text{sec}}}{32.2\frac{ft}{\text{sec}^2}}\right) = 1.9\,\text{sec}$$

7. Compute the Armor Stone Size Along the Shoreline

The *Rubble Mound Revetment Design Module* in ACES was used to compute the required armor layer size (gradation and thickness) in the surf zone to resist the forces generated by turbulence from breaking waves. The following parameters were used in the computation:

- Significant wave height = 1.5 feet
- Significant wave period = 2.0 seconds
- Breaking criteria = 0.78 (Dean and Dalrymple 1991)
- Water depth at toe of the structure = 16 feet

- Cotangent of nearshore slope = 6 (the slope of the bed offshore of the surf zone in Remediation Area)
- Unit weight of rock = 165 lbs/ft^3 (page A-6 of Maynord 1998)
- Permeability coefficient = 0.4 (Figure 4-4-2b of USACE 1992)
- Cotangent of structure (revetment) slope = 2 (restored slope for Remediation Area)
- Minor Displacement Level (S) = 2 (from Table VI-5-21 of USACE 2006 and Table 4-4-1 of USACE 1992)

Table A-2 presents the armor layer gradation results for the minor displacement level for a 2H:1V slope computed by ACES.

Table A-2
Shoreline Armor Gradation for Minor Displacement for Remediation Area

Gradation and Thickness	Stone Size (inches) for Minor Displacement (S=2)
D_0	2.4
D_{15}	3.6
D_{50}	4.8
D_{85}	6.0
D_{100}	7.2
Thickness of Armor Layer	9.6

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ATTACHMENT 2
PROPELLER WASH ANALYSIS FOR SEDIMENT BACKFILL LAYER DESIGN

Objective: To determine the propeller wash velocities from commercial and recreational vessels that may operate at the Jorgensen Forge project site and the resultant particle size(s) necessary for stability of the sediment cap subject to these propeller wash flows.

This document presents the calculations for the Island Tug and Barge Company Tug Tugboat *Patricia S.*

References:

Blaauw, H.G., and E.J. van de Kaa. 1978. "Erosion of Bottom and Sloping Banks Caused by the Screw Race of Maneuvering Ships." Paper presented at the 7th International Harbour Congress, Antwerp, Belgium. May 22-26, 1978.

Maynord, S. 1998. *Appendix A: Armor Layer Design for the Guidance for In-Situ Subaqueous Capping of Contaminated Sediment*. Prepared for the U.S. Environmental Protection Agency (USEPA).

Weggel, J.R. and R.M. Sorensen. 1986. "Ship wave prediction for port and channel design." Proceedings of the Ports '86 Conference, Oakland, CA, May 19-21, 1986. Paul H. Sorensen, ed., American Society of Civil Engineers, New York, pp. 797-814.

Windward and QEA, 2008. Final Lower Duwamish Waterway Sediment Transport Analysis Report. Prepared for the Lower Duwamish Waterway Group. January 24.

AMEC Floyd Snider, 2011. Appendix I – Vessel Propeller Wash And Wake Scour Analysis. Prepared for The Boeing Company.

Computation of commercial vessel propeller wash and resultant particle size(s): The following presents a detailed example calculation for a commercial vessel operating on the Duwamish River. The numbered list below outlines the general approach used for the calculation and defines specific parameters used in the calculations. Subsequent sections below illustrate a step-by-step calculation for the example case. The calculation is for the *Patricia S* tugboat operating in 15 ft of water (low tide) at 25 percent of the installed engine power.

1. Select representative vessel for analysis

The *Patricia S* tugboat was the example vessel used in the calculation to represent tugboats operating on the Lake. The tugboat has the following characteristics:

- Number of engines: Two
- Propeller shaft depth: 8 feet (ft)
- Total installed engine horsepower: 2400 horsepower (hp)
- Propeller diameter: 6.3 ft
- Ducted propeller: Yes

2. Determine the maximum bottom velocities in the propeller wash of a maneuvering vessel

Equation 4 from Maynord (1998) is used to first determine the jet velocity exiting a propeller (U_0) in feet per second (fps):

$$U_0 = C_2\left(\frac{P_d}{D_p^{\,2}}\right)^{\frac{1}{3}}$$

Where:
C_2 = 7.68 for ducted propellers (page A-10 from Maynord 1998)
P_d = applied engine horsepower = 300 hp
D_p = Propeller diameter = 6.3 ft (from above)

In this analysis it is assumed an average of 25 percent of the engines horsepower is applied, i.e. P_d = 0.25x1200 hp = 300 hp. Therefore,

$$U_0 = C_2\left(\frac{P_d}{D_p^{\,2}}\right)^{\frac{1}{3}} = (7.68)\left(\frac{300}{6.3^2}\right)^{\frac{1}{3}} = 15.1\,\text{fps}$$

The resulting maximum bottom velocities, $V_{b(maximum)}$, in the propeller wash of a maneuvering vessel is computed using Equation 3 from Maynord (1998):

$$V_{b(maximum)} = C_1 U_0 D_p / H_p$$

Where:
C_1 = 0.30 for a ducted propeller
H_p = distance from propeller shaft to channel bottom in ft

In this calculation, the *Patricia S* is operating in a depth of 15 feet of water (low water). Therefore, the distance form the propeller shaft to channel bottom is the water depth minus the shaft depth (i.e., H_p = 15 ft- 8 ft = 7 ft). The maximum bottom velocity for this case is:

$$V_{b(maximum)} = C_1 U_0 D_p / H_p = 0.30(15.1)(6.3)/7 = 4.1\ \text{fps}$$

3. Compute the Stable Sediment Sizes to resist the propeller wash of a maneuvering vessel

Equation 5 from Maynord (1998) is used to compute the Stable Sediment Sizes to resist the propeller wash of a maneuvering vessel:

DESIGNER: TLS	DATE: 1-28-12	CALC. NO.: 1	REV.NO.:
PROJECT: Jorgensen Forge		CHECKED BY:	CHECKED DATE:
SUBJECT: Attachment 2 – Propeller Wash Analysis for Sediment Backfill Layer Design			

$$V_{b(\max imum)} = C_3 \left[g \left(\frac{\gamma_s - \gamma_w}{\gamma_w} \right) D_{50} \right]^{\frac{1}{2}}$$

Where:

C_3 = 0.6 for infrequent attacked expected (page A-10 from Maynord 1998)
D_{50} = median particle size
γ_s = unit weight of stone = 165 pounds per cubic foot (lbs/ft^3) (page A-6 of Maynord 1998)
γ_w = unit weight of sea water = 64.0 lbs/ft^3

Solving for D_{50}:

$$D_{50} = \frac{\left(\frac{4.1}{0.6}\right)^2}{32.2\left(\frac{165-64.0}{64.0}\right)} = 0.91\,\text{ft} = 10.9 \text{ inches}$$

It should be noted that this method provides a conservative estimate of stable particle size for the low bottom velocities when compared with other methods used to compute a representative particle size to resist erosion associated with current velocities. For example, the stable particle size to resist a 4.1 fps bottom current velocity using Shields diagram presented in Vanoni (1975) is 0.8 inches (21 millimeters).

RECORD OF REVISIONS

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ATTACHMENT 3
CURRENT VELOCITY AND ARMOR SIZE CALCULATIONS

CALCULATION COVER SHEET

PROJECT: Jorgensen Forge	CALC NO. 1	SHEET 1 of 5
SUBJECT: Attachment 3 – Current Velocity and Armor Size Calculations		

Objective: To determine current velocities present adjacent to the site for a 100-year return period event and use these velocities to calculate an appropriate armor stone size for the embankment.

References:

Dingman, S.L. Fluvial Hydraulics. Oxford University Press. February 26, 2009.

Federal Emergency Management Agency (FEMA). Flood Insurance Study, King County, WA and incorporated areas. FEMA. April 19, 2005.

Palermo, M., Maynord, S., Miller, J., and Reible, D. Guidance for In-Situ Subaqueous Capping of Contaminated Sediments, EPA 905-B96-004. EPA Great Lakes National Program Office, Chicago, IL. 1998

Windward and QEA, 2008. Final Lower Duwamish Waterway Sediment Transport Analysis Report. Prepared for the Lower Duwamish Waterway Group. January 24.

QEA, 2008. Lower Duwamish Waterway Sediment Transport Modeling Report – Final. Prepared for the U.S. Environmental Protection Agency and Washington State Department of Ecology. October.

Verification of bottom velocity data. To ensure that the velocities used to determine the armor stone size are of sufficient magnitude to represent extreme conditions at the site, the velocities shown in STM Figure E-18 (QEA 2008) were supplemented with velocities back-calculated from the maximum bottom shear stresses at the site. This was accomplished using Equations A-2 through A-4 in Appendix A of the STM, reiterated and detailed below:

$$\tau = \rho_w C_f u^2$$

$$C_f = \kappa^2 \ln^{-2}\left(11\frac{z_{ref}}{k_s}\right)$$

$$z_{ref} = 0.5\frac{\eta - h}{10}$$

$$k_s = 2D_{90}$$

Where:
τ = bottom shear stress due to skin friction (Pa)
ρ_w = density of water (1000 kg/m^3)
C_f = skin friction coefficient
u = near-bottom current velocity (m/s)
κ = Von Karman's constant (0.4)
z_{ref} = reference height above bed (m)
k_s = effective bed roughness height (m)
η = water surface elevation (m MSL)
h = bottom elevation (m MSL)
D_{90} = 90 percentile grain diameter (m)

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Table B-6 of the STM shows that the D_{90} of the cohesive sediment on the eastern bench near the site is 940 microns. The effective bed roughness is then:

$$k_s = 2D_{90} = 2 * 0.00094 = 0.00188m$$

In the case of the largest modeled shear stress (4.0 Pa), the lowest bottom elevation is -25 ft MSL and the highest water surface elevation is +6 ft MSL. The reference height is then calculated:

$$z_{ref} = 0.5\frac{\eta - h}{10} = 0.5\frac{6 - -25}{10} = 1.55\text{ft} = 0.47\text{m}$$

The coefficient of skin friction is then:

$$C_f = \kappa^2 \ln^{-2}\left(11\frac{z_{ref}}{k_s}\right) = 0.4^2 \ln^{-2}\left(11\frac{0.47}{0.00188}\right) = 0.0026$$

Finally, the velocity can be calculated:

$$u = \sqrt{\tau/\rho_w C_f} = \sqrt{4.0/1000(0.0026)} = 1.25\text{m/s} = 4.1\text{ft/s}$$

Calculating depth-averaged velocity from bottom shear data. For sizing armor along the banks, a depth-averaged velocity over the entire water column is more appropriate. The depth-averaged velocity can be estimated using the 'law of the wall', in which an idealized logarithmic velocity is developed from the bottom shear stress and the flow and sediment characteristics (Dingman 2009). The equations below show this method in detail as it is applied here.

$$u = \frac{u_*}{\kappa}\ln\left(y/y_0\right)$$
$$u_* = \sqrt{\tau/\rho_w}$$
$$y_0 = k_s/30$$
$$k_s = 2D_{90}$$

Where:
u = horizontal velocity as a function of height from bottom (m/s)
u_* = shear velocity (m/s)
κ = Von Karman's constant (0.4)

y = height from bottom of channel (m)
y_0 = reference height for rough turbulent flow (m)
τ = bottom shear stress (Pa, from Table 3)
ρ_w = density of water (1000 kg/m^3)
k_s = effective bed roughness height (m)
D_{90} = 90 percentile grain diameter (m)

Using the same depth and bottom shear scenario as above, the calculations are as follows. The effective bed roughness is first determined:

$$k_s = 2D_{90} = 2 * 0.00094 = 0.00188m$$

The reference height is based on the effective bed roughness:

$$y_0 = {k_s}/{30} = {0.00188}/{30} = 6.27 * 10^{-5}\text{m}$$

The shear velocity is based on bottom shear stress and water density:

$$u_* = \sqrt{\tau/\rho_w} = \sqrt{4.0/1000} = 0.0632\text{m/s}$$

The velocity profile over the entire water column is then defined as:

$$u = \frac{u_*}{\kappa}\ln\left({y}/{y_0}\right) = 0.1581\ln\left({y}/{6.27 * 10^{-5}}\right)$$

Values of velocity were calculated on a fine interval over the entire 31 ft (9.45 m) water column and the average value was found to be 173 cm/s (5.7 ft/s).

Determining the required armor stone size based on velocity and bank slope. The Maynord formulation (Appendix A, Palermo, 1998) was used to estimate a median riprap diameter and weight based on the largest depth-averaged velocity in Table 4 of 5.7 ft/s. The formula is detailed below.

$$W_{50} = \gamma_s {D_{50}}^3$$

$$D_{50} = S_f C_s C_v C_t C_g d\left[\sqrt{\frac{\gamma_w}{\gamma_s - \gamma_w}}\frac{V}{\sqrt{K_1 g d}}\right]^{2.5}$$

$$K_1 = \sqrt{1 - \frac{\sin^2\theta}{\sin^2\varphi}}$$

$$C_v = 1.283 - 0.2\log\left({}^{R}/_{W}\right)$$

$$C_g = \left(\frac{D_{85}}{D_{15}}\right)^{1/3}$$

where:
W_{50} = median stone weight (lb)
D_{50} = median stone diameter (ft)
γ_s = unit weight of stone (165 lb/ft^3)
γ_w = unit weight of water (62.4 lb/ft^3)
S_f = factor of safety (2.0)
C_s = stability coefficient (0.30 for angular stone)
C_v = velocity distribution coefficient
C_t = blanket thickness coefficient (1.0 for flood flows)
C_g = gradation coefficient
V = depth-averaged velocity (ft/s)
g = gravitational acceleration (32.2 ft/s^2)
d = water depth (ft)
K_1 = side slope correction factor
Θ = revetment slope ($\tan^{-1}$(rise/run))
Φ = riprap angle of repose (40°)
R = radius of curvature of the bend (2,300 ft)
W = surface width upstream of the bend (400 ft)
D_{85}/D_{15} = ratio of 85 percentile armor size to 15th percentile armor size (4.0)

This example uses the maximum depth-averaged velocity expected in the area (5.7 ft/s) and a bank slope of 1V:2H (26.6 degrees). First, the gradation coefficient is calculated:

$$C_g = \left(\frac{D_{85}}{D_{15}}\right)^{1/3} = (4.0)^{1/3} = 1.59$$

The velocity distribution coefficient is based on the width of the river and the radius of the bend:

$$C_v = 1.283 - 0.2\log\left({}^{R}/_{W}\right) = 1.283 - 0.2\log\left({}^{2300}/_{400}\right)$$
$$= 1.131$$

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The side slope correction factor is based on the slope of the bank and the riprap angle of repose (40 degrees):

$$K_1 = \sqrt{1 - \frac{\sin^2\theta}{\sin^2\varphi}} = \sqrt{1 - \frac{\sin^2 26.6}{\sin^2 40}} = 0.718$$

The median armor stone diameter is then calculated using the Maynord equation for a depth of 1.0 ft:

$$D_{50} = S_f C_s C_v C_t C_g d \left[\sqrt{\frac{\gamma_w}{\gamma_s - \gamma_w}} \frac{V}{\sqrt{K_1 g d}}\right]^{2.5}$$

$$= 2.0 * 0.30 * 1.131 * 1.0 * 1.59 * 1.0 \left[\sqrt{\frac{62.4}{165 - 62.4}} \frac{5.7}{\sqrt{0.718 * 32.2 * 1.0}}\right]^{2.5}$$

$$= 0.88\text{ft}$$

Finally, the median armor weight is found by assuming the median diameter represents the 'equivalent cube side length' of the stone:

$$W_{50} = \gamma_s {D_{50}}^3 = 165 * 0.88^3 = 114lb$$

RECORD OF REVISIONS

NO.	REASON FOR REVISION	BY	CHECKED	APPROVED/ ACCEPTED	DATE

ANCHOR QEA

APPENDIX C
SLOPE STABILITY ANALYSIS

APPENDIX C
SLOPE STABILITY ANALYSIS
BASIS OF DESIGN REPORT
JORGENSEN FORGE EARLY ACTION AREA

Prepared for

U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, Washington 98101

On behalf of

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March 2013

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LIST OF ACRONYMS AND ABBREVIATIONS

AOC	Administrative Settlement Agreement and Order on Consent for Removal Action Implementation
Basis of Design Report	Basis of Design Report
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DAR	Design Analysis Report
EAA	Early Action Area
EMJ	Earle M. Jorgensen
EPA	U.S. Environmental Protection Agency
Facility	Jorgensen Forge facility
g	acceleration due to gravity
H:V	Horizontal to Vertical
Jorgensen Forge	Jorgensen Forge Corporation
LDW	Lower Duwamish Waterway
MLLW	mean lower low water
NTCRA	non-time-critical removal action
Owner	EMJ and Jorgensen Forge
pcf	per cubic foot
PGA	peak ground acceleration
SM	Silty sand
SOW	Statement of Work
SP	poorly graded sand
USACE	U.S. Army Corps of Engineers
WSDOT	Washington State Department of Transportation

EMJ015140

1 GENERAL

This Slope Stability Report was prepared on behalf of Earle M. Jorgensen Company (EMJ) and Jorgensen Forge Corporation (Jorgensen Forge; herein referred to collectively as the Owner) pursuant to the Administrative Settlement Agreement and Order on Consent for Removal Action Implementation (AOC; U.S. Environmental Protection Agency [EPA] Region 10 Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] Docket No. 10-2012-0032) and attached Statement of Work (SOW). This Slope Stability Report is an appendix to the Basis of Design Report (BODR) Final Design submittal for the cleanup of contaminated sediments and associated bank soils in a portion of the Lower Duwamish Waterway (LDW) Superfund Site adjacent to the Jorgensen Forge facility (Facility) located in Tukwila, King County, Washington (see Figure 1 of the BODR; Jorgensen Forge Early Action Area [EAA]). The cleanup will be conducted as a non-time-critical removal action (NTCRA) in accordance with EPA's selected cleanup alternative documented in the *Action Memorandum for a Non-Time-Critical Removal Action at the Jorgensen Forge Early Action Area of the Lower Duwamish Waterway Superfund Site in Seattle, Washington* (Action Memo; EPA 2011) and detailed in the *Final Engineering Evaluation/Cost Analysis [EE/CA]– Jorgensen Forge Facility, 8531 East Marginal Way South, Seattle, Washington* (Anchor QEA 2011). The Jorgensen Forge EAA is located near River Miles (RMs) 3.6 to 3.7 on the east bank of the LDW.

The evaluations presented in this appendix indicate that the proposed engineered slopes meet the required performance standards for short-term and long-term stability. Slope stability analysis indicates that the proposed design meets the long-term slope stability performance standard of 1.3 of the Washington State Department of Transportation (WSDOT) *Geotechnical Design Manual* with an estimated factor of safety of 1.5 (WSDOT 2011). Consistent with the work of others (Integral 2007), post-shoreline containment stability was evaluated for a ground motion, which represented a 100-year earthquake. For this pseudostatic analysis, the minimum factor of safety of 1.06 meets the required performance standard of 1.05 (WSDOT 2011).

For short-term stability of the dredged slope, the estimated factor of safety is 1.2 prior to shoreline containment placement.

1.1 General

Slope stability evaluations were performed with SLIDE6.0, a commonly used geotechnical engineering software program which uses a trial and error algorithm to determine the critical slip surface, which is the plane that represents the lowest factor of safety for a user-specified soil profile.

The lowest factor of safety determined from limit equilibrium modeling is compared to performance standards. Performance standards used in this appendix are based off of the WSDOT *Geotechnical Design Manual* and the U.S. Army Corps of Engineers (USACE) Slope Stability Guide (USACE 2003). For general analysis of permanent slopes involving cuts and fills not adjacent to structures, a minimum factor of safety of 1.3 is appropriate. For seismic analysis, the minimum required factor of safety is 1.05. For temporary cuts to embankments not supporting structures, the safety of workers is the primary concern. Therefore, a safety factor of approximately 1:1 should be met.

1.2 Inputs

Geologic cross sections were interpreted using on-site boring logs, and supplemented by geotechnical data from nearby sites. Soil parameters for the model were determined using boring log data, which included soil observations and classifications, Standard Penetration Resistance, and laboratory results when available. Using empirically published correlations and available geotechnical data, Table 1 summarizes the input parameters for the stability evaluation. Figure 1 presents the generalized soil profile.

EMJ015142

Table 1
Summary of SLIDE Input Parameters

Soil Layer	Unit Weight (pcf)	Saturated Unit Weight (pcf)	Friction Angle (Degrees)
1 - Loose Sand - SP	115	118	30
2 - Fill, cobbles, sand	124	137	35
3 - Dense Sand - SP	121	122	42
4 - Very Loose Sand - SM	115	118	28
5 - Shoreline Containment Material	125	130	36
6 - Loose Sand Backfill	115	116	28

Notes:
pcf = per cubic foot
SM = Silty sand
SP = Poorly graded sand

Slope stability was evaluated where deposits of loose soils were present, and where existing grades were steepest. This is represented by the cross section presented in Figure 1. The steepest portion of this slope is approximately 1H:1V (Horizontal to Vertical), approximately 10feet high, and in an over-steepened condition, as indicated by observed erosion. Below the over-steepened portion, the slope is flatter than 1.5H:1V, eventually flattening to approximately 6H:1V near the channel. The underlying loose sand layer is approximately 12 feet thick and extends to the proposed toe of the designed shoreline containment slope.

Consistent with the slope stability evaluations provided by others in Appendix E of the Slip 4 Early Action 100% Design Submittal (Integral 2007):

- Slope stability evaluations were performed using Spencer's Method of Slices.
- The minimum critical failure depth was set to 5 feet.
- Longer–term slope stability evaluations were performed considering a low tide of 0 mean lower low water (MLLW) and a high tide of 12 MLLW.

EMJ015143

1.3 Results

1.3.1 Existing Conditions

Slope stability modeling indicated that the minimum factor of safety of the existing slope is near 1.0. The critical slip surface shown on Figure 2 occurs in the over-steepened portion of the slope.

Inspection of the contours presented in Figure 2shows that at a distance of 15 feet from the crest of the slope, the factor of safety is greater than 1.5. This indicates that deformations would likely be limited to shallow slope failures, and is consistent with observations at the site.

1.3.2 Post-dredge Temporary Slope

The short-term stability of the temporary post-dredge slope was evaluated assuming a 2H:1V cut back slope, and a dredge cut consistent with the proposed remedial design. Figure 3 indicates a minimum factor of safety of 1.2 for the temporary construction slope. As shown in Figure 3, the critical surface occurs in the underlying loose sandy layer.

1.3.3 Post-shoreline Containment

Consistent with the proposed design, long-term stability of the slope was evaluated assuming a 4-foot-thick shoreline containment placed on the slope after excavation of the existing soils. Stability analyses shown in Figure 4 indicate a minimum factor of safety of 1.5.

1.3.4 Seismic

Consistent with the work of others (Integral 2007), a peak ground acceleration (PGA) of 0.15 g (acceleration due to gravity) is anticipated to represent the ground motion experienced during a 100-year earthquake. The resultant horizontal earthquake loading coefficient of 0.075g was chosen to represent the acceleration that the soil mass will respond to. The acceleration is then multiplied by the weight of the mobilized soil layers to estimate the de-stabilizing force of the earthquake. As shown in Figure 5, the minimum factor of safety for the seismic condition is 1.1.

EMJ015144

1.4 Liquefaction Potential

Soil conditions and densities were evaluated to determine the likelihood of liquefaction during a design-level seismic event. The potential for liquefaction was evaluated for the design level of seismic activity, with a recurrence interval of roughly 100 years, a peak ground acceleration of 0.15g, and a magnitude of 6.5. Factors of safety were computed based on SPT blow counts, percent fines, and depth of layers using the method of Seed et al. (1985).

Our analysis indicates that during a design level event, the loose sand layer presented in Figure 1 would be susceptible to liquefaction.

EMJ015145

2 CONCLUSIONS

Table 2 summarizes the factors of safety and performance standards for each loading condition. The proposed design meets the required short-term and long-term performance standards, and will likely improve the stability of the bank by flatting the slopes, and increasing the strength of the surface soils by construction of a shoreline containment layer which has a higher strength than current sandy layer.

While the factor of safety for the temporary construction slope is low, the overall stability of the embankment should be improved from the existing condition. The temporary construction slope stability evaluation assumes that the entire slope will be dredged prior to slope containment, and that the exposed surface will be the loose sand unit. If shallow slope failures occur during dredging, excavation of smaller sections of the slope and immediately placing shoreline containment will improve temporary slope stability.

Table 2
Summary of Minimum Factors of Safety and Performance Criteria

Scenario	Loading Condition (Long-term or Short-term)	Factor of Safety	Performance Standard
Existing Conditions	Long-term	1	Not Applicable
Post-dredge, Temporary Construction	Short-term	1.2	1.2
Post-shoreline Containment	Long-term	1.5	1.3
Seismic	Short-term	1.1	1.05

EMJ015146

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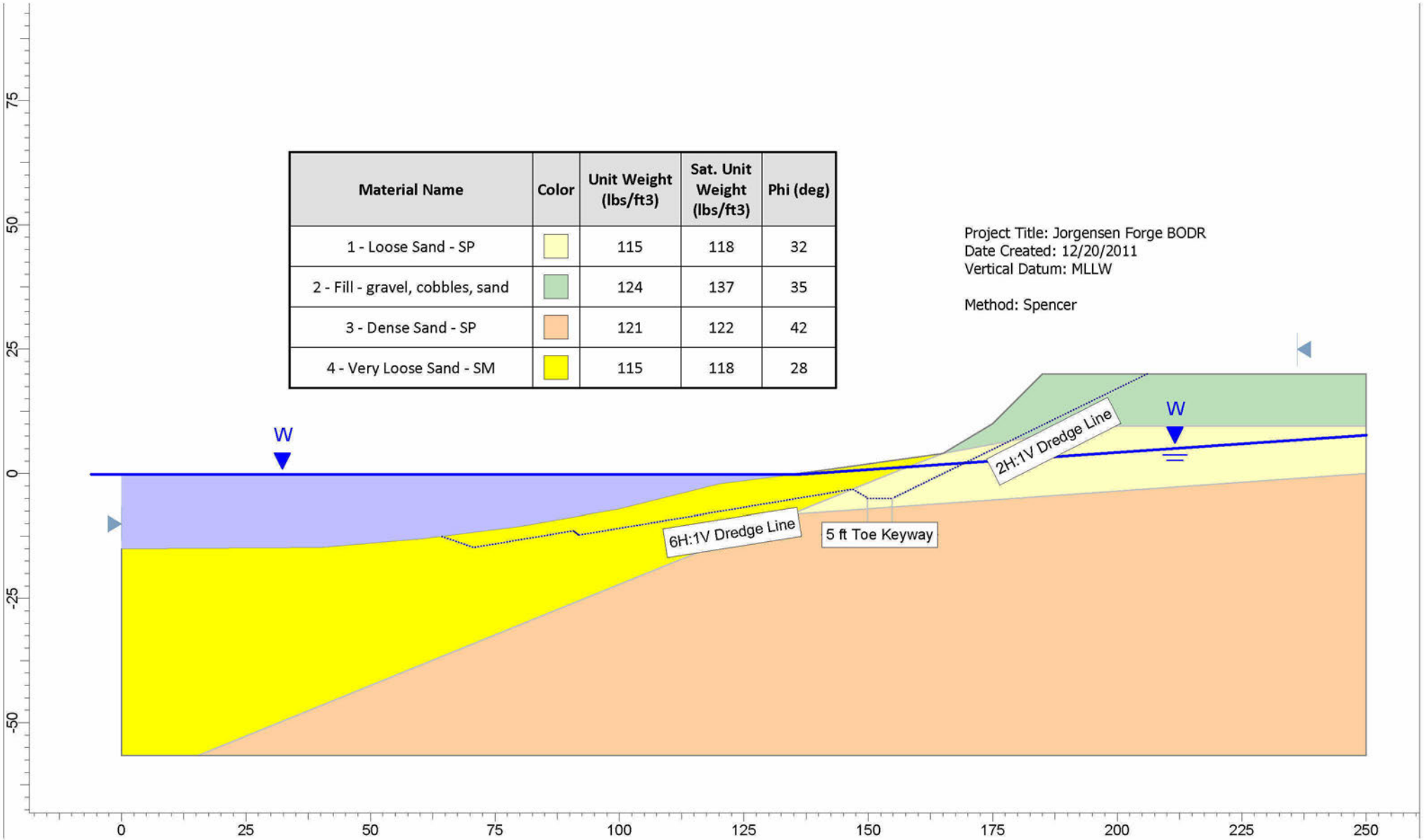
EMJ015147

FIGURES

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Phi (deg)
1 - Loose Sand - SP		115	118	32
2 - Fill - gravel, cobbles, sand		124	137	35
3 - Dense Sand - SP		121	122	42
4 - Very Loose Sand - SM		115	118	28

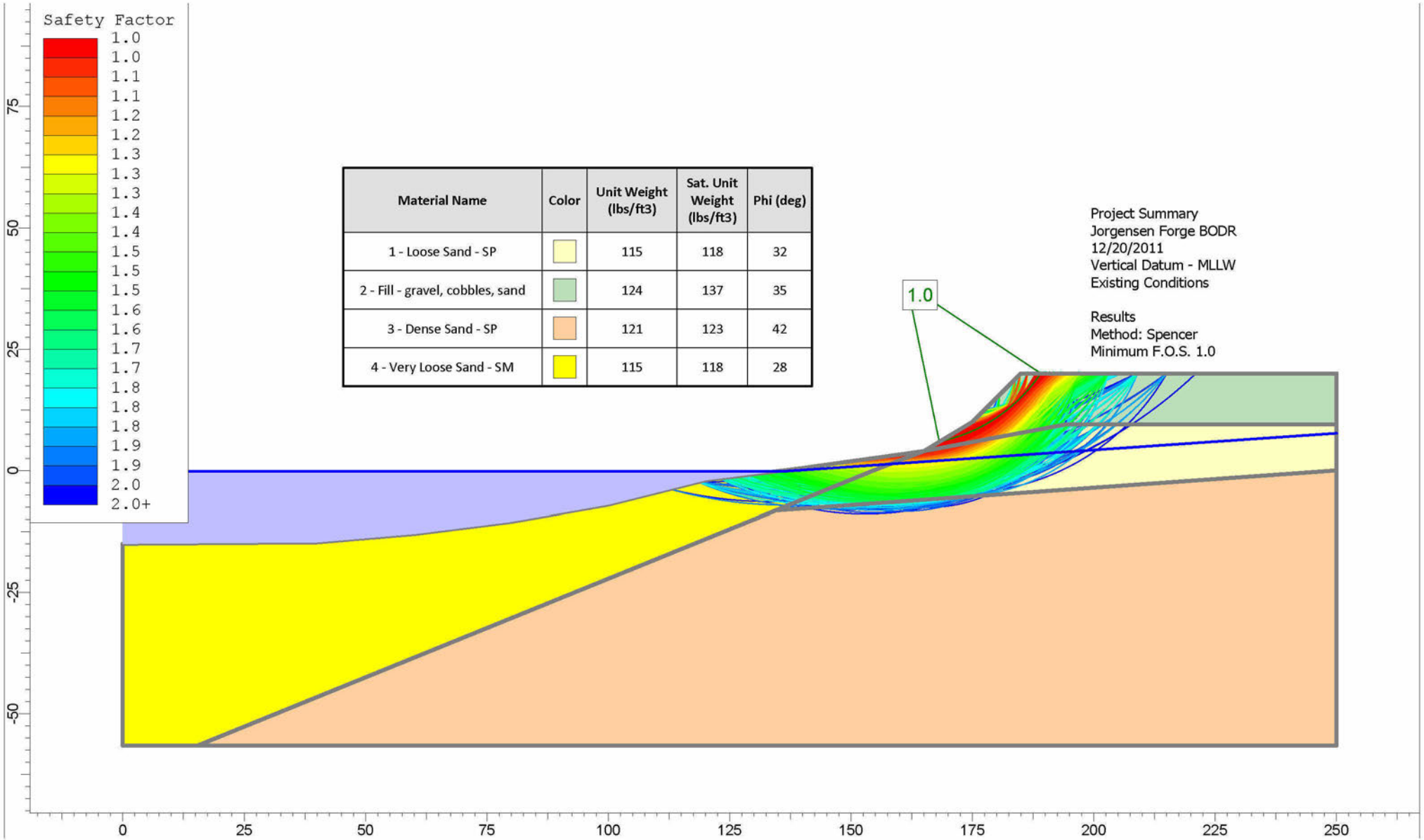
Project Title: Jorgensen Forge BODR
Date Created: 12/20/2011
Vertical Datum: MLLW

Method: Spencer



ANCHOR QEA

Figure 1
Existing Conditions
Slope Stability Analysis
Jorgensen Forge Facility



Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Phi (deg)
1 - Loose Sand - SP		115	118	32
2 - Fill - gravel, cobbles, sand		124	137	35
3 - Dense Sand - SP		121	123	42
4 - Very Loose Sand - SM		115	118	28

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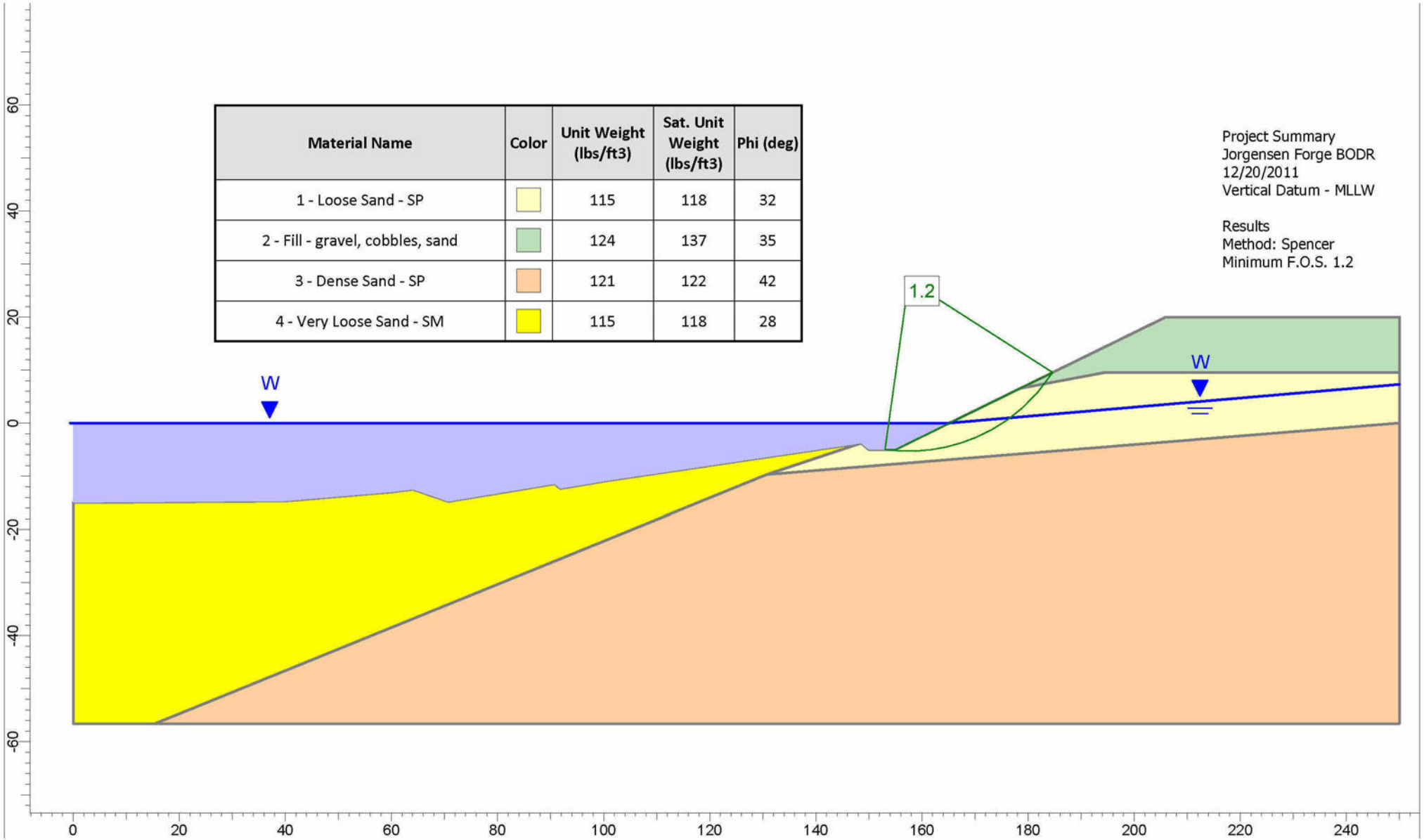
Figure 2
Geologic Cross Section and Existing Conditions
Slope Stability Analysis
Jorgensen Forge Facility



Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Phi (deg)
1 - Loose Sand - SP		115	118	32
2 - Fill - gravel, cobbles, sand		124	137	35
3 - Dense Sand - SP		121	122	42
4 - Very Loose Sand - SM		115	118	28

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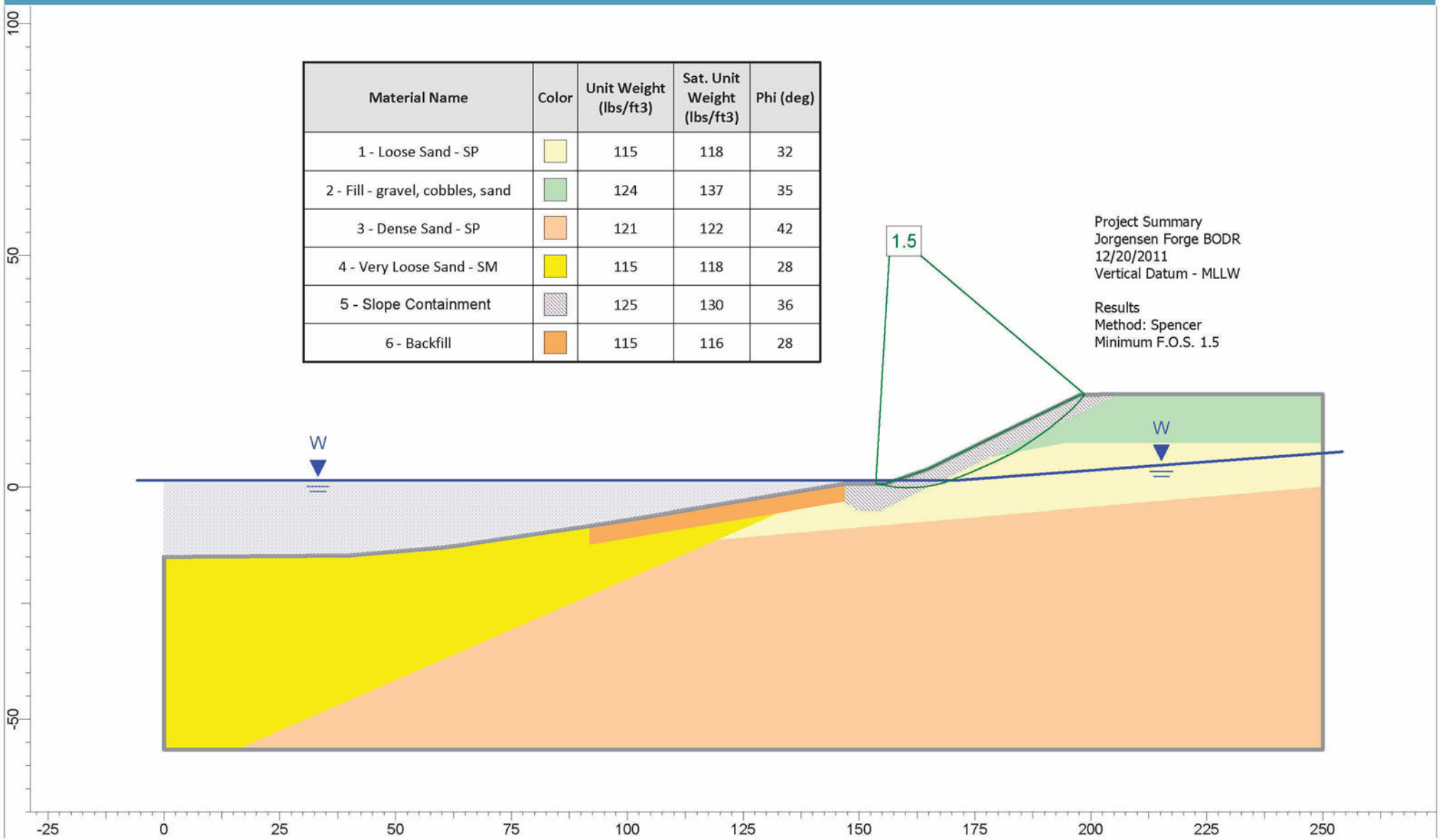
Figure 3
Post-dredge Temporary Slope
Slope Stability Analysis
Jorgensen Forge Facility



Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Phi (deg)
1 - Loose Sand - SP		115	118	32
2 - Fill - gravel, cobbles, sand		124	137	35
3 - Dense Sand - SP		121	122	42
4 - Very Loose Sand - SM		115	118	28
5 - Slope Containment		125	130	36
6 - Backfill		115	116	28

ANCHOR QEA

Figure 4
Post Slope Containment : Long Term
Slope Stability Analysis
Jorgensen Forge Facility

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Phi (deg)
1 - Loose Sand - SP		115	118	32
2 - Fill - gravel, cobbles, sand		124	137	35
3 - Dense Sand - SP		121	122	42
4 - Very Loose Sand - SM		115	118	30
5 - Slope Containment		125	130	36
6 - Backfill		115	116	28

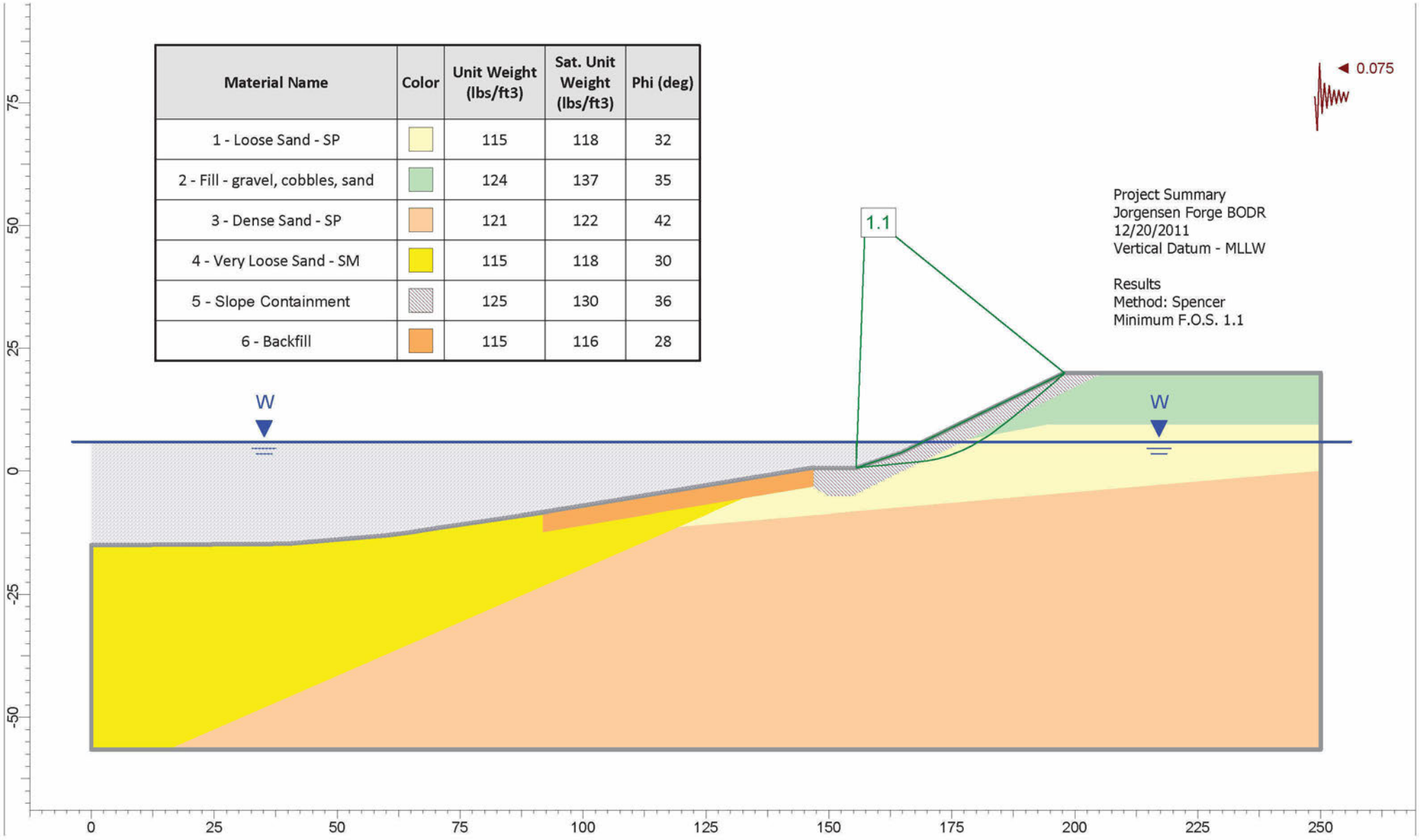


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Figure 5
Post Slope Containment : Seismic
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Jorgensen Forge Facility

APPENDIX D
CONSTRUCTION QUALITY ASSURANCE PLAN

APPENDIX D
CONSTRUCTION QUALITY ASSURANCE PLAN
BASIS OF DESIGN REPORT
JORGENSEN FORGE EARLY ACTION AREA

Prepared for

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March 2013

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LIST OF ACRONYMS AND ABBREVIATIONS

Action Memo	Action Memorandum for a Non-Time-Critical Removal Action at the Jorgensen Forge Early Action Area of the Lower Duwamish Waterway Superfund Site in Seattle, Washington
Anchor QEA	Anchor QEA, LLC
ARAR	applicable or relevant and appropriate requirement
AOC	Administrative Order on Consent
BODR	Basis of Design Report
Boeing	The Boeing Company
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CHASP	Construction Health and Safety Plan
CIH	Certified Industrial Hygienist
cm	centimeters
CMP	corrugated metal pipes
COC	chemicals of concern
CQA	construction quality assurance
CQAP	Construction Quality Assurance Plan
CQAO	Construction Quality Assurance Officer
CQC	construction quality control
cy	cubic yards
DMU	dredge management unit
DSOA	Duwamish Sediment Other Area
DTM	Digital Terrain Model
EAA	Early Action Area
Ecology	Washington State Department of Ecology
EE/CA	Engineering Evaluation/Cost Analysis
EMJ	Earle M. Jorgensen Company
EPA	U.S. Environmental Protection Agency
EPP	Environmental Protection Plan
Facility	Jorgensen Forge facility
FSP	Field Sampling Plan

EMJ015159

Jorgensen Forge	Jorgensen Forge Corporation
LDW	Lower Duwamish Waterway
MHHW	Mean higher high water
MLLW	Mean lower low water
NTCRA	non-time-critical removal action
OMMP	Operations, Maintenance, and Monitoring Plan
Owner	EMJ and Jorgensen Forge
PCB	polychlorinated biphenyl
PPE	personal protective equipment
QAPP	Quality Assurance and Protection Plan
RAB	Removal action boundary
RACR	Removal Action Completion Report
RAO	Removal Action Objectives
RAWP	Removal Action Work Plan
RCRA	Resource Conservation and Recovery Act
RTK GPS	Real Time Kinematic Global Positioning System
RvAL	removal action level
SOQ	Statement of Qualifications
SOW	Statement of Work
TOC	Total organic carbon
WQMP	Water Quality Monitoring Plan

EMJ015160

1 INTRODUCTION

This Construction Quality Assurance Plan (CQAP) has been prepared on behalf of Earle M. Jorgensen Company (EMJ) and Jorgensen Forge Corporation (Jorgensen Forge; herein referred to collectively as the Owner) pursuant to the Administrative Settlement Agreement and Order on Consent for Removal Action Implementation (AOC; U.S. Environmental Protection Agency [EPA] Region 10 Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] Docket No. 10-2013-0032) and attached Statement of Work (SOW). This CQAP is an appendix to the Basis of Design Report (BODR) Final Design submittal for the cleanup of contaminated sediments and associated bank soils in a portion of the Lower Duwamish Waterway (LDW) Superfund Site adjacent to the Jorgensen Forge facility (Facility) located in Tukwila, King County, Washington (see Figure 1 of the BODR; Jorgensen Forge Early Action Area [EAA]). Construction activities planned as part of the cleanup include in-water dredging and backfilling, shoreline bank excavation and armoring, and transport and off-site disposal of impacted sediments and soils. The cleanup will be conducted as a non-time-critical removal action (NTCRA) in accordance with EPA's selected cleanup alternative documented in the *Action Memorandum for a Non-Time-Critical Removal Action at the Jorgensen Forge Early Action Area of the Lower Duwamish Waterway Superfund Site in Seattle, Washington* (Action Memo; EPA 2011a) and detailed in the *Final Engineering Evaluation/Cost Analysis [EE/CA] – Jorgensen Forge Facility, 8531 East Marginal Way South, Seattle, Washington* (Anchor QEA 2011).

The purpose of the CQAP is to detail the sediment removal verification methods and the approach to quality assurance during construction activities within the removal action boundary (RAB), including compliance with applicable or relevant and appropriate requirements (ARARs). To accomplish this purpose, this document identifies the quality assurance program during implementation of the construction activities to ensure the activities are performed in accordance with the Final Design documents. Additionally, this CQAP describes the methods used to measure compliance with performance objectives.

As described in Section 1.1 of the BODR, The Boeing Company (Boeing) is conducting an interim corrective action under the Resource Conservation and Recovery Act (RCRA) adjacent to the Boeing Plant 2 Facility in the area immediately adjacent and downstream

from the RAB (Figure 1). In addition, Jorgensen Forge and Boeing are currently planning to perform a removal action under a Second Modification to the AOC with the EPA Office of Emergency Response that will include removal of inactive corrugated metal pipes (CMP) and underlying soils with polychlorinated biphenyls (PCBs) located in the northwest corner of the Jorgensen Forge property. This removal action will also be directly adjacent to the RAB shoreline reconfiguration. This CQAP incorporates the necessary information to support successful integration of these adjacent removal actions.

The remainder of this CQAP is organized into the following sections to address the document requirements detailed in the SOW:

- **Section 2 – Definitions and Use of Terms**: Defines terms relative to the Quality Management System, which includes both construction quality control (CQC) and construction quality assurance (CQA).
- **Section 3 – Project Organization and Responsibilities**: Presents the roles and responsibilities of the parties involved in the sediment remediation, including EPA and other agencies.
- **Section 4 – Contractor and Construction Quality Assurance Officer (CQAO) Qualifications**: Describes the qualifications and experience required for the Contractor and any selected subcontractors, as well as the qualifications of the CQAO and supporting inspection personnel.
- **Section 5 – Quality Assurance Program**: Describes the performance objectives and criteria, quality assurance measures, inspection and verification activities, and contingency actions for each construction activity.
- **Section 6 – Documentation and Reporting**: Describes the reporting requirements for CQA activities. These requirements include daily and weekly summary reports, inspection data sheets, problem identification and corrective measures reports, design acceptance reports, and final documentation. A description of the provisions for final storage of all records consistent with the requirements of the AOC is also included in this section.

EMJ015162

2 DEFINITIONS AND USE OF TERMS

CQC and CQA are defined as follows:

- CQC is the planned system of inspections and testing by the General Contractor's (Contractor's) team (or their subcontractors) to monitor and control the characteristics of an item, service, removal, or installation in relation to design requirements. The CQC activities provide for a collection of construction condition measurements.
- CQA is the planned and systematic means and actions that provide the Owner adequate confidence that materials, dredging and shoreline reconfiguration, backfill and armor layer placement, and transport and off-site disposal activities meet or exceed design criteria and requirements. The CQA activities provide for collection of mutual and independent third-party measurements of construction conditions, as well as review and confirmation of the quality of data collected as part of the CQC activities.

In the context of this document, CQC refers to the following:

- Those actions taken by the Contractor's team (or their subcontractors) to determine compliance of the various components of the dredging and shoreline reconfiguration, backfilling and armor layer placement, and transport and off-site disposal activities with the requirements of the approved design.

In the context of this document, CQA refers to the following:

- Means and actions employed by the Owner to independently assess conformity of the various components of the dredging and shoreline reconfiguration, backfilling and armor layer placement, and transport and off-site disposal activities with the requirements of the approved design.

EMJ015163

3 PROJECT ORGANIZATION AND RESPONSIBILITIES

The roles and responsibilities of the parties involved in the removal action activities are described below and presented in Figure 1.

3.1 U.S. Environmental Protection Agency and Other Agencies

EPA is the regulatory authority and is the responsible agency for overseeing and authorizing the removal action activities described herein. In this capacity, EPA will review information described in the attached BODR and Construction Specifications and Drawings, and this CQAP for consistency with the Removal Action Objectives (RAO), the AOC, and ARARs. The EPA Project Coordinator, or a designee, will exercise project oversight for EPA, coordinate comments developed by EPA and other agencies, and communicate agency observations with the Owner and the Project Engineer. The EPA Project Coordinator shall notify the Owner if they identify any concerns regarding the implementation of the removal action. The Owner, or a designated representative, will propose to EPA and the EPA Project Coordinator response measures or recommendations, as appropriate. The EPA, as appropriate, will make final decisions to resolve such issues or problems that may change the removal action scope.

EPA will work cooperatively with other government agencies, and other federal agencies, as necessary. The other agencies will continue to review documents and participate in decision making related to the removal action, as necessary and facilitated by EPA. Other agencies will provide their comments to the EPA Project Coordinator for communication to the Owner.

3.2 Owner

The Owner is ultimately responsible for implementing the removal action in accordance with the AOC and SOW. The Owner, or a designated representative, will implement the CQAP, review Contractor work products, and be the point of contact with EPA.

EMJ015164

3.3 Project Engineer

The Project Engineer is responsible for two main tasks. First, the Project Engineer is responsible for preparing the design of the removal action such that successful implementation of the design will result in achieving the AOC and construction activity-specific objectives and requirements.

Additionally, the Project Engineer will provide consultation and observations during construction to assist with implementation of the removal action in conformance with the EPA-approved design documents. During implementation of the removal action, potentially noncompliant construction activities will be referred to the Project Engineer. The Project Engineer is responsible for determining whether the allegedly noncompliant construction is acceptable within the design, unacceptable, or acceptable with a design modification. EPA will have final authority to approve design modifications proposed by the Project Engineer.

3.4 Construction Quality Assurance Officer

The CQAO will be responsible for overseeing the implementation of the CQAP. In overseeing implementation of the CQAP, the CQAO is responsible for monitoring construction performance for compliance with construction performance standards and design requirements during implementation of the removal action, and is responsible for overseeing the required inspection and verification activities. The CQAO will review documentation submitted by and work completed by the Contractor for adherence to performance standards and design requirements. The CQAO will be sufficiently familiar with the EPA-approved design documents and the construction operations to recognize deviations from those documents. The CQAO will also have the ability to manage and maintain the integrity of the data generated during implementation of the removal action.

The CQAO will be responsible for identifying those field conditions that may warrant deviation from the EPA-approved design documents. In such circumstances, the CQAO will coordinate with the EPA Project Coordinator to identify and agree upon any necessary deviations to meet the overall objectives of the design. Any agreed-upon deviations will be documented in the weekly progress reports to EPA.

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The CQAO may use inspectors with the requisite expertise and experience to help perform the duties described above.

3.5 General Contractor

The Contractor will be responsible for implementing the removal action by either performing tasks or contracting with subcontractors. The Contractor is responsible to ensure that the work complies with the requirements of the contract Construction Specifications and Drawings and provides all necessary quality control information.

As part of the removal action implementation, the Contractor will be responsible for developing and implementing the CQC Plan, including the required monitoring, sampling, testing, and reporting needed to implement the project in accordance with the Construction Specifications and Drawings. Independent of the Contractor's quality control program, Jorgensen Forge will implement this CQAP to verify that the removal action is implemented in accordance with the design. In accordance with implementing the removal action construction activities, the Contractor will oversee the development of an Environmental Protection Plan (EPP).

The Contractor will use key personnel to help with the tasks described above, including an on-site superintendent, CQC supervisor, and health and safety manager.

3.5.1 Contractor On-Site Superintendent

Direction of the work for the Contractor will be through an on-site Superintendent who will be responsible for executing the work in full compliance with the Construction Specifications and Drawings. The Superintendent will work to resolve work-related problems and day-to-day project management. The Superintendent may utilize one or more foremen to directly supervise the major construction activities. The Superintendent will exercise supervision over subcontractors, if subcontractors are utilized.

3.5.2 Contractor Construction Quality Control Manager

A CQC Manager will be provided by the Contractor as required in the Construction Specifications. The CQC Manager will develop and implement the CQC Plan through which

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the Contractor ensures compliance with the requirements of the Construction Specifications and Drawings. The CQC Plan will identify the duties and responsibilities assigned by the Contractor to the CQC Manager and additional inspectors, as needed to monitor that the removal action is implemented in accordance with the Construction Specifications and Drawings. The CQC Plan will state the chain of command for the CQC team, including identification of responsibilities for each member, to ensure that any actions related to the quality of work will be executed in an accurate and expeditious manner.

3.5.3 Contractor Health and Safety Manager

The Contractor will employ a Health and Safety Manager to develop and implement a Construction Health and Safety Plan (CHASP). The CHASP will contain details of the chain of command and personnel responsibilities, as discussed in the Construction Specifications. The Health and Safety Manager will be required to have the appropriate current federal and state health and safety training necessary to perform the work.

3.6 Subcontractors

The Contractor will either perform construction elements or contract with subcontractors to perform selected phases of the work for which they have special expertise. The subcontractors are responsible to the Contractor for the quality of their work, protection of the environment, CQC Plan, EPP, and CHASP. The subcontractors' principals will each designate a job foreman with responsibility to see that the work is conducted in accordance with the contract requirements and the Construction Specifications and Drawings.

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4 CONTRACTOR AND CONSTRUCTION QUALITY ASSURANCE OFFICER QUALIFICATIONS

Qualifications of the CQAO and supporting inspection personnel, including minimum training and experience that will be required, are provided below. Additionally, the qualifications required for the Contractor's firm and personnel are provided.

4.1 Project Manager

The Project Manager will have experience in managing environmental projects of a complexity and magnitude similar to or greater than the removal action project. The Project Manager will be thoroughly familiar with the AOC and SOW, applicable environmental laws, and the requirements of the EPA-approved design documents. The Project Manager will be supported by other personnel, such as an attorney and an engineer, assigned to the project.

4.2 CQAO and Inspector Qualifications

The CQAO will be determined prior to start of work. The CQAO will have an engineering degree and experience managing CERCLA-related construction projects with similar quality assurance requirements. The CQAO will be required to have the appropriate current federal and state health and safety training necessary to perform the work. Additionally, the CQAO will be sufficiently familiar with the EPA-approved design documents and the construction operations to recognize deviations from those documents and operations. The CQAO will also have the ability to manage and maintain the integrity of the data generated during the project. Additional inspectors may be used to help the CQAO. These inspectors will have experience inspecting construction activities for CERCLA-related projects and will have current federal and state health and safety training.

4.3 Contractor Qualifications

The Contractor will be selected through a competitive qualifications-based selection process. Each potential Contractor proposing on the project will be required to provide a Statement of Qualifications (SOQ) to the Owner with its proposal. This will allow the Owner to

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determine that the proposer is qualified, in terms of experience and capability, to perform the work.

The Contractor will employ (as part of its permanent organization) senior, knowledgeable, and experienced personnel to oversee the project. The journeyman operators, surveyors, and other Contractor personnel performing key jobs must also have the demonstrated ability and skills to satisfactorily perform their respective assignments.

The CQC Manager, and the Contractor as a whole, must have documented qualifications and experience to perform independent checks on the Contractor's operations as necessary to determine compliance with the Construction Specifications and Drawings. These documented qualifications will be submitted to the Owner for approval prior to identifying a CQC Manager. Additionally, any subcontractors utilized in the work must have demonstrated to the satisfaction of the Owner that they are qualified and have satisfactorily performed the type of work for which they will be engaged. However, responsibility for the subcontractor performance rests with the Contractor. All Contractor and subcontractor personnel working on this project will be required to have current federal and state health and safety training, as applicable to the work they will be doing on this project.

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5 QUALITY ASSURANCE PROGRAM

The quality assurance program to be implemented during the removal action is described in this section by construction activity. Specific construction activities to be implemented are described, along with specific performance objectives, performance criteria, quality assurance measures, inspection and verification activities, and contingency actions. Removal action construction elements subject to the quality assurance program include the following:

- Dredging and shoreline bank reconfiguration
- Backfill and armor layer placement

For each of these construction elements, inspection and verification activities will be implemented to confirm performance objectives have been met.

During the removal action, the quality assurance program will progress as follows:

- The Contractor will submit a CQC Plan as detailed in Section 6. The CQC Plan will be subject to Owner approval before removal action field work begins.
- The Contractor will provide documentation to the CQAO to demonstrate that specific components of the EPA-approved design documents have been properly implemented. The Owner, in consultation with the CQAO, will determine whether the components of the removal action are acceptable and complete.
- The Contractor and the CQAO will conduct inspection and verification activities (i.e., sampling, testing, and monitoring) to ensure compliance with the EPA-approved design documents and to ensure that performance objectives have been met. The Owner will have final approval authority for all such inspections and for verifying that corrective actions, if any are warranted, are implemented.

The remainder of this section details each construction element and associated performance objectives and criteria, along with quality assurance measures and specific inspection and verification activities that will be performed to confirm that performance objectives have been met. This section addresses two main construction elements: dredging and shoreline reconfiguration as well as backfill and shoreline armor placement. In addition, this section summarizes the following sediment and bank soil quality monitoring components:

- "Z-layer" sediment sampling to document the sediment quality conditions of the sediment bed below the removal elevations.
- "Z-layer" shoreline bank sampling to document the soil quality conditions of the shoreline bank soil below the excavation elevations.
- Pre- and post-remediation perimeter surface sediment sampling to assess potential construction-related releases from the RAB.

5.1 Dredging and Shoreline Bank Reconfiguration

This section describes the construction oversight activities, including CQC and CQA tasks, which will be undertaken to verify that dredging and shoreline reconfiguration within the RAB has been completed in accordance with the EPA-approved design documents.

5.1.1 Post-dredging and Shoreline Bank Reconfiguration Verification

This section presents post-dredging and shoreline reconfiguration verification plans and performance criteria that will be implemented to verify that the removal action has been completed to the horizontal and vertical extents required by the EPA-approved design documents. Verification of the completion of dredging and shoreline reconfiguration requirements will be performed on a "management unit" basis. A dredge management unit (DMU) is a dredging area within the RAB that will be used for assessing compliance with elevation targets and dredging thickness removal. The purpose of subdividing the RAB into DMUs is to facilitate continuous tracking of the dredging progress and for post-dredge verification purposes while actively dredging in the vicinity of a DMU. The number and orientation of DMUs will be determined in coordination with the contractor based on their means, methods, and construction sequencing. It is anticipated that the DMUs will generally align with the dredging "lanes" depicted on the dredge plan, RAB-specific conditions, and the overall thickness of materials to be removed.

The limits of dredging and shoreline reconfiguration were delineated based on sediment and soil sampling data presented in the BODR. Post-removal surveying will be performed to verify that the limits and extents of removal required by the BODR within a DMU have been achieved prior to placement of the required backfill or slope containment materials.

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As part of the CQC program, post-dredging bathymetric surveys will be performed by the Owner using a multi-beam fathometer. In areas where a survey vessel is unable to access, pole soundings or land-based conventional upland survey methods will be employed to supplement the data collection. Survey lines will be set at a 25-foot-grid spacing perpendicular and parallel to the dredge cut where practical. Pole sounding measurements will be taken at a maximum interval of 10 feet along each transect or at a noted break in grade. A Real Time Kinematic Global Positioning System (RTK GPS) will be used to determine the horizontal position of each shallow water survey measurement taken. The Owner will also process the survey data obtained to verify the target elevations have been achieved.

Daily and weekly dredging reports will be prepared to track cumulative volume progress as well as dredging production and coverage. In addition, weekly (during active construction) or monthly (during no active construction) progress reports will be prepared and submitted to EPA.

5.1.2 Post-dredging and Shoreline Bank Reconfiguration Completion Metrics

A three-dimensional surface (i.e., Digital Terrain Model [DTM]) of the DMU will be developed from the CQC survey. Dredging will be considered complete when post-dredging surveys confirm that the required dredge elevation has been achieved over 95 percent of the surface area of a given DMU, with the following additional requirements:

- "High spots" above the required elevations (i.e., up to 5 percent of the area) are relatively isolated (i.e., non-contiguous) and are not the result of intentional bias during implementation
- No more than 1 percent of a given DMU area has an elevation that exceeds the required elevation by greater than 0.5 feet
- None of the area will be permitted to exceed the required elevation by more than 2.0 feet

In the event that post-dredge surveying indicates that required dredge elevations have not been achieved in accordance with the compliance criteria, the Owner will have an option to perform additional post-dredge surveying to check the Contractor survey accuracy and/or

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forego additional surveying and perform additional dredging in previously identified non-compliant areas. A subsequent bathymetric survey will be performed and compliance will be reassessed following any additional dredging.

5.2 Backfill and Shoreline Bank Armor Placement

This section describes the construction oversight activities, including CQC and CQA tasks, which will be undertaken to verify that backfill and shoreline bank armor placement has been completed in accordance with the EPA-approved design documents. The CQC and CQA activities will verify that the materials placed are as specified in the Construction Specifications, that they are of the required thicknesses per DMU, and that design elevations have been met.

The backfill is designed to restore the in-water dredging areas to roughly pre-dredge mudline elevations. The shoreline armor materials will stabilize soils and sediments along the shoreline from erosive forces.

5.2.1 Material Verification

This section presents the measurements and analyses that will be performed to demonstrate that the materials used to meet the specifications required in the EPA-approved design documents.

The purpose of the CQA program is to verify that the imported materials conform to the design specifications. As part of the CQA program, the Owner will obtain an approximately 50-pound sample from each borrow source, composed of five subsamples, to confirm that the material gradations are in conformance with the specifications in the EPA-approved design documents. The Owner will perform desktop reviews of particle-size distribution curve submittals, laboratory chemical analysis results submittals, and siderite and carbon certification documentation provided by the manufacturers. The Owner will conduct on-site visual observations of materials on a periodic basis. The Owner will compare the chemical concentrations to the required backfill levels presented in the BODR and Construction Specifications and reject any materials that are above the backfill levels.

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5.2.2 Backfill Placement Verification

This section presents verification measurements that will be performed to demonstrate that the backfill material has been placed to the vertical and horizontal limits and extents required by the EPA-approved design documents. Similar to the sediment dredging, verification of the completion of the materials placement will be performed on a "management unit" basis. The number and orientation of DMUs will be determined in coordination with the contractor based on their means, methods, and construction sequencing. It is anticipated that the DMUs will generally align with the dredging "lanes" depicted on the dredge plan, RAB-specific conditions, and the overall thickness of backfill materials to be placed.

After dredging is completed in a DMU, interim backfill material will be placed over the dredged surfaces as soon as possible after dredging is accepted as complete and subject to z-layer sampling (if applicable for a particular DMU as described in Section 5.3.1.1). The 6-inch layer of backfill will be verified using electronic data gathered by the positioning system on backfill placement equipment and field observation of material placement.

For the final backfill layer placement, the CQC and CQA programs involve measuring the thickness of the layer placement to verify that the required thickness has been achieved by surveying the post-backfill surface elevation and comparing that to the post-dredge surface elevation. Additionally, the survey will verify that final target elevations have been met.

Once the backfill material has been placed, post-placement verification surveys will be performed by the Owner using the same surveying methods and spacing described in Section 5.1.1.

As discussed in Section 6, daily and weekly reports will be prepared by the Owner to track cumulative volume placed as well as production and coverage. In accordance with the AOC, weekly (during active construction) or monthly (during no active construction) progress reports will be prepared and submitted to EPA.

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5.2.3 Shoreline Bank Armor Layers Placement Verification

This section presents verification measurements that will be performed to demonstrate that the shoreline armor layers have been placed to the vertical and horizontal limits and extents required by the EPA-approved design documents.

As part of the CQC program, the Owner will confirm that the installation of the shoreline armor layers is in compliance with the design requirements. The armor layers range in material type from sand or fine gravel for the filter layer to riprap for the upper layer.

Post-placement verification surveys will be performed by an independent surveyor using the same surveying methods and spacing described in Section 5.1.1 for the filter layer and riprap layer. The habitat substrate layer will be verified using electronic bucket placement verification, visual observation, and spot layer thickness measurements. The post-placement verification surveys will be used in conjunction with layer thickness measurements to document that the required minimum thickness of the filter material (1.5 feet), riprap material (2.5 feet) and habitat substrate (nominal 6 inches) has been achieved.

As discussed in Section 6, daily and weekly reports will be prepared by the Owner to track cumulative volume placed as well as production and coverage. In accordance with the AOC, weekly (during active construction) or monthly (during no active construction) progress reports will be prepared and submitted to EPA.

5.3 Construction Monitoring Sediment and Bank Soil Sampling

This section presents the sampling approach and analysis that will be performed as part of the post-dredge sampling to document that the final post-dredge surface ("z-layer") chemical concentrations are not significantly greater than the total PCB removal action level (RvAL), as well as post-excavation bank sampling to document the nature of the material below the shoreline bank armor layers. In addition, this section presents the sampling approach and analysis that will be performed as part of the perimeter surface sediment monitoring to assess potential construction-related releases from the RAB.

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5.3.1 Sampling Objectives and Approach

5.3.1.1 Post-dredge Sediment Z-layer Monitoring

As described in Section 1.3.2 of the Final EE/CA (Anchor QEA 2011), EPA communicated in a meeting on January 27, 2011 that although the EPA-approved removal action alternative includes the removal of the full horizontal and vertical extent of total PCB RvAL exceedances in the RAB and existing data is sufficient to document the sediment quality below these exceedances, EPA will require collection and analysis of the post-dredge surface sediment z-layer samples to fulfill the Washington State Department of Ecology's (Ecology's) request for this information. The z-layer is defined as the 0- to 1-foot interval below the post-dredge surface elevation, prior to backfill placement.

To confirm the post-dredge sediment z-layer chemical concentrations, six sub-surface sediment cores will be collected within the in-water portion of the RAB as shown in Figure 2. Additional material below the 0- to 1-foot sample interval may be archived by the Owner for potential future data evaluation needs. As described in Section 5.4.3.1, sediment z-layer sample collection will be attempted prior to backfill placement, if possible. If backfill has been placed prior to z-layer sample collection, core samples will be collected through the backfill to facilitate sampling of the 0- to 1-foot z-layer below the backfill material.

EPA has acknowledged that the removal action activities may result in a thin layer of sediments with residual total PCB concentrations deposited on the final post-dredge surface. Because of this acknowledgement, coupled with the extensive surface and subsurface data collected within the RAB, EPA approved (EPA 2011b) the Final EE/CA (Anchor QEA 2011) condition that the results of any post-dredge sampling and analysis would not trigger any further remedial actions unless the area weighted concentrations in the RAB are greater than 20 times the RvAL or 240 milligrams per kilogram normalized for organic carbon. In this situation, further evaluation would be required and these data would be used to document that the surface backfill concentrations in this area(s) remain protective of human health and the environment based on the surface weighted average concentrations in the RAB.

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5.3.1.2 Post-excavation Shoreline Bank Z-layer Monitoring

Post-excavation z-layer shoreline bank samples will be collected from the 0- to 1-foot interval to document the nature of the shoreline material beneath the backfill area. A total of six samples will be collected between the mean higher high water (MHHW) elevation (11 feet mean lower low water [MLLW]) and the top of bank (approximately 19 to 20 feet MLLW) as shown on Figure 2. In accordance with Comment No. 2 in a letter from EPA dated January 22, 2013, "sample results will not compel future remediation events under the existing AOC." The shoreline bank z-layer samples will be collected prior to shoreline bank armor placement.

5.3.1.3 Perimeter Surface Sediment Monitoring

Pre- and post-construction perimeter surface sediment samples will be collected to evaluate whether there are significant increases in concentrations of chemicals of concern (COCs) in surface sediments adjacent to the RAB relative to their pre-remediation concentrations due to releases from the construction activities. Consistent with Ecology Sediment Management Standards (SMS), the depth for the surface sediment samples will be the top 10 centimeters (cm) below mudline.

To better assess the potential contributions from removal action construction releases versus off-site sources, samples will be collected in an area directly adjacent to the RAB as well as an upstream area outside the influence of the construction, as shown on Figure 3. A total of six discrete samples will be collected from each of these areas and submitted for chemical analysis as described in Section 5.3.3.

Boeing Plant 2 Duwamish Sediment Other Area (DSOA) cleanup action is located directly downstream of the RAB. Active cleanup of the portion of the DSOA in the vicinity of the RAB is anticipated to begin expeditiously following completion of the removal action performed by the Owner. Boeing is expected to implement a separate perimeter monitoring plan to address potential releases from the DSOA removal activity as described in the Pre- and Post-Construction Perimeter Sediment Monitoring Plan (AMEC 2012). Therefore, no perimeter monitoring downstream of the RAB is proposed in this CQAP.

