IN-WATER REMEDIAL INVESTIGATION REPORT

WEYERHAEUSER SAWMILL ABERDEEN/SEAPORT LANDING
FACILITY SITE ID 1126, CLEANUP SITE ID 4987,
AGREED ORDER NO. DE 15953
WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES
AQUATIC LANDS LEASE NO. 22-092275

Prepared for
GRAYS HARBOR HISTORICAL SEAPORT AUTHORITY
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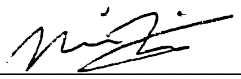
The material and data in this report were prepared under the supervision and direction of the undersigned.

MAUL FOSTER & ALONGI, INC.



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CONTENTS

TABLES AND ILLUSTRATIONS V

ACRONYMS AND ABBREVIATIONS VII

1 INTRODUCTION 1
1.1 REGULATORY FRAMEWORK 1
1.2 PURPOSE AND OBJECTIVES 2
1.3 ORGANIZATION 2

2 BACKGROUND AND PHYSICAL SETTING 3
2.1 LOCATION AND CURRENT SITE CONDITIONS 3
2.2 CURRENT AND FUTURE SITE USE 3
2.3 QUINAULT INDIAN NATION TREATY RIGHTS 4
2.4 SITE HISTORY 4
2.5 PREVIOUS INVESTIGATIONS 7

3 ENVIRONMENTAL CONDITIONS 8
3.1 TOPOGRAPHY AND BATHYMETRY 9
3.2 GEOLOGY AND HYDROGEOLOGY 9
3.3 SURFACE WATER AND STORMWATER 10
3.4 AQUATIC ENVIRONMENT AND BOTTOM SUBSTRATE 10
3.5 SEDIMENTATION AND HYDRAULIC ASSESSMENT 11
3.6 BENEFICIAL WATER AND LAND USES 12
3.7 CRITICAL AREAS REPORT 13
3.8 CLIMATE 13

4 FIELD AND ANALYTICAL METHODS 14
4.1 SEDIMENT FIELD METHODS 14
4.2 ANALYTICAL METHODS 16
4.3 SULFIDE SEEP SURVEY 18
4.4 DEVIATIONS FROM WORK PLAN 18

5 SCREENING LEVELS 19
5.1 SCREENING LEVELS FOR PROTECTION OF BENTHIC ORGANISMS 19
5.2 SCREENING LEVELS FOR PROTECTION OF HUMAN HEALTH AND HIGHER TROPHIC LEVEL ECOLOGICAL RECEPTORS 20
5.3 WOOD WASTE 21
5.4 PRELIMINARY CLEANUP STANDARDS 22

6 ANALYTICAL RESULTS 23
6.1 DATA USABILITY 23
6.2 SEDIMENT CHEMISTRY 25
6.3 RADIOISOTOPES 30
6.4 BIOASSAY 31
6.5 DIFFUSIVE GRADIENTS IN THIN FILM 32

7 CONCEPTUAL SITE MODEL 33
7.1 SOURCE CHARACTERIZATION 33
7.2 FATE AND TRANSPORT OF CONTAMINANTS 36
7.3 POTENTIAL RECEPTORS AND EXPOSURE SCENARIOS 38

CONTENTS (CONTINUED)

8 NATURE AND EXTENT OF CONTAMINATION 40
8.1 AOCS 41

9 SUMMARY 42

LIMITATIONS

REFERENCES

TABLES

FIGURES

APPENDIX A
STUDY AREA INVESTIGATION

APPENDIX B
SEDIMENTATION AND HYDRAULICS ANALYSIS

APPENDIX C
CRITICAL AREAS REPORT

APPENDIX D
GEOLOGIC LOGS

APPENDIX E
FIELD SAMPLING DATA SHEETS

APPENDIX F
PHOTOGRAPH LOG

APPENDIX G
DGT TECHNICAL MEMORANDUM

APPENDIX H
WOOD WASTE CLEANUP LEVEL DEVELOPMENT TECHNICAL MEMORANDUM

APPENDIX I
LABORATORY REPORTS

APPENDIX J
DATA VALIDATION MEMORANDA

TABLES AND ILLUSTRATIONS

FOLLOWING REPORT:

TABLES

4-1 SEDIMENT SAMPLE DESCRIPTIONS AND ANALYSES

5-1 SCREENING LEVELS FOR PROTECTION OF BENTHIC ORGANISMS

5-2 SCREENING LEVELS FOR PROTECTION OF HUMAN HEALTH AND HIGHER TROPHIC ECOLOGICAL RECEPTORS

5-3 PRELIMINARY CLEANUP STANDARDS

6-1 ANALYTICAL SUMMARY OF 2013–2020 DATA

6-2 2019-2020 SEDIMENT ANALYTICAL RESULTS

6-3 2013-2015 SEDIMENT ANALYTICAL RESULTS

6-4 WOOD WASTE PARAMETERS AND BIOASSAY RESULTS

6-5 SITE-SPECIFIC WOOD WASTE CLEANUP LEVEL SCORING

8-1 2013–2020 SEDIMENT ANALYTICAL RESULTS

FIGURES

1-1 SITE LOCATION

1-2 SITE VICINITY AND AREA OF IN-WATER INVESTIGATION

2-1 ZONING DESIGNATIONS

2-2 HISTORICAL AND CURRENT SITE FEATURES

2-3 HISTORICAL FILL AND SHORELINE CHANGES

2-4 PREVIOUS SAMPLE LOCATIONS

3-1 BATHYMETRY AND TOPOGRAPHY

4-1 SUBSURFACE SEDIMENT SAMPLING LOCATIONS

4-2 SURFACE SEDIMENT SAMPLING LOCATIONS

6-1 PRELIMINARY SCREENING LEVEL EXCEEDANCES

6-2A DOWNRIVER WOOD WASTE PARAMETERS

6-2B UPRIVER WOOD WASTE PARAMETERS

6-3 BIOASSAY RESULTS

7-1 CONCEPTUAL SITE MODEL

7-2 VISIBLE PERCENT WOOD WASTE IN SURFACE AND SUBSURFACE SEDIMENT

TABLES AND ILLUSTRATIONS (CONTINUED)

7-3A DOWNRIVER ESTIMATED WOOD WASTE THICKNESS

7-3B UPRIVER ESTIMATED WOOD WASTE THICKNESS

7-4 GEOLOGIC CROSS SECTION A TO A'

7-5 GEOLOGIC CROSS SECTION B TO B'

8-1 SITE-RELATED IHS EXCEEDANCES

ACRONYMS AND ABBREVIATIONS

AET	apparent effects threshold
agreed order	Agreed Order DE 15953
AOC	area of concern
bml	below mud line
cm	centimeter
COC	contaminant of concern
conventionals	total organic carbon, total volatile solids, total solids, ammonia as nitrogen, total sulfides
cPAH	carcinogenic polycyclic aromatic hydrocarbon
CSL	cleanup screening level
CSM	conceptual site model
CUL	cleanup level
DGT	diffusive gradients in thin-films
dioxins/furans	polychlorinated dibenzo-p-dioxins and -furans
DNR	Washington State Department of Natural Resources
DNR lease area	Washington State Department of Natural Resources aquatic land lease number 22-092275
EcoAnalysts	EcoAnalysts, Inc.
Ecology	Department of Ecology (Washington)
EPA	U.S. Environmental Protection Agency
GHHSA	Grays Harbor Historical Seaport Authority
HPAH	high-molecular-weight PAH
IHS	indicator hazardous substance
LPAH	low-molecular-weight PAH
MFA	Maul Foster & Alongi, Inc.
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MTCA	Model Toxics Control Act
NAVD 88	North American Vertical Datum of 1988
PAHs	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyl
PCP	pentachlorophenol
pg/g	picogram per gram
pH	potential hydrogen
PID	photoionization detector
POC	point of compliance
PQL	practical quantitation limit
Property	500 North Custer Street, Aberdeen, Washington
PSEP	Puget Sound Estuary Protocols
QIN	Quinault Indian Nation
RBC	risk-based concentration
RI	remedial investigation

ACRONYMS AND ABBREVIATIONS (CONTINUED)

RIWP	remedial investigation work plan
Sanborn maps	Sanborn Fire Insurance maps
SCO	sediment cleanup objective
SCUM	Sediment Cleanup User's Manual II
Site	Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site
SM	Standard Methods for the Examination of Water and Wastewater
SMS	Sediment Management Standards
SVOC	semivolatile organic compound
TCDD	2,3,7,8-tetrachloro dibenzo-p-dioxin
TCLP	toxicity characteristic leaching procedure
TEF	toxic equivalent factor
TEQ	toxic equivalent quotient
TOC	total organic carbon
TPH	total petroleum hydrocarbon
TVS	total volatile solids
ug/kg	micrograms per kilogram
UTL	upper tolerance limit
WAC	Washington Administrative Code
Weyerhaeuser	Weyerhaeuser Company

1 INTRODUCTION

Maul Foster & Alongi, Inc. (MFA), has prepared this remedial investigation (RI) report on behalf of the Grays Harbor Historical Seaport Authority (GHHSA) for the sediments of the in-water area of the Weyerhaeuser Company (Weyerhaeuser) Sawmill Aberdeen/Seaport Landing Site (the Site) located at 500 North Custer Street in Aberdeen, Washington (the Property; see Figure 1-1). The Site is defined as the area where hazardous substances have been deposited, stored, disposed of, or placed, or otherwise come to be located as a result from release(s) from the Property. The Site is divided into an upland area and an in-water area, each with a separate RI report; with the two areas separated by the ordinary high water line. The upland area includes the Property, which is owned by GHHSA. The in-water area includes portions of the Chehalis River adjacent to the south bank, the pocket beach area, and Shannon Slough. Within the in-water area Washington State Department of Natural Resources (DNR) leases 16.9 acres of aquatic land to GHHSA (aquatic land lease No. 22-092275) (see Figure 1-2). The Site is listed in the Washington State Department of Ecology's (Ecology) database as Facility Site ID 1126 and Cleanup Site ID 4987. The in-water area that was further characterized as part of this RI include the Chehalis River, pocket beach area, and Shannon Slough, and are shown as the in-water area of investigation in Figure 1-2. Historically, the Site was used as a lumber mill by Weyerhaeuser and other wood products companies. The Site is the home port for the *Lady Washington* tall ship as part of a new maritime heritage facility called Seaport Landing.

1.1 Regulatory Framework

On August 17, 2015, the GHHSA entered into Agreed Order DE 11225 with Ecology, which required GHHSA to investigate the DNR lease area, evaluate cleanup alternatives for the DNR lease area, and produce a study area investigation and alternatives analysis. On March 28, 2019, GHHSA entered into Agreed Order DE 15953 (Agreed Order) with Ecology that incorporates the remaining tasks from and supersedes the 2015 agreed order. The Agreed Order requires GHHSA to conduct an RI and feasibility study (FS) and develop a draft cleanup action plan for the Site in a manner that complies with requirements of the Model Toxics Control Act (MTCA) cleanup regulations under Washington Administrative Code (WAC) 173-340. The Agreed Order states that separate RI and FS reports may be prepared for the upland and in-water areas of the Site.

Weyerhaeuser assumed the aquatic land lease at the time it acquired the Property in 1955 (see approximate aquatic lease area on Figure 1-2). On September 13, 2001, DNR signed an aquatic land lease (Aquatic Land Lease No. 22-A02150). This lease permitted Weyerhaeuser to use a portion of the in-water area of the Site for a process mill, chip storage, log storage, and a shipping pier. In 2013 GHHSA acquired the Property from Weyerhaeuser, and on March 26, 2013, GHHSA entered into a sublease agreement with Weyerhaeuser for the DNR lease area, which requires GHHSA to remediate this portion of the Site. On April 14, 2017, the GHHSA entered into Aquatic Land Lease No. 22-092275 with DNR, which permits "moorage of vessels within the harbor area…and for no other purpose". The lease also states that the walkway, pier, dolphins, and batter piles are to be removed by March 10, 2020, if plans for future boat moorage are not realized, and the shed building and ship

loader are to be removed by December 31, 2020.[1] The DNR lease area is located in the Chehalis River adjacent to the Property and extends approximately 250 feet upriver of the Property. As part of the Property acquisition, GHHSA assumed responsibility for site investigation and cleanup.

This RI was conducted consistent with MTCA (WAC 173-340-350 through 370), the Sediment Management Standards (SMS) stipulated in WAC 173-204, and applicable guidance documents issued by Ecology (Sediment Cleanup User's Manual [SCUM] II [Ecology, 2021], Wood Waste Cleanup: Identifying, Assessing, and Remediating Wood Waste in Marine and Freshwater Environments [Ecology, 2013]). The RI sampling activities were conducted consistent with industry standard techniques in general compliance with the sampling protocols and approaches outlined in the RI work plan (RIWP) and RIWP addendum, which were approved by Ecology under the Agreed Order (MFA, 2019a and 2020). This RI report was prepared pursuant to the terms of the Agreed Order.

1.2 Purpose and Objectives

This report describes the nature and extent of contamination in sediments within the in-water area of the Site, based on previous environmental investigations (i.e., in 2013 and 2015) and RI data collection activities conducted in September 2019 and July 2020. This RI addresses characterization of the in-water area adjacent to the upland area below ordinary high water (+7.77 North American Vertical Datum of 1988 [NAVD 88]), which includes portions of the Chehalis River adjacent to the south bank, the pocket beach area, and Shannon Slough (Figure 1-2). The portion of Shannon Slough upstream of the Property and outside the boundaries of the upland area was not included as part of the in-water or upland RI. The data collected during the RI informs evaluation of potential risks to benthic organisms as well as human health and higher trophic ecological receptors. An assessment of potential cleanup alternatives will be discussed in the forthcoming FS. The purpose of this RI is to generate data to fulfill data objectives and more thoroughly characterize the nature and extent of contamination in sediment to allow for risk screening and support an evaluation of potential cleanup actions in the subsequent FS.

1.3 Organization

This document is organized as follows:

- ***Section 2*** summarizes the background and physical setting of the upland and in-water areas, including the history and previous investigations.
- ***Section 3*** summarizes the environmental conditions of the upland and in-water areas.
- ***Section 4*** describes the field and analytical methods implemented during the RI.
- ***Section 5*** presents the applicable screening levels specific to the in-water area.
- ***Section 6*** presents the analytical results of sampling from previous investigations and the RI.

[1] In coordination with Ecology, the timelines dictated in the Agreed Order have been extended, including for the removal of overwater structures. At the time of this draft report submittal, the structures have not been removed.

- ***Section 7*** presents the conceptual site model (CSM).
- ***Section 8*** defines the nature and extent of contamination in the in-water area.
- ***Section 9*** summarizes the findings of the RI.

2 BACKGROUND AND PHYSICAL SETTING

The background and physical setting descriptions below are summarized from prior investigations, interviews with the GHHSA, and review of past environmental reports.

2.1 Location and Current Site Conditions

The Property is located at 500 North Custer Street in the City of Aberdeen, Washington, along the alluvial meander plain of the Chehalis River in the northwestern margins of the Willapa Hills physiographic region of southwest Washington (Figure 1-1), approximately two miles upriver from Grays Harbor. The City of Aberdeen is situated in southwestern Washington, approximately 15 miles from the Pacific Ocean and approximately 70 air miles west-southwest of Tacoma, Washington. U.S. Highways 101 and 105 are each located less than 0.25 mile south of the Site. The Site is situated in sections 9 and 10 of township 17 north, range 9 west, Willamette Base Meridian. It is bordered to the west by a former boatyard and marine service center, to the east by a former Weyerhaeuser log storage yard, to the north by the Chehalis River, and to the south by residential and commercial development. The Property that makes up the upland area consists of 20 tax parcels comprising 23.6 acres. Tax parcels and zoning designations for the Property and surrounding area are provided on Figures 1-2 and 2-1, respectively.

The in-water area encompasses the area of the Site riverward of the line of ordinary high water, which includes 16.9 acres of tidelands leased from DNR. The DNR lease area extends between the inner and outer harbor line (Figure 2-2). The Grays Harbor Navigation Channel is federally maintained to 32 feet deep and extends to the Pacific Ocean (USACE, n.d.).

2.2 Current and Future Site Use

The Site is currently used by the GHHSA as its headquarters and is the home port for the *Lady Washington* tall ship as part of a new maritime heritage facility called Seaport Landing. The future-use plan for the Site is to develop a maritime heritage center with education, public access, tourism, and commercial uses. The Property is currently zoned by the City of Aberdeen for industrial use (Figure 2-1), but a land use and zoning change to waterfront mixed use is in process. The DNR aquatic land lease permitted uses include moorage of vessels, public access, and education activities.

2.3 Quinault Indian Nation Treaty Rights

The Quinault Indian Nation (QIN) is a sovereign tribal government with federally protected treaty rights. The Quinault Treaty of 1856 provides Quinault tribal members the right to harvest fish and shellfish in their usual and accustomed areas, which include Grays Harbor and streams that empty into Grays Harbor. Harvest in Grays Harbor is conducted in tribally regulated gillnet fisheries via drift gillnetting or set-netting methods. Drift gillnetting consists of deploying a gillnet across the Chehalis River, perpendicular to the shoreline. Setnets are affixed to the Chehalis River riverbank on one end and secured with an anchor in the river at the other end. Additional information on tribal uses is provided in Section 3.6.1.

2.4 Site History

The operational history of the Site is detailed in a Level I environmental site assessment (PES, 2010). Historical and current site features are shown on Figure 2-2. Sawmills historically operated on both the upland and in-water areas of the Site, beginning before 1900. The south Aberdeen waterfront has been developed for commercial and industrial use since the early 1890s. The pilings (commonly referred to as a pile field) at the mouth of Shannon Slough marks the location of an early Aberdeen salmon cannery. In the late 1890s, the Aberdeen Lumber sawmill was constructed on the Property with logs rafted along the shoreline to feed the mill. Aberdeen Lumber was later sold, becoming Schafer Brothers Lumber and Door Company Mill #4. The business expanded, as did its footprint. Schafer Brothers later sold the property to Simpson Timber Company.

Weyerhaeuser acquired the Property and the northeast adjacent property in 1955 and operated several sawmills and associated support facilities through January 2009, when the mill known as the Small Log Mill was permanently closed. The Small Log Mill was part of a larger Weyerhaeuser operational area, which included log debarking, whole-log chipping, sawing dimensional lumber, log sorting, planing lumber, treating planed lumber with anti-sapstain, cutting lumber to length, grading, sorting, stacking and banding lumber, end-sealing and labeling finished product, storing finished product, and loading/shipping finished product. Until the mid-1960s, raw logs were brought to the mill in log rafts on the Chehalis River and tied up to pilings in the river in front of the Big Mill, herein referred to as the Former Mill (see Figure 2-2). After the mid-1960s, raw logs were brought to the Property by truck and staged on log decks at various locations on and adjacent to the Property. The Former Mill was originally configured to manufacture shingles and slats for housing construction. During World War II, the Former Mill was converted for manufacturing ship keels for the war effort. The precursor to the Small Log Mill was added in 1972. Small Log Mill operations were performed on the Property and the last upgrade to the Small Log Mill took place in 2003. In 2006, the Former Mill and attached wharf extension were closed; the associated structures were removed between 2006 and 2008. These structures are shown on Figure 2-2. The Small Log Mill continued to operate into early 2009, at which time operations on the Property and in-water area ceased. The GHHSA purchased the Property from Weyerhaeuser on March 29, 2013, for one dollar. On April 14, 2017, the GHHSA entered into aquatic lands lease No. 22-092275 with DNR. The DNR lease area borders the GHHSA-owned portions of the Property in the Chehalis River and extends upriver approximately 250 feet.

2.4.1 Shoreline Modifications and Historical Fill Events

Historical Sanborn Fire Insurance maps (Sanborn maps) from 1906, 1914, 1928, 1948, and 1989 are provided as part of the study area investigation in Appendix A. The Sanborn maps depict the development of mill-related structures on pilings in the Chehalis River, shoreline modifications resulting from filling events, and other important details regarding the composition of fill materials. Subsurface investigations within the footprint of the filled areas identify material consisting of silty sand and sandy silt with or without gravel, as well as wood waste (see fill areas and shoreline modifications on Figure 2-3). Shoreline modifications since 1906, illustrated on the Sanborn maps provided in the study area investigation in Appendix A, are summarized below.

1906: The 1906 Sanborn maps show a mill and related structures extending into the Chehalis River from Front Street between North Custer and Columbus streets. The structures are constructed on posts. These Former Mill structures were farther east and south than subsequent mill structures of the Former Mill. The 1906 mill and mill-related structures were in the approximate location of the present-day former Main Shipping Shed structure (Figure 2-2). Shorelines on either side of the 1906 mill area are not fully depicted in the Sanborn maps. However, the maps do show that the shoreline along Front Street at the mouth of the Shannon Slough is undeveloped. There is another mill to the east of the Site, just east of Lawrence Street labeled as lumber yard on saw dust fill. An overwater structure referred to as the ferry wharf is visible west of the Site. The Sanborn maps show mill-related development consisting primarily of irregular lumber piles on planked fill or planked on sawdust.

1914: The 1906 mill is not visible in the 1914 Sanborn maps. However, the Sanborn maps show that the shoreline at the mouth of Shannon Slough has been modified to extend farther north into the Chehalis River, as it was filled in with irregular lumber piles.

1928: The 1928 Sanborn maps show further offshore development north into the Chehalis River. The 1906 mill structures had been removed and the mill area shifted farther west between Custer and Clark streets. The structures shown are constructed on planks in the Chehalis River. The wharf that is currently present on the Site was constructed as of 1928—the wharf and mill site were built on pilings. The shoreline to the east of the current upland area is relatively unchanged.

1948: As of 1948, the area between the planked over-water structures and Front Street between Clark and Custer have been filled in with refuse and planked. The over-water structures remain on planks. The shoreline to the east of the upland area was relatively unchanged as of 1948.

1989: As of 1989, the entire former in-water area of the Chehalis River north of Custer Street and to the east to Shannon Slough has been filled, including a portion of the DNR lease area. According to the Sanborn maps, fill material in this area consisted of earth and rock and lumber piles on filled ground. The area east of Shannon Slough is shown as fill consisting of sawdust piles.

2.4.2 Former Operations and Areas

Former facility operations with demonstrated or potential environmental impacts to the in-water area are discussed below. Upland facility operations are not included in this discussion but are detailed in

the Level I environmental site assessment and RI for the upland area (PES, 2010; MFA, 2022). The areas identified below are shown on Figure 2-2.

2.4.2.1 Former Mill Area and Pocket Beach

The Former Mill Area, which included the Former Mill and wharf extension (see Figure 2-2), that appeared in the 1928 Sanborn map between Custer and Clark streets was originally constructed on pilings over the Chehalis River and the pocket beach area. Facilities and equipment were installed over plank flooring. Logs were rafted along the shoreline in this area to feed the mill. Before 1970, there was no spill protection to prevent spills on the flooring from falling into the river below. In the mid-1970s, Weyerhaeuser reportedly modified the flooring to prevent releases through the planking. Beginning in approximately 1980, containment pans were installed beneath all mill hydraulic components.

The Former Mill was closed in 2006 and was removed between 2006 and 2008, exposing the Chehalis River and the pocket beach area. More than 1,000 creosoted wood pilings were removed from this area during demolition. Creosote-treated piles can be harmful and toxic to aquatic species. Therefore, the removal of the creosote-treated pilings has been a major focus of DNR's restoration program and has also been used in the regulatory process to generate mitigation credits. Personal communication with Helen Bond, former environmental manager at Weyerhaeuser, suggests these pilings were removed completely during this effort. It is unknown whether these pilings were completely extracted or removed to mudline. This data gap will be addressed as part of future remedy predesign activities, which may include surveys (e.g., sonar surveys) to identify debris.

2.4.2.2 Lumber Shed

The lumber shed located in the northwest corner of the Property was used to store finished dimensional lumber. Historically, an iron fuel-oil tank was used to supply the internal combustion engine powered cranes at the west end of the wharf. According to the GHHSA staff, a fire destroyed much of this area in 1965.

2.4.2.3 Former Boiler

Wood-fired boilers were located adjacent to the powerhouse at the east end of the wharf. The boilers contained asbestos that reportedly was removed during demolition of the Former Mill. The footprint of the former boiler currently consists of concrete slabs propped on piles. One transformer currently present at the powerhouse does not contain polychlorinated biphenyls (PCBs). The powerhouse has been cleaned, and a vault below the powerhouse has been cleaned and filled with pea gravel. An oil house, which was used to store hydraulic oils used in the Former Mill, was also located next to the powerhouse.

2.4.2.4 Beach Area

Along the Chehalis River, the area between the pocket beach and the mouth of Shannon Slough consists of former tidal flats that historically were filled with unknown types and quantities of debris,

including wood waste (Figure 2-2). See Section 2.4.1 for information detailing what is known, based on historical Sanborn maps, regarding these fill events.

2.4.2.5 Shannon Slough

Shannon Slough meanders from south to north across the eastern portion of the Property and discharges into the Chehalis River next to the former chip loader area. The Shannon Slough discharge forms a small deltaic feature. Shannon Slough is a creek that receives stormwater runoff from the Property, upstream residential areas, and U.S. Highway 101. Currently, stormwater passes through catch basins and oil/water separators before discharging through various culverts directly into the Shannon Slough or Chehalis River. Drainage basins, conveyances, and outfall locations are shown on Figure 2-4. The Property's National Pollutant Discharge Elimination System sampling location is at the outfall along the west bank of Shannon Slough. In 1989, releases of paint waste to Shannon Slough resulted in a Clean Water Act enforcement action and conviction, and led to subsequent remediation activities (PES, 2010). Pilings are present in the mudflats along the northeastern portion of Shannon Slough. According to Sanborn maps (provided as part of the study area investigation in Appendix A), the pilings have been on the Site since at least 1906. Field observations of the pilings identified a thick, dark coating, creosote-like odor, and faint sheen on the water surface adjacent to the piles. Given their age and based on field observations of the pilings, it is reasonable to assume that the pilings are creosote-treated. There is potential for localized sediment impacts around the pilings.

2.5 Previous Investigations

Previous investigations were conducted on the Site in 1998, 2011, 2013, 2015, 2019, and 2020. The investigations conducted from 1998 through 2015 are summarized in the study area investigation report prepared by MFA (see Appendix A). The 2013 and 2015 investigations are further described below. This RI includes a review of analytical data collected from investigations from 2013 through 2020 and results are further discussed in Sections 6 and 8. The 1998 and 2011 data are not included in this RI, as those data are no longer considered representative of current sediment conditions in the in-water area due to the age of the data and the dynamics of the Chehalis River.

2013 Leased Property Sediment Sampling. In November 2013, MFA collected sediment samples from six locations in the Former Mill Area and in the Chehalis River (see Figure 2-4). The Chehalis River surface sediment samples (CR-01 through CR-03) were analyzed for total organic carbon (TOC), total metals, organic chemicals, phthalates, chlorinated organics, polycyclic aromatic hydrocarbons (PAHs), PCBs, semivolatile organic compounds (SVOCs), polychlorinated dibenzo-p-dioxins and -furans (dioxins/furans), and total petroleum hydrocarbon (TPH). The full suite of conventional analytes (conventionals; TOC, total volatile solids [TVS], total solids, ammonia as nitrogen, total sulfides) were not analyzed in samples CR-01 through CR-03 because wood waste impacts were not observed in those samples.

DNR and Ecology requested core sampling in the pocket beach area to further delineate historical elevated concentrations of butyl benzyl phthalate, pentachlorophenol (PCP), mercury, and dioxins/furans. Samples from three sediment cores (CR-04 through CR-06) were analyzed using a tiered approach, and the list of analytes included mercury, dioxins/furans, PCBs, SVOCs, and TPH.

Analysis for conventionals was conducted on surface sediment samples and select subsurface sediment that included more than 25 percent wood waste by volume.

Results of the 2013 investigation were compared to SMS criteria, and screening level exceedances of several SVOCs and PAHs, total PCBs, and mercury were identified up to 5 feet below mud line (bml). For conventional parameters, up to 49.5 percent TOC and up to 2,910 milligrams per kilogram (mg/kg) sulfide were observed, with the highest concentrations in sediment collected from the Pocket Beach.

2015 Study Area Investigation. MFA conducted a supplemental investigation in 2015 that included characterization of nearshore soil, reconnaissance groundwater, seep water, and stormwater adjacent to the pocket beach, as well as surface and subsurface sediment in the pocket beach area and Chehalis River. Samples were collected to identify sources of hazardous substances that have impacted sediment.

Sample locations included in this investigation are shown on Figure 2-4. Tideland soil samples CR-20 through CR-23 identified impacts of metals, PCBs, SVOCS, TPH, and dioxins/furans in one or more samples. Reconnaissance groundwater samples were also collected from locations CR-20 through CR-23 to identify potential upgradient sources of contamination to the pocket beach. Analyte concentrations in groundwater were compared to surface water screening levels and were generally non-detect or below the surface water screening levels, with the exception of total chromium, 1-methylnaphthalene, and TPH. An opportunistic seep sample (SEEP-01) was also collected from the pocket beach area to assess whether discharge is representative of groundwater. TPH impacts were identified in the seep sample and the water quality signature was found to be more similar to groundwater than to Chehalis River porewater. One stormwater sample was collected (STORM-01) near the pocket beach and results were compared to water quality criteria. Only total arsenic was detected above its water quality criterion. These results indicate that, except for TPH, analytes detected in soil do not appear to leach to groundwater in significant amounts and therefore likely do not contribute to impacts in sediment.

Sediment samples were collected at locations CR-07 through CR-19 and CR-24 through CR-26. This investigation identified presence of wood waste to significant depths (greater than 15 feet in some areas) and exceedances of SMS screening levels in sediment for benzyl alcohol, 4-methylphenol, benzoic acid, mercury, PCBs, phthalates, PAHs, PCP, phenol, SVOCs, and zinc. However, many of these exceedances were observed in one sample only or were slight exceedances of screening levels. These results were used to inform data needs for the fieldwork conducted as part of this RI.

3 ENVIRONMENTAL CONDITIONS

This section describes the environmental conditions at and in the vicinity of the Site, including topography and bathymetry, geology and hydrogeology, surface water, aquatic environment and bottom substrate, sedimentation and hydraulic assessment, beneficial water and land uses, critical areas, and climate.

3.1 Topography and Bathymetry

The upland topography and in-water area bathymetry were surveyed to NAVD 88 (Wilson Engineering, 2016; Berglund, Schmidt & Associates, 2016; see Figure 3-1). According to the U.S. Geological Survey Aberdeen, Washington, 7.5-minute series topographic map, the upland is located at elevations near sea level along the shoreline up to approximately 20 feet above mean sea level. The topography of the upland is generally flat, with elevations ranging from approximately 10 to 15 feet NAVD 88 (see Figure 3-1). Steep slopes are present around the upland portion of Shannon Slough with the top of the slope at approximately 10 feet and base of 4 feet NAVD 88.

Bathymetry data indicate that the top of the riverbank is at an elevation of approximately 13 feet NAVD 88. The riverbank then slopes steeply toward the beach, which slopes gently toward the Chehalis River. The shelf of the Chehalis River slopes steeply toward the center of the Chehalis River, where a federally maintained navigation is present, from an elevation of approximately 0 to -30 feet NAVD 88. Elevations in the pocket beach area range from approximately 9 feet NAVD 88 to 6 feet NAVD 88.

3.2 Geology and Hydrogeology

The Site is in the alluvial meander plain of the Chehalis River on the northwestern margins of the Willapa Hills physiographic region of southwestern Washington.

The Chehalis River valley is filled with variable thicknesses of recent alluvium consisting of river-deposited gravels, sands, and silts. Near the ocean, the thicknesses of these alluvial deposits can be significant (more than 100 feet) because of valley filling as rising sea levels decrease the river's ability to transport sediments downstream (Eddy, 1966). Well logs from resource protection wells in the vicinity of the Site indicate that alluvium in the area is at least 60 feet thick and consists of sands, silts, and clayey silts. Logs from borings located along State Highway 12 to the north indicate that the bedrock encountered below the alluvium at depths exceeding 100 feet consists of silt and sandstone.

Cross sections from a 1951 map of the Property provided by Weyerhaeuser indicate that much of the area of the main mill facilities was tideland prior to, and during, the early development in the late 1800s and early 1900s. Most of the early structures were constructed on wood-piling support platforms.

Upland soil borings advanced upgradient of the pocket beach during the investigations in 2015 and 2019 identified silts and silty sands beginning at depths of 8 to 9 feet bgs. The silts and silty sands are assumed to represent the original riverbed surface and were overlain by wood waste (up to 80 percent by volume of primarily wood and bark chips) of varying thicknesses—occasionally wood waste layers were more than 5 feet thick. Wood waste typically occurred around 4.5 to 5 feet bgs surrounding the pocket beach area. This layer of wood waste was overlain primarily by gravelly sands, comprising the layer to the ground surface. Borings advanced along the shoreline of the upland area identified dark brown, sandy sawdust at approximately 4 to 5 feet bgs, overlain by light brown sawdust and woodchips, with crushed gravel at the surface (SAIC, 2011).

Depth to groundwater in the upland area is approximately 4 to 5 feet bgs. MFA evaluated groundwater-to-surface-water as a potential pathway for contaminants to reach and discharge to the Chehalis River or Shannon Slough (see *Draft Upland RI report*; MFA, 2022). Groundwater in the northern and northwestern portion of the upland area discharges directly to the Chehalis River and is tidally influenced. Groundwater in the southern and southeastern portions of the upland area discharges to Shannon Slough, which flows into the Chehalis River at the northeastern corner of the upland area, though does not appear to be influenced by tides. Although available data suggests that the groundwater to surface water pathway is complete at some locations, there is little evidence that surface water in Chehalis River or Shannon Slough interacts with groundwater, as physical advection of surface water into groundwater is limited spatially and seasonally. The 2015 study area investigation and a 2010 investigation determined that water originating from seeps in the pocket beach area had a different chemical signature than Chehalis River water, suggesting that the seeps are more consistent with upland area groundwater and do not represent bank storage of river water inundated during high tide (see Appendix A; Floyd|Snider, 2010).

3.3 Surface Water and Stormwater

Surface water bodies in the vicinity of the Site include the Chehalis River to the north and east; the Wishkah River to the west; one small, unnamed drainage channel that enters the Chehalis River beyond the east end of the Site; and Shannon Slough in the southern and eastern portion of the Site, which enters the Chehalis River at an embayment located near the upstream portion of the Site (see Figures 2-1 and 2-2). All surface water drainages in the area ultimately discharge to the Chehalis River. The Chehalis River is tidally connected to Grays Harbor and the Pacific Ocean, resulting in a mixed semidiurnal tidal regime (i.e., two different high and two different low tides per lunar day). According to the Ecology Water Quality Atlas, the line between marine and freshwater coincides with the U.S. Highway 101 bridge, approximately 1,500 feet downstream of the Site (Ecology, n.d.). According to the National Oceanic and Atmospheric Administration, the tidal range in Aberdeen is between -4.3 feet and 10.6 feet NAVD 88 (NOAA, n.d.). During investigations, MFA staff observed that the pocket beach and other beach features are fully inundated at high tide and exposed at low tide.

Shannon Slough is a creek that receives stormwater runoff from the Property, upstream residential areas, and U.S. Highway 101. Currently, after passing through catch basins and oil-water separators, stormwater runoff from the Property flows through a conventional storm sewer pipe network and is discharged, through various culverts, directly into Shannon Slough or into the Chehalis River.

3.4 Aquatic Environment and Bottom Substrate

The Chehalis River is a tidal river that is frequented by commercial and recreational fisherman and provides habitat to multiple fish species including Chinook *(Oncorhynchus tshawytscha),* coho (*O. Kisutch)*, and chum *(O. keta)* salmon; steelhead *(O. mykiss)*, bull trout *(Salvelinus confluentus,* and eulachon *(Thaleichthys pacificus),* which are all listed under the federal Endangered Species Act as threatened. Moreover, white sturgeon *(Acipenser transmontanus)* are listed under the federal Endangered Species Act as endangered. Following removal of the mill, pilings, and debris in the Former Mill Area, the pocket beach area was colonized by vegetation characteristic of estuarine wetland environments, such as cattail and rushes. This section of the river has been observed to be a depositional area, with debris—

including loose pilings and household appliances—floating downstream and becoming lodged against the wharf. The apparent depositional nature of this section of river is further discussed in Section 3.5. Along the Chehalis River, the area between the pocket beach and the mouth of Shannon Slough consists of former tidal flats that were historically filled with unknown types and quantities of debris, including wood waste. Debris from the Former Mill are also present in surface sediment in this area. Shannon Slough meanders from south to north across the Property and discharges to the Chehalis River, forming a small deltaic feature. Multiple pilings are present in the mudflats along the northeastern portion of the slough and are the legacy of a historical salmon cannery.

Salinity data from 2013 Chehalis River sediment samples (e.g., samples CR-01 through CR-03) indicate that the in-water area is estuarine according to SMS guidance (i.e., salinity values of 0.5 to 25 parts per thousand). Samples collected in this area had salinity values ranging from 6.9 to 11 parts per thousand.

Select sediment samples collected in 2013, 2015, and 2019 were analyzed for grain size distribution. Percentages of fines (silt and clay) ranged from 29.7 to 85.1 in surface sediment and from 40.8 to 82.8 in subsurface sediment. Percentages of sand ranged from 11.4 to 46.8 and gravel ranged from 0 to 38.2 percent. Generally, larger grain sizes were observed near the Former Mill Area and finer grain sizes were observed along the shoreline.

3.4.1 Wood Waste

Significant accumulations of wood waste (>25 percent) were observed in the former boiler area and extend eastward from the Former Mill area to, and include, the pocket beach. Surficial sulfide bacterial mats were observed and are generally colocated with areas of significant wood waste accumulation (see Section 4.3). For some samples collected during the study area investigation and RI, wood debris or other debris would obstruct the core liner and necessitate that an additional boring be advanced nearby (typically within 5 to 10 feet) until a sample could be obtained. These investigations demonstrated that wood waste extends from near the surface to significant depths (more than 10 feet), and that, with distance from shore, the wood waste thickness decreases and the sediment layer overlying the wood waste increases. Additional information regarding wood waste nature and extent is provided in Section 8.

3.5 Sedimentation and Hydraulic Assessment

Watershed Science & Engineering prepared a sedimentation and hydraulics analysis in support of this RI (Appendix B). The assessment concluded that the riverbank and channel geometry in the Site has been relatively stable for the past 75 years. Recent survey data identified erosion of up to one foot since 2009 in some nearshore portions of the in-water area, however, this is not considered to be a significant long-term trend. Typical flow velocities during tidal cycles are less than two feet per second, and do not increase substantially during floods. Hydraulic modeling indicates that these velocities are not expected to cause significant erosion of sediment. Radioisotope analysis was also conducted on two sediment cores as part of this RI. Results from the analysis are provided in Section 4.2.

3.6 Beneficial Water and Land Uses

Providing protection for the highest beneficial use (i.e., the use requiring the highest quality in the resource) of water will generally also provide protection for other existing and future beneficial uses of water. Based on hydrogeological conditions observed on the Site and regional topography, the following surface water and shallow groundwater conditions are present in the area:

- Surface water in the region discharges to the Pacific Ocean.
- Shallow groundwater in the area appears to flow toward the Chehalis River.

Currently, there are no potable water wells on the Property. Shallow groundwater under the western portion of the upland area discharges to the Chehalis River and appears tidally influenced. Groundwater under the eastern portion of the upland area discharges to the Shannon Slough, which ultimately discharges to the Chehalis River. The current and reasonably likely future uses of the river include recreation, fishing, and fish and wildlife habitat. Grays Harbor provides habitat for a number of shellfish species, including clams, mussels, and Dungeness crab. There is limited information on the potential presence of shellfish in the Chehalis River upstream of the U.S. Highway 101 bridge. A recent field investigation conducted as part of the environmental impact statement for Washington State Route 520 pontoon construction facility, located approximately one mile downstream of the Site, found softshell clams (*Mya arenaria*) in the lower intertidal zone.

3.6.1 Tribal Uses

As described in Section 2.3, the QIN tribal fishing operations, including both drift gillnetting and set-netting methods, are conducted at and in the vicinity of the Site. Setnets are occasionally affixed to trees and other features along the shoreline. In addition to these fishing methods, QIN fishers also tie up to dolphins located at the Site when fishing. QIN fishing occurs in April through July for white sturgeon *(A. transmontanus)*, late September through November for Chinook *(O. tshawytscha),* coho (*O. Kisutch)*, and chum *(O. keta)* salmon, and December through April for winter steelhead *(O. mykiss)*. Little fishing occurs in the month of August. Any in-water activities have the potential to impact the QIN fishers' use of this portion of the Chehalis River for federally protected treaty fishing.

The in-water area is habitat for Chinook *(O. tshawytscha),* coho (*O. Kisutch)*, and chum *(O. keta)* salmon; steelhead *(O. mykiss)*, bull trout *(S. confluentus),* white sturgeon *(A. transmontanus)*, and eulachon *(T. pacificus),* and is occupied by at least one of these species the entire year:

- **Chinook *(O. tshawytscha)*.** Juvenile Chinook salmon migrate downstream through the Chehalis River system continuously and enter estuarine areas approximately March through August. Spring Chinook adults migrate through the Chehalis River early spring through July with the bulk of the migration occurring March through May. Adult fall Chinook migrate through August through November.
- **Coho (*O. Kisutch)*.** Coho salmon smolts migrate through the Chehalis River primarily in April and May and adult coho move through September through December.

- **Chum *(O. keta)*.** Juvenile Chum salmon migrate through the Chehalis River in March and April, and adult chum move through September through December.
- **Steelhead *(O. mykiss)*.** Steelhead smolt migrate through the Chehalis River March through May, and adult steelhead move through November through April.
- **Eulachon *(T. pacificus)*.** Eulachon juveniles migrate through the Chehalis River January through April, and adult eulachon move through in January and February.

3.7 Critical Areas Report

A critical areas report was prepared by Grette Associates LLC in October 2019 (Appendix C). This report was prepared to document wetlands, fish, and wildlife habitat conservation areas at the Site to meet the requirements defined in Chapter 14.50 of the City of Aberdeen's Shoreline Master Program. The primary findings of the report include the following:

- Three wetland areas were delineated: Wetland A in the pocket beach area; Wetland B-1 at the mouth of Shannon Slough; and Wetland B-2, in Shannon Slough south of the road crossing and associated tidal flap gate.
- Wetlands A and B-1 were classified as freshwater tidal wetlands, and Wetland B-2 was classified as a riverine wetland.
- Salt-tolerant vegetation was not observed in any of the designated wetlands.
- All three wetlands were classified as Category III, which are defined as wetlands with low habitat value that have generally been disturbed in some ways and are less diverse or more isolated from other natural resources in the landscape (Ecology, 2014b). This determination designates a buffer of 75 feet to each wetland. Aberdeen code states that buffers do not extend through existing developments (i.e., existing developments are grandfathered in and do not need to comply with buffer requirements).
- Shannon Slough was designated as a non-fish habitat natural water feature.
- The Chehalis River is classified as a Water of the State. Buffer determinations assumed high land use and the Industrial and Port Development shoreline environmental designation.
- According to the Washington Department of Fish and Wildlife, the Chehalis River provides habitat for the following salmonid species: chinook *(O. tshawytscha),* coho (*O. Kisutch)*, and chum *(O. keta)* salmon; steelhead *(O. mykiss),* resident coastal cutthroat trout (*O. clarki)*; and bull trout (*S. confluentus*).

3.8 Climate

The climate in Aberdeen, Washington, is characterized by mild winters and cool summers. Between 1991 and 2020, mean monthly temperatures varied from an average minimum of 41.7 degrees Fahrenheit in December to an average maximum of 61.8 degrees Fahrenheit in August. Average

monthly wind velocities range from 4.7 miles per hour in September to 7 miles per hour in January. The prevailing wind direction is to the east. Mean annual precipitation for Aberdeen is 84.94 inches. Average monthly precipitation varies from a low of 0.91 inch in July to a high of 13.93 inches in January.

Possible climate change impacts to the Site include rising sea levels, flooding due to tidal influences, wildfires, and landslides due to extreme precipitation events (Bethel and Nguyen, n.d.).

4 FIELD AND ANALYTICAL METHODS

Sediment sampling was conducted to refine the lateral and vertical extent of previously identified contamination and to facilitate remedial design for the in-water area. Sampling was conducted between September 23 and 27, 2019, and July 21 and 22, 2020. Sampling was coordinated to occur outside of the designated QIN fishing windows. Final sample locations were generally recorded with a global positioning device and are shown on Figure 4-1 (subsurface sampling locations) and Figure 4-2 (surface locations). Lithologic descriptions and the analytical suite for samples are provided in Table 4-1.

Samples were collected and handled under standard chain-of-custody procedures, consistent with the sampling and analysis plan provided as Appendix A of the RIWP (MFA, 2019a). Sediment core logs were documented in geologic logs (Appendix D). Sample documentation, field measurements, and observations were recorded on field sampling data sheets (Appendix E). A photograph log of the subsurface and surface samples is provided in Appendix F.[2] Investigation-derived waste consisted of sediment and disposable sampling equipment. Sediment collected during the in-water investigation was returned near the location in which it was collected within the Chehalis River or Shannon Slough. Personal protective equipment, paper towels, and expended core liners generated were disposed of as solid waste.

4.1 Sediment Field Methods

This section describes the surface and subsurface sediment sample field collection, wood waste characterization, and field screening methods.

4.1.1 Sediment Sample Collection

In September 2019, 20 subsurface sediment samples were collected using a Vibracore sampling device deployed from a subcontractor vessel at locations where previous sampling showed contamination was unbounded, or where previous sampling was constrained to shallow depths (e.g., less than 2.5 feet bml; Figure 4-1). Subsurface sediment samples were submitted for select analyses including SMS analytes, conventionals, and grain size as summarized below. Toxicity characteristic leaching

[2] Usable images that are representative of surface and subsurface samples are provided.

procedure (TCLP) samples to inform waste disposal considerations were collected at two subsurface locations, including locations where the presence of wood waste is known.

Surface (i.e., 0 to 10 centimeters [cm] bml) sediment samples were also collected in September 2019 (Figure 4-2), using a PONAR sampling device, hand auger, or trowel (e.g., nearshore locations during low tide). Surface sediment samples were submitted for select analyses as described below. A composite background surface sediment chemistry sample was collected upstream of the Site (i.e., SE-21), and a discrete surface sediment background sample was collected in Shannon Slough (i.e., SE-20). Surface sediment samples were also collected in July 2020, for conventionals and porewater sulfide.

All sediment samples were transferred to a stainless-steel bowl and homogenized with a stainless-steel spoon before they were placed in laboratory-supplied sample containers. Under standard chain-of-custody procedures, samples were submitted to Apex Laboratories LLC of Tigard, Oregon for archiving or for one or more of the following analyses:

- Ammonia as nitrogen by Plumb (1981)/Standard Methods for the Examination of Water and Wastewater (SM) 4500-NH3 G
- Dioxins/furans by U.S. Environmental Protection Agency (EPA) 1613B
- Diesel- and residual-range (Dx) hydrocarbons by Northwest TPH NWTPH-Dx with silica gel cleanup
- Gasoline-range (Gx) hydrocarbons by NWTPH-Gx
- Grain size by Puget Sound Estuary Protocols (PSEP) 1986 (Ecology et al., 2015)/ASTM D422 modified
- PCBs as Aroclors by EPA 8082A
- Porewater salinity by SM 2520 B-00
- SVOCs by EPA 8270D
- Sulfide and/or porewater sulfide by SM 4500-S2-D-00
- Total metals (including arsenic, cadmium, chromium, copper, lead, nickel, selenium, silver, and zinc) by EPA 6020A
- Total mercury by EPA 7470A/7471B
- TOC by EPA 9060A-modified/SM 5310C
- Total solids by PSEP 1986
- TCLP mercury by EPA 1311/7470A
- TCLP lead by EPA 1311/6010C
- TVS by SM 2540G

4.1.2 Wood Waste Sample Collection and Screening

Subsurface sediment samples were collected using a Vibracore deployed from a subcontractor vessel. Samples were collected to refine the extent of wood waste, primarily in areas not previously investigated (Figure 4-1). These areas included the vicinity of the chip loader and transects closer to the center of the Chehalis River. Cores were retrieved and visually inspected for wood waste along transects that moved perpendicularly away from the shore or from potential wood waste source(s) until significant wood waste was no longer observed. In some cases, during the study area investigation

and RI, wood debris or other debris would obstruct the core liner and necessitate an additional boring be advanced nearby (typically within 5 to 10 feet) until a sample could be obtained. Wood waste was also commonly observed along the shoreline in the beach area between the pocket beach and Shannon Slough.

Significant wood waste is defined as greater than 25 percent by volume. Wood waste volume was estimated in the field by an MFA environmental scientist or geologist. Subsurface sediment cores were visually inspected for the presence and vertical extent of wood waste impacts. A minimum of one sample was collected for analysis of conventional parameters related to wood waste impacts at each wood waste investigation transect. Twenty samples were submitted to Apex Laboratories LLC for archiving or for one or more of the following analyses:

- Ammonia as nitrogen by Plumb (1981)/SM 4500-NH3-G
- Sulfide and/or porewater sulfide by SM 4500-S2-D-00
- TOC by EPA 9060A-modified/SM 5310C
- Total solids by PSEP 1986
- TVS by SM 2540G

4.1.3 Field Screening

Sediment cores were generally field screened for volatile organic compounds, using a photoionization detector (PID). Sediment samples were placed in a Ziploc bag (filled less than half full) and allowed to warm to ambient temperatures. PID measurements were made within 30 minutes of collection by inserting the 10.2 eV PID probe into the bag. Measurements were recorded on the geologic logs (Appendix D).

4.2 Analytical Methods

4.2.1 Radioisotope Analysis

Samples were collected for radioisotope analysis at two subsurface locations within the previously interpreted boundaries of wood waste (Figure 4-2) to evaluate sediment accumulation rates. One sample location was within the pocket beach inlet (SE-12) and the other sample was located further upstream offshore (SE-08B-RADIO; Figure 4-1). Each core was sectioned every 1 cm in the top 20 cm bml, every 2 cm from 20 to 40 cm bml, and in 5-cm increments below 40 cm bml, as determined in coordination with Flett Research. Samples were collected in clean, heavy-walled, water-tight polypropylene jars and sent to Flett Research in Winnipeg, Manitoba, Canada, for analysis of lead-210, radium-226, and cesium-137.

4.2.2 Sediment Bioassay

As is outlined in Ecology's SCUM II guidance, acute and chronic ecological toxicity testing (i.e., bioassay testing) was performed to assess the effects of sediment contamination on benthic organisms. These data were used as a line of evidence to assess potential adverse effects related to chemical

contamination and/or the presence of wood waste in sediment. Bioassays evaluate the toxicity of sediment to the benthic community more holistically than screening individual chemicals against screening criteria (Ecology, 2021). Specifically, bioassays account for bioavailability of contaminants to benthic organisms, other-than-additive effects of chemical mixtures in sediments, and toxicity of non-chemical stressors such as wood waste (Ecology, 2021).

Eight surface (i.e., 0 to 10 cm bml) sediment samples were collected at sampling locations SE-15 through SE-18, SE-20, SE-24, SE-26, and SE-31 (Figure 4-2) and submitted to EcoAnalysts, Inc. (EcoAnalysts) for standard SMS marine bioassay analysis by PSEP 1986, including a ten-day amphipod test, a 20-day juvenile polychaete survival and growth test, and a benthic larval development test (Ecology et al., 2015). The benthic toxicity surface sediment samples were colocated with select discrete surface sediment chemistry samples described above.

Three standard marine bioassays were conducted at eight locations (i.e., SE-15 through SE-18, SE-20, SE-24, SE-26, and SE-31) spanning the in-water area. EcoAnalysts also collected three reference sediment samples for bioassay control testing from Carr Inlet in Puget Sound, Washington. The reference sediment samples were tested concurrently with each bioassay and used to estimate non-treatment effects due to grain size. All reference sediments were analyzed for total solids, TOC, bulk ammonia, total sulfides, and grain size.

4.2.3 Diffusive Gradients in Thin Film Sampling

Ten diffusive gradients in thin-film (DGT) passive samplers were deployed along the shoreline (Figure 4-1) for approximately 24 hours to obtain the bioavailable fraction of sulfide in sediment. In situ porewater potential hydrogen (pH), temperature, and salinity data were evaluated with a soil probe prior to retrieval of the DGT samplers. These parameters inform calculation of hydrogen sulfide, which represents the toxic portion of sulfides.

Surface sediment samples were collected after DGT passive samplers were retrieved to avoid disturbance of sediment prior to deploying the DGT units. Discrete samples were placed directly into sample collection jars and submitted to Apex Laboratories LLC for analysis by the following methods:

- Ammonia as nitrogen by Plumb (1981)/SM 4500-NH3
- Bulk sulfide by SM 4500-S2-D-00
- Porewater salinity by centrifuge extraction and SM 2520 B-00
- Porewater sulfide by centrifuge extraction and SM 4500-SD-D-00
- TOC by EPA Method 9060A
- Total solids by PSEP 1986
- TVS by SM 2540G

Field measurements of porewater pH, temperature, and salinity were used to inform the calculation of hydrogen sulfide. Laboratory-derived porewater salinity was used for comparison purposes only. A detailed discussion of the DGT sampling methodology and results is provided in Appendix G.

4.3 Sulfide Seep Survey

During the deployment of the DGT, MFA conducted a sulfide seep survey along the shoreline to document and photograph seeps and to document whether and where sulfide bacterial mats[3] are present. Seeps were identified as wet areas where light or white filamentous material was observed. Locations of possible sulfide seeps are shown on Figure 4-2 and as part of a photograph log provided in Appendix F.

4.4 Deviations from Work Plan

Modifications to the RIWP sampling regime were coordinated with Ecology. The following sampling locations were modified due to information gained during sampling activities, or due to difficulties encountered during sampling (i.e., tidal conditions, strong currents, debris on river bottom preventing sediment retrieval, time constraints due to fishing windows, or access issues). Final sample locations are shown on Figures 4-1 and 4-2.

- SE-01C: Shifted initial transect to the northwest.
- SE-01D: Shifted initial transect to the northwest.
- SE-04: Canceled due to time constraints.
- SE-07A: Shifted initial transect to the northwest.
- SE-09: Canceled due to time constraints.
- SE-11: Canceled due to time constraints.
- SE-12: Collected radioisotope sample at this location.
- SE-13: Canceled after five failed attempts to retrieve sediment.
- SE-14: Moved to location northeast of concrete slabs.
- SE-15: Moved in line with SE-08 transect.
- SE-17: Moved to vicinity of SE-01A.
- SE-18: Moved to the northwest to be further away from revised SE-17 location.
- SE-22: Collected discrete sample in place of composite sample due to access constraints.
- SE-26: Shifted east from initial location to drainage area of pocket beach.
- SE-27: Shifted west from initial location, further offshore.
- SE-29: Subsurface sediment chemistry sample collected instead of at SE-12.
- SE-30: Collected subsurface sediment sample in place of SE-09 and SE-11.
- SE-31: Added surface sediment sample location between SE-17 and SE-19.

Other sampling notes or deviations include the following:

- Two borings (RAU2-GA1 and RAU2-GA2) were completed as part of upland activities near the pocket beach area. The lithology (including percentage wood waste) of these borings was used to inform the determination of the extent of wood waste at the Site. The analytical data from these borings will be included in the RI for the upland area.

[3] Observed mats appeared to consist of sulfide-oxidizing bacterium *Beggiatoa*.

- Mercury was tested in addition to the typical wood waste parameters in a few cases. The mercury data are included for completeness.
- At SE-06A, sulfide analysis was not initially requested, and upon review, the sulfide analysis was not conducted due to hold time exceedance and preservation requirements for sulfide analysis.

5 SCREENING LEVELS

According to MTCA, the cleanup standards for a site have two primary components: chemical-specific cleanup levels (CULs) and points of compliance (POCs). The CUL is the concentration of a chemical in a specific environmental medium that will not pose unacceptable risks to human health or the environment. The POC are the areas where the CUL must be met. The CULs for the Site will be informed by screening levels that consider human health and ecological receptor exposure pathways. Screening levels protective of ecological receptors and human health are further described in this section.

5.1 Screening Levels for Protection of Benthic Organisms

Screening levels for protection of benthic organisms are presented in Table 5-1. Lower-tier sediment cleanup objective (SCO) sediment cleanup standards were established using criteria and procedures presented in the SCUM II guidance (Ecology, 2021). The SCO cleanup standards are the long-term sediment quality goals; they are the lowest chemical concentrations allowed as sediment CULs. Based on salinity measurements collected from the Chehalis River within the in-water area in 2013 (i.e., 6.9 to 11 parts per trillion), both freshwater and marine SMS benthic criteria were incorporated into sediment screening level determinations, consistent with Ecology guidance and common practice (Ecology, 2021).

Marine criteria for benthic organisms are based on either dry-weight or organic carbon-normalized concentrations. Analytical results for data were organic carbon-normalized if the TOC concentration was within the standard 0.5 to 3.5 percent range. Analytical results for data outside of the standard 0.5 to 3.5 percent TOC range were screened against marine sediment apparent effects threshold (AET) values on a dry-weight basis consistent with Table 8-1 in the SCUM II guidance (Ecology, 2021), or against the freshwater benthic criteria if lower (more protective) than the marine AET values.

Two sets of screening levels for benthic organisms were established: one for samples within the standard 0.5 to 3.5 percent TOC range and one for samples outside of that range. The lowest (most protective) benthic screening levels were established as shown in Table 5-1 for each TOC range.

Marine biological criteria for each biological test for sediment bioassay samples are provided in Table 8-2 of the SCUM II guidance (Ecology, 2021). Adverse effects for the amphipod test are based on 10-day mortality, adverse effects for the larval test are based on bivalve or echinoderm abnormality or mortality, and the juvenile polychaete test measures the Neanthes 20-day growth. Criteria associated

with SCO and CSL screening levels are provided in Table 8-2 of the SCUM II guidance and in the bioassay laboratory report (Ecology, 2021; Appendix I).

5.2 Screening Levels for Protection of Human Health and Higher Trophic Level Ecological Receptors

Screening levels for the protection of human health and higher trophic ecological receptors are provided in Table 5-2. These screening levels account for potentially complete exposure pathways via human sediment ingestion/dermal contact and aquatic organism ingestion (e.g., fishers and fish-eating ecological receptors) and were established using the following:

Risk-based concentrations (RBCs). Human health RBCs for sediment ingestion/dermal contact for the beach play (child), subsistence clam digging (adult), and subsistence net fishing (adult) scenarios were considered as provided in Table 9-3 in the SCUM II guidance. The lowest (most protective) value was identified as the human health direct contact RBC.

Option 1 in the SCUM II guidance was used to determine screening levels that account for the potentially complete aquatic organism ingestion (bioaccumulation) pathway. Option 1 is a simplified approach where the screening level is established at natural background or the practical quantitation limits (PQL), whichever value is higher. Ecology also provides an alternative (Option 2) for generating criteria to protect against the accumulation of chemicals in tissue and subsequent ingestion by higher trophic levels (i.e., fish, birds, mammals, and humans). Calculating biota-sediment accumulation factors via option 2 is a more time-intensive process that often results in criteria that are unattainable because they are below background concentrations and/or PQLs. Under Option 1, the higher of natural background and PQL was identified as the screening level protective of aquatic organism ingestion (bioaccumulation) for human health and ecological receptors. All chemicals identified as bioaccumulatives in the SCUM II guidance, Appendix K, were considered.

Natural background. Natural background is defined in WAC 173-204-505(11) as "the concentration of a hazardous substance consistently present in the environment that has not been influenced by localized human activities." Natural background concentrations for selected analytes in marine sediment are provided by Ecology in the SCUM II guidance (Ecology marine site natural background 90/90 upper tolerance limit [UTL]). Natural background concentrations for freshwater sediment have not been developed by Ecology to date; however, background data have been collected immediately upstream of the Site as further described in section 7 and were also considered during nature and extent determinations for the Site (see section 8).

Practical quantitation limits (PQLs). The PQL is defined in WAC 173-204-505(15) as "the lowest concentration that can be reliably measured within specified limits of precision, accuracy, representativeness, completeness, and comparability during routine laboratory operating conditions, using department approved methods." PQLs provided in Table 11-1 of the SCUM II guidance were used for screening level determination (Ecology, 2021).

The bioaccumulation screening levels for protection of human health and higher trophic level ecological receptors were identified as shown in Table 5-2.

5.3 Wood Waste

Wood waste in large volumes can overwhelm the assimilative capacity of sediment and affect the aquatic environment physically, chemically, and biologically. Wood waste impacts can result from the following:

- The physical presence of wood waste, which prevents biota from thriving and recruiting in and on healthy native substrate
- Decreased dissolved oxygen due to microbial decomposition, which can create an unhealthy or toxic environment for biota
- Decomposition by-products such as sulfides, ammonia, and phenols, which can cause or contribute to toxicity

As a result, wood waste is considered a deleterious substance in the environment that is subject to cleanup, consistent with MTCA and SMS rules. Site-specific cleanup levels associated with wood waste informed by multiple line of evidence are provided below and are discussed in greater detail in the site-specific wood waste cleanup level development memorandum included as Appendix H.

Based on the relationship between the wood waste parameters and bioassay test results from samples collected from the in-water area, MFA recommends incorporating TOC, TVS, and wood waste percent into the site-specific wood waste cleanup level. Samples containing higher concentrations of TOC, TVS, and wood waste percent correlated with bioassay failures. Sulfides and ammonia are not incorporated in the site-specific wood waste cleanup level. Bulk sulfides did not correlate with bioassay results, whereas higher concentrations of porewater sulfides did correlate with bioassay failure. However, because bioassay failures associated with high porewater sulfide concentrations correlated well with TOC and TVS, porewater sulfides are thereby accounted for with TOC and TVS. Ammonia concentrations did not correlate well with bioassay results and were therefore excluded from the wood waste scoring matrix. Although there are studies that have evaluated and published concentrations that result in toxic effects for porewater sulfides, those concentrations are widely variable. Podger (2013) summarized sulfide toxicity values ranging from 0.1 to 32 mg/L whereas Berlin et al. (2019) indicated values as low as 1 to 2 mg/L are toxic for numerous marine species. There is significant variability in published toxic concentrations, therefore porewater sulfide was excluded as a parameter for developing a site-specific wood waste cleanup level. Instead, TOC, TVS, and wood waste percentage are used as a proxy for porewater sulfides as indicators of wood waste toxicity. The *Wood Waste Cleanup* guidance document (Ecology, 2013) summarizes site-specific cleanup case studies. Wood waste percentages that required cleanup ranged from 25 percent (Scott Paper Mill) to 50 percent (Hylebos Waterway and Barbee Mill).

Based on the relationship between the wood waste parameters and bioassay test results from site samples, a proposed site-specific wood waste cleanup level has been developed that incorporates TOC, TVS, and wood waste percent, using a three-part scoring matrix, as shown in the table below. Points were assigned based on parameter ranges and summed to assess compliance with the site-specific wood waste cleanup level. Locations that receive a score of two or greater exceed the site-specific wood waste cleanup level. Additional data may be needed for final decision making at some

sample locations where all three parameters are not available. Parameter ranges and associated scoring are presented in the table below (also see Appendix H).

Parameter	0 Point Range	1 Point Range	2 Point Range
TOC (%)	< 6	6 – 7	> 7
TVS (%)	< 14	14 – 16	> 16
Wood waste (% Volume)	< 25	25 – <50	≥ 50
NOTES: Based on parameter ranges, award either zero (0), one (1), or two (2) points. If the total points for a sample location equal or exceed two (2), the sample is not in compliance with the site-specific wood waste cleanup level. The POC is the top 10 cm bml. It is recognized that deeper wood will continue to decompose into by-products such as sulfides, ammonia, and phenols. Deeper wood will be addressed as part of the FS.			

5.4 Preliminary Cleanup Standards

Preliminary cleanup standards were developed based on the screening levels for the protection of benthic organisms and human health and higher trophic level ecological receptors (see Tables 5-1 and 5-2) and by identifying potential POCs. For sediment, the POC is the point or points at which the CUL must be attained for a site to comply with the cleanup standards. The POC for benthic organisms and human health and higher trophic level ecological receptors consists of the biologically active zone in the top 10 cm bml (see Table 5-3). If the CUL is based on the PQL or background (i.e., criteria for bioaccumulation), the POC must be attained over an area-wide average in the top 10 cm bml. For sediment CULs based on benthic criteria, the POC is the top 10 cm bml and must be attained on a point-by-point basis. Preliminary cleanup standards protective of all potential exposure pathways are summarized in Table 5-3. Note that the preliminary cleanup standards are shown to summarize potential CULs and POCs and it is not anticipated that cleanup standards will be developed for all chemicals shown. The SCO based criteria are shown as the presumptive CUL, and a higher CUL may be set (between SCO and CSL-based criteria), if justified by technical feasibility and net adverse environmental impact on natural resources and habitat. The final site-specific CULs and cleanup standards are defined on a site-by-site basis by Ecology.

Cleanup standards will ultimately be developed for relevant indicator hazardous substances (IHSs) identified in this report. IHSs are those compounds that are included for further consideration during the development of the cleanup approach because of their frequency, mobility, persistence in the environment, or toxicity. Compounds can be eliminated from further consideration on a site-specific basis, using the following evaluation factors outlined in WAC 173-340-703:

- The toxicological characteristics of the hazardous substance relative to the concentration of the hazardous substance at the Site
- The chemical and physical characteristics of the hazardous substance that govern its tendency to persist in the environment

- The chemical and physical characteristics of the hazardous substance that govern its tendency to move into and through environmental media
- The natural background concentrations of the hazardous substance
- The thoroughness of testing for the hazardous substance at the Site
- The frequency at which the hazardous substance has been detected at the Site
- Degradation by-products of the hazardous substance

IHSs for the Site are identified and further discussed in section 8.

6 ANALYTICAL RESULTS

This section summarizes the sediment chemistry, radioisotopes, and bioassay data for samples collected during the investigation. Laboratory reports are provided in Appendix I.

Analytical data and the laboratory's internal quality assurance and quality control data were reviewed to assess whether they meet project-specific data quality objectives. This review was performed consistent with accepted EPA procedures for evaluating laboratory analytical data (EPA, 2017a,b) and appropriate laboratory and method-specific guidelines. A data validation memorandum summarizing data evaluation procedures, usability of data, and deviations from specific field and/or laboratory methods as they relate to sediment chemistry data is provided as Appendix J. The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

6.1 Data Usability

Analytical results collected during RI activities were reviewed for usability and are qualified consistent with EPA procedures and appropriate laboratory and method-specific guidelines (see Appendix J). Data validation memoranda for historical data that have been previously submitted to Ecology are available in the study area investigation in Appendix A. All validated analytical data have been uploaded to Ecology's Environmental Information Management System database.[4]

Detected concentrations of some constituents were summed for comparison to applicable screening levels, as described in Section 5. Descriptions of how the constituents were summed are as follows:

- Total PCBs are the sum of detected Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260, with non-detected values assigned a value of zero; where all results are non-detect, the highest detection limit is used.

[4] Available at Environmental Information Management database - Washington State Department of Ecology (accessed April 12, 2022).

- Total PAHs
  - **Total High-Molecular-Weight PAHs** (HPAHs) are the sum of benzo(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; benzo(ghi)perylene; benzo(k)fluoranthene; chrysene; dibenzo(a,h)anthracene; fluoranthene; indeno(1,2,3-cd)pyrene; and pyrene. Non-detect results are not included in the sum. When all analytical results are non-detect, the highest detection limit is used.
  - **Total Low-Molecular-Weight PAHs** (LPAHs) are the sum of acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene. Non-detect results are not included in the sum. When all analytical results are non-detect, the highest detection limit is used.
  - **Total PAHs** are the sum of 1-methylnaphthalene; 2-methylnaphthalene; acenaphthene; acenaphthylene; anthracene; benzo(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; benzo(ghi)perylene; benzo(k)fluoranthene; chrysene; dibenz(a,h)anthracene; fluoranthene; fluorene; indeno(1,2,3-cd)pyrene; naphthalene; phenanthrene; and pyrene. Non-detect results are not included in the sum. When all analytical results are non-detect, the highest detection limit is used.
- **Toxic Equivalent Quotients (TEQs).** Consistent with WAC 173-340-708(8), mixtures of dioxins and carcinogenic PAHs (cPAHs) are considered as single hazardous substances in evaluating compliance with preliminary cleanup levels such that the toxicity of a particular congener is expressed relative to the most toxic dioxins or cPAH congener (i.e., 2,3,7,8-tetrachloro dibenzo-p-dioxin [TCDD] and benzo(a)pyrene, respectively). The toxicity of dioxins and cPAHs as groups was assessed using a toxic equivalent approach. Each congener in the group is assigned a toxic equivalent factor (TEF) describing the toxicity of that congener relative to the toxicity of the reference compound, TCDD or benzo(a)pyrene. Multiplying the concentration of a congener by its TEF produces the concentration of TCDD or cPAH that is equivalent in toxicity to the congener concentration of concern. Summing those values permits expression of all congener concentrations in terms of a total TCDD or cPAH TEQ (i.e., dioxin TEQ and cPAH TEQ, respectively):

$$\text{Dioxin TEQ} = \sum_{i=1}^{k} C_i \times TEF_i$$

$$\text{cPAH TEQ} = \sum_{i=1}^{k} C_i \times TEF_i$$

Where C_i = individual TCDD or dioxin-like compounds and TEF_i = TEF assigned for TCDD or dioxin-like compound.

Dioxin and cPAH TEQs were qualified and calculated as follows:

- Congeners qualified as non-detect and flagged with a "U" are used in the TEQ calculation at one-half the associated value.
- Congeners qualified as estimated and flagged with a "J" are used without modification in the TEQ calculation.

- Congeners qualified as non-detect with an estimated limit (i.e., flagged with a "UJ") are used in the TEQ calculation at one-half the associated value.
- If all congeners in a chemical group are undetected, the group sum is reported as the highest detection limit.

The most recent effort to develop TCDD TEFs for dioxins, made at an expert meeting organized by the World Health Organization in 2005 (Van den Berg et al., 2006), used multiple lines of evidence to develop a consensus-based list of TEFs for mammal, bird, and fish receptors of dioxins. These TEFs were used to develop the dioxin TEQ. TEFs for cPAHs were used consistent with WAC 173-340-708(8)(e) and Table 708-2 of WAC.

6.2 Sediment Chemistry

A summary of analytical results for data collected between 2013 and 2020, including detection frequency, minimum and maximum detected values, and exceedance frequency, is provided in Table 6-1. Sediment analytical results were compared against screening levels protective of benthic organisms and human health and higher trophic ecological receptors. Results for data obtained from the in-water RI conducted in September 2019 and July 2020 are summarized in Table 6-2, results from 2013 and 2015 are summarized in Table 6-3, and results for wood waste parameters (including conventionals, porewater sulfide, and bioassay) are provided in Table 6-4. Screening level exceedances for all samples collected between 2013 and 2020 are shown on Figures 6-1A and 6-1B. Surface sediment includes samples collected between 0 and 10 centimeters bml and subsurface sediment includes samples collected deeper than 10 centimeters bml.

6.2.1 Conventionals

TOC, TVS, ammonia as nitrogen, and bulk sulfide were generally detected in all samples analyzed. Site-specific wood waste cleanup levels–including levels for wood waste percentage, TOC, and TVS–were developed for the Site and are discussed in section 5.3 and Appendix H. Scoring and cleanup level failures for sediment samples collected from the in-water area are provided in Table 6-5. Twenty of the 73 locations (i.e., 27 percent of samples) analyzed for wood waste parameters failed the site-specific wood waste cleanup level. Conventionals results are shown on Figures 6-2A and 6-2B and are summarized here:

- TOC was analyzed and detected in all 70 samples between 0.415 and 49.5 percent. TOC ranged from 1 to 35.6 percent in surface samples and 0.415 to 49.5 percent in subsurface samples. TOC in samples collected from the beach area and further riverward ranged from 1.09 to 13.6 percent, while samples collected in the pocket beach and vicinity of the Former Mill Area ranged from 0.415 to 49.5 percent. Eleven samples collected from nine sample locations exceeded the site-specific wood waste cleanup level of 7 percent TOC. Except for two samples collected in the pocket beach that had TOC concentrations between 16.5 and 49.5 percent (CR-04, CR-06), the remaining exceedances ranged from 7.1 to 13.6 percent.

- TVS was analyzed and detected in 44 samples between 2.51 and 69.2 percent. TVS ranged from 2.51 to 60.5 percent in surface samples and 7.49 to 69.2 percent in subsurface samples. TVS in samples collected from the beach area and further riverward ranged from 5.02 to 36.5 percent, while samples collected in the pocket beach ranged from 2.51 to 69.2 percent. Fourteen samples from 12 sample locations exceeded the site-specific wood waste cleanup level of 16 percent TVS, with exceedances ranging from 18.4 to 69.2 percent.
- Ammonia, as well as bulk sediment (dry weight) and porewater sulfide, can indicate potential toxicity associated with wood waste. Ammonia as nitrogen was analyzed in 44 samples and detected in 43 samples. Ammonia as nitrogen ranged from 0.47 to 26.4 milligrams of nitrogen per kilogram (mg N/kg) in surface samples and 4.76 to 408 mg N/kg in subsurface samples. Two samples collected near the chip loader and beach area exceeded the cleanup level of 230 mg N/kg.
- Bulk sulfide was detected in 41 of the 43 samples analyzed and ranged from 2.7 to 2,110 mg/kg in surface samples and 124 to 4,040 mg/kg in subsurface samples. 39 of the samples exceeded the cleanup level of 39 mg/kg. Porewater sulfide was analyzed by the laboratory in 16 surface samples and detected in 13 samples at concentrations between 0.06 and 0.202 milligrams per liter (mg/L). DGT-calculated porewater sulfide ranged from 0.01 to 7.85 mg/L.

6.2.2 TCLP

Three subsurface samples (two samples in 2019 and one sample in 2015) collected from within and near the pocket beach were analyzed for TCLP lead and mercury to inform potential waste disposal considerations. All three samples were non-detect.

6.2.3 Metals

Up to 54 samples were analyzed for one or more metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, and zinc). Copper, lead, mercury, and zinc were the most frequently detected metals (detected in 93 to 100 percent of the samples). Metals detections were generally consistent across locations, with a few exceptions in the pocket beach where individual metals tended to have higher concentrations.

- Arsenic was detected slightly above the bioaccumulation screening level (11 mg/kg) in surface and subsurface samples collected in the Former Mill Area (CR-08A, CR-08B, CR-15C, CR-17D, CR-18B) and the beach area (CR-19F), in a surface sample collected near the mouth of Shannon Slough (CR-10) and riverward of the wharf (CR-26). Arsenic was detected above the screening levels as deep as 20 feet bml. Exceedances ranged from 20 to 30 mg/kg. Note that arsenic was not detected above screening levels in samples collected in 2019.
- Cadmium, chromium, copper, silver, and zinc were not detected above applicable screening levels.

- Lead was detected above the bioaccumulation screening level (21 mg/kg) in surface samples collected in the Former Mill Area (CR-08A) and in surface and subsurface samples collected in the pocket beach (CR-06, SE-10, SE-14, SE-23 through SE-26). Lead was detected above the screening level as deep as 3.7 feet bml. Exceedances ranged from 24 to 110 mg/kg, with the highest concentrations observed in the pocket beach.
- Mercury was detected above the bioaccumulation (0.2 mg/kg) and benthic screening level (0.41 mg/kg) in surface and/or subsurface samples collected in the pocket beach (CR-04, CR-05, CR-06, SE-07A). Mercury was detected above the benthic and bioaccumulation screening levels as deep as 2.5 feet bml. Excluding surface sample CR-04 (6.2 mg/kg), exceedances were slightly above the screening levels and ranged from 0.226 to 0.55 mg/kg.
- Nickel was detected slightly above the benthic screening level (26 mg/kg) in surface samples collected in the pocket beach (SE-14, SE-23, SE-24), near the beach area (SE-16, SE-17, SE-18, SE-27), in Shannon Slough (SE-22), near the chip loader (SE-31), and in subsurface samples collected in the Former Mill Area (SE-29) and near the beach area (SE-30). Exceedances ranged from 26.1 to 40.2 mg/kg. Although nickel was detected above the benthic screening level, the natural background concentration for nickel is 50 mg/kg and no samples exceeded that value.

6.2.4 Organic Chemicals

Up to 52 samples were analyzed for one or more organic chemicals. Except for n-nitrosodiphenylamine (which was not detected in any samples), the remaining organic chemicals were detected at least once, and at least one organic chemical was detected in each sample. Phenol was the most frequently detected organic chemical, detected in 79 percent (41 of the 52) of samples analyzed at concentrations between 8.4 and 980 micrograms per kilogram (ug/kg). The highest concentrations were observed in samples collected in 2013 from the beach area, the pocket beach, and on the downstream end of the wharf.

- 2,4-dimethylphenol reporting limits exceed the screening level in all samples collected in 2019 and in approximately 20 percent of samples collected in 2013 and 2015. The one detected sample had a concentration of 17 ug/kg, below the benthic screening level (29 ug/kg).
- 3- & 4-methylphenol (m,p-cresol) was detected above the benthic screening level (260 ug/kg) in surface sample SE-31 collected on the downstream end of the chip loader and subsurface samples collected in the Former Mill Area (SE-29) and the pocket beach (SE-10). 3- & 4-methylphenol was detected above the benthic screening level as deep as 3.7 feet bml. Excluding subsurface sample SE-29 (1,600 ug/kg), exceedances were minor and ranged from 209 to 267 ug/kg. 3- & 4-methylphenol was not analyzed in samples collected during the 2013 or 2015 investigations.
- Benzoic acid was detected above the benthic screening level (650 ug/kg) in a surface sample collected from the downstream end of the wharf (CR-24), and in surface and/or subsurface samples collected in the pocket beach (CR-04, CR-05, CR-06). Benzoic acid was detected above the benthic screening level as deep as 2.5 feet bml. Exceedances ranged

from 680 to 1,700 ug/kg. Note that the reporting limit exceeds the benthic screening level for samples collected in 2019.

- Benzyl alcohol was detected slightly above the benthic screening level (57 ug/kg) in a surface sample collected from the beach area (CR-09B) and in a subsurface sample collected from riverward of the wharf (CR-26; 0.5 to 1 foot bml). Exceedances were minor and ranged from 58 to 64 ug/kg. Note that the reporting limit exceeds the benthic screening level for nearly all samples collected in 2019.
- Phenol was detected above the benthic screening level (120 ug/kg) in surface samples collected from the beach area (CR-09A, CR-09B), and in surface and/or subsurface samples collected in the pocket beach (CR-04, CR-05, CR-06, SE-29). Phenol was detected above the benthic screening level as deep at 5 feet bml. Exceedances ranged from 130 to 980 ug/kg.
- Dibenzofuran was detected above the benthic screening level (200 ug/kg) in surface and/or subsurface samples collected in the pocket beach (CR-04, CR-05, CR-06). Dibenzofuran was detected above the benthic screening level as deep as 2.5 feet bml. Exceedances ranged from 210 to 490 ug/kg.

6.2.5 Phthalates

Up to 50 samples were analyzed for one or more phthalates. Bis(2-ethylhexyl)phthalate and butylbenzylphthalate were detected in 24 and 20 percent of samples analyzed, respectively. The remaining phthalates were detected in 10 percent or less of samples. The highest concentrations of phthalates were observed in samples collected in the pocket beach. Phthalates were not detected in the 2019 investigation samples. A summary of phthalate exceedances for samples collected in 2013 and 2015 is provided below.

- Bis(2-ethylhexyl)phthalate was detected above the benthic screening level (500 ug/kg) in surface and/or subsurface samples collected in the pocket beach (CR-04, CR-05, CR-06). Bis(2-ethylhexyl)phthalate was detected above the benthic screening level as deep as 2.5 feet bml. Exceedances ranged from 870 to 9,400 ug/kg.
- Butylbenzylphthalate was detected above the organic carbon-normalized benthic screening level (4,900 ug/kg) in the composite surface sample collected in the Former Mill Area (CR-08B) at a concentration of 15,600 ug/kg organic carbon-normalized. Note that the reporting limit exceeds the benthic screening level for nearly all samples collected in 2019.
- Diethylphthalate was detected above the benthic screening level (200 ug/kg) in one subsurface sample collected in the pocket beach (CR-06; 1 to 2.5 feet bml) at a concentration of 270 ug/kg.
- Di-n-octyl phthalate was detected above the benthic screening level (29 ug/kg) in one surface sample collected in the Former Mill Area (CR-08A) at a concentration of 710 ug/kg. Note that the reporting limit exceeds the benthic screening level for samples collected in 2019.

6.2.6 Chlorinated Organics

Up to 50 samples were analyzed for one or more chlorinated organics, which were detected in less than 20 percent of samples. Chlorinated organics were not detected in the 2019 investigation samples. Pentachlorophenol was most frequently detected chlorinated organic, which was detected in 16 percent of the samples at concentrations ranging between 11 and 400 ug/kg. The highest concentrations of chlorinated organics were observed in samples collected in the pocket beach. 1,2,4-trichlorobenzene, 1,4-dichlorobenzene, and PCP were detected above their respective benthic screening levels in surface and/or subsurface samples collected in the pocket beach (CR-04, CR-05). Exceedances were observed up to 2.5 feet bml.

6.2.7 PAHs

Up to 49 samples were analyzed for one or more PAHs, and one or more PAHs were generally detected in each sample. Fluoranthene and pyrene were the most frequently detected individual PAHs. The highest concentrations of PAHs are generally limited to the pocket beach.

PAHs exceeded their respective benthic screening levels in subsurface samples collected in the pocket beach (CR-04, CR-05, CR-06). The sample collected from 1 to 2.5 feet bml in boring CR-04 exceeded the benthic screening levels for dibenzo(a,h)anthracene and fluoranthene; the sample collected from 0.33 to 2.5 feet bml in boring CR-05 exceeded the benthic screening levels for fluoranthene and pyrene; and the sample collected from 1 to 2.5 feet bml in boring CR-06 exceeded the benthic screening levels for total PAHs, total LPAHs, 2-methylnaphthalene, fluorene, phenanthrene, total HPAHs, chrysene, fluoranthene, and pyrene. Deeper samples were either not collected in these borings or were not analyzed for PAHs.