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Post-construction perimeter surface sediment sampling will be conducted concurrently with additional Year 0 surface sediment monitoring within the RAB as described in the Operations, Maintenance, and Monitoring Plan (OMMP; Appendix F to the BODR) and will serve as a baseline condition for future long-term monitoring.

5.3.2 Monitoring Methods, Locations, and Timing

A brief summary of the monitoring methods, locations, and timing is provided in the following subsections. Detailed procedures for subsurface and surface sediment and soil sampling are provided in the Field Sampling Plan (FSP) for this project (see Attachment 2 of Appendix I to the BODR). Detailed field and laboratory quality assurance and quality control criteria, including method specifications, detection limits, accuracy and precision requirements, are provided in the Quality Assurance Project Plan (QAPP) for this project (see Attachment 1 of Appendix I to the BODR).

5.3.2.1 Sampling Methods

5.3.2.1.1 Post-dredge Sediment Z-layer Monitoring

The post-dredge sediment z-layer samples will be collected from the 0- to 1-foot interval using a van Veen grab sampler or equivalent deployed from a winch line on a sampling vessel if the sampling is conducted prior to backfill placement. If the sampling is conducted following backfill placement, the subsurface (0- to 1-foot layer beneath the backfill) z-layer samples will be collected using a MudMole™ coring device or similar deployed from a winch line on a sampling vessel. Cores would be advanced to a minimum depth of 3 feet below the bottom of the backfill, or until refusal. Additional material deeper than the 0- to 1-foot interval may be archived for future data evaluation needs. A detailed summary of the sampling methods is provided in Attachment 2 of Appendix I in the BODR.

5.3.2.1.2 Post-excavation Shoreline Bank Z-layer Monitoring

The post-excavation shoreline bank z-layer samples will be collected from the 0- to 1-foot interval by hand-collection methods. If hand collection of samples is not possible due to debris or hard substrate, more robust sampling equipment will be used as necessary to collect the samples. All samples will be collected prior to shoreline armor layer placement.

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Additional material deeper than the 0- to 1-foot interval may be archived for future data evaluation needs. A detailed summary of the sampling methods is provided in Attachment 2 of Appendix I in the BODR.

5.3.2.1.3 Perimeter Surface Sediment Monitoring

Perimeter surface sediment monitoring samples will be collected using a van Veen grab sampler or equivalent deployed from a winch line on a sampling vessel. All grab samples will be collected from the top 10 cm of the sediments. A detailed summary of the sampling methods is provided in Attachment 2 of Appendix I in the BODR.

5.3.2.2 Sampling Locations

5.3.2.2.1 Post-dredge Sediment Z-layer Monitoring

The six proposed post-dredge sediment z-layer sample locations are shown in Figure 2. The locations are distributed to achieve spatial coverage and target areas with the highest surface and subsurface PCB concentrations (see Figure 7 of the BODR). The sample coordinates for each sediment core location are listed in Table 1.

5.3.2.2.2 Post-excavation Shoreline Bank Z-layer Monitoring

The six proposed post-excavation shoreline bank z-layer sample locations are shown in Figure 2. Soil sample locations are spatially distributed along the bank and in target areas with relatively high PCB concentrations shown on Figure 2. Bank soil sample location PEB-1 specifically documents the post-excavation material within the property line storm pipe outfall removal action described in Section 2.2.2.1 of the BODR. The samples will be collected between the MHHW elevation (11 feet MLLW) and the top of bank (approximately 19 to 20 feet MLLW) as shown on Figure 2. The sample coordinates for each bank sample are listed in Table 1. Actual sample locations may need to be adjusted as necessary to collect samples of the post-excavation material within the target elevation range.

5.3.2.2.3 Perimeter Surface Sediment Monitoring

The proposed perimeter surface sediment sample locations are shown on Figure 2. Surface sediment grab samples are systematically distributed within two different monitoring areas, including the adjacent Federal Navigation Channel area and one upstream area.

Six sediment grab samples will be collected from both the adjacent area and the upstream area. The 12 samples will be collected for the chemical analyses described in Section 5.3.3. The sample coordinates for each of the sediment grab sample locations are listed in Table 1.

5.3.3 Chemical Analytical Parameters

The post-dredge sediment z-layer samples (six samples) and the perimeter surface sediment monitoring samples (12 samples) will be submitted for analysis of the following parameters:

- Total PCB Aroclors
- Total organic carbon
- Metals (i.e., arsenic, cadmium, chromium, copper, lead, mercury, silver, and zinc)
- Total solids
- Grain size

As described in the EE/CA (Anchor QEA 2011), these COCs are consistent with the COCs identified within the RAB at elevated concentrations.

Post-excavation shoreline bank z-layer samples (six total samples) will be submitted for analysis of the full list of SMS analytes provided in Table 2.

5.3.4 Monitoring Timing

5.3.4.1 Post-dredge Sediment Z-layer Monitoring

Post-dredge sediment z-layer samples will be collected at the locations shown in Figure 2 after the completion of dredging and, if possible, prior to interim backfill placement (dependent on final construction sequencing). If the samples are collected prior to backfill placement, backfill material may be placed immediately following sampling (i.e., backfill placement is not affected by the z-layer analytical results).

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5.3.4.2 Post-excavation Shoreline Bank Z-layer Monitoring

Post-excavation bank monitoring samples will be collected at the locations shown in Figure 2 after completion of excavation and before placement of the shoreline bank armor layers.

5.3.4.3 Perimeter Surface Sediment Monitoring

Perimeter surface sediment monitoring will be performed both prior to the initiation of removal action construction activities as well as immediately following completion of the dredging and backfill placement activities. Pre-construction grab samples will be collected at the locations shown in Figure 3 prior to the start of any construction activities. Post-construction grab samples will be collected from the locations shown in Figure 3 as soon as possible after backfill placement to the final grade is complete.

Additional surface sediment monitoring of sediments adjacent to the RAB may be performed during active remediation contingent upon removal activity by other LDW parties, concurrent with construction.

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6 DOCUMENTATION AND REPORTING

Documentation and reporting for CQA activities will include pre-construction documentation, construction documentation, and post-construction documentation as detailed below. The Contractor and the CQAO will work closely on a daily basis during the removal action to complete the project as specified in the EPA-approved design documents and to collect the documentation required. The following sections describe documentation that will be required throughout the removal action.

6.1 Pre-Construction Documentation

The Contractor will be required to submit a Removal Action Work Plan (RAWP) for approval by the Owner and EPA. The RAWP will contain the following elements:

- Project Work Plan
- CQC Plan
- Construction Health and Safety Plan
- Construction Environmental Protection Plan (EPP)
- Project Construction Schedule
- Survey Control Plan
- Procedures for processing design changes and securing EPA review and approval of such changes to ensure changes are consistent with the objectives of the EPA-approved design documents
- Procedures for coordinating with EPA regarding compliance with EPA's Off-Site Rule, as applicable

EPA's approval authority for these plans is defined in the AOC. CQA and CQC procedures will be addressed in various elements of the RAWP. A brief description of the contents of each plan component of the RAWP is provided below.

6.1.1 Project Work Plan

The Project Work Plan will describe, in narrative form, the methods to be employed in the removal action including equipment types, modes of operation, schedules, sequence of activities, and other aspects necessary to describe how and when the specified work will be

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performed. The Project Work Plan will have specific sections detailing how the following elements will be completed:

- Dredging and shoreline reconfiguration
- Backfill and armor layer placement

The Project Work Plan will describe how each of the quality assurance measures and verification activities identified in Section 5 will be addressed in the field.

6.1.2 Construction Quality Control Plan

The CQC Plan will present the system through which the Contractor ensures that construction activities are being implemented in compliance with the requirements of the contract and specifically how each of the quality assurance measures and verification activities identified in Section 5 will be addressed in the field. The CQC Plan will identify personnel, procedures, methods, instructions, inspections, records, and forms to be used in the CQC system. Specifically, the CQC Plan will include a description of procedures for maintaining and updating daily activity logs, procedures for reporting out-of-spec conditions, recordkeeping procedures for personnel, equipment maintenance and calibration, and daily and weekly reporting requirements.

6.1.3 Construction Health and Safety Plan

The Contractor will submit its CHASP presenting the necessary health and safety requirements for job site activities, and the measures and procedures to be employed for protection of on-site personnel. The plan will cover the controls, work practices, personal protective equipment (PPE), and other health and safety requirements that will be implemented by the Contractor in connection with the removal action construction activities. The Contractor shall use personnel that are trained to maintain the necessary health and safety protocols for this type of cleanup work.

6.1.4 Construction Environmental Protection Plan

The Contractor will be required to submit an EPP describing the environmental protection measures and monitoring activities that will accompany all construction activities. The EPP

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will cover potential environmental releases as a result of the Contractor operations, as well as monitoring and corrective actions necessary to control such releases. The EPP will contain separate sections addressing contamination prevention, containment and cleanup, erosion and turbidity control, sound level control, air pollution and dust control, and water quality monitoring as they pertain to the pertinent construction activities described in Section 5.

6.1.5 Project Construction Schedule

A detailed Project Construction Schedule will be submitted by the Contractor for each construction element prior to construction. Periodic schedule updates will be submitted by the Contractor following progress meetings.

6.1.6 Survey Control Plan

The Contractor will submit a Survey Control Plan prior to construction. The plan will detail the specific procedures, equipment, and personnel to be used for all landside and in-water surveying work. The plan will also discuss the quality assurance and quality control measures to confirm surveying results.

6.2 Construction Documentation

During construction activities, the Contractor will be required to provide a variety of documentation to the CQAO, including testing results of materials received, weigh tickets for shipments of materials removed, survey results, and documentation of pay items completed. The Contractor will also maintain a daily log of activities, as described in Section 6.2.1. The CQAO will maintain a field report of daily activity and complete an internal weekly report. The contents of the report are described in Section 6.2.2. Weekly progress reports will be submitted to EPA. Additional documentation is described in Sections 6.2.3 through 6.2.6. The records described in this section will be maintained in the project files. Monitoring data will be provided electronically to EPA in the Removal Action Completion Report (RACR).

All final construction documentation will be stamped, as appropriate, by licensed professionals. If, during the course of construction, modification of the final stamped and approved design is required, modifications will be documented in writing and stamped by a

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licensed engineer. Undocumented modifications of the design or other deviations from the approved design will not be permitted. Construction surveys, including as-built surveys, will be documented on drawings using the same datum, unit, and scale as design drawings. Record drawings will allow for a direct visual assessment of the quality and completeness of construction.

6.2.1 Contractor's Daily Quality Control Report

During construction activities, the Contractor shall prepare a Daily Quality Control Report and submit it to the CQAO. The Contractor's daily report will record at a minimum:

- Identification of personnel on-site and appropriate professional certifications
- Activities completed
- Any changes to best management practices or environmental controls
- Materials delivered or used
- Equipment used
- Hours worked
- Materials dredged and disposed of off-site
- Debris removed and disposed of off-site
- Surveys completed
- Results of any quality control inspections, tests, or other monitoring activities
- On-site/ off-site loading facility activities
- Problems encountered and resolution of problems
- Any EPA-authorized deviations from the Final Design

The Daily Quality Control Reports will be sent to EPA on a weekly basis as part of the Weekly Summary Report as discussed in Section 6.2.3.

6.2.2 Construction Quality Assurance Officer's Daily Report

The CQAO will maintain a daily field log to record observations, measurements, inspections completed, data received, communications with other members of the project team or EPA, any water quality exceedances, additional environmental controls that were implemented, problems encountered, and resolutions. The daily field log will be supported by submittals received from the Contractor, such as survey results and weigh tickets, chain of custody

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forms for water quality monitoring samples collected, laboratory data received, inspection reports, and written communication from members of the project team or EPA. Water quality results will also be separately recorded and reported as defined in the Water Quality Monitoring Plan (WQMP; Appendix E of the BODR).

6.2.3 Weekly Summary Reports

The CQAO, in cooperation with the Contractor, will prepare weekly summaries of progress. These summaries will facilitate the preparation of the Weekly Summary Reports. The Weekly Summary Report will identify progress organized by activity:

- Dredging and Shoreline Reconfiguration
  - Area worked (supported by Contractor's log)
  - Volume of material removed (supported by Contractor's log)
  - Surveys completed (supported by Contractor's log)
  - Problems encountered
  - Corrective actions
- Backfill and Shoreline Armor Placement
  - Area worked (supported by Contractor's log)
  - Weight/volume of material placed
  - Problems encountered
  - Corrective actions
- Environmental Controls
  - Samples collected
  - Summary of analytical results
  - Problems encountered
  - Corrective actions

6.2.4 Weekly Construction Meetings

Weekly progress meetings will be coordinated with EPA and its partner agencies including pre-notification of time and place of meetings. Conference call access will be provided as needed and requested by those agencies and meeting minutes will be prepared and made available to attendees. As part of ongoing coordination efforts with Boeing, the Owner will

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determine if and when Boeing representatives should be invited to attend the weekly meetings.

6.2.5 Import Material Characterization

Prior to any on-site placement of import materials, the Contractor shall submit a Borrow Site Characterization Report to the CQAO. The characterization report will include identification of the source (including a map documenting the origin of the material), site inspection, and material sample and characterization (physical and chemical testing, as specified) to ensure that the import material will uniformly meet the chemical and physical specifications of its intended use.

6.2.6 Post-Construction Documentation

Within 90 days of EPA confirmation that all of the removal action requirements have been fulfilled (excluding long-term post-construction monitoring requirements), the Owner will submit a Draft RACR. The Draft RACR will contain the following information:

- Introduction
  - Site location
  - Environmental setting
  - Relevant operational history
  - Summary of previous investigations and actions
- Removal Action Background
  - Basis for the removal action (i.e., the AOC)
  - Context within overall LDW Superfund Site
  - RAOs
  - Summary of design basis
  - Summary of deviations from the design, if any
- Construction Activities
  - Description of dredging activities
  - Description of shoreline bank reconfiguration
  - Description of backfill and armor placement

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  - Description of transport, offloading and offsite disposal
  - Description of construction monitoring activities
  - Description of completion and demobilization

- Chronology of Events
  - Description of the timing of construction activities, identifying milestones with reference to a tabular summary of a more detailed construction timeline

- Performance Standards and CQC
  - Description of performance objectives and verification activities performed to confirm the removal action was implemented in accordance with the Construction Specifications and Drawings
  - Description of actual construction performance relative to performance objectives, including a summary of the results of CQA measurements and analyses
  - Description of contingency actions implemented, if any were necessary
  - Description of EPA's oversight activities
  - Summary of z-layer sampling and perimeter monitoring results
  - (Note: quality assurance for water quality monitoring analytical data will be included in the Final Water Quality Monitoring Report)

- Final Inspection and Certifications
  - Description of final inspections, including the scope of inspections and noting any deficiencies identified and corrective actions implemented
  - Summary of health and safety monitoring during the implementation of the removal action with notation of deviations or incidents, if applicable
  - Identification of any institutional or engineering controls that are implemented to maintain the integrity of the removal action, including identification of parties responsible for maintaining and enforcing controls
  - If applicable, summary of close out requirements for off-site offloading facility

- Operation and Maintenance Activities
  - Description of post-construction monitoring and maintenance requirements
  - Description of contingency measures that would be implemented if post-construction monitoring indicates such measures are warranted

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- Summary of Project Costs
  - Identification of the actual final costs incurred to comply with the provisions of the AOC
  - Identification of costs previously estimated for implementation of the removal action and an update of the cost estimate for post-construction monitoring and maintenance costs
- Observations and Lessons Learned
  - Identification of problems encountered, if any, in implementing the removal action and corrective actions
  - Identification of successes in implementing the removal action
  - Analysis of lessons learned that may be applied to future activities
- Removal Action Contact Information
  - Identification of individuals (contact names, addresses, and phone numbers) for design and remediation contractors, EPA oversight contractors, and key personnel at the Owner, EPA, and other agencies

The RACR will also include copies of as-built drawings, summaries of waste disposal and analytical results, the Final Water Quality Monitoring Report, and the certification statement required by the AOC.

If applicable, the Owner will submit a Final RACR within 60 day of receipt of EPA comments on the Draft RACR.

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7 REFERENCES

AMEC, 2012. *Pre- and Post-Construction Perimeter Sediment Monitoring Plan. Duwamish Sediment Other Area and Southwest Bank Corrective Measure and Habitat Project, Boeing Plant 2, Seattle/Tukwila, Washington*. May 2012.

Anchor QEA, 2011. *Final Engineering Evaluation/Cost Analysis – Jorgensen Forge Facility, 8531 East Marginal Way South, Seattle, Washington*. Prepared for the U.S. Environmental Protection Agency. March 2011.

EPA (U.S. Environmental Protection Agency), 2011a. Action Memorandum for a Non-Time-Critical Removal Action at the Jorgensen Forge Early Action Area of the Lower Duwamish Waterway Superfund Site in Seattle, Washington. Seattle, Washington.

EPA, 2011b. Letter from Shawn Blocker, EPA, to Gil Leon and Peter Jewitt. Re: Conditional Approval with Modifications of the Final Engineering Evaluation/Cost Analysis, Jorgensen Forge Facility, 8531 E. Marginal Way South, Seattle, Washington, Comprehensive Environmental Response, Compensation, and Liability Act Administrative Order On Consent (EPA Docket No. CERCLA-10-2003-01). September 29, 2011.

EPA, 2013. Letter from Rebecca Chu, EPA, to Gil Leon and Peter Jewitt. Re: Comments on the Draft Basis of Design Report, Jorgensen Forge Early Action Area, November 2012. January 22, 2013.

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TABLES

Table 1
Sediment Sampling Station Coordinates

Sediment Monitoring Area		Station ID	Northing	Easting
Post-Dredge Z-Layer Monitoring		PDS-1	1275835.7	195628.2
		PDS-2	1275850.7	195510.5
		PDS-3	1275895.3	195460.8
		PDS-4	1275867.2	195315.2
		PDS-5	1275947.9	195369.4
		PDS-6	1275929.0	195180.7
Post Excavation Bank A-Layer Monitoring		PEB-1	1275796.0	195785.1
		PEB-2	1275831.7	195730.0
		PEB-3	1275863.1	195679.0
		PEB-4	1275905.8	195567.9
		PEB-5	1275947.2	195461.6
		PEB-6	1275977.2	195385.6
Perimeter Surface Sediment Monitoring	Upstream	PMU-1	1275966.1	195048.1
		PMU-2	1276023.2	195050.7
		PMU-3	1276036.5	194766.3
		PMU-4	1276116.1	194768.4
		PMU-5	1276136.4	194395.6
		PMU-6	1276219.3	194412.7
	Navigation Channel	PMN-1	1275774.8	195556.9
		PMN-2	1275826.8	195386.5
		PMN-3	1275860.4	195216.3
		PMN-4	1275852.9	195070.9
		PMN-5	1275941.8	194756.9
		PMN-6	1276033.0	194371.4

Note:

Horizontal Datum: WA SP NAD 83, North Zone, U.S. Feet

Table 2
Sediment Management Standards List of Analytes

Parameter	Analytical Method	Units	Ecology 2003 Freshwater Criteria[d]		Sediment Management Standards Criteria[d]		SAPA Recommended Practical Quantitation Limit (PQL)[b]	Laboratory PQL
			LAET	2LAET	Sediment Quality Standards	Cleanup Screening Level		
Conventional Parameters								
Grain size	PSEP, 1986	%	--	--	--	--	1	1.0
Total solids	PSEP, 1986	% wet wt	--	--	--	--	0.1	0.01
Total organic carbon (TOC)	PSEP, 1986	% dry wt	--	--	--	--	0.1	0.05
Total sulfides	PSEP, 1986	% dry wt	--	--	--	--	10	1.0
Ammonia	Plumb, 1981	mg-N/kg dry wt	--	--	--	--	100	1.0
Metals								
Arsenic	6010B/6020	mg/kg dry wt	31.4	50.9	57	93	19	0.2
Cadmium	6010B/6020	mg/kg dry wt	2.39	2.9	5.1	6.7	1.7	0.2
Chromium	6010B/6020	mg/kg dry wt	95	133	260	270	87	0.5
Copper	6010B/6020	mg/kg dry wt	619	829	390	390	130	0.5
Lead	6010B/6020	mg/kg dry wt	335	431	450	530	150	0.2
Mercury	7471A	mg/kg dry wt	0.8	3.04	0.41	0.59	0.14	0.025
Silver	6010B/6020	mg/kg dry wt	0.545	3.5	6.1	6.1	2	0.2
Zinc	6010B/6020	mg/kg dry wt	683	1080	410	960	137	4.0
SVOCs								
PAHs								
Total LPAH	8270D	µg/kg dry wt	6,590	9,200	370 mg/kg OC	780 mg/kg OC	--	--
Naphthalene	8270D	µg/kg dry wt	529	1,310	99 mg/kg OC	170 mg/kg OC	700	20
Acenaphthylene	8270D	µg/kg dry wt	470	640	66 mg/kg OC	66 mg/kg OC	433	20
Acenaphthene	8270D	µg/kg dry wt	1,060	1,320	16 mg/kg OC	57 mg/kg OC	167	20
Fluorene	8270D	µg/kg dry wt	1,070	3,850	23 mg/kg OC	79 mg/kg OC	180	20
Phenanthrene	8270D	µg/kg dry wt	6,100	7,570	100 mg/kg OC	480 mg/kg OC	500	20
Anthracene	8270D	µg/kg dry wt	1,230	1,580	220 mg/kg OC	1,200 mg/kg OC	320	20
2-Methylnaphthalene[a]	8270D	µg/kg dry wt	469	555	38 mg/kg OC	64 mg/kg OC	223	20
Total HPAHs	8270D	µg/kg dry wt	31,640	54,800	960 mg/kg OC	5,300 mg/kg OC	--	--
Fluoranthene	8270D	µg/kg dry wt	11,100	15,000	160 mg/kg OC	1,200 mg/kg OC	567	20
Pyrene	8270D	µg/kg dry wt	8,790	16,000	1,000 mg/kg OC	1,400 mg/kg OC	867	20
Benzo(a)anthracene	8270D	µg/kg dry wt	4,260	5,800	110 mg/kg OC	270 mg/kg OC	433	20
Chrysene	8270D	µg/kg dry wt	5,940	6,400	110 mg/kg OC	460 mg/kg OC	467	20
Total benzo(b+k)fluoranthenes	8270D	µg/kg dry wt	11,000	13,800	230 mg/kg OC	450 mg/kg OC	1,067	20
Benzo(a)pyrene	8270D	µg/kg dry wt	3,300	4,810	99 mg/kg OC	210 mg/kg OC	533	20
Indeno(1,2,3-cd)pyrene	8270D	µg/kg dry wt	4,120	5,300	34 mg/kg OC	88 mg/kg OC	200	20
Dibenz(a,h)anthracene	8270D	µg/kg dry wt	800	839	12 mg/kg OC	33 mg/kg OC	77	20
Benzo(g,h,i)perylene	8270D	µg/kg dry wt	4,020	5,200	31 mg/kg OC	78 mg/kg OC	223	20
Chlorinated Benzenes								
1,2-Dichlorobenzene	8260C	µg/kg dry wt	--	--	2.3 mg/kg OC	2.3 mg/kg OC	35	1.0
1,4-Dichlorobenzene	8260C	µg/kg dry wt	--	--	3.1 mg/kg OC	9 mg/kg OC	37	1.0
1,2,4-Trichlorobenzene	8260C	µg/kg dry wt	--	--	0.81 mg/kg OC	1.8 mg/kg OC	31	5.0
Hexachlorobenzene	8081A	µg/kg dry wt	--	--	0.38 mg/kg OC	2.3 mg/kg OC	22	1.0
Phthalates								
Dimethyl phthalate	8270D	µg/kg dry wt	311	436	53 mg/kg OC	53 mg/kg OC	24	20
Diethyl phthalate	8270D	µg/kg dry wt	--	--	61 mg/kg OC	110 mg/kg OC	67	20
Di-n-butyl phthalate	8270D	µg/kg dry wt	103	--	220 mg/kg OC	1,700 mg/kg OC	467	20
Butyl benzyl phthalate	8270D	µg/kg dry wt	260	366	4.9 mg/kg OC	64 mg/kg OC	21	20
Bis(2-ethylhexyl) phthalate	8270D	µg/kg dry wt	2,520	6,380	47 mg/kg OC	78 mg/kg OC	433	20
Di-n-octyl phthalate	8270D	µg/kg dry wt	11	201	58 mg/kg OC	4,500 mg/kg OC	2,067	20
Miscellaneous Extractables								
Dibenzofuran	8270D	µg/kg dry wt	399	443	15 mg/kg OC	58 mg/kg OC	180	20
Hexachlorobutadiene	8081A	µg/kg dry wt	--	--	3.9 mg/kg OC	6.2 mg/kg OC	11	1.0
N-Nitrosodiphenylamine	8270D	µg/kg dry wt	--	--	11 mg/kg OC	11 mg/kg OC	28	20
Ionizable Organic Compounds								
Phenol	8270D	µg/kg dry wt	--	--	420	1,200	140	20
2-Methylphenol	8270D	µg/kg dry wt	--	--	63	63	63	20
4-Methylphenol	8270D	µg/kg dry wt	760	2,360	670	670	223	20
2,4-Dimethylphenol	8270D	µg/kg dry wt	--	--	29	29	29	20
Pentachlorophenol	8270D	µg/kg dry wt	--	--	360	690	120	100
Benzyl Alcohol	8270D	µg/kg dry wt	--	--	57	73	57	100
Benzoic Acid	8270D	µg/kg dry wt	2,910	3790	650	650	217	200
PCBs								
Total PCB Aroclors	8082	µg/kg dry wt	62	354	12 mg/kg OC	65 mg/kg OC	6	10

Notes:

a - 2-Methylnapthalene is not included in the sum of LPAHs

b - Washington State Department of Ecology Sediment Sampling and Analysis Plan Appendix, February 2008

c - TEQs will be calculated using WHO 2005 Mammalian TEFs with ND=DL, EMPC=EMPC & ND=DL/2, EMPC=EMPC

d - Units designated with "OC" are TOC normalized per SMS guidance; however, TOC values <0.5% or >3% will be not be OC normalized and screened against LAET and 2LAET criteria

µg/kg = microgram per kilogram

mg/kg = milligram per kilogram

HPAH = high-molecular-weight polycyclic aromatic hydrocarbon

LAET = lowest apparent effects threshold

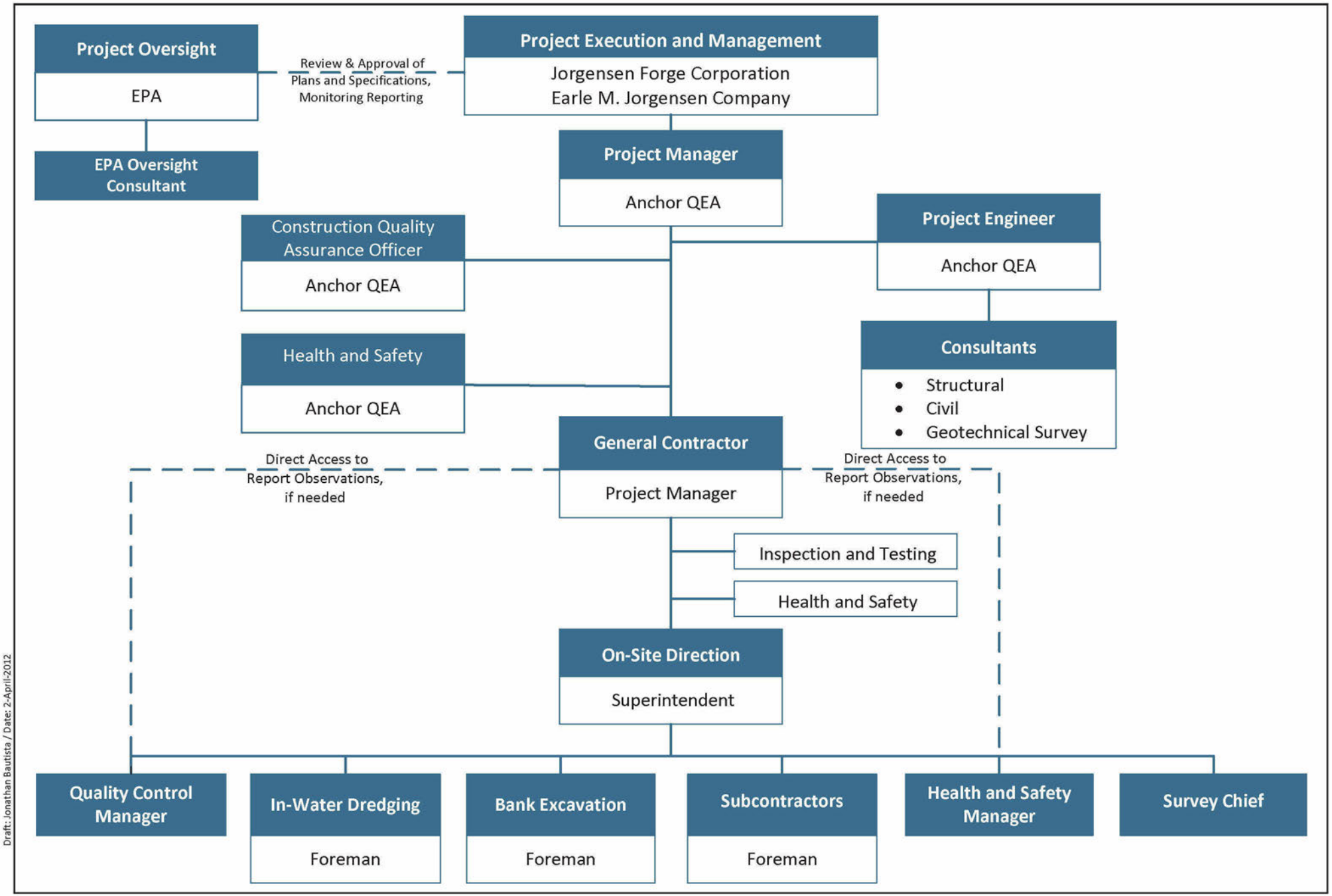
2LAET = second lowest apparent effects threshold

LPAH = low-molecular-weight polycyclic aromatic hydrocarbon

PQL = Practical Quantitation Limits

SSAPA = Sediment Sampling and Analysis Plan Appendix (Washington State Department of Ecology, 2008. *Sediment Sampling and Analysis Plan Appendix* . Ecology Publication No. 03-09-043. February 2008).

FIGURES



Draft: Jonathan Bautista / Date: 2-April-2012

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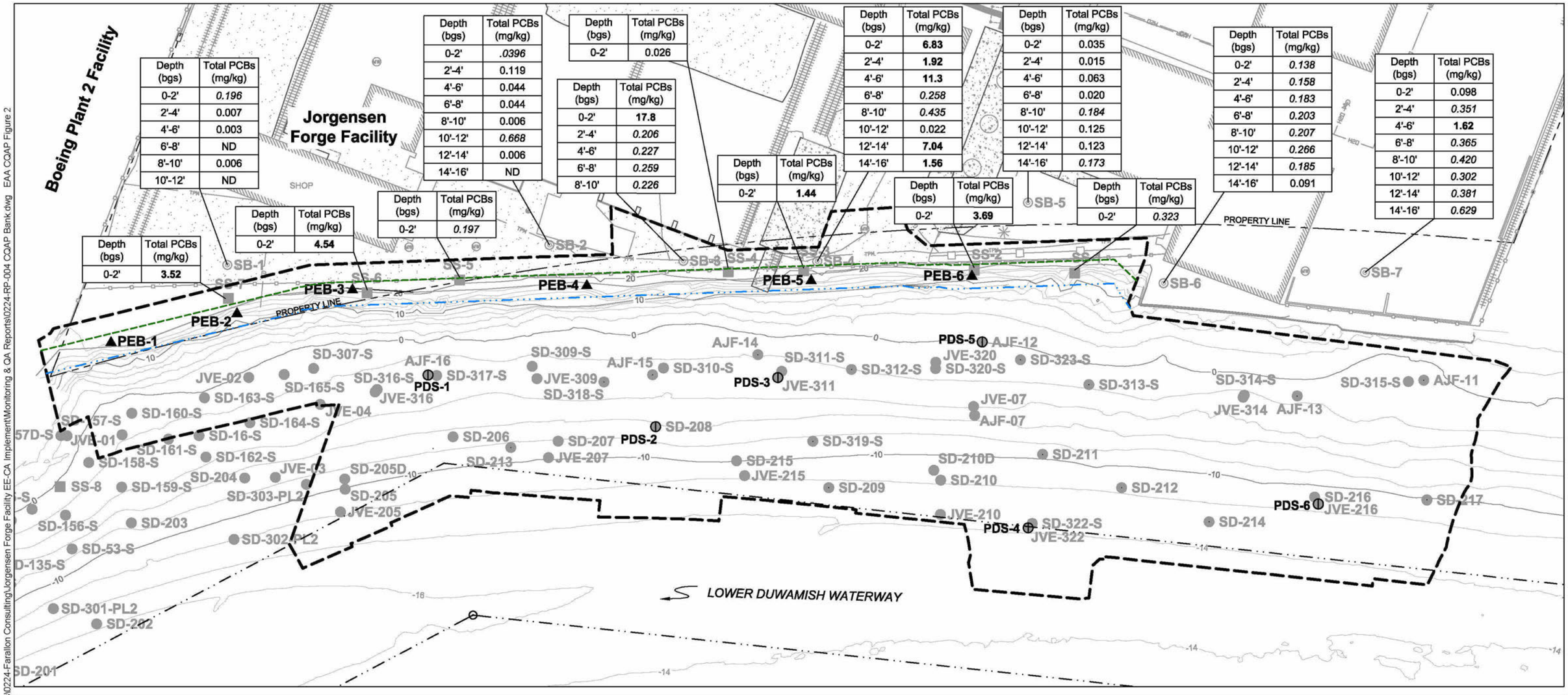
Figure 1
Organizational Chart
Construction Quality Assurance Plan
Jorgensen Forge Early Action Area



Depth (bgs)	Total PCBs (mg/kg)
0-2'	*0.196*
2'-4'	0.007
4'-6'	0.003
6'-8'	ND
8'-10'	0.006
10'-12'	ND

Depth (bgs)	Total PCBs (mg/kg)
0-2'	**3.52**

Depth (bgs)	Total PCBs (mg/kg)
0-2'	**4.54**

Depth (bgs)	Total PCBs (mg/kg)
0-2'	*0.197*

Depth (bgs)	Total PCBs (mg/kg)
0-2'	*.0396*
2'-4'	0.119
4'-6'	0.044
6'-8'	0.044
8'-10'	0.006
10'-12'	*0.668*
12'-14'	0.006
14'-16'	ND

Depth (bgs)	Total PCBs (mg/kg)
0-2'	0.026

Depth (bgs)	Total PCBs (mg/kg)
0-2'	**17.8**
2'-4'	*0.206*
4'-6'	*0.227*
6'-8'	*0.259*
8'-10'	*0.226*

Depth (bgs)	Total PCBs (mg/kg)
0-2'	**1.44**

Depth (bgs)	Total PCBs (mg/kg)
0-2'	**6.83**
2'-4'	**1.92**
4'-6'	**11.3**
6'-8'	*0.258*
8'-10'	*0.435*
10'-12'	0.022
12'-14'	**7.04**
14'-16'	**1.56**

Depth (bgs)	Total PCBs (mg/kg)
0-2'	**3.69**

Depth (bgs)	Total PCBs (mg/kg)
0-2'	0.035
2'-4'	0.015
4'-6'	0.063
6'-8'	0.020
8'-10'	*0.184*
10'-12'	0.125
12'-14'	0.123
14'-16'	*0.173*

Depth (bgs)	Total PCBs (mg/kg)
0-2'	*0.323*

Depth (bgs)	Total PCBs (mg/kg)
0-2'	*0.138*
2'-4'	*0.158*
4'-6'	*0.183*
6'-8'	*0.203*
8'-10'	*0.207*
10'-12'	*0.266*
12'-14'	*0.185*
14'-16'	0.091

Depth (bgs)	Total PCBs (mg/kg)
0-2'	0.098
2'-4'	*0.351*
4'-6'	**1.62**
6'-8'	*0.365*
8'-10'	*0.420*
10'-12'	*0.302*
12'-14'	*0.381*
14'-16'	*0.629*

HORIZONTAL DATUM: Washington State Plane North, NAD83.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

DATA BOX NOTES:

1. '*Italic*' text indicates concentrations above the sediment management standards Lowest Apparent Effect Threshold (LAET) screening level.
2. '**Bold**' text indicates concentrations above the sediment management standards 2 LAET screening level.
3. Sediment z-layer confirmation samples will be collected from the 0- to 1-foot interval of the post-dredge surface. Samples may be collected either before (surface grab) or following placement (subsurface core). The timing and methods will be determined based on the construction sequencing.
4. Shoreline bank z-layer surface grab confirmation samples will be collected from the 0- to 1-foot interval of the post-excavation surface.

LEGEND:

- Navigation Channel
- Existing Bathymetry (2 ft interval)
- Existing Fence Line
- Dredge/Excavation Limits
- Post-Construction +11 ft Elevation Contour, Mean Higher High Water
- Post-Construction +17 ft Elevation Contour
- (bgs) Below Ground Surface
- (mg/kg) Milligram per Kilogram
- PDS-1 Proposed Sediment Z-Layer Confirmation Sample
- PEB-6 Proposed Shoreline Bank Z-Layer Confirmation Sample
- SB-1 Existing Soil Boring Sample
- SS-5 Existing Surface Soil Sample
- SD-207 Existing Subsurface Sediment Sample

0 50
Scale in Feet

K:\Projects\0224-Farallon Consulting\Jorgensen Forge Facility EE-CA Implement\Monitoring & QA Reports\0224-RP-004 CQAP Bank.dwg EAA CQAP Figure 2
Mar 25, 2013 2:53pm chewett

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Figure 2
Sediment and Shoreline Bank Post-Removal Z-Layer Confirmation Station Locations
Construction Quality Assurance Plan
Jorgensen Forge Early Action Area

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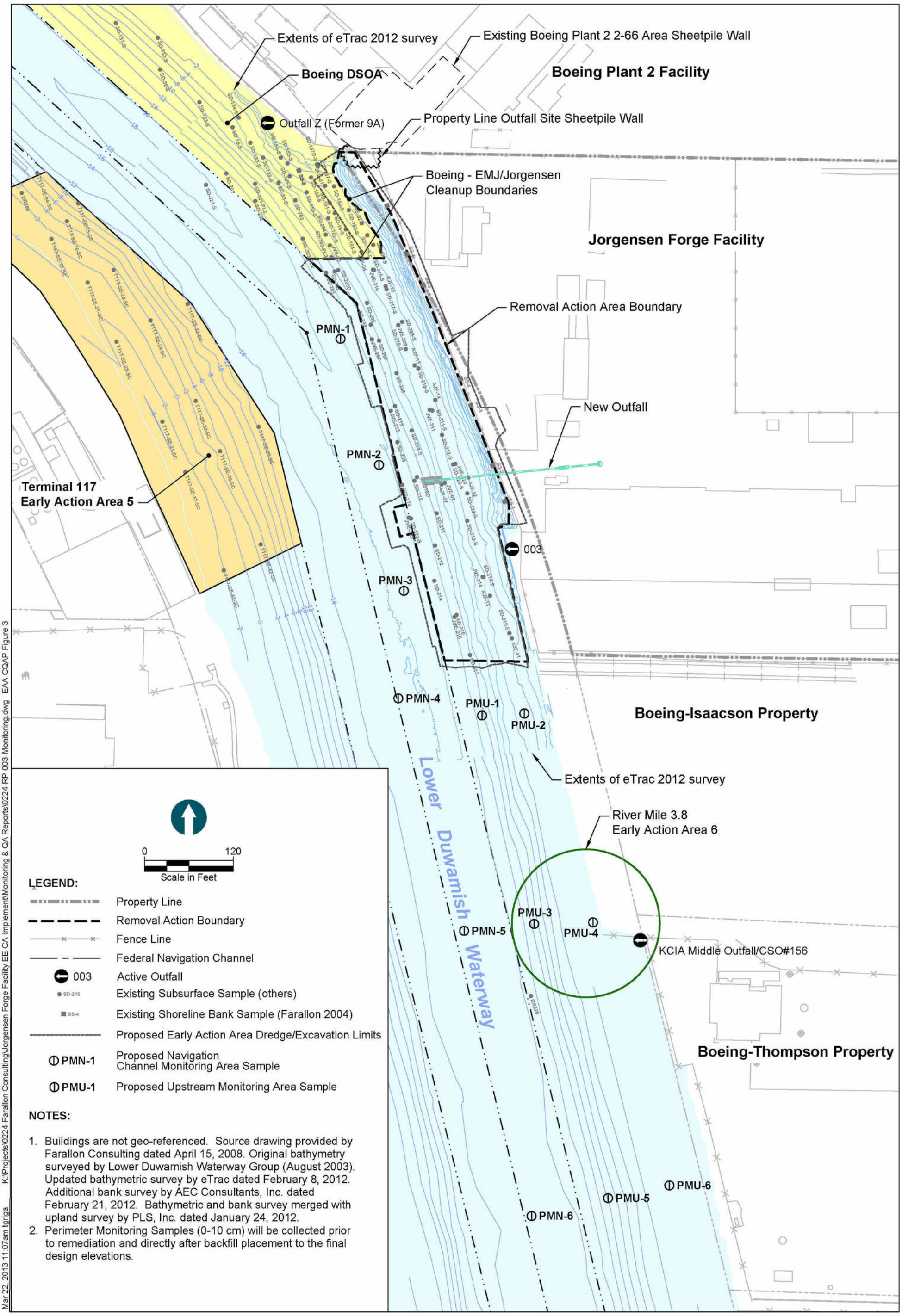

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Figure 3
Sediment Perimeter Monitoring Station Locations
Construction Quality Assurance Plan
Jorgensen Forge Early Action Area

APPENDIX E
WATER QUALITY MONITORING PLAN

APPENDIX E
WATER QUALITY MONITORING PLAN
BASIS OF DESIGN REPORT
JORGENSEN FORGE EARLY ACTION AREA

Prepared for

U.S. Environmental Protection Agency
Region 10
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August 2013

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Attachment 1 Water Quality Monitoring Form

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LIST OF ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
µg/L	Micrograms per liter
AOC	Administrative Settlement Agreement and Order on Consent
BiOp	Biological Opinion
BMP	best management practice
BODR	Basis of Design Report
Boeing	The Boeing Company
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	chemical of concern
CQAO	Chief Quality Assurance Officer
CWA	Clean Water Act
cy	cubic yards
DGPS	differential global positioning system
DO	dissolved oxygen
DSOA	Duwamish Sediment Other Area
EAA	Early Action Area
Ecology	Washington State Department of Ecology
EMJ	Earle M. Jorgensen Company
EPA	U.S. Environmental Protection Agency
EPP	Environmental Protection Plan
ESA	Endangered Species Act
Facility	Jorgensen Forge facility
FSP	Field Sampling Plan
HASP	Health and Safety Plan
Jorgensen Forge	Jorgensen Forge Corporation
LDW	Lower Duwamish Waterway
mg/kg-OC	milligrams per gram of organic carbon
mg/L	milligrams per liter

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MLLW	mean lower low water
MOU	Memorandum of Understanding
NMFS	National Marine Fisheries Service
NTCRA	non-time-critical removal action
NTU	nephelometric turbidity units
Owner	EMJ and Jorgensen Forge
PCB	polychlorinated biphenyl
QAPP	Quality Assurance Project Plan
RAB	removal action boundary
RAWP	Removal Action Work Plan
RvAL	removal action level
SQS	Sediment Quality Standard
USACE	U.S. Army Corps of Engineers
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WQMP	Water Quality Monitoring Plan
WQMR	Water Quality Monitoring Report

1 INTRODUCTION

This Water Quality Monitoring Plan (WQMP) has been prepared on behalf of Earle M. Jorgensen Company (EMJ) and Jorgensen Forge Corporation (Jorgensen Forge; herein referred to collectively as the Owner) pursuant to the Administrative Settlement Agreement and Order on Consent for Removal Action Implementation (AOC; U.S. Environmental Protection Agency [EPA] Region X Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] Docket No. 10-2012-0032) and attached Statement of Work. This WQMP is an appendix to the Basis of Design Report (BODR) Final Design submittal for the cleanup of contaminated sediments and associated bank soils in a portion of the Lower Duwamish Waterway (LDW) Superfund Site adjacent to the Jorgensen Forge facility (Facility) located in Tukwila, King County, Washington (Figure 1; Jorgensen Forge Early Action Area [EAA]). Construction activities planned as part of the cleanup include in-water dredging, placement of in-water backfill and shoreline materials, reconfiguring the shoreline bank, and transport and off-site disposal of impacted sediments and soils. The cleanup will be conducted as a non-time-critical removal action (NTCRA) in accordance with EPA's selected cleanup alternative documented in the *Action Memorandum for a Non-Time-Critical Removal Action at the Jorgensen Forge Early Action Area of the Lower Duwamish Waterway Superfund Site in Seattle, Washington* (Action Memo; EPA 2011) and detailed in the *Final Engineering Evaluation/Cost Analysis [EE/CA]– Jorgensen Forge Facility, 8531 East Marginal Way South, Seattle, Washington* (Anchor QEA 2011).

The purpose of this WQMP is to address substantive requirements of the Clean Water Act (CWA) Section 401 water quality memorandum associated with implementation of the removal action activities.

1.1 Removal Action Description

The limits of the EPA-approved removal action boundary (RAB) are shown on Figure 2, as identified in the EE/CA (Anchor QEA 2011). The removal action extends from the top of the bank at approximately 19 to 20 feet mean lower low water (MLLW) (or top of the sheetpile/concrete panel on the southern portion of the Facility) to the federal navigation channel. The RAB is bounded to the north by The Boeing Company (Boeing) Plant 2

Duwamish Sediment Other Area (DSOA) and Southwest Bank Corrective Measure EAA cleanup area, which is also an EAA.

This document details the water quality monitoring activities and protections that will be implemented during the removal action to minimize adverse impacts to water quality during construction. The removal action includes the following components:

- **Sediment Dredging**. Removal of sediments exceeding the identified polychlorinated biphenyls (PCB) removal action level (RvAL) using a shore-based and barge-mounted precision excavator where implementable based on the encountered materials.
- **Sediment Backfilling**. Placement of imported clean fill material in removal areas to bring these areas back up to a stable grade and elevation.
- **Shoreline Bank Reconfiguration**. Removal of debris, reconfiguration for stability and containment of the shoreline bank; this work is planned to be conducted "in the dry" to the extent possible given LDW elevations during the construction period.

The in-water components of this work would be conducted during the in-water work window, which EPA has allowed from August 1 through February 15. In-water work conducted outside of the work window will only occur in coordination with EPA. Depending on the number of days construction occurs per week (i.e., 5 to 7 days), the total project duration is estimated to take approximately 8 to 12 weeks to complete, including approximately 6 to 8 weeks of in-water work. Construction scheduling details will be further developed in coordination with the selected General Contractor (Contractor) as part of the Removal Action Work Plan (RAWP) documents.

1.2 Water Quality Monitoring Plan Elements

The remainder of this document provides the following information related to water quality monitoring during construction:

- **Section 2 – Water Quality Monitoring Program** describes the monitoring objectives, monitoring approach, compliance boundaries, station locations and depths, and applicable water quality criteria.
- **Section 3 – Activity-Specific Monitoring Requirements** presents specific monitoring activities and schedules for each construction activity.

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- **Section 4 – Sampling and Analysis Methods** describes the details of sampling including station identification, sample location and depth control, monitoring methods and equipment, monitoring equipment calibration and maintenance, and measurement documentation.
- **Section 5 – Reporting Requirements** describes the requirements for water quality data submittals and documentation.
- **Section 6 – Contingency Plan** describes exceedance notification requirements, contingency response actions, and construction best management practices (BMPs) to be implemented to minimize water quality exceedance potential.
- **Section 7 – Monitoring Personnel and Key Contacts** details the responsibilities of key monitoring personnel.

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2 WATER QUALITY PROTECTION PLAN

A description of each major construction activity, and the environmental protection measures, operational controls, and BMPs that will be implemented to minimize impacts and protect water quality are presented in this section.

2.1 General Water Quality Protection Measures

The following general water quality protection measures will be implemented during all construction activities:

- In-water work for this project will comply with the timing restrictions specified in the in-water work window unless changed in coordination with EPA. EPA has allowed in-water work to occur from August 1 to February 15.
- Prior to entering the water, all equipment will be checked for leaks and cleaned of any external petroleum products, hydraulic fluid, coolants, and other deleterious materials.
- The Contractor will prepare a Spill Containment and Control Plan to be maintained during construction activities. The Spill Containment and Control Plan will contain notification procedures, material storage requirements, emergency response spill containment and cleanup procedures, and employee training requirements.
- The Contractor will prepare an Environmental Protection Plan (EPP), which prevents environmental pollution and minimizes environmental degradation during and as a result of construction operations, including consideration of noise levels and prevention of adverse impacts to air, water, and land. Erosion and turbidity control measures will be included in the EPP.

2.2 Sediment Dredging

2.2.1 Description

The purpose of sediment dredging is to remove surface and subsurface sediments containing elevated concentrations of total PCBs above the RvAL of 12 milligrams per kilogram of organic carbon (mg/kg-OC). Based on characterization data collected in the RAB, all other contaminants above applicable cleanup levels will be removed along with the PCBs. The dredged sediments will be disposed at an EPA-approved Subtitle D landfill. The dredging

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depths vary from 1 to 11 feet of removal, with an overdredge tolerance of 2 feet. Dredging adjacent to the sheet pile and concrete panel walls will be offset by 5 feet to minimize potential impacts to the structural stability of the walls.

Approximately 10,800 cubic yards (cy) of material is required to be removed during dredging. Progress and post-construction bathymetric surveys will be performed to confirm contractor estimates of sediments removed from the target areas and to ensure that target elevations are achieved. Following dredging, the removal areas will be backfilled with clean import material to bring the area generally back to its approximate original grade, with the exception of areas within and up to 10 feet outside of the navigation channel, which will not be backfilled fully to grade (e.g., maximum elevation of -15 feet MLLW) to accommodate future maintenance dredging needs by the U.S. Army Corps of Engineers (USACE) in the adjacent navigation channel.

Dredging is anticipated to be completed using mechanical methods. Specifically, an excavator with an articulated, enclosed bucket will be used to the extent possible. However, large debris has been identified in the RAB (e.g., trees, concrete blocks, intact and broken pilings, or molten debris piles) and is likely beyond the lifting capacity of this type of bucket. In such cases, a heavier bucket with digging capabilities or a conventional wire-supported clamshell dredge, grapple, or vibratory hammer may be necessary. The sediments removed during dredging will be placed on a barge equipped to hold the dredged material and associated water, and transported to an EPA-approved offloading and rehandling facility, which is expected to be located on the LDW.

2.2.2 Water Quality Protection Measures

Water quality protection measures that will be applied to sediment dredging work include the following:

- During transport, handling, and off-site offloading of sediment, adequate containment measures and inspections will be employed to minimize spillage of material into the LDW.
- Bottom or beach stockpiling will be avoided at all times.
- Taking multiple bites with the dredge bucket will be avoided at all times.

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- Overfilling of the bucket will be avoided at all times.
- Barges will not be overfilled, and will be loaded so that sufficient freeboard remains to allow for safe movement of the barge and its material on its planned route without spillage.
- A clean sand cover (3 to 6 inches) will be placed over dredge cuts in a timely manner and as soon as practical after dredging is complete. This cover will limit the potential for resuspension and release of sediment from the post-dredging residual surface.
- An enclosed environmental type bucket will be used to the extent practicable to limit sediment loss and resuspension during dredging activities; however, in certain conditions (in particular, with the presence of large debris), an alternative bucket type (e.g., digging or clamshell bucket) may be necessary.
- Stair-step dredge cuts for steeper slopes will be implemented to reduce sloughing of sediment, which reduces the potential for sediment resuspension.
- An excavator dredge will be used, as appropriate, for improved bucket control on steeper slopes; this is expected to reduce sediment resuspension on steeper slopes.
- The direct overflow of water in sediment haul barges back to the LDW without proper processing and management of the dredging return water will be prohibited. The water management BMP for this proposed action will involve either active pumping of the excess water from the sediment haul barges to an upland or on-barge treatment system to remove excess sediment and associated contaminants prior to discharging back to the LDW. Excess water will be discharged to the LDW in the immediate vicinity of the dredge platform.

2.3 Sediment Backfilling

2.3.1 Description

Upon completion of the dredging activities, the dredged areas will be backfilled approximately to grade, except in areas within and up to 10 feet outside of the navigation channel as previously noted. The backfill material will be habitat-friendly and consist of a sand and gravel mixture. Backfill activities in dredged areas will be staged from the water side working at higher tides as needed to provide the required draft for the equipment. Backfill materials are anticipated to be placed mechanically from a barge using a clamshell bucket. The material will be placed with sufficient control to meet the design thickness.

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Following the placement of the backfill material, a bathymetric survey of aquatic areas will be completed to verify and document that the placed thickness meets the design specification.

2.3.2 Water Quality Protection Measures

Water quality protection measures that will be applied to sediment backfilling work include the following:

- During transport and handling of import material, adequate containment measures and inspections will be employed to minimize spillage of material into the LDW.
- Barges will not be overfilled, and will be loaded so that sufficient freeboard remains to allow for safe movement of the barge and its material on its planned route without spillage.
- Construction quality control procedures will be used to verify the limits and elevations during placement of the backfill materials.

2.4 Shoreline Bank Reconfiguration

2.4.1 Description

The shoreline bank will be excavated to remove impacted nearshore soils and sediments, followed by the placement of a target 4-foot slope containment layer. This portion of the shoreline is degraded, containing elevated chemical concentrations above the Sediment Quality Standard (SQS) criteria, highly armored, and over-steepened banks (approximately 1:1 slopes), and various debris, including derelict creosote-treated piles and asphalt fragments. Bank excavation and subsequent placement of slope containment will stabilize the slope. The proposed shoreline reconfiguration extends from the top of the existing bank at approximately 19 to 20 feet MLLW down to -8 feet MLLW elevation. These excavation and containment activities will be performed from the landside during low tides to the extent practicable to accomplish this work “in the dry” using conventional land-based earthmoving equipment (e.g., excavators, front-end loaders, and dump trucks).

The excavation is proposed to occur over a total distance of approximately 570 linear feet of shoreline. The design excavation depth is between 1 and 11 feet shoreward of the existing ground surface from the toe of slope upwards, and the finished bank will be reconfigured to a

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gentler, more stable 2 horizontal to 1 vertical slope (2H:1V; Figure 2). The excavation will result in the required removal of approximately 5,400 cy of impacted soil/sediment, fill material, and debris.

Following excavation, slope containment materials will be placed along the full length and height of the reconfigured slope. The containment will be composed of three layers: a target 1.5-foot "filter" layer (sandy gravel to gravelly sand) overlain by a target 2.5-foot riprap material, and finished with a target 0.5-foot habitat layer (anticipated to consist of rounded or sub-rounded, 2.5-inch minus gravel). The filter layer will act as the chemical isolation layer, the riprap layer will protect the filter layer from erosion, and the habitat layer will provide enhanced substrate for benthic invertebrates and salmonids. Application of the slope containment will result in the placement of approximately 2,500 cy of filter material, 3,800 cy of riprap material, and 1,300 cy of a habitat material (for a total placement volume of approximately 7,600 cy) over approximately a total of 0.75 acres.

2.4.2 Water Quality Protection Measures

Water quality protection measures that will be applied to this work include the following:

- Shoreline excavation and placement of slope containment materials are anticipated to be performed "in the dry" to the extent possible given the LDW tidal elevations during the construction period.
- Construction quality control procedures will be used to verify the limits and depths of excavation, and the limits and thickness of slope containment materials.
- Surface booms, oil-absorbent pads, and similar materials will be made available in case any sheen is observed on the surface of the water during construction.
- Proper erosion and sediment and erosion measures will be implemented, following the guidelines of the *Stormwater Management Manual of Western Washington* (Ecology 2005), to contain the excavated and imported materials and to prevent any materials from entering the LDW during handling, storage, and transport to the off-site disposal facility.

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3 WATER QUALITY MONITORING PROGRAM

The objective of water quality monitoring during the removal action is to confirm that water quality criteria are met or to ensure approval to allow temporary exceedances of water quality standards during any construction activity that may affect the water column.

The details of the water quality monitoring program, including monitoring parameters, compliance boundary locations, monitoring station locations and depths, monitoring schedules, and applicable water quality criteria are described below.

3.1 Monitoring Parameters

The following field parameters will be monitored during removal action construction activities (see Table 1):

- Field Parameters
  - Turbidity (in nephelometric turbidity units [NTU])
  - Dissolved oxygen (DO; in milligrams per liter [mg/L])
  - Temperature (in degrees Celsius [°C])
  - Hydrogen ion concentration (in pH units)

In addition, chemical monitoring of the following site chemicals of concern (COCs) will be performed during removal action construction activities (see Table 1):

- Total PCBs (micrograms per liter [µg/L])
- Metals (cadmium, chromium, copper, lead, mercury, and zinc [mg/L])

3.2 Compliance Criteria

Based on the beneficial use classification of the LDW as "excellent quality", the compliance criteria for field parameters will be the Class A (excellent quality) Washington State Surface Water Quality Standards for marine waters (Washington Administrative Code [WAC] 173-201A-210). Compliance criteria for chemical parameters will be the more stringent of the National Recommended Water Quality Criteria and the Washington State Acute Marine Criterion for PCBs and metals. Compliance with these criteria will be evaluated at the EPA-approved point of compliance. These criteria do not apply within the authorized mixing

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zone area. Further information about the point of compliance and compliance criteria for the various field parameters and chemical parameters is discussed in the below subsections and summarized in Table 1.

3.2.1 Turbidity

The point of compliance for turbidity will be 150 feet downcurrent of the construction activity (depending on tide direction). Turbidity at the point of compliance shall not exceed five NTU over background turbidity when background turbidity is less than 50 NTU, or have more than a 10 percent increase in turbidity when the background turbidity is greater than 50 NTU.

A biological opinion (BiOp) was issued by the U.S. Fish and Wildlife Service (USFWS) for this cleanup action. In accordance with the BiOp, if at any time, turbidity measured at the 150-foot compliance boundary is 59 NTU greater than the measured background turbidity concentration, additional monitoring would be conducted to confirm that measured turbidity at a distance of 800 feet from the construction work area does not exceed 18 NTU over background turbidity concentration. Monitoring at a distance of 800 feet would be conducted every 2 hours for the remainder of the day, or until measured turbidity falls below 18 NTU over background.

3.2.2 Dissolved Oxygen

The point of compliance for DO is 150 feet downcurrent of the construction activity (depending on tide direction). DO at the point of compliance shall not decrease below 6.0 mg/L. When natural conditions such as upwelling occur, causing the DO to be depressed near or below 6.0 mg/L, natural DO levels may be degraded by up to 0.2 mg/L by human-caused activities.

3.2.3 Temperature

The point of compliance for temperature is 150 feet downcurrent of the construction activity (depending on tide direction). Temperature at the point of compliance shall not exceed 16°C (60.8°F). When the water temperature is naturally warmer than the criterion (or within 0.3°C [0.54°F] of the criterion), then human actions may not cause the 7-day average of daily

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maximum temperatures to increase more than 0.3°C (0.54°F). When the natural condition of the water is cooler than the criterion, temperature increases must not, at any time, exceed 12/(T-2) as measured at the edge of a mixing zone boundary (where T represents the background temperature as measured at a point or points unaffected by the discharge and representative of the highest ambient water temperature in the vicinity of the discharge). Also, when the natural condition of the water is cooler than the criterion, temperature increases resulting from the combined effect of all non-point source activities in the water body must not, at any time, exceed 2.8°C (5.04°F).

3.2.4 Hydrogen Ion Concentration (pH)

The point of compliance for pH is 150 feet downcurrent of the construction activity (depending on tide direction). At the point of compliance, pH shall be within the range of 7.0 to 8.5 with a human-caused variation within this range of less than 0.5 unit.

3.2.5 Chemicals of Concern

The point of compliance for chemical parameters will be 150 feet and 300 feet from the construction work area for acute and chronic water quality criteria, respectively. The acute and chronic criteria are based on the National Recommended Water Quality Criteria and the Washington State Acute Marine Criterion for PCBs and metals (WAC 173-201A-240), as summarized in Table 1.

3.3 Monitoring Locations

During each monitoring event, field parameters (i.e., turbidity, DO, temperature, and pH) will be measured at the background station, and the upriver or downriver early warning station and 150-foot compliance boundary station, as shown on Figure 3. A description of each of these stations is provided below. Early warning and compliance station locations will be based on the distance upriver and downriver from the construction work area. During ebb and slack tides, field parameters will be collected from the early warning and compliance station locations located downriver of the construction work area. During flood tides, field parameters will be collected from early warning and compliance boundary stations located upriver of the construction work area to account for tide reversal. Tide direction will be determined by predicted tides for river mile 3.6 in the LDW. When chemical monitoring is

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required, turbidity will also be collected at the downcurrent 300-foot compliance station to determine if a sample is archived or submitted for immediate analysis.

Chemical monitoring, when required, will be performed at the background, 150- and 300-foot compliance stations (Figure 3). Chemistry samples will be collected from both the background and compliance stations (upriver and downriver) regardless of tidal direction. Samples collected at the background and downcurrent 150-foot and 300-foot compliance stations (depending on tide direction) from the depth with the highest concurrent turbidity will be submitted for analysis. Samples collected at the upcurrent 150-foot and 300-foot compliance stations and all other depths will be archived for future potential analysis, pending results of the samples taken at the downcurrent depth with the highest turbidity (see Section 6).

The location of the background station will remain the same for all monitoring events. A description of all monitoring stations is provided below and shown on Figure 3:

- **150-foot Compliance Stations (150C)**. The 150-foot compliance stations are located at the edge of the inner mixing zone 150 feet up and downriver from the construction work area. The 150-foot compliance stations (station 150C) are at approximately the same water depth as the construction activity. Compliance with field water quality criteria will be evaluated at the downcurrent 150C station, depending on tide direction. Compliance with chemical parameter acute criteria will be evaluated at these stations.
- **300-foot Compliance Stations (300C)**. The 300-foot compliance stations are located at the edge of the outer mixing zone 300 feet upriver and downriver from the construction work area. The 300-foot compliance stations (station 300C) are at approximately the same water depth as the construction activity. Compliance with chemical parameter chronic criteria will be evaluated at these stations.
- **Early Warning Station (EW)**. The early warning station (Station EW) is located 75 feet upriver or downriver (depending on tide direction) from the construction work area, at approximately the same water depth as the construction activity. The objective of the early warning station is to become more quickly aware of potential field parameter water quality impacts at the construction work area, and to be able to

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adjust dredging operations or BMPs before a field parameter exceedance occurs at the compliance station.

- **Background Station (BG)**. The background station (Station BG) is located 600 feet upriver from the RAB and beyond the influence of removal action construction activities. Coordinates of the background station are provided on Figure 3. The background station will be monitored during every event because the turbidity criterion is based on an acceptably small increase (i.e., 5 NTU) in the vicinity of the RAB relative to ambient LDW background levels.

3.4 Monitoring Depths

At each station, conventional and/or chemical monitoring will occur at two depths:

- Surface – 3 feet below the water surface
- Bottom – 4 feet above the mudline

If the water depth is less than 10 feet at the monitoring station, monitoring will occur at the mid-point of the water column (i.e., single depth).

As described in Section 3.3. at stations where water chemistry sampling is required, samples from the depth with the highest turbidity will be submitted for analysis. Samples collected at all other depths will be archived for future potential analysis, pending results of the sample taken at the depth with the highest turbidity (see Section 6). Turbidity will be measured at each compliance station and depth to inform the chemical analyses.

3.5 Monitoring Tiers and Schedules

The in-water components of this work are limited to occur only within the EPA-allowed in-water work window, which extends from August 1 through February 15. In-water work conducted outside of the work window will only occur in coordination with EPA. The total project duration is estimated to take approximately 8 weeks to complete with 5 weeks of in-water work.

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Water quality monitoring schedules are divided into three tiers for all in-water work, as summarized in Table 2. Tier I monitoring will be performed during the first 4 days of in-water removal work. Tier II monitoring will occur during all in-water removal work after the first 4 days of monitoring have been performed. Finally, Tier III monitoring will occur during in-water backfill placement. Additionally, chemical monitoring at the Tier I frequency will occur during removal activities performed within three small areas in the RAB showing relatively elevated total PCB concentrations (Figure 4). The following subsections and Table 2 provide a detailed summary of the monitoring schedules for the specific removal action activities.

3.5.1 Tier I Schedule

Tier I monitoring will occur for the first 4 days of in-water removal activity (dredging, in-water debris removal, pile removal or submerged shoreline bank excavation). This monitoring will be conducted concurrent with removal in areas showing the highest relative total PCB concentrations and includes the measurement of field parameters (turbidity, DO, temperature, and pH) twice daily at the background, early warning, and 150-foot compliance stations. In addition, concurrent with field parameter monitoring, water samples will be collected once daily at the background, and 150-foot and 300-foot compliance stations twice during the first four days of monitoring.

The first daily monitoring round should be conducted at least 1 hour after the startup of daily work activities. The second daily monitoring round should be separated by a minimum of 4 hours from the first monitoring round. If practicable, monitoring events should target one flood tide and one ebb tide condition. No monitoring will be performed within two hours before dark and during dark hours due to safety concerns.

As described in Section 3.3, during ebb and slack tides, the early warning and 150-foot compliance stations for field parameters will be oriented downriver. During flood tides, the early warning and 150-foot compliance stations for field parameters will be oriented upriver to account for the reversing tidal current, as shown on Figure 3. When chemical monitoring is required, samples will be collected from both the upriver and downriver 150- and 300-foot compliance stations. Samples collected at the background and downcurrent compliance

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stations (depending on tide direction) from the depth with the highest concurrent turbidity will be submitted for analysis. Samples collected at the upcurrent compliance stations and all other depths will be archived for future potential analysis, pending results of the samples taken at the downcurrent depth with the highest turbidity (see Section 6).

3.5.2 Tier II Schedule

After four consecutive days of Tier I monitoring, monitoring may be reduced to the Tier II schedule, which includes measurement of the field parameters (i.e., turbidity, DO, temperature, and pH) twice daily, three days per week. In addition, water samples will be collected for chemical analysis once daily, twice per week. Field parameter and chemical monitoring will be scheduled each week to coincide with removal of the highest relative total PCB concentrations.

As described in Section 3.3, during ebb and slack tides, the early warning and 150-foot compliance stations for field parameters will be oriented downriver. During flood tides, the early warning and 150-foot compliance stations for field parameters will be oriented upriver to account for the reversing tidal current, as shown on Figure 3. When chemical monitoring is required, samples will be collected from both the upriver and downriver 150- and 300-foot compliance stations. Samples collected at the background and downcurrent compliance stations (depending on tide direction) from the depth with the highest concurrent turbidity will be submitted for analysis. Samples collected at the upcurrent compliance stations and all other depths will be archived for future potential analysis, pending results of the sample taken at the downcurrent depth with the highest turbidity (see Section 6).

3.5.3 Tier III Schedule

Tier III monitoring will be performed during in-water backfill placement and includes the one-time measurement of field parameters (turbidity, DO, temperature, and pH) two times in a single day at the background, early warning and 150-foot compliance stations. No chemical monitoring will be performed during backfill placement. No monitoring will be performed within two hours before dark and during dark hours.

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3.5.4 Elevated Total PCB Concentration Areas Schedule

During in-water removal activity conducted within the relatively elevated total PCB concentration areas shown on Figure 4, chemical monitoring at the Tier I frequency will occur (i.e., once daily, two days per week). Chemical samples will be collected from the background and upstream and downstream 150C and 300C stations (Figure 3). Downcurrent (depending on tide direction) and background samples collected from the depth with the highest turbidity identified with concurrent turbidity measurements will be submitted for analysis. Samples collected at all other depths and upcurrent compliance stations will be archived for future potential analysis, pending results of the sample taken at the downcurrent depth with the highest turbidity (see Section 6). Field parameters will also be collected at the Tier I schedule.

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4 FIELD PROCEDURES

4.1 Methods and Equipment

Water samples for chemical analysis will be collected using a Van Dorn or similar water sampling device deployed to the appropriate depth in the water column. The water sampling device will be decontaminated prior to collection of each sample as described in the Field Sampling Plan (FSP; Attachment 2 to Appendix I). Analytical methods, reporting limits and turnaround times are provided in the Quality Assurance Project Plan (QAPP; Attachment 1 to Appendix I to the BODR).

Field parameters (turbidity, DO, temperature, and pH) will be measured using a real-time, calibrated field instrument (hydroprobe or equivalent) deployed to the appropriate depth in the water column.

4.2 Sample Location and Depth Control

A laser range finder and/or differential global positioning system (DGPS) will be used to navigate to and verify station locations. Field measurements will be collected within 3 meters of the target station locations. Depth to the bottom will be determined using a lead line or depth sounder. Based on the water depth at the time of measurement, the appropriate measurement depths (surface, middle, and deep) will be determined. Location control data (coordinates, water depths) will be carefully documented on the Water Quality Monitoring Form (Attachment 1).

4.3 Station Identification

All stations will be properly identified on the Water Quality Monitoring Form (Attachment 1), and consistently applied from one monitoring event to the next. Station names will use the following identification scheme consisting of up to 13 alphanumeric characters (A-BBBB-C-D-YYMMDD):

In which:

1. The first character [A] will be used to identify the construction activity being monitored:

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- R = Removal (e.g., dredging, debris removal, pile removal)
- B = Backfilling

2. The second set of characters[BB] will be used to identify the water quality monitoring location:
   - BG = Background Station
   - EW = Early Warning Station
   - 150C = 150-foot Compliance Station (downriver or upriver of the construction work area)
   - 300C = 300-foot Compliance Station (downriver or upriver of the construction work area)
3. The third character [C] will be used to identify the station orientation:
   - U = Upriver of the Construction Work Area
   - D = Downriver of the Construction Work Area
4. The fourth character [D] will be used to identify the monitoring depth:
   - S = Surface
   - M = Middle
   - B = Bottom
5. The last set of characters (YYMMDD) will be used to identify the monitoring date:
   - YY = The last two digits of the year of collection
   - MM = The month of collection
   - DD = The date of collection

For example, following this identification scheme, "R-150C-U-B-131018" represents field monitoring during removal (R) at the 150-foot compliance station (150C) upriver of the construction work area (U), at the bottom depth in the water column (B) on October 18, 2013.

4.4 Field Documentation

Important field observations and measurement data will be recorded on the Water Quality Monitoring Form (Attachment 1), including the following:

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- Station name (see Section 4.3)
- Station coordinates
- Date and time
- Tidal phase (flood, ebb, slack)
- Direction of monitoring, i.e., whether upriver or downriver from the construction activity
- Water depth on station
- Depth in the water column of each field parameter measurement (surface, middle, and bottom depths)
- Weather and current conditions

Completed forms will be scanned at the end of each field day and e-mailed to the Construction Quality Assurance Officer (CQAO).

4.5 Equipment Calibration and Maintenance

Analytical laboratory equipment calibration and maintenance requirements are described in the QAPP (Attachment 1 to Appendix I to the BODR).

Field monitoring equipment will undergo routine and ongoing calibration according to the manufacturers' instructions prior to use in the field. The calibration will be conducted once at the beginning of each sampling day for all equipment. Where not covered by manufacturers' instructions, calibration procedures will follow Standard Methods 2130-b (turbidity) and 4500-O (DO).

For the turbidity meter, at the end of each day of monitoring, a post-calibration procedure will be performed by measuring one of the calibration standards (preferably the standard whose value is closest to the LDW turbidity during that day). In addition, standards may be measured to check the calibration throughout the day, especially if higher or lower than expected turbidity values occur, and to verify a turbidity exceedance, if one occurs.

All calibration information will be recorded in the field notebook. Equipment that does not properly calibrate will not be used.

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Instruments and equipment will be tested and inspected before each monitoring event. Any field equipment that is faulty or not functioning properly will not be used for monitoring and will be replaced.

4.6 Quality Control/ Quality Assurance Procedures

Water quality monitoring activities will follow the quality control and quality assurance procedures specified in the QAPP for this project (Attachment 2 to Appendix I to the BODR).

4.7 Health and Safety Procedures

Health and safety procedures applicable to water quality monitoring activities will be implemented as specified in the removal action Health and Safety Plan (HASP; Appendix K to the BODR).

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5 REPORTING

Daily, weekly, and final reporting of water quality monitoring results are required for this project, and are described as follows.

5.1 Daily Reporting

Data will be collected and recorded in the field on the Water Quality Monitoring Form (Attachment 1), or equivalent. At the end of each field day, the field forms will be scanned and e-mailed to the CQAO. Unless an exceedance of a water quality parameter occurs (which would trigger the contingency response actions described in Section 6), daily field results will not be transmitted to EPA unless specifically requested.