Exceedances of the cPAH TEQ bioaccumulation screening level (21 ug/kg) are widespread in surface and subsurface samples collected in the in-water area, with exceedances ranging from 21.3 to 1,610 ug/kg and the highest concentrations observed in the pocket beach. Exceedances were detected as deep as 15 feet bml in the pocket beach.

6.2.8 Pesticides and PCBs

Carbazole was analyzed for in one sample on the downstream end of the wharf and was not detected above the benthic screening level. Up to 49 samples were analyzed for one or more PCB Aroclors, of which only Aroclors 1254 and 1260 were detected. Total PCBs were detected above the bioaccumulation screening level (3.5 ug/kg) in nearly all samples with detections. Exceedances range from 4.16 to 42.4 ug/kg. Several samples collected during the 2013 and 2015 investigations also exceeded the benthic screening level (110 ug/kg) and include surface and/or subsurface samples collected at the pocket beach (CR-04, CR-05, CR-06). Exceedances for these samples range from 180 to 1,170 ug/kg. Benthic screening level exceedances were detected as deep as 4.5 feet bml at the pocket beach and the beach area upstream of the pocket beach.

6.2.9 Additional SVOCs

Up to 31 samples were analyzed for one or more SVOCs, which were detected in less than 40 percent of samples analyzed. The highest concentrations of SVOCs were observed in samples collected in the pocket beach.

There are no screening levels for the SVOCs analyzed. 1,3-dichlorobenzene and 4-methylphenol were detected in samples collected during the 2013 and 2015 investigations at concentrations between 280 and 620 ug/kg, and 26 and 870 ug/kg, respectively.

6.2.10 Dioxins/Furans

Twenty-three samples were analyzed for dioxins/furans. All dioxins/furans were detected at least once, and at least one dioxin or furan congener was detected in each sample. The dioxin/furan TEQ exceeded the bioaccumulation screening level (5 picograms per gram [pg/g]) in nearly all surface and subsurface samples analyzed. Exceedances range from 5.97 to 359 pg/g, with the highest concentrations observed in the pocket beach. Dioxins/furans were detected above the bioaccumulation screening level in sediment up to 8 feet bml in the pocket beach.

6.2.11 TPH

Up to 34 samples were analyzed for TPH, including gasoline-, diesel-, and/or motor-oil-range hydrocarbons.

- There is no screening level identified for gasoline-range hydrocarbons, however, gasoline was not detected in any of the samples analyzed.
- Diesel-range hydrocarbons were detected in 16 samples. Diesel-range hydrocarbons were detected above the benthic screening level (340 ug/kg) in a surface sample collected on the downstream end of the wharf (CR-24), and in surface and/or subsurface samples collected in the pocket beach (CR-04, CR-05, CR-06). Exceedances of the screening level range from 370 to 20,000 mg/kg, with the highest concentration observed from 1 to 2.5 feet bml in the pocket beach. Diesel-range hydrocarbons were generally not detected in samples collected during the 2019 investigation.
- Motor-oil-range hydrocarbons were detected in 30 samples. Motor-oil-range hydrocarbons were detected above the benthic screening level (3,600 mg/kg) in surface and/or subsurface samples collected in the pocket beach (CR-04, CR-05, CR-06). Exceedances range from 4,800 to 60,000 mg/kg, with the highest concentration observed from 1 to 2.5 feet bml in the Former Mill Area.

6.3 Radioisotopes

Sediment cores were collected for radioisotope samples in the vicinity of the former wharf extension (SE-08B) and pocket beach (SE-12) (see locations on Figure 4-1). The cores were longitudinally sectioned and analyzed for Lead-210, Radium-226, and Cesium-137. Lead-210 is a decay product of

volatized atmospheric radon-222 and is generally present in sediment with recent atmospheric deposition. Radium-226 is used to determine background levels of lead-210. Cesium-137 concentrations originate from atmospheric fallout from nuclear weapons testing between 1954 and 1963. Results of radioisotope analysis are provided in Appendix I and summarized below:

SE-08B. Analysis of the 75-cm long sediment core collected at SE-08B suggest that the upper 31 cm of the sampled area indicates variable sediment accumulation rates, while the lower 31 to 75 cm of the sample may have been deposited in a very short period. All sediments in the sample appear to be deposited after 1963, and the overall sediment accumulation rate is high.

SE-12. Analysis of the 60-cm long sediment core collected at SE-12 indicate that the deposition rate at the sampled area is highly variable, the overall sediment accumulation rate is high, and all sediments in the sample appear to be deposited after 1963.

Both samples indicate that the average sediment deposition rate is greater than 1 cm per year (since 1963) and accumulation rates appear to vary over time. However, the date of deposition of the sediments cannot be confidently determined other than to say all sediments appear to be deposited after 1963. These results show that, on average, the areas evaluated are depositional in nature.

6.4 Bioassay

Three standard marine bioassays were conducted at eight locations (i.e., SE-15 through SE-18, SE-20, SE-24, SE-26, and SE-31) spanning the in-water area (Figure 6-3): the ten-day amphipod test, the 20-day juvenile polychaete survival and growth test, and the benthic larval development test (see bioassay lab report in Appendix I). Wood waste in the samples ranged from zero to 80 percent by volume. EcoAnalysts initially analyzed sediment porewater (extracted via centrifugation) for ammonia, sulfides, and water quality parameters (salinity and pH) to inform whether modifications to the testing method were required. Values were below what would be expected to cause toxicity; therefore, no method modifications or supplemental testing was performed. Samples generally met quality assurance criteria for sulfide, ammonia, and water quality parameters, with the following exceptions:

Ten-day amphipod bioassay—Several samples during the ten-day amphipod bioassay salinity measurements fell below the recommended parameter of 28 ± 1 parts per trillion during testing; however, salinity remained within the test organism's acceptable range and was presumed to have no effect on the test results.

20-day juvenile polychaete survival—Two samples (SE-15 and SE-20) contained predatory native fauna that resulted in high mortality rates in the ten-day amphipod, 20-day juvenile polychaete bioassay. EcoAnalysts also noted that these samples had a high percentage of woody debris. These two samples were subsequently press-sieved to remove native fauna and re-tested for the 20-day juvenile polychaete bioassay.

Larval development bioassay—Dissolved oxygen levels were below the acceptable range on day 1 of the test in several samples. The test chambers for these samples were aerated for the remainder of the test. EcoAnalysts indicated that none of the dissolved oxygen measurements were low enough to cause developmental effects, regardless of wood waste percentage. The PSEP guidance provides a

threshold of 5.0 mg/L and the lowest dissolved oxygen in the test was 5.4 mg/L. EcoAnalysts also noted that the resuspension method was used to recover larvae that may be trapped in woody debris, therefore it does not appear that wood waste had an effect on the reliability of the test results. Initial total sulfide concentrations in samples SE-15, SE-16, and SE-26 were above the trigger value of 0.009 milligrams per liter (mg/L), however, undissociated hydrogen sulfide measurements were below the trigger value of 0.003 mg/L in all samples except for SE-26. These sulfide measurements may have contributed to larval development.

Bioassay results are shown on Figure 6-3, Table 6-4, and summarized below:

- All locations passed the SCO and cleanup screening level (CSL) criteria for the ten-day amphipod bioassay.
- All locations passed the SCO and CSL criteria when evaluated on a dry-weight and ash-free dry-weight basis for the 20-day juvenile polychaete bioassay.
- For the benthic larval development bioassay, SE-24 failed the SCO and CSL criteria, and SE-26 failed the SCO criteria, but not the CSL criteria. These locations are in the pocket beach area. All other samples passed both criteria.

The bioassay results indicate that surface sediments within the in-water area, with the exception of the pocket beach area, are not expected to result in adverse effects to benthic organisms. Sediment bioassay samples were not collected at all sample locations, and therefore, surface sediment toxicity has not been fully characterized at the Site. Given the visual observations of sulfide bacterial mats and presence of wood waste along the beach area, it is unlikely that benthic organisms could inhabit surface sediment along the beach without experiencing adverse effects from the degradation of wood waste.

6.5 Diffusive Gradients in Thin Film

The DGT analysis was conducted to quantify the bioavailable fraction of sulfide present in sediment pore water. Sulfide concentrations were quantified using the gray-scale color left on the silver iodide layer of the DGT probe (i.e., the binding gel). The gray-scale intensity on the binding gel was mathematically converted to free sulfide and hydrogen sulfide (see equations in Appendix G). Free sulfide DGT values ranged from 0.0002 to 7.85 mg/L. The highest free sulfide value was at sample location SE-40. Hydrogen sulfide DGT values ranged from 0.0001 to 4.17 mg/L. The highest hydrogen sulfide value was at sample location SE-33.

Free sulfide and hydrogen sulfide values did not correlate with laboratory-derived bulk sulfide or porewater sulfide results, or with visual observations of wood waste (i.e., the samples with the highest percentage of wood waste had some of the lowest concentrations of free sulfide and hydrogen sulfide). Additional factors contributing to uncertainty with the DGT sulfide measurements include variability of in situ pH, conductivity, and temperature measurements, iron oxide precipitate on the binding gels, and non-uniform gray-scale intensity on the binding gels. Due to these factors, this sampling method may not provide a reliable predictor of benthic toxicity at the Site. A memorandum summarizing the field methods, data analysis, and results for DGT analysis—including samples collected for conventionals and porewater sulfide—is provided as Appendix G.

7 CONCEPTUAL SITE MODEL

The CSM describes potential chemical sources, release mechanisms, environmental transport processes, exposure routes, and receptors. The primary purpose of the CSM is to describe pathways by which human and ecological receptors could be exposed to site-related chemicals. A complete exposure pathway consists of four necessary elements: (1) a source and mechanism of chemical release to the environment, (2) an environmental transport medium for a released chemical, (3) a point of potential contact with the impacted medium (referred to as the exposure point), and (4) an exposure route (e.g., sediment ingestion) at the exposure point.

The CSM describes potential exposure scenarios, based on information collected during site investigations. Elements of potentially complete exposure scenarios relevant to human health and ecological receptors are discussed below and presented in Figure 7-1. The CSM diagram focuses on site receptors and potential exposure pathways related to historical releases from the Site. The Site includes any area where a hazardous substance from a release originating from the Property has come to be located. The CSM and exposure scenarios for a site play a role in selection of cleanup standards.

7.1 Source Characterization

7.1.1 Sources of Contamination

Potential sources of contamination associated with historical operations at the Site were identified during previous environmental investigations, as described in the study area investigation report prepared by MFA (see Appendix A). Suspected historical sources of sediment impacts at the Site include releases from the over-water former Mill and upland operations related to wood processing, and include the following:

- Spills from the over-water sawmill hydraulic equipment previously located on the Site.
- Releases to sediment from over-water structures currently and formerly located on the Site.
- Releases from upland historical site operations that migrated to the in-water area of the Site land via stormwater or groundwater transport. Petroleum products, antifreeze, various oils and lubricants, boiler treatment chemicals, anti-sapstain mixtures (which contained PCP until approximately 1987),[5] inks, red end paint (until the early 1990s), and paints and solvents were used and/or stored on the Site during historical sawmill operations (PES, 2010).

[5] PCP use was prohibited indoors in 1984 and was restricted to certified applicators in 1987 (EPA, 2010).

- Wood-fired boilers and two wood-refuse burners were identified at the Site. Operation of this equipment is associated with dioxin formation; the historical disposition of boiler ash at the Site is unknown (PES, 2010).
- Historically, PCB-containing equipment supporting site operations was present. All PCB-containing transformers and light ballasts were removed from the Site between 1990 and 2001, and EPA identified no other PCB-containing equipment at the Site in 2006 (PES, 2010).
- Timbers and piles associated with historical and current over-water structures may be treated with creosote or other wood preservatives. These preservatives may contain PAHs that have the possibility to leach into surrounding sediment (DNR, 2018).
- Background sources (further described below), including stormwater discharge to Shannon Slough.
- Accumulations of wood waste from historical sawmill operations, including the chip loader and various processes in the Former Mill Area, as well as the use of wood waste as fill material (see Figure 2-3). Impacts from wood waste include the physical presence of the wood waste; decreased dissolved oxygen concentrations in sediment; and increased concentrations of wood waste decomposition products, such as sulfides, ammonia, and phenols, that can cause or contribute to toxicity. Figure 7-2 depicts the wood waste visually confirmed in sediment cores at 2-foot depth intervals. Wood waste was identified at depths up to 22 feet bml and is most extensive in the area east of the wharf and at the pocket beach. Figures 7-3a and 7-3b depict the modeled extent of wood waste laterally and by depth using the nearest-neighbor spatial approach. Figures 7-4 and 7-5 present cross-sectional lithology of the in-water area of the Site, with 25 percent or more wood waste by volume identified as a lithological unit. Section lines for the two cross sections are shown on Figure 7-3a. Seeps observed along the northeastern portion of the beach area (see Figure 4-2), also coincide with sulfide bacterial mats and accumulations of wood waste. However, because no borings were advanced in the vicinity of these features, the vertical extent of wood waste in this area is uncertain.

7.1.2 Sediment Background Conditions

In addition to former site-related sources, upstream or ubiquitous sources of chemicals and deleterious substances have the potential to impact the Site. The Chehalis River has a long history of industrial activity that could result in the release of contaminants similar to what has been observed at the in-water area of the Site. Shannon Slough, which discharges to the Chehalis River, receives considerable stormwater input from roads and neighborhoods upgradient of the Site. A stormwater study conducted on the upland area by MFA in 2016 identified stormwater drainage features in poor condition, with significant solids and sediment accumulation and cracked or eroded pipes. The stormwater pipes were jetted to remove solids and sediment and were subsequently inspected. The inspection found that in places where pipes were compromised, stormwater is in direct contact with soil (MFA, 2016a). Drainage basins, stormwater conveyances, and outfall locations on the Site are shown on Figure 2-4.

Persistent organic pollutants such as dioxins/furans, PAHs, PCBs, and metals are known to be widespread in the environment.

Dioxins/furans and PAHs can result from both natural and anthropogenic sources. The area around the Property is an urban environment where industrial activity has been conducted and a city has been established for over 100 years. In urban areas vehicle emissions, back-yard trash burning, structure fires, stormwater runoff, and other common events and activities can generate these chemicals (EPA, 2006). Therefore, low levels are commonly present in sediment because of natural and/or non-point anthropogenic activities. The highest concentrations of dioxin/furans associated with site activities are observed in the pocket beach/Former Mill area (see Section 6.2.10); outside of this area concentrations of dioxin/furan TEQ are lower than those observed in the pocket beach/Former Mill area and no similar pattern of hot spots are observed.

PCBs are a class of persistent, bioaccumulative, and toxic compounds that historically had a wide range of uses, including electrical transformers, hydraulic systems, lubricants, surface coatings, adhesives, plasticizers, inks, insulating materials, pesticides, and consumer products (Ecology, 2014a). In the Puget Sound, surface runoff is the largest pathway to aquatic environments, followed by wastewater treatment plants and air deposition. PCBs are ubiquitous throughout the natural environment, including sediment, and are found in animal tissue throughout the food chain. The highest concentrations of PCBs in sediment are found in the pocket beach (see Section 6.2.8), with concentrations decreasing riverward and upstream of the pocket beach.

Metals, including arsenic and mercury, are naturally occurring elements in the environment, and can be concentrated by human activities. The distribution of naturally occurring metals is controlled by geologic processes that occur across different physiographic regions. Metals are commonly transferred to the marine environment from sewage treatment facilities, atmospheric deposition, and continental weathering. Due to naturally high occurrences in the Cascade Mountains, arsenic concentrations are commonly elevated above risk-based concentrations in sediment in Western Washington. Section 10.2 of the SCUM II guidance provides a regional background concentration for the North Olympic Peninsula of 14 mg/kg (Ecology, 2021).

During the 2019 investigation, MFA collected composite surface sample SE-21 upstream of the chip loader and discrete surface sample SE-22 from the Shannon Slough in an effort to understand background concentrations. Sample CR-03 was collected upstream of the chip loader in 2013 and is considered a background sample. In addition, existing Chehalis River sediment data collected within 1 mile of the DNR lease area were previously queried from Ecology's EIM database (see Appendix A) to determine potential contribution from diffuse background sources. Taken together, the sample data show background inputs to the Site from upstream areas (Chehalis River and Shannon Slough) to the Site can exceed the Ecology marine site natural background 90/90 UTL for total PCBs and dioxin/furan TEQ. There is not an area background concentration for total PCBs of dioxin/furan TEQ, however, these background inputs should be considered in identification of sample locations with Site-related impacts and ultimately in development of final cleanup standards for the Site as part of forthcoming evaluations and Ecology determination.

- **Total PCBs (Chehalis River).** The total PCBs concentrations for background samples collected in 2019 were higher than the Ecology marine site natural background 90/90 UTL of

3.5 ug/kg (i.e., 4.16 ug/kg upstream in the Chehalis River [sample SE-21] and non-detect at 46 ug/kg [sample CR-03]). These results indicate concentrations up to at least 4.16 ug/kg may not reflect site-related impacts.

- **Total PCBs (Shannon Slough).** The total PCBs concentrations for background samples collected in 2019 were higher than the Ecology marine site natural background 90/90 UTL of 3.5 ug/kg at 8.17 ug/kg in Shannon Slough (sample SE-22). The concentration of total PCBs in the sample located further downstream in Shannon Slough (sample SE-20; 4.7 ug/kg) further indicates that the concentration in the background sample is due to inputs from offsite sources. These results indicate that upstream inputs related to offsite sources up to at least 8.17 ug/kg may not reflect site-related impacts and PCBs observed at SE-20 are likely not related to historical site operations.

- **Dioxin/Furan TEQ (Chehalis River).** The dioxin/furan TEQ for the Chehalis River background surface sediment sample SE-21 was consistent with typical background concentrations, at 1.52 pg/g TEQ, and was more elevated at CR-03 at 12.2 pg/g dioxin/furan TEQ. Review of data in the vicinity of the Site also show concentrations of up to 13 pg/g dioxin/furan TEQ (see Appendix A). These results indicate background concentrations are variable and can be significantly elevated up to 13 pg/g, well above the Ecology marine site natural background 90/90 UTL of 4 pg/g.

- **Dioxin/Furan TEQ (Shannon Slough).** The dioxin/furan TEQ for the Shannon Slough background surface sediment sample SE-22 was elevated at 18.8 pg/g dioxin/furan TEQ. These results indicate background concentrations can be significantly elevated above the Ecology marine site natural background 90/90 UTL of 4 pg/g and upstream inputs related to offsite sources up to at least 18.8 pg/g dioxin TEQ may not reflect site-related impacts.

7.2 Fate and Transport of Contaminants

The primary potential contaminant transport mechanisms to site sediments include historical pathways, potentially complete historical and current pathways, and secondary transportation mechanisms as described below.

- **Historical pathways** include the following:
  - Over-water spills and releases directly to the Chehalis River and sediment
  - Stormwater discharges via outfalls
  - Airborne deposition (e.g., from waste burners, incinerators)
- **Potentially complete historical and current pathways** include the following:
  - Surface water and stormwater runoff through outfalls and/or the Shannon Slough
  - Erosion of contaminated upland riverbanks into the beach area
  - Contaminated groundwater from fill and surface spills seepage to the intertidal zone

Former facility operations are described in Section 2.4.2. Potential mechanisms of contaminant transport to the in-water area include stormwater flow from the upland area (i.e., in the Former Mill Area and in the vicinity of the pocket beach) to surface water and sediment. Stormwater discharges to sediments have the potential to transfer contaminants to areas adjacent to stormwater outfalls at the pocket beach and Shannon Slough, as well as through overland flow. Upstream runoff from residential, highway, and other properties may be impacting Shannon Slough.

Contaminated soil within 10 feet landward of the line of ordinary high water may erode to the riverbank. Potentially erodible soils are discussed further and screened against applicable sediment screening levels in the *Draft Upland Remedial Investigation Report* (MFA 2022).

Groundwater on the western portion of the upland area discharges to the Chehalis River and, on the eastern portion of the upland area, to the Shannon Slough (see Section 3.2). Contaminated groundwater from the upland area may discharge to surface water, and is therefore considered a potentially complete transport pathway.

- **Additional transport mechanisms** are erosion of contaminated sediment and repositioning via currents, waves, propeller wash scour, and anchoring. Biological transport mechanisms include bioturbation of contaminated sediment in the biologically active zone, as well as bioaccumulation via food chain transfer.

  In sediments, physical transport of contaminants can be upward (advection or diffusion, ebullition), downward (advection or diffusion, burial), or lateral (resuspension/deposition); bioturbation caused by benthic organisms can further displace or mix contaminants. In water, contaminants can move by the same advective and diffusive forces operating in the sediment, by sorption to or from sediments resuspended by currents or scour events, or via bioturbation (e.g., releases from sediment to the water column). The relative importance of these processes will vary, depending on the chemical and physical properties of a released contaminant. The properties of sediment and the dynamics of groundwater flow also shape contaminant fate and transport. The most significant site-specific transport mechanisms are discussed further below.

  A number of processes, including water flow, wave erosion, propeller wash, and anchoring, have the potential to impact sediment transport in the Chehalis River. As this reach of the Chehalis River is tidally influenced, some sediment resuspension likely occurs during the ebb and flood of the tides. Though wind waves may be a mechanism for erosion in the Chehalis River, these waves are likely to be a less significant transport mechanism than the larger wakes from passing vessels. Portions of the in-water area within the Chehalis River are potentially vulnerable to erosion from propeller wash where vessels may operate now or in the future. Sediment resuspension and redistribution due to river and wave energy inputs is not expected to be a significant transport mechanism closer to shore in the pocket beach and beach area, where presence of fines indicates a depositional environment.

Based on the CSM and river dynamics, impacts to sediment are unlikely to extend upriver or downriver past the wharf to sediment adjacent to neighboring properties. In addition, MFA reviewed data collected in 2015 from the Pakonen Boatyard site, which is located adjacent to the downstream end

of the wharf on the Site (MFA, 2016b). Sediment at the Pakonen Boatyard site is generally characterized by a different group of chemicals and includes widespread elevated mercury impacts. Mercury concentrations at the Site are generally consistent with background and minor exceedances are highly localized to the pocket beach. Further, the two samples collected on the downstream end of the wharf (i.e., CR-07 and CR-24) did not exceed the screening level for mercury, which indicates that the downriver extent of sediment impacts at the Site is defined.

7.3 Potential Receptors and Exposure Scenarios

The primary purpose of the CSM is to identify potential receptor groups and to describe pathways by which those populations may be exposed to site-related chemicals in the environment (EPA, 1989). This discussion focuses on populations that may be exposed to contaminants at a site and identifies pathways by which these populations may come into contact with contaminants. A complete pathway requires the following:

- A source and mechanism for release of constituents
- A transport or retention medium
- A potential environmental contact (exposure point) with the affected medium
- An exposure route at the exposure point

The Property is part of a new maritime heritage facility called Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site. The GHHSA staff currently occupies the office building and use other structures remaining on the Site. Public use and access to the Property are currently limited. The future-use plan for the Site is to develop a maritime heritage center with education, public access, tourism, and commercial uses. The Chehalis River is frequented by industrial marine users, recreational and tribal fishers, and recreationists.

The exposure pathways considered potentially complete for human health and ecological receptors are summarized below and presented in Figure 7-1.

On-site Workers and Visitors—Current and future users of the Property, such as occupational workers and public visitors, may come into contact with the soils. Occupational workers may come into contact with the Chehalis River while maintaining the area. Future visitors may come into contact with the soils while touring and exploring the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site. While these groups may also come into direct contact with sediment and surface water, the exposure is anticipated to be occasional and incidental. Current and future workers and future visitors may occasionally and incidentally be exposed to chemically impacted sediment through the following pathways:

- Direct skin contact with, and incidental ingestion of, surface water, sediment, or porewater.

Recreationists—The water recreation scenario includes assorted beach and water activities, including activities related to operation of personal watercraft. Individuals may come into contact with sediment and surface water while operating vessels; however, adult exposure is expected to be generally limited to contact with sediment and surface water while entering and exiting the water. Swimming is not a

common activity in the area, given boat traffic and dangerous currents; any limited swimming that does occur likely is significantly limited in duration and frequency, given Aberdeen weather conditions. Because of the strongly hydrophobic nature of chemicals present, exposure via surface water is not expected to be a significant pathway. However, children may be exposed to sediment through direct contact if playing in nearshore beach areas in the future when the Site is developed for visitor use. Recreationists, including the child/beach play scenario, could potentially be exposed to chemicals through the following pathways:

- Direct skin contact with, and incidental ingestion of, surface water, sediment, or pore water.

Fishers—Areas at the Site are in the QIN's usual and accustomed tribal fishing area. Fishers generally angle by boat, using hook and line and/or large nets. The shoreline is not conducive to shore fishing. Fishers may include adults and children. Fish are caught for personal consumption by sport fishermen and tribes during permitted times of the year. Because of the strongly hydrophobic nature of the chemicals present, exposure to fishers via surface water is not expected to be a significant pathway. The primary exposure pathway for potential fishers is consumption of aquatic organisms. Other exposure pathways relevant to fishers could include contact with sediment during net fishing or harvesting shellfish. Current or future recreational and subsistence fishers, including tribal fishers of the QIN, could potentially be exposed to chemicals by the following pathways:

- Direct skin contact with, and incidental ingestion of, surface water, sediment, or porewater.
- Ingestion of chemicals bioaccumulated in the tissue of fish from impacted surface water or sediment. While this scenario provides a complete pathway in current and future scenarios, it likely would pose an insignificant risk to recreational and subsistence fishers from chemicals present at the Site. The likely insignificant risk is due to the anadromous nature of the fishable species potentially present at the in-water area of the Site. These nonresident fish are typically present only when transiting from the ocean to rearing habitat during spawning season or from rearing habitat to the ocean after a short residence after hatching. Rearing habitat is not present at the Site, and indeed typically occurs in tributaries off the main stem of the Chehalis River higher up in the Chehalis River system where appropriate bed material is present (Williams, Laramie, and Ames, 1975). Despite the likely insignificant risk, this pathway was retained for evaluation of its protectiveness for all potential future uses and receptors.

Aquatic Ecological Receptors—Water-dependent ecological receptors, including plants, benthic invertebrates, fish (piscivorous, omnivorous, and benthivorous), piscivorous mammals, and piscivorous raptors are the primary potential ecological receptors.

Relevant exposure media for ecological receptors include sediment and fish tissue (for receptors at higher trophic levels). Plants, benthic invertebrates, fish, birds, and mammals may all be exposed to chemicals present in sediment. Specifically, plants and benthic invertebrates may be exposed to chemicals through direct contact with and uptake from sediment; fish may be exposed to chemicals through direct contact with sediment and ingestion of food that has accumulated contaminants. Birds and mammals may be exposed to chemicals through incidental ingestion of sediment and

consumption of food that has accumulated contaminants. Aquatic and water-dependent ecological receptors may be exposed to chemically impacted surface water, sediment, and/or fish tissue by the following pathways under current and future scenarios:

- Direct contact with, and ingestion of, surface water or sediment.
- Ingestion of chemicals bioaccumulated in the tissue of fish from chemically impacted surface water or sediment at the Site. Chemicals at the Site are unlikely to bioaccumulate in significant amounts because of the anadromous nature of the fish species that may be present at the Site. Despite the likelihood that this risk is insignificant, this pathway was retained for evaluation of its protectiveness for all potential future uses and receptors.

8 NATURE AND EXTENT OF CONTAMINATION

This section delineates areas of contamination based on the information presented in this RI, including the extent of wood waste and areas with chemical screening level exceedances, as well as the areas of concern (AOCs) for further evaluation during the FS. Chemical exceedances are summarized in Table 8-1. Figure 8-1 presents a summary of sample locations with both wood waste and chemical exceedances as well as the boundaries for the AOCs.

Woodwaste—Up to 90 percent wood waste by volume was observed in surface samples and up to 80 percent was observed in subsurface samples (see Figures 7-2 through 7-5 and Tables 6-4 and 6-5). Significant accumulations of wood waste (>25 percent) were observed in the former boiler area and extend eastward from the Former Mill Area to (and include) the beach area. Further, sulfide bacterial mats and seeps associated with accumulations of wood waste were visually observed along the northeastern portion of the beach area and mouth of Shannon Slough (see Figures 4-2 and 8-1). The visual observations of wood waste along the shoreline are captured within the beach area AOC (see Figure 8-1). The thickest deposits of wood waste (up to 19 feet) are in the pocket beach where wood was historically used as fill. RI investigations demonstrated that wood waste extends from near the surface to significant depths, and that, with distance from shore, the wood waste thickness decreases significantly and the sediment layer overlying the wood waste increases. As shown in Figures 7-3A, 7-3B, and 8-1, with the exception of the northeast portion of the beach area and in the vicinity of the mouth of Shannon Slough, the lateral extent of wood waste has been defined. The vertical extent of wood waste is greatest in the pocket beach and Former Mill Area, and decreases to shallower depths riverward, in the beach area, and in the Chehalis River adjacent to the chip loader. Based on field observations of sulfide seeps and associated bacterial mats (see Figure 4-2), areas proximal to the shoreline along the beach near the mouth of Shannon Slough likely exhibit elevated levels of sulfides and significant wood waste accumulations. However, because no borings were advanced along the northeastern portion of the beach or near the mouth of Shannon Slough, the depth of wood waste in this area is uncertain.

Chemical—The pocket beach and Former Mill Area also exhibit the highest frequency of chemical exceedances including metals; organic chemicals (benzoic acid, phenol, dibenzofuran, bis(2-

ethylhexyl)phthalate, 3- & 4-methylphenol [m,p-cresol]), PAHs (fluoranthene, cPAH TEQ), total PCBs, and dioxin/furan TEQ. Exceedances were observed up to 23 feet bml, the maximum depth explored. In addition, the bioassay tests from this area (i.e., SE-24 and SE-26) failed the larval development SCO or CSL.

Chemical exceedances in other areas are more infrequent and limited to fewer chemicals. Exceedances in the beach area were observed up to 2 feet bml and are limited to arsenic, cPAH TEQ, total PCBs, and dioxin/furan TEQ. Samples collected near the chip loader had chemical exceedances of ammonia as nitrogen, m,p-cresol, cPAH TEQ, total PCBs, and dioxin/furan TEQ up to 1.5 feet bml. Chemical exceedances in Shannon Slough are limited to total PCBs, however concentrations are lower than those detected in the upstream background sample. In summary, chemical exceedances are generally low-level and bioassay tests in these areas show no failures, indicating toxicity to benthic organisms is not anticipated.

The screening approach described above supports identification of IHSs in Site sediments. WAC 173-340-703 states that when cleanup requirements are being defined for a site that is contaminated with a large number of hazardous substances, those hazardous substances that contribute a small percentage of the overall threat to human health and the environment may be eliminated from consideration, and the remaining hazardous substances shall serve as IHSs for purposes of defining site cleanup requirements. The number of screening level exceedances and the frequency of exceedances for all samples are provided in Table 6-1.

Wood waste is considered an IHS. Conventional parameters exceed screening levels in up to 91 percent of samples. As discussed in Appendix G, conventionals are associated with wood waste and are accounted for at locations where there are exceedances of site-specific wood waste cleanup levels, which include TOC, TVS, and wood waste percentage.

In addition, the following chemicals frequently exceeded applicable screening levels and are considered IHSs: arsenic, cPAH TEQ, total PCBs, and dioxin/furan TEQ. Lead, mercury, organic chemicals, phthalates, chlorinated organics, and individual PAHs are not included as IHSs as less than 20 percent of samples exceed screening levels and locations with exceedances are accounted for by the identified IHSs. Exceedances of TPH were observed in the pocket beach and are colocated with areas of significant wood waste. These locations are therefore accounted for by the presence of wood waste which is identified as an IHS. There are some spatial differences for cPAH TEQ, total PCBs, and dioxin/furan TEQ exceedances, and they are carried forward as IHSs at the Site as they generally account for remaining chemical exceedances. Arsenic is identified as an IHS due to different chemical characteristics compared to other IHSs.

In summary the IHSs at the Site include wood waste, arsenic, cPAH TEQ, total PCBs, and dioxin/furan TEQ. See figure 8-1 for the extent of IHSs at the Site.

8.1 AOCs

AOCs were identified based on a combination of sediment chemistry screening, bioassay results, and field observations. AOCs are areas that will be further evaluated as part of the FS for additional

assessment and/or cleanup options. The AOCs identified include the pocket beach/Former Mill Area, the beach area, and the chip loader area (Figure 8-1):

- Pocket beach/Former Mill Area—Chemical and bioassay exceedances are common in this area. The site-specific wood waste cleanup level is also commonly exceeded and the thickest accumulation of wood waste is present. This AOC includes the two samples located downstream of the wharf (i.e., CR-07 and CR-24).

- Beach area—Chemical exceedances are limited in the beach area and the bioassay sample (SE-17) showed impacts to benthic organisms are not expected. However, field observations of sulfide seeps and significant accumulations of wood waste were noted along the shoreline. Chemical exceedances in combination with field observations establish the nearshore beach area as an AOC.

- Chip loader area—The chip loader is a large, dilapidated metal structure in the Chehalis River and derelict creosote-treated piles remain in the sediment adjacent to the chip loader. Based on some limited chemical exceedances, potential for chemical and physical impacts associated with the degrading structure, and presence of tens of creosote-treated pilings that have the potential for localized sediment impacts, this area is considered an AOC.

Other areas with chemical or wood waste exceedances that aren't considered AOCs include the Shannon Slough and the area riverward of the beach area. Although there are chemical exceedances in the two samples collected from Shannon Slough, the downstream sample concentrations were less than those in the upstream sample. This indicates that upstream inputs related to offsite sources are contributing to sediment conditions in the Shannon Slough. Further, the bioassay sample (SE-20) showed impacts to benthic organisms are not expected. The area riverward of the beach areas is excluded as an AOC as there are limited sporadic chemical exceedances, limited wood waste was observed, and the two bioassay samples (i.e., SE-16 and SE-18) showed impacts to benthic organisms are not expected.

9 SUMMARY

This RI was conducted as part of the work to be performed under the agreed order. Suspected historical sources of sediment impacts at the Site include releases from the over-water mill (i.e., the Former Mill Area) and upland operations related to wood processing and include over-water spills, upland spills conveyed to the in-water area of the Site via stormwater or riverbank erosion, and background or ambient sources, including stormwater runoff and outfall discharges to Shannon Slough and the Chehalis River. These background inputs are likely contributing to sediment conditions on the Site. Potential receptors include upland construction workers and visitors, as well as recreationists (including children), fishers (including tribal fishers), and aquatic ecological receptors. The purpose of the RI was to evaluate the nature and extent of contamination in the in-water area of the Site. Wood waste is a primary IHS in sediments, which is further impacted by chemical IHSs

including arsenic, cPAH TEQ, total PCBs, and dioxin/furan TEQ. Three AOCs have been identified at the Site and include the pocket beach/Former Mill Area, the beach area, and the chip loader. The most significant wood waste and chemical impacts are observed in the pocket beach and the Former Mill Area. Other areas show significantly decreased wood waste accumulations and chemical and bioassay data indicate toxic effects are not suspected; an exception is areas proximal to the beach shoreline where data and observations indicate potential for elevated sulfides due to sulfide seeps and wood waste in sediments and/or in upland fill areas. The dilapidated chip loader and adjacent creosote-treated piles present environment and physical risks. The results of this RI will be used to support an evaluation of potential cleanup actions under a future FS.

LIMITATIONS

The services undertaken in completing this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

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TABLES



Table 4-1
Sediment Sample Descriptions and Analyses
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Boring / Surface Sample Location	Lithologic Description (bgs/bml)	Depth (cm bml)	Collection Depth (ft bml)	Analytical Suite	Archive Sample Depths (ft bml)
Surface Samples					
SE-14	0-2 cm: Silt with sand (ML); black; 80% fines; 10% sand; 10% gravel. 2-10 cm: wood waste; 15% fines; 85% wood waste, chips, shreds.	0-10	0-0.33	Total Metals PCB Aroclors Dioxins/furans TPH SVOCs Conventionals Pore Water Sulfide	0-0.33
SE-15	Silt (ML); dark gray; 60% fines; 10% sand; 30% wood waste, chips; trace masonry debris; strong sulfur odor.	0-10	0-0.33	Total Metals PCB Aroclors TPH SVOCs Conventionals	0-0.33
SE-16	Silt (ML); dark gray; 90% fines, soft; 10% sand; trace wood waste; no odor.	0-10	0-0.33	Total Metals PCB Aroclors TPH SVOCs Conventionals Pore Water Sulfide	0-0.33
SE-17	Silt with sand (ML); dark gray with orange mottling; 85% fines; 15% sand; trace organic debris; no odor.	0-10	0-0.33	Total Metals PCB Aroclors TPH SVOCs Conventionals	0-0.33
SE-18	Silt (ML); black; 85% fines; 10% sand, fine; 5% wood waste; no odor.	0-10	0-0.33	Total Metals PCB Aroclors TPH SVOCs Conventionals Pore Water Sulfide	0-0.33

Table 4-1
Sediment Sample Descriptions and Analyses
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Boring / Surface Sample Location	Lithologic Description (bgs/bml)	Depth (cm bml)	Collection Depth (ft bml)	Analytical Suite	Archive Sample Depths (ft bml)
SE-19	0-3 cm: Silt (ML); brown; 100% fines, soft. 3-10 cm: Silt (ML); dark gray; 90% fines; 10% sand; no odor.	0-10	0-0.33	Mercury Conventionals Pore Water Sulfide	0-0.33
SE-20	Silt (ML); 100% fines, soft; trace benthic organisms; faint organic-like odor.	0-10	0-0.33	Total Metals PCB Aroclors TPH SVOCs Conventionals Pore Water Sulfide	0-0.33
SE-21A	Silt with sand (ML); brown; 70% fines; 15% sand, fine; 15% wood waste, 1-inch to 4-inch chunks; no odor.	0-10	0-0.33	Total Metals PCB Aroclors Dioxins/furans TPH SVOCs Conventionals Pore Water Sulfide	0-0.33
SE-21B	Silt (ML); dark gray; 85% fines; 10% sand, fine; 5% wood waste, fine chips; no odor.	0-10	0-0.33	Total Metals PCB Aroclors Dioxins/furans TPH SVOCs Conventionals Pore Water Sulfide	0-0.33
SE-21C	0-1 cm: Silt (ML); brown; 100% fines, soft. 1-10 cm: Sand (SP); dark gray; 90% sand, coarse; 10% wood waste, chunks.	0-10	0-0.33	Total Metals PCB Aroclors Dioxins/furans TPH SVOCs Conventionals Conventionals in Pore Water	0-0.33

Table 4-1
Sediment Sample Descriptions and Analyses
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Boring / Surface Sample Location	Lithologic Description (bgs/bml)	Depth (cm bml)	Collection Depth (ft bml)	Analytical Suite	Archive Sample Depths (ft bml)
SE-21D	0-1 cm: Silt (ML); brown; 100% fines, soft. 1-10 cm: Sand (SP); dark gray; 95% sand, coarse; 5% wood waste, chunks; no odor.	0-10	0-0.33	Total Metals PCB Aroclors Dioxins/furans TPH SVOCs Conventionals Conventionals in Pore Water	0-0.33
SE-22	Silt (ML); 80% fines, soft; 10% wood waste, chips; 10% riprap.	0-10	0-0.33	Total Metals PCB Aroclors Dioxins/furans TPH SVOCs Conventionals Pore Water Sulfide	0-0.33
SE-23	Silt (ML); dark gray; 80% fines; 5% sand, fine; 15% wood waste, chips; trace masonry pieces; no odor.	0-10	0-0.33	Total Metals PCB Aroclors TPH SVOCs Conventionals Pore Water Sulfide	0-0.33
SE-24	Silt (ML); gray; 70% fines; 5% sand, fine; 25% wood waste, chips and chunks; no odor.	0-10	0-0.33	Total Metals PCB Aroclors TPH SVOCs Conventionals Pore Water Sulfide	0-0.33

Table 4-1
Sediment Sample Descriptions and Analyses
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Boring / Surface Sample Location	Lithologic Description (bgs/bml)	Depth (cm bml)	Collection Depth (ft bml)	Analytical Suite	Archive Sample Depths (ft bml)
SE-25	Wood waste; gray to black; 20% fines; 80% wood waste, chips, pulp, chunks; faint hydrocarbon-like odor.	0-10	0-0.33	Total Metals PCB Aroclors TPH SVOCs Conventionals	0-0.33
SE-26	wood waste; gray; 20% fines; 80% wood waste, shreds, pulp, chunks; no odor.	0-10	0-0.33	Total Metals PCB Aroclors TPH SVOCs Conventionals Pore Water Sulfide	0-0.33
SE-27	0-2 cm: Silt (ML); brown; 80% fines; 10% sand, fine; 10% wood waste; no odor. 2-10 cm: wood waste; 100% wood waste, chips and shreds.	0-10	0-0.33	Total Metals PCB Aroclors TPH SVOCs Conventionals	0-0.33
SE-28	Wood waste; 25% fines; 75% wood waste, pulp, chips, chunks; organic-like odor.	0-10	0-0.33	Mercury Conventionals Pore Water Sulfide	0-0.33
SE-31	Silt with sand (ML); 50% fines; 15% sand; 35% wood waste, chips and fibers; sulfur-like odor.	0-10	0-0.33	Total Metals PCB Aroclors TPH SVOCs Conventionals	0-0.33
SE-32	Silt (ML); 90% fines, low plasticity; 10% sand, fine; trace woody material.	0-10	0-0.33	Conventionals	0-0.33
SE-33	Silt with sand (ML); 70% fines, low plasticity; 30% sand, fine; rootlets.	0-10	0-0.33	Conventionals	0-0.33
SE-34	Silt (ML); 90% fines, low plasticity; 10% sand, fine; wood twigs and chunks (5%).	0-10	0-0.33	Conventionals	0-0.33

Table 4-1
Sediment Sample Descriptions and Analyses
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Boring / Surface Sample Location	Lithologic Description (bgs/bml)	Depth (cm bml)	Collection Depth (ft bml)	Analytical Suite	Archive Sample Depths (ft bml)
SE-35	Silt (ML); 95% fines, low plasticity; 5% sand, fine; trace rootlets and woody debris (chunks).	0-10	0-0.33	Conventionals	0-0.33
SE-36	Silt with sand (ML); 80% fines, low plasticity; 20% sand, fine; twigs and wood chunks (5-10%).	0-10	0-0.33	Conventionals	0-0.33
SE-37	Silt (ML); 95% fines, low plasticity; 5% sand, fine; wood waste chunks (25%).	0-10	0-0.33	Conventionals	0-0.33
SE-38	Silt with sand (ML); 85% fines, low plasticity; 15% sand, fine to medium; wood waste chips, chunks, and sawdust (50%); strong sulfur-like odor.	0-10	0-0.33	Conventionals	0-0.33
SE-39	Wood waste; 90% wood chunks, chips, twigs, rootlets; 5% fines; 5% sand, fine.	0-10	0-0.33	Conventionals	0-0.33
SE-40	Sandy gravel with silt (GP-GM); 15% fines; 15% sand; 70% gravel, fine to medium, subangular to subrounded; black and white material coating gravel; sulfur-like odor.	0-10	0-0.33	Conventionals	0-0.33
SE-41	Silt (ML); 90% fines, low plasticity; 10% sand, fine; trace gravel; wood twigs and chunks (5%); sulfur-like odor.	0-10	0-0.33	Conventionals	0-0.33
Subsurface Samples					
SE-01A	0 to 3.3 feet: Silt (ML); black; 75% fines, low plasticity, firm; 5% sand, fine; 20% wood waste, fibers, chips, chunks.	0-7.2	1-2	Conventionals	1-2
	3.3 to 7.2 feet: Silt (ML); dark gray; 95% fines, low plasticity, firm 5% wood waste, fibers, chips.				
SE-01B	0 to 0.6 feet: Silt (ML); dark gray; 90% fines, low plasticity, soft; 10% wood waste, fibers, small chips (<0.5 inches)~~;~~.	0-1.6	0.5-1.5	Archive Only	0.5-1.5
	0.6 to 1.4 feet: wood waste; brown to gray; 20% fines; 80% wood waste, fibers, chips, chunks (<3 inches).				
	1.4 to 1.6 feet: Silt (ML); dark gray; 80% fines, low plasticity, firm; 20% wood waste, fibers, chips (<0.5 inches)~~;~~.				