5.2 Weekly Reporting

The results from each week's water quality monitoring activities will be compiled into a summary table with a comparison to water quality compliance criteria. The weekly summaries will be provided to EPA within 2 business days of the work (i.e., generally by the close of business on Tuesday of the following week). The weekly summary tables and compliance evaluations will be performed by designated office support staff under the direction of the Water Quality Field Leader. All reporting will include both regularly scheduled monitoring and any additional monitoring results that may have been triggered by exceedances of water quality criteria.

5.3 Final Water Quality Monitoring Report

After all construction has been completed, the water quality monitoring data for the entire construction project will be provided to the EPA in a *Water Quality Monitoring Report* (WQMR) as an appendix to the *Removal Action Completion Report*. The WQMR will include the following information:

- Any deviations from the specifications of this WQMP, and reasons for the deviations
- Tabular summaries of all water quality monitoring data with comparisons to water quality compliance criteria

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- Narrative text describing the results of water quality monitoring related to each construction operation and removal action activity (e.g., dredging, backfilling, shoreline reconfiguration)
- Narrative discussion of any water quality exceedances, probable cause of the exceedance(s), results of follow-up measurements, agency communications and decisions, and actions taken to mitigate the exceedance(s), including implementation of additional or enhanced BMPs
- Lessons learned regarding BMP implementability and effectiveness
- An appendix containing all completed Water Quality Monitoring Forms
- Documentation of instrument calibration will be provided on request

EMJ015226

6 CONTINGENCY PLAN

6.1 Notification Requirements

The primary purpose of water quality monitoring during construction is to determine when water quality impacts may be occurring so that additional operational or engineering controls can be implemented as necessary to mitigate the exceedance. If water quality measurements exceed compliance criteria at the compliance boundary, timely notifications will be made to the Contractor, the CQAO, the Owner's Project Coordinators, and the EPA Remedial Project Manager, as described in this section. The contact information for the EPA Remedial Project Manager and the EMJ and Jorgensen Forge Project Coordinators is provided below:

EPA Remedial Project Manager
Rebecca Chu
EPA, Region 10
1200 Sixth Avenue
Seattle, WA 98101-3140
(206) 553-5122
chu.rebecca@epa.gov

Jorgensen Forge Project Coordinator
Environmental Manager
Sheri Bozic
8531 East Marginal Way S.
Seattle, WA 98108
(206) 965-1352
sbozic@jorgensenforge.com

EMJ Project Coordinator
Gil Leon
10650 Alameda St.
Lynwood, CA 90262
(323) 923-6120
gleon@emjmetals.com

The contact information for the CQAO and the Contractor will be provided prior to the start of monitoring activities.

6.2 Exceedances of Water Quality Criteria

This section describes the contingency actions that will occur if the monitoring crew reports an exceedance of conventional water quality parameter, or if an exceedance of the chemical parameter criteria is detected. The decision flow chart describing the sequence of contingency actions and notifications that will be implemented in response to a water quality exceedance is provided in Figure 5. In the event of an exceedance, additional or enhanced operational or engineering BMPs may need to be implemented. Section 2 of this WQMP should be consulted for a standard list of construction BMPs to protect water quality.

6.2.1 Exceedance of Conventional Parameters

If conventional parameters (turbidity, DO, temperature, or pH) are exceeded at the 150-foot compliance boundary during removal action construction activities, the following contingency actions will be implemented:

1. Immediately notify CQAO. Immediately re-take field measurements at the Compliance Stations (and if necessary, the Background Station) to confirm, or not confirm, the exceedance.
2. If exceedance is confirmed, immediately notify the Contractor, CQAO and EPA.
3. Evaluate the concurrent measurements at the Background Station and supporting evidence to determine whether the exceedance is attributed to removal action construction activities versus other ambient conditions in the LDW (e.g., visual observations, wind waves, boat wakes, barge/ship traffic, or storm inflow).
4. If the exceedance is confirmed and attributed to removal action construction activities:
    a. Immediately notify the Contractor, CQAO, and EPA.
    b. The CQAO will direct the Contractor to expeditiously modify operations or implement additional BMPs to mitigate the exceedance (see Section 2 for list of construction BMPs to protect water quality).
    c. Immediately collect additional chemical water samples at the upstream and downstream 150- and 300-foot compliance stations and background station.
        i. Immediately analyze the background and downcurrent compliance stations (depending on tide direction) from the depth with the highest concurrent turbidity. Archive all other samples for future potential

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analysis, pending results of the sample taken at the downcurrent depth with the highest turbidity (see Section 6.2.2).

5. Re-take field measurements at all stations 2 hours later, after additional BMPs or operational modifications have been implemented.
6. Within 24 hours, notify EPA of the actions taken to mitigate the exceedance and the results of the follow-up measurements. If the water quality exceedance continues to persist, even with additional BMPs and/or operational modifications, the Owner and/or CQAO will discuss next steps with EPA. The path forward could include some or all of the following:
    a. Implement more aggressive BMPs or operational modifications.
    b. Implement more intensive monitoring to better track the growth or dissipation of the plume.
    c. If options (a) or (b) are not successful at controlling the water quality exceedance, it may be necessary to temporarily stop work to further assess the source of the exceedance, identify effective mitigation measures, and allow the water column to recover. Additionally, samples may be collected at 200 and 250 feet from construction activity to support a potential modification to the 150-foot mixing zone.

6.2.2 Exceedance of Chemical Criteria

If acute criteria are exceeded at the downcurrent 150-foot compliance boundary at the depth with the highest turbidity, or chronic criteria are exceeded at the downcurrent 300-foot compliance boundary at the depth with the highest turbidity, the following actions will be implemented:

1. Immediately notify the Contractor, CQAO, and EPA.
2. In consultation with EPA, evaluate the concurrent measurements at the Background Station and supporting evidence to determine whether the exceedance is caused by removal action construction activities versus other ambient conditions in the LDW (e.g., visual observations, wind waves, boat wakes, barge/ship traffic, other construction activity within the LDW, or storm inflow).
3. If exceedance is attributed to removal action construction activities:

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   a. Assess construction methods and existing BMPs.
   b. Analyze concurrent archived samples collected at the compliance boundary (both upstream and downstream) where exceedance was observed to determine if 1-hour average concentrations exceed the compliance criteria.
   c. If 1-hour average concentrations at the 300-foot compliance boundary exceed the chronic criteria, analyze remaining archived samples collected at the 300-foot compliance station on the day of the exceedance to determine if 24-hour concentrations exceed the compliance criteria.
4. If average concentrations exceed the compliance criteria, discuss path forward with EPA. The path forward could include some or all of the following:
   a. Implement more aggressive BMPs or operational modifications.
   b. Implement more intensive monitoring to better track the growth or dissipation of the plume.
   c. If options (a) or (b) are not successful at controlling the water quality exceedance, it may be necessary to temporarily stop work to further assess the source of the exceedance and identify effective mitigation measures. Additionally, samples may be collected at 200 and 250 feet from construction activity to support a potential modification to the 150-foot mixing zone.

6.3 Distressed or Dying Fish

In the event distressed or dying fish are observed in the RAB and are attributed to removal action activities, work will immediately stop and the Ecology, the Washington Department of Fish and Wildlife (WDFW), and the National Marine Fisheries Service (NMFS) will be contacted at the numbers listed as follows:

- Washington Military Department Emergency Management Division at (800) 258-5990
- Anne Friesz, WDFW, at (360) 906-6764
- NMFS Office of Law Enforcement at (503) 231-6240 or (206) 526-6133

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The condition of the fish (dead, dying, or erratic behavior); an estimate of the number, species, and size of fish in each condition; and, the location of fish relative to construction operations will be noted. If any dead Endangered Species Act (ESA)-listed species are present, samples will be frozen in secure storage under chain-of-custody for possible agency inspection. Additional fish and water sampling may be conducted at the direction of the resource agencies.

6.4 Discharge of Oil, Fuel, or Chemicals

In the event of a discharge of oil, fuel, or chemicals (including wet concrete) into the LDW resulting from removal action construction activities, work will stop and containment and cleanup efforts shall begin immediately and be completed as soon as possible. Work may resume only after the source of the spill or leak has been identified and controlled, as long as the work does not interfere with, delay, or hinder the containment and cleanup efforts. Cleanup includes appropriate disposal of any spilled material and cleanup material. The following agencies will be immediately notified:

- Ecology's Spill Response Office at (360) 407-6300
- Washington State Emergency Management at (800) 258-5990
- National Response Center at (800) 424-8802

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7 MONITORING PERSONNEL AND RESPONSIBILITIES

Key monitoring personnel required to implement this WQMP include the following:

- Water Quality Field Leader
- Monitoring personnel
- CQAO

Persons fulfilling these roles will be designated at least 1 week prior to the start of monitoring activities, and contact information will be provided at that time to the EPA, the Owner's Project Coordinators, the CQAO, and the Water Quality Field Leader. All monitoring personnel will be experienced in the collection and measurement of water quality parameters.

7.1.1 Water Quality Field Leader

The Water Quality Field Leader will be responsible for:

- Oversight of all water quality monitoring activities and field personnel
- Verification that results are properly recorded and forms are completely filled out
- Verification that appropriate calibration and quality control/quality assurance procedures are being implemented
- Notifying the CQAO in the event that water quality exceedances are observed, and providing the CQAO with all necessary supporting field documentation to be able to determine an appropriate path forward in consultation with EPA

Under the oversight of the Water Quality Field Leader, monitoring personnel will be responsible for conducting the field activities, required instrument calibrations, quality assurance and quality control procedures, and documentation of results in daily field reports.

7.1.2 Construction Quality Assurance Officer

The CQAO will be responsible for:

- Reviewing field reports to verify that appropriate field methods and quality control procedures are being implemented in accordance with the procedures specified in this WQMP

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- Weekly reporting of water quality results to the EPA Project Manager
- Notifying EPA if a confirmed water quality exceedance is observed, and coordinating with EPA to determine an appropriate path forward if a response action is warranted
- Coordinating with the Contractor to ensure appropriate construction BMPs are being implemented, and to strategize ways to add BMPs or enhance the effectiveness of existing BMPs as necessary to mitigate unacceptable water quality effects

EMJ015233

8 REFERENCES

Anchor QEA, 2011. *Final Engineering Evaluation/Cost Analysis – Jorgensen Forge Facility, 8531 East Marginal Way South, Seattle, Washington*. Prepared for the U.S. Environmental Protection Agency. March 2011.

Ecology (Washington State Department of Ecology), 2005.*Stormwater Management Manual of Western Washington.* February 2005.

EMJ (Earle M. Jorgensen), Jorgensen Forge Corporation (Jorgensen Forge), and The Boeing Company (Boeing), 2007. *Memorandum of Understanding: Coordination at the Boeing and EMJ/Jorgensen Transition Zone Boundary Sediment Cleanup Areas; Lower Duwamish Waterway*. September 2007.

EPA (U.S. Environmental Protection Agency), 2011. Action Memorandum for a Non-Time-Critical Removal Action at the Jorgensen Forge Early Action Area of the Lower Duwamish Waterway Superfund Site in Seattle, Washington. Seattle, Washington.

USFWS (U.S. Fish and Wildlife Service) 2012. Biological Opinion – Lower Duwamish Waterway Cleanup Actions at Jorgensen Forge and Boeing Plant 2/Duwamish Sediment Other Area. August 22, 2012.

EMJ015234

TABLES

EMJ015235

Table 1
Field Criteria

Parameter	Method	Criteria[a]		Target Reporting Limit	Laboratory PQL	Units
		Acute	Chronic			
Field Parameters						
Turbidity	Field Probe	BG+10%[g], BG+5 NTU		1	--	NTU
DO	Field Probe	>6.0 mg/L[h]		0.1	--	mg/L
Temperature	Field Probe	<16 °C[i]		0.1	--	°C
pH (Hydrogen ion concentration)	Field Probe	Between 7 - 8.5 pH Units[j]		0.2	--	pH Units
Chemical of Concern Analytes and Criteria						
Metals [b]						
Cadmium	6020A/200.8	40[k]	8.8[l]	0.10	0.10	µg/L
Chromium[c]	6020A/200.8	1,100[k]	50[l]	0.50	0.50	µg/L
Copper	6020A/200.8	4.8[k]	3.1[l]	0.5	0.5	µg/L
Lead	6020A/200.8	210[k]	8.1[l]	0.1	0.1	µg/L
Mercury	7470A	1.8[k]	0.94[l]	0.1	0.1	µg/L
Silver	6020A/200.8	1.9[l]	1.9[f,l]	0.2	0.2	µg/L
Zinc	6020A/200.8	90[k]	81[l]	4.0	4.0	µg/L
PCBs						
Total PCB Aroclors[d]	8082B	10[e,m]	0.03[m]	0.01	0.01	µg/L

Notes:
BG = Background
DO = dissolved oxygen
µg/L = micrograms per liter
mg/L = milligrams per liter
NTU = nephelometric turbidity units
PCBs = polychlorinated biphenyls
PQL = Practical Quantitation Limit
National Recommended Water Quality: Aquatic Life Criteria,
[a] http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm
[b] Acute and chronic criteria for metals (except mercury) are based on the dissolved fraction. The chronic criterion for mercury is based on total recoverable and the acute criterion is based on the dissolved fraction.
[c] Acute and chronic criteria for chromium is for the hexavalent form. Hexavalent chromium is not one of the chemicals of concern at the Jorgensen Forge site; therefore, chromium will be reported.
[d] Criteria for total PCBs based on the total recoverable fraction (EPA 2002)
[e] There is no National Recommended Water Quality Aquatic Life Acute Criterion for PCBs. The Washington State Acute Marine criterion for PCBs (Washington Administrative Code [WAC] 173-201A-240) is used.
[f] There is no chronic criterion for silver; the acute criterion of 1 .9 µg/L will be used as the chronic criterion/reporting limit.
[g] When background is above 50 NTU.
[h] When a water body's DO is lower than the criteria in Table 210 (1)(d) (or within 0.2 mg/L of the criteria) and that condition is due to natural conditions, then human actions considered cumulatively may not cause the DO of that water body to decrease more than 0.2 mg/L.
[i] When a water body's natural temperature is warmer than the criterion (or within 0.3°C [0.54°F] of the criterion), then human actions may not cause the 7-day average of daily maximum temperatures to increase more than 0.3°C (0.54°F). When the natural condition of the water is cooler than the criterion, the temperature increases must not, at any time, exceed 12/(T-2) as measured at the edge of a mixing zone boundary (where *T* represents the background temperature as measured at a point or points unaffected by the discharge and representative of the highest ambient water temperature in the vicinity of the discharge). Additionally, when the natural temperature of the water is cooler than the criterion, incremental temperature increases resulting from the combined effect of all non-point source activities in the water body must not, at any time, exceed 2.8°C (5.04°F).

[j] Any human-caused variation within the range listed above in the table must be less than 0.5 units.
[k] 1-hour average concentration.
[l] 4-day average concentration.
[m] 24-hour average concentration.

Table 2
Monitoring Schedule

Activity	In-Water Removal Activities			Backfill	Dredge Return Water
	Tier I	Tier II	Relatively Elevated Total PCB Concentration Areas[b]	Tier III	
Field Parameter Frequency	Daily for first 4 days; 2 times/day (ebb and flood tide)	3 times/week timed to relatively elevated areas; 2 times/day (ebb and flood tide)	Same as Tier I	One day during project; 2 times/day (ebb and flood tide)	Dredge return water will be returned to the "construction work area" after treatment and will be monitored concurrently with in-water removal activity monitoring.
Field Parameters and Depths	In situ conventional parameters (e.g., turbidity, DO, temperature, and pH) taken at 150-foot compliance, early warning and background monitoring station at 2 depths (top and bottom). Turbidity will also be measured at 300-foot compliance boundary to support chemistry analysis.	Same as Tier I	Same as Tier I	Same as in-water removal	
Station Location	- 75-foot early warning, 150- and 300-foot compliance station. - Background station located 600 feet upstream of Removal Action Boundary.	Same as Tier I	Same as Tier I	Same as in-water removal	
Field Parameter Monitoring Locations	- 75-foot early warning and 150-foot compliance station oriented downstream (depending on tide direction).	Same as Tier I	Same as Tier I	Same as in-water removal	
Chemical Monitoring Parameters and Locations	- COCs (PCBs and metals) collected at 150 and 300-foot compliance stations (upstream and downstream) and background station. - Analyze depth with highest turbidity at background and downcurrent compliance stations. - Archive all other samples for potential future analysis if exceedance observed.	Same as Tier I	Same as Tier I	No chemical monitoring required.	
Chemical Monitoring Frequency	- COC analysis 2 days/week; 1 time/day at depth with highest turbidity	Same as Tier I	Same as Tier I	N/A	
Water Quality Chemical Criteria	- Acute and chronic criteria (PCBs and metals). See Table 1.[a] - Chronic compliance assessed at 300-foot compliance boundary. - Acute compliance assessed at 150-foot compliance boundary.	Same as Tier I	Same as Tier I	N/A	
Water Quality Field Parameter Criteria	- Compliance assessed at 150-foot compliance boundary. - Class A (Excellent) marine waters; BG + 5 NTU, or 10% over BG when >50 NTU, DO > 6.0 mg/L at compliance, temperature < 16°C, pH between 7 - 8.5. See Table 1 for additional notes related to criteria.	Same as Tier I	Same as Tier I	Same as in-water removal	
Water Quality Field Parameter Exceedance Action	- Immediate collection and analysis of chemistry samples at 150 and 300 feet from the construction work area at exceedance depth. - Field parameter monitoring every 2 hours for remainder of day or until compliance documented.	Same as Tier I	Same as Tier I	Field parameter monitoring every 2 hours for remainder of day or until compliance documented.	
Water Quality Chemistry Exceedance Action	- Consult EPA and Ecology for appropriate action. - Analyze archived samples. - Determine if 1-hour (acute) or 24-hour (chronic) average concentrations exceed criteria.	Same as Tier I	Same as Tier I	N/A	

Notes:
[a] See Table 1 for chemical criteria.
[b] See Figure 4 for Relatively Elevated Total PCB Concentration Area.
µg/L = microgram per liter
BG = background
COC = chemical of concern
DO = dissolved oxygen
Ecology = Washington State Department of Ecology
EPA = U.S. Environmental Protection Agency
mg/L = milligram per liter
NTU = Nephelometric Turbidity Unit
PCB = polychlorinated biphenyl

FIGURES

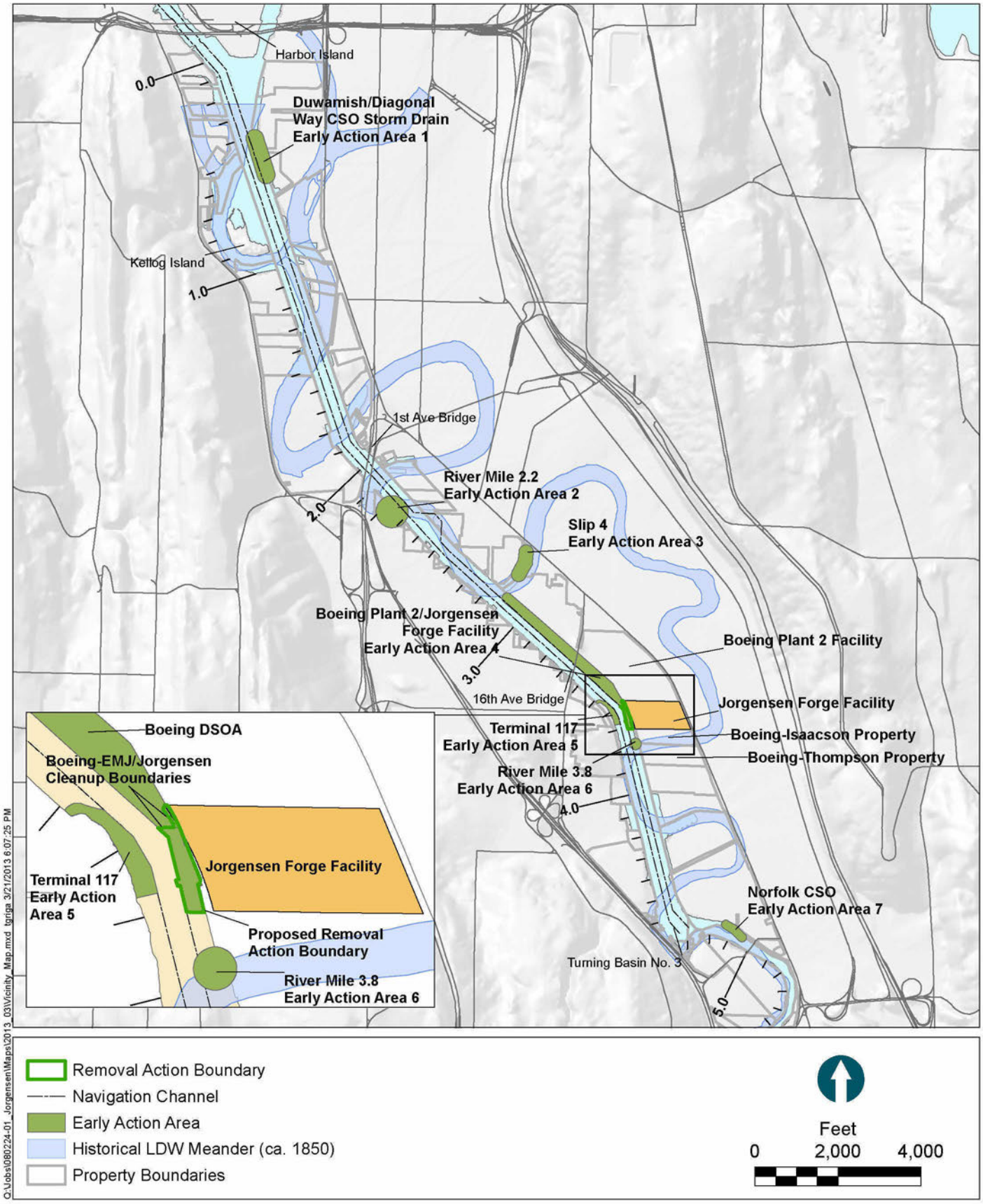

Figure 1
Removal Action Vicinity Map
Water Quality Monitoring Plan
Jorgensen Forge Early Action Area

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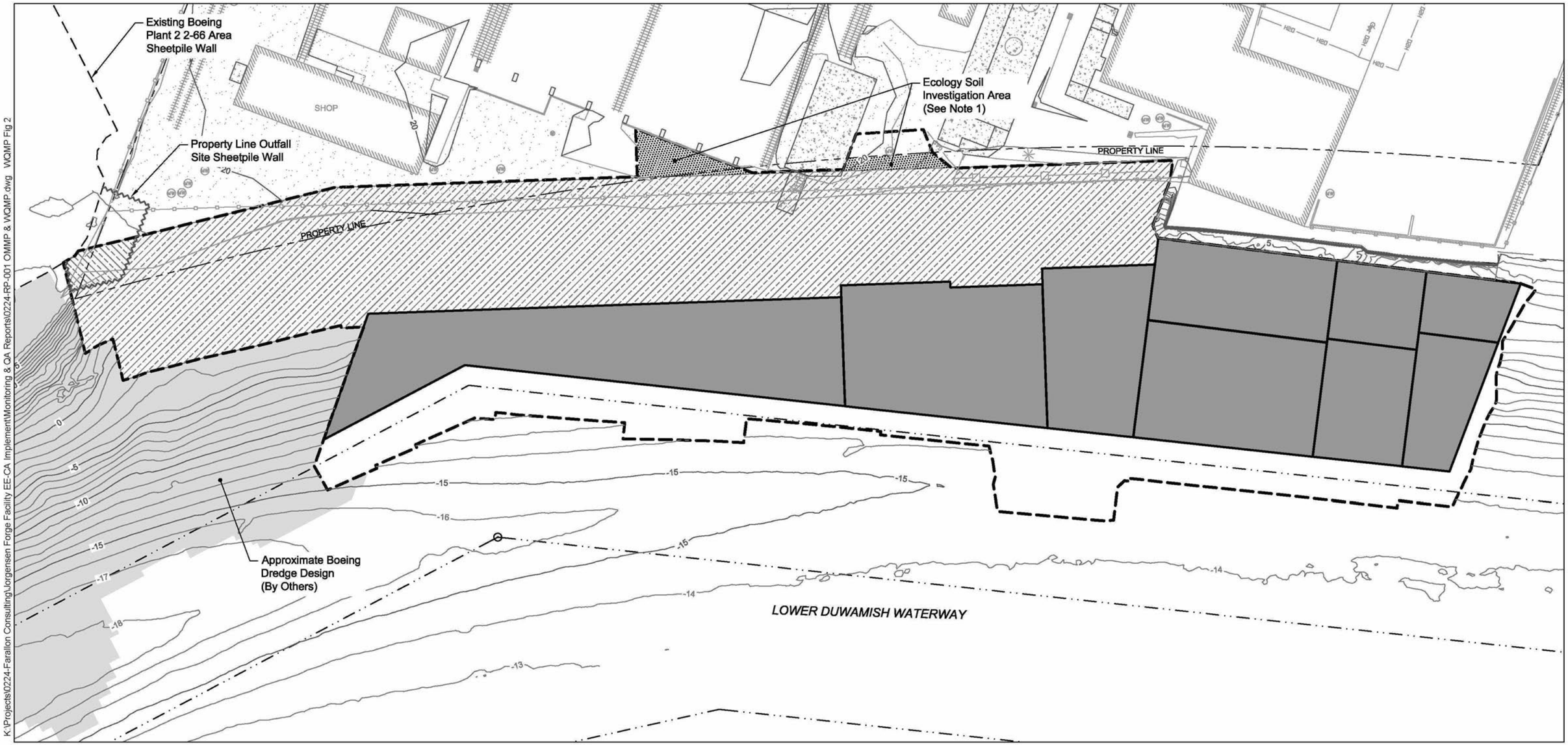

HORIZONTAL DATUM: Washington State Plane North, NAD83, U.S. Feet.
VERTICAL DATUM: Mean Lower Low Water (MLLW).
NOTES:

1. The Owner is removing additional soil and backfilling along the top of bank area surrounding soil borings SB-3 and SB-4 to remove relatively elevated concentrations of polychlorinated biphenyls. This work is not being performed under the EPA scope of work but rather as an Independent Action under the existing Ecology Agreed Order (No. DE 4127) at the facility.

LEGEND:

- Navigation Channel
- 5 Existing Contour (1 Ft Interval)
- Dredge/Excavation Limits
- Backfill Material Placement Area
- Shoreline Containment Area

0 50
Scale in Feet

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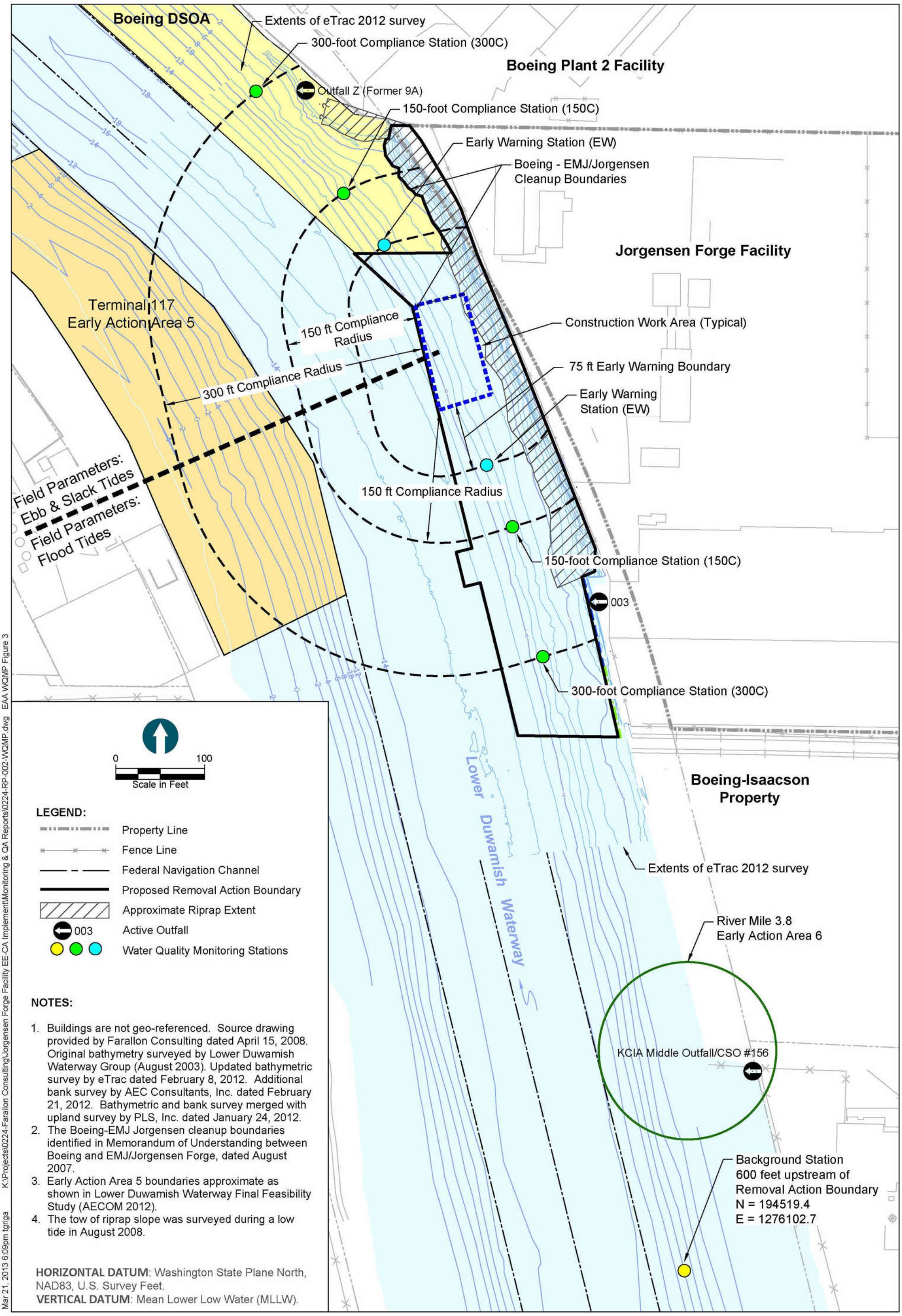
ANCHOR QEA

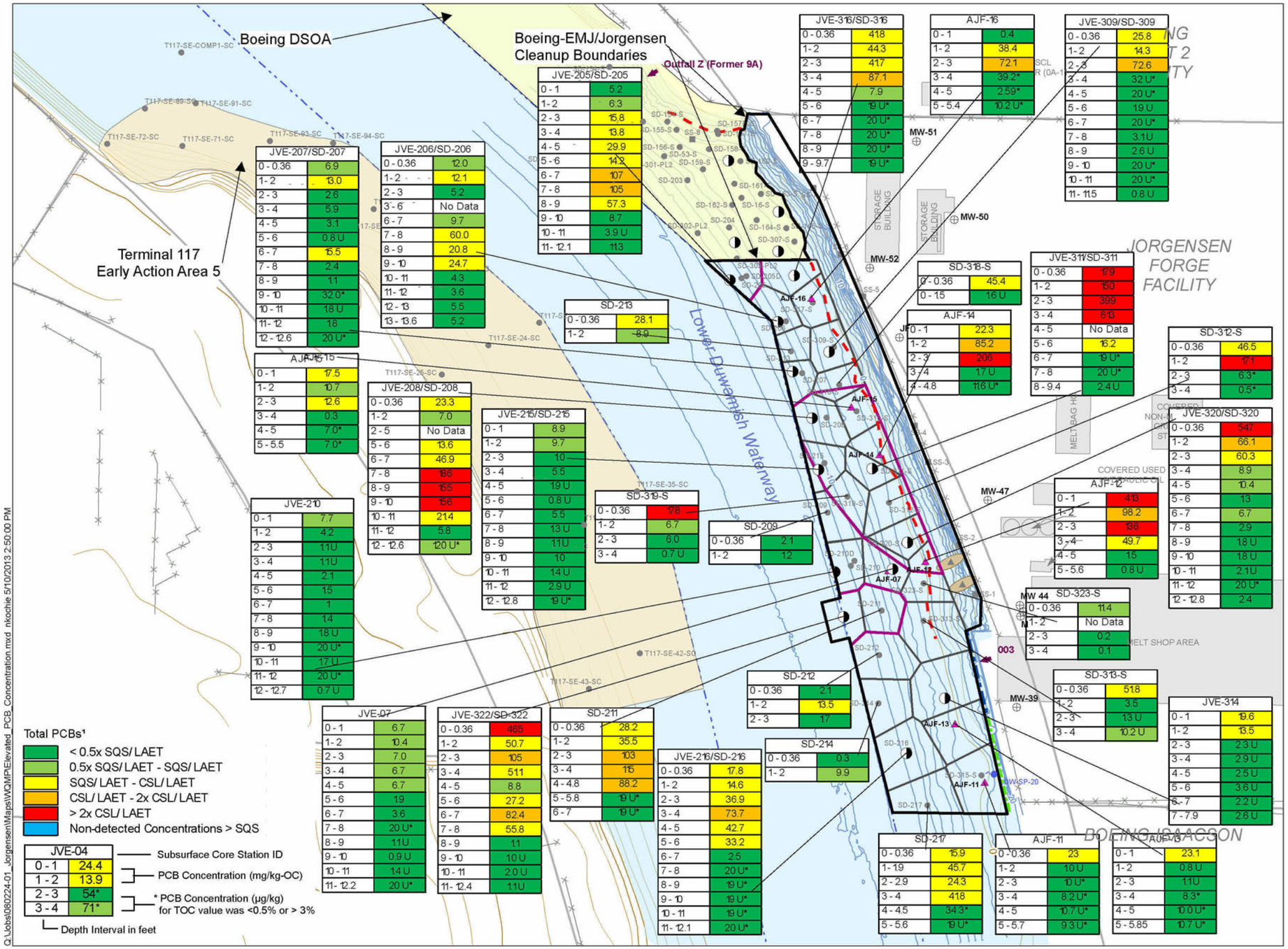
Figure 2
Proposed Action Site Plan
Water Quality Monitoring Plan
Jorgensen Forge Early Action Area

EMJ015240



ANCHOR QEA

Figure 3
Monitoring Plan
Water Quality Monitoring Plan
Jorgensen Forge Early Action Area



LEGEND

- Vertical Extent Sampling Location (Anchor, 2011)
- Subsurface Samples (Anchor, 2005)
- Subsurface Sampling Locations (others)
- Shoreline (0-2 ft) Bank Samples (Farallon, 2004)
- Debris Pile Samples (Farallon, 2004)
- Seep Sampling Location (Windward, 2004b)
- Groundwater Monitoring Well
- Active Outfall
- Concrete Panel Wall
- Toe of Riprap
- Sheetpile Wall
- Fences
- Federal Channel
- Removal Action Boundary
- Debris Pile
- Property Boundaries
- Boeing DSOA
- Terminal 117 Early Action Area 5 Boundary
- Thiessen Polygon
- Relatively Elevated Total PCB Concentration Area

NOTES:

1. Sediment samples were OC-normalized and compared to SQS and CSL Total PCBs criteria. Sediment samples with TOC <0.5% or TOC >3% were not OC-normalized and were compared to LAET and 2LAET Total PCBs criteria. *TOC value was <0.5% or > 3%; reported in µg/kg dry weight.
2. Bathymetric survey by eTrac dated February 8, 2012. Additional back survey by AEC Consultants, Inc. dated February 21, 2012. Bathymetric and bank survey merged with upland survey by PLS, Inc. dated January 24, 2012.
4. Outfall locations field identified on May 14, 2003.
5. The toe of riprap slope was surveyed during a low tide on August 28, 2008.
6. The Boeing-EMJ/Jorgensen cleanup boundaries is identified in the Memorandum of Understanding between Boeing and EMJ/Jorgensen Forge, dated August 2007 (EMJ et al. 2007).
7. Sediment Quality Standard (SQS) = 12 mg/kg-OC.
8. Lower Apparent Effects Threshold (LAET) = 0.13 mg/kg.
9. Cleanup Screening Level (CSL) = 65 mg/kg-OC.
10. Second Lower Apparent Effects Threshold (2LAET) = 1 mg/kg.

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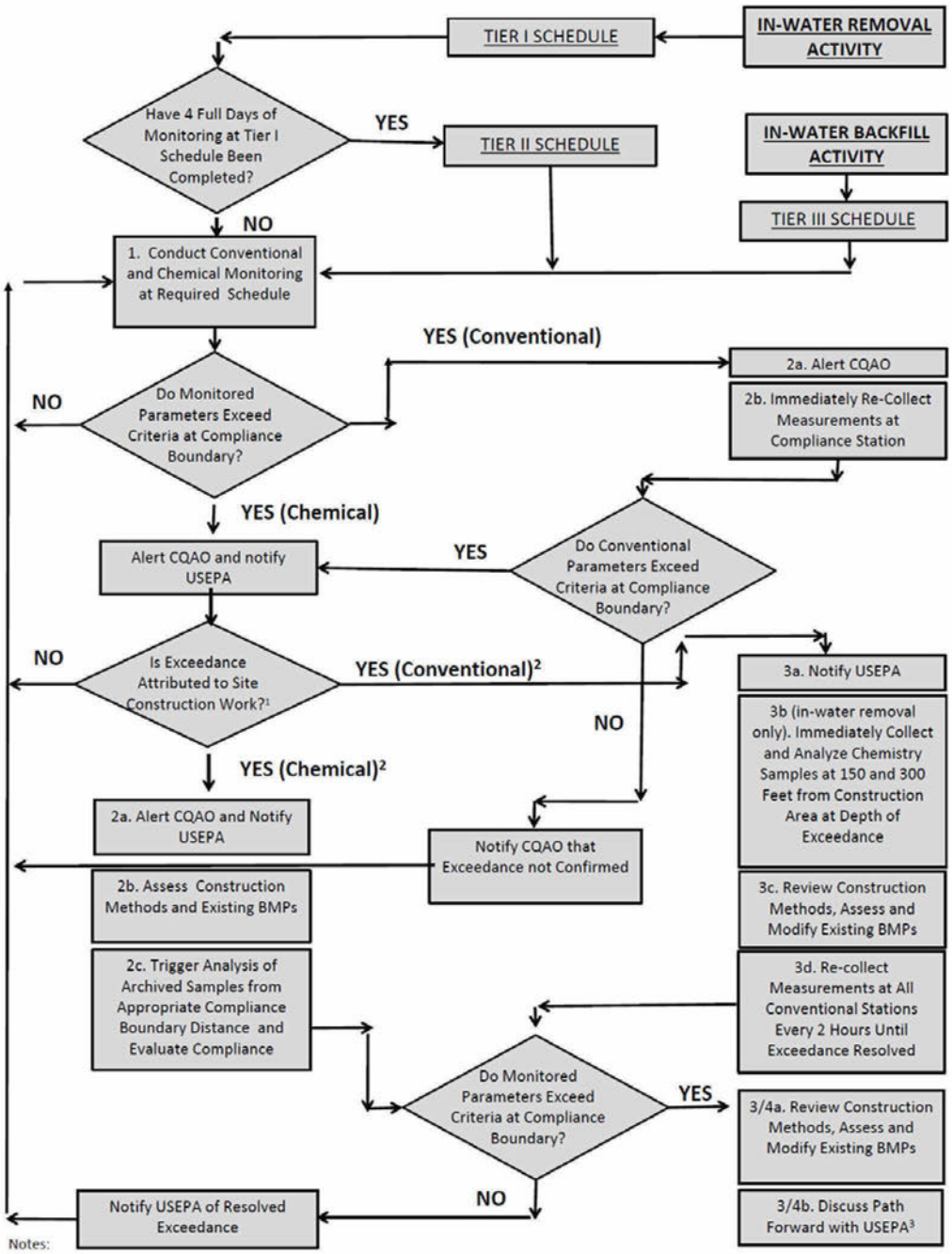
Feet
0 50 100 150 200

Figure 4
Relatively Elevated Total PCB Concentration Area
Water Quality Monitoring Plan
Jorgensen Forge Early Action Area



Notes:

1) Compile and evaluate all data to determine the potential cause(s) of the exceedance if these causes are attributable to site construction work. At a minimum, this evaluation will include comparision of the background concentration to the compliance concentrations and review of work activities and construction methods occurring at the time of the exceedance.

2) Consistent with the Boeing DSOA cleanup EPA approved Water Quality Monitoring Work Plan (WQMWP) and Ecology Water Quality Certification, exceedance of chemical or conventional criteria will trigger the following steps to attempt to remedy continued exceedances: determine if exceedance is attributable to site construction work; if yes, notify EPA of exceedance; review construction methods to determine potential source(s) of exceedance; implement operational and/or BMP modifications; and, perform additional testing to determine effectiveness of these modifications.

3) If continued conventional and/or chemical criteria exceedance are identified following the modification of the construction activities and BMPs, the Owner will coordinate further with EPA to determine the appropriate further actions. These actions may include, the performance of additional monitoring, the implementation of additional more robust BMPS, revision of the compliance zone boundary, and the temporary halting of construction activities pending further actions.

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Figure 5
Water Quality Decision Framework
Water Quality Monitoring Plan
Jorgensen Forge Early Action Area

ATTACHMENT 1
WATER QUALITY MONITORING FORM

ANCHOR QEA

720 Olive Way, Suite 1900
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

Water Quality Monitoring Form

Station ID:		**Date:**	**Time:**
Project Name:		**Project Number:**	
Coordinates Datum:			
Lat/Northing:		Long/Easting:	

Weather/River Stage/Flow Observations:

Status/Description of Operation at Time of Sampling:

Depth to Bottom: _____ (m)(ft)

	Dissolved Oxygen (mg/L)	Temperature (C)	Turbidity (NTU)	Other
Depth 1: ____ (m)(ft)				
Depth 2: ____ (m)(ft)				
Other:				

Evidence of floating or suspended materials:	
Evidence of oil/hydrocarbon sheen: (Thickness, contiguous?, size, rate of dissipation)	
Discoloration and Turbidity:	
Velocity at stated depth:	
Color:	
Odor:	
Other Observations:	

Comments:

Recorded by: Other Monitoring Personnel:

APPENDIX F
OPERATIONS, MONITORING, AND MAINTENANCE PLAN

APPENDIX F
OPERATIONS, MONITORING, AND MAINTENANCE PLAN
BASIS OF DESIGN REPORT
JORGENSEN FORGE EARLY ACTION AREA

Prepared for

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March 2013

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EMJ015249

LIST OF ACRONYMS AND ABBREVIATIONS

Action Memo	*Action Memorandum for a Non-Time-Critical Removal Action at the Jorgensen Forge Early Action Area of the Lower Duwamish Waterway Superfund Site in Seattle, Washington*
ANOVA	Analysis of Variance
AOC	Administrative Order on Consent
BODR	Basis of Design Report
Boeing	The Boeing Company
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm	centimeter
COC	chemical of concern
CQAP	Construction Quality Assurance Plan
cy	cubic yard
DSOA	Duwamish Sediment Other Area
EAA	Early Action Area
EMJ	Earle M. Jorgensen Company
EPA	U.S. Environmental Protection Agency
Facility	Jorgensen Forge facility
FSP	Field Sampling Plan
H:V	Horizontal to vertical
Jorgensen Forge	Jorgensen Forge Corporation
LDW	Lower Duwamish Waterway
mg/kg-OC	milligrams per kilogram (parts per million) organic carbon normalized
MLLW	mean lower low water
MOU	Memorandum of Understanding
NTCRA	non-time critical removal action
OMMP	Operations, Monitoring, and Maintenance Plan
Owner	EMJ and Jorgensen Forge
PCB	polychlorinated biphenyl

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QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RAB	Removal Action Boundary
RAWP	Removal Action Work Plan
RvAL	Removal Action Level
SAP	Sampling and Analysis Plan
SOW	Statement of Work
SMS	Sediment Management Standards

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1 INTRODUCTION

This Operations, Monitoring, and Maintenance Plan (OMMP) has been prepared on behalf of Earle M. Jorgensen Company (EMJ) and Jorgensen Forge Corporation (Jorgensen Forge; herein referred to collectively as the Owner) pursuant to the Administrative Settlement Agreement and Order on Consent for Removal Action Implementation (AOC; U.S. Environmental Protection Agency [EPA] Region X Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] Docket No. 10-2012-0032) and attached Statement of Work (SOW). This OMMP is an appendix to the Basis of Design Report (BODR) Final Design submittal for the cleanup of contaminated sediments and associated bank soils in a portion of the Lower Duwamish Waterway (LDW) Superfund Site adjacent to the Jorgensen Forge facility (Facility) located in Tukwila, King County, Washington (Figure 1; Jorgensen Forge Early Action Area [EAA]).

Construction activities planned as part of the cleanup include in-water dredging, placement of in-water backfill and shoreline materials, reconfiguring the shoreline bank, and transport and off-site disposal of impacted sediments and soils. The cleanup will be conducted as a non-time-critical removal action (NTCRA) in accordance with EPA's selected cleanup alternative documented in the *Action Memorandum for a Non-Time-Critical Removal Action at the Jorgensen Forge Early Action Area of the Lower Duwamish Waterway Superfund Site in Seattle, Washington* (Action Memo; EPA 2011) and detailed in the *Final Engineering Evaluation/Cost Analysis [EE/CA]– Jorgensen Forge Facility, 8531 East Marginal Way South, Seattle, Washington* (Anchor QEA 2011).

The limits of the Jorgensen Forge EAA (herein referred to as the Removal Action Boundary [RAB]) are shown on Figure 2. The RAB extends from the top of the bank at approximately 19 to 20 feet mean lower low water (MLLW) (or top of the sheetpile/concrete panel on the southern portion of the Facility) to the federal navigation channel. The RAB is bounded to the north by The Boeing Company (Boeing) Plant 2 Duwamish Sediment Other Area (DSOA) and Southwest Bank Corrective Measure EAA cleanup area, as specified in the EPA-approved Memorandum of Understanding (MOU; EMJ 2007). EPA identified this cleanup area as the northern portion of the Jorgensen Forge EAA.

The removal action consists of the following elements:

- **Sediment Dredging**. Removal of the complete vertical and lateral extents of sediments exceeding the identified polychlorinated biphenyl (PCB) removal action level (RvAL; EPA 2008b) using barge-mounted equipment. Because the complete extents of total PCB RvAL exceedances and other co-located chemical exceedances will be removed, the removal action does not include a requirement for chemical isolation and the backfill material does not need to provide this function.
- **Sediment Backfilling**. Placement of imported clean fill material in removal areas to bring these areas back up to near the existing grade and elevation.
- **Shoreline Bank Reconfiguration**. Excavation of shoreline bank debris and sediments/soils to support greater slope stability and containment of the shoreline bank with imported clean materials; this work is planned to be conducted "in-the-dry" to the extent possible based on tidal elevations encountered during completion of the removal action.

1.1 Objectives of the OMMP

The general objectives of the OMMP are to develop long-term monitoring and maintenance requirements for the removal action to confirm that performance standards are being met in the years following construction, and to demonstrate that upland source controls at the Facility are effectively minimizing the potential for sediment recontamination.

The specific objectives of the OMMP are listed in Section II.2.1.1 of the SOW and include the following:

1. Establish baseline conditions for assessing the success of the NTCRA[1]
2. Monitor the predicted natural recovery of sediments[2]
3. Evaluate the effectiveness of source control, natural recovery, sediment removal, and thin-layer placement remedial actions[3]
4. Evaluate contaminant concentration levels or changes in sediment quality

[1]Baseline conditions will be established using post-construction surveys as specified in the Construction Quality Assurance Plan (CQAP; Appendix D to the BODR).
[2] Natural recovery is not a technology included in the EPA-approved removal action (EPA 2011). Rather, the changes in surface sediment quality in the new clean backfill surface within the RAB will be monitored over time to evaluate the anticipated increases in concentrations due to ongoing offsite sources in the LDW.
[3] Natural recovery and thin-layer placement are not components of the NTCRA.

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5. Specify maintenance requirements for any structural components or structural soil/rock systems for the long-term protection of covered or contained areas, if applicable
6. Establish a schedule of inspections and monitoring
7. Define objective criteria for determining if maintenance is necessary based on monitoring results

1.2 Performance Standards

A summary of the proposed standards that will be used to evaluate the long-term performance of the removal action is provided below.

Sediment Recontamination. Clean imported sediments will be placed throughout the entire in-water and shoreline bank areas in the RAB following completion of the removal action. Over time, this clean sediment surface is expected to increase in concentration due to migration of chemicals from ongoing off-site sources in the LDW. The changes in surface sediment concentration within the RAB will be evaluated relative to areas outside the RAB through the collection and chemical analysis of surface sediment concentrations over time.

Shoreline Bank Containment Integrity. The shoreline bank area of the RAB will be contained with a 1.5-foot filter material layer overlain by a 2.5-foot riprap material layer, further overlain by a 0.5-foot layer of habitat substrate. The integrity of this containment will be maintained over the long term. Specifically, the bank will be inspected for significant signs of sloughing or erosion. Note that the intent of the habitat substrate is to allow it to naturally accrete or erode; it will not be specifically maintained.

1.3 Organization of the OMMP

The remainder of this OMMP is organized as follows:

- **Section 2** - Project Description
- **Section 3** - Monitoring of Dredging Area
- **Section 4** - Monitoring of Sediment Quality in Dredging Area
- **Section 5** - Monitoring of Shoreline Area
- **Section 6** - Potential Response Actions

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- **Section 7** - Reporting

The three primary monitoring activities for the OMMP are described in Sections 3, 4, and 5. Monitoring objectives, schedules, and methods, including the type, number, location, and frequency of samples or measurements are presented in these sections. Section 6 describes the potential response actions that will be evaluated if long-term performance standards are not achieved. Section 7 presents the OMMP reporting requirements.

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2 PROJECT DESCRIPTION

Design elements of the removal action are provided in the BODR and summarized in this section. The elements of the removal action are shown on Figure 2 and consist of the following activities:

- Shoreline bank excavation and slope containment (intertidal)
- Sediment dredging and backfilling (subtidal)

2.1 Sediment Dredging and Backfilling

As detailed in the BODR, the removal action includes dredging of all subtidal sediments with concentrations greater than the Washington State Department of Ecology (Ecology) Sediment Management Standards (SMS) PCB criterion (12 milligrams per kilogram normalized for organic carbon content [12 mg/kg-OC]). This total PCB criterion is referred to as the RvAL in this OMMP consistent with the BODR and Action Memorandum (EPA 2011). The target dredge elevations will be based on existing subsurface core data in the RAB showing RvAL exceedances. Based on current information, the dredge cuts will vary in thickness between 1 and 11 feet, and the contractor will be allowed an additional overdredge tolerance of 2 feet. Approximately 10,800 cubic yards (cy) of material is required to be removed during dredging.

Note that areas within 10 feet of the navigation channel in the RAB will not be fully backfilled to its current grade in consideration of future navigational dredging needs in the federal navigation channel. Also, dredging adjacent to the abutted sheet pile and concrete panel walls will be offset by 5 feet to minimize potential impacts to the structural stability of the walls. That 5-foot strip will be covered with a minimum of 18 inches of clean material.

Dredging will be followed by the placement of clean import material to bring the area back generally to its existing grade. The clean backfill material will consist of sand and gravel mixture that meets EPA-approved chemical criteria.

2.2 Shoreline Bank Excavation and Slope Containment

The shoreline bank will be excavated to remove debris and underlying affected nearshore soil/sediment, followed by the placement of 4-foot-thick slope containment (Figure 2). The

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slope containment is designed to promote slope stability, enhance habitat, and contain underlying soil/sediment materials. The shoreline bank reconfiguration extends from the top of the existing bank from approximately 19 to 20 feet MLLW down to -8 feet MLLW elevation.

The excavation is proposed to occur over a total distance of approximately 570 linear feet of shoreline. The design excavation depth is between 1 and 11 feet (including 1 feet over-excavation tolerance) shoreward of the existing ground surface from the toe of slope upwards, and the finished bank will be reconfigured to a gentler, more stable 2 horizontal to 1 vertical slope (2H:1V; Figure 2). The excavation will result in the required removal of approximately 5,400 cy of impacted soil/sediment, fill material, and debris.

Following excavation, slope containment materials will be placed along the full length and height of the reconfigured slope. The containment will be composed of three layers: a target 1.5-foot "filter" layer (sandy gravel to gravelly sand), overlain by a target 2.5-foot riprap material, and finished with a target 0.5-foot habitat layer (anticipated to consist of rounded or sub-rounded, 2.5-inch minus gravel). The filter layer will act as the chemical isolation layer, the riprap layer will protect the filter layer from erosion, and the habitat layer will provide enhanced substrate for benthic invertebrates and salmonids. Application of the slope containment will result in the placement of approximately 2,500 cy of filter material, 3,800 cy of riprap material, and 1,300 cy of a habitat material (for a total placement volume of approximately 7,600 cy) over approximately a total of 0.75 acres.

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3 MONITORING OF BACKFILL IN DREDGING AREAS

Visual monitoring of the backfill area will be performed in intertidal areas following dredging and backfilling to confirm that significant erosion or sloughing is not occurring in the years following the removal action (Figure 2). Because the complete vertical and lateral extents of total PCB RvAL exceedances and other co-located chemical exceedances will be removed, the removal action does not include a requirement for chemical isolation and the backfill material does not need to be monitored for this function.

3.1 Monitoring Objectives and Approach

The objective of visual monitoring the intertidal dredge and backfill areas is to confirm that the backfill material is generally remaining in place and that sloughing or other evidence of slope instability is not occurring. This objective will be achieved by visual surveys at low tide. Monitoring of subtidal dredge and backfill areas is not necessary since any significant slope instability in the backfill area would be identified during the visual monitoring performed in the intertidal areas during low tide.

3.2 Monitoring Methods, Locations, and Frequency

3.2.1 Monitoring Methods

A visual survey will be performed from land at a spring low tide when tides are typically at the lowest elevations of the year. Photos taken from fixed observation points will determine if any dredge and backfill areas are sloughing or other visual signs of slope instability are evident. Any areas of instability will be noted on figures and contingency and response actions will be taken as necessary as described in Section 6.1. Photos taken during the first year of monitoring will serve as a baseline for future monitoring.

3.2.2 Monitoring Locations

The density and specific location of fixed observation points will be determined in the first year of monitoring after final backfill grades and site access routes have been established. It is anticipated that the observation points will be established in the backfill area at elevations at or above -2 feet MLLW.

3.2.3 Monitoring Frequency

Visual surveys of dredge and backfill areas will be performed in Year 1, 3, 5, 7, and 10, following the completion of the removal action. Visual surveys will be performed during a spring low tide to the extent practicable to maximize the coverage of the survey area.

Monitoring reports will include color photos of a reasonable size to interpret the conditions and a discussion of any evidence of sloughing or instability in the backfill material. As discussed in Section 6.1 below, recommendations for additional slope stabilization measures will also be included, if necessary.

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4 POST-CONSTRUCTION MONITORING OF SEDIMENT QUALITY IN DREDGING AREAS

Long-term monitoring of the chemical quality of surface sediments in the RAB will be performed as described below. The complete vertical and lateral extents of total PCB RvAL exceedances and other co-located chemical exceedances will be removed in the RAB so this monitoring will serve to document anticipated increases in surface sediment chemical concentrations over time due to off-site ongoing releases in the LDW and evaluate potential recontamination from ongoing Facility operations.

4.1 Monitoring Objectives and Approach

Post-construction surface sediment monitoring will be performed in the RAB to evaluate the changes in surface sediment concentration over time. Consistent with the SMS, the surface sediment samples will be collected from within the top 10 centimeters (cm) below the mudline.

To evaluate changes in surface sediment concentrations within the RAB, six surface sediment samples will be collected within the dredging area (Figure 3). Surface sediment locations are distributed to achieve spatial coverage and target potential sources of recontamination within the RAB. Figure 7 of the BODR presents subsurface sediment total PCB concentrations within the RAB. Five of the surface sediment locations are co-located with existing subsurface sampling locations with relatively high PCB concentrations. A sixth surface sediment sample (LTR-4) is specifically located to monitor potential sediment quality impacts from the discharge area of the new outfall that will be constructed during the removal action. Surface sediment samples collected within the RAB will be submitted for chemical analysis for the chemicals of concern (COCs) described in Section 4.2.

Surface samples will also be collected from two other areas, including one immediately adjacent area outside the RAB within the navigation channel and one area upstream of the RAB. Samples collected from the upstream and navigation channel areas will be archived to support potential future analysis of off-site source impacts to the RAB, if necessary.

The Boeing Plant 2 DSOA corrective action will occur directly downstream of the RAB following completion of the removal action in the RAB. Boeing will implement a separate

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perimeter monitoring plan to address releases from the DSOA corrective action as described in the Pre- and Post-Construction Perimeter Sediment Monitoring Plan (AMEC 2012). Therefore, no downstream perimeter sample collection is proposed in this OMMP.

4.2 Monitoring Methods, Locations, and Frequency

4.2.1 Surface Sediment Sampling Methods

Surface sediment samples from all locations shown in Figure 3 (including R, U, and N samples, as described in Section 4.2.2, below) will be collected using a van Veen grab sampler or equivalent deployed from a winch line on a sampling vessel. All individual grab samples will be collected from the top 10 cm below mudline.

Detailed procedures for field sampling, location control, sample handling, and decontamination are provided in the Field Sampling Plan (FSP) for this project (see Appendix I to the BODR). In areas where riprap has been placed as part of the shoreline containment, collection of surface grab samples may not be possible. As described in the FSP, sample locations will be excluded from the analysis if sample collection is unsuccessful after three attempts.

Detailed field and laboratory quality assurance and quality control criteria, including method specifications, detection limits, accuracy and precision requirements, are provided in the Quality Assurance Project Plan (QAPP) for this project (see Attachment 1 of Appendix I to the BODR).

4.2.2 Surface Sediment Sample Locations

The proposed long-term surface sediment sample locations are shown on Figure 3. Surface sediment grab samples are systematically distributed within the following three different monitoring areas to evaluate potential sources of recontamination, including one area within the RAB, one immediately adjacent area outside the RAB, and one area upstream from the RAB:

- Subtidal and intertidal areas within the RAB (R)
- Federal navigation channel immediately adjacent and upstream of RAB (N)
- Subtidal and intertidal areas immediately upstream of RAB (U) as well as further

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upstream in vicinity of river mile (RM) 3.8 EAA and upstream of the EAA

As shown in Figure 3, six individual surface sediment samples will be collected from each of the sediment monitoring areas R, U, and N, resulting in a total of 18 samples. The samples will be submitted for chemical analysis or archived as described in the following sections.

The target sample coordinates for each of the sediment grab sample locations are listed in Table 1.

4.2.3 Chemical Analytical Parameters

The sediment samples collected from sediment monitoring area R will be submitted for the following list of chemical and conventional parameters:

- Total PCBs
- Total organic carbon
- Metals
- Total solids
- Grain size

The remaining samples from sediment monitoring areas U and N will be archived. These archived samples will be kept in frozen storage at the analytical laboratory pending potential future analysis.

4.2.4 Monitoring Frequency

A post-construction sediment sampling event will be conducted in sediment monitoring areas U and N as part of the CQAP activities (see Appendix D of the BODR) to verify the final "as built" quality of the sediment surface following the removal action construction completion. Sediment sampling conducted as part of the OMMP will be performed in sediment monitoring area R concurrently with this CQAP sampling. This CQAP and OMMP data will serve as the Year 0 baseline condition and the comparison endpoint for future OMMP surface sediment monitoring data.

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Subsequent sampling will be conducted in all sediment monitoring areas shown in Figure 3 in Years 1, 3, 5, 7, and 10 following the completion of the removal action. The monitoring schedule will be re-evaluated in consultation with EPA after the first two events are completed and analyzed. The monitoring frequency may be decreased if sediment concentrations are consistently below SMS Sediment Quality Standard criteria and show relatively insignificant changes over time. Additional monitoring may be conducted if a significant documented release occurs from the Facility to the LDW.

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5 POST-CONSTRUCTION MONITORING OF SHORELINE BANK AREA

Post-construction visual monitoring of the reconfigured shoreline bank will be conducted during spring low tide in the area identified as "Reconfigured Bank Visual Monitoring Area" shown on Figure 3. To the extent possible, visual monitoring of the shoreline bank areas will occur concurrently with monitoring of the backfill area.

5.1 Monitoring Objectives and Strategy

The objective of visual monitoring within the shoreline bank area is to verify that slope containment remains generally stable and there are no significant signs of riprap movement, sloughing, or erosion. In addition, the condition and coverage of the 6-inch habitat cover layer will be visually assessed. Note that the intent of the habitat cover layer is to allow it to naturally accrete or erode so this layer is anticipated to migrate and come to equilibrium based on the encountered forces (e.g., LDW discharge, waves, or propeller wash).

5.2 Monitoring Methods, Locations, and Frequency

5.2.1 Containment Stability Survey Methods

A visual survey of the shoreline bank area will be completed that will look for evidence of sloughing and erosion to ensure that the function and integrity of the shoreline containment is being maintained. Transects will be established on 100-foot centers perpendicular to the shoreline (approximately 6 transects) to provide a fixed frame of reference from one monitoring event to the next. Observers will walk the top of the shoreline bank and visually observe the areas above the waterline and document any evidence suggesting erosion or instability of the riprap layer relative to the nearest transect. Any areas of erosion or instability will be noted on figures relative to the transect locations.

A visual survey of the habitat layer will be completed to estimate the coverage of the habitat material over the riprap. Observers will walk the entire top of shoreline bank area looking for areas of erosion or accretion. The estimated percent coverage of riprap by the habitat layer, areas of exposed riprap, and the estimated thickness of the habitat layer will be recorded relative to the transect locations.

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5.2.2 Shoreline Evaluation

If significant signs of erosion of the riprap material or bank instability are observed, contingency response actions will be evaluated, as described in Section 6.

Because the habitat cover layer is expected to naturally accrete or erode in response to the encountered forces (e.g., LDW discharge, waves and propeller wash), the loss of this material from the shoreline area will not trigger a response action.

5.2.3 Shoreline Monitoring Frequency

Visual monitoring of the shoreline area at spring low tide will be performed in Years 1, 3, 5, 7, and 10 following the completion of the removal action. To the extent possible, visual monitoring of the shoreline area will be performed concurrently with visual monitoring of the backfill area described in Section 3. Contingent visual monitoring of the shoreline area will be performed in response to a storm event or flood event of 25-year return period or greater, if one happens to occur in the LDW during the post-construction OMMP monitoring period.

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6 CONTINGENCY RESPONSE ACTIONS

This section describes potential response actions that will be undertaken if monitoring results indicate the long-term performance standards identified in Section 1.2 are not being achieved.

There are four potential issues with the long-term integrity of the removal action that would warrant an evaluation of response actions, including:

- Significant erosion, sloughing or instability of the backfill material
- Recontamination within the RAB from Facility releases
- Erosion or instability of the shoreline containment area
- Earthquake of 100 recurrence interval or greater

Potential response actions for each of these scenarios are discussed below.

6.1 Significant Erosion, Sloughing, or Instability of the Backfill Material

If significant signs of erosion, sloughing, or significant downslope movement of the backfill material are observed, a geotechnical engineer will assess the slope configuration to determine the severity of the instability and whether ongoing failures are likely. If additional slope stabilization measures are deemed necessary, cost-effective alternatives will be discussed with EPA.

Note that the primary objective of any response action will be to correct sloughing or slope instability concerns. The complete vertical and lateral extents of total PCB RvAL exceedances and other co-located chemical exceedances will be removed so the backfill material is not designed to perform as a chemical isolation layer.

6.2 Recontamination within the RAB from Facility Releases

It is expected that surface sediment COC concentrations within the RAB will increase over time from the post-construction baseline as chemical concentrations approach equilibrium with ongoing off-site source loadings in the LDW. As described in Sections 4 and 5, samples will be collected both within the RAB and in the adjacent areas within the LDW (see the

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three monitoring areas shown Figure 3) to document whether the surface sediment concentration increases in the RAB are sourced from the Facility versus off-site LDW-wide sources. If the data suggest increased surface sediment concentrations above the applicable EPA-approved risk based concentrations are due to Facility releases, the following sequence of contingency response actions will be initiated:

- An additional round of sediment testing will be conducted immediately to confirm the results. The sediment testing locations may be revised from those identified in Figure 3 to target potential release areas. If recontamination from Facility sources is not confirmed, monitoring will resume according to the regular OMMP schedule.
- If recontamination from Facility sources is also identified during the confirmation testing, the Owner and EPA, in coordination with Ecology, will review the data, in particular the nature and magnitude of the exceedance, and agree on an appropriate path forward. The path forward may include one or more of the following:
  - Sampling of the Facility stormwater discharge following treatment and discharge into the LDW
  - Increased frequency of sediment monitoring
  - Use of additional field measurements (e.g., bioassays, fish tissue samples) to evaluate site-specific risk
  - Application of a thin sand cover layer to the affected area
  - Upland source tracing and environmental monitoring to isolate and identify the source of contamination
  - Evaluation of additional cost-effective source control measures, potentially including enhanced or additional best management practices (BMPs), engineering or operational controls

6.3 Erosion or Instability of the Shoreline Bank Area

If the shoreline bank is determined to be unstable or is undergoing significant erosion such that it compromises the integrity of the shoreline containment, the following sequence of contingency actions will be initiated:

- Delineate the extent of the containment reduction
- Determine the cause of the instability
- Address the instability based on the findings. Measures to improve the stability of the

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shoreline containment may include:

- Regrading of the slope
- Placement of a toe buttress
- Increasing the gradation and/or thickness of the riprap layer

If response actions are warranted, it may be necessary to monitor this area more frequently to observe the effectiveness of any shoreline repairs, to better understand the causative processes, and to quickly identify new areas of erosion if any should develop.

6.4 Earthquake of 100-Year Recurrence Interval or Greater

If an earthquake occurs with a 100-year recurrence interval or greater, the long-term monitoring procedures described in Section 3, 4, and 5 will determine whether significant erosion, sloughing, or instability of the backfill material occurred; whether Facility releases occurred that could have the potential to recontaminate the RAB; and, whether erosion or instability of the shoreline containment area may have occurred and potentially compromised the integrity of the shoreline containment. If any of the above conditions exist, the potential response actions identified in Sections 6.1, 6.2, and 6.3 will be triggered.

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7 REPORTING

OMMP monitoring reports will be prepared following Year 1, 3, 5, 7, and 10 monitoring events, as well as any emergency monitoring events that may need to be conducted in response to a severe storm or flood or documented significant release from the Facility. Each monitoring report will be prepared and submitted to EPA within 90 days of receipt of final validated analytical results for that event. The reports will include a presentation and evaluation of all monitoring activities conducted during the monitoring year, and will be organized according to the three primary monitoring tasks described in Sections 3, 4, and 5 of this OMMP. Follow-up meetings with the Owner and EPA will be scheduled, as necessary, to review and discuss the monitoring results, in particular to agree on a path forward if contingency response actions are recommended. At a minimum, the monitoring reports will include the information summarized below.

7.1 General Reporting

Each monitoring report will generally contain the following information:

1. Summary of all field activities, including a description of any deviations from the FSP, QAPP, or OMMP, and reasons for the deviations.
2. Final Quality Assurance/Quality Control (QA/QC) report to ensure that data quality is sufficient to meet project objectives and support project decisions.
3. Electronic (PDF) copies of all relevant field and analytical data forms and reports, including QA/QC data.

7.2 Post-construction Monitoring of Backfill in Dredging Area

Each monitoring report will contain the following information regarding the monitoring results for the backfill in the dredge areas:

1. Summary of visual observations at low tide, specifically including evidence of sloughing or instability of the backfill with supporting photographic documentation.
2. Comparison of current conditions relative to prior monitoring events and the baseline condition.
3. Geotechnical analysis of current and future slope stability in the backfill areas, if required based on identified areas of sloughing or instability.

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4. If warranted based on the results of the geotechnical analysis, recommendations to improve slope stability.

7.3 Post-construction Monitoring of Sediment Quality in Dredging Area

Each monitoring report will contain the following information regarding the monitoring results for sediment quality in the dredge areas:

1. Maps and tables showing actual locations of surface sediment sampling stations in state plane coordinates to the nearest foot.
2. Summary table of validated sediment analytical results.
3. Summary of changes in sediment quality within the RAB relative to any potential adjacent and/or upstream areas that are submitted for chemical analysis.

7.4 Post-construction Monitoring of Shoreline Bank Area

Each monitoring report will contain the following information regarding the monitoring results for the shoreline bank areas:

1. Summary of visual observations at low tide relative to transect locations, specifically including evidence of erosion of the shoreline containment and estimates of the relative coverage of habitat material, with supporting photographic documentation.
2. Comparison of current conditions relative to prior monitoring events and the baseline condition.
3. If erosion is observed, estimated areas and depths of erosion, and the affected shoreline containment layers (i.e., base layer, riprap layer), delineated on a plan map.
4. If possible, an assessment of the probable cause(s) of erosion.
5. If significant erosion is observed, recommendations regarding contingency response actions and a preliminary schedule for their implementation.

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8 REFERENCES

AMEC, 2012. *Pre- and Post-Construction Perimeter Sediment Monitoring Plan. Duwamish Sediment Other Area and Southwest Bank Corrective Measure and Habitat Project, Boeing Plant 2, Seattle/Tukwila, Washington*. May 2012.

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EPA, 2011. Action Memorandum for a Non-Time-Critical Removal Action at the Jorgensen Forge Early Action Area of the Lower Duwamish Waterway Superfund Site in Seattle, Washington. Seattle, Washington.