Table 4-1
Sediment Sample Descriptions and Analyses
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Boring / Surface Sample Location	Lithologic Description (bgs/bml)	Depth (cm bml)	Collection Depth (ft bml)	Analytical Suite	Archive Sample Depths (ft bml)
SE-01C	0 to 4.6 feet: Silt (ML); dark gray; 90% fines, low plasticity, firm, 10% sand, fine; trace wood waste. 2.6 to 2.9 feet: Increase in wood waste fibers up to 15%.	2-3	2-3	Archive Only	2-3
SE-01D	0 to 1.6 feet: Silt (ML); gray; 80% fines, low plasticity, firm; 5%, 1.6 to 4.7 feet: SILT (ML); gray; 95% fines; low plasticity; firm; 5% wood waste; fibers.	0-4.7	0-1	Archive Only	0-1
SE-02A	0 to 2.4 feet: Silt (ML); black; 90% fines, low plasticity, soft; 10% sand, fine; trace wood waste. 2.4 to 5.1 feet: Silt (ML); 90% fines, low plasticity, firm; 10% wood waste, fibers, chips. 3.4 feet: Decrease in wood waste to 5%.	0-5.1	2.5-3.5	Mercury Conventionals	2.5-3.5
SE-03A	0 to 2 feet: Silt (ML); dark gray; 80% fines, low plasticity, soft; 10% sand, fine; 10% wood waste, shreds. 0.3 feet to 0.4 feet: Lens of 20% wood waste. 2 to 4.5 feet: Silt (ML); gray; 90% fines, low plasticity, soft; 5% sand, fine; 5% wood waste, fibers. 4.5 to 5.5 feet: No wood waste observed.	0-5.5	0-1	Conventionals	0-1
SE-03B	0 to 5.1 feet: Silt (ML); dark gray; 80% fines, low plasticity, soft; 10% sand, fine; 10% wood waste, shreds.	0-5.1	1-2	Archive Only	1-2
SE-05A	0 to 2.3 feet: Silt with sand(ML); gray; 80% fines, low plasticity; 20% sand, fine to medium; trace organic debris and wood waste. 2.3 to 9.7 feet: No wood waste observed.	0-9.7	2-3	Conventionals	2-3
SE-05B	0 to 6 feet: Silt (ML); dark gray; 95% fines, low plasticity, firm; 5% sand; trace organic debris and wood waste. 3 to 3.2 feet: Increase in wood waste to 5%. 6 to 7.2 feet: Sand with silt (SP-SM); gray; 10% fines, firm; 90% sand, fine to medium.	0-7.2	2.5-3.5	Archive Only	2.5-3.5

Table 4-1
Sediment Sample Descriptions and Analyses
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Boring / Surface Sample Location	Lithologic Description (bgs/bml)	Depth (cm bml)	Collection Depth (ft bml)	Analytical Suite	Archive Sample Depths (ft bml)
SE-06A	0 to 4.7 feet: Silt (ML); dark gray; 75% fines, low plasticity, firm; 5% sand, fine; 20% wood waste, chunks (1 to 3 inches).	0-7.5	0.5-1.5	Conventionals	0.5-1.5
	4.7 to 7.5 feet: No wood waste observed.				
SE-06B	0 to 1.5 feet: Silt (ML); black; 90% fines, low plasticity, soft; 10% sand, fine; trace wood waste.	0-5.2	3-4	Archive Only	3-4
	1.5 to 5.2 feet: Sand (SW); gray; 5% fines; 95% sand; moderate to coarse; trace wood waste.				
	3 to 3.2 feet: Interval of 10% wood waste chips.				
SE-07A	0 to 4 feet: Silt (ML); black; 60% fines, low plasticity, soft; 40% wood waste, pulp, chips, chunks (<2 inches); wet; free product (petroleum) impacts.	0-4	0-1	Mercury Conventionals	0-1
SE-07B	0 to 6.5 feet: Silt (ML); dark gray; 90% fines, low plasticity, firm; 5% sand, fine; 5% wood waste, chips; no odor; moist.	0-6.5	0-1	Archive Only	0-1
	0.3 feet: Decrease to trace wood waste, fine chips; increase to 10% sand.				
SE-08A	0 to 1.3 feet: wood waste; gray; 15% fines; 85% wood waste, pulp to fine chips.	0-1.3	0-1	Conventionals	0-1
SE-08B	0 to 5.3 feet: Silt (ML); grayish black; 75% fines, low plasticity, soft; 10% sand, fine; 15% wood waste, pulp to fine chips.	0-5.3	0-1	Archive Only	0-1
SE-08C	0 to 3.9 feet: Silt (ML); grayish black; 85% fines, low plasticity, firm; 10% sand, fine; 5% wood waste, chips, chunks (1 to 3 inches).	0-4.2	3.2-4.2	Conventionals	3.2-4.2
	0.9 to 4 feet: wood waste; 100% wood waste; chips, chunks.				
	4 to 4.1 feet: Lens of silt; gray; 90% fines; low plasticity; 10% wood waste; pulp, chips.				

Table 4-1
Sediment Sample Descriptions and Analyses
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Boring / Surface Sample Location	Lithologic Description (bgs/bml)	Depth (cm bml)	Collection Depth (ft bml)	Analytical Suite	Archive Sample Depths (ft bml)
SE-08D	0 to 2 feet: Silt with sand (ML): dark gray; 80% fines, low plasticity, firm; 15% sand; 5% wood waste, chunks (1 to 3 inches) 2 to 2.75 feet: wood waste; brown with gray; 10% fines; 90% wood waste, shreds, chips, chunks (<4 inches). 2.75 to 5.75 feet: Silt (ML): dark gray; 90% fines, low plasticity, firm; 5% sand, fine; 5% wood waste, fibers, shreds, chips (<1 inch).	0-5.8	2-3	Archive Only	2-3
SE-10	0 to 2 feet: wood waste (ML): brown; 20% fines; 80% wood waste, fibers, chips. 2 to 3.7 feet: Silt (ML): gray; 70% fines, low plasticity, firm; 30% wood waste.	0-3.7	2-3.7	Total Metals TCLP PCB Aroclors TPH SVOCs Conventionals	2-3.7
SE-29	0 to 2.3 feet: wood waste; gray; 20% fines, soft; 80% wood waste, pulp to chips. 2.3 to 2.5 feet: Silt (ML); gray; 75% fines, low plasticity, soft; 25% wood waste, chips.	0-2.5	0-2	Total Metals PCB Aroclors TPH SVOCs Conventionals	0-2
SE-30	0 to 2.5 feet: wood waste; black; 20% fines; 80% wood waste, chips, chunks (<2 inches). 2.5 to 3.4 feet: Silt (ML); gray; 75% fines, low plasticity, firm; 5% sand, fine; 20% wood waste, shreds, chips. 2.9 to 3 feet: Lens of 100% solid wood waste. 3.4 to 6.1 feet: Silt (ML); gray; 90% fines; 5% sand, fine; 5% wood waste, chips.	0-6.1	2.5-4.5	Total Metals TCLP PCB Aroclors TPH SVOCs Conventionals	0-2 2.5-4.5 4.5-5.5

Table 4-1
Sediment Sample Descriptions and Analyses
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Notes

bgs = below ground surface.

bml = below mudline.

cm = centimeter.

conventionals = total organic carbon, total volatile solids, total solids, ammonia as nitrogen, total sulfides.

ft = foot or feet.

PCB = polychlorinated biphenyl.

SVOC = semivolatile organic compound.

TCLP = toxicity characteristic leaching procedure.

TPH = total petroleum hydrocarbon.

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Table 5-1
Screening Levels for Protection of Benthic Organisms
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Contaminant of Concern	Criteria for Protection of Benthic Organisms[1]				Screening Level for Protection of Benthic Organisms			
	SMS Freshwater Sediment Criteria	SMS Marine Sediment Criteria		SMS Marine Sediment AETs[a][4]	Organic Carbon (0.5% to 3.5%)[b]	Units	Organic Carbon (<0.5% or >3.5%)[c]	Units
	dry weight	dry weight	OC-normalized	dry weight				
	SCO	SCO	SCO	SCO				
Conventional Parameters								
Ammonia as Nitrogen	230	--	--	--	**230**	mg/kg	**230**	mg/kg
Sulfide	39	--	--	--	**39**		**39**	
Total Metals (mg/kg)								
Arsenic	14	57	--	57	14	mg/kg	14	mg/kg
Cadmium	2.1	5.1	--	5.1	2.1		2.1	
Chromium	72	260	--	260	**72**		**72**	
Copper	400	390	--	390	**390**		**390**	
Lead	360	450	--	450	360		360	
Mercury	0.66	0.41	--	0.41	0.41		0.41	
Nickel	26	--	--	--	26		26	
Selenium	11	--	--	--	11		11	
Silver	0.57	6.1	--	6.1	**0.57**		**0.57**	
Zinc	3,200	410	--	410	**410**		**410**	
Organic Chemicals (ug/kg)								
2,4-Dimethylphenol	--	29	--	29	**29**	ug/kg	**29**	ug/kg
2-Methylphenol	--	63	--	63	**63**		**63**	
3- & 4-Methylphenol (m,p-cresol)[d]	260	670	--	670	**260**		**260**	
Benzoic acid	2,900	650	--	650	**650**		**650**	
Benzyl alcohol	--	57	--	57	**57**		**57**	
Phenol	120	420	--	420	**120**		**120**	
Dibenzofuran	200	--	15,000	540	**200**		**200**	
N-Nitrosodiphenylamine	--	--	11,000	28	**11,000**	ug/kg-OC normalized	**28**	
Phthalates (ug/kg)								
Bis(2-ethylhexyl)phthalate	500	--	47,000	1,300	**500**	ug/kg	**500**	ug/kg
Butylbenzylphthalate	--	--	4,900	63	**4,900**	ug/kg-OC normalized	**63**	
Diethyl phthalate	--	--	61,000	200	**61,000**		**200**	
Dimethyl phthalate	--	--	53,000	71	**53,000**		**71**	
Di-n-butyl phthalate	380	--	220,000	1,400	**380**	ug/kg	**380**	
Di-n-octyl phthalate	39	--	58,000	6,200	**39**		**39**	
Chlorinated Organics (ug/kg)								
1,2,4-Trichlorobenzene	--	--	810	31	**810**	ug/kg-OC normalized	**31**	ug/kg
1,2-Dichlorobenzene	--	--	2,300	35	**2,300**		**35**	
1,4-Dichlorobenzene	--	--	3,100	110	**3,100**		**110**	
Hexachlorobenzene	--	--	380	22	**380**		**22**	
Hexachlorobutadiene	--	--	3,900	11	**3,900**		**11**	
Pentachlorophenol	1,200	360	--	360	**360**	ug/kg	**360**	

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Table 5-1
Screening Levels for Protection of Benthic Organisms
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Contaminant of Concern	Criteria for Protection of Benthic Organisms[1]				Screening Level for Protection of Benthic Organisms			
	SMS Freshwater Sediment Criteria	SMS Marine Sediment Criteria		SMS Marine Sediment AETs[a][4]	Organic Carbon (0.5% to 3.5%)[b]	Units	Organic Carbon (<0.5% or >3.5%)[c]	Units
	dry weight	dry weight	OC-normalized	dry weight				
	SCO	SCO	SCO	SCO				
PAHs (ug/kg)								
Total PAHs[e]	17,000	--	--	--	**17,000**	ug/kg	**17,000**	ug/kg
2-Methylnaphthalene	--	--	38,000	670	**38,000**	ug/kg-OC normalized	**670**	ug/kg
Total LPAH[f]	--	--	370,000	5,200	**370,000**		**5,200**	
Acenaphthene	--	--	16,000	500	**16,000**		**500**	
Acenaphthylene	--	--	66,000	1,300	**66,000**		**1,300**	
Anthracene	--	--	220,000	960	**220,000**		**960**	
Fluorene	--	--	23,000	540	**23,000**		**540**	
Naphthalene	--	--	99,000	2,100	**99,000**		**2,100**	
Phenanthrene	--	--	100,000	1,500	**100,000**		**1,500**	
Total HPAH[g]	--	--	960,000	12,000	**960,000**		**12,000**	
Benzo(a)anthracene	--	--	110,000	1,300	**110,000**		**1,300**	
Benzo(a)pyrene	--	--	99,000	1,600	**99,000**		**1,600**	
Benzo(ghi)perylene	--	--	31,000	670	**31,000**		**670**	
Chrysene	--	--	110,000	1,400	**110,000**		**1,400**	
Dibenzo(a,h)anthracene	--	--	12,000	230	**12,000**		**230**	
Fluoranthene	--	--	160,000	1,700	**160,000**		**1,700**	
Indeno(1,2,3-cd)pyrene	--	--	34,000	600	**34,000**		**600**	
Pyrene	--	--	1,000,000	2,600	**1,000,000**		**2,600**	
Total Benzofluoranthenes[h]	--	--	230,000	3,200	**230,000**		**3,200**	
cPAH[i][1]	--	--	--	--	--	--	--	--
Pesticides and PCBs (ug/kg)								
Total PCBs[j,k]	110	--	12,000	130	110	ug/kg	110	ug/kg
Carbazole	900	--	--	--	**900**		**900**	
TPH (mg/kg)								
Diesel-Range Hydrocarbons	340	--	--	--	**340**	mg/kg	**340**	mg/kg
Lube-Oil-Range Hydrocarbons	3,600	--	--	--	**3,600**		**3,600**	

Table 5-1
Screening Levels for Protection of Benthic Organisms
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Notes

Shading indicates the chosen screening level based on the SMS framework for establishing sediment cleanup levels.

Screening level for sediment inside standard 0.5 to 3.5 percent TOC range. Shading also applies to screening levels that are the same for sediment inside and outside of the standard total organic carbon range.

Screening level for sediment outside standard 0.5 to 3.5 percent total organic carbon range.

Bold values are those selected as preliminary cleanup standards. Refer to Table 5-3.

-- = not applicable or not available.
< = less than.
> = greater than.
AET = apparent effects threshold.
cPAH = carcinogenic PAH.
HPAH = high-molecular-weight PAH.
LPAH = low-molecular-weight PAH.
mg/kg = milligrams per kilogram.
ng/kg = nanograms per kilogram.
OC = organic carbon.
PAH = polycyclic aromatic hydrocarbon.
PCB = polychlorinated biphenyl.
SCO = sediment cleanup objective.
SCUM = Washington State Department of Ecology Sediment Cleanup User's Manual.
SMS = Washington State Department of Ecology Sediment Management Standards.
SVOC = semivolatile organic compound.
TEQ = toxic equivalent quotient.
TEF = toxicity equivalence factor
TOC = total organic carbon
TPH = total petroleum hydrocarbons.
ug/kg = micrograms per kilogram.

[a] When TOC results are outside 0.5-3.5%; samples are evaluated against dry-weight-based marine sediment AETs instead of organic carbon-normalized-based SMS marine sediment SCO/CSLs (Barrick et al. 1988).
[b]Screening level for sediment within the standard 0.5 to 3.5 percent TOC range is equivalent to the lowest of the SMS freshwater and SMS marine criteria.
[c]Screening level for sediment outside the standard 0.5 to 3.5 percent TOC range is equivalent to the lowest of the SMS freshwater and SMS marine criteria and SMS marine AETs.
[d]Screened against SMS criteria for 4-methylphenol.
[e]Total PAHs is the sum of 1-methylnaphthalene; 2-methylnaphthalene; acenaphthene; acenaphthylene; anthracene; benzo(a)anthracene; benzo(a])pyrene; benzo(b)fluoranthene; benzo(ghi)perylene; benzo(j+k)fluoranthene; chrysene; dibenz(a,h)anthracene; fluoranthene; fluorene; indeno(1,2,3-cd)pyrene; naphthalene; phenanthrene; and pyrene.
[f]Total LPAH is the sum of acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene.
[g]Total HPAH is the sum of benzo(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; benzo(ghi)perylene; benzo(j+k)fluoranthene; chrysene; dibenzo(a;h)anthracene; fluoranthene; indeno(1,2,3-cd)pyrene; and pyrene.
[h]Total benzofluoranthenes is the sum of benzo(b)fluoranthene and benzo(j+k)fluoranthene.
[i]cPAH TEQ is calculated with 2005 California EPA toxicity equivalence factors provided in table 6-1 of SCUM (Ecology, 2021).
[j]Total PCB Aroclors for freshwater sediment evaluation is the sum of detected Aroclors 1016, 1221, 1242, 1248, 1254, and 1260.
[k]Total PCB Aroclors for marine sediment evaluation is the sum of detected Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260.

Reference

[1] Ecology. 2021. Sediment cleanup user's manual (SCUM), guidance for implementing cleanup provisions of the sediment management standards, Chapter 173-204 WAC. Publication no. 12-09-057. Washington State Department of Ecology. Revised December 2021.

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Table 5-2
Screening Levels for Protection of Human Health and Higher Trophic Ecological Receptors
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

	Human Health Direct Contact[a][1]			Bioaccumulation via Consumption of Aquatic Organisms[d]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[e]
Contaminant of Concern	Beach Play	Subsistence Clam Digging (Adult)	Subsistence Net Fishing (Adult)	Ecology Marine Site Natural Background 90/90 UTL[b][1]	PQL[c][1]	
Total Metals (mg/kg—dry)						
Arsenic	2.1	0.82	1.9	11	0.3	**11**
Cadmium	220	1,100	2,500	0.8	0.07	**0.8**
Lead	--	--	--	21	0.1	**21**
Mercury[f]	67	230	460	0.2	0.02	**0.2**
Nickel	--	--	--	50	--	**50**
PAHs (ug/kg—dry)						
cPAH[g][1]	170	120	150	21	9	**21**
PCBs (ug/kg—dry)						
PCBs[h]	--	--	--	3.5	--	**3.5**
Dioxins and Furans (pg/g—dry)						
Dioxin/Furan TEQ[i][1]	29	12	29	4	5	**5**

Notes
Selected screening level protective of human health and higher trophic ecological receptors.
Bold values are those selected as preliminary cleanup standards. Refer to Table 5-3.
-- = not applicable or not available.
cPAH = carcinogenic polycyclic aromatic hydrocarbon.
mg/kg = milligrams per kilogram.
PCB = polychlorinated biphenyl.
pg/g = picograms per gram.
PQL = practical quantitation limit.
TEQ = toxic equivalent quotient.
TPH = total petroleum hydrocarbons.
UTL = upper tolerance limit.
[a]Sediment Cleanup User's Manual II Table 9-3 Human health risk-based sediment concentrations for ingestion of sediment and direct contact with sediment. Concentration is the lowest of the three scenarios (Ecology, 2021).
[b]Sediment Cleanup User's Manual II Table 10-1 Natural background 90/90 UTL (dry weight) (Ecology, 2021).
[c]Sediment Cleanup User's Manual II Table 11-1 Programmatic sediment and tissue PQLs used to establish the PQL-based SCO and CSL (Ecology, 2021).
[d]Bioaccumulation via consumption of aquatic organisms is the higher value of Ecology Marine Site Natural Background 90/90 UTL and the PQL.
[e]Human health and higher trophic level ecological receptor screening levels are chosen from lowest of bioaccumulative and direct contact pathways. If the risk-based value is lower than natural background or PQL, the cleanup level defaults to
[f]Human health risk-based concentrations are calculated using methylmercury.
[g]cPAH TEQ is calculated with 2005 California EPA toxicity equivalence factors provided in table 6-1 of SCUM (Ecology, 2021).
[h]Bioaccumulative risk based on dioxin-like PCB Congeners TEQ; the corresponding background value is based on total PCBs.
[i]Dioxin/furan TEQ is calculated with 2005 World Health Organization toxic equivalence factors provided in table 6-2 of SCUM (Ecology, 2021).

Reference
[1] Ecology. 2021. Sediment cleanup user's manual (SCUM), guidance for implementing cleanup provisions of the sediment management standards, Chapter 173-204 WAC. Publication no. 12-09-057. Washington State Department of Ecology. Revised

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Table 5-3
Preliminary Cleanup Standards
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

	Preliminary Cleanup Standards					
Contaminant of Concern	Organic Carbon (0.5% to 3.5%)[a]	Units	Organic Carbon (<0.5% or >3.5%)[b]	Units	Point of Compliance	Basis
Conventional Parameters						
Ammonia as Nitrogen	230	mg/kg	230	mg/kg	BAZ (10 cm) point by point	SMS Freshwater Sediment Criteria SCO
Sulfide	39		39		BAZ (10 cm) point by point	SMS Freshwater Sediment Criteria SCO
Total Metals						
Arsenic	11	mg/kg	11	mg/kg	BAZ (10 cm) areawide average	Ecology Marine Site Natural Background 90/90 UTL
Cadmium	0.8		0.8		BAZ (10 cm) point by point	Ecology Marine Site Natural Background 90/90 UTL
Chromium	72		72		BAZ (10 cm) point by point	SMS Freshwater Sediment Criteria SCO
Copper	390		390		BAZ (10 cm) areawide average	Ecology Marine Site Natural Background 90/90 UTL
Lead	21		21		BAZ (10 cm) areawide average	Ecology Marine Site Natural Background 90/90 UTL
Mercury	0.2		0.2		BAZ (10 cm) point by point	Ecology Marine Site Natural Background 90/90 UTL
Nickel	50		50		BAZ (10 cm) areawide average	Ecology Marine Site Natural Background 90/90 UTL
Selenium	11		11		BAZ (10 cm) point by point	SMS Freshwater Sediment Criteria SCO
Silver	0.57		0.57		BAZ (10 cm) point by point	Ecology Marine Site Natural Background 90/90 UTL
Zinc	410		410		BAZ (10 cm) areawide average	Ecology Marine Site Natural Background 90/90 UTL
Organic Chemicals						
2,4-Dimethylphenol	29	ug/kg	29	ug/kg	BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
2-Methylphenol	63		63		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
3- & 4-Methylphenol (m,p-cresol)[c]	260		260		BAZ (10 cm) point by point	SMS Freshwater Sediment Criteria SCO
Benzoic acid	650		650		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Benzyl alcohol	57		57		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Phenol	120		120		BAZ (10 cm) point by point	SMS Freshwater Sediment Criteria SCO
Dibenzofuran	200		200		BAZ (10 cm) point by point	SMS Freshwater Sediment Criteria SCO
N-Nitrosodiphenylamine	11,000	ug/kg-OC-normalized	28		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Phthalates						
Bis(2-ethylhexyl)phthalate	500	ug/kg	500	ug/kg	BAZ (10 cm) point by point	SMS Freshwater Sediment Criteria SCO
Butylbenzylphthalate	4,900	ug/kg-OC-normalized	63		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Diethyl phthalate	61,000		200		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Dimethyl phthalate	53,000		71		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Di-n-butyl phthalate	380	ug/kg	380		BAZ (10 cm) point by point	SMS Freshwater Sediment Criteria SCO
Di-n-octyl phthalate	39		39		BAZ (10 cm) point by point	SMS Freshwater Sediment Criteria SCO
Chlorinated Organics						
1,2,4-Trichlorobenzene	810	ug/kg-OC-normalized	31	ug/kg	BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
1,2-Dichlorobenzene	2,300		35		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
1,4-Dichlorobenzene	3,100		110		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Hexachlorobenzene	380		22		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Hexachlorobutadiene	3,900		11		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Pentachlorophenol	360	ug/kg	360		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET

Table 5-3
Preliminary Cleanup Standards
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

	Preliminary Cleanup Standards					
Contaminant of Concern	Organic Carbon (0.5% to 3.5%)[a]	Units	Organic Carbon (<0.5% or >3.5%)[b]	Units	Point of Compliance	Basis
PAHs						
Total PAHs[d]	17,000	ug/kg	17,000	ug/kg	BAZ (10 cm) point by point	SMS Freshwater Sediment Criteria SCO
Total LPAH[e]	370,000	ug/kg-OC-normalized	5,200		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
2-Methylnaphthalene	38,000	ug/kg-OC-normalized	670	ug/kg	BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Acenaphthene	16,000		500		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Acenaphthylene	66,000		1,300		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Anthracene	220,000		960		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Fluorene	23,000		540		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Naphthalene	99,000		2,100		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Phenanthrene	100,000		1,500		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Total HPAH[f]	960,000		12,000		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Benzo(a)anthracene	110,000		1,300		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Benzo(a)pyrene	99,000		1,600		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Benzo(ghi)perylene	31,000		670		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Chrysene	110,000		1,400		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Dibenzo(a,h)anthracene	12,000		230		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Fluoranthene	160,000		1,700		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Indeno(1,2,3-cd)pyrene	34,000		600		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Pyrene	1,000,000		2,600		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
Total Benzofluoranthenes[g]	230,000		3,200		BAZ (10 cm) point by point	SMS Marine Sediment Criteria SCO/AET
cPAH[h][1]	21	ug/kg	21	ug/kg	BAZ (10 cm) areawide average	Ecology Marine Site Natural Background 90/90 UTL
Pesticides and PCBs (ug/kg)						
Total PCBs[i,j]	3.5	ug/kg	3.5	ug/kg	BAZ (10 cm) point by point	Ecology Marine Site Natural Background 90/90 UTL
Carbazole	900		900		BAZ (10 cm) point by point	SMS Freshwater Sediment Criteria SCO
Dioxins and Furans (ng/kg)						
Dioxin/Furan TEQ[k][1]	5	ng/kg	5	ng/kg	BAZ (10 cm) areawide average	PQL
TPH (mg/kg)						
Diesel-Range Hydrocarbons	340	mg/kg	340	mg/kg	BAZ (10 cm) point by point	SMS Freshwater Sediment Criteria SCO
Lube-Oil-Range Hydrocarbons	3,600		3,600		BAZ (10 cm) point by point	SMS Freshwater Sediment Criteria SCO

Table 5-3
Preliminary Cleanup Standards
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Notes

Shading indicates the chosen preliminary cleanup standard based on the SMS framework for establishing sediment cleanup levels.

Preliminary cleanup standards for sediment inside standard 0.5 to 3.5 percent total organic carbon range. Shading also applies to Preliminary cleanup standards that are the same for sediment inside and outside of the standard TOC

Preliminary cleanup standards for sediment outside standard 0.5 to 3.5 percent total organic carbon range.

< = less than.
> = greater than.
AET = apparent effects threshold.
BAZ = biologically active zone.
cm = centimeter.
cPAH = carcinogenic PAH.
HPAH = high-molecular-weight PAH.
LPAH = low-molecular-weight PAH.
mg/kg = milligrams per kilogram.
ng/kg = nanograms per kilogram.
OC = organic carbon.
PAH = polycyclic aromatic hydrocarbon.
PCB = polychlorinated biphenyl.
PQL = practical quantitation limit.
SCO = sediment cleanup objective.
SCUM = Washington State Department of Ecology Sediment Cleanup User's Manual.
SMS = Washington State Department of Ecology Sediment Management Standards.
SVOC = semivolatile organic compound.
TEQ = toxic equivalent quotient.
TPH = total petroleum hydrocarbons.
ug/kg = micrograms per kilogram.
UTL = upper tolerance limit.

[a]Preliminary cleanup standard for sediment within the standard 0.5 to 3.5 percent TOC range is equivalent to the highest of natural background, PQL, or risk-based concentrations. Risk-based concentrations are the lowest of SMS freshwater, SMS marine, and human health and higher trophic ecological receptors risk criteria.

[b]Preliminary cleanup standards for sediment outside of the standard 0.5 to 3.5 percent TOC range is equivalent to the highest of natural background, PQL, or risk-based concentrations. Risk-based concentrations are the lowest of SMS freshwater, SMS marine, SMS marine AETs, and human health and higher trophic ecological receptors risk criteria.

[c]Screened against SMS criteria for 4-methylphenol.

[d]Total PAHs is the sum of 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a])pyrene, benzo(b)fluoranthene, benzo(ghi)perylene, benzo(j+k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene.

[e]Total LPAH is the sum of acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene.

[f]Total HPAH is the sum of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(ghi)perylene, benzo(j+k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene.

[g]Total Benzofluoranthenes is the sum of benzo(b)fluoranthene and benzo(j+k)fluoranthene.

[h]cPAH TEQ is calculated with 2005 California EPA toxicity equivalence factors provided in table 6-1 of SCUM (Ecology, 2021).

[i]Total PCB Aroclors for freshwater sediment evaluation is the sum of detected Aroclors 1016, 1221, 1242, 1248, 1254, and 1260.

[j]Total PCB Aroclors for marine sediment evaluation is the sum of detected Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260.

[k]Dioxin/furan TEQ is calculated with 2005 World Health Organization toxic equivalence factors provided in table 6-2 of SCUM (Ecology, 2021).

Reference

[1] Ecology. 2021. Sediment cleanup user's manual (SCUM), guidance for implementing cleanup provisions of the sediment management standards, Chapter 173-204 WAC. Publication no. 12-09-057. Washington State Department of Ecology. Revised December 2021.

Table 6-1
Analytical Summary of 2013–2020 Data
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

	Preliminary Cleanup Standards		Number of Samples	Number of Detects	Number of Non-Detects	Frequency of Detection	Minimum Detected Value	Maximum Detected Value	Number of Detected Samples Exceeding Preliminary Cleanup Standards	Frequency of Detected Exceedances for All Samples
	Organic Carbon (0.5% to 3.5%)	Organic Carbon (<0.5% or >3.5%)								
Conventional Parameters										
Total Organic Carbon (%)	--	--	70	70	0	100%	0.415	49.5	--	--
Total Volatile Solids (%)	--	--	44	44	0	100%	2.51	69.23	--	--
Ammonia as Nitrogen (mg N/kg)	230	230	44	43	1	98%	0.783	408	2	5%
Sulfide (mg/kg)	39	39	43	41	2	95%	6.46	4,040	39	91%
Porewater Sulfide (mg/L)										
Sulfide	--	--	16	13	2	81%	0.06	0.202	--	--
TCLP Metals (mg/L)										
Lead	--	--	3	0	3	0%	NV	NV	--	--
Mercury	--	--	3	0	3	0%	NV	NV	--	--
Metals (mg/kg-dry)										
Arsenic	11	11	45	32	13	71%	4.49	30	21	47%
Cadmium	0.8	0.8	45	20	25	44%	0.118	0.725	0	0%
Chromium	72	72	45	29	16	64%	19.1	52	0	0%
Copper	390	390	44	44	0	100%	40.8	134	0	0%
Lead	21	21	45	44	1	98%	6.35	110	8	18%
Mercury	0.2	0.2	54	50	4	93%	0.0244	6.2	6	11%
Nickel	50	50	18	18	0	100%	21.8	40.2	0	0%
Selenium	11	11	18	16	2	89%	0.63	1.01	0	0%
Silver	0.57	0.57	44	9	35	20%	0.0854	0.26	0	0%
Zinc	410	410	44	44	0	100%	64	237	0	0%

Table 6-1
Analytical Summary of 2013–2020 Data
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

	Preliminary Cleanup Standards		Number of Samples	Number of Detects	Number of Non-Detects	Frequency of Detection	Minimum Detected Value	Maximum Detected Value	Number of Detected Samples Exceeding Preliminary Cleanup Standards	Frequency of Detected Exceedances for All Samples
	Organic Carbon (0.5% to 3.5%)	Organic Carbon (<0.5% or >3.5%)								
Organic Chemicals (ug/kg-dry)										
2,4-Dimethylphenol	29	29	49	1	48	2%	17	17	0	0%
2-Methylphenol	63	63	49	9	40	18%	3.3	45	0	0%
3- & 4-Methylphenol (m,p-Cresol)	260	260	18	12	6	67%	28.4	1,600	3	17%
Benzoic acid	650	650	49	27	22	55%	110	1,700	4	8%
Benzyl alcohol	57	57	49	15	34	31%	15	64	2	4%
Dibenzofuran	120	120	49	28	21	57%	12	490	4	8%
Phenol	200	200	52	41	11	79%	8.4	980	10	19%
N-Nitrosodiphenylamine	11,000	28	49	0	49	0%	NV	NV	0	0%
Phthalates (ug/kg-dry)										
Bis(2-ethylhexyl)phthalate	500	500	49	12	37	24%	29	9,400	4	8%
Butylbenzylphthalate	4,900	63	50	10	40	20%	2.8	320	1	2%
Diethylphthalate	61,000	200	49	5	44	10%	20	270	1	2%
Dimethyl phthalate	53,000	71	49	2	47	4%	2.5	3.1	0	0%
Di-n-butyl phthalate	380	380	49	2	47	4%	130	213	0	0%
Di-n-octyl phthalate	39	39	49	1	48	2%	710	710	1	2%
Chlorinated Organics (ug/kg-dry)										
1,2,4-Trichlorobenzene	810	31	49	4	45	8%	3	74	2	4%
1,2-Dichlorobenzene	2,300	35	49	3	46	6%	1.6	3.3	0	0%
1,4-Dichlorobenzene	3,100	110	49	5	44	10%	3.7	1,000	2	4%
Hexachlorobenzene	380	22	49	1	48	2%	3.3	3.3	0	0%
Hexachlorobutadiene	3,900	11	49	1	48	2%	2.8	2.8	0	0%
Pentachlorophenol	360	360	50	8	42	16%	11	400	1	2%

Table 6-1
Analytical Summary of 2013–2020 Data
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

	Preliminary Cleanup Standards		Number of Samples	Number of Detects	Number of Non-Detects	Frequency of Detection	Minimum Detected Value	Maximum Detected Value	Number of Detected Samples Exceeding Preliminary Cleanup Standards	Frequency of Detected Exceedances for All Samples
	Organic Carbon (0.5% to 3.5%)	Organic Carbon (<0.5% or >3.5%)								
PAHs (ug/kg-dry)										
Total PAHs[a]	17,000	17,000	49	48	1	98%	16.3	22,700	1	2%
Total LPAHs[b]	370,000	5,200	49	45	4	92%	13.6	7,810	1	2%
1-Methylnaphthalene	--	--	41	18	23	44%	9.5	76.7	--	--
2-Methylnaphthalene	38,000	670	49	16	33	33%	10	780	1	2%
Acenaphthene	16,000	500	49	32	17	65%	12	490	0	0%
Acenaphthylene	66,000	1,300	49	23	26	47%	9.7	520	0	0%
Anthracene	220,000	960	49	31	18	63%	11	750	0	0%
Fluorene	23,000	540	49	30	19	61%	11	650	1	2%
Naphthalene	99,000	2,100	49	35	14	71%	13	1,800	0	0%
Phenanthrene	100,000	1,500	49	44	5	90%	13.6	3,600	1	2%
Total HPAHs[c]	960,000	12,000	49	48	1	98%	16.3	14,100	1	2%
Benzo(a)anthracene	110,000	1,300	49	37	12	76%	11	1,300	0	0%
Benzo(a)pyrene	99,000	1,600	49	29	20	59%	12	1,200	0	0%
Benzo(ghi)perylene	31,000	670	49	27	22	55%	13	660	0	0%
Chrysene	110,000	1,400	49	38	11	78%	8.6	1,600	1	2%
Dibenzo(a,h)anthracene	12,000	230	49	23	26	47%	2.3	360	1	2%
Fluoranthene	160,000	1,700	49	47	2	96%	13.8	3,900	3	6%
Indeno(1,2,3-cd)pyrene	34,000	600	49	24	25	49%	8.8	490	0	0%
Pyrene	1,000,000	2,600	49	48	1	98%	13	3,600	2	4%
Benzo(b)fluoranthene	--	--	18	9	9	50%	20.8	180	--	--
Benzo(k)fluoranthene	--	--	18	3	15	17%	36.5	75.8	--	--
Total Benzofluoranthenes[d]	230,000	3,200	49	39	10	80%	12	2,000	0	0%
cPAH TEQ[e][1]	21	21	49	42	7	86%	12.9	1,610	29	59%

Table 6-1
Analytical Summary of 2013–2020 Data
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

	Preliminary Cleanup Standards		Number of Samples	Number of Detects	Number of Non-Detects	Frequency of Detection	Minimum Detected Value	Maximum Detected Value	Number of Detected Samples Exceeding Preliminary Cleanup Standards	Frequency of Detected Exceedances for All Samples
	Organic Carbon (0.5% to 3.5%)	Organic Carbon (<0.5% or >3.5%)								
Pesticides and PCBs (ug/kg-dry)										
Aroclor 1016	--	--	49	0	49	0%	NV	NV	--	--
Aroclor 1221	--	--	49	0	49	0%	NV	NV	--	--
Aroclor 1232	--	--	49	0	49	0%	NV	NV	--	--
Aroclor 1242	--	--	49	0	49	0%	NV	NV	--	--
Aroclor 1248	--	--	49	0	49	0%	NV	NV	--	--
Aroclor 1254	--	--	49	9	40	18%	2.38	490	--	--
Aroclor 1260	--	--	49	18	31	37%	2.31	730	--	--
Aroclor 1268	--	--	23	0	23	0%	NV	NV	--	--
Total PCBs[f]	3.5	3.5	49	22	28	45%	4.16	1,170	22	45%
Carbazole	900	900	1	1	0	100%	24	24	0	0%
Additional SVOCs (ug/kg-dry)										
1,3-Dichlorobenzene			9	2	7	22%	280	620	--	--
4-Methylphenol			31	12	19	39%	26	870	--	--
Hexachlorocyclopentadiene			19	0	19	0%	NV	NV	--	--
Dioxins/Furans (pg/g-dry)										
1,2,3,4,6,7,8-HpCDD	--	--	23	16	7	70%	6.640	12,200	--	--
1,2,3,4,6,7,8-HpCDF	--	--	23	14	9	61%	1.260	1,170	--	--
1,2,3,4,7,8,9-HpCDF	--	--	23	12	11	52%	0.096	81.3	--	--
1,2,3,4,7,8-HxCDD	--	--	23	15	8	65%	0.589	32.5	--	--
1,2,3,4,7,8-HxCDF	--	--	23	6	17	26%	0.032	4.39	--	--
1,2,3,6,7,8-HxCDD	--	--	23	21	2	91%	0.850	1,020	--	--
1,2,3,6,7,8-HxCDF	--	--	23	18	5	78%	0.140	51.7	--	--
1,2,3,7,8,9-HxCDD	--	--	23	23	0	100%	1.140	98.1	--	--
1,2,3,7,8,9-HxCDF	--	--	23	11	12	48%	0.268	62.9	--	--

Table 6-1
Analytical Summary of 2013–2020 Data
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

	Preliminary Cleanup Standards		Number of Samples	Number of Detects	Number of Non-Detects	Frequency of Detection	Minimum Detected Value	Maximum Detected Value	Number of Detected Samples Exceeding Preliminary Cleanup Standards	Frequency of Detected Exceedances for All Samples
	Organic Carbon (0.5% to 3.5%)	Organic Carbon (<0.5% or >3.5%)								
Dioxins/Furans (pg/g-dry) cont.										
1,2,3,7,8-PeCDD	--	--	23	22	1	96%	0.643	34.1	--	--
1,2,3,7,8-PeCDF	--	--	23	13	10	57%	0.141	41.4	--	--
2,3,4,6,7,8-HxCDF	--	--	23	18	5	78%	0.105	69.3	--	--
2,3,4,7,8-PeCDF	--	--	23	16	7	70%	0.070	43.5	--	--
2,3,7,8-TCDD	--	--	23	20	3	87%	0.936	5.26	--	--
2,3,7,8-TCDF	--	--	23	8	15	35%	0.088	2.48	--	--
OCDD	--	--	23	22	1	96%	33.1	68,300	--	--
OCDF	--	--	23	22	1	96%	1.08	3,100	--	--
Total HpCDDs	--	--	23	23	0	100%	15.5	21,300	--	--
Total HpCDFs	--	--	23	10	13	43%	17.4	3,910	--	--
Total HxCDDs	--	--	23	7	16	30%	11.3	4,840	--	--
Total HxCDFs	--	--	23	5	18	22%	64.7	2,130	--	--
Total PeCDDs	--	--	23	9	14	39%	3.71	88.7	--	--
Total PeCDFs	--	--	23	1	22	4%	40.4	40.4	--	--
Total TCDDs	--	--	23	2	21	9%	14.1	14.1	--	--
Total TCDFs	--	--	23	2	21	9%	14.1	16.8	--	--
Dioxin/Furan TEQ[(g)(2)]	5	5	23	23	0	100%	1.52	359	20	87%
TPH (mg/kg-dry)										
Gasoline-Range Hydrocarbons	--	--	19	0	19	0%	NV	NV	--	--
Diesel-Range Hydrocarbons	340	340	34	16	18	47%	18.5	20,000	6	18%
Motor-Oil Range Hydrocarbons	3,600	3,600	34	30	4	88%	19	60,000	5	15%

Table 6-1
Analytical Summary of 2013–2020 Data
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Notes

Cleanup standard derived from criteria for protection of benthic organisms. Refer to Tables 5-1 and 5-3.

Cleanup standard derived from criteria for protection of human health and higher trophic ecological receptors. Refer to Tables 5-2 and 5-3.

-- = not applicable.
% = percent.
cPAH = carcinogenic PAH.
HPAH = high-molecular-weight PAH.
HpCDD = heptachlorodibenzo-p-dioxin
HpCDF = heptachlorodibenzofuran
HxCDD = hexachlorodibenzo-p-dioxin
HxCDF = hexachlorodibenzofuran
LPAH = low-molecular-weight PAH.
mg N/kg = milligrams of nitrogen per kilogram.
mg/kg = milligrams per kilogram.
mg/kg-dry = milligrams per kilogram, dry weight.
mg/L = milligrams per liter.
NV = no value.
OCDD = octochlorodibenzo-p-dioxin
OCDF =octochlorodibenzofuran
PAH = polycyclic aromatic hydrocarbon.
PCB = polychlorinated biphenyl.
PeCDD = pentachlorodibenzo-p-dioxin
PeCDF = pentachlorodibenzofuran
pg/g-dry = picograms per gram (parts per trillion), dry weight.
SVOC = semivolatile organic compound.
TCDD = tetrachlorodibenzo-p-dioxin
TCDF = tetrachlorodibenzofuran
TEQ =-toxic equivalent-quotient.
TPH = total petroleum hydrocarbon.
ug/kg-dry = micrograms per kilogram, dry weight.

[a]Total PAH is the sum of detected 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluorene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene. Non-detect results are not included in the sum. When all analytical results are non-detect, the highest detection limit is used.

[b]LPAH is the sum of detected acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene. Non-detect results are not included in the sum. When all analytical results are non-detect, the highest detection limit is used.

[c]HPAH is the sum of detected benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene. Non-detect results are not included in the sum. When all analytical results are non-detect, the highest detection limit is used.

[d]Total benzofluoranthenes are the sum of concentrations of the b, j, and k isomers and are reported by the laboratory. Their calculation method was not provided.

[e]cPAH TEQ is calculated with 2005 California EPA toxic equivalence factors presented in Table 708-2 (Washington Administrative Code 173-340-900). Non-detect results are included at one-half the detection limit. When all cPAHs are non-detect, the highest reported detection limit is shown.

[f]Total PCBs is the sum of all detected recolors. Non-detect results are not included in the sum. When all analytical results are non-detect, the highest detection limit is used.

[g]Dioxin/furan TEQ is calculated with 2005 World Health Organization toxic equivalence factors as presented in Table 708-1 (Washington Administrative Code 173-340-900). Non-detect results are included at one-half the detection limit.

References

[1] EPA. 2010. Development of a relative potency factor (RPF) approach for polycyclic aromatic hydrocarbon (PAH) mixtures. EPA/635/R-08/012A. U.S. Environmental Protection Agency. February.

[2] van den Berg, M., L.S. Birnbaum, M. Denison, M. De Vito, W. Farland, M. Feeley, H. Fiedler, H. Hakansson, A. Hanberg, L. Haws, M. Rose, S. Safe, D. Schrenk, C. Tohyama, A. Tritscher, J. Tuomisto, M. Tysklind, N. Walker, R.E. Peterson. 2006. The 2005 World Health Organization reevaluation of human and mammalian toxic equivalency factors for dioxins and dioxin-like compounds. July 7.

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Table 6-2
2019-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	SE-01A	SE-02A	SE-03A	SE-05A	SE-06A	SE-07A	SE-08A	SE-08C	SE-10	SE-14
Sample Name:				SE-01A-1.0-	SE-02A-2.5-	SE-03A-0-1.0	SE-05A-2.0-	SE-06A-0.5-	SE-07A-0-1.0	SE-08A-0-1.0	SE-08C-3.2-	SE-10-2.0-3.7	SE-14-0-0.33
Collection Date:				09/25/2019	09/26/2019	09/25/2019	09/23/2019	09/25/2019	09/26/2019	09/24/2019	09/24/2019	09/26/2019	09/27/2019
Collection Depth (ft bml):				1-2	2-3.5	0-1	2-3	0.5-1.5	0-1	0-1	3-4.2	2-3.7	0-0.33
Type:				Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Surface
Percent Wood waste:				20	10	10	Trace	20	40	85	25	30	85
TOC:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		Outside	Inside	Inside	Inside	Inside	Outside	Outside	Outside	Outside	Outside
Conventional Parameters													
Total Organic Carbon (%)	NV	NV	NV	4.4	3.3	2.3	2.3	3.2	6.3	6.8	7.1	7.9 J	5.5
Total Solids (%)	NV	NV	NV	51.9	55.5	45.6	47.8	55.6	34	35.8	44	38.3	34.8
Total Volatile Solids (%)	NV	NV	NV	11.9 J	7.94 J	8.11 J	7.49	9.92 J	20.7 J	31.7	19.8	30.1	12.5
Ammonia as Nitrogen (mg/kg)	230	230	NV	290 J	230 J	168 J	47.1	408 J	7.73 J	8.65	36.3	5.37 J	15.2
Sulfide (mg/kg)	39	39	NV	865 J	977	856 J	4,040 J	--	639	153 J	124 J	228 J	409
Grain Size (%)													
Clay	NV	NV	NV	--	--	--	--	--	--	--	--	15.7	9.2
Silt	NV	NV	NV	--	--	--	--	--	--	--	--	39.5	41.2
Sand	NV	NV	NV	--	--	--	--	--	--	--	--	29.4	27.3
Gravel	NV	NV	NV	--	--	--	--	--	--	--	--	15.5	22.4
TCLP Metals (mg/L)													
Lead	NV	NV	NV	--	--	--	--	--	--	--	--	0.0065 U	--
Mercury	NV	NV	NV	--	--	--	--	--	--	--	--	0.000007 U	--
Metals (mg/kg-dry)													
Arsenic	14	14	11	--	--	--	--	--	--	--	--	**5.47**	**8.63**
Cadmium	2.1	2.1	0.8	--	--	--	--	--	--	--	--	**0.595**	0.139 U
Chromium	72	72	NV	--	--	--	--	--	--	--	--	**25.2**	**33.9**
Copper	390	390	NV	--	--	--	--	--	--	--	--	**56.1**	**85.5**
Lead	360	360	21	--	--	--	--	--	--	--	--	**24.0**	**47.3**
Mercury	0.41	0.41	0.2	--	**0.103**	--	--	--	**0.226**	--	--	**0.129**	**0.0882**
Nickel	26	26	NV	--	--	--	--	--	--	--	--	**25.1**	**27.9**
Selenium	11	11	NV	--	--	--	--	--	--	--	--	**0.667 J**	**0.716 J**
Silver	0.57	0.57	NV	--	--	--	--	--	--	--	--	**0.138 J**	0.139 U
Zinc	410	410	NV	--	--	--	--	--	--	--	--	**71.9**	**82.2**
Organic Chemicals (ug/kg-dry)													
2,4-Dimethylphenol	29	29	NV	--	--	--	--	--	--	--	--	341 U	75.7 U
2-Methylphenol	63	63	NV	--	--	--	--	--	--	--	--	170 U	37.8 U
3- & 4-Methylphenol (m,p-Cresol)	260	260	NV	--	--	--	--	--	--	--	--	**309 J**	37.8 U
Benzoic acid	650	650	NV	--	--	--	--	--	--	--	--	8,550 U	1,900 U
Benzyl alcohol	57	57	NV	--	--	--	--	--	--	--	--	341 U	75.7 U
Dibenzofuran	200	200	NV	--	--	--	--	--	--	--	--	68.1 U	15.1 U
Phenol	120	120	NV	--	--	--	--	--	--	--	--	137 U	**71.5**
N-Nitrosodiphenylamine	NV	28	NV	--	--	--	--	--	--	--	--	170 U	37.8 U
Organic Chemicals (ug/kg-OC)													
N-Nitrosodiphenylamine	11,000	NV	NV	--	--	--	--	--	--	--	--	2,150 U	687 U
Phthalates (ug/kg-dry)													
Bis(2-ethylhexyl)phthalate	500	500	NV	--	--	--	--	--	--	--	--	1,020 U	227 U
Butylbenzylphthalate	NV	63	NV	--	--	--	--	--	--	--	--	341 U	75.7 U
Diethyl phthalate	NV	200	NV	--	--	--	--	--	--	--	--	341 U	75.7 U
Dimethyl phthalate	NV	71	NV	--	--	--	--	--	--	--	--	341 U	75.7 U
Di-n-butyl phthalate	380	380	NV	--	--	--	--	--	--	--	--	341 U	75.7 U
Di-n-octyl phthalate	39	39	NV	--	--	--	--	--	--	--	--	548 U	121 U

Table 6-2
2019-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	SE-01A	SE-02A	SE-03A	SE-05A	SE-06A	SE-07A	SE-08A	SE-08C	SE-10	SE-14
Sample Name:				SE-01A-1.0-	SE-02A-2.5-	SE-03A-0-1.0	SE-05A-2.0-	SE-06A-0.5-	SE-07A-0-1.0	SE-08A-0-1.0	SE-08C-3.2-	SE-10-2.0-3.7	SE-14-0-0.33
Collection Date:				09/25/2019	09/26/2019	09/25/2019	09/23/2019	09/25/2019	09/26/2019	09/24/2019	09/24/2019	09/26/2019	09/27/2019
Collection Depth (ft bml):				1-2	2-3.5	0-1	2-3	0.5-1.5	0-1	0-1	3-4.2	2-3.7	0-0.33
Type:				Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Surface
Percent Wood waste:				20	10	10	Trace	20	40	85	25	30	85
TOC:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		Outside	Inside	Inside	Inside	Inside	Outside	Outside	Outside	Outside	Outside
Phthalates (ug/kg-OC)													
Butylbenzylphthalate	4,900	NV	NV	--	--	--	--	--	--	--	--	4,320 U	1,380 U
Diethyl phthalate	61,000	NV	NV	--	--	--	--	--	--	--	--	4,320 U	1,380 U
Dimethyl phthalate	53,000	NV	NV	--	--	--	--	--	--	--	--	4,320 U	1,380 U
Chlorinated Organics (ug/kg-dry)													
1,2,4-Trichlorobenzene	NV	31	NV	--	--	--	--	--	--	--	--	170 U	37.8 U
1,2-Dichlorobenzene	NV	35	NV	--	--	--	--	--	--	--	--	170 U	37.8 U
1,4-Dichlorobenzene	NV	110	NV	--	--	--	--	--	--	--	--	170 U	37.8 U
Hexachlorobenzene	NV	22	NV	--	--	--	--	--	--	--	--	68.1 U	15.1 U
Hexachlorobutadiene	NV	11	NV	--	--	--	--	--	--	--	--	170 U	37.8 U
Pentachlorophenol	360	360	NV	--	--	--	--	--	--	--	--	681 U	151 U
Chlorinated Organics (ug/kg-OC)										--	--		
1,2,4-Trichlorobenzene	810	NV	NV	--	--	--	--	--	--	--	--	2,150 U	687 U
1,2-Dichlorobenzene	2,300	NV	NV	--	--	--	--	--	--	--	--	2,150 U	687 U
1,4-Dichlorobenzene	3,100	NV	NV	--	--	--	--	--	--	--	--	2,150 U	687 U
Hexachlorobenzene	380	NV	NV	--	--	--	--	--	--	--	--	862 U	275 U
Hexachlorobutadiene	3,900	NV	NV	--	--	--	--	--	--	--	--	2,150 U	687 U
PAHs (ug/kg-dry)													
Total PAH[d]	17,000	17,000	NV	--	--	--	--	--	--	--	--	**590 J**	**109 J**
1-Methylnaphthalene	NV	NV	NV	--	--	--	--	--	--	--	--	137 U	30.3 U
2-Methylnaphthalene	NV	670	NV	--	--	--	--	--	--	--	--	137 U	30.3 U
Total LPAH[e]	NV	5,200	NV	--	--	--	--	--	--	--	--	**137**	**55.2 J**
Acenaphthene	NV	500	NV	--	--	--	--	--	--	--	--	68.1 U	**15.4 J**
Acenaphthylene	NV	1,300	NV	--	--	--	--	--	--	--	--	68.1 U	15.1 U
Anthracene	NV	960	NV	--	--	--	--	--	--	--	--	68.1 U	15.1 U
Fluorene	NV	540	NV	--	--	--	--	--	--	--	--	68.1 U	15.1 U
Naphthalene	NV	2,100	NV	--	--	--	--	--	--	--	--	137 U	30.3 U
Phenanthrene	NV	1,500	NV	--	--	--	--	--	--	--	--	68.1 U	**39.8**
Total HPAH[f]	NV	12,000	NV									**590 J**	**53.5 J**
Benzo(a)anthracene	NV	1,300	NV	--	--	--	--	--	--	--	--	68.1 U	30.3 U
Benzo(a)pyrene	NV	1,600	NV	--	--	--	--	--	--	--	--	**167 J**	22.7 U
Benzo(ghi)perylene	NV	670	NV	--	--	--	--	--	--	--	--	**73.4 J**	15.1 U
Chrysene	NV	1,400	NV	--	--	--	--	--	--	--	--	68.1 U	**16.6 J**
Dibenzo(a,h)anthracene	NV	230	NV	--	--	--	--	--	--	--	--	68.1 U	15.1 U
Fluoranthene	NV	1,700	NV	--	--	--	--	--	--	--	--	**76.1 J**	**21.1 J**
Indeno(1,2,3-cd)pyrene	NV	600	NV	--	--	--	--	--	--	--	--	68.1 U	15.1 U
Pyrene	NV	2,600	NV	--	--	--	--	--	--	--	--	**152**	**15.8 J**
Benzo(b)fluoranthene	NV	NV	NV	--	--	--	--	--	--	--	--	**121 J**	22.7 U
Benzo(k)fluoranthene	NV	NV	NV	--	--	--	--	--	--	--	--	102 U	22.7 U
Total benzofluoranthenes[g]	NV	3,200	NV	--	--	--	--	--	--	--	--	**121 J**	22.7 U
cPAH TEQ[h][1]	NV	NV	21	--	--	--	--	--	--	--	--	**195 J**	**16.8 J**

Table 6-2
2019-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	SE-01A	SE-02A	SE-03A	SE-05A	SE-06A	SE-07A	SE-08A	SE-08C	SE-10	SE-14
Sample Name:				SE-01A-1.0-	SE-02A-2.5-	SE-03A-0-1.0	SE-05A-2.0-	SE-06A-0.5-	SE-07A-0-1.0	SE-08A-0-1.0	SE-08C-3.2-	SE-10-2.0-3.7	SE-14-0-0.33
Collection Date:				09/25/2019	09/26/2019	09/25/2019	09/23/2019	09/25/2019	09/26/2019	09/24/2019	09/24/2019	09/26/2019	09/27/2019
Collection Depth (ft bml):				1-2	2-3.5	0-1	2-3	0.5-1.5	0-1	0-1	3-4.2	2-3.7	0-0.33
Type:				Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Surface
Percent Wood waste:				20	10	10	Trace	20	40	85	25	30	85
TOC:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		Outside	Inside	Inside	Inside	Inside	Outside	Outside	Outside	Outside	Outside
PAHs (ug/kg-OC)													
2-Methylnaphthalene	38,000	NV	NV	--	--	--	--	--	--	--	--	1,730 U	551 U
Total LPAH[e]	370,000	NV	NV	--	--	--	--	--	--	--	--	1,730 U	**1,000 J**
Acenaphthene	16,000	NV	NV	--	--	--	--	--	--	--	--	862 U	**280 J**
Acenaphthylene	66,000	NV	NV	--	--	--	--	--	--	--	--	862 U	275 U
Anthracene	220,000	NV	NV	--	--	--	--	--	--	--	--	862 U	275 U
Fluorene	23,000	NV	NV	--	--	--	--	--	--	--	--	862 U	275 U
Naphthalene	99,000	NV	NV	--	--	--	--	--	--	--	--	1,730 U	551 U
Phenanthrene	100,000	NV	NV	--	--	--	--	--	--	--	--	862 U	**724**
Total HPAH[f]	960,000	NV	NV	--	--	--	--	--	--	--	--	**7,470 J**	**973 J**
Benzo(a)anthracene	110,000	NV	NV	--	--	--	--	--	--	--	--	862 U	551 U
Benzo(a)pyrene	99,000	NV	NV	--	--	--	--	--	--	--	--	**2,110 J**	413 U
Benzo(ghi)perylene	31,000	NV	NV	--	--	--	--	--	--	--	--	**929 J**	275 U
Chrysene	110,000	NV	NV	--	--	--	--	--	--	--	--	862 U	**302 J**
Dibenzo(a,h)anthracene	12,000	NV	NV	--	--	--	--	--	--	--	--	862 U	275 U
Fluoranthene	160,000	NV	NV	--	--	--	--	--	--	--	--	**963 J**	**384 J**
Indeno(1,2,3-cd)pyrene	34,000	NV	NV	--	--	--	--	--	--	--	--	862 U	275 U
Pyrene	1,000,000	NV	NV	--	--	--	--	--	--	--	--	**1,920**	**287 J**
Benzo(b)fluoranthene	NV	NV	NV	--	--	--	--	--	--	--	--	**1,530 J**	413 U
Benzo(k)fluoranthene	NV	NV	NV	--	--	--	--	--	--	--	--	1,290 U	413 U
Total benzofluoranthenes[g]	230,000	NV	NV	--	--	--	--	--	--	--	--	**1,530 J**	413 U
PCBs (ug/kg-dry)													
Aroclor 1016	NV	NV	NV	--	--	--	--	--	--	--	--	2.15 U	5.75 UJ
Aroclor 1221	NV	NV	NV	--	--	--	--	--	--	--	--	2.15 U	5.75 UJ
Aroclor 1232	NV	NV	NV	--	--	--	--	--	--	--	--	2.15 U	5.75 UJ
Aroclor 1242	NV	NV	NV	--	--	--	--	--	--	--	--	2.15 U	5.75 UJ
Aroclor 1248	NV	NV	NV	--	--	--	--	--	--	--	--	2.15 U	5.75 UJ
Aroclor 1254	NV	NV	NV	--	--	--	--	--	--	--	--	**5.86 J**	5.75 UJ
Aroclor 1260	NV	NV	NV	--	--	--	--	--	--	--	--	**7.17 J**	**8.41 J**
Total PCBs[i]	110	110	3.5	--	--	--	--	--	--	--	--	**13.0 J**	**8.41 J**
Additional SVOCs (ug/kg-dry)													
Hexachlorocyclopentadiene	NV	NV	NV	--	--	--	--	--	--	--	--	341 U	75.7 U

Table 6-2
2019-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	SE-01A	SE-02A	SE-03A	SE-05A	SE-06A	SE-07A	SE-08A	SE-08C	SE-10	SE-14
Sample Name:				SE-01A-1.0-	SE-02A-2.5-	SE-03A-0-1.0	SE-05A-2.0-	SE-06A-0.5-	SE-07A-0-1.0	SE-08A-0-1.0	SE-08C-3.2-	SE-10-2.0-3.7	SE-14-0-0.33
Collection Date:				09/25/2019	09/26/2019	09/25/2019	09/23/2019	09/25/2019	09/26/2019	09/24/2019	09/24/2019	09/26/2019	09/27/2019
Collection Depth (ft bml):				1-2	2-3.5	0-1	2-3	0.5-1.5	0-1	0-1	3-4.2	2-3.7	0-0.33
Type:				Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Surface
Percent Wood waste:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		20	10	10	Trace	20	40	85	25	30	85
TOC:				Outside	Inside	Inside	Inside	Inside	Outside	Outside	Outside	Outside	Outside
Dioxins/Furans (pg/g-dry)													
1,2,3,4,6,7,8-HpCDD	NV	NV	NV	--	--	--	--	--	--	--	--	--	**263**
1,2,3,4,6,7,8-HpCDF	NV	NV	NV	--	--	--	--	--	--	--	--	--	**52.5**
1,2,3,4,7,8,9-HpCDF	NV	NV	NV	--	--	--	--	--	--	--	--	--	2.34 UJ
1,2,3,4,7,8-HxCDD	NV	NV	NV	--	--	--	--	--	--	--	--	--	**5.92 J**
1,2,3,4,7,8-HxCDF	NV	NV	NV	--	--	--	--	--	--	--	--	--	2.61 UJ
1,2,3,6,7,8-HxCDD	NV	NV	NV	--	--	--	--	--	--	--	--	--	**10**
1,2,3,6,7,8-HxCDF	NV	NV	NV	--	--	--	--	--	--	--	--	--	1.66 UJ
1,2,3,7,8,9-HxCDD	NV	NV	NV	--	--	--	--	--	--	--	--	--	**6.08 J**
1,2,3,7,8,9-HxCDF	NV	NV	NV	--	--	--	--	--	--	--	--	--	0.641 U
1,2,3,7,8-PeCDD	NV	NV	NV	--	--	--	--	--	--	--	--	--	2.46 UJK
1,2,3,7,8-PeCDF	NV	NV	NV	--	--	--	--	--	--	--	--	--	1.26 UJ
2,3,4,6,7,8-HxCDF	NV	NV	NV	--	--	--	--	--	--	--	--	--	1.85 UJ
2,3,4,7,8-PeCDF	NV	NV	NV	--	--	--	--	--	--	--	--	--	**1.23 J**
2,3,7,8-TCDD	NV	NV	NV	--	--	--	--	--	--	--	--	--	**1.73**
2,3,7,8-TCDF	NV	NV	NV	--	--	--	--	--	--	--	--	--	**1.75**
OCDD	NV	NV	NV	--	--	--	--	--	--	--	--	--	**2,830**
OCDF	NV	NV	NV	--	--	--	--	--	--	--	--	--	**116**
Total HpCDDs	NV	NV	NV	--	--	--	--	--	--	--	--	--	**836 J**
Total HpCDFs	NV	NV	NV	--	--	--	--	--	--	--	--	--	**180 J**
Total HxCDDs	NV	NV	NV	--	--	--	--	--	--	--	--	--	**118 J**
Total HxCDFs	NV	NV	NV	--	--	--	--	--	--	--	--	--	**64.7 J**
Total PeCDDs	NV	NV	NV	--	--	--	--	--	--	--	--	--	33.8 UJK
Total PeCDFs	NV	NV	NV	--	--	--	--	--	--	--	--	--	22.2 UJK
Total TCDDs	NV	NV	NV	--	--	--	--	--	--	--	--	--	**14.1 J**
Total TCDFs	NV	NV	NV	--	--	--	--	--	--	--	--	--	**14.1 J**
Dioxin/Furan TEQ[ij][1]	NV	NV	5	--	--	--	--	--	--	--	--	--	**10.1 J**
TPH (mg/kg-dry)													
Gasoline-Range Hydrocarbons	NV	NV	NV	--	--	--	--	--	--	--	--	11.8 U	12.8 U
Diesel-Range Hydrocarbons	340	340	NV	--	--	--	--	--	27.6 U	--	--	25.8 U	27.3 U
Motor-Oil-Range Hydrocarbons	3,600	3,600	NV	--	--	--	--	--	**644**	--	--	**898**	**384**

Table 6-2
2019-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	SE-15	SE-16	SE-17	SE-18	SE-19	SE-20	SE-21	SE-22	SE-23	SE-24
Sample Name:				SE-15-0-0.33	SE-16-0-0.33	SE-17-0-0.33	SE-18-0-0.33	SE-19-0-0.33	SE-20-0-0.33	SE-21-0-0.33	SE-22-0-0.33	SE-23-0-0.33	SE-24-0-0.33
Collection Date:				09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/25/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019
Collection Depth (ft bml):				0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Type:				Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Percent Wood waste:				30	Trace	0	5	0	0	10	10	15	25
TOC:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		Outside	Inside	Inside	Inside	Inside	Outside	Inside	Outside	Inside	Outside
Conventional Parameters													
Total Organic Carbon (%)	NV	NV	NV	4.7	1.5	2.3	1.7	2	6.6	1.3	3.8	2.6	7.8
Total Solids (%)	NV	NV	NV	43.4	52.9	43.3	46.3	41.5	36.8	59.4	33.4	45.4	35.5 J
Total Volatile Solids (%)	NV	NV	NV	14.4	5.35	6.8	6.06	6.95	12.7	5.02	11.6	7.18	18.9 J
Ammonia as Nitrogen (mg/kg)	230	230	NV	5.75	8.43	10.7	12.9	9.43	3.9	7.06	7.81	11.8	9.49
Sulfide (mg/kg)	39	39	NV	191	469	20	691	924	2.7 U	359	937	856	281
Grain Size (%)													
Clay	NV	NV	NV	11.2	15.4	24.1	17.4	--	26.6	13.5	20.4	14.6	8.3
Silt	NV	NV	NV	42.4	42.4	56.9	43.8	--	58.5	33.5	49.2	39.2	39.2
Sand	NV	NV	NV	21	41.8	18.5	38.8	--	9.74	46.2	13.6	38.4	14.3
Gravel	NV	NV	NV	25.4	0.39	0.55	0.02	--	5.18	6.79	16.8	7.85	38.2
TCLP Metals (mg/L)													
Lead	NV	NV	NV	--	--	--	--	--	--	--	--	--	--
Mercury	NV	NV	NV	--	--	--	--	--	--	--	--	--	--
Metals (mg/kg-dry)													
Arsenic	14	14	11	**6.2**	**4.91**	**7.09**	**5.93**	--	**7.96**	**4.49**	**6.97**	**8.51**	**8.26**
Cadmium	2.1	2.1	0.8	**0.175 J**	**0.143 J**	**0.151 J**	**0.169 J**	--	**0.239 J**	**0.118 J**	**0.201 J**	**0.513**	**0.216 J**
Chromium	72	72	NV	**32**	**32.2**	**36.1**	**34.5**	--	**32.9**	**29.1**	**35.7**	**37.8**	**40**
Copper	390	390	NV	**49.8**	**52**	**57.3**	**62.1**	--	**64.6**	**49.9**	**68.6**	**117**	**73.7**
Lead	360	360	21	**7.52**	**6.35**	**8.21**	**7.28**	--	**11.7**	**7.2**	**16.9**	**34.9**	**32.9**
Mercury	0.41	0.41	0.2	**0.0402 J**	**0.0244 J**	**0.045 J**	**0.0386 J**	**0.0379 J**	**0.069**	**0.0385 J**	**0.0528 J**	**0.0928**	**0.111**
Nickel	26	26	NV	**21.8**	**26.1**	**27.2**	**30.1**	--	**25.4**	**25.1**	**26.3**	**37.5**	**40.2**
Selenium	11	11	NV	**0.714 J**	**0.725 J**	**0.867 J**	**0.86 J**	--	**0.941 J**	**0.63 J**	**1.01 J**	**0.798 J**	**0.797 J**
Silver	0.57	0.57	NV	**0.115 J**	0.0918 U	**0.119 J**	0.111 U	--	**0.144 J**	**0.0854 J**	0.147 U	**0.148 J**	**0.146 J**
Zinc	410	410	NV	**67.3**	**75.1**	**82.1**	**80.3**	--	**142**	**64**	**136**	**136**	**93**
Organic Chemicals (ug/kg-dry)													
2,4-Dimethylphenol	29	29	NV	60.4 U	48.8 U	59 U	57 U	--	71.8 U	44.4 U	79.3 U	142 U	74 U
2-Methylphenol	63	63	NV	30.2 U	24.4 U	29.5 U	28.4 U	--	35.8 U	22.2 U	39.6 U	71.1 U	37 U
3- & 4-Methylphenol (m,p-Cresol)	260	260	NV	**157**	**28.4 J**	29.5 U	28.4 U	--	**43.2 J**	**100**	39.6 U	71.1 U	**137**
Benzoic acid	650	650	NV	1,510 U	1,220 U	1,480 U	1,430 U	--	1,800 U	1,110 U	1,990 U	3,560 U	1,850 UJ
Benzyl alcohol	57	57	NV	60.4 U	48.8 U	59 U	57 U	--	71.8 U	44.4 U	79.3 U	142 U	74 U
Dibenzofuran	200	200	NV	**14.5 J**	9.74 U	**18.7 J**	11.4 U	--	14.3 U	8.85 U	15.8 U	28.4 U	**21.1 J**
Phenol	120	120	NV	**58.3 J**	19.5 U	23.6 U	22.8 U	--	28.7 U	**28.1 J**	31.7 U	57 U	**88.9**
N-Nitrosodiphenylamine	NV	28	NV	30.2 U	24.4 U	29.5 U	28.4 U	--	35.8 U	22.2 U	39.6 U	71.1 U	37 U
Organic Chemicals (ug/kg-OC)													
N-Nitrosodiphenylamine	11,000	NV	NV	643 U	1,630 U	1,280 U	1,670 U	--	542 U	1,710 U	1,040 U	2,730 U	474 U
Phthalates (ug/kg-dry)													
Bis(2-ethylhexyl)phthalate	500	500	NV	181 U	146 U	177 U	171 U	--	215 U	133 U	238 U	427 U	222 U
Butylbenzylphthalate	NV	63	NV	60.4 U	48.8 U	59 U	57 U	--	71.8 U	44.4 U	79.3 U	142 U	74 U
Diethyl phthalate	NV	200	NV	60.4 U	48.8 U	59 U	57 U	--	71.8 U	44.4 U	79.3 U	142 U	74 U
Dimethyl phthalate	NV	71	NV	60.4 U	48.8 U	59 U	57 U	--	71.8 U	44.4 U	79.3 U	142 U	74 U
Di-n-butyl phthalate	380	380	NV	60.4 U	48.8 U	59 U	57 U	--	71.8 U	44.4 U	79.3 U	142 U	74 U
Di-n-octyl phthalate	39	39	NV	96.9 U	78.3 U	94.6 U	91.4 U	--	115 U	71.2 U	127 U	228 U	119 U

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Table 6-2
2019-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	SE-15	SE-16	SE-17	SE-18	SE-19	SE-20	SE-21	SE-22	SE-23	SE-24
Sample Name:				SE-15-0-0.33	SE-16-0-0.33	SE-17-0-0.33	SE-18-0-0.33	SE-19-0-0.33	SE-20-0-0.33	SE-21-0-0.33	SE-22-0-0.33	SE-23-0-0.33	SE-24-0-0.33
Collection Date:				09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/25/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019
Collection Depth (ft bml):				0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Type:				Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Percent Wood waste:				30	Trace	0	5	0	0	10	10	15	25
TOC:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		Outside	Inside	Inside	Inside	Inside	Outside	Inside	Outside	Inside	Outside
Phthalates (ug/kg-OC)													
Butylbenzylphthalate	4,900	NV	NV	1,290 U	3,250 U	2,570 U	3,350 U	--	1,090 U	3,420 U	2,090 U	5,460 U	949 U
Diethyl phthalate	61,000	NV	NV	1,290 U	3,250 U	2,570 U	3,350 U	--	1,090 U	3,420 U	2,090 U	5,460 U	949 U
Dimethyl phthalate	53,000	NV	NV	1,290 U	3,250 U	2,570 U	3,350 U	--	1,090 U	3,420 U	2,090 U	5,460 U	949 U
Chlorinated Organics (ug/kg-dry)													
1,2,4-Trichlorobenzene	NV	31	NV	30.2 U	24.4 U	29.5 U	28.4 U	--	35.8 U	22.2 U	39.6 U	71.1 U	37 U
1,2-Dichlorobenzene	NV	35	NV	30.2 U	24.4 U	29.5 U	28.4 U	--	35.8 U	22.2 U	39.6 U	71.1 U	37 U
1,4-Dichlorobenzene	NV	110	NV	30.2 U	24.4 U	29.5 U	28.4 U	--	35.8 U	22.2 U	39.6 U	71.1 U	37 U
Hexachlorobenzene	NV	22	NV	12 U	9.74 U	11.8 U	11.4 U	--	14.3 U	8.85 U	15.8 U	28.4 U	14.8 U
Hexachlorobutadiene	NV	11	NV	30.2 U	24.4 U	29.5 U	28.4 U	--	35.8 U	22.2 U	39.6 U	71.1 U	37 U
Pentachlorophenol	360	360	NV	120 U	97.4 U	118 U	114 U	--	143 U	88.5 U	158 U	284 U	148 U
Chlorinated Organics (ug/kg-OC)													
1,2,4-Trichlorobenzene	810	NV	NV	643 U	1,630 U	1,280 U	1,670 U	--	542 U	1,710 U	1,040 U	2,730 U	474 U
1,2-Dichlorobenzene	2,300	NV	NV	643 U	1,630 U	1,280 U	1,670 U	--	542 U	1,710 U	1,040 U	2,730 U	474 U
1,4-Dichlorobenzene	3,100	NV	NV	643 U	1,630 U	1,280 U	1,670 U	--	542 U	1,710 U	1,040 U	2,730 U	474 U
Hexachlorobenzene	380	NV	NV	255 U	649 U	513 U	671 U	--	217 U	681 U	416 U	1,090 U	190 U
Hexachlorobutadiene	3,900	NV	NV	643 U	1,630 U	1,280 U	1,670 U	--	542 U	1,710 U	1,040 U	2,730 U	474 U
PAHs (ug/kg-dry)													
Total PAH[d]	17,000	17,000	NV	**899 J**	**40.4 J**	**2,060 J**	22.8 U	--	**34.3 J**	**119 J**	**58.2 J**	**1,750 J**	**594 J**
1-Methylnaphthalene	NV	NV	NV	24.2 U	19.5 U	**70.6**	22.8 U	--	28.7 U	17.8 U	31.7 U	57 U	29.6 U
2-Methylnaphthalene	NV	670	NV	24.2 U	19.5 U	**33.7 J**	22.8 U	--	28.7 U	17.8 U	31.7 U	57 U	29.6 U
Total LPAH[e]	NV	5,200	NV	**93.8 J**	**13.6 J**	**1,010 J**	22.8 U	--	28.7 U	**83.20 J**	31.7 U	**296 J**	**223 J**
Acenaphthene	NV	500	NV	**48.7**	9.74 U	**126**	11.4 U	--	14.3 U	8.85 U	15.8 U	28.4 U	**29.3 J**
Acenaphthylene	NV	1,300	NV	12 U	9.74 U	**22.9 J**	11.4 U	--	14.3 U	**14.5 J**	15.8 U	**37.6 J**	14.8 U
Anthracene	NV	960	NV	**20.8 J**	9.74 U	**121**	11.4 U	--	14.3 U	8.85 U	15.8 U	**45.8 J**	**22.6 J**
Fluorene	NV	540	NV	12 U	9.74 U	**87.5**	11.4 U	--	14.3 U	8.85 U	15.8 U	28.4 U	**24.2 J**
Naphthalene	NV	2,100	NV	24.2 U	19.5 U	**77**	22.8 U	--	28.7 U	**49.2**	31.7 U	57 U	**69.8**
Phenanthrene	NV	1,500	NV	**24.3**	**13.6 J**	**575**	11.4 U	--	14.3 U	**19.5**	15.8 U	**213**	**76.8**
Total HPAH[f]	NV	12,000	NV	**805 J**	**26.8 J**	**945 J**	17.1 U	--	**34.3 J**	**35.8 J**	**58.2 J**	**1,450 J**	**371 J**
Benzo(a)anthracene	NV	1,300	NV	**61.2**	9.74 U	**66.5**	11.4 U	--	14.3 U	8.85 U	15.8 U	**164**	**41.2**
Benzo(a)pyrene	NV	1,600	NV	**45.8**	14.6 U	**38.7**	17.1 U	--	21.5 U	13.3 U	23.8 U	**163**	**31.8 J**
Benzo(ghi)perylene	NV	670	NV	**18.3 J**	9.74 U	11.8 U	11.4 U	--	14.3 U	8.85 U	15.8 U	**77.8**	14.8 U
Chrysene	NV	1,400	NV	**71.9**	9.74 U	**70.3**	11.4 U	--	14.3 U	8.85 U	15.8 U	**153**	**33.4**
Dibenzo(a,h)anthracene	NV	230	NV	12 U	9.74 U	11.8 U	11.4 U	--	14.3 U	8.85 U	15.8 U	28.4 U	14.8 U
Fluoranthene	NV	1,700	NV	**250**	**13.8 J**	**335**	11.4 U	--	**16.9 J**	**18.1**	**31.8**	**285**	**123**
Indeno(1,2,3-cd)pyrene	NV	600	NV	**20.7 J**	9.74 U	11.8 U	11.4 U	--	14.3 U	8.85 U	15.8 U	**80.7**	14.8 U
Pyrene	NV	2,600	NV	**210**	**13 J**	**401**	11.4 U	--	**17.4 J**	**17.7 J**	**26.4 J**	**305**	**113**
Benzo(b)fluoranthene	NV	NV	NV	**90.7**	14.6 U	**33.9 J**	17.1 U	--	21.5 U	13.3 U	23.8 U	**153**	**28.6 J**
Benzo(k)fluoranthene	NV	NV	NV	**36.5 J**	14.6 U	17.7 U	17.1 U	--	21.5 U	13.3 U	23.8 U	**68.1 J**	22.2 U
Total benzofluoranthenes[g]	NV	3,200	NV	**127 J**	14.6 U	**33.9 J**	17.1 U	--	21.5 U	13.3 U	23.8 U	**221 J**	**28.6 J**
cPAH TEQ[h][1]	NV	NV	21	**68 J**	14.6 U	**51.5 J**	17.1 U	--	21.5 U	13.3 U	23.8 U	**213 J**	**41.7 J**