TABLES

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Table 1
Sediment Sampling Station Coordinates

Sediment Monitoring Area	Station ID	Northing	Easting
Subtidal Removal Area (R)	LTR-1	1275822.6	195624.0
	LTR-2	1275850.7	195510.5
	LTR-3	1275888.5	195458.6
	LTR-4	1275879.8	195363.8
	LTR-5	1275930.3	195367.9
	LTR-6	1275929.0	195180.7
Upstream (U)	PMU-1	1275966.1	195048.1
	PMU-2	1276023.2	195050.7
	PMU-3	1276036.5	194766.3
	PMU-4	1276116.1	194768.4
	PMU-5	1276136.4	194395.6
	PMU-6	1276219.3	194412.7
Navigation Channel (N)	PMN-1	1275774.8	195556.9
	PMN-2	1275826.8	195386.5
	PMN-3	1275860.4	195216.3
	PMN-4	1275852.9	195070.9
	PMN-5	1275941.8	194756.9
	PMN-6	1276033.0	194371.4

Note:

Horizontal Datum: WA SP NAD 83, North Zone, U.S. Feet

Table 2
Sampling Parameters, Analytical Methods, and Chemical Criteria

Parameter	Analytical Method	Units	Ecology 2003 Freshwater LAET	Sediment Management Standards Sediment Quality Standards	SAPA Recommended Practical Quantitation Limit (PQL)[b]	Laboratory PQL
Conventional Parameters						
Grain size	PSEP, 1986	%	--	--	1	1.0
Total solids	PSEP, 1986	% wet wt	--	--	0.1	0.01
Total organic carbon (TOC)	PSEP, 1986	% dry wt	--	--	0.1	0.05
Metals						
Arsenic	6010B/6020	mg/kg dry wt	31.4	57	19	0.2
Cadmium	6010B/6020	mg/kg dry wt	2.39	5.1	1.7	0.2
Chromium	6010B/6020	mg/kg dry wt	95	260	87	0.5
Copper	6010B/6020	mg/kg dry wt	619	390	130	0.5
Lead	6010B/6020	mg/kg dry wt	335	450	150	0.2
Mercury	7471A	mg/kg dry wt	0.8	0.41	0.14	0.025
Silver	6010B/6020	mg/kg dry wt	0.545	6.1	2	0.2
Zinc	6010B/6020	mg/kg dry wt	683	410	137	4.0
Polychlorinated Biphenyks (PCBs)						
Total PCB Aroclors	8082	µg/kg dry wt	62	12 mg/kg OC	6	10

Notes:

a = 2-Methylnapthalene is not included in the sum of LPAHs

b = Washington State Department of Ecology Sediment Sampling and Analysis Plan Appendix, February 2008

c = Toxic Equivalents Quotients will be calculated using WHO 2005 Mammalian Toxicity Equivalency Factors with ND=DL, EMPC=EMPC, ND=DL/2, EMPC=EMPC

d = Units designated with "OC" are TOC normalized per Sediment Management Standards guidance; however, TOC values <0.5 percent or >3 percent will be not be OC normalized and screened against LAET criteria

2LAET = Second lowest apparent effects threshold

µg/kg = micrograms per kilogram

HPAH = high-molecular-weight polycyclic aromatic hydrocarbon

LAET = Lowest apparent effects threshold

LPAH = low-molecular-weight polycyclic aromatic hydrocarbon

mg/kg = milligrams per kilogram

ng/kg = nanograms per kilogram

FIGURES

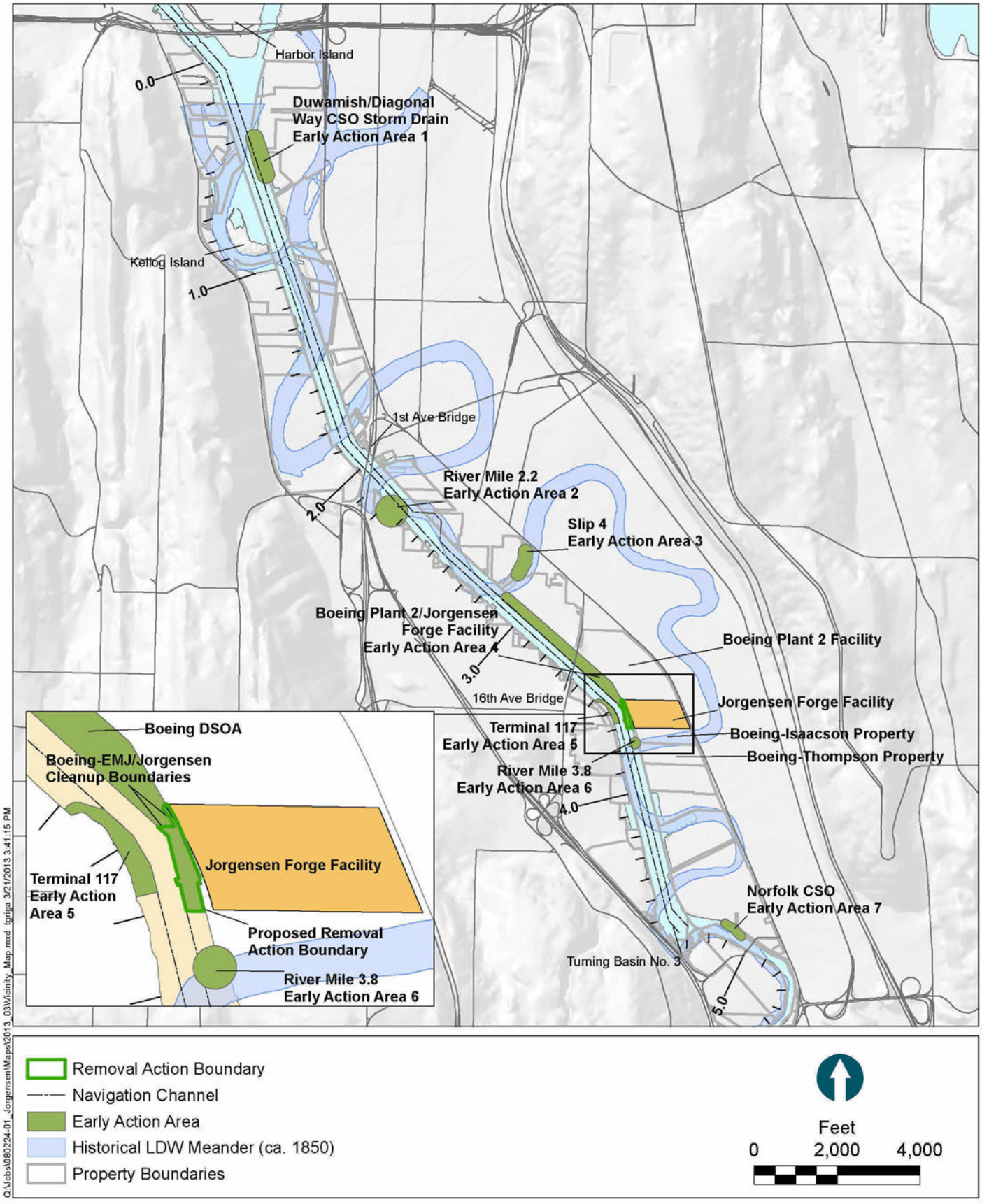
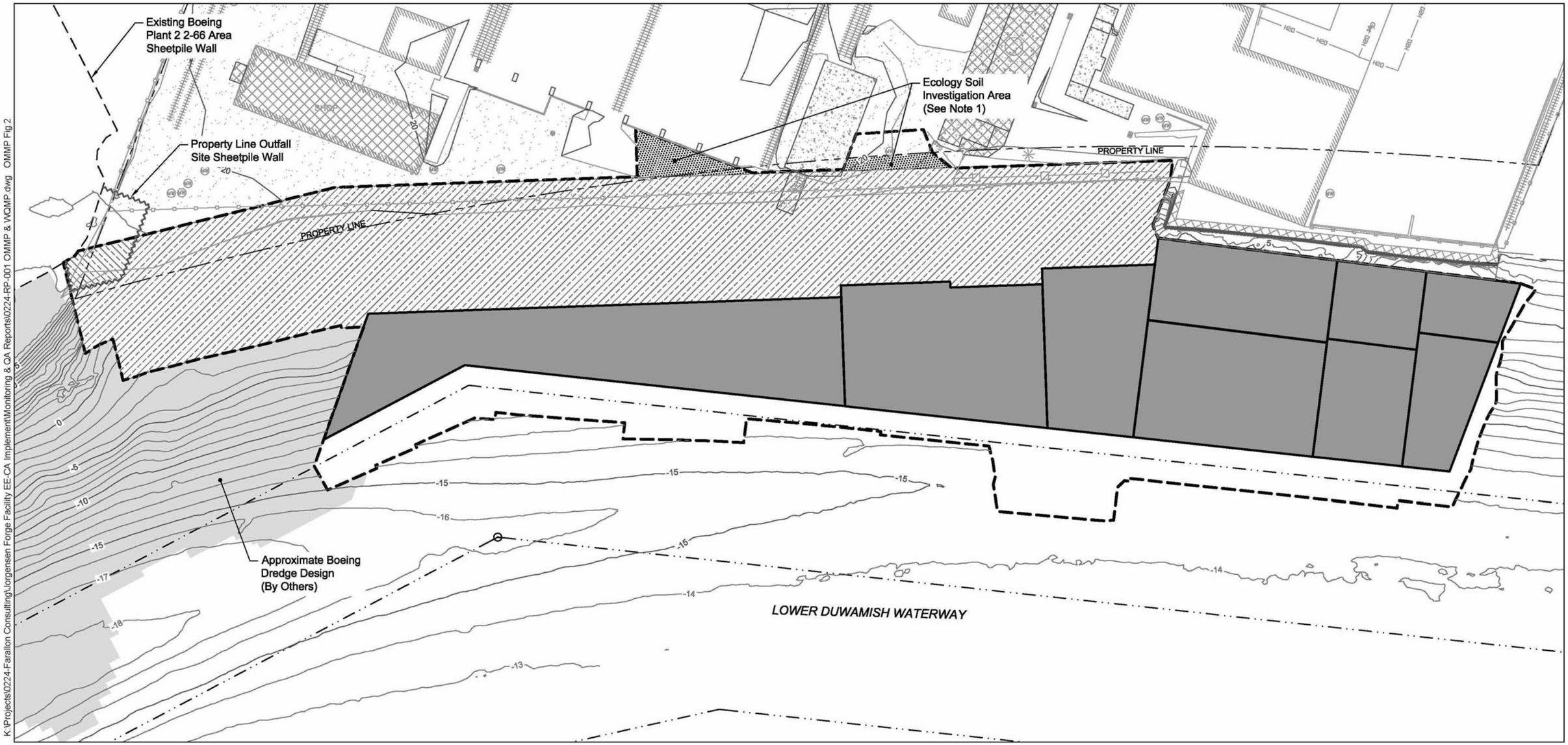


Figure 1
Removal Action Vicinity Map
Operation, Monitoring and Maintenance Plan
Jorgensen Forge Early Action Area

ANCHOR QEA



HORIZONTAL DATUM: Washington State Plane North, NAD83, U.S. Feet.
VERTICAL DATUM: Mean Lower Low Water (MLLW).
NOTES:

1. The Owner is removing additional soil and backfilling along the top of bank area surrounding soil borings SB-3 and SB-4 to remove relatively elevated concentrations of polychlorinated biphenyls. This work is not being performed under the EPA scope of work but rather as an Independent Action under the existing Ecology Agreed Order (No. DE 4127) at the facility.

LEGEND:

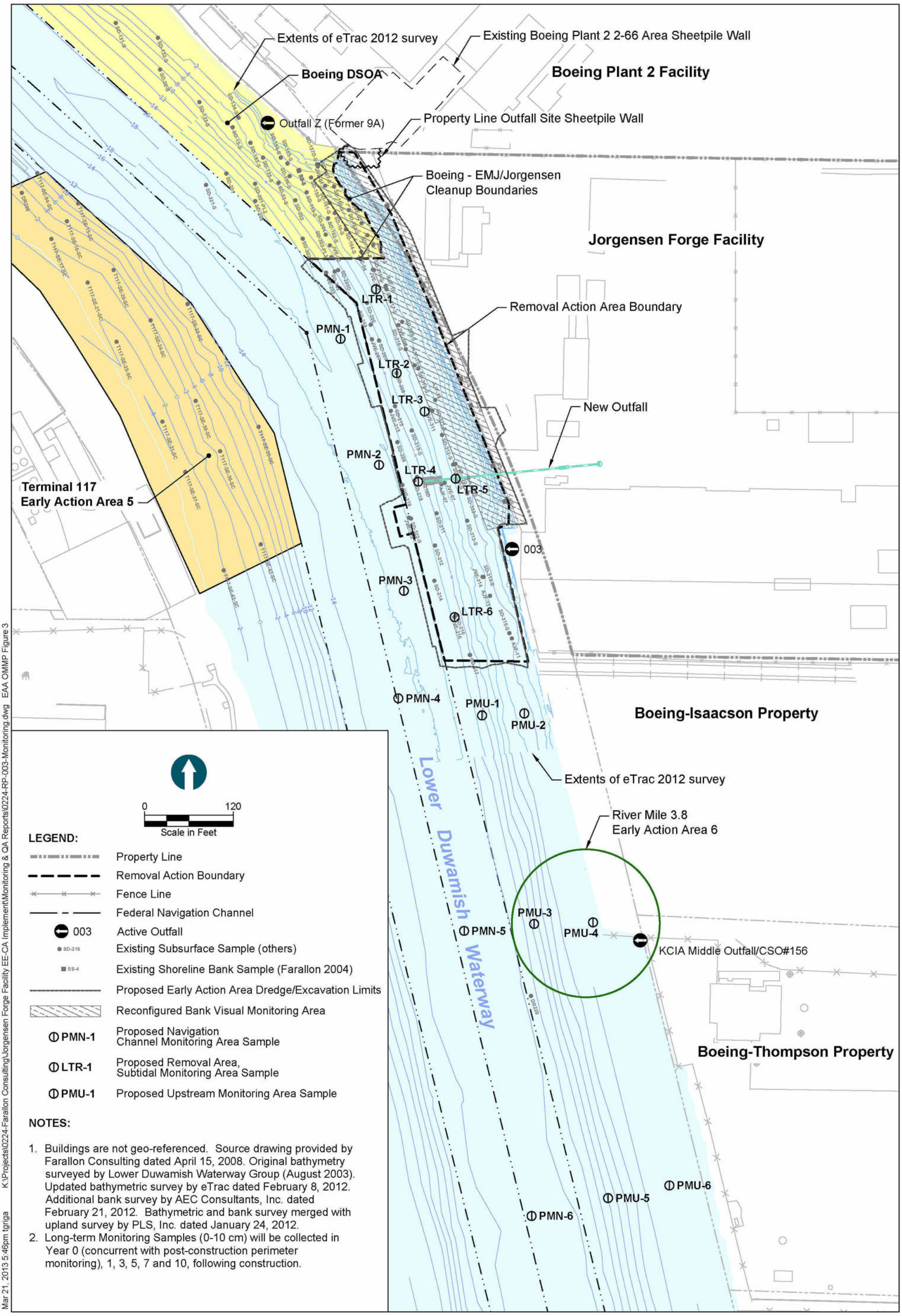
- Navigation Channel
- 5 — Existing Contour (1 Ft Interval)
- Dredge/Excavation Limits
- Backfill Material Placement Area
- Shoreline Containment Area

0 50
Scale in Feet

K:\Projects\0224-Farallon Consulting\Jorgensen Forge Facility EE-CA Implement\Monitoring & QA Reports\0224-RP-001 OMMP & WQMP.dwg OMMP Fig 2
Mar 25, 2013 3:04pm chewett

ANCHOR QEA

Figure 2
Removal Action Site Plan
Operations, Monitoring and Maintenance Plan
Jorgensen Forge Early Action Area



ANCHOR QEA

Figure 3
Monitoring Station Locations
Operations, Monitoring and Maintenance Plan
Jorgensen Forge Early Action Area

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CONSTRUCTION DRAWINGS

APPENDIX H
CONSTRUCTION SPECIFICATIONS

APPENDIX I
SAMPLING AND ANALYSIS PLAN

APPENDIX I
SAMPLING AND ANALYSIS PLAN
BASIS OF DESIGN REPORT
JORGENSEN FORGE EARLY ACTION AREA

Prepared for

U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, Washington 98101

On behalf of

Earle M. Jorgensen Company
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March 2013

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Attachment 2 – Field Sampling Plan

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LIST OF ACRONYMS AND ABBREVIATIONS

BODR	Basis of Design Report
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CQAP	Construction Quality Assurance Plan
EAA	Early Action Area
EE/CA	Engineering Evaluation/Cost Analysis
EMJ	Earle M. Jorgensen
EPA	U.S. Environmental Protection Agency
Facility	Jorgensen Forge facility
FSP	Field Sampling Plan
Jorgensen Forge	Jorgensen Forge Corporation
LDW	Lower Duwamish Waterway
MLLW	mean lower low water
MOU	Memorandum of Understanding
QA/QC	quality assurance and quality control
QAPP	Quality Assurance Project Plan
RAB	removal action boundary
SAP	Sampling and Analysis Plan

EMJ015284

1 INTRODUCTION

This Sampling and Analysis Plan (SAP) was prepared on behalf of Earle M. Jorgensen (EMJ) and Jorgensen Forge Corporation (Jorgensen Forge) pursuant to the Administrative Settlement Agreement and Order on Consent for Removal Action Implementation (U.S. Environmental Protection Agency [EPA] Region X Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] Docket No. 10-2013-0032) and attached Statement of Work. This SAP is an appendix to the Basis of Design Report (BODR) Final Design submittal for the cleanup of contaminated sediments and associated bank soils in a portion of the Lower Duwamish Waterway (LDW) Superfund Site adjacent to the Jorgensen Forge facility (Facility) located in Tukwila, King County, Washington (see Figure 1 of the BODR; Jorgensen Forge Early Action Area [EAA]). The cleanup will be conducted as a non-time-critical removal action in accordance with EPA's selected cleanup alternative documented in the *Action Memorandum for a Non-Time-Critical Removal Action at the Jorgensen Forge Early Action Area of the Lower Duwamish Waterway Superfund Site in Seattle, Washington* (Action Memo; EPA 2011) and detailed in the *Final Engineering Evaluation/Cost Analysis* (EE/CA) – *Jorgensen Forge Facility, 8531 East Marginal Way South, Seattle, Washington* (Anchor QEA 2011). The southern portion of the Jorgensen Forge EAA is located near River Miles 3.6 to 3.7 on the east bank of the LDW.

The limits of the Jorgensen Forge EAA are referred to as the removal action boundary (RAB). The RAB extends from the top of the bank at approximately +19 to +20 feet mean lower low water (MLLW; or top of the sheetpile/concrete panel on the southern portion of the Facility) to the federal navigation channel. The RAB is bounded to the north by The Boeing Company Plant 2 Duwamish Sediment Other Area and Southwest Bank Corrective Measure EAA cleanup area, as specified in the EPA-approved Memorandum of Understanding (MOU; EMJ et al. 2007). EPA identified this cleanup area as the northern portion of the Jorgensen Forge EAA.

This SAP provides the Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP) as Attachments 1 and 2, respectively. The QAPP describes the quality assurance and quality control (QA/QC) procedures that will be implemented as part of the construction phase for the removal action. The purpose of the QAPP is to ensure that the data generated are of

sufficient quality to meet the sampling objectives as described in the BODR and Construction Quality Assurance Plan (CQAP; Appendix D to the BODR). The FSP addresses the collection of data required during the construction phase of the removal action. The data will be used for verification and documentation purposes during the construction phase of the removal action as well as completion of the long-term monitoring performed in accordance with the CQAP, Water Quality Monitoring Plan (Appendix E to the BODR), and Long-term Operations, Monitoring, and Maintenance Plan (Appendix F to the BODR).

Refer to Attachment 1 and Attachment 2 for a detailed summary of the QA/QC procedures and field sampling procedures that will completed during the construction phase of the removal action.

EMJ015286

2 REFERENCES

Anchor QEA, 2011. *Final Engineering Evaluation/Cost Analysis – Jorgensen Forge Facility, 8531 East Marginal Way South, Seattle, Washington*. Prepared for the U.S. Environmental Protection Agency. March 2011.

Earle M. Jorgensen (EMJ), Jorgensen Forge Corporation, and The Boeing Company, 2007. Memorandum of Understanding: Coordination at the Boeing and EMJ/Jorgensen Transition Zone Boundary Sediment Cleanup Areas; Lower Duwamish Waterway (MOU). September 2007.

EPA, 2011. *Action Memorandum for a Non-Time-Critical Removal Action at the Jorgensen Forge Early Action Area of the Lower Duwamish Waterway Superfund Site in Seattle, Washington*. Seattle, Washington.

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ATTACHMENT 1
QUALITY ASSURANCE PROJECT PLAN

ATTACHMENT 1
QUALITY ASSURANCE PROJECT PLAN
SAMPLING AND ANALYSIS PLAN
JORGENSEN FORGE EARLY ACTION AREA

Prepared for

U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, Washington 98101

On behalf of

Earle M. Jorgensen Company
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August 2013

Approvals:

EMJ Project Manager Amy Essig Desai, Farallon Consulting, LLC	Date
Anchor QEA Project Manager David Templeton, Anchor QEA	Date
Anchor QEA QA Manager Delaney Peterson, Anchor QEA	Date
EPA Project Manager Rebecca Chu, EPA	Date
EPA Region 10 QA Manager Ginna Grepo-Grove, EPA	Date

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LIST OF ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
BODR	Basis of Design Report
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	chain-of-custody
CQAP	Construction Quality Assurance Plan
DQO	data quality objective
EAA	Early Action Area
EDD	electronic data deliverable
EMJ	Earle M. Jorgensen Company
EPA	U.S. Environmental Protection Agency
Facility	Jorgensen Forge facility
FC	Field Coordinator
FSP	Field Sampling Plan
Jorgensen Forge	Jorgensen Forge Corporation
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LDW	Lower Duwamish Waterway
MLLW	mean lower low water
MOU	Memorandum of Understanding
MS	matrix spike
MSD	matrix spike duplicate
OMMP	Operations, Monitoring, and Maintenance Plan
PCB	polychlorinated biphenyl
PSEP	Puget Sound Estuary Program
PSSRM	Puget Sound Sediment Reference Material
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RAB	removal action boundary
RPD	relative percent difference
SAP	Sampling and Analysis Plan
SOP	standard operating procedure

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SRM	Standard reference materials

EMJ015295

DISTRIBUTION LIST

All group leaders and technical advisors will receive copies of this Quality Assurance Project Plan (QAPP) and any approved revisions.

This list identifies all individuals to receive one copy of the approved QAPP:

- U.S. Environmental Protection Agency (EPA) Project Manager – Rebecca Chu, EPA
- EPA Region Quality Assurance (QA) Manager – Ginna Grepo-Grove, EPA
- Earl M. Jorgensen Company (EMJ) Project Manager – Amy Essig Desai, Farallon Consulting
- Jorgensen Forge Corporation (Jorgensen Forge) Project Manager – Sheri Bozic, Jorgensen Forge
- Anchor QEA Project Manager – David Templeton, Anchor QEA
- Anchor QEA Project Lead – Ryan Barth, Anchor QEA
- Anchor QEA QA/QC Manager – Delaney Peterson, Anchor QEA
- Anchor QEA Field Coordinator – Joy Dunay, Anchor QEA

The following Laboratory Managers will receive one copy of the approved QAPP and Field Sampling Plan (FSP; Attachment 2 to the Sampling and Analysis Plan [SAP]):

- Analytical Resources Incorporated (ARI) – Cheronne Oreiro
- Laboratory Data Consultants – Ming Hwang (Data validation)

EMJ015296

1 PROJECT/TASK ORGANIZATION

This section identifies key project personnel, describes the rationale for conducting the monitoring studies, identifies the studies to be performed and their respective schedules, outlines project data quality objectives (DQOs) and criteria, lists training and certification requirements for sampling personnel, and describes documentation and record-keeping procedures. Responsibilities of the team members, as well as laboratory project managers, are described in the following paragraphs.

Because the individuals listed below may change over time, this QAPP has been written to include "designee" as an alternate to the current project organization. The following paragraphs define their functional responsibilities.

1.1 Management

The EMJ and Jorgensen Forge Project Managers are **Amy Essig Desai** of Farallon Consulting, LLC and Sheri Bozic of Jorgensen Forge, respectively. The primary role of the Project Manager is to ensure compliance with the requirements.

The EPA Project Manager is **Rebecca Chu**.

The Anchor QEA, LLC Project Manager is **David Templeton** and the Anchor QEA Project Lead is **Ryan Barth**. The Anchor QEA Project Manager and Project Lead will act as the direct line of communication between Anchor QEA and EMJ and Jorgensen Forge Corporation (Jorgensen Forge), and are responsible for implementing activities described in this QAPP. They will also be responsible for production of work plans, producing all project deliverables, and performing the administrative tasks needed to ensure timely and successful completion of the work. The Anchor QEA Project Manager will provide the overall programmatic guidance to support staff and will ensure that all documents, procedures, and project activities meet the objectives contained within this QAPP. The Anchor QEA Project Manager and Project Lead will also be responsible for resolving project concerns or conflicts related to technical matters.

1.2 Field Coordinator

Joy Dunay will serve as the Anchor QEA Field Coordinator (FC). The FC is responsible for day-to-day technical and QA/quality control (QC) oversight. She will ensure that appropriate protocols for sample collection, preservation, and holding times are observed and will submit environmental samples to the designated laboratories for chemical and physical analyses.

1.3 Quality Assurance Manager

Delaney Peterson will serve as the Anchor QEA QA/QC Manager. She will provide QA oversight for both the field sampling and laboratory programs, ensuring that samples are collected and documented appropriately, coordinating with the analytical laboratories, ensuring data quality, overseeing data validation, and supervising project QA coordination and data validation.

1.4 Data Manager

Laurel Menoche will serve as the Anchor QEA Data Manager. She will compile field observations and analytical data into a database, review the data for completeness and consistency, append the database with qualifiers assigned by the data validator, and ensure that the data obtained is in a format suitable for inclusion in the appropriate databases and delivery to the EPA.

1.5 Laboratory Manager and Data Validation Manager

Cheronne Oreiro of ARI will serve as the Laboratory Manager and will oversee all laboratory operations associated with the receipt of the environmental samples, chemical/physical analyses, and laboratory report preparation for this project. **Ming Hwang** of Laboratory Data Consultants will serve as the primary contact to perform all applicable data validation.

The analytical testing laboratories will be responsible for the following:

- Perform the methods outlined in this QAPP, including those methods referenced for each analytical procedure
- Follow documentation, custody, and sample logbook procedures

EMJ015298

- Implement QA/QC procedures required by Puget Sound Estuary Program (PSEP; 1986, 1997a, 1997b, 1997c) or other guidelines
- Meet all reporting and QA/QC requirements
- Deliver electronic data files as specified in this QAPP
- Meet turnaround times for deliverables as described in this QAPP
- Allow EPA and the QA/QC contractor to perform laboratory and data audits

EMJ015299

2 PROBLEM DEFINITION/BACKGROUND

This QAPP was prepared on behalf of Earle M. Jorgensen (EMJ) and Jorgensen Forge Corporation (Jorgensen Forge) pursuant to the Administrative Settlement Agreement and Order on Consent for Removal Action Implementation (EPA Region X Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] Docket No. 10-2013-0032) and attached Statement of Work. This QAPP is Attachment 1 to the SAP, which is an appendix to the Basis of Design Report (BODR) Final Design submittal for the cleanup of contaminated sediments and associated bank soils in a portion of the Lower Duwamish Waterway (LDW) Superfund Site adjacent to the Jorgensen Forge facility (Facility) located in Tukwila, King County, Washington (Jorgensen Forge Early Action Area [EAA]). The cleanup will be conducted as a Non-Time Critical Removal Action in accordance with EPA's selected cleanup alternative documented in the *Action Memorandum for a Non-Time Critical Removal Action at the Jorgensen Forge Early Action Area of the Lower Duwamish Waterway Superfund Site in Seattle, Washington* (EPA 2011) and detailed in the *Final Engineering Evaluation/Cost Analysis – Jorgensen Forge Facility, 8531 East Marginal Way South, Seattle, Washington* (Anchor QEA 2011). The Jorgensen Forge EAA is located near River Miles 3.6 to 3.7 on the east bank of the LDW, as shown on Figure 1.

The limits of the Jorgensen Forge EAA (herein referred to as the removal action boundary [RAB]) are shown on Figure 2. The RAB extends from the top of the bank at approximately +19 to +20 feet mean lower low water (MLLW; or top of the sheetpile/concrete panel on the southern portion of the Facility) to the federal navigation channel. The RAB is bounded to the north by The Boeing Company Plant 2 Duwamish Sediment Other Area and Southwest Bank Corrective Measure EAA cleanup area, as specified in the EPA-approved Memorandum of Understanding (MOU; EMJ et al. 2007). EPA identified this cleanup area as the northern portion of the Jorgensen Forge EAA.

This QAPP describes the quality assurance and quality control (QA/QC) procedures that will be implemented as part of the construction phase for the removal action. The purpose of the QAPP is to ensure that the data generated are of sufficient quality to meet the sampling objectives as described in the BODR and Construction Quality Assurance Plan (CQAP; Appendix D to the BODR).

This QAPP was prepared in accordance with the EPA's *Requirements for Quality Assurance Project Plans* (EPA 2001a), *EPA Guidance for Quality Assurance Project Plans* (EPA 2002), and *EPA Requirements for Quality Management Plans* (EPA 2001b). Chemistry analytical laboratory work will be performed in accordance with the specified analytical methods, the data quality objectives (DQOs), and this QAPP. The QAPP should be reviewed with the Field Sampling Plan (FSP; Attachment 2 to the SAP), CQAP (Appendix D to the BODR), and Water Quality Monitoring Plan (Appendix E of the BODR).

EMJ015301

3 PROJECT/TASK DESCRIPTION

Pre- and post-construction surface sediment chemical data will be collected as described in the Operations, Monitoring, and Maintenance Plan (OMMP; Appendix F to the Basis of Design Report [BODR]) and Construction Quality Assurance Plan (CQAP; Appendix D to the BODR). Water quality monitoring will be conducted during all construction activities as described in the Water Quality Monitoring Plan (WQMP; Appendix E to the BODR). Data collection approaches and objectives are discussed in detail in the respective plans and summarized as follows:

- CQAP. Perimeter surface sediment monitoring will be performed to evaluate whether there are significant increases in concentrations of chemicals of concern in surface sediments adjacent to the RAB relative to their pre-remediation concentrations due to releases from the construction activities. Post-removal and pre-backfill Z-layer surface sampling will be performed to document the sediment quality underlying the placed clean backfill material. Post-excavation and pre-backfill layer bank soil sampling will be performed to document the soil quality beneath the placed clean backfill material. Post-dredge sampling will be conducted following construction plan approval and prior to backfill placement.
- OMMP. Post-construction long-term surface sediment monitoring will be performed to confirm that performance standards are being met in the years following construction, and to demonstrate that Facility source controls are effectively protecting the quality of the adjacent river sediments and preventing their recontamination. Long-term monitoring sample collection and visual inspections will occur in Years 1, 3, 5, 7, and 10 following completion of the removal action.
- WQMP. Surface water sampling will be performed during removal activities to monitor water quality during in-water construction activities.

EMJ015302

4 DATA QUALITY OBJECTIVES AND CRITERIA

DQOs provide a qualitative and quantitative framework and series of planning steps based on the scientific method around which data collection programs can be designed. The use of DQOs ensures that:

- The objectives of the investigation are clearly defined
- The type, quantity, and quality of environmental data used in decision making are appropriate for their intended application
- Acceptable levels of decision error and performance goals are specified, such that the quantity and quality of data needed to support management decisions are provided

4.1 Measurement Quality Objectives for Chemical Data

Reporting limit goals for sediment and water sampling parameters are presented in Tables 1 and 5.

The overall QA/QC objective of this QAPP is to develop and implement procedures for sampling, chain-of-custody (COC), laboratory analysis, instrument calibration, data reduction and reporting, internal QC, audits, preventive maintenance, and corrective action such that valid data will be generated. These procedures are presented or referenced in the following sections of the QAPP. Specific QC checks are discussed in Section 12.2 of this document.

Project-specific control limits will be used to assess analytical performance with regard to precision and accuracy and are outlined in Table 2. Data representativeness will be addressed by the sample quantities and locations identified in the OMMP (Appendix F to the BODR) and CQAP (Appendix D to the BODR). Data comparability will be achieved through the use of standard EPA-approved methods. Data completeness will be assessed at the conclusion of analytical activities.

QC indicators are generally defined in terms of five parameters:

- Precision
- Accuracy

- Representativeness
- Comparability
- Completeness

Each parameter is defined below. Specific QA objectives for sample collection and analyses are set forth in other sections of this QAPP as referenced below.

4.1.1 Precision

Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the objectives of the action. To maximize precision, sampling and analytical procedures will be followed. All work for this project will adhere to established protocols as presented in this QAPP. Analytical precision will be measured through laboratory control sample/laboratory control sample duplicates (LCS/LCSDs), as well as matrix spike/matrix spike duplicates (MS/MSDs) for organic analyses and laboratory duplicate samples for inorganic analyses. Analytical precision measurements will be carried out on project-specific samples at a minimum frequency of one per laboratory analysis group or one in 20 samples, whichever is more frequent, per matrix analyzed as outlined in Table 4. Laboratory precision will be evaluated against project-required control limits outlined in Table 2.

Field precision will be evaluated by the collection of blind field duplicates at a frequency of 5 percent. Field duplicate precision will be screened against a relative percent difference (RPD) of 50 percent for sediment samples and 35 percent for water samples. However, no data will be qualified based solely on field duplicate precision.

The equation used to express precision is:

$$RPD = \frac{(A-B)}{\frac{(A+B)}{2}} \; x \; 100\% \qquad (1\text{-}1)$$

where:

A = Analytical result from one of two duplicate measurements

B = Analytical result from the second measurement

EMJ015304

Precision measurements can be affected by how close a chemical concentration is to the reporting limit, which can increase the percent error (expressed as RPD). When a sample or duplicate concentration is within five times the reporting limit, alternative control limits recommended by the EPA (1999) of two times +/- the reporting limit for sediment samples, and one time +/- the reporting limit for waters will be used.

4.1.2 Accuracy

Accuracy is a measure of how close a measured result is to the true value. Both field and analytical accuracy will be monitored through initial and continuing calibration of instruments. In addition, reference standards, MS, blank spikes, LCS, and surrogate standards will be used to assess the accuracy of the analytical data. Accuracy measurements will be carried out at a minimum frequency of one per 20 samples per matrix analyzed. Because MS/MSDs measure the effects of potential matrix interferences for a specific matrix, the laboratory will report MS/MSDs only on project-specific samples. Surrogate recoveries will be determined for every sample analyzed for organics.

Laboratory accuracy will be evaluated against project-specific control limits outlined in Table 2. Accuracy can be expressed as a percentage of the true or reference value, or as a percent recovery in those analyses where reference materials are not available and spiked samples are analyzed. The equation used to express accuracy is:

$$Percent\ Recovery = \frac{A-X}{B}\ x\ 100\% \qquad (1\text{-}2)$$

where:

A = Value measured in spiked sample or standard

X = Value measured in original sample

B = True value of amount added to sample or true value of standard

4.1.3 Representativeness

Representativeness is the degree to which sample data accurately and precisely represent conditions in the project area. Representativeness is dependent on sampling and analytical

EMJ015305

variability and the variability of environmental media. The FSP (Attachment 2 to the SAP) has been designed to assess the presence of the chemical constituents at the time of sampling and presents the rationale for sample quantities and sampling locations. In addition, the use of the prescribed field and laboratory analytical methods, with their associated holding times and preservation requirements, is intended to provide representative data.

4.1.4 Comparability

Comparability is the degree of confidence with which one data set can be compared to another. Comparability will be maintained through consistent use of the sampling and analytical methodologies set forth in this QAPP and through the use of established QA/QC procedures and appropriately trained personnel.

4.1.5 Completeness

Completeness is defined as a measure of the amount of valid data obtained from an event or investigation compared to the total amount that was obtained. Completeness will be calculated as follows:

$$C = \frac{[(\text{number of acceptable data points}) \times 100]}{(\text{total number of data points collected})} \qquad (1\text{-}3)$$

where:

C = completeness

The DQO for completeness for all components of this project is 95 percent. Data that have been qualified as estimated because the QC criteria were not met will be considered valid for the purpose of assessing completeness. Data that have been qualified as rejected will not be considered valid for the purpose of assessing completeness.

EMJ015306

5 SPECIAL TRAINING/CERTIFICATION

For the sediment logging and sample preparation tasks, it is important that field crews are trained in standardized logging and data collection procedures and requirements, so that data are consistent among the field crew. All field crew are fully trained in the collection and processing of sediment and water samples; decontamination protocols; visual inspections; and COC procedures. All field crew are also required to be 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) certified with 8-hour Refresher Training, as required.

EMJ015307

6 DOCUMENTS AND RECORDS

ARI will be required, where applicable, to provide the following in a laboratory report:

- **Project Narrative**. This summary, in the form of a cover letter, will discuss problems, if any, encountered during any aspect of analysis. This summary should discuss, but not be limited to, QC, sample shipment, sample storage, and analytical difficulties. Any problems encountered, actual or perceived, and their resolutions will be documented in as much detail as appropriate.
- **Chain of Custody Records**. Legible copies of the COC forms will be provided as part of the data package. This documentation will include the time of receipt and condition of each sample received by the laboratory. Additional internal tracking of sample custody by the laboratory will also be documented.
- **Sample Results**. The data package will summarize the results for each sample analyzed. The summary will include the following information when applicable:
  - Field sample identification code and the corresponding laboratory identification code
  - Sample matrix
  - Date of sample extraction
  - Date and time of analysis
  - Weight and/or volume used for analysis
  - Final dilution volumes or concentration factor for the sample
  - Identification of the instrument used for analysis
  - Method detection limits
  - Method reporting limits
  - Analytical results with reporting units identified
  - Data qualifiers and their definitions
- **QC Summaries.** This section will contain the results of the laboratory QC procedures. Each QC sample analysis will be documented with the same information required for the sample results (see above). No recovery or blank corrections will be made by the laboratory. The required summaries are listed below; additional information may be requested.
- **Calibration Data Summary.** This summary will report the concentrations of the

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initial calibration and daily calibration standards, and the date and time of analysis. The response factor, percent relative standard deviation, percent difference, r-value, and retention time for each analyte will be listed, as appropriate. Results for standards to indicate instrument sensitivity will be documented.

- **Internal Standard Area Summary.** The area counts of internal standard areas will be reported and compared to method criteria.
- **Method Blank Analysis.** The method blank analyses associated with each sample and the concentrations of all compounds of interest will be reported.
- **Surrogate Spike Recovery.** This will include all surrogate spike recovery data for organic compounds. The names of all compounds added, percent recoveries, and range of acceptable recoveries will be listed.
- **Matrix Spike Recovery.** All matrix spike recovery data for all applicable analyses will be reported. The names and concentrations of all compounds added, percent recoveries, and range of acceptable recoveries will be listed. The RPD for all matrix spike duplicate analyses will be included.
- **Matrix Duplicate.** RPD values for all matrix duplicate analyses will be reported.
- **Laboratory Control Sample.** All laboratory control sample recovery data will be reported. The names and concentrations of all compounds added, percent recoveries, and range of acceptable recoveries will be listed. The RPD for all laboratory control sample duplicate analyses will be included.
- **Relative Retention Time.** The relative retention times of each analyte detected in the samples for both primary and confirmational analyses will be reported.
- **Original Data.** Legible copies of the original data generated by the laboratory will include:
  - Sample extraction, preparation, and cleanup logs
  - Instrument specifications and analysis logs for all instruments used on days of calibration and analysis
  - Reconstructed ion chromatograms for all samples, standards, blanks, calibrations, spikes, replicates, and reference materials
  - Spectra of detected compounds with associated best-match spectra for each sample
  - Printouts and quantitation reports for each instrument used, including reports for all samples, standards, blanks, calibrations, spikes, replicates, and reference materials

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- Original data quantification reports for each sample
- Original data for blanks and samples not reported

All data from this project will be stored electronically in Anchor QEA's project files. In addition to the PDF laboratory report including all elements outlined above, the laboratory will also provide results in Anchor QEA's custom EQUiS four-file format.

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7 SAMPLING PROCESS DESIGN

The sampling process design is summarized below and described in detail in the CQAP (Appendix D to the BODR), the OMMP (Appendix F to the BODR), and the WQMP (Appendix E to the BODR).

- Post-dredge core or surface grab sampling will be conducted to document that the final post-dredge surface ("z-layer") chemical concentrations are not significantly greater than the total polychlorinated biphenyl (PCB) removal action level (RvAL). Post-excavation bank sampling will also be conducted to document the chemical concentrations of the material below the shoreline containment layers. See the CQAP for additional details.
- Pre- and post-construction perimeter surface sediment samples will be collected to evaluate whether there are significant increases in concentrations of chemicals of concern in surface sediments adjacent to the RAB relative to their pre-remediation concentrations due to releases from the construction activities. See the CQAP for additional details.
- Water quality monitoring will be conducted during all construction activities to monitor changes in physical and chemical characteristics of the water column. See Appendix E for additional details.
- Visual monitoring of the intertidal dredge and backfill areas will be conducted to confirm that the backfill material is generally remaining in place and that sloughing or other evidence of slope instability is not occurring. See Appendix F for additional details.
- Post-construction surface sediment monitoring will be conducted in the RAB to evaluate the changes in surface sediment concentration over time. Consistent with the SMS, the surface sediment samples will be collected from within the top 10 centimeters (cm) below the mudline. See Appendix F for additional details.

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8 SAMPLING METHODS

Sampling methods are explained in detail in the CQAP (Appendix D to the BODR), the OMMP (Appendix F to the BODR), and the WQMP (Appendix E to the BODR). Sampling methods will include:

- Post-dredge confirmation sampling will utilize either core collection or surface grab collection to collect samples from the 0 to 1 foot interval. If cores are to be collected, a MudMole™ or similar coring device will be utilized. If grab samples are to be collected, a VanVeen grab sampler or similar device will be utilized.
- Pre- and post-construction perimeter sampling and long term sediment monitoring sampling will utilize a VanVeen grab sampler or similar device.
- Water quality monitoring field parameters will be measured using a real-time, calibrated field instrument (hydroprobe or equivalent) and surface water samples will be collected using a Van Dorn water sampler or similar device.
- Visual observations will be conducted for monitoring of intertidal dredge and backfill areas.

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9 SAMPLE HANDLING AND CUSTODY

Sample documentation is a critical aspect of environmental investigations. Sample possession and handling must be traceable from the time of sample collection, through laboratory and data analysis, to the time sample results are potentially introduced as evidence. A sample log form and field logbook entries will be completed for each location occupied and each sample collected. Documentation procedures for sampling are provided in greater detail in the FSP (Attachment 2 to the SAP).

9.1 Sample Containers, Preservation, and Holding Time Requirements

Pre-cleaned, certified sample containers, which will be provided by the contract analytical laboratory, must be used for all sediment and water samples that will be analyzed by the laboratory. Specific types and sizes of containers for each parameter, as well as holding time and preservation requirements, are listed in Table 3.

Sample containers for conventional parameters, metals, and organics will be cleaned to EPA protocols. Certifications attesting to the cleanliness of pre-cleaned containers are required for containers used for organic analyses and will be maintained by the laboratory.

Sample custody seals and packing materials for filled sample containers will be provided by the analytical laboratory. The filled and labeled containers will be placed in a cooler on ice (Section 9.2) and carefully packed to eliminate the possibility of container breakage.

9.2 Sample Packing, Handling, and Shipping

Sample packaging and shipment procedures are designed to ensure that the samples will arrive at the laboratory with the chain-of-custody (COC) form intact. Samples will either be hand-delivered to the laboratory or be delivered via courier.

Samples will be packaged for shipment as outlined below:

1. Ensure that sample labels are securely affixed to sample containers with clear packing tape, if necessary.
2. Check the caps on the sample containers to ensure that they are properly sealed.

3. Complete the COC form with the required sampling information and ensure that the recorded information matches the sample labels. Note: If the designated sampler relinquishes the samples to other sampling or field personnel for packing or other purposes, the sampler will complete the COC prior to this transfer. The appropriate personnel will sign and date the COC form to document the sample custody transfer.
4. Wrap sample containers in bubble wrap or other cushioning material.
5. Place sample containers in zip-top bags to prevent any possible cross-contamination.
6. Place 1 to 2 inches of cushioning material at the bottom of the cooler.
7. Place the sealed sample containers and a temperature blank in the cooler.
8. Place ice in plastic bags and seal. Place the ice-filled bags loosely in the cooler.
9. Fill the remaining space in the cooler with cushioning material.

Samples will be packaged by the field personnel and transported as low-concentration environmental samples. The samples will either be delivered by an express carrier or will be picked up by a laboratory courier. Shipments will be accompanied by the COC form identifying the contents. The original form will accompany the shipment; copies will be retained by the sampler for the sampling office records. If the samples are sent by common carrier, a bill of lading will be used. Receipts or bills of lading will be retained as part of the permanent project documentation. Commercial carriers are not required to sign off on the COC form as long as the forms are sealed inside the sample coolers and the custody seals remain intact.

9.3 Sample Receipt

All samples received at the laboratory will be carefully checked for label identification and complete, accurate COC documentation. The condition of the samples will be checked, and the temperature blank will be measured and recorded (with a calibrated digital thermometer) immediately after the cooler is opened. These results, along with any questions or comments regarding sample integrity, will be recorded on the COC form (or the appropriate laboratory cooler receipt form). The laboratory will contact Anchor QEA immediately if discrepancies between the samples and COC records are found upon receipt. If it is necessary for the receiving laboratory to ship samples to other laboratories, a COC form will be completed and will accompany the samples. A copy of the COC form (and

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cooler receipt form) will be emailed to Anchor QEA within 2 days of sample receipt and included in the final analytical data report.

Once received at the laboratory, the samples will be maintained at 4 ± 2 degrees Celsius (°C), unless it is required that the samples be held at a lower temperature (-10 ± 10°C) to extend the holding time.

If a sample container is received broken, a sample is received in an inappropriate container, or a sample has not been preserved by appropriate means, the laboratory will notify Anchor QEA as soon as possible on the day of sample receipt. The laboratory sample custodian will be responsible for logging the samples in, assigning a unique laboratory identification number to each sample, labeling each sample bottle with its laboratory identification number, and moving the samples to appropriate storage locations to await analysis. The project name, field sample code, date sampled, date received, analysis required, storage location and date, and action for final disposition will be recorded in the laboratory tracking system. Relevant custody documentation will be placed in the project file.

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10 ANALYTICAL METHODS

Sampling will be performed in accordance with the methods presented in the FSP (Attachment 2 to the SAP). Sediment and water samples submitted for analysis will be analyzed for a variety of chemical parameters, including total PCBs and metals. In addition, sediment samples will be analyzed for total organic carbon, total solids and grain size. Bank soil samples submitted for analysis will be analyzed for the full Washington State Department of Ecology Sediment Management Standards list of analytes. Analyte lists, analytical methods, and target reporting limits are outlined in Table 1 for surface sediment and soil samples and Table 5 for water samples.

Tables 1 and 5 present the methods of analysis and reporting limit goals. The laboratory standard operating procedure (SOP) provided by the contracted analytical laboratory will describe the chemical analytical procedures in detail. These SOPs will be maintained in the analytical laboratory's file.

The laboratory will provide Level IV data reports for all data in order to complete the required level of validation.

10.1 Reporting Limits

In general, reporting limit goals for sediment are based on dry weight and assume 50 percent total solids content in the sediment samples. If the total solids content is less than 50 percent, sample reporting limits may increase. Interferences in individual water, sediment, and soil samples may also result in increased reporting limits. To achieve the required low reporting limits, some modifications to the methods may be necessary. These modifications from Standard SW846 methodology protocol will be provided by the laboratory at the time of sample submittal, and any modifications to the methods will be documented in the case narrative that accompanies the final report.

11 QUALITY CONTROL

This section describes the laboratory and field QC procedures to be followed to ensure data are of known and acceptable precision and accuracy so that project objectives are achieved. These procedures include analytical and field QC requirements.

11.1 Field Quality Control Checks

Field QC samples include field equipment blanks and field duplicates and will be analyzed to identify possible problems resulting from sample collection or sample processing in the field. All field QC samples will be documented in the field logbook and verified by the Project QA Manager or designee.

11.1.1 Field Equipment Blanks

Field equipment blanks are used to determine whether cross contamination has occurred during sampling. A minimum of one rinsate blank of the sediment or soil sample device and processing equipment will be submitted per sampling event. For surface water samples, a minimum of one rinsate blank of the water sampling device will be submitted during the project.

11.1.2 Field Duplicates

A minimum of one field duplicate will be collected per 20 samples submitted for analysis for each media and will be evaluated as described Section 6.3.1.

11.2 Analytical Laboratory Quality Control Checks

Internal laboratory QC checks will be used to monitor data integrity. These checks will include method blanks, MSs (and MSDs), LCSs (and LCSDs), internal standards, surrogate standards, calibration standards, and reference material standards. Project-required control limits will be used to evaluate MS/MSD and LCS/LCSD percent recoveries and RPD values. Surrogate recoveries will be evaluated using laboratory control limits. Laboratory control charts will be used to determine long-term instrument trends.

Results of QC samples from each sample group will be reviewed by the analyst immediately after a sample group has been analyzed. The QC sample results will then be evaluated to determine whether control limits have been exceeded. If control limits are grossly exceeded in the sample group, the Project QA Manager will be contacted immediately, and corrective action (e.g., method modifications followed by reprocessing of the affected samples) will be initiated prior to processing a subsequent group of samples.

All primary chemical standards and standard solutions used in this project will be traceable to the National Institute of Standards and Technology, Environmental Resource Associates, National Research Council of Canada, or other documented, reliable, commercial sources. Standards will be validated to determine their accuracy by comparison with an independent standard. Any impurities found in a standard will be documented.

11.2.1 Method Blanks

Method blanks are analyzed to assess possible laboratory contamination at all stages of sample preparation and analysis. The method blank for all analyses must be less than the method reporting limit of any single target analyte/compound. If a laboratory method blank exceeds this criterion for any analyte/compound, and the concentration of the analyte/compound in any of the samples is less than five times the concentration found in the blank (10 times for common contaminants), analyses must stop and the source of contamination must be eliminated or reduced.

11.2.2 Laboratory Control Samples

LCSs are prepared and analyzed to assess possible laboratory bias at all stages of sample preparation and analysis. The LCS is a matrix-dependent spiked sample prepared at the time of sample preparation along with the preparation of samples, method blanks, and MSs. The LCS will provide information on the accuracy of the analytical process, and when analyzed in duplicate, will provide precision information as well.

11.2.3 Matrix Spike/Matrix Spike Duplicate

MS/MSDs will be performed on project-specific samples at a frequency of 5 percent or per analytical batch, whichever is more frequent. Analysis of MS samples provides information

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on the preparation and/or analytical efficiency of the method for the sample matrix. By performing duplicate MS analyses, information on the precision of the method is also provided. MS/laboratory duplicates can be performed in place of MS/MSDs for inorganic analyses for precision information.

11.2.4 Surrogate Spikes

Surrogates are compounds that are unlikely to occur under natural conditions and have properties similar to the analytes of interest. Surrogates are added to the samples prior to purging or extraction and are primarily used for organic samples analyzed by gas chromatography/mass spectrometry and gas chromatography methods. The surrogate spike provides broader insight into the proficiency and efficiency of an analytical method on a sample-specific basis. This control reflects analytical conditions that may not be attributable to the sample matrix. All project samples and associated sample QC to be analyzed by organic methods will be spiked with appropriate surrogate compounds as defined in the analytical methods.

11.2.5 Laboratory Duplicates

For inorganic analyses, laboratory duplicates will be analyzed to assess laboratory precision. A laboratory duplicate is defined as a separate aliquot of a sample that is analyzed as a separate sample.

11.2.6 Calibration Standards

Calibration check standards analyzed within a particular analytical series provide information regarding instrument stability and validity of the instrument calibration. The analytical frequency of calibration check standards is specified by the analytical method.

11.2.7 Standard Reference Materials

Standard reference materials (SRMs) are substances of the same or similar matrix to the project samples and contain a known concentration of target analyte(s). These materials are prepared and analyzed in the same manner as routine samples and in the same preparation and analytical batch. The recovery of the target analyte(s) provide information on

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interferences caused by the sample matrix. The Puget Sound Sediment Reference Material (PSSRM) for PCBs will be used for sediment samples.

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12 INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE

Instruments and equipment will be tested and inspected before each sampling event and each laboratory analysis. Any field equipment that is faulty or not functioning properly will not be used for sampling.

Preventive maintenance of laboratory equipment generally will follow the guidelines recommended by the manufacturer. A malfunctioning instrument will be repaired immediately by in-house staff or through a service call to the manufacturer. If the instrument malfunction is of a nature to impact the project's turnaround time, this must be communicated to the Anchor QEA QA Manager as soon as the malfunction is discovered so that contingencies for analysis can be coordinated.

Maintenance schedules for laboratory equipment will adhere to the manufacturers' recommendations. Records will reflect the complete history of each instrument and specify the timeframe for future maintenance. Major repairs or maintenance procedures will be performed through service contracts with manufacturers or by qualified contractors. Paperwork associated with service calls and preventive maintenance calls will be kept on file by the laboratory.

Laboratory systems managers are responsible for the routine maintenance of instruments used in a particular laboratory. Any routine preventive maintenance carried out is logged into the appropriate logbooks. Routine and non-routine maintenance schedules and procedures will be performed in accordance with the laboratory's QA manual.

All major instruments will be backed up by comparable (if not equivalent) instrument systems in the event of unscheduled downtime. An inventory of spare parts will also be available to minimize equipment/instrument downtime.

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13 INSTRUMENT/EQUIPMENT CALIBRATION PROCEDURES AND FREQUENCY

When analyses are conducted according to EPA methods, the calibration procedures and frequencies specified in the applicable method will be followed. For analyses governed by SOPs, see the appropriate laboratory SOP for the required calibration procedures and frequencies. Records of calibrations will be filed and maintained by the laboratory. These records may be subject to a QA audit.

All standards used in the calibration of equipment will be traceable, directly or indirectly, to the National Institute of Standards and Technology, Environmental Resource Associates, National Research Council of Canada, or other documented, reliable, commercial sources. All standards received shall be logged into standard receipt logs maintained by the individual analytical groups. Each group shall maintain a standards log that tracks the preparation of standards used for calibration and QC purposes.

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14 INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES

Inspection and acceptance of field supplies, including laboratory-prepared sampling bottles, will be conducted by the FC. All primary chemical standards and standard solutions used in this project either in the field or laboratory will be traceable to documented, reliable, commercial sources. Standards will be validated to determine their accuracy by comparison with an independent standard. Any impurities found in the standard will be documented.

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15 NON-DIRECT MEASUREMENTS

Additional information may be obtained from EMJ, Jorgensen Forge, or EPA. If such information is needed, EMJ, Jorgensen Forge, or EPA will be asked to provide any information on data limitations. This information will be maintained with the additional files.

16 DATA MANAGEMENT

All data will undergo two levels of QA/QC evaluation: one at the laboratory and one by a qualified data validator. Initial data reduction, evaluation, and reporting at the laboratory will be carried out as described in the appropriate analytical protocols and the laboratory's QA manual. QC data resulting from methods and procedures described in this document will also be reported.

16.1 Sample Management

All laboratory analytical batches will be assigned a unique number and tracking identifier at the laboratory. All data reports will include this tracking number. The laboratory will use a laboratory information management system to track all samples throughout the analytical process.

16.2 Data Reporting

Analytical chemistry results will be provided by the laboratory in digital and electronic deliverable formats. The data packages will be reviewed to ensure that the correct analyses were performed for each sample submitted and that all of the analyses requested on the COC form were performed. If discrepancies are noted, the Project QA Manager will be notified and will promptly follow up with the laboratory to resolve any issues.

Following completion of data validation, the digital files will be used to generate the appropriate report tables. Electronic data deliverables (EDDs) will be supplied by the laboratory in Anchor QEA's custom EQuIS electronic format. Laboratory data, which is electronically provided and loaded into the database, will undergo a 10 percent check against the laboratory data deliverable. Data will be validated or reviewed manually, and qualifiers, if assigned, will be entered manually. All manually entered data will be verified by a second party. Data tables and reports are exported from EQuIS to Microsoft Excel tables as needed.

Any analytical data that cannot be provided by the laboratory in electronic format will be entered manually. After entry into the database, the EDD data will be compared to the field information previously entered into the database to confirm that all requested analytical data have been received.

16.3 Data Management Procedures

A record of all field documentation, as well as analytical and QA/QC results, will be maintained to ensure the validity of the data. To effectively execute such documentation, carefully constructed sample tracking and data management procedures will be used throughout the sampling program.

Sample tracking will begin with the completion of COC forms, as described in the FSP (Attachment 2 to the SAP) and summarized in Section 5 of this QAPP. Copies of all completed COC forms will be maintained in the project files. The laboratory shall verify receipt of the samples electronically within 48 hours of sample receipt.

When analytical data are received from the laboratory, the Project QA Manager will review the incoming analytical data packages and compare the information to the COCs to confirm that the correct analyses were performed for each sample, and that results were received for all samples submitted for analyses. Any discrepancies noted will be promptly followed up by the Project QA Manager.

16.4 Laboratory Turnaround Time

The laboratory turnaround time for data is 3 weeks from sample receipt to the submission of the finalized data report. Preliminary water quality COC data will be requested within 48 to 72 hours of sample receipt.

16.5 Archival/Retention Requirements

Archival sediment samples will be stored in the dark at -18 ± 10°C for possible additional analyses or reanalyses. Archive sample aliquots will be retained for a minimum of 1 year after the collection date. The laboratory will notify the Project QA Manager prior to disposing of any samples.

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17 ASSESSMENTS AND RESPONSE ACTIONS

The project activities will be assessed during project implementation by utilizing laboratory and field audits, if deemed necessary by the FC or the Project QA Manager.

17.1 Laboratory Audits and Corrective Actions

Laboratory and field performance audits and corrective action procedures are described in this section.

17.1.1 Laboratory and Field Performance Audits

Laboratory and field performance audits consist of onsite reviews of QA systems and equipment for sampling, calibration, and measurement. Laboratory audits will not be conducted for this project; however, all laboratory audit reports will be made available to the Project QA Manager upon request. All laboratories are required to have written procedures addressing internal QA/QC; these procedures will be submitted and will be reviewed by the Project QA Manager to ensure compliance with this QAPP. All laboratories must ensure that personnel engaged in sampling and analysis tasks have appropriate training.

The laboratory will, as part of the audit process, provide written details of any and all planned modifications for Anchor QEA's review.

17.2 Corrective Action Procedures

The following sections describe corrective action procedures for field and laboratory procedures.

17.2.1 Corrective Action for Field Sampling

The FC will be responsible for correcting equipment malfunctions during the field sampling effort. The Project QA Manager will be responsible for resolving situations in the field that may result in non-compliance with the QAPP. All corrective measures will be immediately documented in the field logbook.

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17.2.2 Corrective Action for Laboratory Analyses

The laboratory is required to submit and comply with its SOPs. The laboratory project manager will be responsible for ensuring that appropriate corrective actions are initiated as required for compliance with this QAPP. All laboratory personnel will be responsible for reporting problems that may compromise the quality of the data.

If QC results exceed the laboratory control limits, the analyst will identify and correct the anomaly before continuing with the sample analyses, if possible. If the QC exceedance cannot be overcome with standard corrective action (e.g., repreparation and/or reanalysis), the causes of the exceedance(s) and steps taken to overcome them will be discussed by the laboratory project manager in the data package narrative. If the exceedance(s) are gross or widespread, the Project QA Manager will be notified immediately and the appropriate corrective action will be decided.

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18 REPORTS

Reporting requirements are described in detail in the CQAP (Appendix D to the BODR), the OMMP (Appendix F to the BODR), and the WQMP (Appendix E to the BODR). Generally, reports or reporting requirements will occur as outlined below.

- Post-Dredge Confirmation Sampling – Within 90 days of EPA confirmation that all of the removal action requirements have been fulfilled (excluding long-term post-construction monitoring requirements), a Draft Removal Action Completion Report will be submitted. See Appendix D of the BODR for detailed reporting requirements.
- Pre- and Post-Construction Perimeter Sampling and Visual Observations - Monitoring reports will be prepared following Year 1, 3, 5, 7, and 10 monitoring events, as well as any emergency monitoring events that may need to be conducted in response to a severe storm or flood or documented significant release from the Facility. Each monitoring report will be prepared and submitted to EPA within 90 days of receipt of final validated analytical results for that event. See Appendix F of the BODR for detailed reporting requirements.
- Water Quality Monitoring - Daily, weekly, and final reporting of water quality monitoring results will be prepared. The final report will be included as an appendix to the RACR. See Appendix E of the BODR for detailed reporting requirements.

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19 DATA REVIEW, VERIFICATION, AND VALIDATION

Once the data are received from the laboratory, a number of QC procedures will be followed to accurately evaluate data quality and assess data precision, accuracy, and completeness.

19.1 Data Quality Control Review

Chemistry data will be subject to multilevel review by the selected analytical laboratory. The group leader will review all data reports prior to their release for final data report generation. The laboratory QA manager will review the final data reports, and the laboratory project manager will review a cross section of the final data reports prior to delivery to Anchor QEA.

If discrepancies or deficiencies exist in the analytical results, then corrective action will be taken, as discussed in Section 18.

19.2 Data Verification and Validation

Data reports will be reviewed and verified by the QA Manager to verify that all analyses were completed and all analytes of interest were reported. Any problems will be discussed with the laboratory to correct errors. Data validation will be performed under the guidance of the EPA's National Functional Guidelines (EPA 1999, 2004, 2005, 2008) and in accordance with this QAPP.

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20 VERIFICATION AND VALIDATION METHODS

All data will undergo Stage 2B data validation (EPA 2009). Data validation will be performed under the guidance of the EPA's National Functional Guidelines (EPA 1999, 2004, 2005, 2008) and in accordance with this QAPP. The following will be reviewed as appropriate to the stage of data validation being performed and as applicable to the analysis:

- COC forms
- Holding times
- Instrument tunes and calibration
- Method blanks
- Surrogate recoveries
- MS/MSD recoveries and RPD values
- LCS/LCSD recoveries and RPD values
- Field duplicate RPD values
- Laboratory duplicate RPD values
- Detection and reporting limits

The results of the data quality review, including text assigning qualifiers in accordance with the EPA National Functional Guidelines and a tabular summary of qualifiers, will be generated by the data validator and submitted to the project QA/QC manager for final review and confirmation of the validity of the data. Copies of the validation reports will be submitted and presented as an appendix to the applicable data reports.

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21 RECONCILIATION WITH USER REQUIREMENTS

The QA Manager will review data to determine if DQOs have been met. If data do not meet the project's specifications, the QA Manager will review the errors and determine if the problem is due to calibration/maintenance, sampling techniques, or other factors. Corrective action will be discussed with the laboratory and implemented as necessary. If corrective action does not correct the problem, the DQOs will be reviewed for feasibility. If specific DQOs are not achievable, the QA Manager will recommend appropriate modifications. Any revisions will require approval by EPA.

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TABLES

Table 1
Sediment and Soil Sampling Parameters, Analytical Methods, and Chemical Criteria

Parameter	Analytical Method	Units	Ecology 2003 Freshwater Criteria[d]		Sediment Management Standards Criteria[d]		SAPA Recommended Practical Quantitation Limit (PQL)[b]	Laboratory PQL
			LAET	2LAET	Sediment Quality Standards	Cleanup Screening Level		
Conventional Parameters								
Grain size	PSEP, 1986	%	--	--	--	--	1	1.0
Total solids	PSEP, 1986	% wet wt	--	--	--	--	0.1	0.01
Total organic carbon (TOC)	PSEP, 1986	% dry wt	--	--	--	--	0.1	0.05
Total sulfides	PSEP, 1986	% dry wt	--	--	--	--	10	1.0
Ammonia	Plumb, 1981	mg-N/kg dry wt	--	--	--	--	100	1.0
Metals								
Arsenic	6010B/6020	mg/kg dry wt	31.4	50.9	57	93	19	0.2
Cadmium	6010B/6020	mg/kg dry wt	2.39	2.9	5.1	6.7	1.7	0.2
Chromium	6010B/6020	mg/kg dry wt	95	133	260	270	87	0.5
Copper	6010B/6020	mg/kg dry wt	619	829	390	390	130	0.5
Lead	6010B/6020	mg/kg dry wt	335	431	450	530	150	0.2
Mercury	7471A	mg/kg dry wt	0.8	3.04	0.41	0.59	0.14	0.025
Silver	6010B/6020	mg/kg dry wt	0.545	3.5	6.1	6.1	2	0.2
Zinc	6010B/6020	mg/kg dry wt	683	1080	410	960	137	4.0
SVOCs								
PAHs								
Total LPAH	8270D	µg/kg dry wt	6,590	9,200	370 mg/kg OC	780 mg/kg OC	--	--
Naphthalene	8270D	µg/kg dry wt	529	1,310	99 mg/kg OC	170 mg/kg OC	700	20
Acenaphthylene	8270D	µg/kg dry wt	470	640	66 mg/kg OC	66 mg/kg OC	433	20
Acenaphthene	8270D	µg/kg dry wt	1,060	1,320	16 mg/kg OC	57 mg/kg OC	167	20
Fluorene	8270D	µg/kg dry wt	1,070	3,850	23 mg/kg OC	79 mg/kg OC	180	20
Phenanthrene	8270D	µg/kg dry wt	6,100	7,570	100 mg/kg OC	480 mg/kg OC	500	20
Anthracene	8270D	µg/kg dry wt	1,230	1,580	220 mg/kg OC	1,200 mg/kg OC	320	20
2-Methylnaphthalene[a]	8270D	µg/kg dry wt	469	555	38 mg/kg OC	64 mg/kg OC	223	20
Total HPAHs	8270D	µg/kg dry wt	31,640	54,800	960 mg/kg OC	5,300 mg/kg OC	--	--
Fluoranthene	8270D	µg/kg dry wt	11,100	15,000	160 mg/kg OC	1,200 mg/kg OC	567	20
Pyrene	8270D	µg/kg dry wt	8,790	16,000	1,000 mg/kg OC	1,400 mg/kg OC	867	20
Benzo(a)anthracene	8270D	µg/kg dry wt	4,260	5,800	110 mg/kg OC	270 mg/kg OC	433	20
Chrysene	8270D	µg/kg dry wt	5,940	6,400	110 mg/kg OC	460 mg/kg OC	467	20
Total benzo(b+k)fluoranthenes	8270D	µg/kg dry wt	11,000	13,800	230 mg/kg OC	450 mg/kg OC	1,067	40
Benzo(a)pyrene	8270D	µg/kg dry wt	3,300	4,810	99 mg/kg OC	210 mg/kg OC	533	20
Indeno(1,2,3-cd)pyrene	8270D	µg/kg dry wt	4,120	5,300	34 mg/kg OC	88 mg/kg OC	200	20
Dibenz(a,h)anthracene	8270D	µg/kg dry wt	800	839	12 mg/kg OC	33 mg/kg OC	77	20
Benzo(g,h,i)perylene	8270D	µg/kg dry wt	4,020	5,200	31 mg/kg OC	78 mg/kg OC	223	20
Chlorinated Benzenes								
1,2-Dichlorobenzene	8270D-SIM	µg/kg dry wt	--	--	2.3 mg/kg OC	2.3 mg/kg OC	35	5.0
1,4-Dichlorobenzene	8270D-SIM	µg/kg dry wt	--	--	3.1 mg/kg OC	9 mg/kg OC	37	5.0
1,2,4-Trichlorobenzene	8270D-SIM	µg/kg dry wt	--	--	0.81 mg/kg OC	1.8 mg/kg OC	31	5.0
Hexachlorobenzene	8270D-SIM	µg/kg dry wt	--	--	0.38 mg/kg OC	2.3 mg/kg OC	22	5.0
Phthalates								
Dimethyl phthalate	8270D-SIM	µg/kg dry wt	311	436	53 mg/kg OC	53 mg/kg OC	24	5.0
Diethyl phthalate	8270D-SIM	µg/kg dry wt	--	--	61 mg/kg OC	110 mg/kg OC	67	5.0
Di-n-butyl phthalate	8270D	µg/kg dry wt	103	--	220 mg/kg OC	1,700 mg/kg OC	467	20
Butyl benzyl phthalate	8270D-SIM	µg/kg dry wt	260	366	4.9 mg/kg OC	64 mg/kg OC	21	5.0
Bis(2-ethylhexyl) phthalate	8270D	µg/kg dry wt	2,520	6,380	47 mg/kg OC	78 mg/kg OC	433	25
Di-n-octyl phthalate	8270D	µg/kg dry wt	11	201	58 mg/kg OC	4,500 mg/kg OC	2,067	20
Miscellaneous Extractables								
Dibenzofuran	8270D	µg/kg dry wt	399	443	15 mg/kg OC	58 mg/kg OC	180	20
Hexachlorobutadiene	8270D-SIM	µg/kg dry wt	--	--	3.9 mg/kg OC	6.2 mg/kg OC	11	5
N-Nitrosodiphenylamine	8270D	µg/kg dry wt	--	--	11 mg/kg OC	11 mg/kg OC	28	20
Ionizable Organic Compounds								
Phenol	8270D-SIM	µg/kg dry wt	--	--	420	1,200	140	5
2-Methylphenol	8270D-SIM	µg/kg dry wt	--	--	63	63	63	5
4-Methylphenol	8270D-SIM	µg/kg dry wt	760	2,360	670	670	223	10
2,4-Dimethylphenol	8270D-SIM	µg/kg dry wt	--	--	29	29	29	20
Pentachlorophenol	8270D-SIM	µg/kg dry wt	--	--	360	690	120	50
Benzyl Alcohol	8270D-SIM	µg/kg dry wt	--	--	57	73	57	20
Benzoic Acid	8270D	µg/kg dry wt	2,910	3790	650	650	217	400
PCBs								
Total PCB Aroclors	8082	µg/kg dry wt	62	354	12 mg/kg OC	65 mg/kg OC	6	10

Notes:

a - 2-Methylnapthalene is not included in the sum of LPAHs

b - Washington State Department of Ecology Sediment Sampling and Analysis Plan Appendix, February 2008

c - TEQs will be calculated using WHO 2005 Mammalian TEFs with ND=DL, EMPC=EMPC & ND=DL/2, EMPC=EMPC

d - Units designated with "OC" are TOC normalized per SMS guidance; however, TOC values <0.5% or >3% will be not be OC normalized and screened against LAET and 2LAET criteria

µg/kg = microgram per kilogram

mg/kg = milligram per kilogram

HPAH = high-molecular-weight polycyclic aromatic hydrocarbon

LAET = lowest apparent effects threshold

2LAET = second lowest apparent effects threshold

LPAH = low-molecular-weight polycyclic aromatic hydrocarbon

PQL = Practical Quantitation Limits

SSAPA = Sediment Sampling and Analysis Plan Appendix (Washington State Department of Ecology, 2008. *Sediment Sampling and Analysis Plan Appendix*. Ecology Publication No. 03-09-043. February 2008).

Table 2
Quantitative Goals for Sediment Analytical Data

Parameter	Precision (duplicates)	Percent Recovery Goals[1]	Completeness
Sediment			
Grainsize	± 30% RPD	NA	95%
Total solids	± 30% RPD	NA	95%
Total organic carbon	± 30% RPD	75-125% R	95%
Ammonia	± 30% RPD	75-125% R	95%
Sulfide	± 30% RPD	65-135% R	95%
Total metals	± 30% RPD	75-125% R	95%
Volatile organic compounds	± 50% RPD	50-150% R	95%
Semivolatile organic compounds	± 50% RPD	50-150% R	95%
PCBs/Pesticides	± 50% RPD	50-150% R	95%
Surface Water			
Total and dissolved metals	± 25% RPD	75-125% R	95%
PCBs	± 35% RPD	60-140% R	95%
Semivolatile organic compounds	± 35% RPD	60-140% R	95%

Notes:

PCB = polychlorinated biphenyl

R = Recovery

RPD = Relative percent difference

1 Percent recovery goals apply to laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) and matrix spike (MS)/matrix spike duplicate (MSD) analyses

Table 3
Container Requirements, Holding Times, and Preservation Methods

Parameter	Sample Size	Container Size and Type	Holding Time	Sample Preservation Technique
Sediment				
Grain size	300 g	16-oz HDPE	6 months	Cool/4°C (Do Not Freeze)
Total solids	50 g	4-oz Glass	14 days	Cool/4°C
			6 months	Freeze -18°C
Total organic carbon	50 g	from TS container	14 days	Cool/4°C
			6 months	Freeze -18°C
Total sulfides	50 g	2-oz Glass	7 days	5 mL 2N Zn acetate/dark/cool/4°C
Ammonia	40 g	from TS container	7 days	Cool/4°C
Semivolatile organic compounds	150 g	16-oz Glass	14 days until extraction	Cool/4°C
			1 year until extraction	Freeze -18°C
			40 days after extraction	Cool/4°C
Volatile organic compounds	50 g	2-oz Glass	14 days	Cool/4°C; No headspace
Metals	50 g	4-oz Glass	6 months; 28 days for Hg	Cool/4°C
			2 years (except Hg)	Freeze -18°C
PCBs	150 g	from SVOC jar	14 days until extraction	Cool/4°C
			2 years until extraction	Freeze -18°C
			40 days after extraction	Cool/4°C
Archival	--	16-oz Glass	1 year	Freeze -18°C
Water				
Metals, dissolved	100 mL	500 mL HDPE	6 months	HNO_3 to pH < 2
Mercury, total	100 mL	500 mL HDPE	28 days	HNO_3 to pH < 3
PCBs	1000 mL	2 x 1000mL Amber Glass	7 days until extraction	Cool/4°C
			40 days after extraction	Cool/4°C
Semivolatile organic compounds	500 mL	2 x 500mL Amber Glass	7 days until extraction	Cool/4°C
			40 days after extraction	Cool/4°C

Notes:
Samples for total sulfides and volatile organic compounds will be collected prior to compositing.
°C = degrees Celsius
mL = milliliter
HDPE = High Density Polyethylene
oz = ounce
PCB = polychlorinated biphenyl
TS = total solid

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Table 4
Laboratory Quality Control Sample Analysis Frequency

Analysis Type	Initial Calibration	Ongoing Calibration	Replicates	Matrix Spikes	LCS/SRM[e]	Matrix Spike Duplicates	Method Blanks	Surrogate Spikes
Grain size	Each batch [a]	NA	1 per 20 samples	NA	NA	NA	NA	NA
Total solids	Each batch [b]	NA	1 per 20 samples	NA	NA	NA	NA	NA
Total organic carbon	Daily or each batch	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	NA	1 per 20 samples	NA
Ammonia	Each batch [b]	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	NA	1 per 20 samples	NA
Total sulfides	Each batch [b]	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	NA	1 per 20 samples	NA
SVOCs	As needed [c]	Every 12 hours	NA	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample
VOCs	As needed [c]	Every 12 hours	NA	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample
Metals	Daily	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	NA	1 per 20 samples	NA
PCBs/Pesticides	As needed [c]	1 per 10 samples	NA	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample

Notes:

a = Calibration and certification of drying ovens and weighing scales are conducted bi-annually.
b = Initial calibration verification and calibration blank must be analyzed at the beginning of each batch.
c = Initial calibrations are considered valid until the ongoing continuing calibration no longer meets method specifications. At that point, a new initial calibration is performed.
d = Isotope dilution method- labeled standards are spiked in every dioxin/ furan sample to assess method performance in the sample matrix.
e = The Puget Sound Sediment Reference Material will be used for PCB analysis of sediment samples.
NA = Not applicable
LCS = Laboratory control sample
OPR = Ongoing Precision and Recovery sample (used for dioxin/furan analysis)

Table 5
Water Sampling Parameters and Analytical Methods

Parameter	Analytical Method	Units	Laboratory PQL	National Recommended Water Quality Criteria Aquatic Life Criteria[1]	
				Acute Criteria	Chronic Criteria
Metals[2]					
Arsenic	6020A/200.8	µg/L	0.5	--	--
Cadmium	6020A/200.8	µg/L	0.10	40	8.8
Chromium [3]	6020A/200.8	µg/L	0.50	1100	50
Copper	6020A/200.8	µg/L	0.5	4.8	3.1
Lead	6020A/200.8	µg/L	0.1	210	8.1
Mercury	7470A	µg/L	0.1	1.8	0.94
Silver	6020A/200.8	µg/L	0.2	1.9	1.9 [6]
Zinc	6020A/200.8	µg/L	4.0	90	81
SVOCs					
Polycyclic Aromatic Hydrocarbons (PAHs)					
Total LPAH	8270D	µg/L	--	--	--
Naphthalene	8270D	µg/L	1.0	--	--
Acenaphthylene	8270D	µg/L	1.0	--	--
Acenaphthene	8270D	µg/L	1.0	--	--
Fluorene	8270D	µg/L	1.0	--	--
Phenanthrene	8270D	µg/L	1.0	--	--
Anthracene	8270D	µg/L	1.0	--	--
2-Methylnaphthalene[a]	8270D	µg/L	1.0	--	--
Total HPAHs	8270D	µg/L	--	--	--
Fluoranthene	8270D	µg/L	1.0	--	--
Pyrene	8270D	µg/L	1.0	--	--
Benzo(a)anthracene	8270D	µg/L	1.0	--	--
Chrysene	8270D	µg/L	1.0	--	--
Total benzo(b+k)fluoranthenes	8270D	µg/L	5.0	--	--
Benzo(a)pyrene	8270D	µg/L	1.0	--	--
Indeno(1,2,3-cd)pyrene	8270D	µg/L	1.0	--	--
Dibenz(a,h)anthracene	8270D	µg/L	1.0	--	--
Benzo(g,h,i)perylene	8270D	µg/L	1.0	--	--
Chlorinated Benzenes					
1,2-Dichlorobenzene	8270D	µg/L	1.0	--	--
1,4-Dichlorobenzene	8270D	µg/L	1.0	--	--
1,2,4-Trichlorobenzene	8270D	µg/L	1.0	--	--
Hexachlorobenzene	8270D	µg/L	1.0	--	--
Phthalates					
Dimethyl phthalate	8270D	µg/L	1.0	--	--
Diethyl phthalate	8270D	µg/L	1.0	--	--
Di-n-butyl phthalate	8270D	µg/L	1.0	--	--
Butyl benzyl phthalate	8270D	µg/L	1.0	--	--
Bis(2-ethylhexyl) phthalate	8270D	µg/L	3.0	--	--
Di-n-octyl phthalate	8270D	µg/L	1.0		
Miscellaneous Extractables					
Dibenzofuran	8270D	µg/L	1.0	--	--
Hexachlorobutadiene	8270D	µg/L	3.0	--	--
N-Nitrosodiphenylamine	8270D	µg/L	1.0	--	--
Ionizable Organic Compounds					
Phenol	8270D	µg/L	1.0	--	--
2-Methylphenol	8270D	µg/L	1.0	--	--
4-Methylphenol	8270D	µg/L	2.0	--	--
2,4-Dimethylphenol	8270D	µg/L	3.0	--	--
Pentachlorophenol	8270D	µg/L	10.0	--	--
Benzyl Alcohol	8270D	µg/L	2.0	--	--
Benzoic Acid	8270D	µg/L	20	--	--

Table 5
Water Sampling Parameters and Analytical Methods

Parameter	Analytical Method	Units	Laboratory PQL	National Recommended Water Quality Criteria Aquatic Life Criteria[1]	
				Acute Criteria	Chronic Criteria
Polychlorinated Biphenyls (PCBs)					
Total PCB Aroclors[4]	8082B	µg/L	0.01	10 [5]	0.03

Notes:

a = 2-Methylnapthalene is not included in the sum of LPAHs
µg/L = micrograms per liter
HPAH = high-molecular-weight polycyclic aromatic hydrocarbon
LPAH = low-molecular-weight polycyclic aromatic hydrocarbon
PCBs = Polychlorinated Biphenyls
PQL = Practicle Quantitation Limit

1 National Recommended Water Quality: Aquatic Life Criteria, http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm

2 Acute and chronic criteria for metals (except mercury) are based on the dissolved fraction. The chronic criterion for mercury is based on total recoverable and the acute criterion is based on the dissolved fraction.

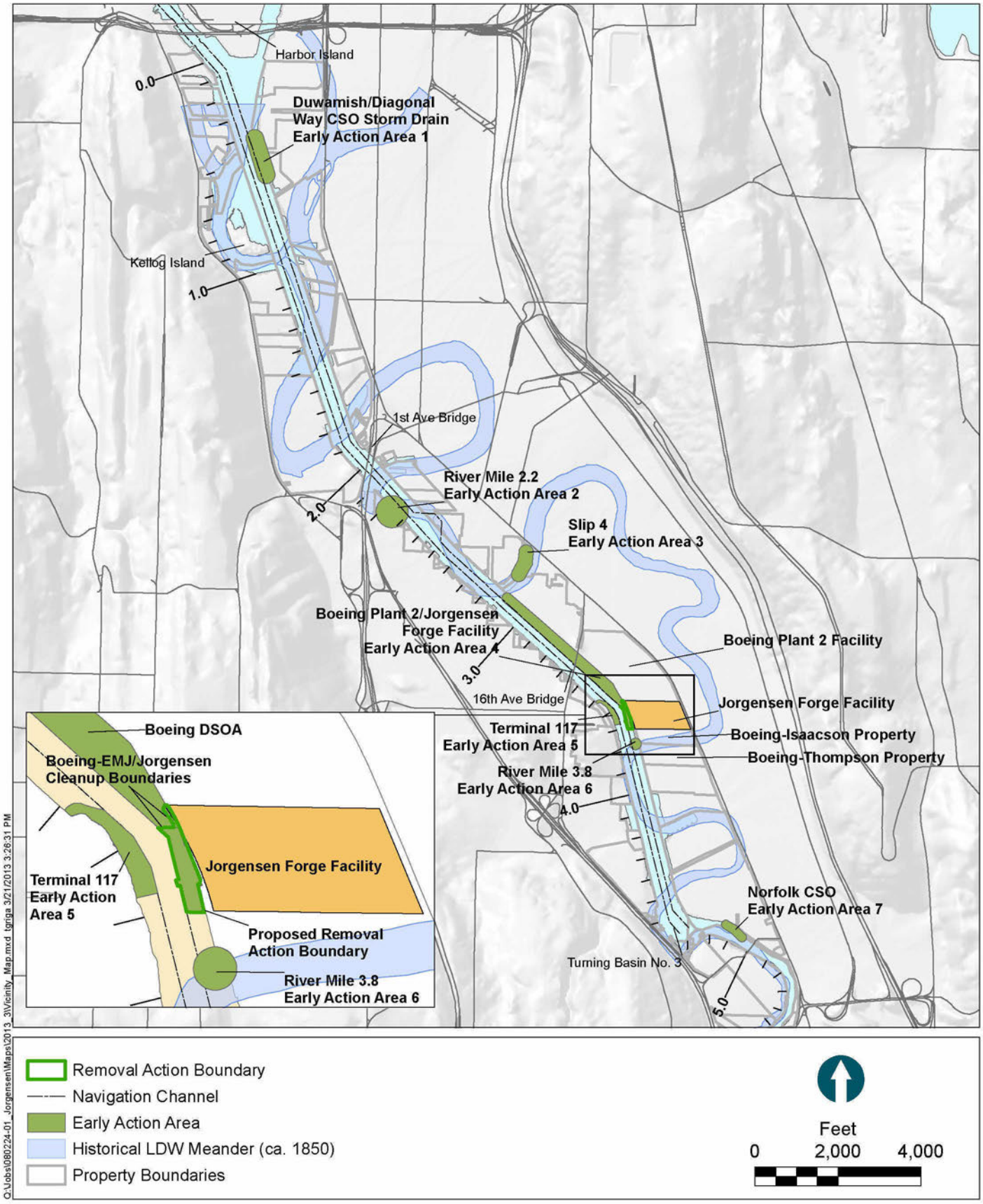
3 Acute and chronic criteria for chromium is for the hexavalent form. Hexavalent chromium is not one of the chemicals of concern at the Jorgensen Forge site; therefore chromium will be reported.

4 Criteria for total PCBs based on the total recoverable fraction (EPA 2002)

5 There is no National Recommended Water Quality Aquatic Life Acute Criterion for PCBs the Washington State Acute Marine Criterion for PCBs (WAC 173-201A-240) is used.

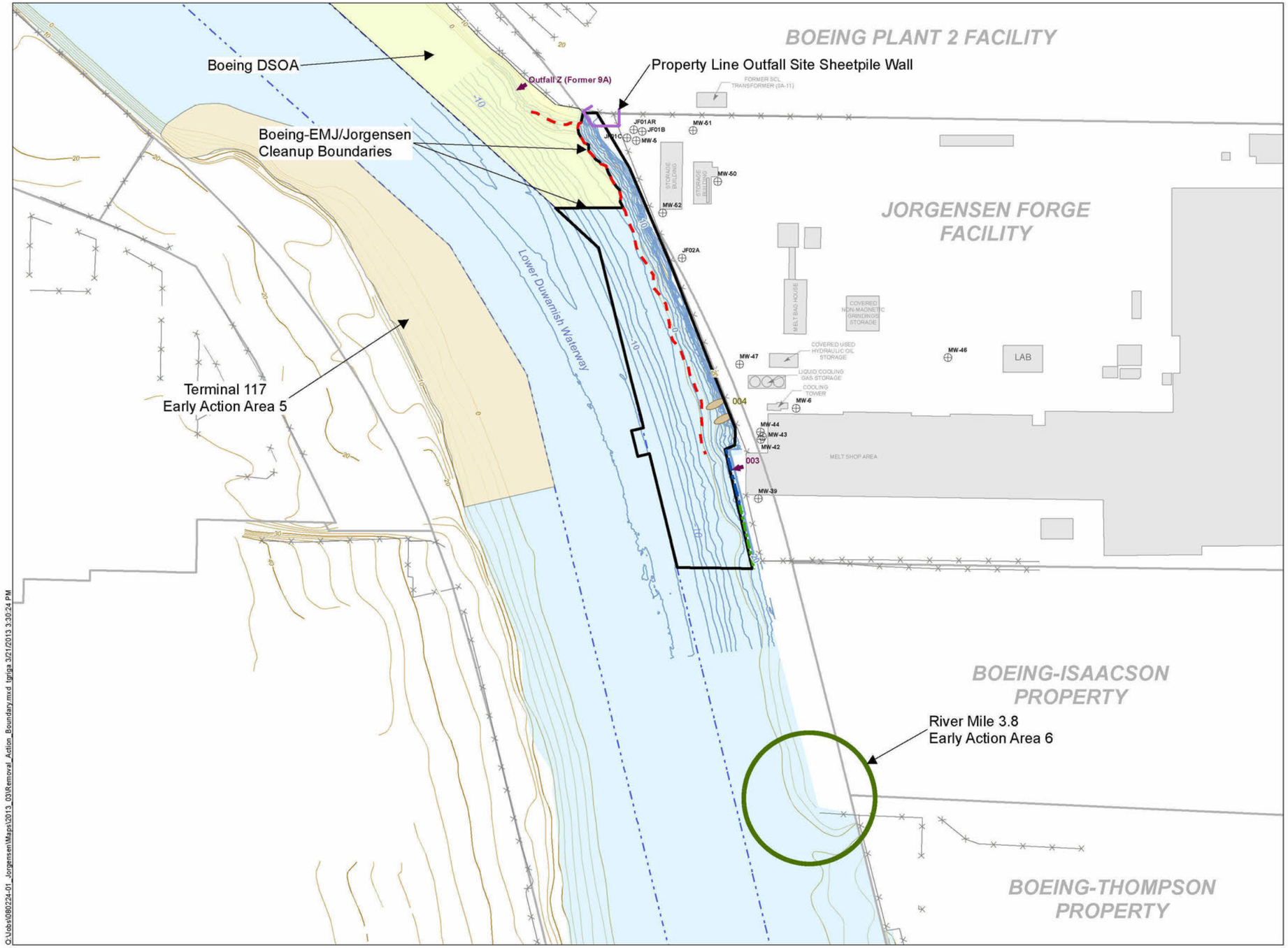
6 There is no chronic criterion for silver; the acute criterion of 1 .9 ug/L will be used as the chronic criterion/reporting limit.

FIGURES



ANCHOR QEA

Figure 1
Removal Action Vicinity Map
Quality Assurance Project Plan
Jorgensen Forge Early Action Area



LEGEND

- Groundwater Monitoring Well
- Active Outfall
- Toe of Existing Riprap
- Existing Sheetpile Wall
- Existing Concrete Panel Wall
- Fences
- Federal Navigation Channel
- Removal Action Boundary
- Debris Pile
- Property Boundaries
- Boeing DSOA
- Terminal 117 Early Action Area 5 Boundary
- Property Line Outfall Site Sheetpile Wall

NOTES:

1. Bathymetric survey by eTrac dated February 8, 2012. Additional back survey by AEC Consultants, Inc. dated February 21, 2012. Bathymetric and bank survey merged with upland survey by PLS, Inc. dated January 24, 2012.

2. Outfall locations field identified on May 14, 2003.

3. The toe of riprap slope was surveyed during a low tide on August 28, 2008.

4. The Boeing-EMJ/Jorgensen cleanup boundaries is identified in the Memorandum of Understanding between Boeing and EMJ/Jorgensen Forge, dated August 2007 (EMJ et al. 2007).

Feet
0 80 160 240 320

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ANCHOR QEA

Figure 2
Removal Action Boundary
Quality Asssurance Project Plan
Jorgensen Forge Early Action Area

ATTACHMENT 2
FIELD SAMPLING PLAN

ATTACHMENT 2
FIELD SAMPLING PLAN
SAMPLING AND ANALYSIS PLAN
JORGENSEN FORGE EARLY ACTION AREA

Prepared for

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Figure 2 Removal Action Boundary

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Attachment 3 Site Map Visual Monitoring Form

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LIST OF ACRONYMS AND ABBREVIATIONS

°C	degree Celsius
AOC	Administrative Settlement Agreement and Order on Consent for Removal Action Implementation
BODR	Basis of Design Report
Boeing	The Boeing Company
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm	centimeter
COC	chain-of-custody
CQAP	Construction Quality Assurance Plan
DGPS	Differential Global Positioning System
DSOA	Duwamish Sediment Other Area
EAA	Early Action Area
EMJ	Earle M. Jorgensen Company
EPA	U.S. Environmental Protection Agency
Facility	Jorgensen Forge facility
FSP	Field Sampling Plan
HASP	Health and Safety Plan
Jorgensen Forge	Jorgensen Forge Corporation
LDW	Lower Duwamish Waterway
NAD83	North American Datum 83
NTCRA	non-time critical removal action
OMMP	Operations, Monitoring, and Maintenance Plan
MLLW	mean lower low water
MOU	Memorandum of Understanding
PCB	polychlorinated biphenyl
PPE	personal protective equipment
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control

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RAB	removal action boundary
RvAL	removal action level
SAP	Sampling and Analysis Plan
SOW	Statement of Work
WQMP	Water Quality Monitoring Plan

EMJ015350

1 INTRODUCTION AND SCOPE OF DOCUMENT

This Field Sampling Plan (FSP) was prepared on behalf of Earle M. Jorgensen (EMJ) and Jorgensen Forge Corporation (Jorgensen Forge) pursuant to the Administrative Settlement Agreement and Order on Consent for Removal Action Implementation (AOC) issued by the U.S. Environmental Protection Agency (EPA) Region 10 (Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] Docket No. 10-2013-0032) and attached Statement of Work (SOW). This FSP is Attachment 2 to the Sampling and Analysis Plan (SAP), which is an appendix to the Basis of Design Report (BODR) Final Design submittal for the cleanup of contaminated sediments and associated bank soils in a portion of the Lower Duwamish Waterway (LDW) Superfund Site adjacent to the Jorgensen Forge facility (Facility) located in Tukwila, King County, Washington (see Figure 1 of the BODR; Jorgensen Forge Early Action Area [EAA]). The cleanup will be conducted as a non-time critical removal action (NTCRA) in accordance with EPA's selected cleanup alternative documented in the *Action Memorandum for a Non-Time Critical Removal Action at the Jorgensen Forge Early Action Area of the Lower Duwamish Waterway Superfund Site in Seattle, Washington* (EPA 2011) and detailed in the *Final Engineering Evaluation/Cost Analysis – Jorgensen Forge Facility, 8531 East Marginal Way South, Seattle, Washington* (Anchor QEA 2011). The southern portion of the Jorgensen Forge EAA is located near River Miles 3.6 to 3.7 on the east bank of the LDW, as shown on Figure 1.

The limits of the Jorgensen Forge EAA (herein referred to as the removal action boundary [RAB]) are shown on Figure 2. The RAB extends from the top of the bank at approximately +19 to +20 feet mean lower low water (MLLW; or top of the sheetpile/concrete panel on the southern portion of the Facility) to the federal navigation channel. The RAB is bounded to the north by The Boeing Company (Boeing) Plant 2 Duwamish Sediment Other Area (DSOA) and Southwest Bank Corrective Measure EAA cleanup area, as specified in the EPA-approved Memorandum of Understanding (MOU; EMJ et al. 2007). EPA identified this cleanup area as the northern portion of the Jorgensen Forge EAA.

This FSP addresses the collection of data required during the construction phase of the removal action. Data will be used for verification and documentation purposes during the construction phase of the removal action as well as for the completion of the long-term

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monitoring performed in accordance with the Construction Quality Assurance Plan (CQAP; Appendix D of the BODR), Water Quality Monitoring Plan (WQMP; Appendix E to the BODR), and Operations, Monitoring, and Maintenance Plan (OMMP; Appendix F to the BODR).

The removal action consists of the following elements:

- **Sediment Dredging**. Removal of sediments exceeding the identified polychlorinated biphenyl (PCB) removal action level (RvAL; EPA 2008).
- **Sediment Backfilling**. Placement of imported clean fill material in removal areas to reach approximately the existing grade and elevation.
- **Shoreline Bank Reconfiguration**. Excavation of shoreline bank debris and sediments/soils to support greater slope stability and containment of the shoreline bank; this work is planned to be conducted in-the-dry to the extent possible based on tidal elevations encountered during completion of the removal action.

This FSP addresses the following:

- Visual monitoring of the shoreline bank and backfill areas
- Surface water and sediment sampling
- Subsurface sediment and soil sampling Decontamination procedures
- Sample identification procedures
- Sample collection schedule
- Sampling documentation, sample handling, and chain-of-custody (COC) procedures
- Quality assurance and quality control (QA/QC) requirements
- Waste management

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2 VISUAL MONITORING

This section describes the visual monitoring activities as they pertain to the OMMP (Appendix F to the BODR). Visual monitoring of the backfill and reconfigured shoreline area will be conducted during the long-term monitoring period (see OMMP). The remainder of this section provides information that is consistent for all visual monitoring methods, including the equipment list, and visual monitoring procedure.

2.1 Equipment List

The following general equipment will be required during sample collection and visual monitoring activities:

- Personal protective equipment (PPE), as required by the Health and Safety Plan (HASP; Attachment 1 of the SAP)
- Navigation and site maps
- Camera
- Field notebook
- Measuring tape (300 feet long)

2.2 Visual Monitoring Procedure

Visual monitoring of the backfill and reconfigured shoreline area will be performed in-the-dry from land at low tide. The visual monitoring approach is described in detail in the OMMP (Appendix F to the BODR). Photographs and observation notes will be taken during each monitoring event. Areas of instability or sloughing will be documented as described in Section 4.1.2.4.

2.3 Visual Monitoring Schedule

The schedule of visual monitoring events is identified in the OMMP (Appendix F to the BODR).

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3 SURFACE WATER, SEDIMENT AND SOIL MONITORING

This section describes the sample collection activities as they pertain to the Construction Quality Assurance Plan (CQAP; Appendix D of the BODR) OMMP (Appendix F to the BODR) and WQMP (Appendix E to the BODR).

Surface water sampling will be conducted as described in the WQMP (Appendix E to the BODR) during the construction phase to minimize adverse impacts to water quality. Surface water chemistry grab samples will be collected using a van Dorn bottle or similar device. Water quality field parameter measurement activities are described in detail in the WQMP and are not included in this FSP.

Surface sediment sampling will be conducted to assess the condition of on-site and adjacent surface sediments prior to and immediately following construction (see the CQAP) and during the 10-year long-term monitoring period (see the OMMP). Post-dredge subsurface sediment sampling will also be conducted to document the final post-dredge surface (z layer) chemical concentrations are not significantly greater (as defined in CQAP; area weighted concentrations in the RAB are greater than 20 times the RvAL or 240 milligrams per kilogram normalized for organic carbon) than the total PCB RvAL. Finally, post-excavation bank soil sampling will be conducted to document the nature of the material beneath the shoreline backfill area.

3.1 Sample Collection

This section provides information that is consistent for all sampling methods, including station positioning and the equipment list. Additional subsections provide method-specific collection and processing procedures.

3.1.1 Station Positioning

The objective of location control is to accurately determine horizontal and vertical positioning of sampling locations. To achieve this objective, each sampling location will be referenced to known survey control points using the methods described below.

The following parameters will be documented at each sampling location, if applicable:

- Location coordinates (Washington state plane north zone, North American Datum 1983 [NAD83], international survey feet)
- Vertical elevation in feet National Geodetic Vertical Datum (MLLW, including mudline and tidal elevation above mudline)
- Actual water depth
- Distance from "construction work area" (applies to water quality monitoring only)
- Time and date
- Tidal elevation referenced to MLLW

These parameters will be measured using pre-surveyed, visual horizontal triangulation to known control points and/or landmarks on shore if necessary, a differential global positioning system (DGPS), laser range finder, and weighted tape measures.

3.1.1.1 Differential Global Positioning System

Location control will be performed with a DGPS unit onboard the sampling vessel. DGPS coordinates for each sampling location will be recorded at the time of sampling.

3.1.1.2 Visual Horizontal Triangulation Methods

Visual horizontal triangulation methods will be used as a backup method to the DGPS. This system will use pre-surveyed markers and/or established landmarks on shore. This method determines sampling locations based on horizontal distances to survey control points and/or landmarks identifiable on base maps. Locations will be identified by measuring the horizontal distance from the actual sampling location to the known control point or landmark to the nearest foot using a tape measure. Horizontal measurements can be calculated from registered base maps in order for field measurements can be translated to state plane coordinates. Buoy markers may be used to mark the sampling location.

3.1.1.3 Vertical Control

The vertical control parameters measured will be depth to sediment (mudline) and tidal elevation. The depth to sediment will be measured during each sampling event using a hand-held weighted tape (lead line). The tape will be dropped from the work platform to

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the bottom, pulled taut, and read to the nearest 0.1 foot. This observation will be cross-checked against the onboard depth sounder.

Tidal readings will be taken periodically from a tide board installed on site and checked against daily tide charts for the LDW. Tidal elevations and time will be monitored and recorded before each sample is collected to the nearest 0.1 foot. Sample elevations will then be corrected to MLLW.

3.1.2 Equipment List

The following general equipment will be required during sample collection procedures:

- PPE, as required by the HASP (Attachment 1 of the SAP)
- Navigation and site maps
- Camera
- Field notebook
- Aluminum decked boat equipped with outboard motor
- Calibrated rod or ruler for sediment depth measurement
- Sampling device (Van Veen grab sampler or similar device, MudMole or similar device and van Dorn or similar device)
- Weighted tape measure calibrated in 0.1-foot increments
- Decontamination supplies
- Stainless-steel sample processing equipment (e.g., bowls, spoons)

3.2 Surface Water Sample Collection

Water column samples will be collected at the depth (3 feet from surface, or 4 feet from bottom) with the highest turbidity as determined by field parameter measurements. Samples will be collected from a self-propelled vessel. Water chemistry grab samples will be collected using a decontaminated van Dorn bottle or similar device and will be analyzed for dissolved metals and total PCB Aroclors. Recovered water from the appropriate depth will be transferred immediately to appropriate laboratory-provided, pre-labeled, pre-cleaned sample containers.

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3.3 Surface Sediment Sample Collection

Surface sediment samples from the 0- to 10-centimeter (cm) biologically active zone will be collected from a vessel for chemical testing using a Van Veen grab sampler or equivalent, in accordance with the protocol listed below.

3.3.1.1 Van Veen Sampling Procedure

The sampling vessel will be maneuvered to the target sampling location. Once the targeted area is determined to be suitable for grab sample collection, the Van Veen jaw assembly will be decontaminated.

The sampler will be deployed vertically through the water column until the river bottom is reached. The winch cable to the grab sampler will be drawn taut and vertical. The location of the cable hoist will be measured and recorded by the location control personnel. The jaw assembly will be closed to collect the sediment sample to a penetration depth of approximately 15 cm. The apparatus will be pulled upward out of the river bottom using a winch and raised to the surface.

The sediment sample will be retrieved aboard the vessel and evaluated against the following acceptability criteria:

- Grab sampler is not overfilled (i.e., sediment surface is not against the top of sampler).
- Sediment surface is relatively flat, indicating minimal disturbance or winnowing.
- Overlying water is present, indicating minimal leakage.
- Overlying water has low turbidity, indicating minimal sample disturbance.
- Desired penetration depth (i.e., 10 cm) is achieved.

Overlying water will be siphoned off and a decontaminated stainless-steel trowel or similar device will be used to collect the sediment from inside the sampler, taking care not to collect sediment in contact with the sides/surface of the sampler.

In the event that gravel, armor rock, or other debris prevents the jaw assembly from closing, the sampling station will be moved 5 feet and a subsequent grab sample collection will be attempted. In areas where armor rock has been placed as part of the shoreline bank

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containment, collection of surface grab samples may not be possible. If sample collection is unsuccessful after three attempts, the station will be excluded from the analysis.

3.3.2 Processing Procedure

Prior to sample collection from the grab sampler, an aliquot for sulfides analysis will be collected from the 0- to10-cm interval and placed directly into the sample container without homogenization. Following sulfide analysis, additional sediment will be collected from the 0- to 10-cm interval and placed in a decontaminated stainless-steel mixing container and homogenized using a stainless-steel spoon or an electric drill with decontaminated stirring paddle until the sediment is of uniform color and consistency. Once homogenized, the subsamples will be placed in appropriate pre-labeled containers. Aliquots will also be collected and archived for potential future additional analyses. Samples will be submitted for laboratory analysis following appropriate handling and COC requirements. A complete description of analytes, analytical methods, target detection limits, and holding requirements can be found in Table 1 of the Quality Assurance Project Plan (QAPP; Attachment 1 to the SAP).

3.4 Subsurface Sediment Sample Collection

Subsurface sediment samples from the 0- to 1-foot interval below the final dredge elevation will be collected from a vessel for chemical testing using a MudMole core sampler or equivalent, in accordance with the protocol listed below. Additional material below the sample interval may be archived to support future potential data needs.

3.4.1 MudMole Sampling Procedure

The sampling vessel will be maneuvered to the target sampling location. The bottom of the coring device will be outfitted with a core catcher to maximize core recovery following penetration. The corer will use a decontaminated aluminum barrel for collecting the sediment. Core tube caps will be removed immediately prior to placement into the coring device.

The corer will be deployed by winch and sent to the river bottom, where the unit will then be energized and lowered to the target coring depth. When that depth is reached, the corer

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will be turned off and returned to the surface for sample processing. During the coring operation, the penetration of the core barrel will be continuously monitored. Section 3.6 describes the field decontamination procedures for core collection.

The target penetration depth for each core is a minimum of 3 feet below the final dredge elevation. Core penetration and recovery will be assessed via internal and external sensors on the MudMole. The core will be sealed on the top to create suction and then removed from the sediment slowly and steadily to avoid agitating the sample. Divers will then transfer the core to the topside crew for processing. Care will be taken to minimize disturbance during this transfer. Once on the vessel, each core will be inspected and a physical description of the material at the mouth of the core will be entered on the core log. The location of the cable hoist will be measured and recorded by the location control personnel.

3.4.1.1 Sample Acceptance Criteria

The sediment core acceptance criteria are as follows:

- The core penetrated to (and retained material to) the target depth or refusal.
- Recovery was at least 75 percent of the length of core penetration.
- Sediment does not extend out of the top of the core tube or contact any part of the sampling apparatus at the top of the core tube.
- There are no obstructions in the cored material that might have blocked the subsequent entry of sediment into the core tube and resulted in incomplete core collection.
- There are no significant air gaps in the core tube, or evidence of significant loss of material out of the cutter head during retrieval.

If acceptance criteria are not achieved, the core will be rejected and the sample station will be moved 5 feet and a subsequent core will be attempted. If sample acceptance criteria are not met after three attempts, the location will be excluded from sample collection. Following inspection, core processing will be conducted as described in Section 3.4.2.

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3.4.2 Core Processing Procedure

Core tubes will be cut vertically using a circular saw or similar device, taking care not to penetrate the sediment too deeply while cutting. Each core will be described and documented on standardized core log. Core logs will include the following observations, as relevant:

- Sample recovery (recovered sediment depth relative to penetration depth) and calculated percent compaction
- Physical soil description in accordance with the Unified Soil Classification System (soil type, density, color, etc.)
- Odor (hydrogen sulfide, petroleum, etc.)
- Presence of vegetation
- Presence of man-made debris (e.g., trash)
- Depth and distinctness of geologic contacts
- Any other distinguishing characteristics or features

All cores will be processed in a stepwise fashion, as follows:

- **Photograph Core.** Field personnel will take digital photographs of the entire penetration depth of the core with measuring tape corresponding to the depth below mudline.
- **Core Logging.** Field personnel will record the description of the full length of the core sample on the core log.
- **Identify Sampling Zones.** The bottom of the dredge elevation will be identified in each core. The sample interval will be established between 0 and 1 feet below the final dredge elevation.

Following identification of sampling zones, sediment will be collected from the 0- to 1-foot interval below the final dredge elevation, placed in a decontaminated stainless-steel mixing container, and homogenized using a stainless-steel spoon or an electric drill with decontaminated stirring paddle until the sediment is of uniform color and consistency. Once homogenized, the subsamples will be placed in appropriate pre-labeled containers. The samples will be submitted for laboratory analysis following appropriate handling and COC requirements as described in the QAPP (Attachment 1 to the SAP). A complete description

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of analytes, analytical methods, target detection limits, and holding requirements are also provided in the QAPP.

3.5 Shoreline Bank Soil Sample Collection

Surface soil samples from the 0- to 1-foot interval will be collected from the landside for chemical testing by hand or excavator bucket, in accordance with the protocol listed below.

3.5.1.1 Soil Sampling Procedure

The sampling personnel or excavator will maneuver to the target sampling location. Using a decontaminated stainless steel shovel or an excavator with a decontaminated bucket, a pit will be dug to a minimum of 1-foot below the final excavation elevation. Using a decontaminated stainless steel shovel or spoon, soil will be collected from the sidewall of the pit between 0 and 1 feet below the final excavation elevation and placed in a decontaminated stainless-steel mixing container. Prior to sample collection, care will be taken to remove any soil from the sidewall that may have been smeared from higher elevations during excavation of the pit.

3.5.1.2 Processing Procedure

The collected soil will be placed in a decontaminated stainless-steel mixing container and homogenized using a stainless-steel spoon or an electric drill with decontaminated stirring paddle until the soil is of uniform color and consistency.

Each sample will be described and documented on standardized sample collection log. Collection logs will include the following observations, as relevant:

- Physical soil description in accordance with the Unified Soil Classification System (e.g., soil type, density, color.)
- Odor (e.g., hydrogen sulfide, petroleum)
- Presence of vegetation
- Presence of man-made debris (e.g., trash)
- Depth and distinctness of geologic contacts
- Any other distinguishing characteristics or features

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Field personnel will take digital photographs of the sample pit and homogenized sample. Once homogenized, the samples will be placed in appropriate pre-labeled containers. The samples will be submitted for laboratory analysis following appropriate handling and COC requirements as described in the QAPP (Attachment 1 to the SAP). A complete description of analytes, analytical methods, target detection limits, and holding requirements are also provided in the QAPP.

3.6 Decontamination Procedures

Sample containers, instruments, working surfaces, technician protective gear, and other items that may come into contact with collected samples must meet high standards of cleanliness. All equipment that comes into contact with sampling media will be decontaminated prior to each day's use and between sampling locations. The decontamination procedure is as follows:

- Pre-wash rinse with site water
- Wash with solution of laboratory grade non-phosphate based soap
- Rinse with site water
- Rinse three times with laboratory-grade distilled water
- Store in clean, closed container or wrap in aluminum foil for next use

Additionally, the laboratory will provide pre-cleaned and labeled sample containers.

3.7 Sample Identification Numbers

3.7.1 Surface Water

All surface water samples will be properly identified on their attached labels as well as on any forms or in other documentation. Station names will use the following identification scheme consisting of up to 12 alphanumeric characters (A-BBBB-C-YYMMDD):

1. The first character (A) will be used to identify the construction activity being monitored:
   - R = Removal (e.g., Dredging, debris removal, pile removal)
   - B = Backfilling

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2. The next two characters (BB) will be used to identify the water quality monitoring location:
   - BG = Background Station
   - EW = Early Warning Station
   - 150C = 150-foot Compliance Station (downstream or upstream of the "construction work area")
   - 200M = 200-foot Monitoring Station (downstream or upstream of the "construction work area")
   - 250M = 250-foot Monitoring Station (downstream or upstream of the "construction work area")
   - 300C = 300-foot Compliance (downstream or upstream of the "construction work area")
3. The third character (C) will be used to identify the monitoring depth:
   - S = Surface
   - M = Middle
   - B = Bottom
4. The last six characters (YYMMDD) will be used to identify the monitoring date:
   - YY = The last two digits of the year of collection
   - MM = The month of collection
   - DD = The date of collection

For example, following this identification scheme, "R-150C-B-131018" represents a sample collected during monitoring during removal (R) at the 150-foot compliance station (150C) at the bottom depth in the water column (B) on October 18, 2013.

3.7.2 Soil and Sediment

All soil and sediment samples will be properly identified on their attached labels as well as on any forms or in other documentation. All sample identification numbers will be consistent with the following identification scheme:

- The first two characters will be "JF" to identify the samples as Jorgensen Forge samples.

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- The next characters will be used for station identification as identified in Table 2 of the OMMP (Appendix F of the BODR) and CQAP (Appendix D of the BODR).
- The last six characters will indicate the sample date by YYMMDD.

For example, following this identification scheme, JF-PEB-1-120518 indicates a sample collected at Jorgensen Forge at Station PEB-1 on May 18, 2012.

3.7.3 Sample Collection Schedule

The schedule of sample collection events is identified in the CQAP (Appendix D to the BODR), WQMP (Appendix E to the BODR), and OMMP (Appendix F to the BODR).

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4 DOCUMENTATION, SAMPLE HANDLING, AND CHAIN-OF-CUSTODY

Requirements for documentation, sample handling, and COC procedures related to sample collection events are outlined in this section.

4.1 Documentation

Field activities and samples must be properly documented during the sample collection process. Documentation of field activities provides an accurate and comprehensive record of the work performed sufficient for a technical peer to reconstruct the day's activities and provide certification that all necessary requirements were met. General requirements include:

- Use of a Field Activity Log to formally document activities and events. The Field Activity Log can be a standard or project-specific form or a bound field book. Pre-printed standard forms are available for many activities and should be used whenever possible. These forms provide prompts and request additional information that may be useful and/or needed. Project-specific field forms may be generated or existing forms may be modified to meet specific project needs. As required, client-supplied forms may be substituted.
- Appropriate header information documented on each page, including project title, project number, date, weather conditions, changes in weather conditions, other persons (if any) in the field party, and author. The specific information requested depends on the nature of the work being performed and on the form being used. Information fields that are not applicable should be noted "N/A" or with other appropriate notations.
- Field documentation entries using indelible ink.
- Legible data entries. A single line should be drawn through incorrect entries and the corrected entry should be written next to the original strikeout. Strikeouts are to be initialed and dated by the originator.
- Applicable units of measurement with entry values.
- Field records maintained in project files unless otherwise specified by a client or stipulated by a contract.

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4.1.1 Documentation Entries

A chronology of field events will be recorded. General entry requirements include:

- Visitors to the removal action area, including EMJ, Jorgensen Forge, and regulatory agency representatives
- Summary of pertinent project communications with the client, regulators, or other removal action area visitors
- Other contractors working at the removal action area
- A description of the day's field activities, in chronological sequence using military time notation (e.g., 9:00 am: 0900 and 5:00 pm: 1700)
- If applicable, calibration of measuring and test equipment and identification of the calibration standard(s) and use of a Calibration Log, if available, with cross-reference entered into the field book
- Field equipment identification, including type, manufacturer, model number, or other specific information
- General weather conditions, including temperature, wind speed, and direction readings, such as time of measurement and units
- Safety and/or monitoring equipment readings, including time of measurements and units
- If applicable, reference in the field notebook to specific forms used for collection of data
- Subcontractor progress and/or problems encountered
- Changes in the scope of work
- Other unusual events

4.1.2 Specific Requirements

4.1.2.1 Sample Collection

Sample collection data will be documented in a bound field book and/or on a sample collection form. Where both are being used, information contained in one is cross-referenced to the other. Entries may include:

- Sample identification number, location taken, depth interval, sample media, sample preservative, collection time, and date
- Sample collection method and protocol

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- Physical description of the sample (according to the Unified Soil Classification System)
- QC-related samples collected (e.g., duplicates, blinds, trip blanks, field blanks)
- Container description and sample volume
- Pertinent technical data, such as sample penetration depth and sampling interval
- Pertinent technical comments
- Identification of personnel collecting the sample

4.1.2.2 Sample Labeling

Sample labels must be prepared and attached to sample containers. Labels will either be provided by the laboratory performing the analyses or will be generated internally. The information to be provided includes:

- Sample identification number
- Sample date and collection time
- Physical description of the sample (e.g., water, solid, gas)
- Analytical parameters
- Preservatives, if present
- Sampling location
- Client

4.1.2.3 Visual Monitoring Documentation

Color photographs of a reasonable quality and quantity will be taken to document any evidence of sloughing or instability in the backfill material or reconfigured shoreline. A visual observation log will be completed in the field by the monitoring crew (Attachment 2). Any areas of sloughing or instability will also be marked on a site map (Attachment 3).

4.1.2.4 Surface Water Collection

Specific surface water sample collection documentation procedures are described in detail in the WQMP (Appendix E to the BODR) and are not included in this FSP.

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4.1.2.5 Sediment and Soil Collection

The field logbook will include clear information concerning sediment and soil collection activities. Sediment Core Collection Log and Visual Observation Log (Attachments 1 and 2) will be completed for each sediment and soil grab or core. In addition to standard entries of personnel, date, and time, the log will also include information regarding station coordinates, penetration of the sampler, sample recovery length and percentage, and physical characteristics of the sediment (such as texture, color, odor, stratification, and sheens).

4.2 Sample Handling Procedures

Sample handling procedures include correctly labeling and packing all sample containers prior to transport for laboratory testing. Sample containers will be obtained from the analytical laboratory. Each container will be labeled appropriately with all relevant information as detailed in Section 4.1.2.2.

Samples will be stored and shipped in a properly packed container at 4 degrees Celsius (°C). All samples will be delivered to the laboratory within 48 hours of the time of collection, with the possible exception of some samples collected on Friday or Saturday. In those cases, the samples will be stored at 4°C and shipped at the earliest allowable time.

4.3 Chain-of-Custody Procedures

An important component of data collection is the ability to demonstrate that samples were obtained from the stated locations and that they reached the laboratory or archive location without alteration. Evidence of collection, shipment, laboratory receipt, and laboratory custody until disposal or archive must be properly documented. Documentation will be accomplished through a COC form that documents each sample and identifies the individuals responsible for sample collection, shipment, and receipt. A sample is considered in one's custody if at least one of the following criteria is met:

- The sample is in a person's actual possession.
- The sample is in unobstructed view, after being in the person's actual possession.
- The sample is locked and only accessible by the custodian after having been in the person's actual possession.
- The sample is in a secured area, restricted to authorized personnel (e.g., laboratory).

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A laboratory typically will not accept samples for analysis without a correctly prepared COC form. The COC form must be signed by each individual who has the sample in his/her custody. A COC form is to be prepared for each sample shipped to a laboratory for analysis. Information on this form correlates with other supporting documentation, including sample labels and sample collection logs.

The COC form accounts for the elapsed time and custodians of the sample from the time of its collection. The individuals who have physically handled the sample or witnessed initial sample collection and packaging (e.g., a sample team member) must be identified on the form. A sample team member relinquishes the sample by signing the COC form. Individuals who either relinquish or receive samples must include their complete names, company affiliation, and the date and time the samples were relinquished and received. The times that the samples are relinquished and received by the next custodian should coincide, with the exception of transfer by commercial carriers. Commercial carriers will not be required to sign the COC.

If a sample is to be stored for a period of time (e.g., overnight), measures are to be taken to secure the sample container in a manner that provides only the custodian of record with access. If samples are relinquished to a commercial carrier (e.g., UPS, Federal Express), the carrier waybill number will be recorded and a copy of the waybill will be attached to the COC form. These documents are maintained with other field documentation. The original COC will be sealed inside the shipping container with the samples.

If a correction is made to the COC, the correction should be made by the originator of the change, who will draw a single line through the error, initial and date the correction, and, if necessary, provide an explanation of the change. The documentation should have sufficient detail to clearly document the change to a third-party reviewer.

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5 QUALITY ASSURANCE AND QUALITY CONTROL REQUIREMENTS

All analyses described in this FSP will be conducted in accordance with the standard QA/QC procedures described in the QAPP (Attachment 1 of the SAP). Analytical instruments will be maintained and calibrated regularly. Log books will be maintained for major field and laboratory instrumentation to document servicing, maintenance, and instrument modification.

5.1 Analytical Chemistry

Quality procedures are described for each analytical method in the QAPP (Attachment 1 of the SAP). The type and frequency of QA/QC samples analyzed by the laboratory will be according to the specified analytical method. Necessary corrective actions will be taken to address problems, according to the guidelines for a particular method. All corrective actions will be reported, along with any deviations from the standard protocols.

Results of all laboratory QA/QC analyses and anything that might affect the integrity of the results will be reported. Any deviations from the standard testing guidelines, QA/QC limits, and acceptability criteria will be reported, including a discussion of their effect on data validity. All datasheets will be checked to ensure that test conditions are within the protocol specifications, and project data will be reviewed to determine their usability for making suitability determinations.

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6 WASTE MANAGEMENT

Procedures that will be used to properly dispose of field-generated waste from the field work associated with sediment samples. Waste disposal will fall into two categories:

- Sediment spilled on the vessel deck during surface sample collection and sediment from rejected grab or core samples will be washed into the surface water at the collection site.
- Waste in the category of disposable sampling materials and PPE will be placed in heavy-weight garbage bags or other appropriate containers.

All disposable sampling materials and PPE used in sample processing (such as disposable coveralls, gloves, and tubing) will be placed in heavyweight garbage bags or other appropriate containers. Disposable materials will be placed in an on-site refuse container for disposal at a solid waste landfill.

EMJ015371

7 REFERENCES

Anchor QEA, 2011. *Final Engineering Evaluation/Cost Analysis – Jorgensen Forge Facility, 8531 East Marginal Way South, Seattle, Washington*. Prepared for the U.S. Environmental Protection Agency. March 2011.

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EPA (U.S. Environmental Protection Agency), 2008. Letter with Subject: Target Remedial Sediment Boundary, Vertical Point of Compliance and Target Sediment Cleanup Level, Administrative Order on Consent, Jorgensen Forge Facility, Tukwila, Washington, Comprehensive Environmental Response, Compensation and Liability Act, as amended, EPA Docket No. CERCLA 10-2003-0111. Prepared for Mr. Peter Jewett of Farallon Consulting, LLC, and Mr. William Johnson of Earle M. Jorgensen Company. August 8, 2008.

EPA, 2011. *Action Memorandum for a Non-Time-Critical Removal Action at the Jorgensen Forge Early Action Area of the Lower Duwamish Waterway Superfund Site in Seattle, Washington*. Seattle, Washington.

FIGURES

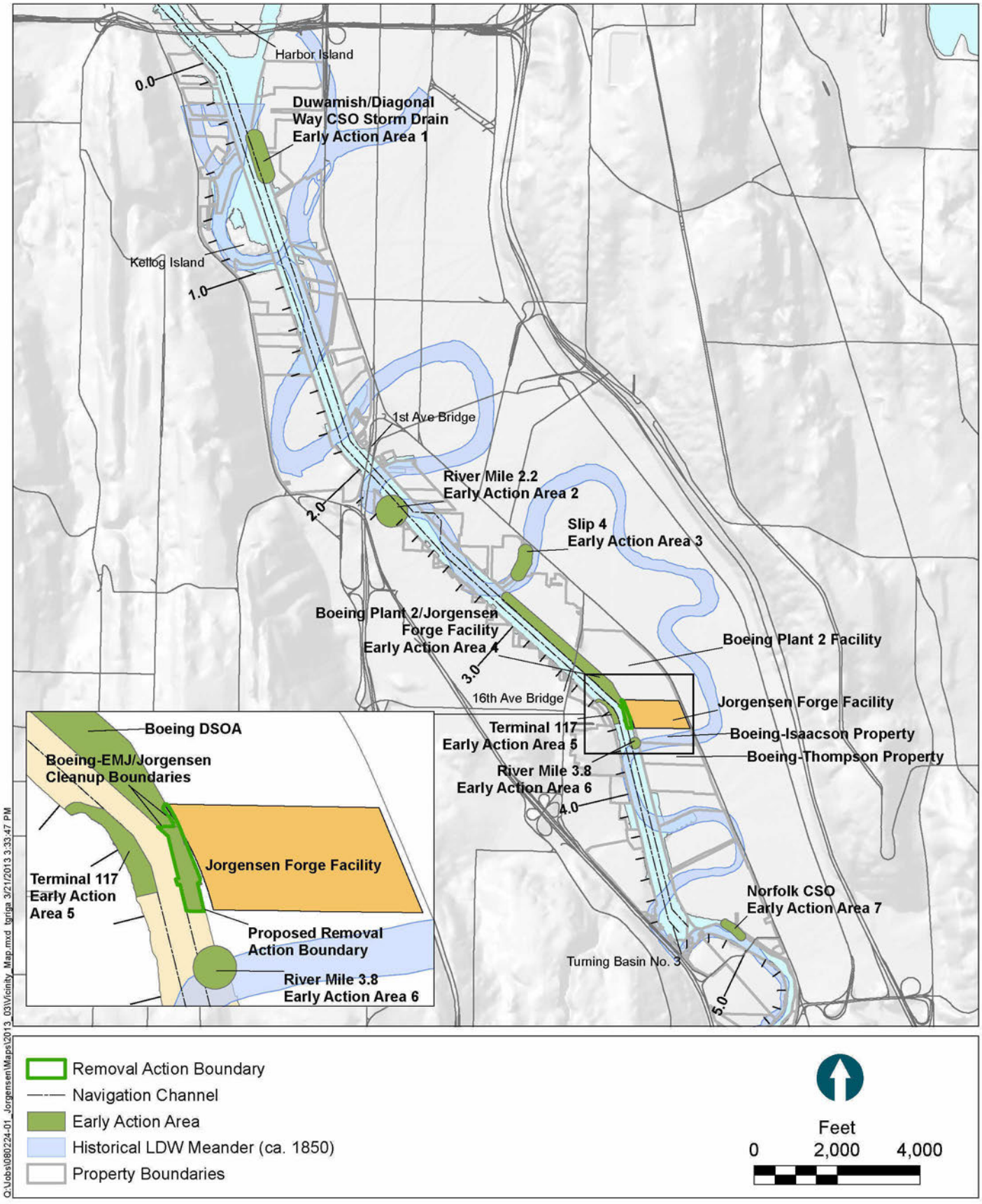
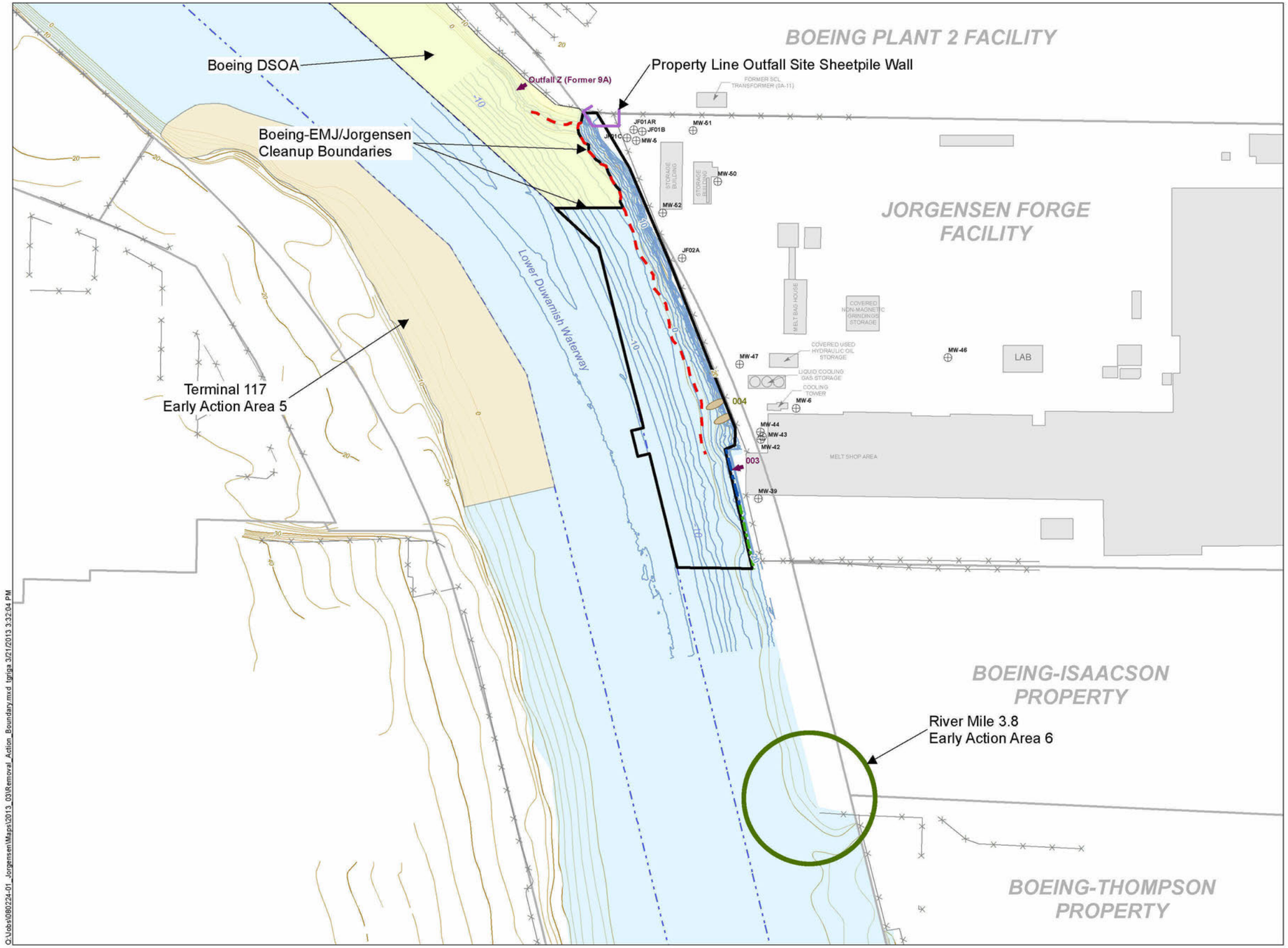


Figure 1
Removal Action Vicinity Map
Field Sampling Plan
Jorgensen Forge Early Action Area

ANCHOR QEA



LEGEND

- Groundwater Monitoring Well
- Active Outfall
- Toe of Existing Riprap
- Existing Sheetpile Wall
- Existing Concrete Panel Wall
- Fences
- Federal Navigation Channel
- Removal Action Boundary
- Debris Pile
- Property Boundaries
- Boeing DSOA
- Terminal 117 Early Action Area 5 Boundary
- Property Line Outfall Site Sheetpile Wall

NOTES:

1. Bathymetric survey by eTrac dated February 8, 2012. Additional back survey by AEC Consultants, Inc. dated February 21, 2012. Bathymetric and bank survey merged with upland survey by PLS, Inc. dated January 24, 2012.

2. Outfall locations field identified on May 14, 2003.

3. The toe of riprap slope was surveyed during a low tide on August 28, 2008.

4. The Boeing-EMJ/Jorgensen cleanup boundaries is identified in the Memorandum of Understanding between Boeing and EMJ/Jorgensen Forge, dated August 2007 (EMJ et al. 2007).

Feet
0 80 160 240 320

Q:\Jobs\080224-01_Jorgensen\Maps\2013_03\Removal_Action_Boundary.mxd lgrigsa 3/21/2013 3:32:04 PM

ANCHOR QEA

Figure 2
Removal Action Boundary
Field Sampling Plan
Jorgensen Forge Early Action Area

ATTACHMENT 1
SEDIMENT CORE COLLECTION LOG

ANCHOR QEA

Sediment Core Collection Log

Job:
Job No:
Field Staff:
Contractor:
Vertical Datum:

Station ID:
Attempt No.
Date:
Logged By:
Horizontal Datum:

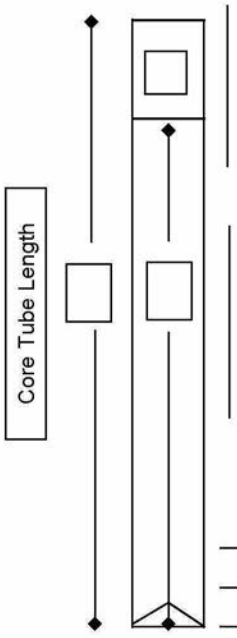
Field Collection Coordinates:
Lat/Northing:
Long/Easting:

A. Water Depth
DTM Depth Sounder:
DTM Lead Line:

B. Water Level Measurements
Time:
Height:
Source:

C. Mudline Elevation

Recovery Measurements (prior to cuts)



Core Collection Recovery Details:
Core Accepted: Yes / No
Core Tube Length:
Drive Penetration:
Headspace Measurement:
Recovery Measurement:
Recovery Percentage:
Total Length of Core To Process:

Drive Notes:

Sections To Process:
A:
B:
C:
D:

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Notes:

ATTACHMENT 2
VISUAL OBSERVATION LOG

Visual Observations Log Form

Date _____ **Project Number:** _____

Location: _____

Project Name: _____

Monitoring Period: _____

Time Observations Started: _____ **Time Observation Concluded:** _____

Weather Conditions:

Photographs Taken: Yes No

Tidal Conditions:

Observations of Erosion, Soughing or Instability:

Observations of Habitat Layer Condition:

Evidence of Armor Movement?

Other Comments:

Recorded by:

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ATTACHMENT 3
SITE MAP VISUAL MONITORING FORM

HORIZONTAL DATUM: Washington State Plane North, NAD83.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

LEGEND:

- Navigation Channel
- Existing Contour (1 Ft Interval)
- Dredge/Excavation Limits
- Backfill Material Placement Area
- Shoreline Containment Area

0 50
Scale in Feet

K:\Projects\0224-Farallon Consulting\Jorgensen Forge Facility EE-CA Implement\Monitoring & QA Reports\0224-RP-001 OMMP & WQMP.dwg FSP Fig
May 23, 2012 10:57am tgriga

ANCHOR QEA

Date _____ **Time** _____ **Recorded By** _____

Site Map Visual Monitoring Form
Jorgensen Forge Early Action Area

APPENDIX J
GREEN REMEDIATION STRATEGY

APPENDIX J
GREEN REMEDIATION STRATEGY
BASIS OF DESIGN REPORT
JORGENSEN FORGE EARLY ACTION AREA

Prepared for

U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, Washington 98101

On behalf of

Earle M. Jorgensen Company
10650 South Alameda Street
Lynwood, California 90262

Jorgensen Forge Corporation
8531 East Marginal Way South
Seattle, Washington 98108

Prepared by

Anchor QEA, LLC
720 Olive Way, Suite 1900
Seattle, Washington 98101

March 2013

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LIST OF ACRONYMS AND ABBREVIATIONS

AOC	Administrative Settlement Agreement and Order on Consent for Removal Action Implementation
BMP	best management practice
BODR	Basis of Design Report
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
EAA	Early Action Area
EMJ	Earl M. Jorgensen Company
EMS	Environmental Management System
EO	Executive Order
EMJ	Earl M. Jorgensen
EPA	U.S. Environmental Protection Agency
FFEO	Federal Facilities Enforcement Office
FFRRO	Federal Facilities Restoration and Reuse Office
FS	Feasibility Study
GHG	greenhouse gas
hp	horse power
Jorgensen Forge	Jorgensen Forge Corporation
NCP	National Contingency Plan
NTCRA	non-time-critical removal action
OEM	Office of Emergency Management
OSRE	Office of Site Remediation Enforcement
OSRTI	Office of Superfund Remediation and Technology Innovation
OSWER	Office of Solid Waste and Emergency Response
Owner	EMJ and Jorgensen Forge
RAO	remedial action objectives
RM	river mile
SOW	Statement of Work

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1 BACKGROUND

This Green Remediation Strategy was prepared on behalf of Earle M. Jorgensen Company (EMJ) and Jorgensen Forge Corporation (Jorgensen Forge; herein referred to collectively as the Owner), pursuant to the Administrative Settlement Agreement and Order on Consent for Removal Action Implementation (AOC; U.S. Environmental Protection Agency [EPA] Region 10 Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] Docket No. 10-2012-0032) and attached Statement of Work (SOW). This Green Remediation Strategy is an appendix to the Basis of Design Report (BODR) Final Design submittal for the cleanup of contaminated sediments and associated bank soils in a portion of the Lower Duwamish Waterway (LDW) Superfund Site that is adjacent to the Jorgensen Forge facility (Facility), which is located in Tukwila, King County, Washington (see Figure 1 of the BODR; Jorgensen Forge Early Action Area [EAA]). The cleanup will be conducted as a non-time-critical removal action (NTCRA) in accordance with EPA's selected cleanup alternative, as documented in the *Action Memorandum, Responsiveness Summary and Future Actions, Jorgensen Forge Early Action Area, 8531 East Marginal Way South, Seattle, Washington, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Administrative Order on Consent (EPA Docket No. CERCLA-10-2003-001)* (EPA 2011) and detailed in the *Final Engineering Evaluation/Cost Analysis [EE/CA]– Jorgensen Forge Facility, 8531 East Marginal Way South, Seattle, Washington* (Anchor QEA 2011). The Jorgensen Forge EAA is located near river miles (RMs) 3.6 to 3.7, on the east bank of the LDW.

Recognizing that site cleanup creates an environmental footprint of its own, the EPA's main objective of green remediation is to minimize this footprint and promote environmental stewardship during all phases of remedial actions. EPA defines green remediation as the practice of considering all environmental effects of remedy implementation and incorporating options to minimize the environmental footprint of cleanup actions. EMJ and Jorgensen Forge are committed to performing the NTCRA consistent with EPA's green remediation guidance, including the EPA Region 10 Clean and Green Policy. The remainder of this document summarizes the applicable elements of the green remediation guidance and policies, and elements that will be incorporated into the NTCRA.

1.1 Green Remediation Regulatory Framework – Policies and Guidance Documents

The green remediation guidance and policies developed by EPA are based on existing statutory and regulatory frameworks across all cleanup programs including CERCLA and National Contingency Plan (NCP), as well as on the EPA Strategic Plan, executive orders, other federal and state statutes, and regulations addressing green and sustainable practices, including the following:

- Energy Policy Act of 2005
- Energy Independence and Security Act 2007
- American Recovery and Reinvestment Act 2009
- Executive Order (EO) 13514, *Federal Leadership in Environmental, Energy and Economic Performance,* 2009
- EO 13423, Strengthening *Federal Environmental, Energy and Transportation Management,* 2009

The development of a green remediation strategy is a continuously evolving process as guidance and policies are being developed in response to environmental obligations and commitment on the state and federal level, as well as in response to the rapid rise of awareness about and innovation of green remediation technologies and practices.

Guidance documents and policies were developed by EPA to promote greener approaches to remediation as discussed in the following subsection.

1.1.1 EPA Superfund Green Remediation Strategy

The EPA Superfund green remediation strategy addresses policy and guidance development as well as resource development and program implementation and evaluation. Its goal is to promote green remediation practices for cleanups without compromising cleanup goals and objectives.

A green remediation primer called *Green Remediation: Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites* was published by the EPA in 2008 (EPA 2008). This document provides an overview of green remediation as well as

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establishes its core elements consisting of energy, air, water, land and ecosystems, materials and waste, and stewardship.

In September 2008, EPA formed the Superfund Green Remediation Workgroup chaired by the Office of Superfund Remediation and Technology Innovation (OSRTI) to develop policy and technical resources towards implementation of a green remediation strategy for cleanup actions. The workgroup includes the Office of Emergency Management (OEM), the Federal Facilities Restoration and Reuse Office (FFRRO), the Office of Site Remediation Enforcement (OSRE), the Federal Facilities Enforcement Office (FFEO), and Superfund Offices in Regions 1 through 10.

Two guidance documents that were developed by the EPA workgroup identify key actions to promote green remediation related to policy and guidance development, resource development and program implementation, and evaluation. The *Superfund Green Remediation Strategy* was first published in August 2009 (EPA 2009a), and the final strategy was published in September 2010 (EPA 2010) after public comment was received on the first document published in 2009. The final document includes an appendix with 30 key implementation actions to integrate green remediation principles into the Superfund program.

1.1.2 EPA OSWER Policy: Principles for Greener Cleanups

Until April 2012, EPA's website (http://www.epa.gov/oswer/greencleanups/principles.html; accessed on July 18, 2011) referenced the *Principles for Greener Cleanups* published in 2009 by the EPA Office of Solid Waste and Emergency Response (OSWER) as the current EPA policy for evaluating and minimizing the environmental footprint of remedial actions (EPA 2009b).

OSWER's policy (EPA 2009b) is consistent with existing laws and regulations requiring the following in cleanup actions:

- Protect human health and the environment
- Comply with all applicable laws and regulations
- Consult with communities regarding response action impacts consistent with existing

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requirements

- Consider the following recommended five core elements of green remediation:
  - Total energy and renewable energy use
  - Air pollutants and greenhouse gas (GHG) emissions
  - Water use and impacts to water resources
  - Materials management and waste reduction
  - Land management and ecosystem protection

These core elements are applicable to all phases of work associated with a remedial action including site investigation; development of cleanup alternatives; and remedy design, construction, operation, and monitoring (EPA 2010).

1.2 EPA Region 10: Green and Clean Policy

Green remediation policies vary for the ten different EPA regions. Guidance and recommendations sharing common elements for incorporating green remediation principles into cleanup projects are in place in all of the ten EPA regions, but only Regions 2 and 10 require green remediation to be incorporated into cleanup projects.

Region 10 developed a "Green and Clean Policy" in 2009 applicable to all Superfund cleanup projects in the region with the goal to promote the application of green or sustainable practices and technologies to remedial actions. While this policy does not "fundamentally change how and why cleanup decisions are made" it "calls for more sustainable methods of implementing those cleanups" (EPA 2009c).

The main objectives of this policy are as follows:

- Protect human health and the environment by achieving remedial action goals
- Support sustainable human and ecological use and reuse of remediated land
- Minimize impacts to water quality and resources
- Reduce air toxics emissions and GHG production
- Minimize material use and waste production
- Conserve natural resources and energy

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This policy details cleanup practices that are encouraged, consistent with other guidance documents addressing green remediation strategies, such as use of renewable energy and energy conservation, use of cleaner fuels and emissions reduction strategies, water conservation and efficiency, incorporation of sustainable site design, reuse and recycling of materials, support of GHG emissions reduction technology, and others (see *Region 10 Superfund, Resource Conservation and Recovery Act, Leaking Underground Storage Tanks, and Brownfields Clean and Green Policy*; EPA 2009c).

1.3 Footprint Evaluation and Reduction Methodology

1.3.1 Core Elements of Green Remediation

EPA's main objective of green remediation is to minimize project footprints and promote environmental stewardship during all phases of remedial actions. Five core elements of green remediation provide a framework for developing best management practices (BMPs) that can lead toward this objective. These core elements include:

1. **Total Energy and Renewable Energy Use**: Many Superfund cleanups involve energy-intensive technologies. Green remediation strategies focus on opportunities to reduce total energy use and increase the percentage of energy from renewable sources.
2. **Air and Atmosphere –Reducing Air Pollutants and GHG emissions**: Superfund cleanups may involve onsite and off-site emissions of GHG and air pollutants from treatment processes, operation of heavy machinery, and transportation of routine vehicles and cargo trucks. These emissions may be reduced by applying the most appropriate advanced technologies and sound field practices.
3. **Water**: Remedial actions may also involve consumption of significant amounts of water for treatment processes and typically need management of surface water. Green remediation strategies focus on reducing water consumption, reusing treated water, and using efficient techniques to manage and protect surface water and groundwater.
4. **Materials and Waste**: Site remediation may require significant amounts of raw materials and sometimes generates its own hazardous and non-hazardous wastes, including materials and debris that often are shipped offsite. Green remediation strategies offer opportunities to reduce materials consumption and waste generation,

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use recycled and local materials, and spend products, and purchase environmentally preferred products.

5. **Land and Ecosystems**: Superfund sites often involve degraded onsite and offsite ecosystems and may have conditions that make the site unsafe for human or other use. But they also may occur in the vicinity of ecosystems and natural resources with varying degrees of integrity. Green remediation strategies focus on protecting ecosystem services during site cleanup; minimizing further harm to the area; protecting land resources and ecosystems at or near the site; and fostering the return of sites to ecological, economic, social, or other uses.

1.3.2 Methodology for Understanding and Reducing a Project's Environmental Footprint

In April 2012, EPA published *Methodology for Understanding and Reducing a Project's Environmental Footprint* (EPA 2012), intended to provide a methodology for footprint analysis conducted on behalf of EPA and for use by EPA in evaluating footprint analysis results submitted by other parties under any cleanup program. This guidance document introduces a detailed process to quantify materials, waste, water, energy, and air metrics that represent the environmental footprint of activities involved with contaminated site cleanup consistent with the earlier defined core elements of green remediation. Quantifying these metrics can serve as an initial step in reducing the remedy footprint by identifying the larger contributors and developing targeted potential approaches to reducing those contributions.

1.3.3 Other Guidance Documents

A number of green remediation reference sheets providing specific BMPs and technologies for various aspects of remedial actions are available at http://www.cluin.org/greenremediation/docs/GR_factsheet_topics_update.pdf), and include the following:

- Excavation and Surface Restoration (EPA 542-F-08-012, December 2008)
- Site Investigation (EPA 542-F-09-004, December 2009)
- Pump and Treat Technologies (EPA 542-F-09-005, December 2009)
- Bioremediation (EPA 542-F-10-006, March 2010)
- Soil Vapor Extraction & Air Sparging (EPA 542-F-10-007, March 2010)

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- Clean Fuel & Emission Technologies for Site Cleanup (EPA 542-F-10-008, August 2010)
- Integrating Renewable Energy into Site Cleanup (EPA 542-F-11-006, April 2011)
- Sites with Leaking Underground Storage Tank Systems (EPA 542-F-11-008, June 2011)
- Landfill Cover Systems and Energy Production (EPA 542-F-11-024)

1.4 Green Remediation Approach for the Jorgensen Forge Early Action Area

Opportunities for the incorporation of green technologies and practices consistent with EPA's green remediation strategy were considered for the project to the extent practicable. While the principles of green remediation are intended to help achieve the cleanup goals and objectives of a project by reducing the environmental footprint of the remedial action, protecting human health and environment remains the primary goal and the determining factor in the remedial action decision making process. Therefore, green remediation strategies are applied without "compromising cleanup objectives, community interests, the reasonableness of cleanup timeframes, or the protectiveness of the cleanup actions" (EPA 2009c).

The following green technologies and practices to reduce total energy use, reduce air pollutants and GHG emissions, reduce water use, and improve materials management and waste reduction efforts may be incorporated into the planned project:

- To reduce GHG emissions from equipment and machinery used during construction, requirements for use of cleaner fuels and emission reduction BMPs will be added to the Contractor specifications, as provided in this document. BMPs required will include careful scheduling of construction sequencing to minimize equipment idling, and maintaining equipment to operate at optimum efficiency.
- Sediment or soil transferred to the landfill will be considered for beneficial reuse or as alternate daily cover, thereby reducing consumption of resources.
- Construction debris removed from the site will be recycled to the extent practical to reduce waste generation.
- Excavated and dredged materials removed from the site will be sent to appropriate landfills; the majority of these materials are designated for beneficial reuse or

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alternate daily landfill cover materials.

- Excavated on-site soil will be reused as backfill to the extent possible. However, backfill—as the main material used for the project—may also need to be imported to the extent that the soil excavated on site cannot be reused. Locally produced backfill materials and soil amendments would be imported to the extent practicable, reducing the length of transportation routes and associated fuel consumption and GHG emissions.
- Environmental Management System (EMS) practices such as reducing the use of paper by moving to fully electronic transmittal of project documents and implementation of waste reduction and recycling programs at all work sites will be incorporated into the project. Electronic submittals for the documents under this project will be used to the extent practicable, minimizing consumption of paper for copies and submittals. Furthermore, electronic communication, documentation, and filing will be utilized as much as possible during the course of construction.

Other green remediation strategies were considered for implementation, but deemed not applicable or not practicable, including the following:

- **100 percent use of renewable energy (green power)**: Jorgensen Forge Corporation (Jorgensen Forge) and Earl M. Jorgensen (EMJ; herein referred to collectively as the Owner) support the use of renewable energy. However, this project does not include permanent installation or long-term operation of any equipment, so the use of green power and energy-efficient equipment does not apply to this project.
- **Cleaner fuels, diesel emissions controls, and retrofits**:
  - **Industrial material reuse or recycling within regulatory requirements**: The Owner supports reuse and recycling of industrial materials. However, this project does not involve use or decommissioning of industrial materials.
  - **Concrete made with coal combustion products replacing a portion of traditional cement**: No new concrete surfaces are proposed for this project; therefore, no cement is expected to be used for the project.
  - **Methane recovery from landfills**: This project is not near any landfills where methane gas is recovered and could be put to use by the project.

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- **Greenhouse gas emission reduction technologies**: The project does not involve installation or permanent use of boilers, diesel generators, or other on-site combustion sources, so this item is not considered applicable to the project.

As noted in the Clean and Green Policy, EPA Region 10 intends to measure the cost differentials and environmental benefits associated with implementing the policy. Examples include, but are not limited to, tracking quantities of materials reduced, reused, or recycled; reductions in carbon or GHG emissions; and the quantity of water conserved or replenished. To support this effort, the Removal Action Completion Report will include a summary of actions implemented consistent with the Clean and Green Policy.

The following specifications will be included in the construction contract, or in a construction contract amendment:

1. **Green policy:** The Contractor shall use practices that are sustainable in accordance with EPA Region 10 Greener Cleanups. The Contractor shall report on the use of these practices, including the associated quantities of materials reduced, reused, or recycled as a direct result of these practices, for all removal action activities conducted under this contract after project completion.
2. **Cleaner fuels, diesel emissions controls and retrofits, and emission reduction strategies**: For non-marine diesel-powered equipment exceeding 50 horse power (hp) that needs to be rented, the Contractor will utilize construction equipment rented from a local supplier whenever possible, and will request the rental of construction equipment meeting Tier 4 standards. If Tier 4 construction equipment is not available, equipment will be requested that meets at least the Tier 3 standards. If equipment meeting Tier 4 or Tier 3 standards is not available, then other equipment may be considered if emission devices, such as oxidation catalysts and/or particulate filters, are added. Equipment with a higher tier emission standard will not be used if selecting the higher tier would result in use of larger equipment that would use more fuel or result in a higher rate of emissions. Contractor-owned diesel-powered equipment exceeding 50 hp shall meet Tier 4 or Tier 3 standards. If Contractor-owned equipment meeting Tier 4 or Tier 3 standards is not available, then other equipment may be considered if emission devices, such as oxidation catalysts and/or particulate filters, are added. Equipment with a higher tier emission standard will not

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be used if selecting the higher tier would result in use of larger equipment that would use more fuel or result in a higher rate of emissions.

3. **Clean fuel:** Cleaner fuels will be used in all diesel-powered equipment. Diesel fuels to be used may include biodiesel blends (e.g., B5 or B20) or ultra-low sulfur diesel.
4. **Greenhouse gas emission reduction technologies**: Diesel-powered equipment should be used where available instead of gasoline-powered equipment. The Contractor shall minimize idling to control air pollution and reduce fuel usage. Procedures to minimize idling shall include turning off all non-marine diesel engines on construction equipment greater than 50 hp when not in active use.
5. **Water conservation and efficiency:** If water consumption is necessary (e.g., for dust suppression), water conservation measures will be utilized where feasible.
6. **Construction material reuse or recycling within regulatory requirements:** Where feasible, the Contractor shall recycle all scrap construction materials, wastes from the construction trailer, and other materials generated during the course of construction activities.
7. **Environmentally preferable purchasing:** Where available, all materials purchased will be post-consumer recycled.
8. **EMS:** Practices such as reducing the use of paper by utilizing electronic transmittal of project documents and implementation of waste reduction and recycling programs at the work site shall be implemented.
9. **Local materials and supplies:** The Contractor shall purchase and use local materials (such as asphalt and backfill material) where available.

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2 REFERENCES

Anchor QEA (Anchor QEA, LLC) *Final Engineering Evaluation/Cost Analysis [EE/CA]– Jorgensen Forge Facility, 8531 East Marginal Way South, Seattle, Washington. Final Report.* Prepared for Prepared for U.S. Environmental Protection Agency, Region 10, on behalf of Earle M. Jorgensen Company and Jorgensen Forge Corporation. March 2011.