Table 6-2
2019-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	SE-15	SE-16	SE-17	SE-18	SE-19	SE-20	SE-21	SE-22	SE-23	SE-24
Sample Name:				SE-15-0-0.33	SE-16-0-0.33	SE-17-0-0.33	SE-18-0-0.33	SE-19-0-0.33	SE-20-0-0.33	SE-21-0-0.33	SE-22-0-0.33	SE-23-0-0.33	SE-24-0-0.33
Collection Date:				09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/25/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019
Collection Depth (ft bml):				0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Type:				Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Percent Wood waste:				30	Trace	0	5	0	0	10	10	15	25
TOC:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		Outside	Inside	Inside	Inside	Inside	Outside	Inside	Outside	Inside	Outside
PAHs (ug/kg-OC)													
2-Methylnaphthalene	38,000	NV	NV	515 U	1,300 U	**1,470 J**	1,340 U	--	435 U	1,370 U	834 U	2,190 U	379 U
Total LPAH[e]	370,000	NV	NV	**2,000 J**	**907**	**43,900**	**1,340**	--	435 U	**6,400**	834 U	**11,400**	**2,860 J**
Acenaphthene	16,000	NV	NV	**1,040**	649 U	**5,480**	671 U	--	217 U	681 U	416 U	1,090 U	**376 J**
Acenaphthylene	66,000	NV	NV	255 U	649 U	**996 J**	671 U	--	217 U	**1,120 J**	416 U	**1,450 J**	190 U
Anthracene	220,000	NV	NV	**443 J**	649 U	**5,260**	671 U	--	217 U	681 U	416 U	**1,760 J**	**290 J**
Fluorene	23,000	NV	NV	255 U	649 U	**3,800**	671 U	--	217 U	681 U	416 U	1,090 U	**310 J**
Naphthalene	99,000	NV	NV	515 U	1,300 U	**3,350**	1,340 U	--	435 U	**3,780**	834 U	2,190 U	**895**
Phenanthrene	100,000	NV	NV	**517**	**907 J**	**25,000**	671 U	--	217 U	**1,500**	416 U	**8,190**	**985**
Total HPAH[f]	960,000	NV	NV	**17,100 J**	**1,790 J**	**41,100 J**	1,010 U	--	**520 J**	**2,750 J**	**1,530 J**	**55,800 J**	**4,760 J**
Benzo(a)anthracene	110,000	NV	NV	**1,300**	649 U	**2,890**	671 U	--	217 U	681 U	416 U	**6,310**	**528**
Benzo(a)pyrene	99,000	NV	NV	**974**	973 U	**1,680**	1,010 U	--	326 U	1,020 U	626 U	**6,270**	**408 J**
Benzo(ghi)perylene	31,000	NV	NV	**389 J**	649 U	513 U	671 U	--	217 U	681 U	416 U	**2,990**	190 U
Chrysene	110,000	NV	NV	**1,530**	649 U	**3,060**	671 U	--	217 U	681 U	416 U	**5,880**	**428**
Dibenzo(a,h)anthracene	12,000	NV	NV	255 U	649 U	513 U	671 U	--	217 U	681 U	416 U	1,090 U	190 U
Fluoranthene	160,000	NV	NV	**5,320**	**920 J**	**14,600**	671 U	--	**256 J**	**1,390**	**837**	**11,000**	**1,580**
Indeno(1,2,3-cd)pyrene	34,000	NV	NV	**440 J**	649 U	513 U	671 U	--	217 U	681 U	416 U	**3,100**	190 U
Pyrene	1,000,000	NV	NV	**4,470**	**867 J**	**17,400**	671 U	--	**264 J**	**1,360 J**	**695 J**	**11,700**	**1,450**
Benzo(b)fluoranthene	NV	NV	NV	**1,930**	973 U	**1,470 J**	1,010 U	--	326 U	1,020 U	626 U	**5,880**	**367 J**
Benzo(k)fluoranthene	NV	NV	NV	**777 J**	973 U	770 U	1,010 U	--	326 U	1,020 U	626 U	**2,620 J**	285 U
Total benzofluoranthenes[g]	230,000	NV	NV	**2,710 J**	**973**	**1,470 J**	**1,010**	--	326 U	**1,020**	626 U	**8,500**	**367 J**
PCBs (ug/kg-dry)													
Aroclor 1016	NV	NV	NV	4.57 U	2.02 U	2.07 U	2.03 U	--	2.12 U	3.36 U	2.04 U	4.39 U	5.6 U
Aroclor 1221	NV	NV	NV	4.57 U	2.02 U	2.07 U	2.03 U	--	2.12 U	3.36 U	2.04 U	4.39 U	5.6 U
Aroclor 1232	NV	NV	NV	4.57 U	2.02 U	2.07 U	2.03 U	--	2.12 U	3.36 U	2.04 U	4.39 U	5.6 U
Aroclor 1242	NV	NV	NV	4.57 U	2.02 U	2.07 U	2.03 U	--	2.12 U	3.36 U	2.04 U	4.39 U	5.6 U
Aroclor 1248	NV	NV	NV	4.57 U	2.02 U	2.07 U	2.03 U	--	2.12 U	3.36 U	2.04 U	4.39 U	5.6 U
Aroclor 1254	NV	NV	NV	4.57 U	2.02 U	4.14 U	2.03 U	--	**2.38 J**	3.36 U	**3.74 J**	**8.09 J**	5.6 U
Aroclor 1260	NV	NV	NV	4.57 U	2.02 U	4.14 U	2.03 U	--	**2.31 J**	**4.16 J**	**4.43 J**	4.39 U	**42.4**
Total PCBs[i]	110	110	3.5	4.57 U	2.02 U	4.14 U	2.03 U	--	**4.69 J**	**4.16 J**	**8.17 J**	**8.09 J**	**42.4**
Additional SVOCs (ug/kg-dry)													
Hexachlorocyclopentadiene	NV	NV	NV	60.4 U	48.8 U	59 U	57 U	--	71.8 U	44.4 U	79.3 U	142 U	74 U

Table 6-2
2019-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	SE-15	SE-16	SE-17	SE-18	SE-19	SE-20	SE-21	SE-22	SE-23	SE-24
Sample Name:				SE-15-0-0.33	SE-16-0-0.33	SE-17-0-0.33	SE-18-0-0.33	SE-19-0-0.33	SE-20-0-0.33	SE-21-0-0.33	SE-22-0-0.33	SE-23-0-0.33	SE-24-0-0.33
Collection Date:				09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/25/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019
Collection Depth (ft bml):				0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Type:				Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Percent Wood waste:				30	Trace	0	5	0	0	10	10	15	25
TOC:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		Outside	Inside	Inside	Inside	Inside	Outside	Inside	Outside	Inside	Outside
Dioxins/Furans (pg/g-dry)													
1,2,3,4,6,7,8-HpCDD	NV	NV	NV	--	--	--	--	--	--	**19.3**	**401**	--	--
1,2,3,4,6,7,8-HpCDF	NV	NV	NV	--	--	--	--	--	--	**9.17**	**92.5**	--	--
1,2,3,4,7,8,9-HpCDF	NV	NV	NV	--	--	--	--	--	--	0.462 UJ	**4.41 J**	--	--
1,2,3,4,7,8-HxCDD	NV	NV	NV	--	--	--	--	--	--	0.317 U	**8.61**	--	--
1,2,3,4,7,8-HxCDF	NV	NV	NV	--	--	--	--	--	--	0.376 UJ	**3.54 J**	--	--
1,2,3,6,7,8-HxCDD	NV	NV	NV	--	--	--	--	--	--	**0.85 J**	**19.4**	--	--
1,2,3,6,7,8-HxCDF	NV	NV	NV	--	--	--	--	--	--	0.346 UJ	**2.79 J**	--	--
1,2,3,7,8,9-HxCDD	NV	NV	NV	--	--	--	--	--	--	**1.14 J**	**14.8**	--	--
1,2,3,7,8,9-HxCDF	NV	NV	NV	--	--	--	--	--	--	0.217 U	1.15 UJ	--	--
1,2,3,7,8-PeCDD	NV	NV	NV	--	--	--	--	--	--	**0.643 J**	**4.75 J**	--	--
1,2,3,7,8-PeCDF	NV	NV	NV	--	--	--	--	--	--	0.161 U	1.16 UJ	--	--
2,3,4,6,7,8-HxCDF	NV	NV	NV	--	--	--	--	--	--	0.414 UJ	**4.24 J**	--	--
2,3,4,7,8-PeCDF	NV	NV	NV	--	--	--	--	--	--	0.315 UJ	**2.15 J**	--	--
2,3,7,8-TCDD	NV	NV	NV	--	--	--	--	--	--	0.341 U	**1.74**	--	--
2,3,7,8-TCDF	NV	NV	NV	--	--	--	--	--	--	0.575 UJK	**1.89**	--	--
OCDD	NV	NV	NV	--	--	--	--	--	--	**177**	**3,250**	--	--
OCDF	NV	NV	NV	--	--	--	--	--	--	**13.4**	**262**	--	--
Total HpCDDs	NV	NV	NV	--	--	--	--	--	--	**43.1**	**737**	--	--
Total HpCDFs	NV	NV	NV	--	--	--	--	--	--	**23.5 J**	**259 J**	--	--
Total HxCDDs	NV	NV	NV	--	--	--	--	--	--	**11.3 J**	**141 J**	--	--
Total HxCDFs	NV	NV	NV	--	--	--	--	--	--	8.49 UJK	**107 J**	--	--
Total PeCDDs	NV	NV	NV	--	--	--	--	--	--	**3.71 J**	**29.5 J**	--	--
Total PeCDFs	NV	NV	NV	--	--	--	--	--	--	3.7 UJK	**40.4 J**	--	--
Total TCDDs	NV	NV	NV	--	--	--	--	--	--	0.404 UJK	**14.1 J**	--	--
Total TCDFs	NV	NV	NV	--	--	--	--	--	--	3.19 UJK	**16.8 J**	--	--
Dioxin/Furan TEQ[ij][1]	NV	NV	5	--	--	--	--	--	--	**1.52 J**	**18.8 J**	--	--
TPH (mg/kg-dry)													
Gasoline-Range Hydrocarbons	NV	NV	NV	10 U	8.42 U	13.3 U	9.11 U	--	13.4 U	6.71 U	16 U	9.01 U	27.9 U
Diesel-Range Hydrocarbons	340	340	NV	22.5 U	**18.5 J**	22.4 U	21.5 U	--	26.7 U	**23.2 J**	29.9 U	21.2 U	28.1 U
Motor-Oil-Range Hydrocarbons	3,600	3,600	NV	**374**	36.8 U	44.9 U	43 U	--	**610**	33.1 U	**130**	**73.8 J**	**559**

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Table 6-2
2019-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	SE-25	SE-26	SE-27		SE-28	SE-29	SE-30	SE-31	SE-32	SE-33	SE-34
Sample Name:				SE-25-0-0.33	SE-26-0-0.33	SE-27-0-0.33	SE-27-0-0.33-DUP	SE-28-0-0.33	SE-29-0-2.0	SE-30-2.5-4.5	SE-31-0-0.33	SE-32	SE-33	SE-34
Collection Date:				09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/24/2019	09/26/2019	09/27/2019	07/22/2020	07/22/2020	07/22/2020
Collection Depth (ft bml):				0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-2	2-4.5	0-0.33	0-0.33	0-0.33	0-0.33
Type:				Surface	Surface	Surface	Surface	Surface	Subsurface	Subsurface	Surface	Surface	Surface	Surface
Percent Wood waste:				80	80	10	10	75	80	20	35	Trace	10	5
TOC:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		Outside	Outside	Outside	Outside	Outside	Outside	Outside	Inside	Inside	Inside	Inside
Conventional Parameters														
Total Organic Carbon (%)	NV	NV	NV	18	13	3.8	3.9	5.5	9.9	5.1	2.1	1.1	1.2	1.2
Total Solids (%)	NV	NV	NV	40.6 J	42.4	39.4	38.3	36	42.9 J	47.6	48.8	46.4	54.1	53
Total Volatile Solids (%)	NV	NV	NV	19	18.4	12.1	9.96	13	27.4 J	14.7	8.8	6.56	6.45	6.69
Ammonia as Nitrogen (mg/kg)	230	230	NV	3.68	3.48	8.47	8.18	7.36	4.76	112	7.98	7.61	26.4	4.82
Sulfide (mg/kg)	39	39	NV	267	3.21 U	394	396	22.7	1,510 J	492	397	337 J	473 J	921 J
Grain Size (%)														
Clay	NV	NV	NV	3	7.1	14.7	21.2	--	7.5	26.6	15.9	--	--	--
Silt	NV	NV	NV	12.8	20.7	51.8	53	--	33.3	56.2	36.6	--	--	--
Sand	NV	NV	NV	33.2	37.2	15.8	17.3	--	26.8	11.4	44.4	--	--	--
Gravel	NV	NV	NV	51	35	17.7	8.57	--	32.4	5.79	2.99	--	--	--
TCLP Metals (mg/L)														
Lead	NV	NV	NV	--	--	--	--	--	--	0.0065 U	--	--	--	--
Mercury	NV	NV	NV	--	--	--	--	--	--	0.000007 U	--	--	--	--
Metals (mg/kg-dry)														
Arsenic	14	14	11	**8.84**	**5.11**	**7.49**	**7.57**	--	**7.45**	**7.52**	**6.07**	--	--	--
Cadmium	2.1	2.1	0.8	**0.725**	0.119 U	**0.154 J**	**0.188 J**	--	**0.188 J**	**0.246**	**0.165 J**	--	--	--
Chromium	72	72	NV	**19.1**	**25.7**	**33.8**	**35.3**	--	**35.1**	**41.4**	**34.7**	--	--	--
Copper	390	390	NV	**76.8**	**81.9**	**62.6**	**63.3**	--	**92.5**	**66**	**61.4**	--	--	--
Lead	360	360	21	**37.9**	**30.4**	**10.8**	**11.6**	--	**16.2 J**	**14.9**	**7.94**	--	--	--
Mercury	0.41	0.41	0.2	**0.103**	**0.104**	**0.0366 J**	**0.0593**	**0.0827**	**0.107**	**0.0865**	**0.0443 J**	--	--	--
Nickel	26	26	NV	**25.5**	**26**	**25.7**	**27.4**	--	**33.8**	**27.7**	**30.2**	--	--	--
Selenium	11	11	NV	0.632 U	0.593 U	**0.896 J**	**0.987 J**	--	**0.644 J**	**0.993 J**	**0.845 J**	--	--	--
Silver	0.57	0.57	NV	0.126 U	0.119 U	0.124 U	0.129 U	--	0.116 U	**0.26**	**0.111 J**	--	--	--
Zinc	410	410	NV	**98.6**	**76**	**80.5**	**88.1**	--	**84.6**	**98.3**	**74.7**	--	--	--
Organic Chemicals (ug/kg-dry)														
2,4-Dimethylphenol	29	29	NV	325 U	153 U	65.6 U	68 U	--	153 U	138 U	53.8 U	--	--	--
2-Methylphenol	63	63	NV	162 U	76.6 U	32.7 U	33.9 U	--	76.3 U	68.8 U	26.9 U	--	--	--
3- & 4-Methylphenol (m,p-Cresol)	260	260	NV	162 U	**93.4 J**	**42.7 J**	**50.4 J**	--	**1,600**	**164**	**267**	--	--	--
Benzoic acid	650	650	NV	8,130 U	3,840 U	1,640 U	1,700 U	--	3,830 U	3,450 U	1,350 U	--	--	--
Benzyl alcohol	57	57	NV	325 U	153 U	65.6 U	68 U	--	153 U	138 U	53.8 U	--	--	--
Dibenzofuran	200	200	NV	64.7 U	**33.9 J**	13.1 U	13.6 U	--	**145**	**35.6 J**	10.7 U	--	--	--
Phenol	120	120	NV	130 U	**94.1 J**	26.2 U	**60.8**	--	**571 J**	**64.7 J**	**73.9**	--	--	--
N-Nitrosodiphenylamine	NV	28	NV	162 U	76.6 U	32.7 U	33.9 U	--	76.3 U	68.8 U	26.9 U	--	--	--
Organic Chemicals (ug/kg-OC)														
N-Nitrosodiphenylamine	11,000	NV	NV	900 U	589 U	861 U	869 U	--	771 U	1,350 U	1,280 U	--	--	--
Phthalates (ug/kg-dry)														
Bis(2-ethylhexyl)phthalate	500	500	NV	974 U	460 U	197 U	204 U	--	458 U	413 U	161 U	--	--	--
Butylbenzylphthalate	NV	63	NV	325 U	153 U	65.6 U	68 U	--	153 U	138 U	53.8 U	--	--	--
Diethyl phthalate	NV	200	NV	325 U	153 U	65.6 U	68 U	--	153 U	138 U	53.8 U	--	--	--
Dimethyl phthalate	NV	71	NV	325 U	153 U	65.6 U	68 U	--	153 U	138 U	53.8 U	--	--	--
Di-n-butyl phthalate	380	380	NV	325 U	153 U	65.6 U	68 U	--	**213 J**	138 U	53.8 U	--	--	--
Di-n-octyl phthalate	39	39	NV	521 U	246 U	105 U	109 U	--	245 U	221 U	86.3 U	--	--	--

Table 6-2
2019-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	SE-25	SE-26	SE-27		SE-28	SE-29	SE-30	SE-31	SE-32	SE-33	SE-34
Sample Name:				SE-25-0-0.33	SE-26-0-0.33	SE-27-0-0.33	SE-27-0-0.33-DUP	SE-28-0-0.33	SE-29-0-2.0	SE-30-2.5-4.5	SE-31-0-0.33	SE-32	SE-33	SE-34
Collection Date:				09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/24/2019	09/26/2019	09/27/2019	07/22/2020	07/22/2020	07/22/2020
Collection Depth (ft bml):				0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-2	2-4.5	0-0.33	0-0.33	0-0.33	0-0.33
Type:				Surface	Surface	Surface	Surface	Surface	Subsurface	Subsurface	Surface	Surface	Surface	Surface
Percent Wood waste:				80	80	10	10	75	80	20	35	Trace	10	5
TOC:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		Outside	Outside	Outside	Outside	Outside	Outside	Outside	Inside	Inside	Inside	Inside
Phthalates (ug/kg-OC)														
Butylbenzylphthalate	4,900	NV	NV	1,810 U	1,180 U	1,730 U	1,740 U	--	1,550 U	2,710 U	2,560 U	--	--	--
Diethyl phthalate	61,000	NV	NV	1,810 U	1,180 U	1,730 U	1,740 U	--	1,550 U	2,710 U	2,560 U	--	--	--
Dimethyl phthalate	53,000	NV	NV	1,810 U	1,180 U	1,730 U	1,740 U	--	1,550 U	2,710 U	2,560 U	--	--	--
Chlorinated Organics (ug/kg-dry)														
1,2,4-Trichlorobenzene	NV	31	NV	162 U	76.6 U	32.7 U	33.9 U	--	76.3 U	68.8 U	26.9 U	--	--	--
1,2-Dichlorobenzene	NV	35	NV	162 U	76.6 U	32.7 U	33.9 U	--	76.3 U	68.8 U	26.9 U	--	--	--
1,4-Dichlorobenzene	NV	110	NV	162 U	76.6 U	32.7 U	33.9 U	--	76.3 U	68.8 U	26.9 U	--	--	--
Hexachlorobenzene	NV	22	NV	64.7 U	30.6 U	13.1 U	13.6 U	--	30.5 U	27.5 U	10.7 U	--	--	--
Hexachlorobutadiene	NV	11	NV	162 U	76.6 U	32.7 U	33.9 U	--	76.3 U	68.8 U	26.9 U	--	--	--
Pentachlorophenol	360	360	NV	647 U	306 U	131 U	136 U	--	305 U	275 U	107 U	--	--	--
Chlorinated Organics (ug/kg-OC)														
1,2,4-Trichlorobenzene	810	NV	NV	900 U	589 U	861 U	869 U	--	771 U	1,350 U	1,280 U	--	--	--
1,2-Dichlorobenzene	2,300	NV	NV	900 U	589 U	861 U	869 U	--	771 U	1,350 U	1,280 U	--	--	--
1,4-Dichlorobenzene	3,100	NV	NV	900 U	589 U	861 U	869 U	--	771 U	1,350 U	1,280 U	--	--	--
Hexachlorobenzene	380	NV	NV	359 U	235 U	345 U	349 U	--	308 U	539 U	510 U	--	--	--
Hexachlorobutadiene	3,900	NV	NV	900 U	589 U	861 U	869 U	--	771 U	1,350 U	1,280 U	--	--	--
PAHs (ug/kg-dry)														
Total PAH[d]	17,000	17,000	NV	**790 J**	**742 J**	**172 J**	**16.3 J**	--	**4,620 J**	**919 J**	**247 J**	--	--	--
1-Methylnaphthalene	NV	NV	NV	130 U	61.4 U	26.2 U	27.2 U	--	**76.7**	55.2 U	21.5 U	--	--	--
2-Methylnaphthalene	NV	670	NV	130 U	61.4 U	26.2 U	27.2 U	--	**149**	55.2 U	21.5 U	--	--	--
Total LPAH[e]	NV	5,200	NV	**64.8 J**	**267 J**	**18.1 J**	27.2 U	--	**1,460 J**	**395 J**	**160 J**	--	--	--
Acenaphthene	NV	500	NV	64.7 U	**40.8 J**	13.1 U	13.6 U	--	**135**	**148**	**37.2**	--	--	--
Acenaphthylene	NV	1,300	NV	64.7 U	30.6 U	13.1 U	13.6 U	--	30.5 U	27.5 U	**19.6 J**	--	--	--
Anthracene	NV	960	NV	64.7 U	30.6 U	13.1 U	13.6 U	--	**204**	**36.8 J**	10.7 U	--	--	--
Fluorene	NV	540	NV	64.7 U	**38.6 J**	13.1 U	13.6 U	--	**136**	**61.8**	10.7 U	--	--	--
Naphthalene	NV	2,100	NV	130 U	**75.2 J**	26.2 U	27.2 U	--	**491**	55.2 U	**74.2**	--	--	--
Phenanthrene	NV	1,500	NV	**64.8 J**	**112**	**18.1 J**	13.6 U	--	**491 J**	**148**	**28.9**	--	--	--
Total HPAH[f]	NV	12,000	NV	**725 J**	**475 J**	**154 J**	**16.3 J**	--	**2,940 J**	**524 J**	**87.4 J**	--	--	--
Benzo(a)anthracene	NV	1,300	NV	**89 J**	**45.8 J**	**20.3 J**	13.6 U	--	**218**	**53.7 J**	**12.5 J**	--	--	--
Benzo(a)pyrene	NV	1,600	NV	**111 J**	**66.5 J**	**23.6 J**	20.4 U	--	**154**	**43.8 J**	**17.3 J**	--	--	--
Benzo(ghi)perylene	NV	670	NV	64.7 U	30.6 U	13.1 U	13.6 U	--	**68**	27.5 U	10.7 U	--	--	--
Chrysene	NV	1,400	NV	64.7 U	**42.4 J**	**20.3 J**	13.6 U	--	**199**	**60.4**	10.7 U	--	--	--
Dibenzo(a,h)anthracene	NV	230	NV	64.7 U	30.6 U	13.1 U	13.6 U	--	30.5 U	27.5 U	10.7 U	--	--	--
Fluoranthene	NV	1,700	NV	**204**	**109**	**36.3**	13.6 U	--	**1,150 J**	**198**	**28**	--	--	--
Indeno(1,2,3-cd)pyrene	NV	600	NV	64.7 U	**34 J**	13.1 U	13.6 U	--	**69.5**	27.5 U	10.7 U	--	--	--
Pyrene	NV	2,600	NV	**184**	**102**	**32.4**	**16.3 J**	--	**823 J**	**168**	**29.6**	--	--	--
Benzo(b)fluoranthene	NV	NV	NV	**137 J**	**75.4 J**	**20.8 J**	20.4 U	--	**180**	41.3 U	16.1 U	--	--	--
Benzo(k)fluoranthene	NV	NV	NV	97.4 U	46 U	19.7 U	20.4 U	--	**75.8 J**	41.3 U	16.1 U	--	--	--
Total benzofluoranthenes[g]	NV	3,200	NV	**137 J**	**75.4 J**	**20.8 J**	20.4 U	--	**256 J**	41.3 U	16.1 U	--	--	--
cPAH TEQ[h][1]	NV	NV	21	**145 J**	**86.3 J**	**30.2 J**	20.4 U	--	**212 J**	**56.7 J**	**21.3 J**	--	--	--

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Table 6-2
2019-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	SE-25	SE-26	SE-27		SE-28	SE-29	SE-30	SE-31	SE-32	SE-33	SE-34
Sample Name:				SE-25-0-0.33	SE-26-0-0.33	SE-27-0-0.33	SE-27-0-0.33-DUP	SE-28-0-0.33	SE-29-0-2.0	SE-30-2.5-4.5	SE-31-0-0.33	SE-32	SE-33	SE-34
Collection Date:				09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/24/2019	09/26/2019	09/27/2019	07/22/2020	07/22/2020	07/22/2020
Collection Depth (ft bml):				0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-2	2-4.5	0-0.33	0-0.33	0-0.33	0-0.33
Type:				Surface	Surface	Surface	Surface	Surface	Subsurface	Subsurface	Surface	Surface	Surface	Surface
Percent Wood waste:				80	80	10	10	75	80	20	35	Trace	10	5
TOC:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		Outside	Outside	Outside	Outside	Outside	Outside	Outside	Inside	Inside	Inside	Inside
PAHs (ug/kg-OC)														
2-Methylnaphthalene	38,000	NV	NV	722 U	472 U	689 U	697 U	--	**1,510**	1,080 U	1,020 U	--	--	--
Total LPAH[e]	370,000	NV	NV	**360 J**	**2,050 J**	**476 J**	697 U	--	**14,700 J**	**7,750 J**	**7,620**	--	--	--
Acenaphthene	16,000	NV	NV	359 U	**314 J**	345 U	349 U	--	**1,360**	**2,900**	**1,770**	--	--	--
Acenaphthylene	66,000	NV	NV	359 U	235 U	345 U	349 U	--	308 U	539 U	**933 J**	--	--	--
Anthracene	220,000	NV	NV	359 U	235 U	345 U	349 U	--	**2,060**	**722 J**	510 U	--	--	--
Fluorene	23,000	NV	NV	359 U	**297 J**	345 U	349 U	--	**1,370**	**1,210**	510 U	--	--	--
Naphthalene	99,000	NV	NV	722 U	**578 J**	689 U	697 U	--	**4,960**	1,080 U	**3,530**	--	--	--
Phenanthrene	100,000	NV	NV	**360 J**	**862**	**476 J**	349 U	--	**4,960 J**	**2,900**	**1,380**	--	--	--
Total HPAH[f]	960,000	NV	NV	**4,030 J**	**3,650 J**	**4,050 J**	**418 J**	--	**29,700 J**	**10,300 J**	**4,160 J**			
Benzo(a)anthracene	110,000	NV	NV	**494 J**	**352 J**	**534 J**	349 U	--	**2,200**	**1,050 J**	**595 J**	--	--	--
Benzo(a)pyrene	99,000	NV	NV	**617 J**	**512 J**	**621 J**	523 U	--	**1,560**	**859 J**	**824 J**	--	--	--
Benzo(ghi)perylene	31,000	NV	NV	359 U	235 U	345 U	349 U	--	**687**	539 U	510 U	--	--	--
Chrysene	110,000	NV	NV	359 U	**326 J**	**534 J**	349 U	--	**2,010**	**1,180**	510 U	--	--	--
Dibenzo(a,h)anthracene	12,000	NV	NV	359 U	235 U	345 U	349 U	--	308 U	539 U	510 U	--	--	--
Fluoranthene	160,000	NV	NV	**1,130**	**838**	**955**	349 U	--	**11,600 J**	**3,880**	**1,330**	--	--	--
Indeno(1,2,3-cd)pyrene	34,000	NV	NV	359 U	**262 J**	345 U	349 U	--	**702**	539 U	510 U	--	--	--
Pyrene	1,000,000	NV	NV	**1,020**	**785**	**853**	**418 J**	--	**8,310 J**	**3,290**	**1,410**	--	--	--
Benzo(b)fluoranthene	NV	NV	NV	**761 J**	**580 J**	**547 J**	523 U	--	**1,820**	810 U	767 U	--	--	--
Benzo(k)fluoranthene	NV	NV	NV	541 U	354 U	518 U	523 U	--	**766 J**	810 U	767 U	--	--	--
Total benzofluoranthenes[g]	230,000	NV	NV	**761 J**	**580 J**	**547 J**	523 U	--	**2,580 J**	810 U	**767**	--	--	--
PCBs (ug/kg-dry)														
Aroclor 1016	NV	NV	NV	4.56 U	4.42 U	2.07 UJ	1.92 UJ	--	11.6 U	7.24 U	3.96 U	--	--	--
Aroclor 1221	NV	NV	NV	4.56 U	4.42 U	2.07 U	1.92 U	--	11.6 U	4.13 U	3.96 U	--	--	--
Aroclor 1232	NV	NV	NV	4.56 U	4.42 U	2.07 U	1.92 U	--	11.6 U	17.6 U	3.96 U	--	--	--
Aroclor 1242	NV	NV	NV	4.56 U	4.42 U	2.07 U	1.92 U	--	11.6 U	10.3 U	3.96 U	--	--	--
Aroclor 1248	NV	NV	NV	4.56 U	4.42 U	2.07 U	1.92 U	--	11.6 U	13.4 U	3.96 U	--	--	--
Aroclor 1254	NV	NV	NV	4.56 U	4.42 U	2.07 U	1.92 U	--	11.6 U	11.4 U	3.96 U	--	--	--
Aroclor 1260	NV	NV	NV	**17.6**	**15.5**	**9.53**	**9.05**	--	**38.9**	**14.4**	3.96 U	--	--	--
Total PCBs[i]	110	110	3.5	**17.6**	**15.5**	**9.53**	**9.05**	--	**38.9**	**14.4**	3.96 U	--	--	--
Additional SVOCs (ug/kg-dry)														
Hexachlorocyclopentadiene	NV	NV	NV	325 U	153 U	65.6 U	68 U	--	153 U	138 U	53.8 U	--	--	--

Table 6-2
2019-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	SE-25	SE-26	SE-27		SE-28	SE-29	SE-30	SE-31	SE-32	SE-33	SE-34
Sample Name:				SE-25-0-0.33	SE-26-0-0.33	SE-27-0-0.33	SE-27-0-0.33-DUP	SE-28-0-0.33	SE-29-0-2.0	SE-30-2.5-4.5	SE-31-0-0.33	SE-32	SE-33	SE-34
Collection Date:				09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/24/2019	09/26/2019	09/27/2019	07/22/2020	07/22/2020	07/22/2020
Collection Depth (ft bml):				0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-2	2-4.5	0-0.33	0-0.33	0-0.33	0-0.33
Type:				Surface	Surface	Surface	Surface	Surface	Subsurface	Subsurface	Surface	Surface	Surface	Surface
Percent Wood waste:				80	80	10	10	75	80	20	35	Trace	10	5
TOC:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		Outside	Outside	Outside	Outside	Outside	Outside	Outside	Inside	Inside	Inside	Inside
Dioxins/Furans (pg/g-dry)														
1,2,3,4,6,7,8-HpCDD	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDF	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8,9-HpCDF	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDD	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDF	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDD	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDF	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDD	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDF	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDD	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDF	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6,7,8-HxCDF	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
2,3,4,7,8-PeCDF	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
2,3,7,8-TCDD	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
2,3,7,8-TCDF	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
OCDD	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
OCDF	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
Total HpCDDs	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
Total HpCDFs	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
Total HxCDDs	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
Total HxCDFs	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
Total PeCDDs	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
Total PeCDFs	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
Total TCDDs	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
Total TCDFs	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
Dioxin/Furan TEQ[j][1]	NV	NV	5	--	--	--	--	--	--	--	--	--	--	--
TPH (mg/kg-dry)														
Gasoline-Range Hydrocarbons	NV	NV	NV	10.1 U	9.64 U	11.5 U	13 U	--	9.53 U	7.95 U	7.73 U	--	--	--
Diesel-Range Hydrocarbons	340	340	NV	24.1 U	23.4 U	24.2 U	25.9 U	--	23.2 U	20.6 U	20.4 U	--	--	--
Motor-Oil-Range Hydrocarbons	3,600	3,600	NV	**2,080**	**842**	**89.6 J**	**72.2 J**	--	**385**	**393**	**58.5 J**	--	--	--

Table 6-2
2019-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	SE-35	SE-36	SE-37	SE-38	SE-39	SE-40	SE-41
Sample Name:				SE-35	SE-36	SE-37	SE-38	SE-39	SE-40	SE-41
Collection Date:				07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020
Collection Depth (ft bml):				0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Type:				Surface	Surface	Surface	Surface	Surface	Surface	Surface
Percent Wood waste:				Trace	10	25	50	90	0	20
TOC:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		Inside	Inside	Inside	Inside	Outside	Inside	Inside
Conventional Parameters										
Total Organic Carbon (%)	NV	NV	NV	1.1	1.1	1.9	1.7	3.9	1	1.8
Total Solids (%)	NV	NV	NV	50	49	46.2	49.6	25.5	77.6	43.4
Total Volatile Solids (%)	NV	NV	NV	6.68	6.88	15.2	10.1	50.1	2.51	10.2
Ammonia as Nitrogen (mg/kg)	230	230	NV	7.45	4.1	14.2	3.49	1.16	0.783	8.41
Sulfide (mg/kg)	39	39	NV	447 J	546 J	204 J	365 J	2,110 J	392 J	567 J
Grain Size (%)										
Clay	NV	NV	NV	--	--	--	--	--	--	--
Silt	NV	NV	NV	--	--	--	--	--	--	--
Sand	NV	NV	NV	--	--	--	--	--	--	--
Gravel	NV	NV	NV	--	--	--	--	--	--	--
TCLP Metals (mg/L)										
Lead	NV	NV	NV	--	--	--	--	--	--	--
Mercury	NV	NV	NV	--	--	--	--	--	--	--
Metals (mg/kg-dry)										
Arsenic	14	14	11	--	--	--	--	--	--	--
Cadmium	2.1	2.1	0.8	--	--	--	--	--	--	--
Chromium	72	72	NV	--	--	--	--	--	--	--
Copper	390	390	NV	--	--	--	--	--	--	--
Lead	360	360	21	--	--	--	--	--	--	--
Mercury	0.41	0.41	0.2	--	--	--	--	--	--	--
Nickel	26	26	NV	--	--	--	--	--	--	--
Selenium	11	11	NV	--	--	--	--	--	--	--
Silver	0.57	0.57	NV	--	--	--	--	--	--	--
Zinc	410	410	NV	--	--	--	--	--	--	--
Organic Chemicals (ug/kg-dry)										
2,4-Dimethylphenol	29	29	NV	--	--	--	--	--	--	--
2-Methylphenol	63	63	NV	--	--	--	--	--	--	--
3- & 4-Methylphenol (m,p-Cresol)	260	260	NV	--	--	--	--	--	--	--
Benzoic acid	650	650	NV	--	--	--	--	--	--	--
Benzyl alcohol	57	57	NV	--	--	--	--	--	--	--
Dibenzofuran	200	200	NV	--	--	--	--	--	--	--
Phenol	120	120	NV	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	NV	28	NV	--	--	--	--	--	--	--
Organic Chemicals (ug/kg-OC)										
N-Nitrosodiphenylamine	11,000	NV	NV	--	--	--	--	--	--	--
Phthalates (ug/kg-dry)										
Bis(2-ethylhexyl)phthalate	500	500	NV	--	--	--	--	--	--	--
Butylbenzylphthalate	NV	63	NV	--	--	--	--	--	--	--
Diethyl phthalate	NV	200	NV	--	--	--	--	--	--	--
Dimethyl phthalate	NV	71	NV	--	--	--	--	--	--	--
Di-n-butyl phthalate	380	380	NV	--	--	--	--	--	--	--
Di-n-octyl phthalate	39	39	NV	--	--	--	--	--	--	--

Table 6-2
2019-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	SE-35	SE-36	SE-37	SE-38	SE-39	SE-40	SE-41
Sample Name:				SE-35	SE-36	SE-37	SE-38	SE-39	SE-40	SE-41
Collection Date:				07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020
Collection Depth (ft bml):				0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Type:				Surface	Surface	Surface	Surface	Surface	Surface	Surface
Percent Wood waste:				Trace	10	25	50	90	0	20
TOC:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		Inside	Inside	Inside	Inside	Outside	Inside	Inside
Phthalates (ug/kg-OC)										
Butylbenzylphthalate	4,900	NV	NV	--	--	--	--	--	--	--
Diethyl phthalate	61,000	NV	NV	--	--	--	--	--	--	--
Dimethyl phthalate	53,000	NV	NV	--	--	--	--	--	--	--
Chlorinated Organics (ug/kg-dry)										
1,2,4-Trichlorobenzene	NV	31	NV	--	--	--	--	--	--	--
1,2-Dichlorobenzene	NV	35	NV	--	--	--	--	--	--	--
1,4-Dichlorobenzene	NV	110	NV	--	--	--	--	--	--	--
Hexachlorobenzene	NV	22	NV	--	--	--	--	--	--	--
Hexachlorobutadiene	NV	11	NV	--	--	--	--	--	--	--
Pentachlorophenol	360	360	NV	--	--	--	--	--	--	--
Chlorinated Organics (ug/kg-OC)										
1,2,4-Trichlorobenzene	810	NV	NV	--	--	--	--	--	--	--
1,2-Dichlorobenzene	2,300	NV	NV	--	--	--	--	--	--	--
1,4-Dichlorobenzene	3,100	NV	NV	--	--	--	--	--	--	--
Hexachlorobenzene	380	NV	NV	--	--	--	--	--	--	--
Hexachlorobutadiene	3,900	NV	NV	--	--	--	--	--	--	--
PAHs (ug/kg-dry)										
Total PAH[d]	17,000	17,000	NV	--	--	--	--	--	--	--
1-Methylnaphthalene	NV	NV	NV	--	--	--	--	--	--	--
2-Methylnaphthalene	NV	670	NV	--	--	--	--	--	--	--
Total LPAH[e]	NV	5,200	NV	--	--	--	--	--	--	--
Acenaphthene	NV	500	NV	--	--	--	--	--	--	--
Acenaphthylene	NV	1,300	NV	--	--	--	--	--	--	--
Anthracene	NV	960	NV	--	--	--	--	--	--	--
Fluorene	NV	540	NV	--	--	--	--	--	--	--
Naphthalene	NV	2,100	NV	--	--	--	--	--	--	--
Phenanthrene	NV	1,500	NV	--	--	--	--	--	--	--
Total HPAH[f]	NV	12,000	NV	--	--	--	--	--	--	--
Benzo(a)anthracene	NV	1,300	NV	--	--	--	--	--	--	--
Benzo(a)pyrene	NV	1,600	NV	--	--	--	--	--	--	--
Benzo(ghi)perylene	NV	670	NV	--	--	--	--	--	--	--
Chrysene	NV	1,400	NV	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	NV	230	NV	--	--	--	--	--	--	--
Fluoranthene	NV	1,700	NV	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	NV	600	NV	--	--	--	--	--	--	--
Pyrene	NV	2,600	NV	--	--	--	--	--	--	--
Benzo(b)fluoranthene	NV	NV	NV	--	--	--	--	--	--	--
Benzo(k)fluoranthene	NV	NV	NV	--	--	--	--	--	--	--
Total benzofluoranthenes[g]	NV	3,200	NV	--	--	--	--	--	--	--
cPAH TEQ[h][1]	NV	NV	21	--	--	--	--	--	--	--

Table 6-2
2019-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	SE-35	SE-36	SE-37	SE-38	SE-39	SE-40	SE-41
Sample Name:				SE-35	SE-36	SE-37	SE-38	SE-39	SE-40	SE-41
Collection Date:				07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020
Collection Depth (ft bml):				0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Type:				Surface	Surface	Surface	Surface	Surface	Surface	Surface
Percent Wood waste:				Trace	10	25	50	90	0	20
TOC:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		Inside	Inside	Inside	Inside	Outside	Inside	Inside
PAHs (ug/kg-OC)										
2-Methylnaphthalene	38,000	NV	NV	--	--	--	--	--	--	--
Total LPAH[e]	370,000	NV	NV	--	--	--	--	--	--	--
Acenaphthene	16,000	NV	NV	--	--	--	--	--	--	--
Acenaphthylene	66,000	NV	NV	--	--	--	--	--	--	--
Anthracene	220,000	NV	NV	--	--	--	--	--	--	--
Fluorene	23,000	NV	NV	--	--	--	--	--	--	--
Naphthalene	99,000	NV	NV	--	--	--	--	--	--	--
Phenanthrene	100,000	NV	NV	--	--	--	--	--	--	--
Total HPAH[f]	960,000	NV	NV							
Benzo(a)anthracene	110,000	NV	NV	--	--	--	--	--	--	--
Benzo(a)pyrene	99,000	NV	NV	--	--	--	--	--	--	--
Benzo(ghi)perylene	31,000	NV	NV	--	--	--	--	--	--	--
Chrysene	110,000	NV	NV	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	12,000	NV	NV	--	--	--	--	--	--	--
Fluoranthene	160,000	NV	NV	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	34,000	NV	NV	--	--	--	--	--	--	--
Pyrene	1,000,000	NV	NV	--	--	--	--	--	--	--
Benzo(b)fluoranthene	NV	NV	NV	--	--	--	--	--	--	--
Benzo(k)fluoranthene	NV	NV	NV	--	--	--	--	--	--	--
Total benzofluoranthenes[g]	230,000	NV	NV	--	--	--	--	--	--	--
PCBs (ug/kg-dry)										
Aroclor 1016	NV	NV	NV	--	--	--	--	--	--	--
Aroclor 1221	NV	NV	NV	--	--	--	--	--	--	--
Aroclor 1232	NV	NV	NV	--	--	--	--	--	--	--
Aroclor 1242	NV	NV	NV	--	--	--	--	--	--	--
Aroclor 1248	NV	NV	NV	--	--	--	--	--	--	--
Aroclor 1254	NV	NV	NV	--	--	--	--	--	--	--
Aroclor 1260	NV	NV	NV	--	--	--	--	--	--	--
Total PCBs[i]	110	110	3.5	--	--	--	--	--	--	--
Additional SVOCs (ug/kg-dry)										
Hexachlorocyclopentadiene	NV	NV	NV	--	--	--	--	--	--	--

Table 6-2
2019-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	SE-35	SE-36	SE-37	SE-38	SE-39	SE-40	SE-41
Sample Name:				SE-35	SE-36	SE-37	SE-38	SE-39	SE-40	SE-41
Collection Date:				07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020
Collection Depth (ft bml):				0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Type:				Surface	Surface	Surface	Surface	Surface	Surface	Surface
Percent Wood waste:				Trace	10	25	50	90	0	20
TOC:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		Inside	Inside	Inside	Inside	Outside	Inside	Inside
Dioxins/Furans (pg/g-dry)										
1,2,3,4,6,7,8-HpCDD	NV	NV	NV	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDF	NV	NV	NV	--	--	--	--	--	--	--
1,2,3,4,7,8,9-HpCDF	NV	NV	NV	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDD	NV	NV	NV	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDF	NV	NV	NV	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDD	NV	NV	NV	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDF	NV	NV	NV	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDD	NV	NV	NV	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDF	NV	NV	NV	--	--	--	--	--	--	--
1,2,3,7,8-PeCDD	NV	NV	NV	--	--	--	--	--	--	--
1,2,3,7,8-PeCDF	NV	NV	NV	--	--	--	--	--	--	--
2,3,4,6,7,8-HxCDF	NV	NV	NV	--	--	--	--	--	--	--
2,3,4,7,8-PeCDF	NV	NV	NV	--	--	--	--	--	--	--
2,3,7,8-TCDD	NV	NV	NV	--	--	--	--	--	--	--
2,3,7,8-TCDF	NV	NV	NV	--	--	--	--	--	--	--
OCDD	NV	NV	NV	--	--	--	--	--	--	--
OCDF	NV	NV	NV	--	--	--	--	--	--	--
Total HpCDDs	NV	NV	NV	--	--	--	--	--	--	--
Total HpCDFs	NV	NV	NV	--	--	--	--	--	--	--
Total HxCDDs	NV	NV	NV	--	--	--	--	--	--	--
Total HxCDFs	NV	NV	NV	--	--	--	--	--	--	--
Total PeCDDs	NV	NV	NV	--	--	--	--	--	--	--
Total PeCDFs	NV	NV	NV	--	--	--	--	--	--	--
Total TCDDs	NV	NV	NV	--	--	--	--	--	--	--
Total TCDFs	NV	NV	NV	--	--	--	--	--	--	--
Dioxin/Furan TEQ[j][1]	NV	NV	5	--	--	--	--	--	--	--
TPH (mg/kg-dry)										
Gasoline-Range Hydrocarbons	NV	NV	NV	--	--	--	--	--	--	--
Diesel-Range Hydrocarbons	340	340	NV	--	--	--	--	--	--	--
Motor-Oil-Range Hydrocarbons	3,600	3,600	NV	--	--	--	--	--	--	--

Table 6-2
2019-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Notes

Shading (color key below) indicates values that exceed screening criteria. All results are screened against SSLs for protection of human health and higher trophic level ecological receptors. Results are screened against SCOs for protection of benthic organisms based on individual sample TOC results.