EPA (U.S. Environmental Protection Agency), 2008. *Green Remediation: Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites*. Office of Solid Waste and Emergency Response. April 2008.

EPA, 2009a. *Superfund Green Remediation Strategy*. Office of Solid Waste and Emergency Response. August 2009.

EPA, 2009b. *Principles for Greener Cleanups. Office of Solid Waste and Emergency Response*. August 2009.

EPA, 2009c. Region 10 Superfund, Resource Conservation and Recovery Act, Leaking Underground Storage Tanks, and Brownfields Clean and Green Policy. August 2009.

EPA, 2010. *Final Superfund Green Remediation Strategy. Office of Solid Waste and* Emergency Response. September 2009.

EPA, 2011. *Action Memorandum, Responsiveness Summary and Future Actions, Jorgensen Forge Early Action Area, 8531 East Marginal Way South, Seattle, Washington, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Administrative Order on Consent (EPA Docket No. CERCLA-10-2003-001).* October 2011.

EPA, 2012. *Methodology for Understanding and Reducing a Project's Environmental Footprint*. Office of Solid Waste and Emergency Response. February 2012.

APPENDIX K
HEALTH AND SAFETY PLAN

APPENDIX K
HEALTH AND SAFETY PLAN
BASIS OF DESIGN REPORT
JORGENSEN FORGE EARLY ACTION AREA

Prepared for

U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, Washington 98101

On behalf of

Earle M. Jorgensen Company
10650 South Alameda Street
Lynwood, California 90262

Jorgensen Forge Corporation
8531 East Marginal Way South
Seattle, Washington 98108

Prepared by

Anchor QEA, LLC
720 Olive Way, Suite 1900
Seattle, Washington 98101

March 2013

CERTIFICATION PAGE

David Templeton Project Manager Corporate Health and Safety Manager Anchor QEA, LLC	Ryan Barth Field Lead Anchor QEA, LLC
Date: _____	Date: _____

The information in this Health and Safety Plan has been designed for the Statement of Work for the removal action implementation for the Jorgensen Forge EAA, U.S. Environmental Protection Agency (EPA) Docket No. CERCLA-10-2013-0032 located within the Lower Duwamish Waterway (LDW) Superfund Site. Therefore, this document may not be appropriate if the work is not performed by or using the methods presently contemplated by Anchor QEA. In addition, as the work is performed, conditions different from those anticipated may be encountered and this document may have to be modified. Therefore, Anchor QEA only intends this plan to address currently anticipated activities and conditions and makes no representations or warranties as to the adequacy of the Health and Safety Plan for all conditions encountered.

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HEALTH AND SAFETY PLAN ACKNOWLEDGEMENT FORM

Project Number: 08224-01.02 Project Name: Jorgensen Forge Early Action Area

My signature below certifies that I have read and understand the policies and procedures specified in this Health and Safety Plan (HASP). For non-Anchor QEA employees, this HASP may include company-specific appendices to this plan developed by entities other than Anchor QEA.

Date	Name (print)	Signature	Company

EMJ015400

Date	Name (print)	Signature	Company

EMJ015401

LIABILITY WAIVER

Release from Liability, Waiver of Claims, and Indemnification – Non-Anchor QEA Employees and Subcontractors

This liability release, waiver, and indemnification is required for participation in our field trips and site tours. Each participant must sign his/her own form.

In return for receiving permission from **Anchor QEA, LLC**, a Washington State limited liability corporation ("**Anchor QEA**") to participate in the field trip which is to take place at _____ (location) on _____ (date) (collectively, the "**Activities**"), the undersigned participant ("**Participant**"), acting through and/or with the consent of his/her parent or legal guardian (if Participant is a minor or the subject of a guardianship), hereby agrees as follows:

1. I fully recognize the dangers of participating in the Activities, and I voluntarily assume all risks associated with my participation in the Activities. I understand that the dangers which I may encounter at the site(s) where the Activities take place (in each case, a "**Site**") include, by way of example only and without limitation: exposure to contaminants; exposure to aerosol vapors; wild animals, poisonous snakes, and harmful insects; poisonous vegetation; drowning, sea sickness and boating accidents; falling from steep slopes, cliffs or narrow trails; landslides; rough terrain; lightning; wildfire; extremes of temperatures; and storms. I realize that there is also a risk of my becoming seriously ill or injured in an area remote from medical care and that Anchor QEA cannot guarantee the availability of emergency medical services or emergency transportation to medical facilities.
2. I agree that neither Anchor QEA nor any of its agents, representatives, partners, contractors, consultants or employees: a) shall have any liability for any defect or dangerous natural or artificial condition relating to any Site or any of the Activities; or b) have made or are making any representation or warranty, expressed or implied, regarding: i) the conditions of any Site; ii) the safety of the Activities or any of the equipment to be used in connection with the Activities; iii) any means of transportation to or from any Site; or iv) any other aspect of any Site or any of the Activities.

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3. I agree to take the responsibility to familiarize myself with the rules and regulations applicable to the Sites and the Activities, and to ensure that I have been properly instructed in and understand the use of any equipment I am to use in the Activities. I realize that my participation in the Activities may require sustained strenuous physical activity. I am in good health, and am not aware of any physical or medical condition that might endanger myself or other participants in the Activities.
4. Acting for myself and my heirs, executors, personal representatives and assigns, I forever release and discharge Anchor QEA and its owners, employees, agents, officers, and directors, and the successors and assigns of each of them (in each case, a "**Released Party**"), of and from all claims, losses, damages, costs, expenses and other liabilities, including (but not limited to) reasonable attorneys' fees (in each case, a "**Claim**"), whether known or unknown, foreseen or unforeseen, relating to property damage or the death, injury, pain, or mental trauma of myself or any other person, and resulting, directly or indirectly, from my participation in the Activities or my travel to or from any Site. Without limiting the above, I agree not to sue any of the Released Parties for any such Claims, to waive any such Claims which I may have at any time against any of the Released Parties, and to indemnify and defend each of the Released Parties against, and to hold each of the Released Parties harmless of and from any Claims resulting from my acts or omissions during the Activities or while at any Site.
5. I have read and understand the policies and procedures specified in the Health and Safety Plan (HASP) for this site. This HASP may include company-specific appendices developed by entities other than Anchor QEA.

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The undersigned Participant acknowledges and agrees that he/she has carefully read this Release from Liability, Waiver of Claims, and Indemnification and fully understands all of its contents, and their legal effect, and agrees that this Release from Liability, Waiver of Claims, and Indemnification (of which I have been given a copy to keep, with any attachments) is contractually binding, and is being signed by the undersigned Participant of his/her own free will.

Signature: _____ Date: _____
Printed Name: _____ Email: _____
Address: _____
(street address – no PO Boxes)
City: _____ State: _____ ZIP: _____
Phone Number: _____
Emergency Contact: _____
Contact's Phone Number: _____

Consent and Release for Publications of Photographs

I, the undersigned, hereby grant Anchor QEA permission to take photographs of me, and irrevocably consent to and authorize the use and reproduction by Anchor QEA, or anyone duly authorized by Anchor QEA, of any and all such photographs, for any legitimate purposes, including for advertising, trade, and editorial purposes, at any time in the future in all media now known or hereafter developed, throughout the world. I also consent to the use of my name in connection with such photos.

I hereby release, indemnify, and hold harmless Anchor QEA and its owners, officers, directors, agents, and employees from any and all claims which may result at any time by reason of the use of my image and name, including, without limitation, claims of privacy. My heirs, executors, administrators, and assigns shall be bound by this consent and release. I am over the age of 18.

Signature: _____ Date: _____
Printed Name: _____

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SITE EMERGENCY PROCEDURES

Site Map

The following figure provides an overview of the general site location.

Figure A
General Site Location Overview

EMJ015405

Emergency Contact Information

Table A

Site Emergency Form and Emergency Phone Numbers*

Category	Information	
Possible Chemicals of Concern	Polychlorinated biphenyls (PCBs), metals, semivolatile organic compounds (SVOCs)	
Minimum Level of Protection	D	
Site(s) Location Address	Jorgensen Forge Corporation 8531 East Marginal Way South Tukwila, Washington 98108	
Emergency Phone Numbers		
Ambulance	911 [American Medical Response (206) 444-4440]	
Fire	911 [Tukwila Fire Department (206) 575-4404]	
Police	911 [Tukwila Police Department (206) 433-1808]	
Poison Control	1-800-222-1212	
Facility Contact	John P. Gross	Office: (206) 965-1352 Cell: (b)) 3
Project Manager (PM)	David Templeton	Office: (206) 287-9130 Cell: (b) (6)
Field Lead (FL)	Ryan Barth	Office: (206) 287-9130 Cell: (b) (6)
Corporate Health and Safety Manager (CHSM)	David Templeton	Office: (206) 287-9130 Cell (b) (6)
Seattle Harbor Patrol	(206) 684-4071	
USCG Puget Sound Sector	(206) 217-6001	
South Park Marina 8604 Dallas Ave South Seattle WA 98108	(206) 762-3880	
National Response Center	1-800-424-8802	
Local Emergency Response System	City of Tukwila Emergency Management (206) 971-8740	
EPA Environmental Response Team	1-201-321-6600	

* In the event of any emergency, contact the PM and FL.

EMJ015406

Hospital Route Map and Driving Directions

Table B
Hospital Information

Category	Information
Hospital Name	Valley Medical Center
Address	400 South 43rd Street
City, State	Renton, Washington 98055
Phone	(425)228-3450
Emergency Phone	911

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Hospital Route Map and Driving Directions

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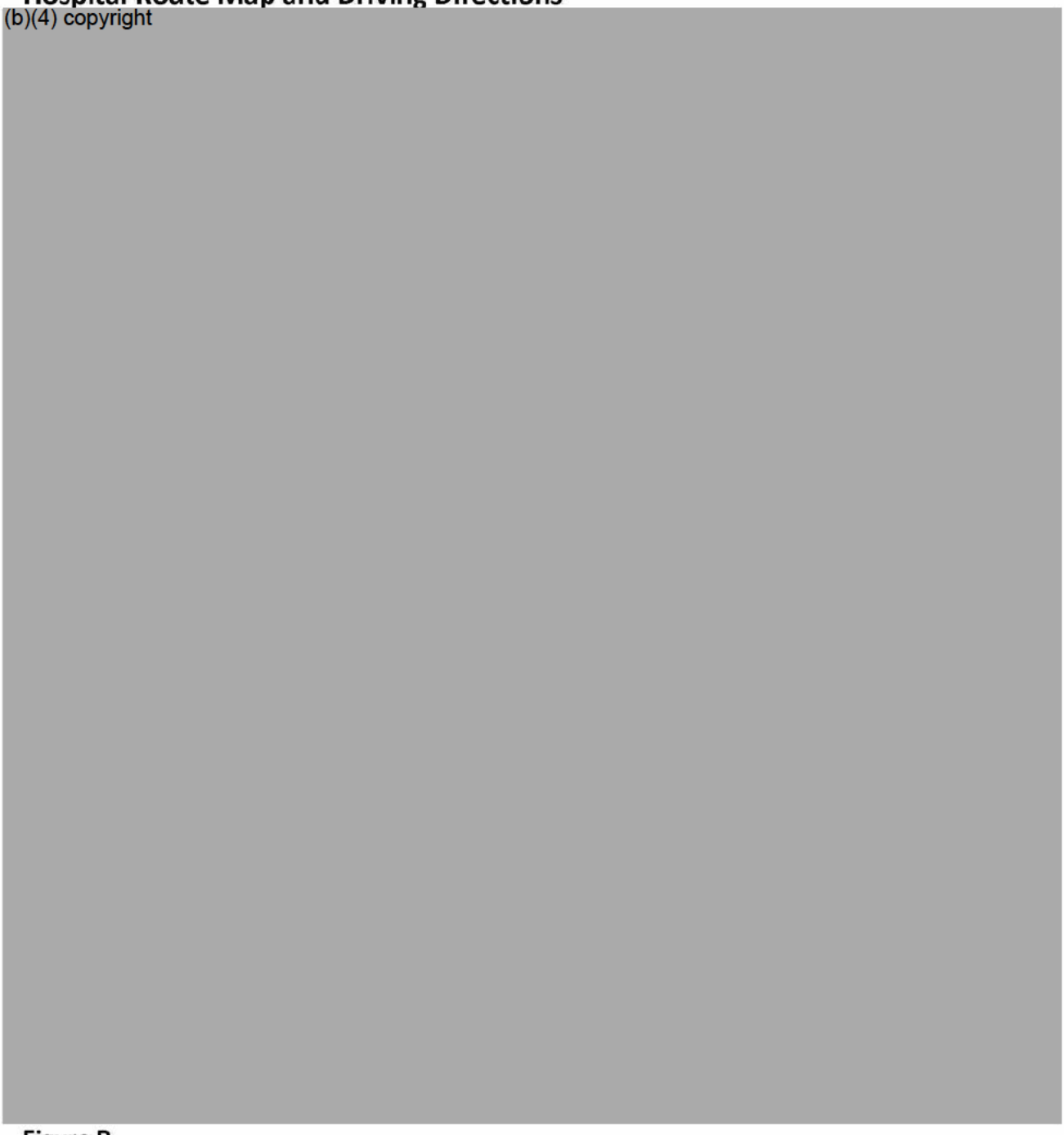

Figure B

Hospital Route Map

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Key Safety Personnel

The following people share responsibility for health and safety at the site. See Section 4 of this HASP for a description of the role and responsibility of each.

Facility Contact: John P. Gross	Office: (206) 965-1352 Cell: (b) (6)
Project Manager (PM): David Templeton	Office: (206) 287-9130 Cell: (b) (6)
Field Lead (FL): Ryan Barth	Office: (206) 287-9130 Cell: (b) (6)
Corporate Health and Safety Manager (CHSM): David Templeton	Office: (206) 287-9130 Cell: (b) (6)

Emergency Response Procedures

In the event of an emergency, immediate action must be taken by the first person to recognize the event. Use the following steps as a guideline:

- Survey the situation to ensure that it is safe for you and the victim. Do not endanger your own life. Do not enter an area to rescue someone who has been overcome unless properly equipped and trained. Ensure that all protocols are followed. If applicable, review Material Safety Data Sheets (MSDS) to evaluate response actions for chemical exposures.
- Call the appropriate emergency number (911; if available) or direct someone else to do this immediately (see Table A). Explain the physical injury, chemical exposure, fire, or release and location of the incident.
- Have someone retrieve the nearest first aid kit and Automatic External Defibrillator (AED), if available. Note: only use an AED if you have been properly trained and are currently certified to do so.
- Decontaminate the victim without delaying life-saving procedures (see Section 8).
- Administer first aid and cardiopulmonary resuscitation (CPR), if properly trained, until emergency responders arrive.
- Notify the Project Manager (PM), Field Lead (FL), and owner.
- Complete the appropriate incident investigation reports.

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First Aid and CPR Guidelines

Personnel qualified and current in basic first aid and/or CPR procedures may perform those procedures as necessary. Personnel qualified and current in basic first aid and/or CPR are protected under Good Samaritan policies as long as they only perform the basic tasks that they were taught. Do not perform first aid and/or CPR tasks if you have not been trained in first aid and/or CPR.

Injury Management/Incident Notification

Observe the following injury management/incident notification procedures and practices:

Injury Management

- Once a personal injury incident is discovered, the first action will be to ensure that the injured party receives appropriate medical attention.
- If it is safe to do so, the nearest workers will immediately assist a person who shows signs of medical distress or who is involved in an accident.
- Render first aid and call 911 or the appropriate emergency number as soon as possible.
- Escort the injured person to the occupational clinic or hospital or arrange for an ambulance.
- Proceed immediately to Notification Requirements, below.

Notification Requirements

- Directly after caring for an injured person, the FL will be summoned. The FL will immediately make contact with the PM or other designated individual to alert them of the medical emergency. The FL will advise them of the following:
  - Location of the victim at the work site
  - Nature of the emergency
  - Whether the victim is conscious
  - Specific conditions contributing to the injury, if known
- Contact the PM (if not contacted previously) immediately.

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- The PM will contact upper line management, and client representative(s) including the Corporate Health and Safety Manager (CHSM).
- The CHSM will facilitate the incident investigation.

All client requirements will also be adhered to pertinent to personal injury incident reporting.

Incident Other Than Personal Injury

All incidents including, but not limited to, fire, explosion, property damage, or environmental release will be responded to in accordance with the site-specific HASP. In general, this includes securing the site appropriate to the incident, turning control over to the emergency responders, or securing the site and summoning appropriate remedial personnel or equipment. Anchor QEA will immediately notify the client of any major incident, fire, equipment or property damage, or environmental incident with a preliminary report. A full report will be provided within 72 hours.

Near-Miss Reporting

All near-miss incidents (those that could have reasonably lead to an injury, environmental release, or other incident) must also be reported to the FL and/or PM immediately so they can take action to ensure that such conditions that lead to the near-miss incident can be readily corrected in order to prevent future occurrences.

Spills and Releases of Hazardous Materials

When required, notify the National Response Center and local state agencies. The following information should be provided to the National Response Center:

- Name and telephone number
- Name and address of facility
- Time and type of incident
- Name and quantity of materials involved, if known
- Extent of injuries
- Possible hazards to human health or the environment outside of the facility

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The emergency telephone number for the National Response Center is 1-800-424-8802. If hazardous waste has been released or produced through control of the incident, ensure that:

- Waste is collected and contained
- Containers of waste are removed or isolated from the immediate site of the emergency
- Treatment or storage of the recovered waste, contaminated soil or surface water, or any other material that results from the incident or its control is provided
- No waste that is incompatible with released material is treated or stored in the facility until cleanup procedures are completed

Ensure that all emergency equipment used is decontaminated, recharged, and fit for its intended use before operations are resumed.

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LIST OF ACRONYMS AND ABBREVIATIONS

° C	degrees Celsius
° F	degrees Fahrenheit
ACGIH	American Conference of Governmental Industrial Hygienists
AED	Automated External Defibrillator
Anchor QEA	Anchor QEA, LLC
ANSI	American National Standards Institute
AOC	Administrative Settlement Agreement and Order on Consent
APR	Air-Purifying Respirator
ASTM	ASTM International
CFR	Code of Federal Regulations
CHSM	Corporate Health and Safety Manager
COC	chemical of concern
CPR	Cardiopulmonary resuscitation
CRZ	Contamination Reduction Zone
dbA	A-weighted decibel
dB	decibel
DOT	U.S. Department of Transportation
EAA	Early Action Area
EPA	U.S. Environmental Protection Agency
eV	electron volts
EZ	Exclusion Zone/Hot Zone
Facility	Jorgensen Forge facility
FL	Field Lead
GFCI	Ground Fault Circuit Interrupter
H:V	horizontal to vertical
HASP	Health and Safety Plan
HAZMAT	Hazardous Materials
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	High Efficiency Particulate Air
HMIS	Hazardous Material Information System

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IP	Ionization Potential
Jorgensen Forge	Jorgensen Forge Corporation
Jorgensen Forge EAA	Jorgensen Forge Early Action Area
JSA	Job Safety Analysis
kV	kilovolts
LDW	Lower Duwamish Waterway
LEL	Lower Explosive Limit
LO/TO	Lock out/Tag out
mg/m^3	Milligrams per cubic meter
MHR	Maximum Heart Rate
mph	miles per hour
MSDS	Material Safety Data Sheets
MUTCD	Manual of Uniform Traffic Control Devices
NEC	National Electrical Code
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
NPL	National Priority List
NRR	Noise Reduction Rating
NTCRA	non-time critical removal action
OEL	Occupational Exposure Limit
OSHA	Occupational Safety and Health Act or Administration
OV	Organic Vapor
OVM	Organic Vapor Monitor
PAH	Polycyclic Aromatic Hydrocarbon
PCB	polychlorinated biphenyl
PEL	Permissible Exposure Limit
PFD	personal flotation device
PM	Project Manager
PPE	Personal Protective Equipment
REL	Recommended Exposure Limits
RCRA	Resource Conservation and Recovery Act
STEL	Short-term Exposure Limit

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SVOC	semivolatile organic compound
SZ	Support Zone/Clean Zone
TLV	Threshold Limit Values
TSD	Treatment, Storage, and Disposal Facility
TWA	Time Weighted Average
TWIC	Transportation Worker Identification Credential
UL	Underwriters Laboratories Inc.
USCG	U.S. Coast Guard
VOC	Volatile organic compound
WBGT	Wet Bulb Globe Temperature

EMJ015419

1 INTRODUCTION

This Health and Safety Plan (HASP) has been prepared on behalf of the Jorgensen Forge Corporation (Jorgensen Forge) and presents the health and safety requirements and procedures that will be followed by Anchor QEA, LLC (Anchor QEA) personnel and at a minimum by its subcontractors during work activities during the Jorgensen Forge Early Action Area (EAA) non-time critical removal action (NTCRA; herein referred to as removal action) conducted on sediments and bank materials (the site) adjacent to the Jorgensen Forge facility (the Facility). This HASP has been developed in accordance with Title 29 of the Code of Federal Regulations (CFR), Part 1910.120(b), and will be used in conjunction with Anchor QEA's Corporate Health and Safety Program. See Section 1.1 for HASP modification procedures.

The provisions of this HASP are mandatory for all Anchor QEA personnel assigned to the project. Anchor QEA subcontractors are also expected to follow the provisions of this HASP unless they have their own HASP that covers their specific activities related to this project. Any subcontractor HASPs must, at a minimum, include the requirements set forth in this HASP. Construction contractors, and their subcontractors, will be required to develop separate HASPs. All visitors to the work site must also abide by the requirements of this HASP and will attend a pre-work briefing where the contents of this HASP will be presented and discussed.

Personnel assigned to work at the Jorgensen Forge EAA will be required to read this plan and must sign the HASP Acknowledgement Form to confirm that they understand and agree to abide by the provisions of the HASP.

Subcontractors are ultimately responsible for the health and safety of their employees. Subcontractors may mandate health and safety protection measures for their employees beyond the minimum requirements specified in this HASP.

The objectives of this HASP are to identify potential physical, chemical, and biological hazards associated with field activities; establish safe working conditions and protective measures to control those hazards; define emergency procedures; and describe the

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responsibilities, training requirements, and medical monitoring requirements for site personnel.

This HASP prescribes the procedures that must be followed during specific site activities. Significant operational changes that could affect the health and safety of personnel, the community, or the environment will not be made without the prior approval of the Project Manager (PM) and the Corporate Health and Safety Manager (CHSM).

Issuance of this approved plan documents that the workplace has been evaluated for hazards. A hazard assessment has been performed and the adequacy of the personal protective equipment (PPE) selected was evaluated as required by 29 CFR 1910.132(d) - Personal Protective Equipment, General Requirements (general industry), 1910.134 – Respiratory Protection, 1926.28 – Personal Protective Equipment (construction industry), and 1926.55 – Gases, vapors, fumes, dusts and mist, and is duly noted by the signature(s) and date appearing on the certification page of this document.

1.1 Health and Safety Plan Modifications

This HASP will be modified by amendment, if necessary, to address changing field conditions or additional work tasks not already described in this document. Modifications will be proposed by the Field Lead (FL) using the "Modification to Health and Safety Plan" form included in Attachment 1. Modifications will be reviewed by the CHSM or authorized representative and approved by the PM.

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2 SITE DESCRIPTION/BACKGROUND INFORMATION

2.1 Site Description

The Facility occupies approximately 20 acres at 8531 East Marginal Way South in Seattle, Washington, and is located directly adjacent sediments and bank materials subject to the removal action. The Facility contains an approximately 124,000-square-foot building of prefabricated steel that houses a Machine Shop Area, Forge Shop Area, Hollowbore Area, Melt Shop Area, Heat Treat Area, and Shipping Area (Figure A). The Facility also contains a building that houses an Aluminum Heat Treating Area and several smaller buildings used for offices, a metallurgical laboratory, and storage areas.

The Facility is currently used as a steel and aluminum forge that produces custom steel and aluminum parts forged and machined to high precision specifications for various industrial clients. The major operations conducted include:

- Melting scrap steel and forming the molten steel into ingots
- Forging the steel ingots into billets and/or shape forgings
- Heat-treating the forged steel and purchased aluminum products
- Grinding and machining the steel billets to required specifications
- Ring rolling and/or expanding the aluminum products to required specifications

Legacy contaminates of concern include polychlorinated biphenyls (PCBs), metals, and semivolatile organic compounds (SVOCs; contained in the footprint of the PCBs) found in sediments and on the shoreline adjacent to the Facility.

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3 SCOPE OF WORK

3.1 Project Scope of Work

Currently, the site is subject to an Administrative Settlement Agreement and Order on Consent (AOC) for removal action implementation for the Jorgensen Forge EAA, U.S. Environmental Protection Agency (EPA) Docket No. CERCLA- 10-2013-0032 located within the Lower Duwamish Waterway (LDW) Superfund Site. The planned removal action consists of mechanical dredging of impacted sediments and bank reconfiguration. As part of the design and implementation of the removal action, the following potential field activities are addressed in concept by this HASP. Upon finalization of specific work tasks, task-specific Job Safety Analyses (JSAs) will be completed and added to the HASP (JSAs are discussed in more detail in Section 6.1).

- Pre-design field activities
- Sediment, surface water, or soil sampling activities
- Non-invasive assessments (bathymetric surveys, habitat inspections)
- Construction observation
- Water quality monitoring activities
- Sediment confirmatory sampling

As previously stated, the HASP addresses these potential work tasks in concept and provides information and procedures that assume a general approach to these tasks, based on Anchor QEA experience conducting similar tasks at multiple sediment cleanup sites. Specific data, where available (such as chemicals of concern [COCs]), are included in the HASP.

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4 AUTHORITY AND RESPONSIBILITIES OF KEY PERSONNEL

This section describes the authority and responsibilities of key Anchor QEA project personnel. The names and contact information for the following key safety personnel are listed in the Emergency Site Procedures section at the beginning of this HASP. Should key site personnel change during the course of the project, a new list will be established and posted immediately at the site. The emergency phone number for the site is 911, and should be used for all medical, fire, and police emergencies.

4.1 Project Manager

The PM provides overall direction for the project. The PM is responsible for ensuring that the project meets the client's objectives in a safe and timely manner. The PM is responsible for providing qualified staff for the project and adequate resources and budget for the health and safety staff to carry out their responsibilities during the field work. The PM will be in regular contact with the FL and CHSM to ensure that appropriate health and safety procedures are implemented into each project task.

The PM has authority to direct response operations; the PM assumes total control over project activities but may assign responsibility for aspects of the project to others. In addition, the PM:

- Oversees the preparation and organization of background review of the project, the work plan, and the field team.
- Ensures that the team obtains permission for site access and coordinates activities with appropriate officials.
- Briefs the FL and field personnel on specific assignments.
- Together with the FL, sees that health and safety requirements are met.
- Consults with the CHSM regarding unsafe conditions, incidents, or changes in site conditions or the Statement of Work.

4.2 Field Lead

The FL reports to the PM, has authority to direct response operations, and assumes control over on-site activities. The FL will direct field activities, coordinate the technical and health

and safety components of the field program, and is responsible in general for enforcing this site-specific HASP and Corporate Health and Safety Program requirements. The FL will be the primary point of contact for all field personnel and visitors and has direct responsibility for implementation and administration of this HASP. The FL and any other member of the field crew have STOP WORK AUTHORITY - the authority to stop or suspend work in the event of an emergency, if conditions arise that pose an unacceptable health and safety risk to the field crew or environment, or if conditions arise that warrant revision or amendment of this HASP. The following include, but are not necessarily limited to, the functions of the FL related to this HASP:

- Conduct and document daily safety meetings, or designate an alternate FL in his or her absence.
- Execute the work plan and schedule.
- Conduct periodic field health and safety inspections to ensure compliance with this HASP.
- Oversee implementation of safety procedures.
- Implement worker protection levels.
- Enforce site control measures to ensure that only authorized personnel are allowed on site.
- Notify, when necessary, local public emergency officials (all personnel on site may conduct this task as needed).
- Follow-up on incident reports to the PM.
- Periodically inspect protective clothing and equipment for adequacy and safety compliance.
- Ensure that protective clothing and equipment are properly stored and maintained.
- Perform or oversee air monitoring in accordance with this HASP.
- Maintain and oversee operation of monitoring equipment and interpretation of data from the monitoring equipment.
- Monitor workers for signs of stress, including heat stress, cold exposure, and fatigue.
- Require participants to use the “buddy” system.
- Provide (via implementation of this HASP) emergency procedures, evacuation routes, and telephone numbers of the local hospital, poison control center, fire department, and police department.
- Communicate incidents promptly to the PM.

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- Maintain communication with the CHSM on site activities.
- If applicable, ensure that decontamination and disposal procedures are followed.
- Maintain the availability of required safety equipment.
- Advise appropriate health services and medical personnel of potential exposures.
- Notify emergency response personnel in the event of an emergency and coordinate emergency medical care.

The FL will record health-and-safety-related details of the project in the field logbook. At a minimum, each day's entries must include the following information:

- Project name or location
- Names of all on-site personnel
- Level of PPE worn and any other specifics regarding PPE
- Weather conditions
- Type of field work being performed

The FL will have completed the required Occupational Safety and Health Administration (OSHA) 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training and annual updates, the 8-hour Supervisor training, medical monitoring clearance, and current first aid and cardiopulmonary resuscitation (CPR) training. Other certifications or training may be stipulated based on client or site requirements.

4.3 Corporate Health and Safety Manager

The CHSM (or his/her designee) will be responsible for managing on-site health and safety activities and will provide support to the PM and FL on health and safety issues. The specific duties of the CHSM are to:

- Provide technical input into the design and implementation of this HASP.
- Advise on the potential for occupational exposure to project hazards, along with appropriate methods and/or controls to eliminate site hazards.
- Ensure that a hazard assessment has been performed and that the adequacy of the PPE selected was evaluated as required by 29 CFR 1910.132(d), 1910.134, 1926.25, and 1926.55, and is duly noted by the signatures and date appearing on the Certification Page of this document.

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- Consult with the FL on matters relating to suspending site activities in the event of an emergency.
- Verify that all on-site Anchor QEA personnel and subcontractors have read and signed the HASP Acknowledgement Form.
- Verify that corrective actions resulting from deficiencies identified by audit and observations are implemented and effective.

The CHSM will have completed the required OSHA 40-hour HAZWOPER training and annual updates, the 8-hour Supervisor training, and have medical monitoring clearance. In addition, the CHSM (or his/her designee) will have current training in first aid and CPR.

4.4 Project Field Team

All project field team members will attend a project-specific meeting conducted by the FL concerning safety issues and project work task review before beginning work. All field crew, including subcontractors, must be familiar with and comply with this HASP. The field crew has the responsibility to immediately report any potentially unsafe or hazardous conditions to the FL, and all members of the field crew have STOP WORK AUTHORITY - the authority to stop or suspend work if conditions arise that pose an unacceptable health and safety risk to the field crew or environment, or if conditions arise that warrant revision or amendment of this HASP. The field team reports to the FL for on-site activities and is responsible for:

- Reviewing and maintaining a working knowledge of this HASP
- Safe completion of on-site tasks required to fulfill the work plan
- Compliance with the HASP
- Attendance and participation in daily safety meetings
- Notification to the FL of existing or potential safety conditions at the site
- Reporting all incidents to the FL
- Demonstrating safety and health conscious conduct

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Per OSHA 1910.120(e)(3)(i)[1], newly assigned HAZWOPER 40-hour trained field team members must have at least 3 days of field work supervised by an experienced FL (preferably an individual with HAZWOPER Supervisor training). It is the responsibility of the PM to identify such "short service" personnel and ensure that their supervised field experience occurs (or has occurred) and is documented in the project field notes and on the Daily Safety Briefing form (provided in Attachment 1).

1 "General site workers (such as equipment operators, general laborers and supervisory personnel) engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances and health hazards shall receive a minimum of 40 hours of instruction off the site, and a minimum of three days actual field experience under the direct supervision of a trained experienced supervisor."

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5 PROJECT-SPECIFIC REQUIREMENTS

This section provides activity-specific levels of protection and air monitoring requirements to be used on this site based on the Statement of Work and the COCs.

5.1 Activity-Specific Level of Protection Requirements

Refer to Section 10 of this HASP for general requirements for PPE. Level D is the minimum acceptable level for most sites. An upgrade to Modified Level D occurs when there is a possibility that contaminated media can come in contact with the skin or work uniform. An upgrade to Level C occurs when there is a potential for exposure to airborne COCs (i.e., if the results of air monitoring reveal that action levels have been exceeded). Hearing protection must be worn when there are high noise levels. Workers must maintain proficiency in the use and care of PPE that is to be worn.

It is assumed at this time that only Level D and Modified Level D will be required for on-site work. If conditions or requirements dictate the need for Level C or higher, this HASP will be amended accordingly.

Table 5-1, Project Job Tasks and Required PPE, describes the specific means of protection needed for potential work activities.

5.2 Project Air Monitoring Requirements

It is assumed at this time that only Level D and Modified Level D will be required for on-site work and, accordingly, air monitoring is not required. As such, if conditions or requirements dictate the need for air monitoring, this HASP will be amended accordingly.

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Table 5-1

Project Job Tasks and Required PPE

Job Tasks		PPE Requirements
• Construction observation, site visits, activities where proximity to chemicals of concern is unlikely	☐	Standard work uniform/coveralls
	☒	Work boots with safety toe conforming to ASTM International (ASTM) (ASTM) F2412-05/ASTM F2413-05
	☒	Traffic Safety Vest
	☐	Chemical-resistant clothing check appropriate garments: ☐ One-piece coverall ☐ Hooded one- or two-piece chemical splash suit ☐ Disposable chemical coveralls ☐ Chemical-resistant hood and apron ☐ Bib-style overalls and jacket with hood **Fabric Type:** Tyvek NOTE: Thick rain pants and coveralls may be substituted for coated Tyvek if sediments are not obviously contaminated with polycyclic aromatic hydrocarbons (PAHs) or related petroleum products. Rain slickers cannot be effectively decontaminated of tar/petroleum contamination.
	☐	Disposable inner gloves (surgical)
	☐	Disposable chemical-resistant outer gloves **Material Type:** Nitrile
	☒	If chemical hazards are present, chemical-resistant boots with safety toe and steel shank conforming to ASTM F2412-05/ASTM F2413-05 or disposable boot covers for safety toe/work boots **Material Type:** Non-absorptive
	☐	Sleeves to be duct-taped over gloves and pants to be duct-taped over boots
	☐	Splash-proof safety goggles
	☒	Safety glasses
	☒	Hard hat
	☐	Hard hat with face shield
	☐	Hearing protectors (**REQUIRED** if site noise levels are greater than 85 decibels [dB] based on an 8-hour time-weighted average [TWA]). **Type:**
	☐	Two-way radio communication (intrinsically safe, if explosive atmosphere is a potential)
	☐	Long cotton underwear
	☒	Orange, U.S. Coast Guard (USCG)-approved personal flotation device (PFD)

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Job Tasks		PPE Requirements
	☒	USCG-approved float coat and bib-overalls (e.g., full two-piece "Mustang" survival suit or similar) or one-piece survival suit if combined air and water temperature is below 90° F
	☐	Half-face Air-Purifying Respirator (APR) (OSHA/ National Institute for Occupational Safety and Health [NIOSH]-approved)
	☐	Full-face APR (OSHA/NIOSH-approved)
	☐	**Type of Cartridges to be Used:** ☐ **OV (organic vapor) or** ☐ **OV/HEPA (if samples are dry)**
Sampling or Survey Activities[2] – sediment coring, surface water sampling, habitat surveys, water quality monitoring, etc.	☐	Standard work uniform/coveralls
	☐	Work boots with safety toe conforming to ASTM F2412-05/ASTM F2413-05
	☒	Traffic Safety Vest
	☒	Chemical-resistant clothing check appropriate garments: ☒ One-piece coverall ☐ Hooded one- or two-piece chemical splash suit ☐ Disposable chemical coveralls ☐ Chemical-resistant hood and apron ☐ Bib-style overalls and jacket with hood **Fabric Type:** Tyvek NOTE: Thick rain pants and coveralls may be substituted for coated Tyvek if sediments are not obviously contaminated with PAHs or related petroleum products. Rain slickers cannot be effectively decontaminated of tar/petroleum contamination.
	☒	Disposable inner gloves (latex or equivalent "surgical")
	☒	Disposable chemical-resistant outer gloves **Material Type:** Nitrile
	☒	If chemical hazards are present chemical-resistant boots with safety toe and steel shank conforming to ASTM F2412-05/ASTM F2413-05 or disposable boot covers for safety toe/work boots **Material Type:** Non-absorptive
	☐	Sleeves to be duct-taped over gloves and pants to be duct-taped over boots
	☐	Splash-proof safety goggles
	☒	Safety glasses
	☒	Hard hat

[2] Please refer to JSAs for task-specific PPE requirements. The PPE requirements provided in this table are default for potential sampling or survey activities.

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Job Tasks		PPE Requirements
	☐	Hard hat with face shield
	☒	Hearing protectors (**REQUIRED** if site noise levels are greater than 85 dB based on an 8-hour TWA). **Type:** Varies
	☐	Two-way radio communication (intrinsically safe, if explosive atmosphere is a potential)
	☐	Long cotton underwear
	☒	Orange, USCG-approved PFD
	☒	USCG-approved float coat and bib-overalls (e.g., full two-piece "Mustang" survival suit or similar) or one-piece survival suit if combined air and water temperature is below 90° F
	☐	Half-face APR (OSHA/NIOSH-approved)
	☐	Full-face APR (OSHA/NIOSH-approved)
	☐	**Type of Cartridges to be Used:** ☐ **OV or** ☐ **OV/HEPA (if samples are dry)**

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6 RISK ANALYSIS AND CONTROL

The following sections discuss the potential worker health and safety hazards associated with potential field tasks for this project. These hazards are addressed through the mechanical and physical control measures, use of PPE, monitoring, training, decontamination, emergency response, and safety procedures.

Significant changes in the scope of work covered by this HASP must be communicated to the PM and CHSM, and an amendment to this HASP must be created as needed (see Section 1.1). Any task conducted beyond those identified in the scope of work and this HASP must be evaluated using the JSA process prior to conducting the work.

6.1 Job Safety Analysis

As specific work tasks are identified and designed, JSA documents will be developed that detail the chemical, physical, and biological hazards associated with these tasks, along with the specific control measures (e.g., engineering controls, administrative controls, and/or PPE) that will be used to ensure that these tasks are conducted in a safe manner.

The PM and FL are responsible for identifying work tasks and project site conditions that are beyond the previously developed JSA documents and for communicating such information to the CHSM. The CHSM will provide support, as needed, to the PM and/or the FL, who will have primary responsibility to develop project-specific JSAs.

The contents of the JSA documents shall be communicated to project personnel during the site orientation meeting and during daily safety meetings when conducting work where the specific JSAs are applicable.

A JSA template document is located in Attachment 2 of this HASP.

6.1.1 Augmented JSA Process

If significant work tasks are identified during the course of the project that were not previously addressed in the current JSA documentation at that time, then a task-specific JSA document must be developed at the project site prior to conducting the work. The PM

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and/or FL shall develop this document(s) with input from the CHSM, as needed, and this HASP will be amended to include the document (see Section 1.1 for HASP modification procedures). Project personnel shall be trained on the contents of the developed task-specific JSA prior to its implementation. A copy of the task-specific JSA form used in this process is supplied in Attachment 2 of this HASP.

6.2 Exposure Routes

Possible routes of exposure to the chemicals potentially encountered on this project include inhalation, dermal contact, and ingestion of dust, mist, gas, vapor, or liquid. Exposure will be minimized by using safe work practices and by wearing the appropriate PPE. A further discussion of PPE requirements is presented in Section 10.

6.2.1 Inhalation

Inhalation of particulates, dust, mist, gas, or vapor during field activities is possible. Whenever possible, work activities will be oriented so that personnel are upwind of the sampling location. An organic vapor monitor (OVM) may be used to monitor ambient air and the breathing zone within the work area for organic compounds. The need for and details of task-specific air monitoring will be evaluated during identification and design of specific tasks.

6.2.2 Dermal Contact

Dermal contact with potentially contaminated soil, sediment, or surface water during field activities is possible. Direct contact will be minimized through the use of appropriate PPE and decontamination procedures.

6.2.3 Ingestion

Direct ingestion of contaminants can occur by inhaling airborne dust, mist, or vapors, or by swallowing contaminants trapped in the upper respiratory tract. Indirect ingestion can occur by introducing the contaminants into the mouth by way of food, tobacco, fingers, or other carriers. Although ingestion of contaminants can occur, proper hygiene, decontamination,

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and contamination reduction procedures should reduce the probability of this route of exposure.

6.3 Chemicals of Concern Profile

The following table provides a summary profile for the COCs for this project. As available, this profile is based on recent site history and site characterization information. For more detailed and specific information, always refer to the Material Safety Data Sheet (MSDS) or equivalent information for the chemical (see Attachment 3).

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Table 6-1
Chemicals of Concern Profile

Chemical	Exposure Routes, Symptoms, Target Organs[1]	TWA[1]	STEL[1]	Odor Threshold[1]	LEL (%)[1]
PCBs (chlorodiphenyl at 54% chlorine)	• Inhalation, absorption, ingestion, contact • Irritant to eyes, chloracne, liver damage, reproductive effects (potential occupational carcinogen) • Skin, eyes, liver, reproductive system	0.001 mg/m^3	--	-- (hydrocarbon odor)	--
PAHs (as benzo(a)pyrene)	• Inhalation, contact • Dermatitis, bronchitis [potential occupational carcinogen] • Respiratory system, skin, bladder, kidneys (lung, kidney, and skin cancer)	0.1 mg/m^3	--	-- (slightly aromatic)	--
Metals (as mercury [inorganic])	• Inhalation, absorption, ingestion, contact • Irritant to eyes and skin, cough, chest pain, difficulty breathing, bronchitis, pneumonia, tremors, insomnia, irritability, indecision, headache, lassitude, stomatitis, salivation, gastrointestinal disturbance, anorexia, weight loss, proteinuria • Eyes, skin, respiratory system, central nervous system, kidneys	0.025 mg/m^3	--	--	--

Notes:
1 = *NIOSH Pocket Guide to Chemical Hazards* (NIOSH September 2007), cross referenced to *TLVs and BEIs* (ACGIH 2012)
eV = electron volts
IP = Ionization Potential
LEL = Lower Explosive Limit
mg/m^3 = milligrams per cubic meter
OEL = Occupational Exposure Limit (identifies the most restrictive exposure limit, e.g., federal or state OSHA permissible exposure limit (PEL), American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit values (TLV), and/or National Institute for Occupational Safety and Health (NIOSH) recommended exposure limit (REL) for the chemicals of concern.
STEL = Short-term exposure limit
-- = no value or not applicable

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7 SITE CONTROL AND COMMUNICATIONS

The primary purposes for site controls are to establish the hazardous area perimeter, to reduce migration of contaminants into clean areas, and to prevent unauthorized access or exposure to hazardous materials by site personnel and the public. Site control is especially important in emergency situations.

7.1 General Site Control Safety Procedures

The following are standard safe work practices that apply to all Anchor QEA site personnel and subcontractors and shall be discussed in the safety briefing prior to initiating work on the site:

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited on site except in designated areas.
- Hands and faces must be washed upon leaving the work area and before eating, drinking, chewing gum or tobacco, and smoking.
- A buddy system will be used. Radio or hand signals will be established to maintain communication.
- During site operations, each worker will consider him/herself as a safety backup to his/her partner.
- Visual contact will be maintained between buddies on-site when performing hazardous duties.
- No personnel will be admitted to the site without the proper safety equipment, training, and medical surveillance certification.
- All personnel must comply with established safety procedures. Any staff member who does not comply with safety policy, as established in this HASP, will be subject to corrective action, potentially including, but not limited to, reprimanded and immediate dismissal.
- Proper decontamination procedures must be followed before leaving a contaminated work area.

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7.2 Work Area Access Control

If work is performed in public areas, the following precautions shall be taken to protect both the workers and the public. Access control to the work area will be accomplished by the use of a combination of the following devices and/or methods:

- Fences and/or barricades
- Traffic control devices and/or use of flaggers
- Caution tape
- Other methods to keep the site secure and provide a visual barrier to help keep unauthorized personnel from entering the site and active work areas

7.3 Hazardous Waste Site Work Control Procedures

To prevent contamination from migrating from personnel and equipment, work areas will be clearly specified as an Exclusion Zone/Hot Zone (EZ), Contaminant Reduction Zone (CRZ), or Support Zone/Clean Zone (SZ) prior to beginning operations. Each work area will be clearly identified using signs or physical barriers. At the end of each workday, the site should be secured and/or guarded to prevent unauthorized entry.

Site work zones will include:

- **Exclusion Zone/Hot Zone (EZ).** The EZ will be the "hot zone" or contaminated area inside the site perimeter (or sample collection area of boat). The EZ is the defined area where potential respiratory and/or health hazards exist. All personnel entering the EZ must use the required PPE, as set forth in this HASP, and meet the appropriate training and medical clearance. Entry to and exit from this zone will be made through a designated point. Appropriate warning signs to identify the EZ should be posted (e.g., DANGER, AUTHORIZED PERSONNEL ONLY, PROTECTIVE EQUIPMENT REQUIRED BEYOND THIS POINT). Personnel and equipment decontamination must be performed upon exiting the EZ.
- **Contaminant Reduction Zone (CRZ).** The CRZ, also known as the "warm zone," is a transitional zone between the EZ and the SZ (also known as the "cold zone" or "clean zone"). The CRZ provides a location for removal and decontamination of PPE and tools leaving the EZ. A separate decontamination area will be established for heavy

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equipment. All personnel and equipment must exit via the CRZ. If, at any time, the CRZ is compromised, a new CRZ will be established.

- **Support Zone/Clean Zone (SZ).** This uncontaminated zone will be the area outside the EZ and CRZ and within the geographic perimeters of the site (including boat and processing areas). The SZ is used for support personnel; staging materials; parking vehicles; office, laboratory, and sanitation facilities; and receiving deliveries. Personnel entering this zone may include delivery personnel, visitors, security guards, and others who will not necessarily be permitted in the EZ or CRZ.

A log of all personnel visiting, entering, or working on the site shall be maintained by the FL. No visitor will be allowed in the EZ without showing proof of training and medical certification, per 29 CFR 1910.120(e), (f), and 29 CFR 1926.1101(k)(9), (m) if appropriate. Visitors will attend a site orientation given by the FL and sign the HASP.

7.4 Site-specific Work Zone Requirements

This section contains guidelines for maintaining safe conditions when working from a boat, in a roadway, or at an excavation site.

7.4.1 Sediment and Water Quality Sampling Work Zones

This subsection contains guidelines concerning health and safety aboard marine sampling vessels. The vessel captain, onshore coring operator, and the FL will delineate the boundaries of the work zones aboard the vessel and will inform the field crews of the arrangement. The purpose of the zones is to limit the migration of sample material out of the zones and to restrict access to active work areas.

Two work zones will be observed aboard the vessel. One will encompass the “moonhole” of the vessel where the samplers will be deployed and recovered. Only the coring crew may enter this zone unless assistance is required by other personnel. The second work zone will be a sample processing area on the vessel. The contractor crew will deliver sediment core tubes to this zone and open them. Anchor QEA personnel will log and process the sediment cores either on the boat or on shore.

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Both the collection and processing areas on the vessel and onshore will have a SZ outside the CRZ to stage clean equipment, don PPE, take rest breaks, or perform any other site activities that do not involve potentially contaminated materials.

7.4.1.1 Vessel Decontamination Area

A station will be set up for decontaminating sample processing equipment and personnel gear such as boots or PPE. The station will have the buckets, brushes, soapy water, rinse water, or wipes necessary to perform decontamination operations. Plastic bags will be provided for expendable and disposable materials. The decontamination fluids will be stored in sealable containers and will be properly disposed of.

7.4.1.2 Access Control

Security and control of access to the sampling vessel and onshore area will be the responsibility of the captain and FL. Additional security measures may be placed into effect by the client, or as required by national security threat levels determined by the federal government. Access to the vessel and onshore areas will only be granted to necessary project personnel and authorized visitors. Any security or access control problems will be reported to the client or appropriate authorities.

7.4.1.3 Safety Equipment

In addition to PPE that will be worn by shipboard personnel, basic emergency and first aid equipment will also be provided. Equipment will include:

- USCG-approved PFDs
- First aid kit adequate for the number of personnel
- Emergency eyewash

Anchor QEA and/or subconsultants will provide this equipment, which must be at the location(s) where field activities are being performed. Equipment will be checked daily to ensure its readiness for use.

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7.4.2 Working in a Roadway

Work conducted in public streets may require coordination with local city and/or county governments and development and submittal of a traffic control plan in accordance with the U.S. Department of Transportation (DOT) Manual on Uniform Traffic Control Devices (MUTCD). Use of personnel qualified as Flaggers may also be required to provide temporary traffic control.

Observe the following site control practices and procedures when working in roadways:

- Wear a traffic vest and hardhat when a vehicle hazard exists.
- Use cones, flag-mounted cones, caution tape, and/or barricades.
- Use a vehicle strobe light and block area with truck.
- Develop a traffic flow plan for high-traffic situations (as appropriate):
  - Use a flag person
  - Use a flashing arrow sign
  - Use "MEN WORKING" signs liberally
  - Obtain lane closing permits
  - Engage police details

See Sections 12.1.9 and 12.1.10 for additional information regarding motor vehicle operation and vehicular traffic.

7.5 Field Communications

Communications between all Anchor QEA employees and subcontractors at the work site can be verbal and/or non-verbal. Verbal communication can be affected by the on-site background noise and various PPE. See Table 7-1 for a list of the types of communication methods and equipment to use, depending on site conditions. Communication equipment must be checked daily to ensure proper operation. All project personnel must be initially briefed on the communication methods prior to starting work; communication methods should be reviewed in daily safety meetings.

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Table 7-1
Field Communication Methods

Type of Communication	Communication Device	Signal
Emergency notification	On-site telephone or cellular telephone	Initiate phone call using applicable emergency numbers
Emergency notification among site personnel	Two-way radio	Initiate radio communication with Code Red message
Hailing site personnel for non-emergency	Compressed air horn	One long blast, one short blast
Hailing site personnel for emergency evacuation	Compressed air horn	Three long, continuous blasts
Hailing site personnel for distress, need help	Visual	Arms waved in circle overhead
Hailing site personnel for emergency evacuation	Visual	Arms waved in criss-cross over head
Contaminated air/strong odor	Visual	Hands clutching throat
Break, lunch, end of day	Visual	Two hands together, break apart

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8 DECONTAMINATION PROCEDURES AND PRACTICES

8.1 Minimization of Contamination

The following measures will be observed to prevent or minimize exposure to potentially contaminated materials:

- Personnel
  - Do not walk through spilled materials
  - Do not handle, touch, or smell sample media directly
  - Make sure PPE has no cuts or tears prior to use
  - Protect and cover any skin injuries
  - Stay upwind of airborne dusts and vapors
  - Do not eat, drink, chew tobacco, or smoke in the work zones
- Sampling Equipment and Vehicles/Vessels
  - Use care to avoid getting sampled media on the outside of sample containers
  - If necessary, bag sample containers before filling with sampled media
  - Place clean equipment on a plastic sheet to avoid direct contact with contaminated media
  - Keep contaminated equipment and tools separate from clean equipment and tools
  - Fill sample containers over a plastic tub to contain spillage
  - Clean up spilled material immediately to avoid tracking around the vehicle/vessel

8.2 Decontamination Equipment

All vehicles, vessels, and equipment that have entered potentially contaminated areas will be visually inspected and, if necessary, decontaminated prior to leaving the area. If the level of vehicle contamination is low, decontamination may be limited to rinsing tires and wheel wells with an appropriate detergent and water. If the vehicle is significantly contaminated, steam cleaning or pressure washing may be required. Tools will be cleaned in the same manner. Rinsate from all decontamination activities will be collected for proper disposal. Decontamination of equipment and tools will take place within the CRZ.

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The following supplies will be available to perform decontamination activities (additional or differing decontamination procedures may be identified for specific tasks):

- Wash and rinse buckets
- Tap water and phosphate-free detergent
- Scrub brushes
- Distilled/deionized water
- Deck pump with pressurized freshwater hose (aboard the vessel)
- Pressure washer/steam cleaner, if appropriate
- Paper towels and plastic garbage bags

8.3 Personnel Decontamination

The FL will ensure that all site personnel are familiar with personnel decontamination procedures as listed below. All personnel wearing PPE in a work area (EZ) must undergo decontamination prior to entering the SZ. Personnel will perform the following decontamination procedures:

- Wash and rinse outer gloves and boots in portable buckets to remove gross contamination.
- If suit is heavily soiled, rinse it off.
- Remove outer gloves; inspect and discard if damaged. Leave inner gloves on. Personnel will remove their outer garment and gloves, dispose of them, and properly label container or drum. Personnel will then decontaminate their hard hats and boots with an aqueous solution of detergent or other appropriate cleaning solution. These items then will be hand-carried to the next station. Remove inner gloves.
- Thoroughly wash hands and face before leaving CRZ.
- Sanitize respirators and place in a clean plastic bag.

8.4 Sampling and Processing Equipment Decontamination

To prevent sample cross-contamination, sampling and processing equipment in contact with soil, sediment, or water samples will undergo the following decontamination procedures when work is completed in the CRZ and prior to additional use:

1. Rinse with potable water and wash with scrub brush.

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2. Wash with phosphate-free detergent (Alconox®).
3. Visually inspect the sampler and repeat the scrub and rinse step, if necessary. If scrubbing and rinsing with Alconox® is insufficient to remove visually observable tar-related contamination on equipment, the equipment will be scrubbed and rinsed using hexane (or similar type solution) until all visual signs of contamination are absent.
4. Rinse external sampling equipment with potable water three times prior to use. Rinse homogenizing equipment once with potable water and three times with distilled water prior to and between sample processing.

8.5 Handling of Investigation-Derived Waste

All remaining soil or sediment, fluids used for decontamination of sampling equipment, and sample collection disposable wastes (e.g., gloves, paper towels, foil, or others) will be placed into appropriate containers and staged on site for disposal.

8.5.1 Disposable PPE

Disposable PPE may include Tyvek suits, inner latex gloves, and respirator cartridges. Dispose of PPE according to the requirements of the client and state and federal agencies.

8.5.2 Non-disposable PPE

Non-disposable PPE may include respirators and boots and gloves. When decontaminating respirators, observe the following practices and procedures:

- Wipe out the respirator with a disinfecting pad prior to donning.
- Decontaminate the respirator on site at the close of each day with an approved sanitizing solution.

When decontaminating boots and gloves, observe the following practices and procedures:

- Decontaminate the boots or gloves outside with a solution of detergent and water; rinse with water prior to leaving the site.
- Protect the boots or gloves from exposure by covering with disposable covers such as plastic to minimize required decontamination activities.

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8.6 Sanitizing of Personal Protective Equipment

Respirators, reusable protective clothing, and other personal articles must not only be decontaminated before being reused, but also sanitized. The insides of masks and clothing become soiled due to exhalation, body oils, and perspiration. Manufacturer's instructions should be used to sanitize respirator masks. If practical, reusable protective clothing should be machine-washed after a thorough decontamination; otherwise, it must be cleaned by hand.

8.7 Emergency Personnel Decontamination

Personnel with medical problems or injuries may also require decontamination. There is the possibility that the decontamination may aggravate or cause more serious health effects. If prompt lifesaving, first aid, and medical treatment are required, decontamination procedures will be omitted. In either case, a member of the site management team will accompany contaminated personnel to the medical facility to advise on matters involving decontamination.

8.8 Containment of Decontamination Fluids

As necessary, spill control measures will be used to contain contaminated runoff that may enter into clean areas. Use plastic sheeting, hay bales, or install a spill control system to prevent spills and contain contaminated water.

8.9 Pressure Washing

The following procedure is required when using high-pressure washing equipment for decontamination purposes:

- Wear modified Level D protection, including a face shield and safety goggles.
- Ensure that other personnel are out of the area prior to decontamination.
- Secure the area around the decontamination pad with cones, caution tape, or barricades.

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- Ensure that safe work practices and precautions are taken to minimize the potential for physical injury from high-pressure water spray. Follow the manufacturer's operating instructions.
- The pressure washer wand must be equipped with a safety release handle.
- Ensure that the area is clean after equipment is decontaminated. Barricades, cones, or caution tape must be left in place and secured at all times.

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9 HEALTH AND SAFETY TRAINING AND INFORMATIONAL PROGRAMS

This section describes the health and safety training and informational programs that Anchor QEA project site personnel must comply with.

9.1 Initial Project Site Orientation

Work on all Anchor QEA project sites will require participation in an initial health and safety orientation presented by the PM or FL that will consist of, at a minimum, the following topics:

- Jorgensen Forge site access requirements
- A review of the contents of this HASP, including the scope of work and associated site hazards and control methods and procedures.
- Provisions of this HASP are mandatory for all Anchor QEA personnel assigned to the project.
- Anchor QEA subcontractors are also expected to follow the provisions of this HASP unless they have their own HASP that covers their specific activities related to this project and includes the minimum requirements of this HASP.
- All visitors to the work site will also be required to abide by the requirements of this plan.
- Personnel assigned to perform work at the project site, working under the provisions of this HASP, will be required to read the plan and must sign the Health and Safety Plan Acknowledgement Form to confirm that they understand and agree to abide by the provisions of this plan. Personnel not directly affiliated with the project (i.e., visitors) may also be required to sign the Liability Waiver provided.

9.2 Daily Safety Meetings

Daily safety meetings ("tailgate meetings") make accident prevention a top priority for everyone and reinforce awareness of important accident-prevention techniques. The following daily safety meeting procedures and practices are required:

- Daily safety meetings will be held each morning prior to conducting site activities.
- The Daily Safety Briefing form in Attachment 1 will be used to document each meeting.

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- Copies of the completed Daily Safety Briefing forms will be maintained on site during the course of the project.

9.3 Hazardous Waste Operations Training

Personnel working on project sites that present a potential exposure to hazardous wastes or other hazardous substances shall be trained in accordance with the requirements of the 29 CFR 1910.120 (HAZWOPER) regulation. Training requirements will consist of the following:

- Field personnel must complete a minimum of 40 hours of hazardous waste activity instruction.
- Field personnel must complete a minimum of 3 days of supervised field instruction.
- Field personnel assigned to the site will also have received 8 hours of refresher training if the time elapse since their previous training has exceeded 1 year.
- On-site managers and supervisors directly responsible for employees engaged in hazardous waste operations will receive an additional 8 hours of supervisory training.
- Field personnel shall be current in first aid/CPR training.
- Other training may be required depending on the task to be performed (e.g., confined space, excavation/trenching, underground storage tank removal, fall protection, respiratory protection, and hazard communication).

9.4 Transportation Worker Identification Credentials (TWIC)

All Anchor QEA field personnel will maintain current TWIC status, pursuant to the Maritime Transportation Security Act of 2002, unless this requirement is waived specifically in writing by relevant property owners.

9.5 Hazard Communication Program

The purpose of hazard communication (Employee Right-to-Know) is to ensure that the hazards of all chemicals located at the field project site are communicated to all Anchor QEA personnel and subcontractors according to 29 CFR 1926.59.

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Every container of hazardous materials must be labeled by the manufacturer, who must also provide a MSDS upon initial order of the product and upon request thereafter. The actual format may differ from company to company (e.g., National Fire Protection Association [NFPA], Hazardous Material Information System [HMIS], or other), but the labels must contain similar types of information. Maintain manufacturer labels if at all possible. The label may use words or symbols to communicate the following:

- The name of the chemical
- The name, address, and emergency telephone number of the company that made or imported the chemical
- The physical hazards (Will it explode or catch fire? Is it reactive? Is it radioactive?)
- Any important storage or handling instruction
- The health hazards (Is it toxic? Could it cause cancer? Is it an irritant? What is the target organ?)
- The basic protective clothing, equipment, and procedures that are recommended when working with the chemical

Upon identification and design of specific work tasks, MSDS' for all chemicals brought onto the site or anticipated to be encountered on site shall be appended in Attachment 3 of this HASP. These MSDS' shall be readily available for reference by site personnel and emergency response personnel.

Hazardous materials received without proper labels shall be set aside and not distributed for use until properly labeled.

If a hazardous chemical is transferred into a portable container (approved safety can), even if it is for immediate use only, the contents of the portable container (e.g., acetone or gasoline) must be identified.

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10 GENERAL PPE REQUIREMENTS

The minimum level of PPE should be selected according to the hazards that may be encountered during site activities in accordance with established EPA levels of protection (D and C). Only PPE that meets American National Standards Institute (ANSI) standards shall be worn. Workers must maintain proficiency in the use and care of PPE.

Refer to Section 5 of this plan for site-specific job task and level-of-protection requirements.

10.1 Minimum Requirements – Level D Protection

The minimum level of protection on project sites will be Level D protection, which consists of the following equipment:

- Standard work uniform/coveralls
- Work boots with safety toe conforming to ASTM F2412-05/ASTM F2413-05
- Approved safety glasses or goggles (meets ANSI Z87.1 – 1989 requirements for eye protection)
- Hard hat (meets ANSI Z89.1 – 1986 requirements for head protection)
- Traffic safety vest
- Hearing protection when there are high noise levels

Level D protection will be used only when:

- The atmosphere contains no known hazards
- Work functions preclude splashes, immersions, or the potential for unexpected inhalation of, or contact with, hazardous concentrations of chemicals
- Atmospheric concentrations of contaminants are less than the PEL and/or TLV

10.1.1 Modified Level D Protection Requirements

Depending on future field tasks and the potential hazards to be encountered, Level D protection shall be modified to include additional protective equipment such as USCG-approved PFDs, face shields/goggles, chemical-resistant clothing, and disposable gloves of varying materials depending on the chemical substances involved. An upgrade to Modified

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Level D occurs when there is a possibility that contaminated media can contact the skin or work uniform.

10.2 Respiratory Protection Requirements

Respiratory protection is not anticipated at this time for field tasks on this project.

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11 GENERAL AIR MONITORING REQUIREMENTS

11.1 General Requirements

Air monitoring is not anticipated at this time for field tasks on this project. However, in the event that air monitoring is deemed necessary, this section provides reference information. Specific air monitoring procedures and action levels will be determined at that time.

In general, air monitoring shall be conducted when the possibility of hazardous atmospheres, chemical volatilization, or contaminated airborne dust exists (e.g., from intrusive activities involving contaminated soils and/or groundwater, developing new monitoring wells, wells containing known COCs, or confined space entry).

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12 HEALTH AND SAFETY PROCEDURES AND PRACTICES

In addition to the task-specific JSAs that would be created pertinent to tasks listed in Section 6.1, this section lists the health and safety procedures and practices reasonably foreseen as applicable to this project. For additional information, consult with the PM.

12.1 Physical Hazards and Controls

12.1.1 General Site Activities

Observe the following general procedures and practices to prevent physical hazards:

- Legible and understandable precautionary labels shall be affixed prominently to containers of potentially contaminated soil, sediment, water, and clothing.
- No food or beverages shall be present or consumed in areas that have the potential to contain COCs and/or contaminated materials or equipment.
- No tobacco products or cosmetics shall be present or used in areas that have the potential to contain COCs and/or contaminated materials or equipment.
- An emergency eyewash unit shall be located immediately adjacent to employees who handle hazardous or corrosive materials, including decontamination fluids. All operations involving the potential for eye injury or splash must have approved eyewash units locally available capable of delivering at least 0.4 gallons per minute for at least 15 minutes.
- On a project-specific basis, personnel working on or near bodies of water shall wear USCG-approved PFDs.
- Certain project sites may have newly finished work (e.g., concrete, paving, framing, habitat reconstruction, or shoreline containment) that may be damaged by unnecessary contact, or that could cause dangerous conditions for personnel (e.g., slipping, sinking, or tripping). Personnel working in or around these areas shall communicate with the PM, FL, and property owner as needed to prevent damaging new work or entering dangerous conditions.
- Generally, all on-site activities will be conducted during daylight hours. If work after dusk is planned or becomes necessary due to an emergency, adequate lighting must be provided.

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- Hazardous work, such as handling hazardous materials and heavy loads and equipment operation, should not be conducted during severe storms.
- All temporary electrical power must have a ground fault circuit interrupter (GFCI) as part of its circuit if the circuit is not part of permanent wiring. All equipment must be suitable and approved for the class of hazard present.

12.1.2 Slip/Trip/Fall

Observe the following procedures and practices to prevent slips, trips, and falls:

- Inspect each work area for slip/trip/fall potential prior to each work task.
- Slip/trip/fall hazards identified must be communicated to all personnel. Hazards identified shall be corrected or labeled with warning signs to be avoided.
- All personnel must be aware of their surroundings and maintain constant communication with each other at all times.

12.1.3 Sediment Core Sampling

Sediment samples will be collected using a "Mud Mole" or vibracore sampling equipment operated from a boat. Please see Section 12.1.12 for additional safety information regarding working on or near the water.

All operations involving the use of powered sediment coring rigs will follow generally accepted drilling/coring practices. One person will be assigned the responsibility of Lead Driller/Corer. Additional personnel will assist with equipment as needed. The Lead Driller/Corer will be responsible for operating the drilling/coring rig and ensuring safety.

General rules associated with drilling/coring rig operations will be as follows:

- While drilling, all non-essential personnel shall remain at a distance that is past the radius of any moving parts.
- All operators and crew members will be familiar with the rig operations and will have received practical training.
- All personnel will be instructed in the use of the emergency kill switch/shutdown on the drill rig.

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- No loose-fitting clothing, jewelry, or free long hair is permitted near the drilling rig or moving machinery parts.
- A first aid kit and fire extinguisher will be available at all times.
- No drilling will occur during impending electrical storms or tornadoes, or when rain, ice, snow, or wind conditions create undue potential hazards.
- Never allow "horsing around" within the vicinity of the drill rig and tool and supply storage areas, even when the drill rig is shut down.

12.1.4 Underground/Overhead Utility Line Contact Prevention

Observe the following underground/overhead utility line contact prevention procedures and practices:

- Prior to conducting work, the PM or FL shall ensure that all existing underground or overhead utilities in the work area are located per the state or local mark-out methods. Documentation of utility mark-out shall be completed using the Utility Contact Prevention Checklist form (see Attachment 1). No excavation work is to be performed until all utility mark-outs are verified.
- The PM or FL shall conduct a site survey to search for signs of other buried or overhead utilities. The results of such surveys shall be documented on the Utility Mark-out documentation form.
- The property owner or facility operator shall be consulted on the issue of underground utilities. As-built drawings shall be reviewed, when available, to verify that underground utility locations are consistent with the utility location mark-outs. All knowledge of past and present utilities must be evaluated prior to conducting work.
- If on-site subsurface utility locations are in question, a private locating service shall be contacted to verify locations. If the investigation calls for boreholes in an area not covered by the municipal One-Call system, then a private utility locate firm shall be contacted to determine the location of other underground utilities.
- The PM shall have documented verbal contact and an agreement with the fiber optic company for all work within 50 feet of any fiber optic cables.

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- **Only hand digging is permitted within 3 feet of underground high voltage, product, or gas lines.** Once the line is exposed, heavy equipment can be used, but must remain at least 3 feet from the exposed line.
- Elevated superstructures (e.g., drill rig, backhoe, scaffolding, ladders, and cranes) shall remain a distance of 10 feet away from utility lines and 20 feet away from power lines. Distance from utility lines may be adjusted by the FL depending on actual voltage of the lines.
- Overhead utility locations shall be marked with warning tape or flags where equipment has the potential for contacting overhead utilities.

Table 12-1 shows the minimum clearances required for energized overhead electrical lines.

Table 12-1
Overhead Utility Clearance Requirements

Minimum Clearance from Energized Overhead Electric Lines	
Nominal System Voltage	**Minimum Required Clearance**
0 to 50 kV	10 feet
51 to 100 kV	12 feet
101 to 200 kV	15 feet
201 to 300 kV	20 feet
301 to 500 kV	25 feet
501 to 750 kV	35 feet
751 to 1000 kV	45 feet

Notes:
kV = kilovolts
Whenever equipment operations must be performed closer than 20 feet from overhead power lines, the F) must be notified. When clearance to proceed is received from the FL, the electric utility company must be contacted to turn the power off or physically insulate (protect) the lines if the operation must be performed closer to the power line than is allowed in this table. For voltages not listed on this table, add 0.4 inches per kV to obtain the safe distance between equipment and power lines.

12.1.5 Electrical Safety

Observe the following procedures and practices to prevent electric shock:

- General

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- Use only appropriately trained and certified electricians to perform tasks related to electrical equipment. A good rule of thumb is to defer any task that would not normally and reasonably be completed by the average public consumer.
- Ensure that all equipment is grounded with either an appropriate plug (i.e., "three-pronged") or by using a GFCI.
- Test all GFCIs prior to use.
- Use only extension cords that are in good condition—if in doubt, throw it out.
- Use only 16-gauge, heavy duty, three-wire, Underwriters Laboratories Inc. (UL)-approved three-pronged extension cords
- Be sure to locate extension cords out of traffic areas or, if this is unavoidable, flag cords and protect workers from tripping over them (i.e., use barricades, tape the cord down, etc.)
- Do not stage extension cords or powered equipment in wet areas, to the degree possible. Elevate cords and equipment out of puddles.

- Specific
  - If unsure if a task requires specific electrical training, err on the side of caution and contact the PM and FL prior to proceeding.
  - If subsurface work is to be performed, follow the guidelines in Section 12.1.4 and conduct utility locating prior to work and in accordance with local ordinances.
  - If lock out/tag out (LO/TO) procedures are required (i.e., de-energizing machinery or equipment so that work may be performed), the equipment owner must provide LO/TO procedures and training. By default, the equipment owner should perform any LO/TO. If it becomes necessary for Anchor QEA personnel to perform LO/TO tasks, contact the PM and FL prior to doing so.
  - Maintain appropriate distance from overhead utilities (see Table 12-1).
  - If unexpected electrical equipment is encountered (i.e., buried wire) assume it is live, stop work, and contact the PM and FL immediately.

12.1.6 General Falls/Ladders

Observe the following general falls/ladders procedures and practices:

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- Assess work areas for fall hazards. A fall protection system that meets OSHA and ANSI Z3591 standards must be used if work is conducted 6 feet or more above the surface.
- Use Type 1A-rated ladders.
- Make sure ladder rungs are sturdy and free of cracks.
- Use ladders with secure safety feet.
- Pitch ladders at a 4 horizontal to 1 vertical (4H:1V) ratio.
- Secure ladders at the top or have another person at the bottom to help stabilize it.
- Ladders used to access an upper landing surface shall extend at least 3 feet above the upper landing surface.
- Use non-conductive ladders near electrical wires.
- The top rung of a ladder should not be used as a step.
- Do not carry any object or load that could cause a loss of balance or a fall.

12.1.7 Heavy Equipment Operations

Observe the following heavy equipment operations procedures and practices:

- Wear leather gloves while attaching support members to protect against pinching injuries.
- While working from elevated levels greater than 6 feet, ensure that all employees have fall protection that meets OSHA and ANSI Z3591 standards.
- Do not stand under loads that are being raised or lowered with cranes or aerial lifts.
- The subcontractor or Anchor QEA equipment operator must conduct pre-operational inspections of all equipment. In addition, daily inspections will be conducted on the equipment prior to site activities.
- Maintain the appropriate distance from overhead utilities (see Table 12-1):
- Always stay out of the swing radius of all heavy equipment. Always use a spotter during movement of equipment. The spotter and others, as appropriate, shall maintain constant communication with the operator.
- All operators must have adequate training and be qualified to operate the particular heavy equipment unit.
- Conduct a site evaluation to determine proper positioning for the unit. Make sure the surface is level. Cordon off holes, drop-offs, bumps, or weak ground surfaces.

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- When using a crane, do not use hands when the load is being lifted or lowered. Use non-conductive tag line to help direct and position the load.
- Never climb a raised platform or stand on the mid-rail or top-rail.
- Tools should always be hung or put into a belt whenever possible

12.1.8 Hand and Power Tools

Observe the following procedures and practices when working with hand and power tools:

- Keep hand tools sharp, clean, oiled, dressed, and not abused.
- Worn tools are dangerous. For example, the "teeth" in a pipe wrench can slip if worn smooth, an adjustable wrench will slip if the jaws are sprung, and hammerheads can fly off loose handles.
- Tools subject to impact (e.g., chisels, star drills, and caulking irons) tend to "mushroom." Keep them dressed to avoid flying spalls. Use tool holders.
- Do not force tools beyond their capacity.
- Flying objects can result from operating almost any power tool, so always warn people in the vicinity and use proper eye protection.
- Each power tool should be examined before use for damaged parts, loose fittings, and frayed or cut electric cords. Tag and return defective tools for repairs. Also inspect for adequate lighting, proper lubrication, and abandoned tools or material that could "vibrate into trouble."
- Compressed air must be shut off or the electric cord unplugged before making tool adjustments. Air must be "bled down" before replacement or disconnection.
- Proper guards or shields must be installed on all power tools before issue. Do not use improper tools or tools without guards in place.
- Replace all guards before start-up. Remove cranks, keys, or wrenches used in service work.

12.1.9 Motor Vehicle Operation

All drivers are required to have a valid driver's license, and all vehicles must have appropriate state vehicle registration and inspection stickers. The use of hand-held wireless devices is prohibited by Anchor QEA while driving any vehicle for business use at any time,

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for personal use during business hours, and as defined by law. Additionally, site-specific motor vehicle requirements must be followed, if any.

When driving to, from, and within the job site, be aware of potential hazards including:

- Vehicle accidents
- Distractions
- Fatigue
- Weather and road conditions

To mitigate these hazards, observe the following procedures and practices regarding motor vehicle operation:

- Wear a seat belt at all times and make sure that clothing will not interfere with driving.
- Inspect fluid levels and air pressure in tires, adjust mirrors and seat positions appropriately, watch the fuel level, and fill up when the fuel level is low.
- Plan your travel route and check maps for directions or discuss with colleagues.
- Clean windows and mirrors as needed throughout the trip.
- Wear sunglasses as needed.
- Follow a vehicle maintenance schedule to reduce the possibility of a breakdown while driving.
- Stop driving the vehicle, regardless of the speed (i.e., even 5 miles per hour [mph]) or location (i.e., a private road), when the potential of being distracted by conversation exists.
- Drivers are prohibited from using hand-held communication devices (e.g., cell phones) while operating any motor vehicle.
- Get adequate rest prior to driving.
- Periodically change your seat position, stretch, open the window, or turn on the radio to stay alert.
- Pull over and rest if you are experiencing drowsiness.
- Check road and weather conditions prior to driving.
- Be prepared to adjust your driving plans if conditions change.
- Travel in daylight hours, if possible.

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- Give yourself plenty of time to allow for slowdowns due to construction, accidents, or other unforeseen circumstances.
- Use lights at night and lights and wipers during inclement weather.

12.1.10 Vehicular Traffic

Observe the following procedures and practices regarding vehicular traffic:

- Wear a traffic safety vest when vehicle hazards exist.
- Use cones, flags, barricades, and caution tape to define the work area.
- Use a vehicle to block work area.
- Engage a police detail for high-traffic situations.
- Always use a spotter in tight or congested areas for material deliveries.
- As necessary, develop traffic control plans and train personnel as flaggers in accordance with the DOT MUTCD and/or local requirements.

See Section 7.4.2 for additional information regarding work in roadways.

12.1.11 Boating Operations

The following precautions shall be followed when conducting boating trailer and launch activities:

- Follow the trailer and boat manufacturers' instructions for securing the boat to the trailer.
- Follow the trailer manufacturer's instructions for securing the trailer to the towing vehicle.
- Prohibit workers from moving into trailer/vehicle pinch points without advising the vehicle operator.
- Use experienced operators when backing trailers on boat ramps.
- Wear proper work gloves when the possibility of pinching or other injury may be caused by moving or handling large or heavy objects.
- Maintain all equipment in a safe condition.
- Launch boats one at a time to avoid collisions.
- Use a spotter for vehicles backing boats to the launch area.

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- Understand and review hand signals.
- Wear boots with non-slip soles when launching boats.
- Wear USCG-approved PFDs when working on or near the water.
- Keep ropes and lines coiled and stowed to eliminate trip hazards.
- Maintain three-point contact on dock/pier or boat ladders.
- Ensure that drain plugs are in place, as present.

The following precautions shall be followed when conducting boating operations:

- Maintain a current boater's license(s) as required.
- Wear USCG-approved PFDs for work activities on or near the water.
- Obtain and review information regarding dams that may be present in work areas, particularly with regard to "no boating" zones and safety buoys, cables, and warning signage.
- Review man-overboard and emergency procedures
- Maintain boat anchorage devices commensurate with anticipate currents, distance to shore, and water depths.
- Provide a floating ring buoy with at least 90 feet of line in the immediate boat launch/landing areas.
- Step into the center of the boat.
- Keep your weight low when moving on the boat.
- Move slowly and deliberately.
- Steer directly across other boat wakes at a 90-degree angle to avoid capsizing.
- Steer the boat facing forward.
- Watch for floating objects in the water.
- Right-of-way is yielded to vessels on your boat's right, or starboard, and vessels with limited ability to maneuver such as any wind-propelled vessel.

The following precautions shall be followed when working on a boat:

- Observe proper lifting techniques.
- Obey lifting limits
- Use mechanical lifting equipment (i.e., pulleys or winches) to move large or awkward loads.

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- Wear USCG-approved PFDs for work activities on or near the water.

The safety-related items listed in Table 12-2 shall be available when conducting boating operations:

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Table 12-2
Safety Equipment Specific to In-water Work

Additional Safety Equipment for Sampling Vessel per U.S. Coast Guard (USCG) Requirements:	
• Proper vessel registration, numbering, and documentation (registered with state, certificate of vessel registration number displayed, and carrying a valid certificate of number) • USCG-approved PFDs, or life jackets, for every person on the sampling vessel (Type II PFD required, Type I PFD preferred as it will turn most unconscious wearers face up in the water) • Appropriate, non-expired, visual distress devices for day and night use from the following: - Three hand-held red flares (day and night), or - One hand-held red flare and two parachute flares (day and night), or - One hand-held orange smoke signal, two floating orange smoke signals (day), and one electric distress light (night only) • Alternate means of propulsion (oars or paddles) • Dewatering device (pump or bailer) • Properly maintained and inspected USCG-approved fire extinguishers (no fixed system = (2) B-1 or (1) B-2 type extinguishers; fixed system = (1) B-1 type extinguisher) • Proper ventilation of gasoline-powered vessels • Sound-producing device (whistle, bell, or horn) • VHF 2-way radio • Proper navigational light display • Throwable life ring with attached line (any vessel larger than 16 feet is required to carry one Type IV [throwable] PFD)	
Additional USCG-recommended Equipment Includes:	
• Extra visual distress signals • Primary and spare anchor • Heaving line • Fenders • First aid kit • Flashlight • Mirror • Searchlight • Sunburn lotion • Tool kit • Spare fuel	• Boat hook • Spare propeller • Mooring line • Food and water • Binoculars • Spare batteries • Sunglasses • Marine hardware • Extra clothing • Spare parts • Pertinent navigational chart(s) and compass

12.1.12 Working Over or Near Water

12.1.12.1 Personal Flotation Devices

PFDs are not required where employees are continuously protected from the hazard of drowning by railings, nets, safety belts, or other applicable provisions.

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Type III, Type V, or better USCG-approved International Orange PFD shall be provided and properly worn by all personnel in the following circumstances:

1. On floating pipelines, pontoons, rafts, or stages.
2. On structures extending over or next to the water, except where guard rails or safety nets are provided for employees.
3. Working alone at night where there are drowning hazards, regardless of other safeguards provided.
4. In skiffs, small boats, or launches, unless in an enclosed cabin or cockpit.
5. Whenever there is a drowning hazard.

The following precautions shall be followed when using PFDs:

- Prior to and after each use, the buoyant work vests or life preservers shall be inspected for defects that would alter their strength or buoyancy. Defective devices or devices with less than 13 pounds buoyancy shall be removed from service.
- All PFDs shall be equipped with reflective tape as specified in 46 CFR 25.25-15.
- Thirty-inch USCG-approved ring buoys with at least 150 feet of 600-pound capacity line shall be provided and readily available for emergency rescue operations. The distance between ring buoys shall not exceed 200 feet.
- PFD lights conforming to 46 CFR 161.012 shall be required whenever there is a potential need for life rings to be used after dark. On shore installations, at least one life ring, and every third one thereafter, shall have a PFD light attached. PFD lights on life rings are required only in locations where adequate general lighting (e.g., floodlights or light stanchions) is not provided.

12.1.12.2 Cold Water Work

When the combined air and water temperature is below 50° F, field personnel working on or near water shall wear either a float coat and bib-overalls (e.g., a full two-piece "Mustang" survival suit or similar), or a one-piece survival suit. Suits or float coats shall be USCG-approved. If extremely cold or severe weather conditions are forecast, work activities should be postponed. Work activities will be continually reviewed and adjustments made if wearing a survival suit during work activities potentially poses a hazard due to warm air

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temperatures, or limited mobility or agility. In addition, proximity of water work to shore and scope/duration/timing of work activities will be considered when stipulating the above requirement. Overall, if water craft will be used during work, or work will be conducted near water, it is imperative that site specific conditions are considered and evaluated so that proper safeguards and procedures are in place prior to beginning work.

In addition to considering the use of apparel appropriate for anticipated air, weather, and water conditions, field teams shall identify any procedures necessary for cold-water "man-overboard" scenarios. These procedures should be identified in the site-specific HASP, described in the JSA used for boating activities and, if prudent, practiced before work.

12.1.13 Noise

Excessive noise is hazardous not only because of its potential to damage hearing, but also because of its potential to disrupt communications and instructions. The following procedures and practices shall be followed to prevent noise-related hazards:

- All employees will have access to disposable ear plugs with a Noise Reduction Rating of not less than 30.
- Ear plugs must be worn in any environment where workers must raise their voices to be heard while standing at a distance of 3 feet or less.
- Ear plugs must be worn by any personnel operating concrete cutting or sawing equipment.

Hearing protection is required for workers operating or working near noisy equipment or operations, where the noise level is greater than 85 A-weighted decibels (dbA) (TWA), as well as personnel working around heavy equipment. The FL will determine the need and appropriate testing procedures, (i.e., sound level meter and/or dosimeter) for noise measurement.

When needed, a sound level meter will be used to measure noise levels at selected locations in the work area and on the site perimeter. When used, noise monitoring equipment must be calibrated before and after each shift.

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If continuous noise levels are found to exceed 85 dbA at any location within the work area, warning signs will be posted. Workers and visitors will be notified that hearing protection is required. Appropriate hearing protection (i.e., ear plugs or ear muffs) will be worn whenever personnel or visitors are working in that location. A supply of ear plugs will be maintained on site.

Action levels in Table 12-3 will trigger the use of appropriate hearing protection (plugs or muffs). Hearing protection must be able to attenuate noise below 90 dbA (8-hour TWA). Each hearing protection or device has a Noise Reduction Rating (NRR) assigned by EPA. The calculation for a hearing protection device's effectiveness is:

$$\text{Noise reading dbA} - (\text{NRR} - 7\text{dB}) < 90 \text{ dbA}$$

Table 12-3
Noise Exposure Action Levels

Instrument	Measurement	Action
Type I or Type II Sound Level Meter or Dosimeter	> 80 dbA to 85 dbA	Hearing protection recommended. Limit work duration to 8-hour shifts.
	> 85 dbA to 90 dbA	Hearing protection required. Limit work duration to 8-hour shifts.
	> 90 dbA to 115 dbA	Hearing protection required. Investigate use of engineering controls. Limit work duration to 8-hour shifts.
	> 115 dbA	Stop work. Consult CHSM.

Dba = A-weighted decibel
CHSM = Corporate Health and Safety Manager

12.1.14 Lifting and Material Handling

Observe the following procedures and practices for lifting and material handling:

- Use leather gloves when handling metal, wire rope, sharp debris, or transporting materials (e.g., wood, piping, or drums).

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- The size, shape, and weight of the object to be lifted must first be considered. No individual employee is permitted to lift any object that weighs over 60 pounds. Multiple employees or mechanical lifting devices are required for objects over the 60-pound limit.
- Plan a lift before doing it. Bend at the knees and lift with the legs; keep the natural curves of the back; do not use back muscles.
- Check the planned route for clearance.
- Use the buddy system when lifting heavy or awkward objects.
- Do not twist your body while lifting.
- Know the capacity of any handling device (e.g., crane, forklift, chain fall, or come-along) that you intend to use.
- Use tag lines to control loads.
- Ensure that your body, material, tools, and equipment are safe from such unexpected movement as falling, slipping, rolling, tripping, bowing, or any other uncontrolled motion.
- Trucks (i.e., flat beds) hauling equipment or materials must not be moved once rigging has been released.
- Chock all material and equipment (e.g., pipe, drums, tanks, reels, trailers, and wagons) as necessary to prevent rolling.
- Tie down all light, large-surface-area material that might be moved by the wind.
- When working at heights, secure tools, equipment, and wrenches against falling.
- Do not store materials or tools on ducts, lighting fixtures, beam flanges, hung ceilings, or similar elevated locations.
- Fuel-powered tools used inside buildings or enclosures shall be vented and checked for excessive noise.

12.1.15 Fire Control

Observe the following fire control procedures and practices:

- Smoke only in designated areas.
- Keep flammable liquids in closed containers.
- Keep the work site clean; avoid accumulating combustible debris such as paper.

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- Obtain and follow property owner hot work safety procedures when welding or performing other activities requiring an open flame.
- Isolate flammable and combustible materials from ignition sources.
- Ensure fire safety integrity of equipment installations according to National Electrical Code (NEC) specifications.

12.1.16 Static Electricity and Transfer of Flammable Liquids

Observe the following procedures and practices regarding static electricity when transferring flammable liquids:

- Electrically bond and ground pumps, transfer vessels, tanks, drums, bailers, and probes when moving flammable liquids.
- Electrically bond and ground vacuum trucks and the tanks they are emptying.
- Do not splash fill containers with flammable liquids.
- Pour flammable liquids slowly and carefully.
- Two fire extinguishers (2A20:BC) must be available, charged, inspected, and readily accessible.

12.1.17 Cleaning Equipment

Observe the following procedures and practices when cleaning equipment:

- Wear appropriate PPE to avoid skin and eye contact with isopropyl alcohol, Alconox®, or other cleaning materials.
- Stand upwind to minimize any potential inhalation exposure.
- Dispose of spent cleaning solutions and rinses accordingly.

12.2 Environmental Hazards and Controls

12.2.1 Heat Stress

Observe the following general procedures and practices regarding heat stress:

- Increase the number of rest breaks and/or rotate workers in shorter work shifts.
- Watch for signs and symptoms of heat stress and fatigue (see Section 12.2.1.1).
- During hot months, plan work for early morning or evening.
- Use ice vests when necessary.

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- Rest in cool, dry areas.

12.2.1.1 Signs, Symptoms, and Treatment

Adverse climatic conditions are important considerations in planning and conducting site operations. High ambient temperature can result in health effects ranging from transient heat fatigue, physical discomfort, reduced efficiency, personal illness, and increased accident probability to serious illness or death. Heat stress is of particular concern when chemical protective garments are worn since they prevent evaporative body cooling. Wearing PPE places employees at considerable risk of developing heat stress.

Heat stress is caused by a number of interacting factors, including environmental conditions, clothing, workload, and the individual characteristics of the worker. Because heat stress is probably one of the most common (and potentially serious) illnesses, regular monitoring and other preventive precautions are vital.

Heat Rash. Heat rash can be caused by continuous exposure to hot and humid air and skin abrasion from sweat-soaked clothing, rubber boots, or impermeable waders. The condition is characterized by a localized red skin rash and reduced sweating. Heat rash reduces the ability to tolerate heat. To treat, keep skin hygienically clean and allow it to dry thoroughly after using chemical protective clothing. Take measures to prevent heat rash by changing clothes often to maximize use of dry garments, or taking frequent breaks to allow doffing of equipment and drying of skin.

Heat Cramps. Heat cramps are caused by profuse perspiration with inadequate electrolytic fluid replacement. This often robs the larger muscle groups (stomach and quadriceps) of blood, which can cause painful muscle spasms and pain in the extremities and abdomen. To treat, remove the employee to a cool place and give sips of water or an electrolytic drink. Watch for signs of heat exhaustion or heat stroke.

Heat Exhaustion. Heat exhaustion is a mild form of shock caused by increased stress on various organs to meet increased demand to cool the body. Onset is gradual and symptoms should subside within 1 hour. Symptoms include a weak pulse; shallow breathing; pale, cool,

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moist skin; profuse sweating; dizziness; and fatigue. To treat, remove the employee to a cool place and remove as much clothing as possible. Give sips of water or electrolytic solution and fan the person continuously to remove heat by convection. Do not allow the affected person to become chilled. Treat for shock if necessary.

Heat Stroke. Heat stroke is the most severe form of heat stress; the body must be cooled immediately to prevent severe injury and/or death. ***This is a medical emergency!*** Symptoms include red, hot, dry skin; a body temperature of 105° F or higher; no perspiration; nausea; dizziness and confusion; and a strong, rapid pulse. Since heat stroke is a true medical emergency, transport the patient to a medical facility immediately. Prior to transport, remove as much clothing as possible and wrap the patient in a sheet soaked with water. Fan the patient vigorously while transporting to help reduce body temperature. If available, apply cold packs under the arms, around the neck, or any other place where they can cool large surface blood vessels. If transportation to a medical facility is delayed, reduce body temperature by immersing the patient in a cool-water bath (however, be careful not to over-chill the patient once body temperature is reduced below 102° F). If this is not possible, keep the patient wrapped in a sheet and continuously douse with water and fan.

12.2.1.2 Prevention

The implementation of preventative measures is the most effective way to limit the effects of heat-related illnesses. During periods of high heat, adequate liquids must be provided to replace lost body fluids. Replacement fluids can be a 0.1 percent saltwater solution, a commercial mix such as Gatorade, or a combination of these with fresh water. The replacement fluid temperature should be kept cool, 50° F to 60° F, and should be placed close to the work area. Employees must be encouraged to drink more than the amount required to satisfy thirst. Employees should also be encouraged to salt their foods more heavily during hot times of the year.

Cooling devices such as vortex tubes or cooling vests can be worn beneath impermeable clothing. If cooling devices are worn, only physiological monitoring will be used to determine work activity.

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All workers are to rest when any symptoms of heat stress are noticed. Rest breaks are to be taken in a cool, shaded rest area. Employees shall remove chemical protective garments during rest periods and will not be assigned other tasks.

All employees shall be informed of the importance of adequate rest and proper diet, including the harmful effects of excessive alcohol and caffeine consumption.

12.2.1.3 Monitoring

Heat stress monitoring should be performed when employees are working in environments exceeding 90° F ambient air temperature. If employees are wearing impermeable clothing, this monitoring should begin at 77° F. There are two general types of monitoring that the health and safety representative can designate to be used: wet bulb globe temperature (WBGT), and physiological. The Heat Stress Monitoring Record form (see Attachment 1) will be used to record the results of heat stress monitoring.

Note that some states such as Washington and California have specific regulatory standards for protection of employees from heat stress-related injuries.

Wet Bulb Globe Temperature (WBGT). The WBGT index is the simplest and most suitable technique to measure the environmental factors that most nearly correlate with core body temperature and other physiological responses to heat. When WBGT exceeds 25 °C (77° F), the work regiment in Table 12-4 should be followed.

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Table 12-4
Permissible Heat Exposure Threshold Limit Values

Work/Rest Regimen	Workload		
	Light	Moderate	Heavy
Continuous work	86° F (30.0° C)	80° F (26.7° C)	77° F (25.0° C)
75% work, 25% rest each hour	87° F (30.6° C)	82° F (28.0° C)	78° F (25.9° C)
50% work, 50% rest, each hour	89° F (31.4° C)	85° F (29.4° C)	82° F (27.9° C)
25% work, 75% rest, each hour	90° F (32.2° C)	88° F (31.1° C)	86° F (30.0° C)

Notes:
° C = degrees Celsius
° F = degrees Fahrenheit
These TLVs are based on the assumption that nearly all acclimated, fully-clothed workers with adequate water and salt intake should be able to function effectively under the given working conditions without exceeding a deep body temperature of 100.4° F (38° C).
(From OSHA Technical Manual, Section III: Chapter 4 - Heat Stress)

The TLVs denoted in Table 12-4 apply to physically fit and acclimatized individuals wearing light, summer clothing. If heavier clothing that impedes sweat or has a higher insulation value is required, the permissible heat exposure TLVs should be adjusted based on the WBGT Correction Factors in Table 12-5.

Table 12-5
WBGT Correction Factors

Clothing Type	WBGT Correction
Summer lightweight working clothing	32° F (0° C)
Cotton coveralls	28° F (-2° C)
Winter work clothing	25° F (-4° C)
Water barrier, permeable	86° F (-6° C)
Fully encapsulating	14° F (-10° C)

Physiological. Physiological monitoring can be used in lieu of, or in addition to, WBGT. This monitoring can be self-performed once the health and safety representative demonstrates appropriate techniques to affected employees. Since individuals vary in their

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susceptibility to heat, this type of monitoring has its advantages. The two parameters that are to be monitored at the beginning of each rest period are:

- **Heart Rate** – The maximum heart rate (MHR) is the amount of work (beats) per minute a healthy person's heart can be expected to safely deliver. Each individual will count his/her radial (wrist) pulse for 1 minute as early as possible during each rest period. If the heart rate of any individual exceeds 75 percent of their calculated MHR (MHR = 200 - age) at the beginning of the rest period, then the work cycle will be decreased by one-third. The rest period will remain the same. An individual is not permitted to return to work until his/her sustained heart rate is below 75 percent of their calculated MHR.
- **Temperature** – Each individual will measure his/her temperature with a thermometer for 1 minute as early as possible in the first rest period. If the temperature exceeds 99.6° F at the beginning of the rest period, then the work cycle will be decreased by one-third. The rest period will remain the same. An individual is not permitted to return to work if his/her temperature exceeds 100.4° F.

12.2.1.4 Training

Employees potentially exposed to heat stress conditions will be instructed on the contents of this procedure. This training can be conducted during daily tailgate safety meetings.

12.2.2 Cold Stress

Observe the following procedures and practices regarding cold stress:

- Take breaks in heated shelters when working in extremely cold temperatures.
- Upon entering the shelter, remove the outer layer of clothing and loosen other layers to promote evaporation of perspiration.
- Drink warm liquids to reduce the susceptibility to cold stress.
- Be aware of cold stress symptoms, including shivering, numbness in the extremities, and sluggishness.
- Provide adequate insulating dry clothing to maintain warmth if work is performed in air temperature below 40° F. Wind chill cooling rates and the cooling power of air

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are critical factors. The higher the wind speed and the lower the temperature in the work area, the greater the insulation value of the protective clothing required.

- If the air temperature is 32° F or less, hands should be protected.
- If only light work is involved and if the clothing on the worker may become wet on the job site, the outer layer of the clothing in use should be impermeable to water. With more severe work under such conditions, the outer layer should be water repellent, and the outer wear should be changed as it becomes wetted. The outer garments should include provisions for easy ventilation in order to prevent wetting of the inner layer by sweat.
- If available clothing does not give adequate protection to prevent cold injury, work should be modified or suspended until adequate clothing is made available, or until weather conditions improve.
- Implement a buddy system in which workers are responsible for observing fellow workers for early signs and symptoms of cold stress.

12.2.2.1 Signs, Symptoms, and Treatment

Cold stress can range from frostbite to hypothermia. The signs and symptoms of cold stress are listed below. The appropriate guidelines should be followed if any personnel exhibit these symptoms:

Frostbite. Frostbite is characterized by pain in the extremities and loss of manual dexterity. "Frostnip," or reddening of the tissue, is accompanied by a tingling or loss of sensation in the extremities and continuous shivering.

Hypothermia. Hypothermia is characterized by pain in the extremities and loss of manual dexterity, with severe, uncontrollable shivering, and an inability to maintain the level of activity. Symptoms include excessive fatigue, drowsiness, irritability, or euphoria. Severe hypothermia includes clouded consciousness, low blood pressure, pupil dilation, cessation of shivering, unconsciousness, and possible death.

Remove the patient to a warm, dry place. If the patient's clothing is wet, remove it and replace it with dry clothing. Keep the patient warm. Re-warming of the patient should be

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gradual to avoid stroke symptoms. Dehydration, or the loss of body fluids, may result in a cold injury due to a significant change in blood flow to the extremities. If the patient is conscious and alert, warm sweet liquids should be provided. Coffee and other caffeinated liquids should be avoided because of diuretic and circulatory effects. Extremities affected by frostbite should be gradually warmed up and returned to normal temperature. Moist compresses should be applied; begin with lukewarm compresses and slowly increase the temperature as changes in skin temperature are detected. Keep the patient warm and calm and remove them to a medical facility as soon as possible.

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13 MEDICAL SURVEILLANCE PROGRAM

This section describes the medical surveillance program that Anchor QEA field personnel must comply with when working on sites where there is a potential for exposure to hazardous wastes or other hazardous substances.

13.1 General Requirements

Anchor QEA employees shall be enrolled in a medical surveillance program in compliance with OSHA standards (29 CFR 1910.120[f]) under the following circumstances:

If they are involved with any of the following operations:

- *Cleanup operations* required by a governmental body, whether federal, state, local, or other involving hazardous substances that are conducted at uncontrolled hazardous waste sites (including, but not limited to, the EPA's National Priority List [NPL] sites, state priority list sites, sites recommended for the EPA NPL, and initial investigation of government-identified sites that are conducted before the presence or absence of hazardous substances has been ascertained).
- *Corrective actions* involving cleanup operations at sites covered by the Resource Conservation and Recovery Act of 1976 (RCRA) as amended (42 U.S.C. 6901 et seq)
- *Voluntary cleanup operations* at sites recognized by federal, state, local, or other governmental bodies as uncontrolled hazardous waste sites.
- *Operations involving hazardous wastes* that are conducted at treatment, storage, and disposal (TSD) facilities regulated by 40 CFR Parts 264 and 265 pursuant to RCRA or by agencies under agreement with the EPA to implement RCRA regulations.
- *Emergency response operations* for releases of, or substantial threats of releases of, hazardous substances without regard to the location of the hazard.

And, if the employee(s) meets the following criteria:

- Are or may be exposed to hazardous substances or health hazards at or above the established PEL, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more per year.

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In addition, employees are required to be enrolled in the medical surveillance program if they meet any of the following conditions:

- Wear a respirator for 30 days or more per year
- Are injured, become ill, or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operations
- Are members of a Hazardous Materials (HAZMAT) team

Anchor QEA employees required to be enrolled in a medical surveillance program under 29 CFR 1910.120(f) shall have medical examinations and consultations made available to them by Anchor QEA on the following schedule:

- Prior to assignment
- At least once every 12 months unless the attending physician believes a longer interval (not greater than biennially) is appropriate
- At termination of employment or reassignment to an area where the employee would not be covered if the employee has not had an examination within the last 6 months
- As soon as possible upon notification that the employee has developed signs or symptoms indicating possible overexposure to hazardous substances or health hazards, or that the employee has been injured or exposed above the PEL or published exposure levels in an emergency situation
- At more frequent times, if the examining physician determines that an increased frequency of examination is medically necessary

The content of medical examinations or consultations made available to employees shall be determined by the attending physician but shall include, at a minimum, a medical and work history with special emphasis on symptoms related to the handling of hazardous substances and health hazards, and to fitness for duty including the ability to wear any required PPE under conditions (e.g., temperature extremes) that may be expected at the work site.

The attending physician shall provide Anchor QEA with a written opinion for each examined employee that contains the following information:

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- Whether the employee has any detected medical conditions that would place the employee at an increased risk of impairment of the employee's health from hazardous waste operations work, emergency response, or respirator use
- Any recommended limitations on the employee's assigned work
- A statement that the employee has been informed of the results of the medical examination and any medical conditions that require further examination or treatment

The written opinion obtained by Anchor QEA shall not reveal specific findings or diagnoses unrelated to occupational exposures. Medical surveillance and other employee-related medical records shall be retained for at least the duration of employment plus 30 years.

13.2 Crew Self-Monitoring

All personnel will be instructed to look for and inform each other of any deleterious changes in their physical or mental condition during the performance of all field activities. Examples of such changes are as follows:

- Headaches
- Dizziness
- Nausea
- Blurred vision
- Cramps
- Irritation of eyes, skin, or respiratory system
- Changes in complexion or skin color
- Changes in apparent motor coordination
- Increased frequency of minor mistakes
- Excessive salivation or changes in papillary response
- Changes in speech ability or speech pattern
- Symptoms of heat stress or heat exhaustion
- Symptoms of hypothermia

If any of these conditions develop, the affected person will be moved from the immediate work location and evaluated. If further assistance is needed, personnel at the local hospital

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will be notified, and an ambulance will be summoned if the condition is thought to be serious. If the condition is the result of sample collection or processing activities, procedures and/or PPE will be modified to address the problem.

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ATTACHMENT 1
HEALTH AND SAFETY LOGS AND FORMS

ANCHOR QEA

DATE: _____

PROJECT NAME: _____

PROJECT NO: _____

DAILY SAFETY BRIEFING

PERSON CONDUCTING MEETING: _____

HEALTH & SAFETY OFFICER: _____

PROJECT MANAGER: _____

TOPICS COVERED:

- ☐ Emergency Procedures and Evacuation Route
- ☐ Directions to Hospital
- ☐ HASP Review and Location
- ☐ Safety Equipment Location
- ☐ Proper Safety Equipment Use
- ☐ Employee Right-to-Know/MSDS Location
- ☐ Fire Extinguisher Location
- ☐ Eye Wash Station Location
- ☐ Buddy System
- ☐ Self and Coworker Monitoring
- ☐ Lines of Authority
- ☐ Communication
- ☐ Site Security
- ☐ Vessel Safety Protocols
- ☐ Work Zones
- ☐ Vehicle Safety and Driving/Road Conditions
- ☐ Equipment Safety and Operation
- ☐ Proper Use of PPE
- ☐ Decontamination Procedures
- ☐ Other:
- ☐ Lifting Techniques
- ☐ Slips, Trips, and Falls
- ☐ Hazard Exposure Routes
- ☐ Heat and Cold Stress
- ☐ Overhead and Underfoot Hazards
- ☐ Chemical Hazards
- ☐ Flammable Hazards
- ☐ Biological Hazards
- ☐ Eating/Drinking/Smoking

WEATHER CONDITIONS: _____

DAILY WORK SCOPE: _____

SITE-SPECIFIC HAZARDS: _____

SAFETY COMMENTS: _____

ATTENDEES

PRINTED NAME	SIGNATURE

ANCHOR QEA

DATE: _____

PROJECT NAME: _____

PROJECT NO: _____

MODIFICATION TO HEALTH AND SAFETY PLAN

MODIFICATION: _____

_____

_____

_____

_____

REASON FOR MODIFICATION: _____

_____

_____

_____

_____

_____

_____

SITE PERSONNEL BRIEFED

NAME: _____ **DATE:** _____

NAME: _____ **DATE:** _____

NAME: _____ **DATE:** _____

NAME: _____ **DATE:** _____

NAME: _____ **DATE:** _____

NAME: _____ **DATE:** _____

NAME: _____ **DATE:** _____

NAME: _____ **DATE:** _____

NAME: _____ **DATE:** _____

NAME: _____ **DATE:** _____

NAME: _____ **DATE:** _____

APPROVALS

FIELD LEAD: _____ _____ _____
Printed Name Signature Date

PROJECT MANAGER: _____ _____ _____
Printed Name Signature Date

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ANCHOR QEA

DATE: _____

PROJECT NAME: _____

PROJECT NUMBER: _____

LOCATION: _____

HEAT STRESS MONITORING RECORD

Employee Name	Monitoring Results												
	Initial Reading Time:	First Work Period Time:		Second Work Period Time:		Third Work Period Time:		Fourth Work Period Time:		Fifth Work Period Time:		Sixth Work Period Time:	
	WBGT (°F):	WBGT (°F):		WBGT (°F):		WBGT (°F):		WBGT (°F):		WBGT (°F):		WBGT (°F):	
	Air Temp (°F):	Air Temp (°F):		Air Temp (°F):		Air Temp (°F):		Air Temp (°F):		Air Temp (°F):		Air Temp (°F):	
	Initial Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:
	Initial H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:
	Initial Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:
	Initial H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:
	Initial Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:
	Initial H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:
	Initial Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:
	Initial H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:
	Initial Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:
	Initial H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:

Notes:

Completed by:

Printed Name _____ Signature _____ Date _____

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UTILITY CONTACT PREVENTION CHECKLIST

NOTE: Utility mark-out requirements vary from state to state; consult state authorities before work.

Purpose: This form is intended to help the Field Lead confirm that underground or overhead utilities are identified to the extent practicable and consistent with applicable regulations prior to site work.

PROJECT NAME/NO: _____ **DATE:** _____

FIELD LEAD: _____ **STATE:** _____

PROJECT MANAGER: _____ **HEALTH & SAFETY OFFICER:** _____

EMERGENCY CONTACT INFORMATION FOR ONE-CALL: _____

DURATION/SUMMARY OF WORK TO BE PERFORMED: _____

_____

_____

Consideration	Check		Explanation	Initial
Has the state one-call been contacted?	☐ Yes	☐ No		
Has the property owner or client been contacted for local knowledge of utilities, as applicable?	☐ Yes	☐ No		
Are any as-built drawings available? If so, do they show any utilities?	☐ Yes	☐ No		
Has a visual inspection of the work area(s) been completed?	☐ Yes	☐ No		
Has a private locating service been contacted?	☐ Yes	☐ No		
Were any utilities identified and marked out through private locating service? If so, duplicate mark outs on site drawings.	☐ Yes	☐ No		
Are there any fiber optic cables, fuel lines, or high pressure lines within 50 feet of hole locations?	☐ Yes	☐ No		
If fiber optic cables, fuel lines, or high pressure lines are within 50 feet has an agreement with the utility owner been established, if applicable?	☐ Yes	☐ No		
Can a test borehole be advanced by hand digging, probing, post hole digging, and/or air knifed to 5 feet below ground surface (bgs)?	☐ Yes	☐ No		
If hand digging, probing, post hole digging, and or air knifing to 5 feet bgs is not possible, can a non-invasive geophysical investigation be conducted? If not, why?	☐ Yes	☐ No		
Other considerations:				

NOTE: Please fill in second page and attach additional reports, drawings, or other information as necessary.

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UTILITY CONTACT PREVENTION CHECKLIST

NOTE: Utility mark-out requirements vary from state to state; consult state authorities before work.

CONFIRMATION NUMBER: _____

CONTACT NAME: _____ **ORGANIZATION:** _____

CONTACT DATE: _____ **CONTACT TIME:** _____

RESPONSE: _____

_____

_____

_____

_____

_____

Completed by:

Printed Name	Signature	Date

Contractor:

Printed Name	Signature	Date

ATTACHMENT 2
JOB SAFETY ANALYSIS (JSA) DOCUMENTS

Job Safety Analysis

Jorgensen Forge Early Action Area

JSA00X

Project Name & Number:	**JSA No.**	**Date:**	**New:**
Location:	**Contractor:**	**Analysis by:**	**Date:**
Required Personal Protective Equipment:		**Revised by:**	**Revised:**
Work Operation:	**Competent Person:**	**Reviewed by:**	**Date:**
		Approved by:	**Date:**

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements

Training Requirements:

All personnel working on hazardous waste sites must receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour and annual 8-hour refresher training. All boat operators must have successfully completed the boating license consistent with Washington requirements.

All assigned employees are required to familiarize themselves with the contents of this JSA before starting a work activity and review it with their Supervisor during their Daily Safety Meeting.

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ATTACHMENT 3
MATERIAL SAFETY DATA SHEETS (MSDS)

Material Safety Data Sheet

Version 4.4
Revision Date 10/28/2011
Print Date 11/28/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Benzo[*a*]pyrene
Product Number	:	B1760
Brand	:	Sigma
Supplier	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone # (For both supplier and manufacturer)	:	(314) 776-6555
Preparation Information	:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Carcinogen, Respiratory sensitiser, Teratogen, Reproductive hazard, Mutagen

Target Organs

Lungs, Skin

GHS Classification
Skin irritation (Category 3)
Respiratory sensitization (Category 1)
Germ cell mutagenicity (Category 1B)
Carcinogenicity (Category 1B)
Reproductive toxicity (Category 1B)
Acute aquatic toxicity (Category 1)
Chronic aquatic toxicity (Category 1)

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H316	Causes mild skin irritation.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H340	May cause genetic defects.
H350	May cause cancer.
H360	May damage fertility or the unborn child.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P273	Avoid release to the environment.

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P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P501	Dispose of contents/ container to an approved waste disposal plant.

HMIS Classification

Health hazard:	3
Chronic Health Hazard:	*
Flammability:	0
Physical hazards:	0

NFPA Rating

Health hazard:	3
Fire:	0
Reactivity Hazard:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms	:	3,4-Benzpyrene 3,4-Benzopyrene Benzo[def]chrysene
Formula	:	$C_{20}H_{12}$
Molecular Weight	:	252.31 g/mol

Component		Concentration
Benzo[a]pyrene		
CAS-No.	50-32-8	-
EC-No.	200-028-5	
Index-No.	601-032-00-3	

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Conditions of flammability
Not flammable or combustible.

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

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Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Basis
Remarks	Cancer Substances for which there is a Biological Exposure Index or Indices (see BEI® section), see BEI® for Polycyclic Aromatic Hydrocarbons (PAHs) Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen: Human data are accepted as adequate in quality but are conflicting or insufficient to classify the agent as a confirmed human carcinogen; OR, the agent is carcinogenic in experimental animals at dose(s), by route(s) of exposure, at site(s), of histologic type(s), or by mechanism(s) considered relevant to worker exposure. The A2 is used primarily when there is limited evidence of carcinogenicity in humans and sufficient evidence of carcinogenicity in experimental animals with relevance to humans.			
Benzo[a]pyrene	50-32-8	TWA	0.2 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.2 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	0.2 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	0.2 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

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Eye protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	solid
Colour	no data available

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: 177 - 180 °C (351 - 356 °F) - lit.
Boiling point	495 °C (923 °F) - lit.
Flash point	no data available
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	1.35 g/cm3
Water solubility	no data available
Partition coefficient: n-octanol/water	log Pow: 5.97
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents

EMJ015494

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
no data available

Inhalation LC50
no data available

Dermal LD50
no data available

Other information on acute toxicity
LD50 Subcutaneous - rat - 50 mg/kg

Skin corrosion/irritation
Skin - mouse - Mild skin irritation

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
Chronic exposure may cause dermatitis.

May cause sensitization by inhalation.

Germ cell mutagenicity
May alter genetic material.
In vivo tests showed mutagenic effects

Carcinogenicity

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC:	1 - Group 1: Carcinogenic to humans (Benzo[a]pyrene)
NTP:	Reasonably anticipated to be human carcinogens. (Benzo[a]pyrene)
	Reasonably anticipated to be a human carcinogen (Benzo[a]pyrene)

Reproductive toxicity

May cause reproductive disorders.

Teratogenicity

May cause congenital malformation in the fetus.

Presumed human reproductive toxicant

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.

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Eyes May cause eye irritation.

Signs and Symptoms of Exposure
burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting

Synergistic effects
no data available

Additional Information
RTECS: DJ3675000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to daphnia and other aquatic invertebrates.	EC50 - Daphnia magna (Water flea) - 0.25 mg/l - 48 h
Toxicity to algae	EC50 - Pseudokirchneriella subcapitata (green algae) - 0.02 mg/l - 72 h

Persistence and degradability
no data available

Bioaccumulative potential

Bioaccumulation	Lepomis macrochirus (Bluegill) - 48 h Bioconcentration factor (BCF): 3,208

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Benzo[a]pyrene)
Reportable Quantity (RQ): 1 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Benzo[a]pyrene)
Marine pollutant: No

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Benzo[a]pyrene)

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Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

OSHA Hazards
Carcinogen, Respiratory sensitiser, Teratogen, Reproductive hazard, Mutagen

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Benzo[a]pyrene	50-32-8	2007-03-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Benzo[a]pyrene	50-32-8	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Benzo[a]pyrene	50-32-8	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Benzo[a]pyrene	50-32-8	2007-03-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. Benzo[a]pyrene	50-32-8	1990-01-01

16. OTHER INFORMATION

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

EMJ015497

Anachemia
255 Norman.
Lachine (Montreal), Que
H8R 1A3

Material Safety Data Sheet

EMERGENCY NUMBERS:

(USA) CHEMTREC : 1(800) 424-9300 (24hrs)
(CAN) CANUTEC : 1(613) 996-6666 (24hrs)
(USA) Anachemia : 1(518) 297-4444
(CAN) Anachemia : 1(514) 489-5711

WHMIS	Protective Clothing	TDG Road/Rail
WHMIS CLASS: E D-1A D-2A		TDG CLASS: 8 PIN: UN2809 PG: III

Section I. Product Identification and Uses

Product name	**MERCURY**
Chemical formula	Hg
Synonyms	Quicksilver, AC-5666, AC-5666T, 55982, 56004
Supplier	Anachemia Canada. 255 Norman. Lachine (Montreal), Que H8R 1A3
Material uses	For laboratory use only.

CI#	Not available.
CAS#	7439-97-6
Code	AC-5666
Formula weight	200.59
Supersedes	

Section II. Ingredients

Name	CAS #	%	TLV
1) MERCURY	7439-97-6	100	Exposure limits: ACGIH (Metallic mercury (as Hg)) TWA 0.025 mg(Hg)/m3 (Skin)

Toxicity values of the hazardous ingredients

MERCURY:
LD50: Not available.
LC50: Not available.

Section III. Physical Data

Physical state and appearance / Odor	Silver metallic liquid. Odorless.
pH (1% soln/water)	Not available.
Odor threshold	Not applicable.
Percent volatile	Not available.
Freezing point	-38.89°C
Boiling point	356.9°C
Specific gravity	13.6 (Water = 1)
Vapor density	7 (Air = 1)
Vapor pressure	1 mm Hg @ 126°C
Water/oil dist. coeff.	Not applicable.
Evaporation rate	<<1
Solubility	Very slightly soluble in cold water.

Section IV. Fire and Explosion Data

Flash point	Not applicable.
Flammable limits	Not applicable.
Auto-ignition temperature	Not applicable.
Fire degradation products	Mercury. Oxides of mercury.
Fire extinguishing procedures	Use extinguishing media appropriate to surrounding fire conditions. Wear adequate personal protection to prevent contact with material or its combustion products. Self contained breathing apparatus with a full facepiece operated in a pressure demand or other positive pressure mode.
Fire and Explosion Hazards	The sensitivity to impact is not applicable. The sensitivity to static discharge is not applicable. Emits toxic fumes under fire conditions.

Section V. Toxicological Properties

Routes of entry	Inhalation and ingestion. Eye contact. Skin absorption.
Effects of Acute Exposure	May be fatal by ingestion, inhalation or skin absorption. Target organs: respiratory system, eyes, skin, kidney, central nervous system, reproductive system. 10 mg/m3 (MERCURY) is immediately dangerous to life or health.
Eye	Causes irritation or burns.
Skin	Causes skin irritation. May cause dermatitis. May cause allergic skin reaction. Liquid can be absorbed in toxic amounts through intact skin. See inhalation.
Inhalation	May cause respiratory tract inflammation and damage. Coughing, dyspnea, tachypnea, metallic taste, headache, nausea, vomiting, diarrhea, fever, bronchitis, irritability, lethargy, agitation, trembling, pneumonitis, emphysema, kidney damage, pulmonary edema. May cause nervous system disturbances. See chronic effects.
Ingestion	Burns in mouth, pharynx and gastrointestinal tract. May cause nausea, vomiting, abdominal pain, diarrhea, metallic taste, salivation, ulcers, hemorrhagic gastritis, and death. See inhalation.

Section V. Toxicological Properties

Effects of Chronic Overexposure	May cause sensitization by skin contact. May cause mercurialism: central nervous system effects, headache, weakness, anorexia, depression, loss of weight, salivation, fatigue, muscle tremors, metallic taste, skin rashes, gingivitis, stomatitis, coloration of the eye lids, photophobia, pyorrhea, blue line on gums, pain, nephritis, diarrhea, anxiety, insomnia, irritability, mental troubles, peripheral neuropathy, central nervous system, nerve, brain, liver and kidney (proteinuria, hypoproteinemia, edema) damage or failure. Neurotoxic effects (insomnia, irritability, loss of memory, depression). Passes through the placental barrier in animal. Teratogen. May cause reproductive effects based on studies in laboratory animals. Carcinogenic effects: Not available. Mutagenic effects: Not available. To the best of our knowledge, the chemical, physical, and toxicity of this substance has not been fully investigated.

Section VI. First Aid Measures

Eye contact	Immediately flush eyes with copious quantities of water for at least 15 minutes holding lids apart to ensure flushing of the entire surface. Seek immediate medical attention.
Skin contact	Immediately flush skin with plenty of water and soap for at least 15 minutes while removing contaminated clothing and shoes. Seek immediate medical attention. Discard contaminated clothing and shoes.
Inhalation	Remove patient to fresh air. Administer approved oxygen supply if breathing is difficult. Administer artificial respiration or CPR if breathing has ceased. Seek immediate medical attention.
Ingestion	If conscious, wash out mouth with water. Have conscious person drink several glasses of water to dilute. Induce vomiting. Seek immediate medical attention. Never give anything by mouth to an unconscious or convulsing person.

Section VII. Reactivity Data

Stability	Stable. Conditions to avoid: High temperatures, sparks, open flames and all other sources of ignition, contamination, air.
Hazardous decomp. products	Not available.
Incompatibility	Metals (calcium, lithium, sodium, potassium, rubidium, nickel, copper, iron, zinc, aluminum and thier alloys, etc..), acetylene, acetylenic compounds, ethylene, oxidizing agents, ammonia, mineral acids, halogens, boron diiodophosphide, nitric acid, sulfuric acid, 3-bromopropane, 3-bromopropyne, amines, perchlorates, tetracarbonylnickel, bromine, methylsilane, ethylene oxide, oxalic acid, peroxyformic acid, methyl azide, sodium carbide, nitromethane, alkalies, nitrates, chlorates, chlorine dioxide, azides, metal oxides and carbonyles.
Reaction Products	Corrosive to aluminum. Hazardous polymerization will not occur.

Section VIII. Preventive Measures

Protective Clothing in case of spill and leak Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves.

Spill and leak Evacuate the area. Absorb spilled mercury with specially designed mercury spill kits. Ventilate area and wash spill site after material pick up is complete. DO NOT empty into drains. DO NOT touch damaged container or spilled material.

Waste disposal Material in the elemental state should be recovered and either reused or recycled. According to all applicable regulations. Harmful to aquatic life at low concentrations. Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.

Storage and Handling Store in a cool place away from heated areas, sparks, and flame. Store in a well ventilated area. Store away from incompatible materials. Do not add any other material to the container. Do not wash down the drain. Do not breathe gas/fumes/vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. Keep away from direct sunlight or strong incandescent light. Keep container tightly closed and dry. Manipulate under an adequate fume hood. Empty containers may contain a hazardous residue. Handle and open container with care. Take off immediately all contaminated clothing. This product must be manipulated by qualified personnel. Do not get in eyes, on skin, or on clothing. Wash well after use. In accordance with good storage and handling practices. Do not allow smoking and food consumption while handling. In case of accident or if you feel unwell, seek medical advice immediately (show the label when possible.).

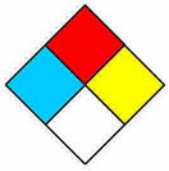
Section IX. Protective Measures

Protective clothing Splash goggles. Impervious rubber gloves, apron, coveralls, and/or other resistant protective clothing. Sufficient to protect skin. Have available and use as appropriate: face shields, rubber suits, aprons, and boots. A OSHA/MSHA jointly approved respirator is advised in the absence of proper environmental controls. If more than TLV, do not breathe vapor. Wear self-contained breathing apparatus. Do not wear contact lenses. Make eye bath and emergency shower available. Ensure that eyewash station and safety shower is proximal to the work-station location.

Engineering controls Use in a chemical fume hood to keep airborne levels below recommended exposure limits. Do not use in unventilated spaces.

Section X. Other Information

Special Precautions or comments Corrosive! Highly toxic! Teratogen! Neurotoxic! Nephrotoxic! Sensitizer! Readily absorbed through skin. Possible risks of irreversible effects. Danger of cumulative effects. Do not breathe vapor. Avoid all contact with the product. Avoid prolonged or repeated exposure. Use in a chemical fume hood. Handle and open container with care. Container should be opened only by a technically qualified person.
Synergistic materials: Not available.
RTECS NO: OV4550000 (Mercury).



NFPA

Prepared by MSDS Department/Département de F.S.. | Validated 21-Dec-2009

Telephone# (514) 489-5711

While the company believes the data set forth herein are accurate as of the date hereof, the company makes no warranty with respect thereto and expressly disclaims all liability for reliance thereon. Such data are offered solely for your consideration, investigation and verification.

Monsanto*

Material Safety Data

Emergency Phone No.
CHEMTREC
800-424-9300

POLYCHLORINATED BIPHENYLS (PCBs)

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: POLYCHLORINATED BIPHENYLS (PCBs)
Aroclor® Series 1016, 1221, 1232, 1242, 1248, 1254, 1260, 1262, 1268
Therminol® FR Series

Date : 9/2004

Chemical Family:	Chlorinated Hydrocarbons
Chemical Name:	Polychlorinated biphenyls
Synonyms:	PCBs, Chlorodiphenyls, Chlorinated biphenyls

Trade Names/Common Names:

PYRANOL® and INERTEEN® are trade names for commonly used dielectric fluids that may have contained varying amounts of PCBs as well as other components including chlorinated benzenes.

ASKAREL is the generic name for a broad class of fire resistant synthetic chlorinated hydrocarbons and mixtures used as dielectric fluids that commonly contained about 30 - 70% PCBs. Some ASKAREL fluids contained 99% or greater PCBs and some contained no PCBs.

PYDRAUL® was the trade name for hydraulic fluids that, prior to 1972, may have contained varying amounts of PCBs and other components including phosphate esters.

THERMINOL® FR-0, -1, -2, and -3 were the trade names for heat transfer fluids that, prior to 1972, contained PCBs. THERMINOL® fluids without the FR designation, including current THERMINOL® products, did not and do not contain PCBs.

The product names/trade names are representative of several commonly used Monsanto products (or products formulated with Monsanto products). Other trademarked PCB products were marketed by Monsanto and other manufacturers. PCBs were also manufactured and sold by several European and Asian companies. Contact the manufacturer of the trademarked product, if not in this listing, to determine if the formulation contained PCBs.

In 1972, Monsanto restricted sales of PCBs to applications involving only closed electrical systems, (transformers and capacitors). In 1977, all manufacturing and sales were voluntarily terminated. In 1979, EPA restricted the manufacture, processing, use, and distribution of PCBs to specifically exempted and authorized activities.

FOR CHEMICAL EMERGENCY, SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT
Call CHEMTREC - Day or Night - 800-424-9300 Toll free in the continental U.S., Hawaii, Puerto Rico, Canada, Alaska, or Virgin Islands. For calls originating elsewhere, call 202-483-7616 (collect calls accepted).

For additional nonemergency information, call 314-480-1677.

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemically, commercial PCBs are defined as a series of technical mixtures, consisting of many congeners, that vary from mobile, oily liquids to white crystalline solids and hard noncrystalline resins. Technical products vary in composition, in the degree of chlorination, and possibly according to batch.

The mixtures generally used contain an average of 3 atoms of chlorine per molecule (42% chlorine) to 5 atoms of chlorine per module (54% chlorine). They were used as components of dielectric fluids in transformers and capacitors. Prior to 1972, PCB applications included heat transfer media, hydraulic and other industrial fluids, plasticizers, carbonless copy paper, paints, inks, and adhesives.

Component	CAS No.
chlorinated biphenyl	1336-36-3
Aroclor 1016	12674-11-2
Aroclor 1221	11104-28-2
Aroclor 1232	11141-16-5
Aroclor 1242	53469-21-9
Aroclor 1248	12672-29-6
Aroclor 1254	11097-69-1
Aroclor 1260	11096-82-5
Aroclor 1262	37324-23-5
Aroclor 1268	11100-14-4

There are also CAS Numbers for individual PCB congeners and for mixtures of Aroclor® products.

PCBs are identified as hazardous chemicals under criteria of the OSHA Hazard Communication Standard (29 CFR Part 1910.1200). PCBs have been listed in the International Agency for Research on Cancer (IARC) Monographs (1987)-Group 2A and in the National Toxicology Program (NTP) Annual Report on Carcinogens (Tenth).

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Appearance and Odor: PCB mixtures range in form and color from clear to amber liquids to white crystalline solids. They have a mild, distinctive odor and are not volatile at room temperature. Refer to Section 9 for details.

WARNING!
CAUSES EYE IRRITATION
MAY CAUSE SKIN IRRITATION

PROCESSING AT ELEVATED TEMPERATURES MAY RELEASE VAPORS OR FUMES WHICH MAY CAUSE RESPIRATORY TRACT IRRITATION

POTENTIAL HEALTH EFFECTS

Likely Routes of Exposure: Skin contact and inhalation of heated vapors

Eye Contact: Causes moderate irritation based on worker experience.

Skin Contact: Prolonged or repeated contact may result in redness, dry skin and defatting based on human experience. A potential exists for developing chloracne. PCBs can be absorbed through intact skin.

Inhalation: Due to the low volatility of PCBs, exposure to this material in ambient conditions is not expected to produce adverse health effects. However, at elevated processing temperatures, PCBs may produce a vapor that may cause respiratory tract irritation if inhaled based on human experience.

Ingestion: No more than slightly toxic based on acute animal toxicity studies. Coughing, choking and shortness of breath may occur if liquid material is accidentally drawn into the lungs during swallowing or vomiting.

Other:

Numerous epidemiological studies of humans, both occupationally exposed and nonworker environmentally exposed populations, have not demonstrated any causal relationship between PCB exposure and chronic human illnesses such as cancer or neurological or cardiovascular effects. PCBs at high dosage can cause skin symptoms; however, these subside upon removal of the exposure source.

Refer to Section 11 for toxicological information.

4. FIRST AID MEASURES

IF IN EYES, immediately flush with plenty of water for at least 15 minutes. If easy to do, remove any contact lenses. Get medical attention. Remove material from skin and clothing.

IF ON SKIN, immediately flush the area with plenty of water. Wash skin gently with soap as soon as it is available. Get medical attention if irritation persists.

IF INHALED, remove person to fresh air. If breathing is difficult, get medical attention.

IF SWALLOWED, do NOT induce vomiting. Rinse mouth with water. Get medical attention. Contact a Poison Control Center. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON

NOTE TO PHYSICIANS: Hot PCBs may cause thermal burn. If electrical equipment arcs between conductors, PCBs or other chlorinated hydrocarbon dielectric fluids may decompose to produce hydrochloric acid (HCl), a respiratory irritant. If large amounts are swallowed, gastric lavage may be considered.

5. FIRE FIGHTING MEASURES

Flash Point: 284 degrees F (140 degrees C) or higher depending on the chlorination level of the Aroclor product

Fire Point. 349 degrees F (176 degrees C) or higher depending on the chlorination level of the Aroclor product

NOTE: Refer to Section 9 for individual flash points and fire points.

Extinguishing Media: Extinguish fire using agent suitable for surrounding fire. Use dry chemical, foam, carbon dioxide or water spray. Water may be ineffective. Use water spray to keep fire-exposed containers or transformers cool.

PCBs are fire-resistant compounds. They may decompose to form CO, C02, HCl, phenolics, aldehydes, and other toxic combustion products under severe conditions such as exposure to flame or hot surfaces.

Dielectric fluids having PCBs and chlorinated benzenes as components have been reported to produce polychlorinated dibenzo-p-dioxins (PCDDs) and furans (PCDFs) during fire situations involving electrical equipment. At temperatures in the range of 600-650 degrees C in the presence of excess oxygen, PCBs may form polychlorinated dibenzofurans (PCDFs). Laboratory studies under similar conditions have demonstrated that PCBs do not produce polychlorinated dibenzo-p-dioxins (PCDDs).

Federal regulations require all PCB transformers to be registered the U.S. Environmental Protection Agency.

If a PCB transformer is involved in a fire-related incident, the owner of the transformer may be required to report the incident. Consult and follow appropriate federal, state and local regulations.

Fire Fighting Equipment: Fire fighters and others exposed to products of combustion should wear self-contained breathing apparatus. Equipment should be thoroughly decontaminated after use.

6. ACCIDENTAL RELEASE MEASURES

Cleanup and disposal of liquid PCBs and other PCB items are strictly regulated by the federal government. The regulations are found at 40 CFR Part 761. Consult these regulations as well as applicable state and local regulations prior to any cleanup or disposal of PCBs, PCB items, or PCB contaminated items.

If PCBs leak or are spilled, the following steps should be taken immediately:

All nonessential personnel should leave the leak or spill area.

The area should be adequately ventilated to prevent the accumulation of vapors.

The spill/leak should be contained. Loss to sewer systems, navigable waterways, and streams should be prevented. Spills/leaks should be removed promptly by means of absorptive material, such as sawdust, vermiculite, dry sand, clay, dirt or other similar materials, or trapped and removed by pumping or other suitable means (traps, drip-pans, trays, etc.).

Personnel entering the spill or leak area should be furnished with appropriate personal protective equipment and clothing as needed. Refer to Section 8 for personal protection equipment and clothing.

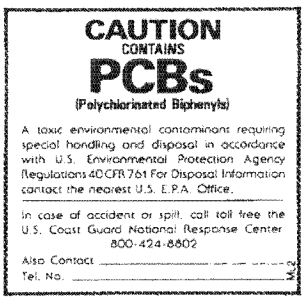
Personnel trained in emergency procedures and protected against attendant hazards should shut off sources of PCBs, clean up spills, control and repair leaks, and fight fires in PCB areas.

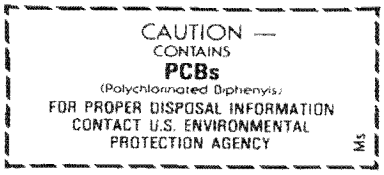
Refer to Section 13 for disposal information and Sections 14 and 15 for information regarding reportable quantity, and Section 7 for marking information.

7. HANDLING AND STORAGE

Care should be taken to prevent entry into the environment through spills, leakage, use vaporization, or disposal of liquid or containers. Avoid prolonged breathing of vapors or mists. Avoid contact with eyes or prolonged contact with skin. If skin contact occurs, remove by washing with soap and water. Following eye contact, flush with water. In case of spillage onto clothing, the clothing should be removed as soon as practical, skin washed, and clothing laundered. Comply with all federal, state, and local regulations.

Federal regulations under the Toxic Substances Control Act require PCBs, PCB items, storage areas, transformer vaults, and transport vehicles to be marked (check regulations, 40 CFR 761, for details).





Storage: The storage of PCB items or equipment (those containing 50 ppm or greater PCBS) and PCB waste is strictly regulated by 40 CFR Part 761. The storage time is limited, the storage area must meet physical requirements, and the area must be labeled.

Avoid contact with eyes.
Wash thoroughly after handling.
Avoid breathing processing fumes or vapors.
Process using adequate ventilation.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Eye Protection: Wear chemical splash goggles and have eye baths available where there is significant potential for eye contact.

Skin Protection: Wear appropriate protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine the appropriate type glove for a given application. Wear chemical goggles, face shield, and chemical resistant clothing such as a rubber apron when splashing is likely. Wash immediately if skin is contacted. Remove contaminated clothing promptly and launder before reuse. Clean protective equipment before reuse. Provide a safety shower at any location where skin contact can occur. Wash thoroughly after handling.

ATTENTION! Repeated or prolonged skin contact may cause chloracne in some people.

Respiratory Protection: Avoid breathing vapor, mist, or dust. Use NIOSH/MSHA approved equipment when airborne exposure limits are exceeded. Full facepiece equipment is recommended when airborne exposure limits are exceeded and, if used, replaces the need for face shield and/or chemical splash goggles. Consult respirator manufacturer to determine the type of equipment for a given application. The respirator use limitations specified by NIOSH/MSHA or the manufacturer must be observed. High airborne concentrations may require use of self-contained breathing apparatus or supplied air respirator. Respiratory protection programs must be in compliance with 29 CFR Part 1910.134.

ATTENTION! Repeated or prolonged inhalation may cause chloracne in some people.

Ventilation: Provide natural or mechanical ventilation to control exposure levels below airborne exposure limits (see below). If practical, use local mechanical exhaust ventilation at sources of vapor or mist, such as open process equipment.

Airborne Exposure Limits:

Product: Chlorodiphenyl (42% chlorine)

OSHA PEL: 1 mg/m^3 8-hour time-weighted average - Skin*
ACGIH TLV: 1 mg/m^3 8-hour time-weighted average - Skin*

Product: Chlorodiphenyl (54% chlorine)

OSHA PEL: 0.5 mg/m^3 8-hour time-weighted average - Skin*
ACGIH TLV: 0.5 mg/m^3 8-hour time-weighted average - Skin*

*For Skin notation see Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, 2003.

9. PHYSICAL AND CHEMICAL PROPERTIES

PROPERTIES OF SELECTED AROCLORS®

PROPERTY	1016	1221	1232	1242	1248	1254	1260
Color (APHA)	40	100	100	100	100	100	150
Physical state	mobile oil	mobile oil	mobile oil	mobile oil	mobile oil	viscous liquid	sticky resin
Stability	inert	inert	inert	inert	inert	inert	inert
Density (lb/gal 25 °C)	11.40	9.85	10.55	11.50	12.04	12.82	13.50
Specific gravity x/15.5°C	1.36-1.37 x-25°	1.18-1.19 x-25°	1.27-1.28 x-25°	1.30-1.39 x-25°	1.40-1.41 x-65°	1.49-1.50 x-65°	1.55-1.56 x-90°
Distillation range (°C)	323-356	275-320	290-325	325-366	340-375	365-390	385-420
Acidity mg KOH/g, maximum	.010	.014	.014	.015	.010	.010	.014
Fire point (°C)	none to boiling point	176	238	none to boiling point	none to boiling point	none to boiling point	none to boiling point
Flash point (°C)	170	141-150	152-154	176-180	193-196	none	none
Vapor pressure (mm Hg @ 100°F)	NA	NA	0.005	0.001	0.00037	0.00006	NA
Viscosity (Saybolt Univ. Sec. @ 100°F) (centistokes)	71-81 13-16	38-41 3.6-4.6	44-51 5.5-7.7	82-92 16-19	185-240 42-52	1800-2500 390-540	— —

NA-Not Available

NOTE: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

10. STABILITY AND REACTIVITY

Stability: PCBs are very stable, fire-resistant compounds.
Materials to Avoid: None
Hazardous Decomposition Products: PCBs may decompose to form CO, CO_2 HCl, phenolics, aldehydes, and other toxic combustion products under severe conditions such as exposure to flame or hot surface.
Hazardous Polymerization: Does not occur.

11. TOXICOLOGICAL INFORMATION

Data from laboratory studies conducted by Monsanto and from the available scientific literature are summarized below.
Single exposure (acute) studies indicate:
Oral - Slightly Toxic (Rat LD50 - 8.65 g/kg for 42% chlorinated; 11.9 g/kg for 54% chlorinated)

The liquid products and their vapors are moderately irritating to eye tissues. Animal experiments of varying duration and at different air concentrations show that for similar exposure conditions, the 54% chlorinated material produces more liver injury than the 42% chlorinated material.

There are literature reports that PCBs can impair reproductive functions in laboratory monkeys. Literature reports of earlier chronic feeding studies of laboratory rodents provided sufficient evidence that Aroclor 1260 could cause liver cancer when fed at high doses. Similar experiments with less chlorinated PCB products produced negative or equivocal results. A recent literature report of a chronic feeding study of Aroclor 1260, Aroclor 1254, Aroclor 1242, and Aroclor 1016 provided evidence that all four mixtures caused cancer in rodent livers.

The consistent finding in animal studies is that PCBs produce liver injury following prolonged and repeated exposure by any route, if the exposure is of sufficient degree and duration. Liver injury is produced first, and by exposures that are less than those reported to cause cancer in rodents. Therefore, exposure by all routes should be kept sufficiently low to prevent liver injury.

Numerous epidemiological studies of humans, both occupationally exposed and nonworker environmentally exposed populations, have not demonstrated any causal relationship between PCB exposure and chronic human illnesses such as cancer or neurological or cardiovascular effects. PCBs at high dosage can cause skin symptoms; however, these subside upon removal of the exposure source.

PCBs have been listed in the International Agency for Research on Cancer (IARC) Monographs (1987)-Group 2A and in the National Toxicology Program (NTP) Tenth Annual Report on Carcinogens.

12. ECOLOGICAL INFORMATION

Care should be taken to prevent entry of PCBs into the environment through spills, leakage, use, vaporization or disposal of liquid or solids. PCBs can accumulate in the environment and can adversely affect some animals and aquatic life. In general, PCBs have low solubility in water, are strongly bound to soils and sediments, and are slowly degraded by natural processes in the environment.

13. DISPOSAL CONSIDERATIONS

The disposal of PCB items or equipment (those containing 50 ppm or greater PCBs) and PCB wastes is strictly regulated by 40 CFR Part 761. For example, all wastes and residues containing PCBs (wiping cloths, absorbent material, used disposable protective gloves and clothing, etc.) should be collected, placed in proper containers, marked and disposed of in the manner prescribed by EPA regulations (40 CFR Part 761) and applicable state and local regulations.

14. TRANSPORT INFORMATION

The data provided in this section are for information only. Please apply the appropriate regulations to properly classify a shipment for transportation.

DOT Classification:	IF WEIGHT OF PCBs TO BE SHIPPED IS OVER ONE POUND, THE FOLLOWING CLASSIFICATION AND LABEL APPLY.	
DOT Label:	LIQUID:	Environmentally Hazardous Substance, liquid, n.o.s. (Contains PCB), 9, UN 3082, III
	SOLID:	Environmentally Hazardous Substance, solid, n.o.s. (Contains PCB), 9, UN 3077, III
DOT Label:	Class 9	
DOT Reportable Quantity:	One pound	
IMO Classification:	Polychlorinated Biphenyls, IMO Class 9, UN 2315, II IMO Page 9034, EMS 6.1-02	
IATA/ICAO Classification:	Polychlorinated Biphenyls, 9, UN2315,II	

15. REGULATORY INFORMATION

For regulatory purposes, under the Toxic Substances Control Act, the term "PCBs" refers to a chemical substance limited to the biphenyl molecule that has been chlorinated to varying degrees or any combination of substances which contain such a substance (40 CFR Part 761).

TSCA Inventory: not listed.

Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370): Immediate, Delayed.
SARA Section 313 Toxic Chemical(s): Listed-1993 (De Minimis concentration 0.1%.)

Reportable Quantity (RQ) under DOT (49 CFR), CERCLA Regulations and TSCA (40 CFR Part 761): 1 lb. (polychlorinated biphenyls) PCBs.

Release of more than 1 (one) pound of PCBs to the environment requires notification to the National Response Center (800-424-8802 or 202-426-2675).

Various state and local regulations may require immediate reporting of PCB spills and may also define spill cleanup levels. Consult your attorney or appropriate regulatory officials for information relating to spill reporting and spill cleanup.

16. OTHER INFORMATION

Reason for revision: Contact information change. Supersedes MSDS dated 7/99.

Therminol® is a registered trademark of Solutia Inc.
Aroclor® and Pydraul® were registered trademarks of Monsanto Company
Pyranol®is a registered trademark of General Electric Company
Inerteen® is a registered trademark of Westinghouse Electric Corporation

FOR ADDITIONAL NONEMERGENCY INFORMATION, CONTACT:

Robert G. Kaley, II, Ph.D.
200 S. Hanley Road
Suite 300
St. Louis, MO 63105
314-480-1677

* The former Monsanto Company, now known as Pharmacia Corporation, ceased manufacturing PCBs in 1977. This MSDS is provided as a convenience to former customers and users.

Although the information and recommendations set forth herein (hereinafter "Information") are presented in good faith and believed to be correct as of the date hereof, Pharmacia makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will Pharmacia be responsible for damages of any nature whatsoever resulting from the use of or reliance upon Information. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS.

APPENDIX L
COST ESTIMATE DETAILS

APPENDIX M
CULTURAL RESOURCES ASSESSMENT

APPENDIX M
CULTURAL RESOURCES ASSESSMENT
BASIS OF DESIGN REPORT
JORGENSEN FORGE EARLY ACTION AREA

Prepared for

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LIST OF ACRONYMS AND ABBREVIATIONS

Abbreviation	Definition
Action Memo	*Action Memorandum for a Non-Time-Critical Removal Action at the Jorgensen Forge Early Action Area of the Lower Duwamish Waterway Superfund Site in Seattle, Washington*
AOC	Administrative Order On Consent
APE	Area of Potential Effects
ARAR	applicable or relevant and appropriate requirement
BODR	Basis of Design Report
BP	before present
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CRA	Cultural Resources Assessment
cy	Cubic yards
EE/CA	Engineering Evaluation/Cost Analysis
EMJ	Earle M. Jorgensen Company
EPA	U.S. Environmental Protection Agency
Facility	Jorgensen Forge facility
fbs	feet below surface
Jorgensen Forge	Jorgensen Forge Corporation
Jorgensen Forge EAA	Jorgensen Forge Early Action Area
LDW	Lower Duwamish Waterway
Navy	U.S. Department of Navy
NRHP	National Register of Historic Places
NTCRA	non-time-critical removal action
PCB	polychlorinated biphenyl
RM	River Mile
RvAL	PCB removal action level
SHPO	State Historic Preservation Office
SOW	Statement of Work

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1 INTRODUCTION

This Cultural Resources Assessment (CRA) has been prepared on behalf of Earle M. Jorgensen Company (EMJ) and Jorgensen Forge Corporation (Jorgensen Forge; herein referred to collectively as the Owner) pursuant to the Administrative Settlement Agreement and Order on Consent for Removal Action Implementation (AOC; U.S. Environmental Protection Agency [EPA] Region X Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] Docket No. 10-2012-0032) and attached Statement of Work (SOW). This CRA is an appendix to the Basis of Design Report (BODR) Final Design submittal for the cleanup of contaminated sediments and associated bank soils in a portion of the Lower Duwamish Waterway (LDW) Superfund Site adjacent to the Jorgensen Forge facility (Facility) located in Tukwila, King County, Washington (see Figure 1; Jorgensen Forge Early Action Area [EAA]). The cleanup will be conducted as a non-time-critical removal action (NTCRA) in accordance with EPA's selected cleanup alternative documented in the *Action Memorandum for a Non-Time-Critical Removal Action at the Jorgensen Forge Early Action Area of the Lower Duwamish Waterway Superfund Site in Seattle, Washington* (Action Memo; EPA 2011) and detailed in the *Final Engineering Evaluation/Cost Analysis [EE/CA]– Jorgensen Forge Facility, 8531 East Marginal Way South, Seattle, Washington* (Anchor QEA 2011).

1.1 Project Description

The 1.6-acre Jorgensen Forge EAA is located in the LDW Superfund Site in Seattle, Washington at approximately River Mile (RM) 3.6 adjacent to a portion of the Jorgensen Forge facility located at 8531 East Marginal Way South (Figure 1). The removal action selected for the Jorgensen Forge EAA by EPA includes cleanup extending from the navigation channel to the top of the shoreline bank and abutting sheetpile and concrete panel walls. Under an AOC, EPA is requiring the Owner, to implement the sediment and bank cleanup due to elevated chemical concentrations (primarily polychlorinated biphenyls [PCBs]). Construction activities planned as part of the cleanup include removing approximately 10,800 cubic yards (cy) of material, placing approximately 7,900 cy of backfill and 7,600 cy of shoreline materials, reconfiguring the shoreline bank, and transport and off-site disposal of impacted sediments and soils.

The EPA-approved removal action in the EAA includes the removal of the complete lateral and vertical extents of sediments within the EAA containing chemical concentrations above the identified PCB removal action level (RvAL) followed by the placement of clean backfill, and reconfiguration and containment of the shoreline bank. EPA is requiring the in-water removal to be conducted using a barge-mounted precision excavator (hydraulic closing bucket where implementable). To the extent feasible, the bank removal and containment should be conducted in-the-dry, based on tidal conditions during the construction period. The removed sediment, soil, armor, and debris (including a few derelict pilings) will either be transported to a temporary offloading facility constructed on a portion of the Jorgensen Forge property or at a permitted off-site offloading facility on the LDW. The offloaded materials will then be transported and disposed of at an off-site non-hazardous Subtitle D commercial disposal facility.

1.2 Regulatory Context and Purpose

For this removal action, EPA must substantively comply with Section 106 and its implementing regulations at 36 CFR 800. CERCLA Section 121(e)(1) provides that no federal, state, or local permits are required for remedial activities conducted entirely on site. However, this does not remove the requirement to meet (or waive) the substantive provisions of permitting regulations that are applicable or relevant and appropriate requirements (ARARs). Section 106 is an ARAR for this removal action. Section 106 requires federal agencies to consider the effects of their undertakings on historic properties listed in (or eligible for listing in) the National Register of Historic Places (NRHP). Thirty-six CFR 800 describes a five-step process for implementing Section 106:

1. Consult with the State Historic Preservation Officer (SHPO), interested and affected Indian Tribes, interested parties, and the public;
2. Determine the undertaking's Area of Potential Effects (APE);
3. Determine whether potential historic properties are present in the APE;
4. Evaluate whether the properties are NRHP-eligible, and if so, whether the project will affect them; and
5. Mitigate adverse effects to NRHP-eligible historic properties.

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The purpose of this CRA is to assist EPA in complying with Section 106 and 36 CFR 800 by describing the APE, describing known and potential historic properties in the APE, and recommending NRHP eligibility and project effects.

1.3 Area of Potential Effects

The removal action does not include demolition or modification of existing structures, or changes to the character of the landscape. The pilings that will be removed are derelict and no longer form a standing structure. Therefore, there are no potential effects to the built environment. The APE is the area where direct and indirect effects to archaeological properties may occur as a result of ground disturbance (Figure 2).