TOC results outside 0.5-3.5%

Detected result exceeding SCO for Protection of Benthic Organisms, Inside or Outside Organic Carbon 0.5-3.5%

Detected result exceeding SSL for Protection of Human Health and Higher Trophic Level Ecological Receptors

Bold is applied to detected results, with the exception of conventional parameters and grain size.

% = percent.
-- = not analyzed.
AET = apparent effects threshold.
cPAH = carcinogenic PAH.
CSL = cleanup screening level.
ft bml = feet below mudline.
HPAH = high-molecular-weight PAH.
HpCDD = heptachlorodibenzo-p-dioxin.
HxCDD = hexachlorodibenzo-p-dioxin.
HxCDF = hexachlorodibenzofuran.
J = result is an estimated value.
K = result is an estimated maximum potential concentration.
LPAH = low-molecular-weight PAH.
mg/kg = milligrams per kilogram.
mg/kg-dry = milligrams per kilogram, dry weight.
mg/L = milligrams per liter.
NV = no value.
OCDD = octachlorodibenzodioxin.
OCDF = octachlorodibenzofuran.
PAH = polycyclic aromatic hydrocarbon.
PCB = polychlorinated biphenyl.
PeCDD = pentachlorodibenzo-p-dioxin.
PeCDF = pentachlorodibenzofuran.
pg/g-dry = picograms per gram, dry weight.
PQL = practical quantitation limit.
RI = remedial investigation.
SCO = sediment cleanup objective.
SVOCs = semivolatile organic compounds.
TCDD = tetrachlorodibenzo-p-dioxin.
TCDF = tetrachlorodibenzofuran.
TCLP = toxicity characteristic leaching procedure.
TEQ = toxic equivalent quotient.
TOC = total organic carbon.
TPH = total petroleum hydrocarbons.
U = result is non-detect at detection limit or estimated detection limit.
ug/kg-dry = micrograms per kilogram, dry weight.
ug/kg-OC = micrograms per kilogram, organic carbon normalized.

[a]Screening level is equivalent to organic carbon-normalized marine criteria. Where organic carbon-normalized criteria are not available, screening level is the lowest marine or freshwater SCO or CSL.

[b]Screening level is the lowest of the following criteria: marine AET, marine sediment, or freshwater sediment SCO or CSL.

[c]Human health and higher trophic level ecological receptor screening levels are chosen from lowest of bioaccumulative and direct contact pathways. If the risk-based value is lower than natural background or PQL, the cleanup level defaults to the higher of natural background or PQL.

[d]Total PAH is the sum of detected 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluorene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene. Non-detect results are not included in the sum. When all analytical results are non-detect, the highest detection limit is used.

[e]LPAH is the sum of detected acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene. Non-detect results are not included in the sum. When all analytical results are non-detect, the highest detection limit is used.

[f]HPAH is the sum of detected benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene. Non-detect results are not included in the sum. When all analytical results are non-detect, the highest detection limit is used.

[g]Total benzofluoranthenes is the sum of detected benzo(b)fluoranthene and benzo(k)fluoranthene. Non-detect results are not included in the sum. When both analytical results are non-detect, the highest detection limit is used.

[h]cPAH TEQ is calculated with 2005 California EPA toxicity equivalence factors provided in table 6-1 of SCUM (Ecology, 2021). Non-detect results are included at one-half the detection limit. When all cPAHs are non-detect, the highest reported detection limit is shown.

[i]Total PCBs is the sum of all detected recolors. Non-detect results are not included in the sum. When all analytical results are non-detect, the highest detection limit is used.

[j]Dioxin/furan TEQ is calculated with 2005 World Health Organization toxic equivalence factors provided in table 6-2 of SCUM (Ecology, 2021). Non-detect results are included at one-half the detection limit.

Reference

[1]Ecology. 2021. Sediment cleanup user's manual (SCUM), guidance for implementing cleanup provisions of the sediment management standards, Chapter 173-204 WAC. Publication no. 12-09-057. Washington State Department of Ecology. Revised December 2021.

MAUL FOSTER ALONGI

Table 6-3
2013-2015 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Investigation Area:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	Lumber Shed		Former Boiler				Beach Area		Shannon Slough	Chehalis River (2013)		
Location:				CR-07	CR-24	CR-08A		CR-08B		CR-09A	CR-09B	CR-10	CR-01	CR-02	CR-03
Sample Name:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		CR-07-SSD-COMP	CR-24-SSD-COMP	CR08a-SSD-COMP	CR08A-SBSD	CR08b-SSD-COMP	CR08b-SBSD	CR09a-SSD-COMP	CR09b-SSD-COMP	CR10-SSD-COMP	CR01-10cm	CR02-10cm	CR03-10cm
Collection Date:				10/13/2015	10/13/2015	10/14/2015	10/15/2015	10/14/2015	10/15/2015	10/13/2015	10/13/2015	10/14/2015	11/08/2013	11/08/2013	11/08/2013
Collection Depth (ft bml):				0-0.33	0-0.33	0-0.33	18.3-20.0	0-0.33	8.0	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Percent Wood waste:				Trace	0	80	0	20	0	40	15	15	0	0	0
TOC:				Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	Inside	Inside	Inside	Inside
Conventionals															
Total Organic Carbon (%)	NV	NV	NV	1.09	1.56	1.92	1.29	2.05	3.08	4.39	2.99	2.94	2.06 J	3.21 J	2.91 J
Ammonia (as N) (mg N/kg)	230	230	NV	--	--	--	--	--	--	--	--	--	--	--	--
Sulfide (mg/kg)	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Total Volatile Solids (%)	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Fixed Solids (%)	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Total Solids (%)	NV	NV	NV	67.22	54.35	47.46	63.97	44.38	55.76	55.6	59.33	45.44	44.09	51.8	36.4
TCLP Metals (mg/L)															
Lead	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Total Metals (mg/kg-dry)															
Arsenic	14	14	11	20 U	20 U	**30**	**20**	**20**	**20**	9 U	9 U	**30**	10 U	9 U	10 U
Cadmium	2.1	2.1	0.8	0.8 U	0.9 U	0.4 U	0.7 U	0.4 U	0.7 U	0.4 U	**0.4**	0.4 U	**0.5**	**0.4**	0.5 U
Chromium	72	72	NV	**43**	**49**	**52**	**39**	**42**	**40**	**31**	**39.9**	**42**	**40 J**	**38.5 J**	**48 J**
Copper	390	390	NV	--	**81.5**	**134**	**57.8**	**61.1**	**55.3**	**40.8**	**49.2**	**54.8**	**58 J**	**56.3 J**	**65.4 J**
Lead	360	360	21	**11**	**21**	**30**	**8**	**14**	**10**	**8**	**10**	**11**	**7**	**9**	**8**
Mercury	0.41	0.41	0.2	**0.04**	**0.16**	**0.06**	0.03 U	**0.06**	**0.07**	**0.04**	**0.06**	**0.07**	**0.05**	**0.1**	**0.09**
Silver	0.57	0.57	NV	--	1 U	0.6 U	1 U	0.7 U	1 U	0.5 U	0.5 U	0.6 U	0.7 U	0.6 U	0.8 U
Zinc	410	410	NV	--	**107**	**134**	**71**	**90**	**75**	**68**	**80**	**83**	**87**	**79**	**91**
Organic Chemicals (ug/kg-dry)															
2,4-Dimethylphenol	29	29	NV	97 U	24 U	24 U	25 U	24 U	**17 J**	24 U	24 U	25 U	24 U	24 U	24 U
2-Methylphenol	63	63	NV	19 U	**8.4**	4.8 U	5 U	4.8 U	4.9 U	**4 J**	**7.3**	**7.7**	4.8 U	4.9 U	**3.3 J**
Benzoic acid	650	650	NV	**170 J**	**680**	**180 J**	**110 J**	**330 J**	**290 J**	**230**	**380**	**210 J**	190 U	**240**	**180 J**
Benzyl alcohol	57	57	NV	19 U	19 U	**27**	**17 J**	19 U	**50**	19 U	**58**	**22**	**15 J**	**43 J**	**43 J**
Phenol	120	120	NV	**18 J**	**100**	**35**	**22**	**71**	**53**	**130**	**200**	**51**	**24**	**94**	**43**
Dibenzofuran	200	200	NV	**45**	**47**	**25**	**14 J**	**53**	**65**	19 U	19 U	**28**	**12 J**	**20**	19 U
N-Nitrosodiphenylamine	NV	28	NV	19 U	4.8 U	4.8 U	5 U	4.8 U	4.9 U	4.7 U	4.8 U	5 U	4.8 U	4.9 U	4.8 U
Organic Chemicals (ug/kg-OC)															
N-Nitrosodiphenylamine	11,000	NV	NV	1,740 U	308 U	250 U	388 U	234 U	159 U	107 U	161 U	170 U	233 U	153 U	165 U
Phthalates (ug/kg-dry)															
Bis(2-ethylhexyl)phthalate	500	500	NV	**58**	**66**	48 U	50 U	48 U	49 U	**43 J**	**39 J**	50 U	**29 J**	49 U	48 U
Butylbenzylphthalate	NV	63	NV	19 U	4.8 U	4.8 U	5 U	**320**	4.9 U	**5.1**	4.8 U	5 U	4.8 U	4.9 U	4.8 U
Diethylphthalate	NV	200	NV	19 U	19 U	**19**	20 U	36 U	**25**	19 U	19 U	20 U	**56**	**20**	**36**
Dimethyl phthalate	NV	71	NV	19 U	4.8 U	4.8 U	5 U	4.8 U	4.9 U	4.7 U	4.8 U	5 U	4.8 U	**3.1 J**	**2.5 J**
Di-n-butyl phthalate	380	380	NV	19 U	**130**	19 U	20 U	19 U	20 U	19 U	19 U	20 U	19 U	20 U	19 U
Di-n-octyl phthalate	39	39	NV	19 U	19 U	**710**	20 U	19 U	20 U	19 U	19 U	20 U	19 U	20 U	19 U
Phthalates (ug/kg-OC)															
Butylbenzylphthalate	4,900	NV	NV	1,740 U	308 U	250 U	388 U	**15,600**	159 U	**116**	161 U	170 U	233 U	153 U	165 U
Diethylphthalate	61,000	NV	NV	1,740 U	1,220 U	**990**	1,550 U	1,760 U	**812**	433 U	635 U	680 U	**2,720**	**623**	**1,240**
Dimethyl phthalate	53,000	NV	NV	1,740 U	308 U	250 U	388 U	234 U	159 U	107 U	161 U	170 U	233 U	**96.6 J**	**85.9 J**
Chlorinated Organics (ug/kg-dry)															
1,2,4-Trichlorobenzene	NV	31	NV	19 U	4.8 U	4.8 U	5 U	4.8 U	4.9 U	4.7 U	4.8 U	**3 J**	4.8 U	4.9 U	4.8 U
1,2-Dichlorobenzene	NV	35	NV	19 U	4.8 U	4.8 U	5 U	4.8 U	**1.8 J**	4.7 U	4.8 U	**3.3 J**	4.8 U	4.9 U	4.8 U
1,4-Dichlorobenzene	NV	110	NV	19 U	4.8 U	**2.4 J**	5 U	4.8 U	4.9 U	**4.2 J**	4.8 U	**3.7 J**	4.8 U	**19** J	4.8 U
Hexachlorobenzene	NV	22	NV	19 U	4.8 U	4.8 U	5 U	4.8 U	4.9 U	4.7 U	4.8 U	**3.3 J**	4.8 U	4.9 U	4.8 U

Table 6-3
2013-2015 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Investigation Area:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	Lumber Shed		Former Boiler				Beach Area		Shannon Slough	Chehalis River (2013)		
Location:				CR-07	CR-24	CR-08A		CR-08B		CR-09A	CR-09B	CR-10	CR-01	CR-02	CR-03
Sample Name:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		CR-07-SSD-COMP	CR-24-SSD-COMP	CR08a-SSD-COMP	CR08A-SBSD	CR08b-SSD-COMP	CR08b-SBSD	CR09a-SSD-COMP	CR09b-SSD-COMP	CR10-SSD-COMP	CR01-10cm	CR02-10cm	CR03-10cm
Collection Date:				10/13/2015	10/13/2015	10/14/2015	10/15/2015	10/14/2015	10/15/2015	10/13/2015	10/13/2015	10/14/2015	11/08/2013	11/08/2013	11/08/2013
Collection Depth (ft bml):				0-0.33	0-0.33	0-0.33	18.3-20.0	0-0.33	8.0	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Percent Wood waste:				Trace	0	80	0	20	0	40	15	15	0	0	0
TOC:				Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	Inside	Inside	Inside	Inside
Hexachlorobutadiene	NV	11	NV	19 U	4.8 U	4.8 U	5 U	4.8 U	4.9 U	4.7 U	4.8 U	**2.8 J**	4.8 U	4.9 U	4.8 U
Pentachlorophenol	360	360	NV	97 U	**86 J**	**14 J**	20 U	**11 J**	20 U	19 UJ	19 UJ	**23**	19 U	20 U	19 U
Chlorinated Organics (ug/kg-OC)															
1,2,4-Trichlorobenzene	810	NV	NV	1,740 U	308 U	250 U	388 U	234 U	159 U	107 U	161 U	**102 J**	233 U	153 U	165 U
1,2-Dichlorobenzene	2,300	NV	NV	1,740 U	308 U	250 U	388 U	234 U	**58.4 J**	107 U	161 U	**112 J**	233 U	153 U	165 U
1,4-Dichlorobenzene	3,100	NV	NV	1,740 U	308 U	**125 J**	388 U	234 U	159 U	**95.7 J**	161 U	**126 J**	233 U	**592 J**	165 U
Hexachlorobenzene	380	NV	NV	1,740 U	308 U	250 U	388 U	234 U	159 U	107 U	161 U	**112 J**	233 U	153 U	165 U
Hexachlorobutadiene	3,900	NV	NV	1,740 U	308 U	250 U	388 U	234 U	159 U	107 U	161 U	**95.2 J**	233 U	153 U	165 U
PAHs (ug/kg-dry)															
Total PAHs[f]	17,000	17,000	NV	**2,030 J**	**1,840 J**	**810 J**	**442 J**	**1,800**	**2,800**	**142 J**	**284 J**	**1,120 J**	**477 J**	**705 J**	**101 J**
Total LPAHs[g]	NV	5,200	NV	**434 J**	**418**	**259 J**	**344 J**	**615**	**1,740**	**71**	**77 J**	**448**	**114**	**488**	**42**
1-Methylnaphthalene	NV	NV	NV	**18 J**	**16 J**	**16 J**	**13 J**	**29**	**50**	**9.5 J**	19 U	**15 J**	--	--	--
2-Methylnaphthalene	NV	670	NV	**40**	19 U	**23**	20 U	19 U	**79**	19 U	19 U	**26**	19 U	**28**	19 U
Acenaphthene	NV	500	NV	**35**	**25**	**16 J**	**18 J**	**51**	**75**	19 U	19 U	**24**	**14 J**	**20**	19 U
Acenaphthylene	NV	1,300	NV	**16 J**	**19**	**14 J**	**56**	**51**	**300**	19 U	19 U	**59**	19 U	**68**	19 U
Anthracene	NV	960	NV	**57**	**65**	**27**	**15 J**	**71**	**72**	19 U	**11 J**	**26**	**14 J**	**16 J**	19 U
Fluorene	NV	540	NV	**48**	**29**	19 U	**15 J**	**52**	**66**	19 U	**14 J**	**29**	**14 J**	**15 J**	19 U
Naphthalene	NV	2,100	NV	**88**	**120**	**110**	**180**	**170**	**800**	**45**	19 U	**200**	**25**	**280**	**23**
Phenanthrene	NV	1,500	NV	**190**	**160**	**92**	**60**	**220**	**430**	**26**	**52**	**110**	**47**	**89**	**19**
Total HPAHs[h]	NV	12,000	NV	**1,540 J**	**1,400**	**512**	**85**	**1,150**	**923**	**61 J**	**207 J**	**631 J**	**363**	**189**	**59**
Benzo(a)anthracene	NV	1,300	NV	**130**	**120**	**43**	20 U	**94**	**46**	19 U	**14 J**	**46**	**28**	**11 J**	19 U
Benzo(a)pyrene	NV	1,600	NV	**67**	**84**	**37**	20 U	**67**	**44**	19 U	**12 J**	**32**	**21**	20 U	19 U
Benzo(ghi)perylene	NV	670	NV	**57**	**56**	**28**	20 U	**54**	**44**	19 U	**14 J**	**29**	**14 J**	**15 J**	19 U
Chrysene	NV	1,400	NV	**180**	**160**	**74**	20 U	**130**	**73**	**10 J**	**24**	**56**	**35**	**17 J**	19 U
Dibenzo(a,h)anthracene	NV	230	NV	**18 J**	**19**	**9.5**	5 U	**12**	**6.4**	4.7 U	**3.9 J**	**8.5**	**3 J**	4.9 U	4.8 U
Fluoranthene	NV	1,700	NV	**450**	**380**	**110**	**44**	**280**	**290**	**22**	**52**	**180**	**100**	**63**	**25**
Indeno(1,2,3-cd)pyrene	NV	600	NV	**43**	**54**	**26**	20 U	**46**	**28**	19 U	**13 J**	**19 J**	19 U	20 U	19 U
Pyrene	NV	2,600	NV	**360**	**300**	**84**	**41**	**250**	**300**	**17 J**	**40**	**150**	**110**	**61**	**21**
Total Benzofluoranthenes[i]	NV	3,200	NV	**230**	**230**	**100**	40 U	**220**	**92**	**12 J**	**34 J**	**110**	**52**	**22 J**	**13 J**
cPAH TEQ[jj][1]	NV	NV	21	**111 J**	**128**	**55.6**	40 U	**106**	**62**	**12.9 J**	**18.7 J**	**50.9 J**	**30.6** J	**14.7 J**	**13 J**
PAHs (ug/kg-OC)															
Total LPAHs[g]	370,000	NV	NV	**39,800 J**	**26,800**	**13,500 J**	**26,700 J**	**30,000**	**56,500**	**1,620**	**2,580 J**	**15,200**	**5,530**	**15,200**	**1,440**
2-Methylnaphthalene	38,000	NV	NV	**3,670**	1,220 U	**1,200**	1,550 U	927 U	**2,560**	433 U	635 U	**884**	922 U	**872**	653 U
Acenaphthene	16,000	NV	NV	**3,210**	**1,600**	**833 J**	**1,400 J**	**2,490**	**2,440**	433 U	635 U	**816**	**680 J**	**623**	653 U
Acenaphthylene	66,000	NV	NV	**1,470 J**	**1,220**	**729 J**	**4,340**	**2,490**	**9,740**	433 U	635 U	**2,010**	922 U	**2,120**	653 U
Anthracene	220,000	NV	NV	**5,230**	**4,170**	**1,410**	**1,160 J**	**3,460**	**2,340**	433 U	**368 J**	**884**	**680 J**	**498 J**	653 U
Fluorene	23,000	NV	NV	**4,400**	**1,860**	990 U	**1,160 J**	**2,540**	**2,140**	433 U	**468 J**	**986**	**680 J**	**467 J**	653 U
Naphthalene	99,000	NV	NV	**8,070**	**7,690**	**5,730**	**14,000**	**8,290**	**26,000**	**1,030**	635 U	**6,800**	**1,210**	**8,720**	**790**
Phenanthrene	100,000	NV	NV	**17,400**	**10,300**	**4,790**	**4,650**	**10,700**	**14,000**	**592**	**1,740**	**3,740**	**2,280**	**2,770**	**653**
Total HPAHs[h]	960,000	NV	NV	**141,000 J**	**89,700**	**26,700**	**6,590**	**56,100**	**30,000**	**1,390 J**	**6,920 J**	**21,500 J**	**17,600**	**5,890**	**2,030**
Benzo(a)anthracene	110,000	NV	NV	**11,900**	**7,690**	**2,240**	1,550 U	**4,590**	**1,490**	433 U	**468 J**	**1,560**	**1,360**	**343 J**	653 U
Benzo(a)pyrene	99,000	NV	NV	**6,150**	**5,380**	**1,930**	1,550 U	**3,270**	**1,430**	433 U	**401 J**	**1,090**	**1,020**	623 U	653 U
Benzo(ghi)perylene	31,000	NV	NV	**5,230**	**3,590**	**1,460**	1,550 U	**2,630**	**1,430**	433 U	**468 J**	**986**	**680 J**	**467 J**	653 U
Chrysene	110,000	NV	NV	**16,500**	**10,300**	**3,850**	1,550 U	**6,340**	**2,370**	**228 J**	**803**	**1,900**	**1,700**	**530 J**	653 U

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Table 6-3
2013-2015 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Investigation Area:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	Lumber Shed		Former Boiler				Beach Area		Shannon Slough	Chehalis River (2013)		
Location:				CR-07	CR-24	CR-08A		CR-08B		CR-09A	CR-09B	CR-10	CR-01	CR-02	CR-03
Sample Name:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		CR-07-SSD-COMP	CR-24-SSD-COMP	CR08a-SSD-COMP	CR08A-SBSD	CR08b-SSD-COMP	CR08b-SBSD	CR09a-SSD-COMP	CR09b-SSD-COMP	CR10-SSD-COMP	CR01-10cm	CR02-10cm	CR03-10cm
Collection Date:				10/13/2015	10/13/2015	10/14/2015	10/15/2015	10/14/2015	10/15/2015	10/13/2015	10/13/2015	10/14/2015	11/08/2013	11/08/2013	11/08/2013
Collection Depth (ft bml):				0-0.33	0-0.33	0-0.33	18.3-20.0	0-0.33	8.0	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Percent Wood waste:				Trace	0	80	0	20	0	40	15	15	0	0	0
TOC:				Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	Inside	Inside	Inside	Inside
Dibenzo(a,h)anthracene	12,000	NV	NV	**1,650 J**	**1,220**	**495**	388 U	**585**	**208**	107 U	**130 J**	**289**	**146 J**	153 U	165 U
Fluoranthene	160,000	NV	NV	**41,300**	**24,400**	**5,730**	**3,410**	**13,700**	**9,420**	**501**	**1,740**	**6,120**	**4,850**	**1,960**	**859**
Indeno(1,2,3-cd)pyrene	34,000	NV	NV	**3,940**	**3,460**	**1,350**	1,550 U	**2,240**	**909**	433 U	**435 J**	**646 J**	922 U	623 U	653 U
Pyrene	1,000,000	NV	NV	**33,000**	**19,200**	**4,380**	**3,180**	**12,200**	**9,740**	**387 J**	**1,340**	**5,100**	**5,340**	**1,900**	**722**
Total Benzofluoranthenes[i]	230,000	NV	NV	**21,100**	**14,700**	**5,210**	3,100 U	**10,700**	**2,990**	**273 J**	**1,140 J**	**3,740**	**2,520**	**685 J**	**447 J**
Pesticides and PCBs (ug/kg-dry)															
Aroclor 1016	NV	NV	NV	19 U	19 U	19 U	18 U	18 U	18 U	18 U	19 U	19 U	18 U	19 U	19 U
Aroclor 1221	NV	NV	NV	19 U	19 U	19 U	18 U	18 U	18 U	18 U	19 U	19 U	18 U	19 U	19 U
Aroclor 1232	NV	NV	NV	19 U	19 U	19 U	18 U	18 U	18 U	18 U	19 U	19 U	23 U	38 U	46 U
Aroclor 1242	NV	NV	NV	19 U	19 U	19 U	18 U	18 U	18 U	18 U	19 U	19 U	18 U	19 U	19 U
Aroclor 1248	NV	NV	NV	19 U	19 U	19 U	18 U	18 U	18 U	18 U	19 U	19 U	18 U	19 U	19 U
Aroclor 1254	NV	NV	NV	19 U	**30**	19 U	18 U	18 U	18 U	18 U	19 U	19 U	18 U	**12 J**	19 U
Aroclor 1260	NV	NV	NV	19 U	**24**	19 U	18 U	**14 J**	18 U	18 U	19 U	19 U	18 U	19 U	19 U
Aroclor 1268	NV	NV	NV	19 U	19 U	19 U	18 U	18 U	18 U	18 U	19 U	19 U	--	--	--
Total PCBs[k]	110	110	3.5	19 U	**54**	19 U	18 U	**14 J**	18 U	18 U	19 U	19 U	23 U	**12 J**	46 U
Carbazole	900	900	NV	**24 J**	--	--	--	--	--	--	--	--	--	--	--
Additional SVOCs (ug/kg-dry)															
1,3-Dichlorobenzene	NV	NV	NV	19 U	--	--	--	--	--	--	--	--	4.8 U	4.9 U	4.8 U
4-Methylphenol	NV	NV	NV	**26**	**120**	**28 J**	**190 J**	**210**	**560 J**	**26**	19 U	**160 J**	**30**	**730**	**60**
Hexachlorocyclopentadiene	NV	NV	NV	97 U	--	--	--	--	--	--	--	--	--	--	--
Dioxins/Furans (pg/g-dw)															
1,2,3,4,6,7,8-HpCDD	NV	NV	NV	--	--	**583**	**14.5**	**955**	**12.5**	**95.4**	**107**	--	**211**	**201**	**66.1**
1,2,3,4,6,7,8-HpCDF	NV	NV	NV	--	--	**33.1**	**1.26**	**75.8**	0.295 U	**14.6**	**23.9**	--	**31.9**	**113**	**24.7**
1,2,3,4,7,8,9-HpCDF	NV	NV	NV	--	--	2.1 U	0.25 U	**3.72**	**0.0959 J**	**0.908 J**	**1.15**	--	**1.59**	**4.94**	**0.894 J**
1,2,3,4,7,8-HxCDD	NV	NV	NV	--	--	**2.33**	0.583 U	**2.96**	**0.589 J**	**1.32**	**1.57**	--	**1.76**	**1.96**	**1.42**
1,2,3,4,7,8-HxCDF	NV	NV	NV	--	--	**1.42**	**0.217 J**	**4.39**	**0.111 J**	0.991 U	1.16 U	--	**2.77**	**4.6**	**1.02**
1,2,3,6,7,8-HxCDD	NV	NV	NV	--	--	**10.7**	**1.3**	**22.3**	**1.71**	**5.25**	**6.27**	--	**9.98**	**10.4**	**4.81**
1,2,3,6,7,8-HxCDF	NV	NV	NV	--	--	**0.798 J**	**0.178 J**	**2.13**	**0.14 J**	**0.626 J**	**0.924 J**	--	**1.19**	**3.22**	**0.862 J**
1,2,3,7,8,9-HxCDD	NV	NV	NV	--	--	**8.01**	**5.31**	**13.9**	**7.04**	**5.49**	**7.96**	--	**11.1**	**12.4**	**12.9**
1,2,3,7,8,9-HxCDF	NV	NV	NV	--	--	0.0933 U	0.258 U	**1.62**	0.146 U	**0.395 J**	**0.42 J**	--	0.778 U	**0.886 J**	**0.268 J**
1,2,3,7,8-PeCDD	NV	NV	NV	--	--	**2.87**	**1.76**	**4.81**	**2.68**	**1.99**	**3.16**	--	**3.93**	**4.53**	**5.08**
1,2,3,7,8-PeCDF	NV	NV	NV	--	--	0.483 U	**0.141 J**	**0.978 J**	0.288 U	0.383 U	**0.394 J**	--	**0.683 J**	**0.804 J**	**0.508 J**
2,3,4,6,7,8-HxCDF	NV	NV	NV	--	--	**1.46**	**0.188 J**	**3.84**	**0.105 J**	**0.991**	**1.36**	--	**1.8**	**5.58**	**0.785 J**
2,3,4,7,8-PeCDF	NV	NV	NV	--	--	**0.506 J**	**0.0704 J**	**1.06**	**0.201 J**	0.379 U	0.528 U	--	**0.814 J**	**1.13**	**0.594 J**
2,3,7,8-TCDD	NV	NV	NV	--	--	**1.71**	**1.55**	**2.79**	**2.06**	**1.18**	2.06 U	--	**2.62**	**2.89**	**3.56**
2,3,7,8-TCDF	NV	NV	NV	--	--	**1.06**	**0.088 J**	**2.48**	**0.529 J**	**0.831 J**	**1.63**	--	**1.96**	**2.18**	**1.34**
OCDD	NV	NV	NV	--	--	**13,700 J**	**130**	**22,200 J**	45.4 U	**700**	**788**	--	**1,690**	**1,550**	**489**
OCDF	NV	NV	NV	--	--	**73.9**	**6.41**	**128**	0.802 U	**23.8**	**33.8**	--	**51**	**211**	**36.4**
Total HpCDDs	NV	NV	NV	--	--	**1,650**	**32.3**	**4120**	**26.3**	**225**	**273**	--	**485**	**433**	**167**
Total HpCDFs	NV	NV	NV	--	--	126 U	3.43 U	243 U	0.643 U	**37.3**	58.9 U	--	87.1 U	**310**	**55.9**
Total HxCDDs	NV	NV	NV	--	--	147 U	33.2 U	**321**	45.4 U	48.3 U	72.3 U	--	**97**	**114**	80.8 U
Total HxCDFs	NV	NV	NV	--	--	44 U	1.27 U	119 U	0.888 U	22.2 U	30.8 U	--	52.5 U	**125**	24.4 U
Total PeCDDs	NV	NV	NV	--	--	25.9 U	12.7 U	**38.2**	21.9 U	12.4 U	21 U	--	**25.8**	**34.9**	**30.6**
Total PeCDFs	NV	NV	NV	--	--	12.8 U	0.428 U	35.9 U	2.08 U	10.6 U	16.5 U	--	18 U	47.6 U	13.2 U

MAUL FOSTER ALONGI

Table 6-3
2013-2015 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Investigation Area:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	Lumber Shed		Former Boiler				Beach Area		Shannon Slough	Chehalis River (2013)		
Location:				CR-07	CR-24	CR-08A		CR-08B		CR-09A	CR-09B	CR-10	CR-01	CR-02	CR-03
Sample Name:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		CR-07-SSD-COMP	CR-24-SSD-COMP	CR08a-SSD-COMP	CR08A-SBSD	CR08b-SSD-COMP	CR08b-SBSD	CR09a-SSD-COMP	CR09b-SSD-COMP	CR10-SSD-COMP	CR01-10cm	CR02-10cm	CR03-10cm
Collection Date:				10/13/2015	10/13/2015	10/14/2015	10/15/2015	10/14/2015	10/15/2015	10/13/2015	10/13/2015	10/14/2015	11/08/2013	11/08/2013	11/08/2013
Collection Depth (ft bml):				0-0.33	0-0.33	0-0.33	18.3-20.0	0-0.33	8.0	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Percent Wood waste:				Trace	0	80	0	20	0	40	15	15	0	0	0
TOC:				Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	Inside	Inside	Inside	Inside
Total TCDDs	NV	NV	NV	--	--	23.9 U	12 U	25 U	21.4 U	8.55 U	15.4 U	--	17.4 U	28.1 U	24.7 U
Total TCDFs	NV	NV	NV	--	--	10.9 U	0.656 U	21.7 U	10.7 U	6.42 U	12.5 U	--	12.4 U	33 U	16.7 U
Dioxin/Furan TEQ[(I)(1)]	NV	NV	5	--	--	**17.6 J**	**4.31 J**	**30.4 J**	**5.97 J**	**6.10 J**	**7.92 J**	--	**12.9 J**	**15.6 J**	**12.2 J**
TPH (mg/kg-dry)															
Gasoline-Range Hydrocarbons	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Diesel-Range Hydrocarbons	340	340	NV	**180**	**370**	--	**26**	**130**	**170**	--	--	--	--	--	--
Motor-Oil Range Hydrocarbons	3,600	3,600	NV	**520**	**850**	--	**74**	**320**	**280**	--	--	--	--	--	--
Grain Size (%)															
Gravel	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Very coarse sand	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Coarse sand	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Medium sand	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Fine sand	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Very fine sand	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Coarse silt	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Medium silt	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Fine silt	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Very fine silt	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Coarse clay	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Medium clay	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Fine clay	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Total fines	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Asbestos (%)															
Asbestos	NV	NV	NV	--	--	<1	<1	<1	<1	--	--	--	--	--	--
Pore Water Analysis															
Conductivity (uS/cm)	NV	NV	NV	--	--	--	--	--	--	--	--	--	**18,700**	**12,200**	**17,500**
Salinity (ppt)	NV	NV	NV	--	--	--	--	--	--	--	--	--	**11**	**6.9**	**10.2**

Table 6-3
2013-2015 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Investigation Area:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	Former Mill Area and Chehalis River											
Location:				CR-04			CR-05		CR-06		CR-11	CR-12	CR-13	CR-14	CR-11-14-COMP
Sample Name:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		CR04-10cm	CR04-2.5	CR04-5	CR05-10cm	CR05-2.5	CR06-10cm	CR06-2.5	CR11-SBSD-23	CR12-SBSD-15	CR13-SBSD-11	CR14-SBSD-12	CR11-14-SBSD-COMP
Collection Date:				11/07/2013	11/08/2013	11/08/2013	11/08/2013	11/08/2013	11/07/2013	11/07/2013	10/13/2015	10/13/2015	10/13/2015	10/13/2015	10/13/2015
Collection Depth (ft bml):				0-0.33	1-2.5	2.5-5	0-0.33	0.33-2.5	0-0.33	1-2.5	23	15	11	12	11-23
Percent Wood waste:				60	60	60	45	45	70	70	0	0	0	0	0
TOC:				Outside	--[d]	Outside	Outside	--[d]	Outside	Outside	Outside	Inside	Inside	Inside	--[e]
Conventionals															
Total Organic Carbon (%)	NV	NV	NV	31.4 J	--	16.5 J	13.6 J	--	35.6 J	49.5 J	0.415	3.33	2.5	3.22	--
Ammonia (as N) (mg N/kg)	230	230	NV	0.47 U	--	15.2	7.21	--	1.37	14.0	--	--	--	--	--
Sulfide (mg/kg)	NV	NV	NV	6.46	--	179	320	--	906	2,910	--	--	--	--	--
Total Volatile Solids (%)	NV	NV	NV	59.91	--	38.2	36.49	--	60.05	69.23	--	--	--	--	--
Fixed Solids (%)	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Total Solids (%)	NV	NV	NV	20.62	--	19.98	30.32	--	21.4	21.59	72.59	56.65	57.95	57.04	--
TCLP Metals (mg/L)															
Lead	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	0.1 U
Mercury	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	0.0001 U
Total Metals (mg/kg-dry)															
Arsenic	14	14	11	--	--	--	--	--	--	20 U	20 U	20 U	9 U	20 U	--
Cadmium	2.1	2.1	0.8	--	--	--	--	--	--	1 U	0.6 U	0.8 U	**0.4**	0.8 U	--
Chromium	72	72	NV	--	--	--	--	--	--	**26 J**	**37**	**48**	**41.3**	**49**	--
Copper	390	390	NV	--	--	--	--	--	--	**96 J**	**47**	**62.2**	**55.1**	**63**	--
Lead	360	360	21	--	--	--	--	--	--	**110**	6 U	**11**	**9**	**12**	--
Mercury	0.41	0.41	0.2	**6.2**	**0.5 J**	--	**0.16**	**0.5 J**	**0.55**	**0.53**	0.03 U	**0.09**	**0.07**	**0.09**	--
Silver	0.57	0.57	NV	--	--	--	--	--	--	1 U	1 U	1 U	0.5 U	1 U	--
Zinc	410	410	NV	--	--	--	--	--	--	**237**	**78**	**86**	**76**	**90**	--
Organic Chemicals (ug/kg-dry)															
2,4-Dimethylphenol	29	29	NV	530 UJ	400 UJ	--	290 UJ	440 UJ	--	350 U	23 U	24 U	24 U	24 U	--
2-Methylphenol	63	63	NV	100 UJ	81 UJ	--	**44 J**	88 UJ	--	**45 J**	4.7 U	4.9 U	**7.2**	4.9 U	--
Benzoic acid	650	650	NV	**1,700 J**	3,200 UJ	--	**950 J**	3,500 UJ	--	**860 J**	190 U	**440**	**260**	**200**	--
Benzyl alcohol	57	57	NV	420 UJ	320 UJ	--	230 UJ	350 UJ	--	280 U	19 U	**23**	**46**	**20**	--
Phenol	120	120	NV	**290 J**	**390 J**	**980 J**	**570 J**	**530 J**	**370 J**	**240 J**	**8.4 J**	**64**	**44**	**50**	--
Dibenzofuran	200	200	NV	420 UJ	**210 J**	--	**310 J**	**230 J**	--	**490**	19 U	**40**	20 U	**20**	--
N-Nitrosodiphenylamine	NV	28	NV	100 UJ	81 UJ	--	58 UJ	88 UJ	--	70 U	4.7 U	4.9 UJ	4.9 U	4.9 U	--
Organic Chemicals (ug/kg-OC)															
N-Nitrosodiphenylamine	11,000	NV	NV	318 UJ	--	--	426 UJ	--	--	141 U	1,130 U	147 UJ	196 U	152 U	--
Phthalates (ug/kg-dry)															
Bis(2-ethylhexyl)phthalate	500	500	NV	1,000 UJ	**870 J**	--	**960 J**	**9,400 J**	--	**1,900**	47 U	49 U	49 U	49 U	--
Butylbenzylphthalate	NV	63	NV	58 UJ	81 UJ	--	58 UJ	88 UJ	310 UJ	70 U	4.7 U	4.9 U	**7.3**	**4.7 J**	--
Diethylphthalate	NV	200	NV	420 UJ	320 UJ	--	230 UJ	350 UJ	--	**270 J**	19 U	20 U	20 U	20 U	--
Dimethyl phthalate	NV	71	NV	100 UJ	81 UJ	--	58 UJ	88 UJ	--	70 U	4.7 U	4.9 U	4.9 U	4.9 U	--
Di-n-butyl phthalate	380	380	NV	420 UJ	320 UJ	--	230 UJ	350 UJ	--	280 U	19 U	20 U	20 U	20 U	--
Di-n-octyl phthalate	39	39	NV	420 UJ	320 UJ	--	230 UJ	350 UJ	--	280 U	19 U	20 U	20 U	20 U	--
Phthalates (ug/kg-OC)															
Butylbenzylphthalate	4,900	NV	NV	185 UJ	--	--	426 UJ	--	871 UJ	141 U	1,130 U	147 U	**292**	**146 J**	--
Diethylphthalate	61,000	NV	NV	1,340 UJ	--	--	1,690 UJ	--	--	**545 J**	4,580 U	601 U	800 U	621 U	--
Dimethyl phthalate	53,000	NV	NV	318 UJ	--	--	426 UJ	--	--	141 U	1,130 U	147 U	196 U	152 U	--
Chlorinated Organics (ug/kg-dry)															
1,2,4-Trichlorobenzene	NV	31	NV	100 UJ	81 UJ	--	**43 J**	**74 J**	--	70 U	4.7 U	4.9 U	4.9 U	4.9 U	--
1,2-Dichlorobenzene	NV	35	NV	100 UJ	81 UJ	--	58 UJ	88 UJ	--	70 U	4.7 U	4.9 U	4.9 U	4.9 U	--
1,4-Dichlorobenzene	NV	110	NV	100 UJ	81 UJ	--	**1,000 J**	**540 J**	--	70 U	4.7 U	4.9 U	4.9 U	4.9 U	--
Hexachlorobenzene	NV	22	NV	100 UJ	81 UJ	--	58 UJ	88 UJ	--	70 U	4.7 U	4.9 U	4.9 U	4.9 U	--