Ground disturbance will occur during the removal of contaminated sediments in the LDW and adjacent shoreline bank. Removal will occur in the removal action boundary (RAB) shown on Figure 3. Depth of excavation is shown on Figures 4 and 5. Staging and stockpiling will occur on existing prepared surfaces.

1.4 Document Organization

This Cultural Resources Report has been organized into the following sections:

- Section 2 – Environmental and Cultural Context. This section describes the environmental setting and cultural history of the LDW in the vicinity of the removal action, as well as previous archaeological research.
- Section 3 – Methods and Results. This section describes how the removal action's potential to affect historic properties was assessed, and the results of the assessment.
- Section 4 – Recommendations. This section includes recommendations for EPA's Section 106 determinations.

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2 ENVIRONMENTAL AND CULTURAL CONTEXT

2.1 Environmental Context

The project vicinity is in the Puget Trough physiographic province, a valley system that extends from Puget Sound south through the Willamette Valley and that separates the Olympic Mountains from the Western Cascades (Franklin and Dyrness 1973). During the last glacial advance, the Vashon Stade of the Late Wisconsin glaciation, glaciers extended as far as Centralia, 85 miles south of Seattle. Glaciers began to recede about 15,000 years ago, leaving behind a rapidly changing landscape of proglacial lakes, meltwater streams, and other alluvial features. This process created the Vashon till, which is the thick layer of Pleistocene glacial outwash underlying Holocene sediments in the project vicinity. As the glaciers retreated, land formerly depressed by the weight of the ice began to rebound, a process of uplift that lasted until approximately 9,000 years ago (Dragovich et al. 1994).

The project area was deeply subtidal—part of an embayment that extended south as far as present-day Auburn—until the Duwamish River delta began to aggrade about 5,700 years ago after a large eruption of Mount Rainier. The eruption created the Osceola mudflow, which introduced massive amounts of sediment into the Duwamish River drainage and caused the river mouth to move northward as the river valley filled with sediment (Dragovich et al. 1994). The Duwamish River delta was near its historic location by 1,500 to 2,200 years ago, at which time, it would have been available for use as a gathering location for local Native American communities. An earthquake that occurred around 1,050 years ago further uplifted the lower Duwamish River area, raising the terraces adjacent to the river mouth (Updegrave 2007; Miss et al. 2008). The Duwamish River mouth at historic contact meandered through low-lying areas surrounded by higher terraces (Figure 6).

Native vegetation in the Puget Sound area consists of forests of the *Tsuga heterophylla* zone, which is characterized by western hemlock, western red cedar, and Douglas fir, with a dense shrub and herbaceous understory including sword fern, salal, Oregon grape, ocean spray, blackberry, red huckleberry, and red elderberry (Franklin and Dyrness 1973). After the Duwamish River attained its late precontact and historic location, the river mouth area would have been a productive salt marsh environment at the forest edge, attractive for resource procurement and settlement.

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2.2 Cultural Context

The Manis mastodon site on the Olympic Peninsula near Sequim, which has been radiocarbon dated to about 12,000 before present (BP; Gustafson and Manis 1984), may be the earliest evidence for prehistoric human occupation in Western Washington. There are few other sites that date before about 5000 BP. Numerous sites have been identified across the region dating to the period after 5000 BP, when larger populations began to organize in more complex ways to exploit a wide range of resources, including salmon and shellfish, land mammals, and plant resources such as berries, roots, and bulbs (Matson and Coupland 1995:97). Over time, populations accumulated in large, semi-sedentary cedar plank house villages located at river mouths and confluences and on protected shorelines. The artifact tool kits became increasingly complex and specialized, allowing for large takes of resources, which were processed and stored for year-long consumption (Ames and Maschner 1999).

The project area is in the traditional territory of the Duwamish, a Southern Coast Salish group speaking the Southern Lushootseed language, who lived in villages from Lake Washington to the Black River (Suttles and Lane 1990:485). More than 12,000 Lushootseed speakers occupied the Puget Sound region prior to European contact; however, epidemics introduced by the newcomers reduced this population to only 5,000 by the 1850s (Suttles and Lane 1990:501).

Southern Coast Salish villages were occupied part of the year, largely in winter, and residents made seasonal journeys to camps near resource gathering areas. Coastal villages relied on fish (Suttles and Lane 1990), which they caught with various weirs and traps, as well as shellfish and sea mammals (Ruby and Brown 1986). These food sources were supplemented by various berries, roots, and bulbs (Suttles and Lane 1990; Ruby and Brown 1986:166).

The Georgetown/South Park area was "a major resource gathering and harvesting area for local Duwamish communities" (ENTRIX and BOAS, Inc. 2008:24). Places named by the Duwamish people are known to be at or adjacent to the APE. Hilbert et al. (2001) edited and reissued a manuscript of place names by ethnographer T.T. Waterman based on interviews with Native American informants. Waterman also published a list and map of place names in Puget Sound in 1922 (Waterman 1922). Both sources show a named location at or near the Jorgensen Forge property (Figure 7). The location is hwa'pitc1d, translated as "where

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one throws something," and denotes a "wide flat near the head of the old river channel" (Hilbert et al. 2001: 120). Just north of the Jorgensen Forge property (approximately 0.1 miles), is the southeastern extent of an abandoned river meander named Lwalb. Lwalb, translated as

> *'Abandoned' for a small channel across a flat on the west side of the new river. It is an old river channel where the river has changed its course* (Hilbert et al. 2011:119).

Three archaeological sites have been located near the central section of this abandoned meander (45KI815, 45KI816, and 45KI817; see Section 2.3). The abandoned channel referenced in the *hwa'pitc1d* and *Lwalb* place names is visible on early maps and shown in Figures 6 and 7.

The nearest ethnographically recorded village site is *Tuqwe'Ltid*, translated as "'a large open space; a plain,' for a large flat in a bend of the river. A village was here" (Hilbert et al. 2001: 120). *Tuqwe'Ltid* is located approximately 1.1 miles north-northwest of the APE. Place names may not always correlate directly with archaeological sites, but they indicate the intensity of use of the Lower Duwamish River at the time of Euroamerican contact and before. By the late 1850s, many Duwamish had moved to newly-established reservations, though some families remained.

Captain George Vancouver's 1792 exploration of Puget Sound marked the first Euroamerican intrusion in the region (Kirk and Alexander 1990:271). However, Euroamerican settlement in the region was not established until 1832; the earliest instance was at Fort Nisqually at the southern end of Puget Sound. The Wilkes Expedition of 1841 used the fort as a base for explorations in southern Puget Sound, which included mapping in proximity to the project area (Kirk and Alexander 1990:308).

Lumber was Puget Sound's major export for much of its early history; in fact, Washington was the number one lumber-producing state in 1910, with 63 percent of the state's wageworkers dependent upon the forest products industry for jobs (Schwantes 1996:215). Many of the mill towns in Puget Sound were established after the devastating San Francisco

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fires of 1852. Virgin timber stands and natural deepwater anchorages provided ships refuge from the Pacific storms. Soon, inlets up and down Puget Sound were exporting timber down the coast (Schwantes 1996:217).

Early industries depended on navigable waterways, and Euroamerican settlers soon began altering the natural environment to promote the movement of goods. Between 1900 and 1920, a number of dredging projects straightened the course of the Lower Duwamish River (now the LDW) and built Harbor Island (Wilma 2001a, 2001b). The South Park and Georgetown areas hosted vegetable and dairy farms that supplied the Seattle area. South Park was incorporated in 1902, and was annexed to Seattle 5 years later. After annexation and the creation of the Duwamish Waterway, South Park became increasingly industrial (Wilma 2001c). Georgetown, where the APE is now located, was platted in 1871, named in 1901, and annexed to Seattle in 1910 (Wilma 2001d). It was known as a red-light district of saloons—not to mention what would become the Rainier Brewery—prior to industrialization.

The land that became the Jorgensen Forge property became waterfront property when the LDW was constructed. A small embayment appears on early photos (Figure 8), but the reason the embayment was constructed is unknown. The Jorgensen Forge property was transferred from Thomas F. Burns to King County in 1916. King County held it for 3 years, transferring it to the Seattle Trust Company in 1919. The next year, the Seattle Trust Company transferred the property back to Thomas F. Burns. In 1940 and 1941, King County transferred the property in three portions to Joe (Guiseppe) Desimone. Until this time, the parcel was in agricultural use, as shown on Figure 8. In 1942, Isaacson Iron Works signed a contract with the U.S. Department of Navy (Navy) to acquire the Jorgensen Forge property and build infrastructure to be owned by the Navy; Isaacson Iron Works purchased most of the property from Desimone shortly thereafter. The property has been owned by various industrial entities from that time until the present.

A 1944 photo shows industrial infrastructure in construction, and the small embayment squared off and armored (Figure 9). A rail trestle runs across the mouth of the embayment and it seems to have been removed after filling was completed. A 1946 photo shows almost the entire property occupied by industrial infrastructure, the embayment filled, and the

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shoreline armored (Figure 10). The Jorgensen Forge property has been almost completely occupied by industrial buildings since the 1940s.

2.3 Previous Research

There are no recorded archaeological sites in the APE. Four sites have been recorded within a mile of the APE. Three are precontact sites clustered near the south end of the 16th Avenue Bridge, across the river and about 0.25 miles from the APE (45KI815, 45KI816, and 45KI817). The Lwalb Old Channel 1 Site (45KI815) is an intact shell midden that has been determined NRHP-eligible. The other two have not been evaluated. The fourth site, 45KI538, is the historic Columbia and Puget Sound Railroad Grade, which has not been evaluated for NRHP-eligibility. It is still in use as a rail facility, and is located approximately 0.65 miles east of the APE.

No previous cultural resources surveys have been conducted in the APE. Seven cultural resources surveys have been conducted within a mile of the APE (Table 1).

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Table 1
Previous Cultural Resources Surveys within a Mile of the APE

Reference	Title	Cultural Resources Located	Notes
Cole 2001	*Heritage Resources Survey of the South Park Cell Tower*	None	
Roedel 2001	*Archaeological Resources Monitoring for the South Park Bridge Project*	None	Historical debris observed in fill, recommended not significant
Historical Research Associates 2004	*South Park Bridge Project Cultural and Historical Resources Technical Report*	None	Pre-fieldwork alternatives analysis
Gilpin 2006	*Archaeological Monitoring at 9229 E. Marginal Way, Tukwila*	None	Historical debris observed in fill, recommended not significant
ENTRIX and BOAS, Inc. 2008	*Cultural Resources Survey for the South Park Bridge Project*	45KI815 45KI816 45KI817	
Zuccotti et al. 2008	*Cultural Resources Section 106 Technical Report, Georgetown Steam Plant Flume Project – DAHP Log No. 030408 – EPA Slip 4 Early Action Area, Lower Duwamish Waterway Superfund Site, Seattle, WA*	No archaeological materials; historical buildings recorded	
Foutch et al. 2009	*Cultural Resources Study for the SR 99 Intelligent Transportation System Improvements Project*	None	Archaeological monitoring recommended.

Only one of the surveys (ENTRIX and BOAS, Inc. 2008) located archaeological resources; this investigation for the South Park Bridge Project recorded 45KI815, 45KI816, and 45KI817.

2.4 Archaeological Expectations

Located just inside a meander of the former Lower Duwamish River, and at (or near) an ethnographically-named place, the vicinity of the Jorgensen Forge property has high potential for precontact or early historic Native American archaeological materials. Any such materials, in intact context, are likely to be significant and NRHP-eligible. These materials would only be expected in intact or minimally disturbed native sediments.

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Previous subsurface testing and monitoring at nearby locations along the LDW has revealed that scattered historic artifacts are common in artificial fill in the LDW area (Roedel 2001; Gilpin 2006). It is likely that industrial debris such as fragments of brick, metal, glass, and tile, is present in fill in the APE. These materials are unlikely to yield information important to the study of history, and are unlikely to be NRHP-eligible. Historic artifacts would be eligible only if found in a feature that can be associated with a particular use, time period, or community. The history of the Jorgensen Forge property does not indicate a high likelihood of this type of feature.

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3 METHODS AND RESULTS

3.1 Methods

Potential effects to historic properties were determined by comparing the ground-disturbing project elements to direct and indirect evidence of landform history to determine if there was potential to encounter unrecorded archaeological resources. Ground-disturbing project elements include dredging in the LDW (in the in-water portion of the RAB), and removal of shoreline bank sediments adjacent to the waterway to a maximum depth of 4 feet below ground surface (fbs).

3.2 Results

3.2.1 Information from Maps and Aerial Photographs

There are two distinct landform histories in the APE: the LDW and the upland areas. Early maps of the area (see Figures 6 and 7) show the entire APE as a low terrace west of the Lower Duwamish River and east of an abandoned meander. The histories diverge at the creation of the LDW in the first decades of the twentieth century.

In the in-water portion of the APE, the LDW was dug into sediments that had rapidly aggraded in an underwater setting as the Duwamish River Delta moved north into Elliot Bay in the late Holocene. Dredging maps on file at the Port of Seattle show that the LDW in front of the Jorgensen Forge property has been dredged on average every 3 to 4 years since 1945 (and likely many times before 1945). The most recent maintenance dredging occurred in 2003.

In the upland portion of the Jorgensen Forge property, at or shortly after creation of the LDW, a small embayment was identified. The property was in agricultural production until the 1940s. The "plow zone," which constitutes the upper 18 inches (45 centimeters) bgs, were likely disturbed. Some clearing or leveling may also have taken place. By the early 1940s, industrial infrastructure was being built on the property. The embayment was filled, and additional filling took place along the shoreline. Aerial photos (Figures 8 though 10) illustrate this progression, and Figure 11 shows the likely location of the pre-industrial shoreline of the LDW.

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3.2.2 Geotechnical Data

Considerable geotechnical investigation has been conducted at the property. Seven borings were obtained just landward of the area of planned shoreline bank ground disturbance. Appendix A contains geotechnical bore logs for these cores, and locations are shown on Figure 11. The logs show thick fill across the site, as deep as 16 feet in some areas. Boring SB-7 shows that the fill from 12.5-16 fbs contains "brick throughout," and several other bore logs mention brick or "white brick." Boring SB-2 includes "cobble and black obsidian-like material" in fill between 6 and 8 fbs. Similar material is also described in Boring SB-3 at 2 fbs. Given the presence of the rail trestle in 1944, the black material could be "clinker" or slag, a by-product of industrial processes. Clinker is commonly found in railroad ballast and other industrial fills.

Only one boring contained possible native sediments. Boring SB-6 showed sand with trace silt between 15.5 and 16.5 fbs. The sand was wet, which is consistent with the water level in the nearby LDW.

3.2.3 Ground-disturbing Project Elements and Archaeological Potential

In-water (subtidal) ground disturbance will occur at the nearshore areas of the RAB. Because the LDW is a recently-created feature dug into alluvial sediments that accumulated underwater, and has been dredged many times in the past, dredging of the channel bottom has little to no potential to encounter precontact or historic archaeological resources.

Ground disturbance will also occur in shoreline bank areas in the RAB. Of these, only the furthest northwest shoreline area is landward of the former LDW shoreline (prior to filling of the embayment and shoreline in the early 1940s). Geotechnical core SB-1 just landward of this northwest corner shows 9.5 feet (2.9 meters) of fill in the area. The other cores show between 8 and 16 feet of fill. Ground disturbance for the project will not exceed 4 feet, and therefore will not encounter native sediments. Therefore, shoreline bank work has no potential to encounter intact precontact archaeological resources.

Upland borings logs show a variety of historic materials in the fill; primarily brick and sawdust, but also other industrial waste. These materials are unlikely to represent discrete

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features for three reasons: 1) materials are distributed throughout thick fill layers, a pattern more characteristic of opportunistic filling with demolition debris and other disturbed sediments than a buried feature; 2) aerial photographs spaced closely in time show no potentially significant features at the shoreline during the period of filling; and 3) historic debris in fill layers in the LDW area has not generally met the threshold for significance (Roedel 2001; Gilpin 2006). Therefore, while the upland sediments certainly contain historic-era materials dating to filling in the 1910s to 1940s, these materials are unlikely to be significant.

Remnants of pilings that once supported the 1944 rail trestle are visible at the surface. The trestle clearly existed for only a short time; no information is available about its function, construction, or significance in the development of the property. Further, the majority of the trestle is gone, and the pilings are deteriorating. It clearly lacks integrity – the ability to convey its historic significance. The pilings are recommended not NRHP-eligible.

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4 RECOMMENDATIONS

The Jorgensen Forge EAA removal action has little to no potential to disturb NRHP-eligible historic properties from the precontact or historic eras. It is recommended that EPA determine that **no historic properties will be affected** by the removal action.

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FIGURES

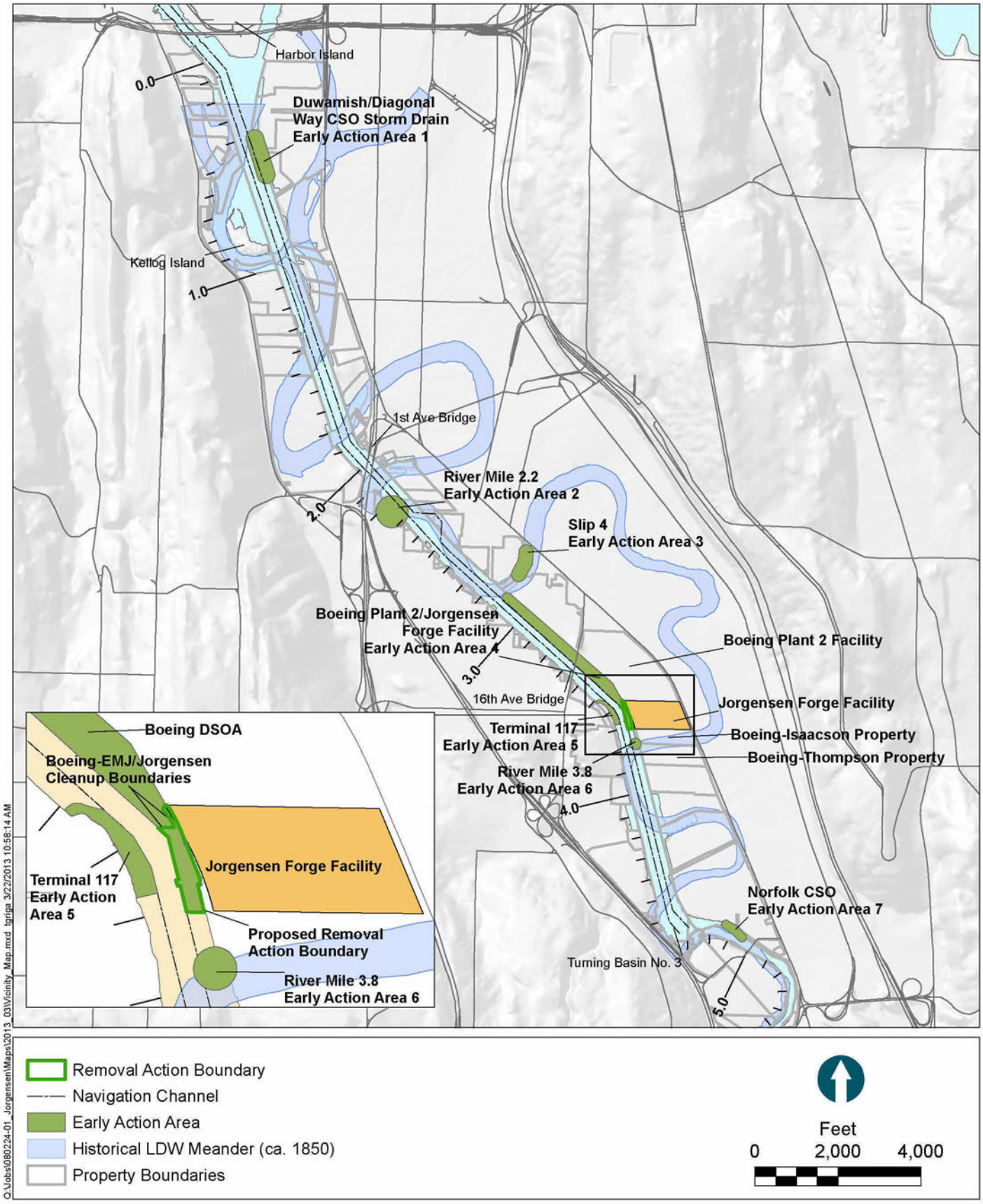


Figure 1
Project Vicinity
Water Quality Monitoring Plan
Jorgensen Forge Early Action Area Removal Action

ANCHOR QEA

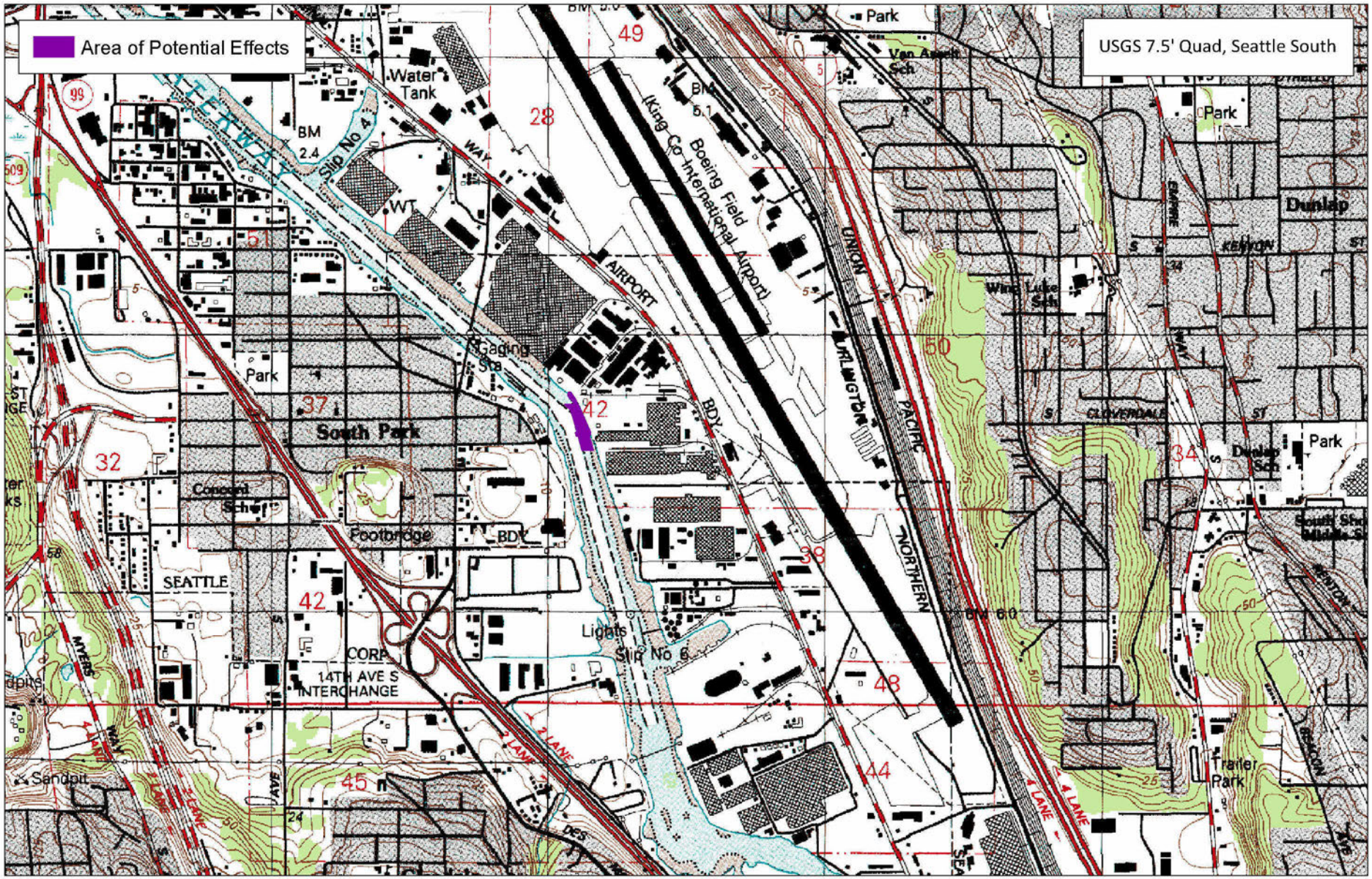
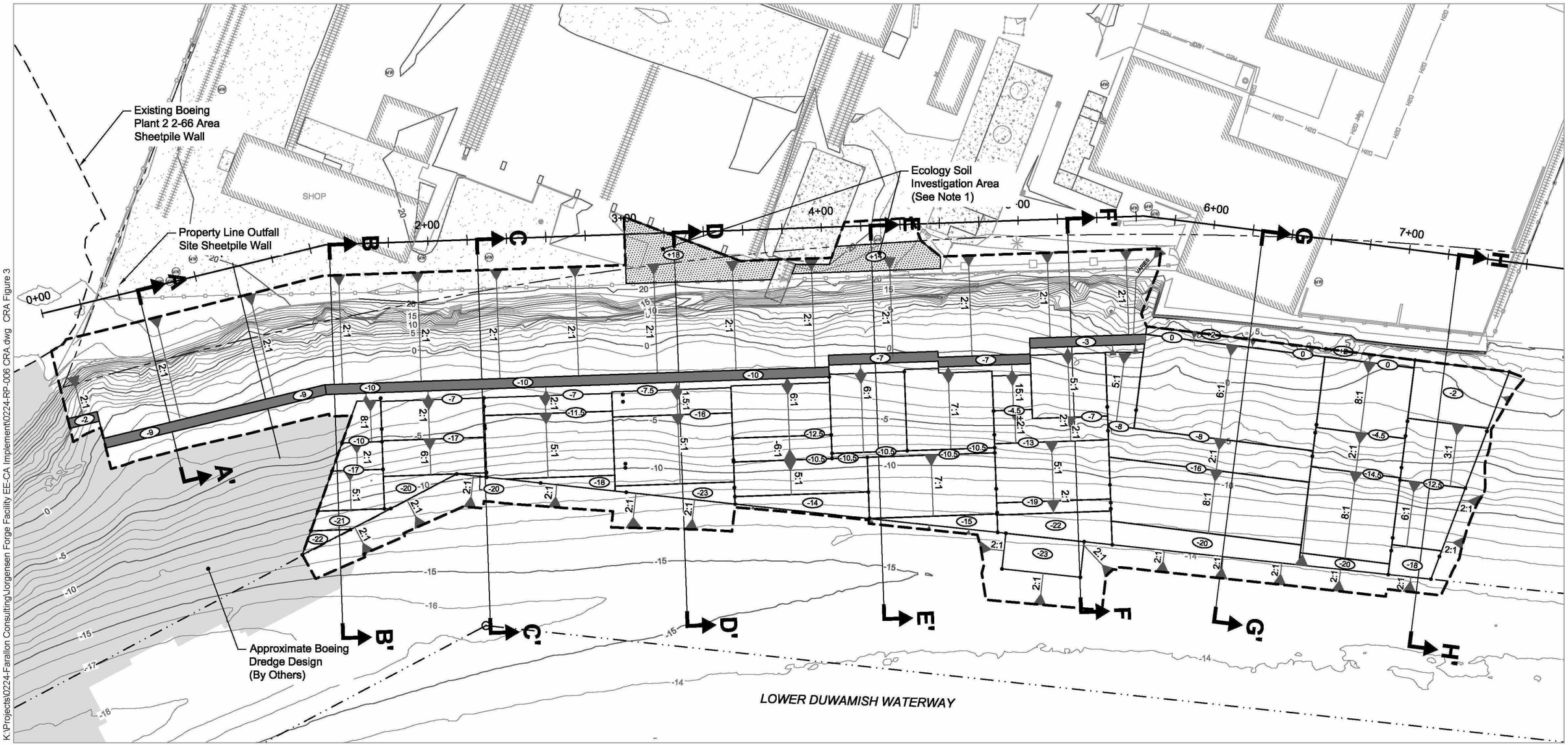


Figure 2
Area of Potential Effects
Cultural Resources Assessment
Jorgensen Forge Early Action Area Removal Action

ANCHOR QEA

Feet
0 890 1,780

EMJ015535



HORIZONTAL DATUM: Washington State Plane North, NAD83, U.S. Feet.
VERTICAL DATUM: Mean Lower Low Water (MLLW).
NOTES:

1. The Owner is removing additional soil and backfilling along the top of bank area surrounding soil borings SB-3 and SB-4 to remove relatively elevated concentrations of polychlorinated biphenyls. This work is not being performed under the EPA scope of work but rather as an Independent Action under the existing Ecology Agreed Order (No. DE 4127) at the facility.

LEGEND:

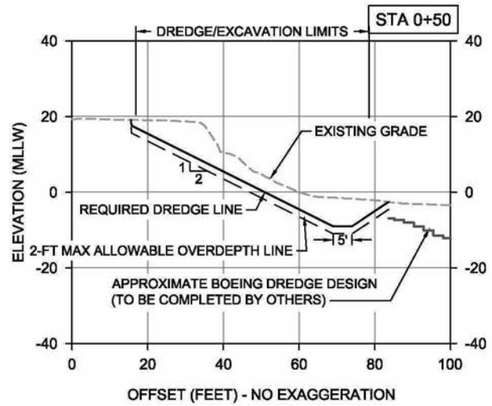
- Navigation Channel
- 5 — Existing Contour (1 Ft Interval)
- Dredge/excavation Limits
- MW — Existing Monitoring Well
- -13 / -17.5 — Required Dredge Elevation (ft Mllw); Top Of Sideslope; Final Grade; Dredge Coordinate; Dredge Boundary
- Slope Arrow
- Toe Trench To Be Constructed At Base of 2H:1V Bank Dredge/Excavation Slope
- 0 60 Scale in Feet

K:\Projects\0224-Farallon Consulting\Jorgensen Forge Facility EE-CA Implement\0224-RP-006 CRA.dwg CRA Figure 3

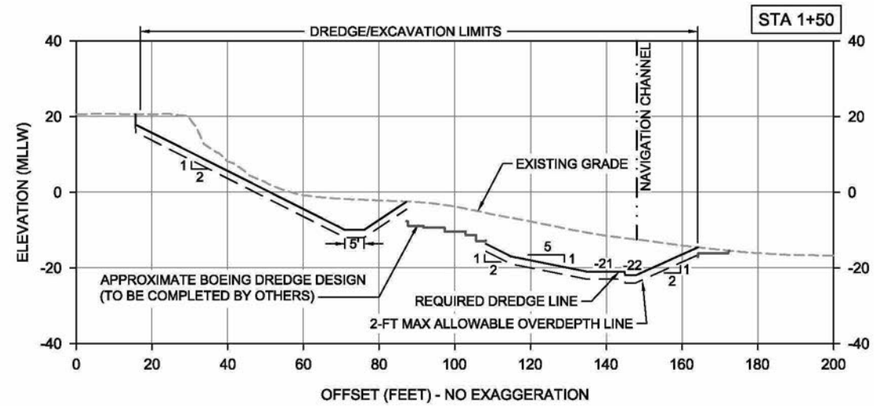
Mar 22, 2013 10:56am tgriga

ANCHOR QEA

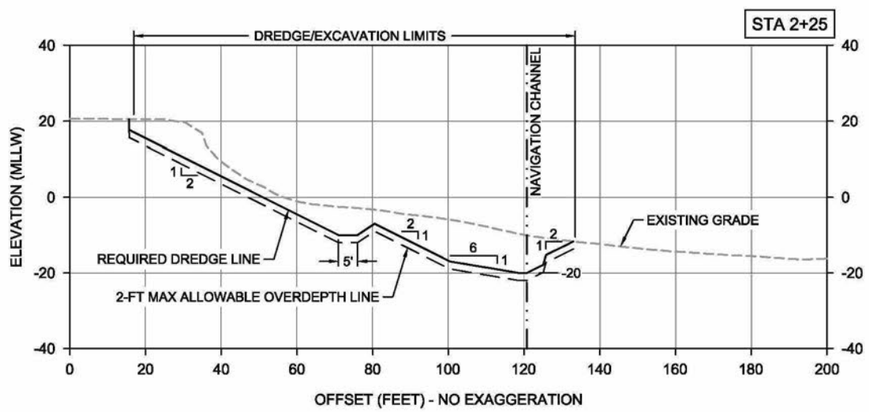
Figure 3
Proposed Action Site Plan
Cultural Resources Assessment
Jorgenson Forge Early Action Area Removal Action



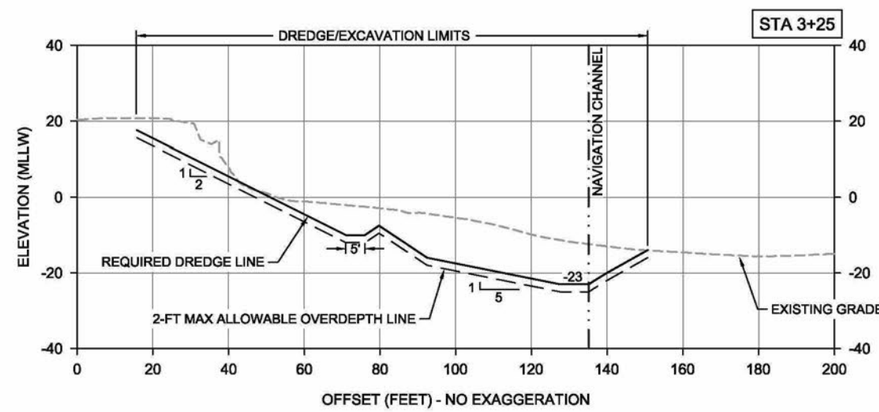
1 DREDGE/EXCAVATION SECTION A-A'
SCALE: 1" = 40'



2 DREDGE/EXCAVATION SECTION B-B'
SCALE: 1" = 40'



3 DREDGE/EXCAVATION SECTION C-C'
SCALE: 1" = 40'



4 DREDGE/EXCAVATION SECTION D-D'
SCALE: 1" = 40'

HORIZONTAL DATUM: Washington State Plane North, NAD83, U.S. Feet.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

NOTES:

1. Existing grade is a merge of upland survey by PLS, Inc. on January 24, 2012, bathymetric survey by eTrac on February 8, 2012, and additional bank survey by AEC Consultants, inc on February 21, 2012.

LEGEND:

- Existing Grade
- Required Dredge Line
- 1-ft Payable Overdepth Line

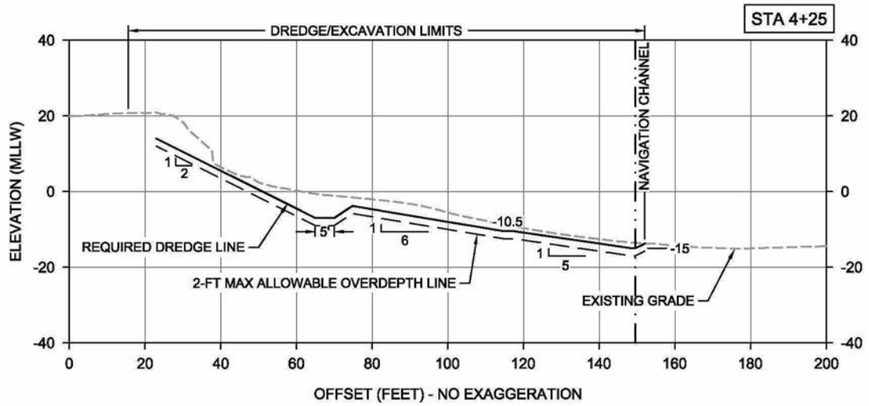
0 40
Scale in Feet

K:\Projects\0224-Farallon Consulting\Jorgensen Forge Facility EE-CA Implement\0224-RP-006 CRA.dwg CRA Figure 4

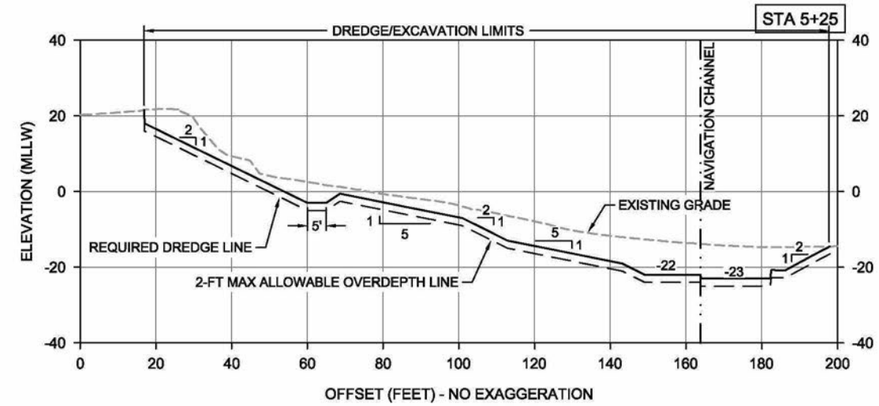
Mar 22, 2013 10:56am tgriga

ANCHOR QEA

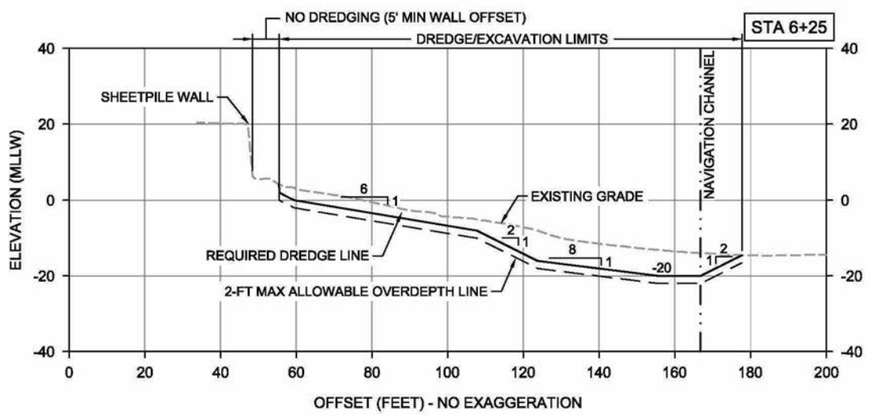
Figure 4
Project Cross-Sections A-A' to D-D'
Cultural Resources Assessment
Jorgenson Forge Early Action Area Removal Action



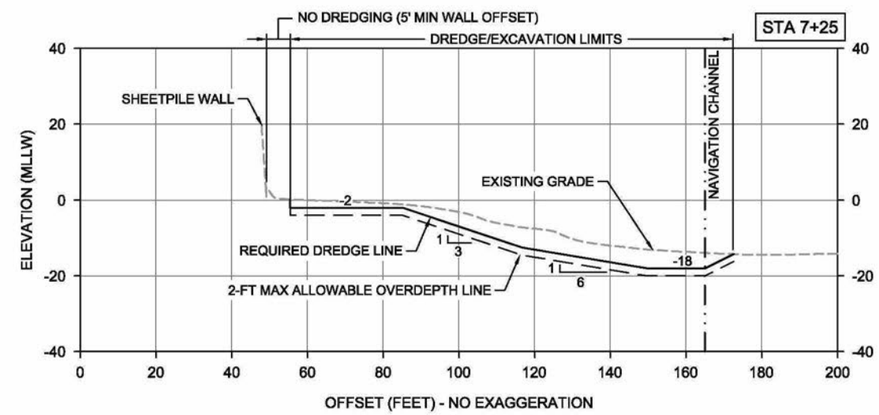
5 DREDGE/EXCAVATION SECTION E-E'
SCALE:1" = 40"



6 DREDGE/EXCAVATION SECTION F-F'
SCALE:1" = 40"



7 DREDGE/EXCAVATION SECTION G-G'
SCALE:1" = 40"



8 DREDGE/EXCAVATION SECTION H-H'
SCALE:1" = 40"

HORIZONTAL DATUM: Washington State Plane North, NAD83, U.S. Feet.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

NOTES:

1. Existing grade is a merge of upland survey by PLS, Inc. on January 24, 2012, bathymetric survey by eTrac on February 8, 2012, and additional bank survey by AEC Consultants, inc on February 21, 2012.

LEGEND:

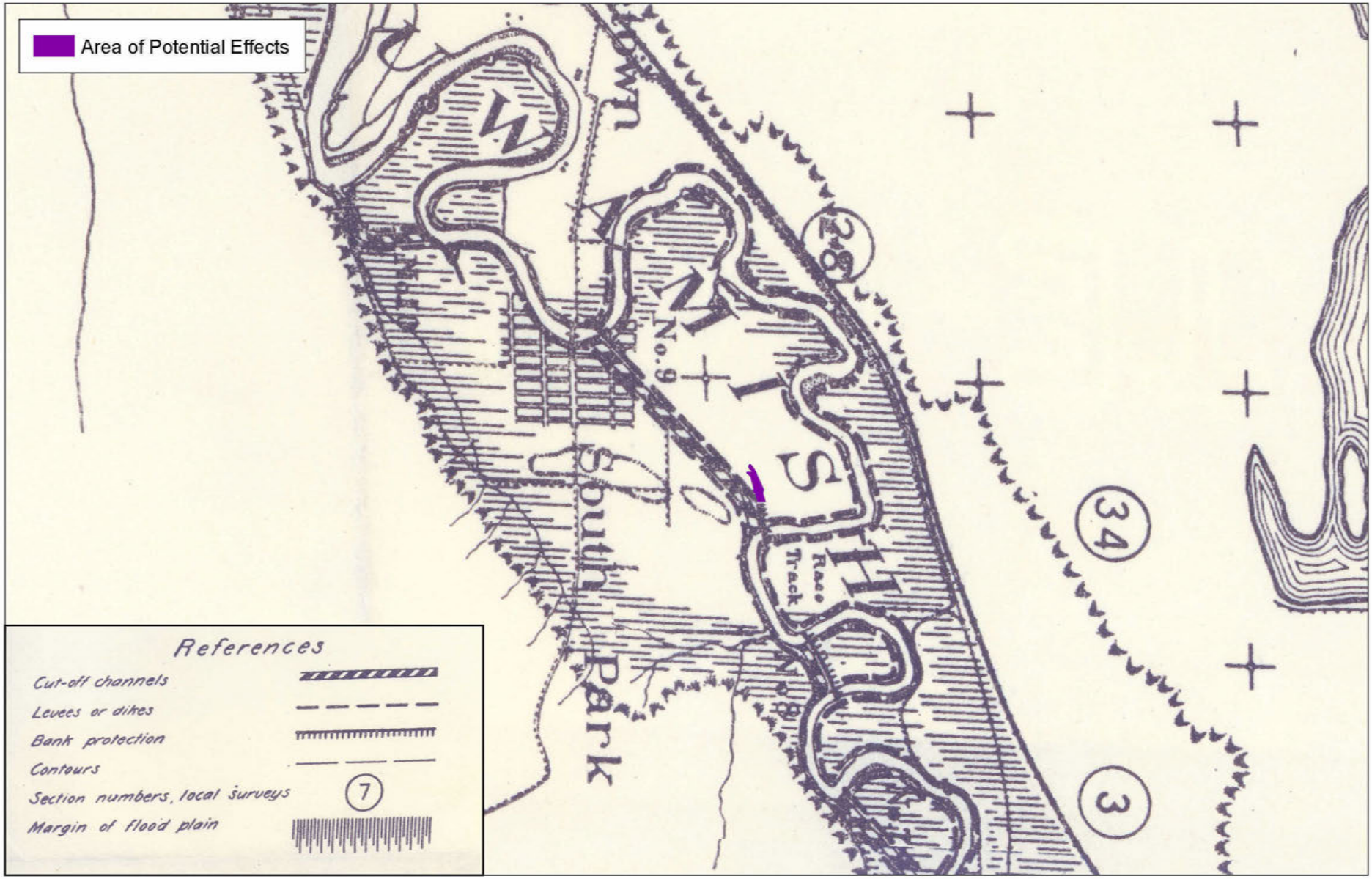
- Existing Grade
- Required Dredge Line
- 1-ft Payable Overdepth Line

0 40
Scale in Feet

K:\Projects\0224-Farallon Consulting\Jorgensen Forge Facility EE-CA Implement\0224-RP-006 CRA.dwg CRA Figure 5
Mar 22, 2013 10:56am tgriga

ANCHOR QEA

Figure 5
Project Cross-Sections E-E' to H-H'
Cultural Resources Assessment
Jorgenson Forge Early Action Area Removal Action



ANCHOR QEA

Feet
0 1,500 3,000

Figure 6
Map of the Duwamish River from Keilland 1907
Cultural Resources Assessment
Jorgensen Forge Early Action Area Removal Action

ANCHOR QEA

Feet
0 1,500 3,000

Figure 7
Ethnographic Place Names from Waterman (1922)
Cultural Resources Assessment
Jorgensen Forge Early Action Area Removal Action

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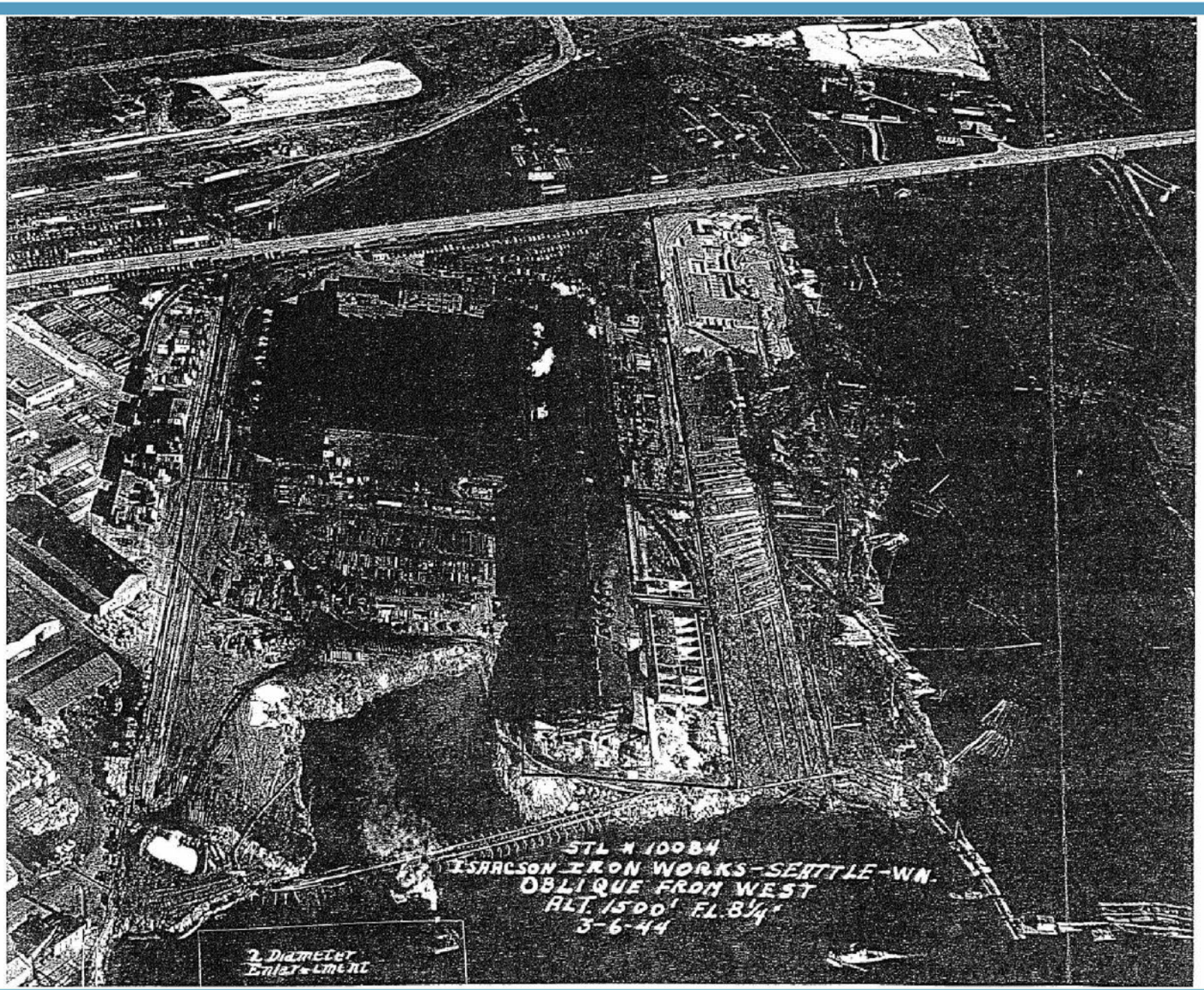
ANCHOR QEA

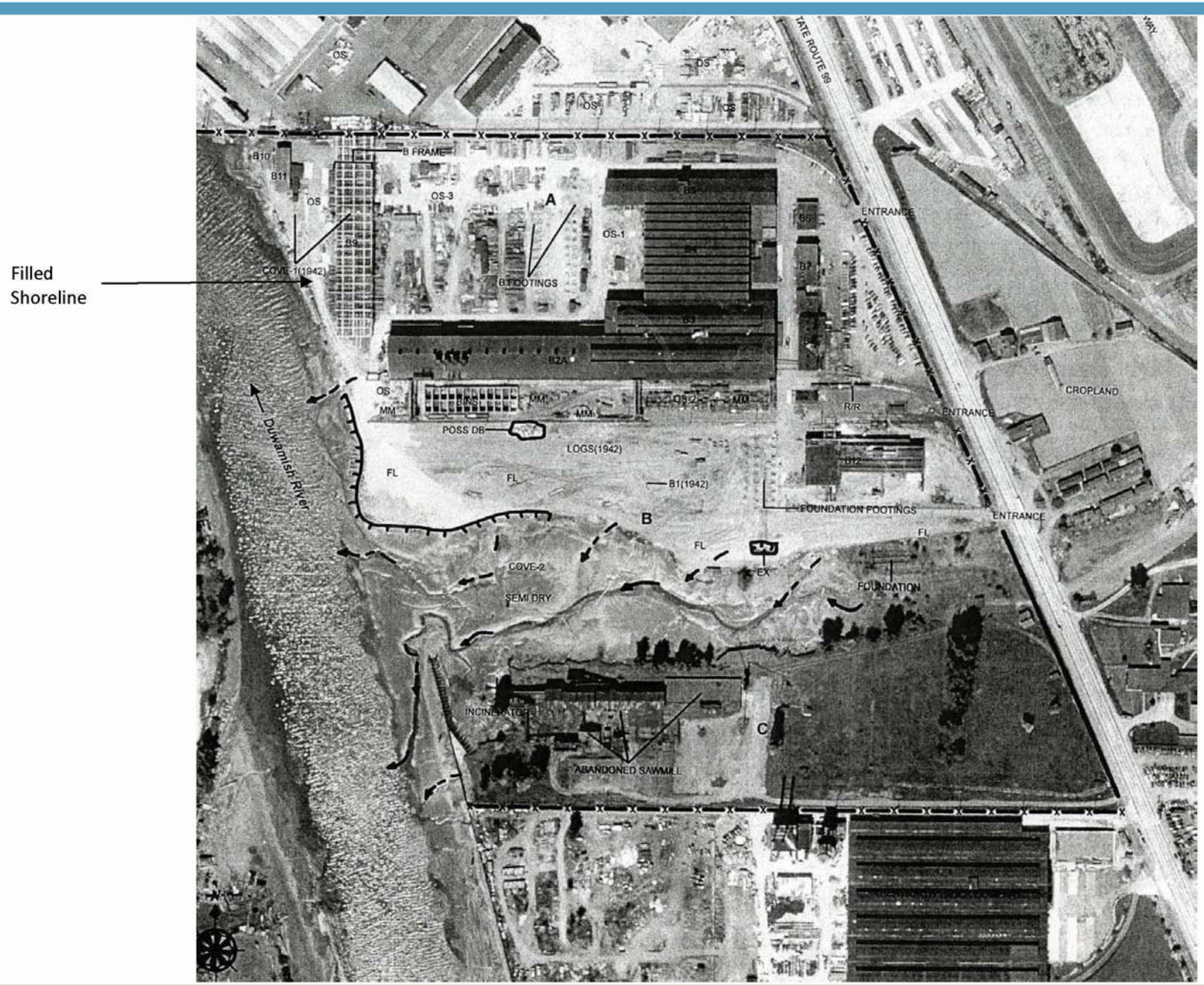
Feet
0 250 500

Figure 8
1940 Aerial Photo
Cultural Resources Assessment
Jorgensen Forge Early Action Area Removal Action



ANCHOR QEA

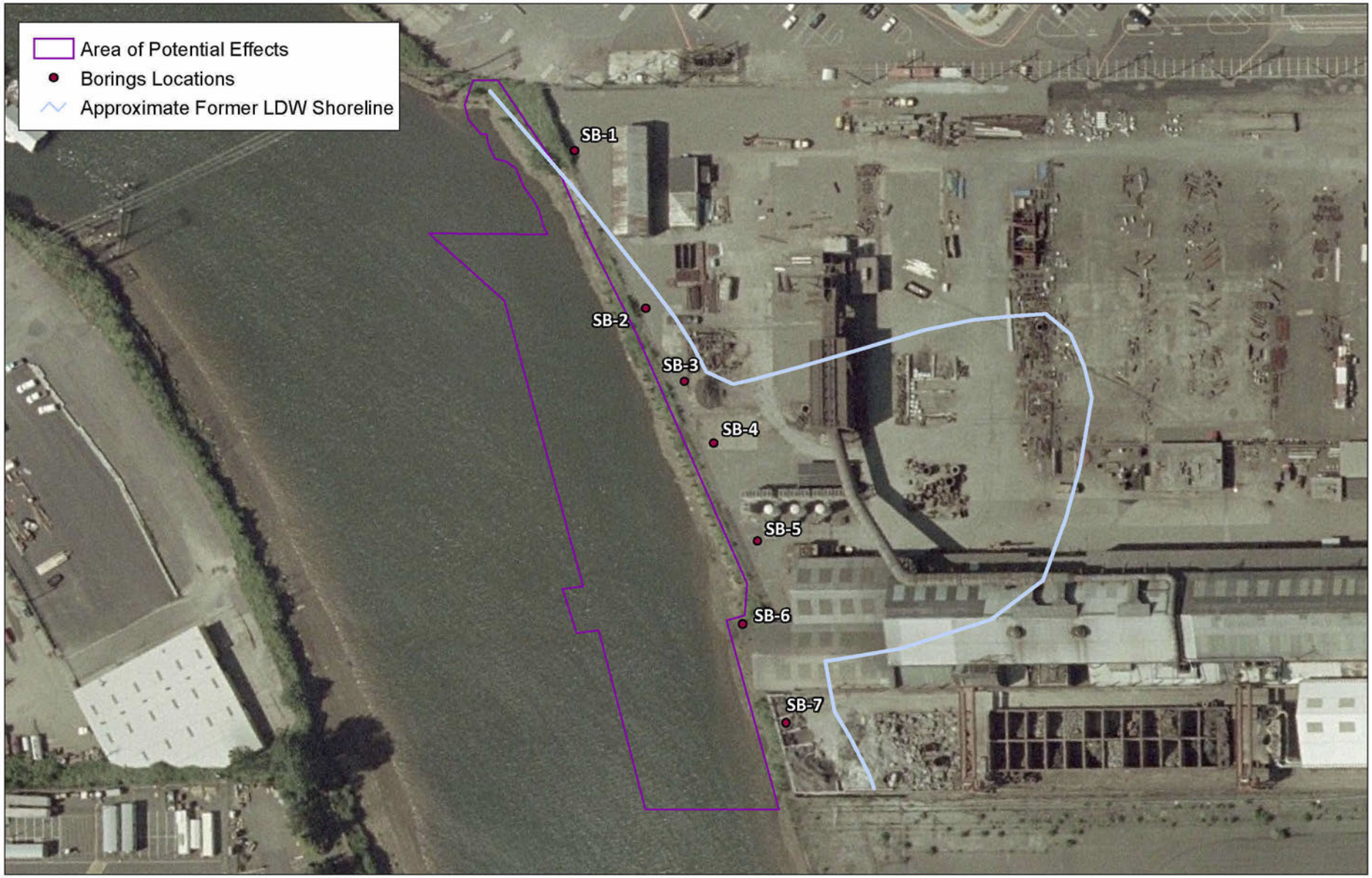
Figure 9
1944 Oblique Aerial Photo
Cultural Resources Assessment
Jorgensen Forge Early Action Area Removal Action



ANCHOR QEA

Figure 10
1946 Aerial Photo
Cultural Resources Assessment
Jorgensen Forge Early Action Area Removal Action

EMJ015543



ANCHOR QEA

Feet
0 75 150

Figure 11
Borings Relative to APE and Former Shoreline
Cultural Resources Assessment
Jorgensen Forge Early Action Area Removal Action

ATTACHMENT 1
GEOTECHNICAL BORE LOGS

FARALLON CONSULTING
320 3rd Avenue NE
Issaquah, WA 98027

Log of Boring: SB-1

Client: EMJ/Jorgensen Forge
Project: Jorgensen Forge
Location: Seattle, WA
Farallon PN: 831-003
Logged By: JAK and JAS

Date/Time Started:	8/26/04 0850	**Sampler Type:**	4-foot sampler
Date/Time Completed:	8/26/04 0915	**Drive Hammer (lbs.):**	140
Equipment:	Geoprobe	**Depth of Water ATD (ft bgs):**	12
Drilling Company:	Cascade Drilling	**Total Boring Depth (ft bgs):**	12
Drilling Foreman:	Kasey Goble	**Total Well Depth (ft bgs):**	NA
Drilling Method:	Geoprobe		

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USGS Graphic	% Recovery	Blow Counts 8/8/8	PID (units)	Sample ID	Sample Analyzed	Well Construction Details
0		FILL--GRAVEL with silt minor sand. 65% fine-coarse gravel, 20% silt, 15% fine sand. Brown, moist, no odor.			50	NA	NA	082604-0850-01	X	
		FILL--GRAVEL minor sand trace silt. 80% fine-coarse gravel, 15% fine-coarse sand, and 5% silt. Brown, moist, no odor. White brick material at 3 feet bgs.			50	NA	NA	082604-0855-02	X	Well not installed
		FILL--Silty GRAVEL with sand. 45% fine-coarse gravel, 40% silt, and 15% fine-coarse fine-course sand. Brown, moist, no odor.			50	NA	NA	082604-0900-03	X	
5		FILL--SAND trace silt. 95% fine-coarse sand, 5% silt. Brown, moist, no odor.			50	NA	NA	082604-0902-04	X	
					50	NA	NA	082604-0910-05	X	
10		SILT. 100% silt. Grey with orange mottling, moist, no-odor.	MH		60	NA	NA	0826-04-0915-06	X	
		SAME wet								▼
15										
20										

Well Construction Information

Monument Type: NA
Casing Diameter (inches): NA
Screen Slot Size (inches): NA
Screened Interval (ft bgs): NA
Filter Pack: NA
Surface Seal: NA
Annular Seal: NA
Ground Surface Elevation (ft): 14-feet
Top of Casing Elevation (ft): NA
Boring Abandonment: Bentonite chips
Surveyed Location: X: 122.30894 Y: 47.52696

FARALLON CONSULTING
320 3rd Avenue NE
Issaquah, WA 98027

Log of Boring: SB-2

Client: EMJ/Jorgensen Forge
Project: Jorgensen Forge
Location: Seattle, WA
Farallon PN: 831-003
Logged By: JAK and JAS

Date/Time Started:	08/26/04 0940	**Sampler Type:**	4-foot sampler
Date/Time Completed:	08/26/04 1020	**Drive Hammer (lbs.):**	140
Equipment:	Geoprobe	**Depth of Water ATD (ft bgs):**	14
Drilling Company:	Cascade Drilling	**Total Boring Depth (ft bgs):**	16
Drilling Foreman:	Kasey Goble	**Total Well Depth (ft bgs):**	NA
Drilling Method:	Geoprobe		

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USGS Graphic	% Recovery	Blow Counts 8/8/8	PID (units)	Sample ID	Sample Analyzed	Well Construction Details
0	X	FILL--GRAVEL minor sand trace silt. 80% fine-coarse gravel, 15% fine-coarse sand, 5% silt. Brown. moist, no odor.			40	NA	NA	082604-0940-07	X	
	X				40	NA	NA	082604-0943-08	X	Well not installed
	X	FILL--SAME with marbeling			50	NA	NA	082604-0945-09	X	
5	X	FILL-SAME with cobble and black obsidion like material			70	NA	NA	082604-0952-10	X	
	X	FILL--Gravel with sand trace silt. 70% fine-coarse gravel, 25% fine-coarse sand, and 5% silt. Marbeled brown, moist, no odor.			50	NA	NA	082604-0956-11	X	
10	X	FILL--White brick			50	NA	NA	082604-1000-12	X	
	X	FILL--SAND minor gravel minor silt. 75% fine-coarse sand, 15% coarse gravel, 10% silt. Grey, moist, no odor.			50	NA	NA	082604-1012-13	X	
	X	FILL--SAND. 100% fine-coarse sand. Grey, moist, no odor, very dense.								
	X	SAME but not very dense.			60	NA	NA	082604-1020-14	X	▼
15	X	FILL--SAND with gravel. 65% fine-coarse sand and 35% fine-coarse gravel. Grey, wet, no odor								
20										

Well Construction Information

Monument Type: NA
Casing Diameter (inches): NA
Screen Slot Size (inches): NA
Screened Interval (ft bgs): NA
Filter Pack: NA
Surface Seal: NA
Annular Seal: NA
Ground Surface Elevation (ft): 14-feet
Top of Casing Elevation (ft): NA
Boring Abandonment: Bentonite chips
Surveyed Location: X: 122.30818 Y: 47.52657

FARALLON CONSULTING
320 3rd Avenue NE
Issaquah, WA 98027

Log of Boring: SB-3

Client: EMJ/Jorgensen Forge
Project: Jorgensen Forge
Location: Seattle, WA
Farallon PN: 831-003
Logged By: JAK and JAS

Date/Time Started:	08/26/04 1055	**Sampler Type:**	4-foot sampler
Date/Time Completed:	08/26/04 1300	**Drive Hammer (lbs.):**	140
Equipment:	Geoprobe	**Depth of Water ATD (ft bgs):**	NE
Drilling Company:	Cascade Drilling	**Total Boring Depth (ft bgs):**	10
Drilling Foreman:	Kasey Goble	**Total Well Depth (ft bgs):**	NA
Drilling Method:	Geoprobe		

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USGS Graphic	% Recovery	Blow Counts 8/8/8	PID (units)	Sample ID	Sample Analyzed	Well Construction Details
0		FILL--GRAVEL with sand minor silt. 65% fine-coarse gravel, 20% fine-coarse sand, 15% silt. Brown, moist, no odor.			50	NA	NA	082604-1105-15	X	
		FILL--GRAVEL with sand trace silt. 70% fine-coarse gravel, 25% fine-coarse sand, 5% silt. Brown, moist, no odor. Black obsidion like material at 2 feet.			60	NA	NA	082604-1106-16	X	Well not installed
		FILL--GRAVEL minor sand. 90% fine-coarse gravel and 10% fine-coarse sand. Marbeled brown, moist, no odor.			50	NA	NA	082604-1109-17	X	
5		FILL--GRAVEL with sand trace silt. 75% fine-coarse gravel, 20% fine-coarse sand, 5% silt. Brown/orange, moist, no odor.			65	NA	NA	082604-1118-18 082604-1240-19	X	
		REFUSAL--move one foot north/			50	NA	NA	082604-1246-20	X	
		SAME as 6'-8'								
10		REFUSAL move one foot north, sampler breaks inside boring.			0	NA	NA			
15										
20										

Well Construction Information

Monument Type:	NA	**Filter Pack:**	NA	**Ground Surface Elevation (ft):**	15-feet
Casing Diameter (inches):	NA	**Surface Seal:**	NA	**Top of Casing Elevation (ft):**	NA
Screen Slot Size (inches):	NA	**Annular Seal:**	NA	**Boring Abandonment:**	Bentonite chips
Screened Interval (ft bgs):	NA			**Surveyed Location:**	X: 122.30866 Y: 47.52640

FARALLON CONSULTING
320 3rd Avenue NE
Issaquah, WA 98027

Log of Boring: SB-4

Client: EMJ/Jorgensen Forge
Project: Jorgensen Forge
Location: Seattle, WA
Farallon PN: 831-003
Logged By: JAK and JAS

Date/Time Started:	08/26/04 1300	**Sampler Type:**	4-foot sampler
Date/Time Completed:	08/26/04 1345	**Drive Hammer (lbs.):**	140
Equipment:	Geoprobe	**Depth of Water ATD (ft bgs):**	12
Drilling Company:	Cascade Drilling	**Total Boring Depth (ft bgs):**	16
Drilling Foreman:	Kasey Goble	**Total Well Depth (ft bgs):**	NA
Drilling Method:	Geoprobe		

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USGS Graphic	% Recovery	Blow Counts 8/8/8	PID (units)	Sample ID	Sample Analyzed	Well Construction Details
0		FILL--GRAVEL with sand trace silt. 85% fine-coarse gravel, 10% fine-coarse sand, and 5% silt. Brown, moist, no odor.			50	NA	NA	082604-1305-21	X	
		REFUSAL--Move one foot north and begin at two feet bgs. SAME as previous in new boring.			50	NA	NA	082604-1308-22	X	Well not installed
		SAME			40	NA	NA	082604-1312-23	X	
5					70	NA	NA	082604-1318-24	X	
					70	NA	NA	082604-1322-25	X	
10					80	NA	NA	082604-1326-26	X	
		FILL--wood debris. Strong creosote odor, shiny, black.			80	NA	NA	082604-1330-27 082604-1335-28	X	▼
		SAME as 4-11.5'								
		FILL--SAND minor silt. 90% fine sand, 10% silt. Brown, wet, apparent creosote odor observed.			20	NA	NA	082604-1345-29	X	
15		FILL--SAND minor silt. 85% fine sand, 15% silt. Blue/grey, wet, strong petroleum odor, sheen observed on sand.								
20										

Well Construction Information

Monument Type: NA
Casing Diameter (inches): NA
Screen Slot Size (inches): NA
Screened Interval (ft bgs): NA
Filter Pack: NA
Surface Seal: NA
Annular Seal: NA
Ground Surface Elevation (ft): 21 feet
Top of Casing Elevation (ft): NA
Boring Abandonment: Bentonite chips
Surveyed Location: X: 122.30853 Y: 47.52620

FARALLON CONSULTING
320 3rd Avenue NE
Issaquah, WA 98027

Log of Boring: SB-5

Client: EMJ/Jorgensen Forge
Project: Jorgensen Forge
Location: Seattle, WA
Farallon PN: 831-003
Logged By: JAK and JAS

Date/Time Started:	08/26/04 1415	**Sampler Type:**	4-foot sampler
Date/Time Completed:	08/26/04 1510	**Drive Hammer (lbs.):**	140
Equipment:	Geoprobe	**Depth of Water ATD (ft bgs):**	12
Drilling Company:	Cascade Drilling	**Total Boring Depth (ft bgs):**	16
Drilling Foreman:	Kasey Goble	**Total Well Depth (ft bgs):**	NA
Drilling Method:	Geoprobe		

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USGS Graphic	% Recovery	Blow Counts 8/8/8	PID (units)	Sample ID	Sample Analyzed	Well Construction Details
0		FILL--GRAVEL minor sand, trace silt. 80% fine-coarse gravel, 15% fine-coarse sand, 5% silt. Light brown, moist, no odor.			60	NA	NA	082604-1414-30	X	
		FILL-GRAVEL with sand, trace silt. 70% fine-coarse gravel, 25% fine-coarse sand, 5% silt. Orangish brown, moist, no odor.			50	NA	NA	082604-1416-31	X	Well not installed
					40	NA	NA	082604-1421-32	X	
5										
					40	NA	NA	082604-1425-33	X	
					40	NA	NA	082604-1428-34	X	
10					50	NA	NA	082604-1455-35	X	
		REFUSAL move one foot north and begin at 10 feet bgs.			20	NA	NA	082604-1500-36	X	▼
		FILL--SAND minor gravel. 85% fine-coarse sand and 15% fine gravel. Brown, wet, no odor.			100	NA	NA	082604-1505-37	X	
15										
20										

Well Construction Information

Monument Type: NA
Casing Diameter (inches): NA
Screen Slot Size (inches): NA
Screened Interval (ft bgs): NA
Filter Pack: NA
Surface Seal: NA
Annular Seal: NA
Ground Surface Elevation (ft): 20-feet
Top of Casing Elevation (ft): NA
Boring Abandonment: Bentonite chips
Surveyed Location: X: 122.30836 Y: 47.52599

FARALLON CONSULTING
320 3rd Avenue NE
Issaquah, WA 98027

Log of Boring: SB-6

Client: EMJ/Jorgensen Forge
Project: Jorgensen Forge
Location: Seattle, WA
Farallon PN: 831-003
Logged By: JAK and JAS

Date/Time Started:	08/27/04 0845	**Sampler Type:**	4-foot sampler
Date/Time Completed:	08/27/04 0948	**Drive Hammer (lbs.):**	140
Equipment:	Geoprobe	**Depth of Water ATD (ft bgs):**	11.5
Drilling Company:	Cascade Drilling	**Total Boring Depth (ft bgs):**	16
Drilling Foreman:	Jaymen Lauer	**Total Well Depth (ft bgs):**	NA
Drilling Method:	Geoprobe - Limited Access		

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USGS Graphic	% Recovery	Blow Counts 8/8/8	PID (units)	Sample ID	Sample Analyzed	Well Construction Details
0		FILL--GRAVEL trace sand. 95% fine-coarse gravel and 5% sand. Brown, moist, no odor.			30	NA	NA	082704-0856-01	X	
					40	NA	NA	082704-0900-02	X	Well not installed
		SAME with white brick.			20	NA	NA	082704-0910-03	X	
5					100	NA	NA	082704-0915-04 082704-0920-05	X	
		FILL--SAND. 100% fine-coarse sand. Tan, dry, no odor, very hard.								
		FILL--GRAVEL with sand trace silt. 75% fine-coarse gravel, 20% fine-coarse sand, and 5% silt. Brown, moist, no odor.			100	NA	NA	082704-0930-06	X	
		FILL--GRAVEL trace sand. 95% fine-coarse gravel, 5% fine-coarse sand. Black with obsidion like material, moist, no odor.								
10					100	NA	NA	082704-0935-07	X	▼
		FILL--SAME as 7.5-8. wet, some red brick.			80	NA	NA	082704-0940-08	X	
					50	NA	NA	082704-0942-09	X	
15		SAND trace silt. 95% fine sand and 5% silty. Grey, wet, no odor	SW							
20										

Well Construction Information

Monument Type: NA
Casing Diameter (inches): Geoprobe
Screen Slot Size (inches): NA
Screened Interval (ft bgs): NA
Filter Pack: NA
Surface Seal: NA
Annular Seal: NA
Ground Surface Elevation (ft): 22
Top of Casing Elevation (ft): NA
Boring Abandonment: Bentonite chips
Surveyed Location: X: 122.30840 Y: 47.52576

FARALLON CONSULTING
320 3rd Avenue NE
Issaquah, WA 98027

Log of Boring: SB-7

Client: EMJ/Jorgensen Forge
Project: Jorgensen Forge
Location: Seattle, WA
Farallon PN: 831-003
Logged By: JAK and JAS

Date/Time Started:	08/27/04 1030	**Sampler Type:**	4-foot sampler
Date/Time Completed:	08/27/04 1120	**Drive Hammer (lbs.):**	140
Equipment:	Geoprobe	**Depth of Water ATD (ft bgs):**	13.5
Drilling Company:	Cascade Drilling	**Total Boring Depth (ft bgs):**	16
Drilling Foreman:	Jaymen Lauer	**Total Well Depth (ft bgs):**	NA
Drilling Method:	Geoprobe		

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USGS Graphic	% Recovery	Blow Counts 8/8/8	PID (units)	Sample ID	Sample Analyzed	Well Construction Details
0		8-inches of concrete	CO		50	NA	NA	082704-1032-10	X	
		FILL--GRAVEL with sand minor silt. 40% fine-coarse gravel, 40% coarse sand, 20% silt. Brown, moist, no odor			40	NA	NA	082704-1034-11	X	Well not installed
		SAME but 50% red brick.			20	NA	NA	082704-1038-12	X	
5		SAME no brick			20	NA	NA	082704-1044-13	X	
		FILL--GRAVEL with sand, trace silt. 75% fine-coarse gravel, 20% fine-coarse sand, and 5% silt. Brown with orangish brown, moist, no odor. Metal debris.			60	NA	NA	082704-1054-14	X	
10					100	NA	NA	082704-1100-15	X	
		FILL--GRAVEL trace sand. 95% fine-coarse gravel and 5% fine-coarse sand. Brown, moist, no odor.			100	NA	NA	082704-1110-16	X	
		SAME as 6-8' interval. Brick throughout. Wet at 13.5			20	NA	NA	082704-1115-17	X	▼
15										
20										

Well Construction Information

Monument Type: NA
Casing Diameter (inches): NA
Screen Slot Size (inches): NA
Screened Interval (ft bgs): NA
Filter Pack: NA
Surface Seal: NA
Annular Seal: NA
Ground Surface Elevation (ft): 25
Top of Casing Elevation (ft): NA
Boring Abandonment: Bentonite chips
Surveyed Location: X: 122.30826 Y: 47.52569