Table 6-3
2013-2015 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Investigation Area:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	Former Mill Area and Chehalis River											
Location:				CR-04			CR-05		CR-06		CR-11	CR-12	CR-13	CR-14	CR-11-14-COMP
Sample Name:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		CR04-10cm	CR04-2.5	CR04-5	CR05-10cm	CR05-2.5	CR06-10cm	CR06-2.5	CR11-SBSD-23	CR12-SBSD-15	CR13-SBSD-11	CR14-SBSD-12	CR11-14-SBSD-COMP
Collection Date:				11/07/2013	11/08/2013	11/08/2013	11/08/2013	11/08/2013	11/07/2013	11/07/2013	10/13/2015	10/13/2015	10/13/2015	10/13/2015	10/13/2015
Collection Depth (ft bml):				0-0.33	1-2.5	2.5-5	0-0.33	0.33-2.5	0-0.33	1-2.5	23	15	11	12	11-23
Percent Wood waste:				60	60	60	45	45	70	70	0	0	0	0	0
TOC:				Outside	--[d]	Outside	Outside	--[d]	Outside	Outside	Outside	Inside	Inside	Inside	--[e]
Hexachlorobutadiene	NV	11	NV	100 UJ	81 UJ	--	58 UJ	88 UJ	--	70 U	4.7 U	4.9 U	4.9 U	4.9 U	--
Pentachlorophenol	360	360	NV	**270 J**	**400 J**	--	230 UJ	350 UJ	1,500 UJ	**240 J**	19 UJ	20 UJ	20 UJ	20 UJ	--
Chlorinated Organics (ug/kg-OC)															
1,2,4-Trichlorobenzene	810	NV	NV	318 UJ	--	--	**316 J**	--	--	141 U	1,130 U	147 U	196 U	152 U	--
1,2-Dichlorobenzene	2,300	NV	NV	318 UJ	--	--	426 UJ	--	--	141 U	1,130 U	147 U	196 U	152 U	--
1,4-Dichlorobenzene	3,100	NV	NV	318 UJ	--	--	**7,350 J**	--	--	141 U	1,130 U	147 U	196 U	152 U	--
Hexachlorobenzene	380	NV	NV	318 UJ	--	--	426 UJ	--	--	141 U	1,130 U	147 U	196 U	152 U	--
Hexachlorobutadiene	3,900	NV	NV	318 UJ	--	--	426 UJ	--	--	141 U	1,130 U	147 U	196 U	152 U	--
PAHs (ug/kg-dry)															
Total PAHs[f]	17,000	17,000	NV	**4,010 J**	**10,800 J**	--	**7,560 J**	**12,000 J**	--	**22,700**	**105 J**	**1,380 J**	**1,030 J**	**763 J**	--
Total LPAHs[g]	NV	5,200	NV	**740 J**	**1,360 J**	--	**2,290 J**	**1,850 J**	--	**7,810**	**19**	**819**	**654**	**432 J**	--
1-Methylnaphthalene	NV	NV	NV	--	--	--	--	--	--	--	19 U	**24**	**22**	**16 J**	--
2-Methylnaphthalene	NV	670	NV	420 UJ	320 UJ	--	**310**	350 UJ	--	**780**	19 U	**41**	20 U	**21**	--
Acenaphthene	NV	500	NV	420 UJ	**180 J**	--	**210**	**390 J**	--	**490**	19 U	**41**	**31**	**20**	--
Acenaphthylene	NV	1,300	NV	420 UJ	320 UJ	--	**170**	350 UJ	--	**520**	19 U	**110**	**110**	**61**	--
Anthracene	NV	960	NV	420 UJ	**290 J**	--	**230**	**320 J**	--	**750**	19 U	**41**	**28**	**18 J**	--
Fluorene	NV	540	NV	420 UJ	**180 J**	--	**260 J**	**230 J**	--	**650**	19 U	**47**	**35**	**23**	--
Naphthalene	NV	2,100	NV	**420 J**	**340 J**	--	**720 J**	**440 J**	--	**1,800**	19 U	**370**	**300**	**190**	--
Phenanthrene	NV	1,500	NV	**320 J**	**370 J**	--	**700 J**	**470 J**	--	**3,600**	**19**	**210**	**150**	**120**	--
Total HPAHs[h]	NV	12,000	NV	**3,270 J**	**9,460 J**	--	**4,960 J**	**10,200 J**	--	**14,100**	**86 J**	**494 J**	**351 J**	**294 J**	--
Benzo(a)anthracene	NV	1,300	NV	**250 J**	**640 J**	--	**390**	**680 J**	--	**1,300**	**11 J**	**30**	**20**	**17 J**	--
Benzo(a)pyrene	NV	1,600	NV	**300 J**	**680 J**	--	**340 J**	**530 J**	--	**1,200**	19 U	20 U	20 U	20 U	--
Benzo(ghi)perylene	NV	670	NV	**230 J**	**660 J**	--	**260 J**	**300 J**	--	**590**	19 U	**30**	**30**	**20**	--
Chrysene	NV	1,400	NV	**530 J**	**940 J**	--	**420 J**	**460 J**	--	**1,600**	**12 J**	**43**	**29**	**25**	--
Dibenzo(a,h)anthracene	NV	230	NV	**120 J**	**360 J**	--	**94 J**	**190 J**	--	**150**	4.7 U	**6.3**	**4.3 J**	**3.2 J**	--
Fluoranthene	NV	1,700	NV	**590 J**	**2,200 J**	--	**1,300 J**	**3,900 J**	--	**3,200**	**24**	**150**	**100**	**88**	--
Indeno(1,2,3-cd)pyrene	NV	600	NV	420 UJ	**480 J**	--	**200 J**	**190 J**	--	**490**	19 U	**24**	**18 J**	**15 J**	--
Pyrene	NV	2,600	NV	**700 J**	**1,800 J**	--	**1,300 J**	**3,100 J**	--	**3,600**	**23**	**150**	**110**	**87**	--
Total Benzofluoranthenes[i]	NV	3,200	NV	**550 J**	**1,700 J**	--	**660**	**810 J**	--	**2,000**	**16 J**	**61**	**40**	**39**	--
cPAH TEQ[jj][1]	NV	NV	21	**418 J**	**1,010 J**	--	**479 J**	**722 J**	--	**1,610**	**13.5 J**	**22.6**	**18.5 J**	**17.7 J**	--
PAHs (ug/kg-OC)															
Total LPAHs[g]	370,000	NV	NV	**2,360 J**	--	--	**16,800 J**	--	--	**15,800**	**4,580**	**24,600**	**26,200**	**13,400 J**	--
2-Methylnaphthalene	38,000	NV	NV	1,340 UJ	--	--	**2,280**	--	--	**1,580**	4,580 U	**1,230**	800 U	**652**	--
Acenaphthene	16,000	NV	NV	1,340 UJ	--	--	**1,540**	--	--	**990**	4,580 U	**1,230**	**1,240**	**621**	--
Acenaphthylene	66,000	NV	NV	1,340 UJ	--	--	**1,250**	--	--	**1,050**	4,580 U	**3,300**	**4,400**	**1,890**	--
Anthracene	220,000	NV	NV	1,340 UJ	--	--	**1,690**	--	--	**1,520**	4,580 U	**1,230**	**1,120**	**559 J**	--
Fluorene	23,000	NV	NV	1,340 UJ	--	--	**1,910 J**	--	--	**1,310**	4,580 U	**1,410**	**1,400**	**714**	--
Naphthalene	99,000	NV	NV	**1,340 J**	--	--	**5,290 J**	--	--	**3,640**	4,580 U	**11,100**	**12,000**	**5,900**	--
Phenanthrene	100,000	NV	NV	**1,020 J**	--	--	**5,150 J**	--	--	**7,270**	**4,580**	**6,310**	**6,000**	**3,730**	--
Total HPAHs[h]	960,000	NV	NV	**10,400 J**	--	--	**36,500 J**	--	--	**28,500**	**20,700 J**	**14,800 J**	**14,000 J**	**9,130 J**	--
Benzo(a)anthracene	110,000	NV	NV	**796 J**	--	--	**2,870**	--	--	**2,630**	**2,650 J**	**901**	**800**	**528 J**	--
Benzo(a)pyrene	99,000	NV	NV	**955 J**	--	--	**2,500 J**	--	--	**2,420**	4,580 U	601 U	800 U	621 U	--
Benzo(ghi)perylene	31,000	NV	NV	**732 J**	--	--	**1,910 J**	--	--	**1,190**	4,580 U	**901**	**1,200**	**621**	--
Chrysene	110,000	NV	NV	**1,690 J**	--	--	**3,090 J**	--	--	**3,230**	**2,890 J**	**1,290**	**1,160**	**776**	--

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2013-2015 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Investigation Area:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	Former Mill Area and Chehalis River											
Location:				CR-04			CR-05		CR-06		CR-11	CR-12	CR-13	CR-14	CR-11-14-COMP
Sample Name:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		CR04-10cm	CR04-2.5	CR04-5	CR05-10cm	CR05-2.5	CR06-10cm	CR06-2.5	CR11-SBSD-23	CR12-SBSD-15	CR13-SBSD-11	CR14-SBSD-12	CR11-14-SBSD-COMP
Collection Date:				11/07/2013	11/08/2013	11/08/2013	11/08/2013	11/08/2013	11/07/2013	11/07/2013	10/13/2015	10/13/2015	10/13/2015	10/13/2015	10/13/2015
Collection Depth (ft bml):				0-0.33	1-2.5	2.5-5	0-0.33	0.33-2.5	0-0.33	1-2.5	23	15	11	12	11-23
Percent Wood waste:				60	60	60	45	45	70	70	0	0	0	0	0
TOC:				Outside	--[d]	Outside	Outside	--[d]	Outside	Outside	Outside	Inside	Inside	Inside	--[e]
Dibenzo(a,h)anthracene	12,000	NV	NV	**382 J**	--	--	**691 J**	--	--	**303**	1,130 U	**189**	**172 J**	**99.4 J**	--
Fluoranthene	160,000	NV	NV	**1,880 J**	--	--	**9,560 J**	--	--	**6,460**	**5,780**	**4,500**	**4,000**	**2,730**	--
Indeno(1,2,3-cd)pyrene	34,000	NV	NV	1,340 UJ	--	--	**1,470 J**	--	--	**990**	4,580 U	**721**	**720 J**	**466 J**	--
Pyrene	1,000,000	NV	NV	**2,230 J**	--	--	**9,560 J**	--	--	**7,270**	**5,540**	**4,500**	**4,400**	**2,700**	--
Total Benzofluoranthenes[i]	230,000	NV	NV	**1,750 J**	--	--	**4,850**	--	--	**4,040**	**3,860 J**	**1,830**	**1,600**	**1,210**	--
Pesticides and PCBs (ug/kg-dry)															
Aroclor 1016	NV	NV	NV	20 UJ	19 UJ	--	20 UJ	19 UJ	--	20 U	17 U	20 U	20 U	20 U	--
Aroclor 1221	NV	NV	NV	20 UJ	19 UJ	--	20 UJ	19 UJ	--	20 U	17 U	20 U	20 U	20 U	--
Aroclor 1232	NV	NV	NV	20 UJ	19 UJ	--	20 UJ	19 UJ	--	20 U	17 U	20 U	20 U	20 U	--
Aroclor 1242	NV	NV	NV	20 UJ	19 UJ	--	20 UJ	19 UJ	--	20 U	17 U	20 U	20 U	20 U	--
Aroclor 1248	NV	NV	NV	29 UJ	48 UJ	--	29 UJ	97 UJ	--	99 U	17 U	20 U	20 U	20 U	--
Aroclor 1254	NV	NV	NV	97 UJ	**440 J**	--	98 UJ	**490 J**	--	200 U	17 U	20 U	20 U	20 U	--
Aroclor 1260	NV	NV	NV	**200 J**	**730 J**	--	**180 J**	**670 J**	--	**690**	17 U	20 U	20 U	20 U	--
Aroclor 1268	NV	NV	NV	--	--	--	--	--	--	--	17 U	20 U	20 U	20 U	--
Total PCBs[k]	110	110	3.5	**200 J**	**1,170 J**	--	**180 J**	**1,160 J**	--	**690**	17 U	20 U	20 U	20 U	--
Carbazole	900	900	NV	--	--	--	--	--	--	--	--	--	--	--	--
Additional SVOCs (ug/kg-dry)															
1,3-Dichlorobenzene	NV	NV	NV	100 UJ	81 UJ	--	**620 J**	**280 J**	--	70 U	--	--	--	--	--
4-Methylphenol	NV	NV	NV	420 UJ	320 UJ	--	**310 J**	**280 J**	--	**420**	19 U	**870 J**	**150**	**130**	--
Hexachlorocyclopentadiene	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Dioxins/Furans (pg/g-dw)															
1,2,3,4,6,7,8-HpCDD	NV	NV	NV	**817**	**4,070**	--	**1,820**	**12,200**	**1,080**	**1,090**	**6.64**	--	--	--	--
1,2,3,4,6,7,8-HpCDF	NV	NV	NV	**165**	**919**	--	**437**	**1,170**	**258**	**276**	0.317 U	--	--	--	--
1,2,3,4,7,8,9-HpCDF	NV	NV	NV	7.55 U	**42.8**	--	**19.8**	**81.3**	**13.2**	**15.5**	0.0458 U	--	--	--	--
1,2,3,4,7,8-HxCDD	NV	NV	NV	**4.26**	**32.5**	--	**11.2**	**24.5**	**12.7**	**8.21**	0.255 U	--	--	--	--
1,2,3,4,7,8-HxCDF	NV	NV	NV	**7.26**	**35.9**	--	**15.3**	**115**	**18.1**	**21.7**	**0.0319 J**	--	--	--	--
1,2,3,6,7,8-HxCDD	NV	NV	NV	**54.5**	**350**	--	**136**	**1,020**	**63.8**	**72.8**	0.631 U	--	--	--	--
1,2,3,6,7,8-HxCDF	NV	NV	NV	**3.38**	**18.9**	--	**10.9**	**51.7**	**8.9**	**8.35**	0.0339 U	--	--	--	--
1,2,3,7,8,9-HxCDD	NV	NV	NV	**10.2**	**48.1**	--	**29.9**	**98.1**	**16.5**	**15.4**	**2.76**	--	--	--	--
1,2,3,7,8,9-HxCDF	NV	NV	NV	**2.45**	**14.6**	--	**6.11**	**62.9**	**4.79**	**4.66**	0.112 U	--	--	--	--
1,2,3,7,8-PeCDD	NV	NV	NV	**4.34**	**18.8**	--	**13.9**	**34.1**	**9.35**	**8.27**	**1.02**	--	--	--	--
1,2,3,7,8-PeCDF	NV	NV	NV	**2.06**	**12.4**	--	**4.73**	**41.4**	**3.28**	**3.24**	0.0398 U	--	--	--	--
2,3,4,6,7,8-HxCDF	NV	NV	NV	**5.09**	**22.2**	--	**11.1**	**69.3**	**16.9**	**16.3**	0.0438 U	--	--	--	--
2,3,4,7,8-PeCDF	NV	NV	NV	**3.43**	**15.7**	--	**5.82**	**43.5**	**5.96**	**5.87**	0.0418 U	--	--	--	--
2,3,7,8-TCDD	NV	NV	NV	1.14 U	**3.97**	--	**3**	**5.26**	**2.09**	**2.11**	**0.936 J**	--	--	--	--
2,3,7,8-TCDF	NV	NV	NV	**3.53**	**16**	--	**6.3**	**54.3**	**4.87**	**4.95**	0.0339 U	--	--	--	--
OCDD	NV	NV	NV	**5,340 J**	**23,500 J**	--	**10,300 J**	**68,300 J**	**7,830 J**	**6,810 J**	**33.1**	--	--	--	--
OCDF	NV	NV	NV	**476**	**1,900**	--	**863**	**3,100**	**680**	**652**	**1.08 J**	--	--	--	--
Total HpCDDs	NV	NV	NV	**1,530**	**7,520**	--	**3,750**	**21,300**	**2,480**	**2,050**	**15.5**	--	--	--	--
Total HpCDFs	NV	NV	NV	678 U	**3,910**	--	**1,560**	5,060 U	**950**	1,120 U	1.28 U	--	--	--	--
Total HxCDDs	NV	NV	NV	350 U	1,540 U	--	1,010 U	**4,840**	742 U	783 U	18.1 U	--	--	--	--
Total HxCDFs	NV	NV	NV	301 U	**2,130**	--	**853**	6,030 U	463 U	518 U	0.599 U	--	--	--	--
Total PeCDDs	NV	NV	NV	68.7 U	133 U	--	334 U	862 U	**88.7**	67 U	**7.59**	--	--	--	--
Total PeCDFs	NV	NV	NV	101 U	658 U	--	281 U	2,660 U	203 U	147 U	0.111 U	--	--	--	--

MAUL FOSTER ALONGI

Table 6-3
2013-2015 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Investigation Area:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	Former Mill Area and Chehalis River											
Location:				CR-04			CR-05		CR-06		CR-11	CR-12	CR-13	CR-14	CR-11-14-COMP
Sample Name:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		CR04-10cm	CR04-2.5	CR04-5	CR05-10cm	CR05-2.5	CR06-10cm	CR06-2.5	CR11-SBSD-23	CR12-SBSD-15	CR13-SBSD-11	CR14-SBSD-12	CR11-14-SBSD-COMP
Collection Date:				11/07/2013	11/08/2013	11/08/2013	11/08/2013	11/08/2013	11/07/2013	11/07/2013	10/13/2015	10/13/2015	10/13/2015	10/13/2015	10/13/2015
Collection Depth (ft bml):				0-0.33	1-2.5	2.5-5	0-0.33	0.33-2.5	0-0.33	1-2.5	23	15	11	12	11-23
Percent Wood waste:				60	60	60	45	45	70	70	0	0	0	0	0
TOC:				Outside	--[d]	Outside	Outside	--[d]	Outside	Outside	Outside	Inside	Inside	Inside	--[e]
Total TCDDs	NV	NV	NV	17.5 U	32.6 U	--	73.6 U	**180**	42.6 U	**28.7**	7.61 U	--	--	--	--
Total TCDFs	NV	NV	NV	27.9 U	119 U	--	78.1 U	558 U	82.8 U	62.3 U	0.303 U	--	--	--	--
Dioxin/Furan TEQ[f][1]	NV	NV	5	**26.7 J**	**140 J**	--	**67.6 J**	**359** J	**44.0 J**	**43.5 J**	**2.38 J**	--	--	--	--
TPH (mg/kg-dry)															
Gasoline-Range Hydrocarbons	NV	NV	NV	--	--	--	--	--	--	54 UJ	--	--	--	--	--
Diesel-Range Hydrocarbons	340	340	NV	**2,400 J**	**3,200 J**	--	**1,200 J**	**3,200 J**	--	**20,000**	7 U	--	--	--	--
Motor-Oil Range Hydrocarbons	3,600	3,600	NV	**7,400 J**	**10,000 J**	--	**4,800 J**	**13,000 J**	--	**60,000**	**19**	--	--	--	--
Grain Size (%)															
Gravel	NV	NV	NV	22.8	--	23.6	20.2	--	22.7	--	--	--	--	--	--
Very coarse sand	NV	NV	NV	13.8	--	13	11.4	--	13	--	--	--	--	--	--
Coarse sand	NV	NV	NV	14.2	--	10.7	13.2	--	15.7	--	--	--	--	--	--
Medium sand	NV	NV	NV	8.5	--	6.1	10.5	--	11.9	--	--	--	--	--	--
Fine sand	NV	NV	NV	3.7	--	3.2	6	--	5.1	--	--	--	--	--	--
Very fine sand	NV	NV	NV	1.4	--	1.4	3.5	--	2	--	--	--	--	--	--
Coarse silt	NV	NV	NV	7.2	--	1.3	8.1	--	4.1	--	--	--	--	--	--
Medium silt	NV	NV	NV	5.9	--	10.6	7.7	--	5.1	--	--	--	--	--	--
Fine silt	NV	NV	NV	6.2	--	8.9	5.1	--	4.5	--	--	--	--	--	--
Very fine silt	NV	NV	NV	4.8	--	6.1	4.5	--	3.7	--	--	--	--	--	--
Coarse clay	NV	NV	NV	2.9	--	4.3	2.1	--	2.7	--	--	--	--	--	--
Medium clay	NV	NV	NV	2.6	--	3.7	2.4	--	2.1	--	--	--	--	--	--
Fine clay	NV	NV	NV	6.1	--	7.2	5.4	--	7.4	--	--	--	--	--	--
Total fines	NV	NV	NV	35.6	--	42.1	35.3	--	29.7	--	--	--	--	--	--
Asbestos (%)															
Asbestos	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Pore Water Analysis															
Conductivity (uS/cm)	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Salinity (ppt)	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--

MAUL FOSTER ALONGI

Table 6-3
2013-2015 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Investigation Area:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	Former Mill Area and Chehalis River										Wharf Area
Location:				CR-15C		CR-17D		CR-18B		CR-19D	CR-19F			CR-26
Sample Name:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		CR15C-SSD	CR15C-SBSD	CR17-D-SSD	CR17-D-SBSD	CR18B-SSD	CR18B-SBSD	CR19D-SSD-CONV	CR19F-SSD	CR19F-SBSD	CR19F-SBSD-DUP	CR26-SBSD
Collection Date:				10/14/2015	10/14/2015	10/15/2015	10/15/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/15/2015
Collection Depth (ft bml):				0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0-0.33	0.5-1.0	0.5-1.0	0.5-1.0
Percent Wood waste:				0	0	0	0	0	0	0	0	0	0	0
TOC:				Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	Inside	Inside	Inside
Conventionals														
Total Organic Carbon (%)	NV	NV	NV	3.17	1.73	1.61	3.05	1.95	2.45	3.99	2.77	2.76	2.59	1.52
Ammonia (as N) (mg N/kg)	230	230	NV	--	--	--	--	--	--	18.6	--	--	--	--
Sulfide (mg/kg)	NV	NV	NV	--	--	--	--	--	--	605	--	--	--	--
Total Volatile Solids (%)	NV	NV	NV	--	--	--	--	--	--	8.58	--	--	--	--
Fixed Solids (%)	NV	NV	NV	--	--	--	--	--	--	44.8	--	--	--	--
Total Solids (%)	NV	NV	NV	35.1	57.47	52.1	48.09	46.44	47.88	39.38	49.31	50.3	51.43	46.69
TCLP Metals (mg/L)														
Lead	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
Mercury	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
Total Metals (mg/kg-dry)														
Arsenic	14	14	11	**20**	**21**	**21**	**30**	**30**	**20**	--	**20**	**22**	**23**	**24**
Cadmium	2.1	2.1	0.8	0.5 U	0.3 U	0.4 U	0.4 U	0.4 U	0.4 U	--	0.4 U	0.4 U	0.3 U	0.4 U
Chromium	72	72	NV	**40**	**34.5**	**34.4**	**40**	**41**	**36**	--	**41**	**50.5**	**51.3**	**39.3**
Copper	390	390	NV	**51.9**	**54.7**	**51.1**	**58.2**	**62.7**	**53.4**	--	**53.1**	**60**	**53.3**	**55.9**
Lead	360	360	21	**11**	**9**	**9**	**12**	**10**	**10**	--	**11**	**13**	**14**	**11**
Mercury	0.41	0.41	0.2	0.06 U	**0.04**	**0.04**	**0.07**	0.05 U	**0.07**	--	**0.05**	**0.05**	**0.07**	**0.09**
Silver	0.57	0.57	NV	0.8 U	0.5 U	0.5 U	0.6 U	0.6 U	0.6 U	--	0.6 U	0.6 U	0.5 U	0.6 U
Zinc	410	410	NV	**77**	**69**	**70**	**79**	**76**	**73**	--	**74**	**80**	**79**	**75**
Organic Chemicals (ug/kg-dry)														
2,4-Dimethylphenol	29	29	NV	24 U	24 U	24 U	24 U	25 U	25 U	--	24 U	25 U	25 U	24 U
2-Methylphenol	63	63	NV	4.9 U	4.9 U	4.8 U	4.9 U	5 U	5 U	--	4.8 U	5 U	5 U	**5.4**
Benzoic acid	650	650	NV	**250 J**	**160 J**	**150 J**	**230 J**	**160 J**	**210 J**	--	**170 J**	**240**	**370**	**440**
Benzyl alcohol	57	57	NV	20 U	20 U	**16 J**	**48**	20 U	20 U	--	19 U	**27**	**28**	**64**
Phenol	120	120	NV	**50**	20 U	**16 J**	**39**	**81**	20 U	**93 J+**	**89**	**47**	**68**	**76**
Dibenzofuran	200	200	NV	**24**	**21**	19 U	**84**	20 U	20 U	--	**15 J**	**25**	**28**	**25**
N-Nitrosodiphenylamine	NV	28	NV	4.9 U	4.9 U	4.8 U	4.9 U	5 U	5 U	--	4.8 U	5 U	5 U	4.9 U
Organic Chemicals (ug/kg-OC)														
N-Nitrosodiphenylamine	11,000	NV	NV	155 U	283 U	298 U	161 U	256 U	204 U	--	173 U	181 U	193 U	322 U
Phthalates (ug/kg-dry)														
Bis(2-ethylhexyl)phthalate	500	500	NV	**29 J**	49 U	48 U	**38 J**	50 U	50 U	--	48 U	50 U	**32 J**	49 U
Butylbenzylphthalate	NV	63	NV	4.9 U	4.9 U	**3.4 J**	4.9 U	**7.2**	**2.8 J**	--	**8.1**	**9.3**	**7.4**	4.9 U
Diethylphthalate	NV	200	NV	21 U	26 U	19 U	19 U	40 U	20 U	--	22 U	24 U	38 U	20 U
Dimethyl phthalate	NV	71	NV	4.9 U	4.9 U	4.8 U	4.9 U	5 U	5 U	--	4.8 U	5 U	5 U	4.9 U
Di-n-butyl phthalate	380	380	NV	20 U	20 U	19 U	19 U	20 U	20 U	--	19 U	20 U	20 U	20 U
Di-n-octyl phthalate	39	39	NV	20 U	20 U	19 U	19 U	20 U	20 U	--	19 U	20 U	20 U	20 U
Phthalates (ug/kg-OC)														
Butylbenzylphthalate	4,900	NV	NV	155 U	283 U	**211 J**	161 U	**369**	**114 J**	--	**292**	**337**	**286**	322 U
Diethylphthalate	61,000	NV	NV	662 U	1,500 U	1,180 U	623 U	2,050 U	816 U	--	794 U	870 U	1,470 U	1,320 U
Dimethyl phthalate	53,000	NV	NV	155 U	283 U	298 U	161 U	256 U	204 U	--	173 U	181 U	193 U	322 U
Chlorinated Organics (ug/kg-dry)														
1,2,4-Trichlorobenzene	NV	31	NV	4.9 U	4.9 U	4.8 U	**4.8 J**	5 U	5 U	--	4.8 U	5 U	5 U	4.9 U
1,2-Dichlorobenzene	NV	35	NV	4.9 U	4.9 U	4.8 U	**1.6 J**	5 U	5 U	--	4.8 U	5 U	5 U	4.9 U
1,4-Dichlorobenzene	NV	110	NV	4.9 U	4.9 U	4.8 U	4.9 U	5 U	5 U	--	4.8 U	5 U	5 U	4.9 U
Hexachlorobenzene	NV	22	NV	4.9 U	4.9 U	4.8 U	4.9 U	5 U	5 U	--	4.8 U	5 U	5 U	4.9 U

Table 6-3
2013-2015 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Investigation Area:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	Former Mill Area and Chehalis River										Wharf Area
Location:				CR-15C		CR-17D		CR-18B		CR-19D	CR-19F			CR-26
Sample Name:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		CR15C-SSD	CR15C-SBSD	CR17-D-SSD	CR17-D-SBSD	CR18B-SSD	CR18B-SBSD	CR19D-SSD-CONV	CR19F-SSD	CR19F-SBSD	CR19F-SBSD-DUP	CR26-SBSD
Collection Date:				10/14/2015	10/14/2015	10/15/2015	10/15/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/15/2015
Collection Depth (ft bml):				0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0-0.33	0.5-1.0	0.5-1.0	0.5-1.0
Percent Wood waste:				0	0	0	0	0	0	0	0	0	0	0
TOC:				Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	Inside	Inside	Inside
Hexachlorobutadiene	NV	11	NV	4.9 U	4.9 U	4.8 U	4.9 U	5 U	5 U	--	4.8 U	5 U	5 U	4.9 U
Pentachlorophenol	360	360	NV	20 UJ	20 UJ	19 U	**21**	20 U	20 U	--	19 U	20 UJ	20 UJ	20 UJ
Chlorinated Organics (ug/kg-OC)														
1,2,4-Trichlorobenzene	810	NV	NV	155 U	283 U	298 U	**157 J**	256 U	204 U	--	173 U	181 U	193 U	322 U
1,2-Dichlorobenzene	2,300	NV	NV	155 U	283 U	298 U	**52.5 J**	256 U	204 U	--	173 U	181 U	193 U	322 U
1,4-Dichlorobenzene	3,100	NV	NV	155 U	283 U	298 U	161 U	256 U	204 U	--	173 U	181 U	193 U	322 U
Hexachlorobenzene	380	NV	NV	155 U	283 U	298 U	161 U	256 U	204 U	--	173 U	181 U	193 U	322 U
Hexachlorobutadiene	3,900	NV	NV	155 U	283 U	298 U	161 U	256 U	204 U	--	173 U	181 U	193 U	322 U
PAHs (ug/kg-dry)														
Total PAHs[f]	17,000	17,000	NV	**800 J**	**725 J**	**101 J**	**3,070**	**356 J**	**1,050 J**	--	**269 J**	**526 J**	**848 J**	**427 J**
Total LPAHs[g]	NV	5,200	NV	**255 J**	**196 J**	**32 J**	**1,160**	**66 J**	**118 J**	--	**131 J**	**258**	**340 J**	**166 J**
1-Methylnaphthalene	NV	NV	NV	**15 J**	**18 J**	19 U	**23**	20 U	20 U	--	19 U	20 U	**13 J**	**11 J**
2-Methylnaphthalene	NV	670	NV	**19 J**	**18 J**	19 U	**31**	20 U	20 U	--	**10 J**	**13 J**	**22**	20 U
Acenaphthene	NV	500	NV	**38**	**37**	19 U	**420**	20 U	**16 J**	--	**12 J**	**27**	**31**	**29**
Acenaphthylene	NV	1,300	NV	**15 J**	**15 J**	19 U	**20**	20 U	**17 J**	--	19 U	20 U	**18 J**	**9.7 J**
Anthracene	NV	960	NV	**18 J**	**20**	19 U	**110**	20 U	**24**	--	**15 J**	**30**	**26**	**14 J**
Fluorene	NV	540	NV	**29**	**20**	19 U	**140**	**11 J**	**12 J**	--	**12 J**	**29**	**27**	**23**
Naphthalene	NV	2,100	NV	**64**	**35**	**13 J**	**110**	**29**	**22**	--	**56**	**62**	**98**	**51**
Phenanthrene	NV	1,500	NV	**91**	**69**	**19**	**360**	**26**	**27**	--	**36**	**110**	**140**	**39**
Total HPAHs[h]	NV	12,000	NV	**511 J**	**493 J**	**68.9 J**	**1,850**	**290 J**	**932 J**	--	**128 J**	**255 J**	**473 J**	**250 J**
Benzo(a)anthracene	NV	1,300	NV	**56**	**64**	19 U	**160**	**29**	**99**	--	**12 J**	**21**	**37**	**18 J**
Benzo(a)pyrene	NV	1,600	NV	**31**	**35**	19 U	**81**	**12 J**	**68**	--	19 U	20 U	20 U	20 U
Benzo(ghi)perylene	NV	670	NV	**23**	**14 J**	19 U	**36**	20 U	**27**	--	19 U	20 U	**15 J**	**13 J**
Chrysene	NV	1,400	NV	**61**	**69**	**8.6 J**	**210**	**66**	**93**	--	**21**	**30**	**64**	**26**
Dibenzo(a,h)anthracene	NV	230	NV	**4 J**	**4.3 J**	**2.3 J**	**15**	5 U	**8**	--	4.8 U	5 U	**3.1 J**	**3.1 J**
Fluoranthene	NV	1,700	NV	**120**	**110**	**25**	**600**	**82**	**210**	--	**41**	**94**	**150**	**75**
Indeno(1,2,3-cd)pyrene	NV	600	NV	**18 J**	**17 J**	19 U	**41**	20 U	**27**	--	19 U	20 U	**14 J**	**8.8 J**
Pyrene	NV	2,600	NV	**98**	**80**	**20**	**470**	**62**	**220**	--	**35**	**83**	**130**	**70**
Total Benzofluoranthenes[i]	NV	3,200	NV	**100**	**100**	**13 J**	**240**	**39 J**	**180**	--	**19 J**	**27 J**	**60**	**36 J**
cPAH TEQ[ij][1]	NV	NV	21	**49.4 J**	**54.2 J**	**13 J**	**129**	**20.7 J**	**100**		**14 J**	**16.4 J**	**22.1 J**	**16.9 J**
PAHs (ug/kg-OC)														
Total LPAHs[g]	370,000	NV	NV	**8,040 J**	**11,300 J**	**1,990 J**	**38,000**	**3,380 J**	**4,820 J**	--	**4,730 J**	**9,350**	**13,100 J**	**10,900 J**
2-Methylnaphthalene	38,000	NV	NV	**599 J**	**1,040 J**	1,180 U	**1,020**	1,030 U	816 U	--	**361 J**	**471 J**	**849**	1,320 U
Acenaphthene	16,000	NV	NV	**1,200**	**2,140**	1,180 U	**13,800**	1,030 U	**653 J**	--	**433 J**	**978**	**1,200**	**1,910**
Acenaphthylene	66,000	NV	NV	**473 J**	**867 J**	1,180 U	**656**	1,030 U	**694 J**	--	686 U	725 U	**695 J**	**638 J**
Anthracene	220,000	NV	NV	**568 J**	**1,160**	1,180 U	**3,610**	1,030 U	**980**	--	**542 J**	**1,090**	**1,000**	**921 J**
Fluorene	23,000	NV	NV	**915**	**1,160**	1,180 U	**4,590**	**564 J**	**490 J**	--	**433 J**	**1,050**	**1,040**	**1,510**
Naphthalene	99,000	NV	NV	**2,020**	**2,020**	**807 J**	**3,610**	**1,490**	**898**	--	**2,020**	**2,250**	**3,780**	**3,360**
Phenanthrene	100,000	NV	NV	**2,870**	**3,990**	**1,180**	**11,800**	**1,330**	**1,100**	--	**1,300**	**3,990**	**5,410**	**2,570**
Total HPAHs[h]	960,000	NV	NV	**16,100 J**	**28,500 J**	**4,280 J**	**60,700**	**14,900 J**	**38,000 J**	--	**4,620 J**	**9,240 J**	**18,300 J**	**16,400 J**
Benzo(a)anthracene	110,000	NV	NV	**1,770**	**3,700**	1,180 U	**5,250**	**1,490**	**4,040**	--	**433 J**	**761**	**1430**	**1180 J**
Benzo(a)pyrene	99,000	NV	NV	**978**	**2,020**	1,180 U	**2,660**	**615 J**	**2,780**	--	686 U	725 U	772 U	1,320 U
Benzo(ghi)perylene	31,000	NV	NV	**726**	**809 J**	1,180 U	**1,180**	1,030 U	**1,100**	--	686 U	725 U	**579 J**	**855 J**
Chrysene	110,000	NV	NV	**1,920**	**3,990**	**534 J**	**6,890**	**3,380**	**3,800**	--	**758**	**1,090**	**2,470**	**1,710**

Table 6-3
2013-2015 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Investigation Area:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	Former Mill Area and Chehalis River										Wharf Area
Location:				CR-15C		CR-17D		CR-18B		CR-19D	CR-19F			CR-26
Sample Name:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		CR15C-SSD	CR15C-SBSD	CR17-D-SSD	CR17-D-SBSD	CR18B-SSD	CR18B-SBSD	CR19D-SSD-CONV	CR19F-SSD	CR19F-SBSD	CR19F-SBSD-DUP	CR26-SBSD
Collection Date:				10/14/2015	10/14/2015	10/15/2015	10/15/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/15/2015
Collection Depth (ft bml):				0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0-0.33	0.5-1.0	0.5-1.0	0.5-1.0
Percent Wood waste:				0	0	0	0	0	0	0	0	0	0	0
TOC:				Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	Inside	Inside	Inside
Dibenzo(a,h)anthracene	12,000	NV	NV	**126 J**	**249 J**	**143 J**	**492**	256 U	**327**	--	173 U	181 U	**120 J**	**204 J**
Fluoranthene	160,000	NV	NV	**3,790**	**6,360**	**1,550**	**19,700**	**4,210**	**8,570**	--	**1,480**	**3,410**	**5,790**	**4,930**
Indeno(1,2,3-cd)pyrene	34,000	NV	NV	**568 J**	**983 J**	1,180 U	**1,340**	1,030 U	**1,100**	--	686 U	725 U	**541 J**	**579 J**
Pyrene	1,000,000	NV	NV	**3,090**	**4,620**	**1,240**	**15,400**	**3,180**	**8,980**	--	**1,260**	**3,010**	**5,020**	**4,610**
Total Benzofluoranthenes[i]	230,000	NV	NV	**3,150**	**5,780**	**807 J**	**7,870**	**2,000 J**	**7,350**	--	**686 J**	**978 J**	**2,320**	**2,370 J**
Pesticides and PCBs (ug/kg-dry)														
Aroclor 1016	NV	NV	NV	20 U	18 U	19 U	20 U	18 U	19 U	--	18 U	19 U	20 U	19 U
Aroclor 1221	NV	NV	NV	20 U	18 U	19 U	20 U	18 U	19 U	--	18 U	19 U	20 U	19 U
Aroclor 1232	NV	NV	NV	20 U	18 U	19 U	20 U	18 U	19 U	--	18 U	19 U	20 U	19 U
Aroclor 1242	NV	NV	NV	20 U	18 U	19 U	20 U	18 U	19 U	--	18 U	19 U	20 U	19 U
Aroclor 1248	NV	NV	NV	20 U	18 U	19 U	20 U	18 U	19 U	--	18 U	19 U	20 U	19 U
Aroclor 1254	NV	NV	NV	20 U	18 U	19 U	**18 J**	18 U	19 U	--	18 U	19 U	20 U	19 U
Aroclor 1260	NV	NV	NV	20 U	18 U	19 U	20 U	18 U	19 U	--	18 U	19 U	20 U	19 U
Aroclor 1268	NV	NV	NV	20 U	18 U	19 U	20 U	18 U	19 U	--	18 U	19 U	20 U	19 U
Total PCBs[k]	110	110	3.5	20 U	18 U	19 U	**18 J**	18 U	19 U	--	18 U	19 U	20 U	19 U
Carbazole	900	900	NV	--	--	--	--	--	--	--	--	--	--	--
Additional SVOCs (ug/kg-dry)														
1,3-Dichlorobenzene	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
4-Methylphenol	NV	NV	NV	**89**	**52**	19 UJ	**120 J**	**42**	20 U	--	19 U	**230**	**320**	**45**
Hexachlorocyclopentadiene	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
Dioxins/Furans (pg/g-dw)					--									
1,2,3,4,6,7,8-HpCDD	NV	NV	NV	**100**	--	**56.2**	--	**30.9**	--	--	**141**	--	--	--
1,2,3,4,6,7,8-HpCDF	NV	NV	NV	**25.3**	--	**8.12**	--	**7.34**	--	--	**24.3**	--	--	--
1,2,3,4,7,8,9-HpCDF	NV	NV	NV	0.959 U	--	0.483 U	--	**0.332 J**	--	--	**1.04**	--	--	--
1,2,3,4,7,8-HxCDD	NV	NV	NV	**1.22**	--	0.736 U	--	**0.758 J**	--	--	**1.35**	--	--	--
1,2,3,4,7,8-HxCDF	NV	NV	NV	1.25 U	--	**0.596 J**	--	0.424 U	--	--	**1.37**	--	--	--
1,2,3,6,7,8-HxCDD	NV	NV	NV	**5.48**	--	**2.94**	--	**2.46**	--	--	**9.89**	--	--	--
1,2,3,6,7,8-HxCDF	NV	NV	NV	**0.806 J**	--	**0.37 J**	--	0.294 U	--	--	**1.07**	--	--	--
1,2,3,7,8,9-HxCDD	NV	NV	NV	**10**	--	**6.33**	--	**8**	--	--	**8.91**	--	--	--
1,2,3,7,8,9-HxCDF	NV	NV	NV	0.338 U	--	0.324 U	--	0.226 U	--	--	0.571 U	--	--	--
1,2,3,7,8-PeCDD	NV	NV	NV	**3.65**	--	**2.49**	--	**3.28**	--	--	**3.01**	--	--	--
1,2,3,7,8-PeCDF	NV	NV	NV	**0.408 J**	--	0.213 U	--	0.157 U	--	--	0.613 U	--	--	--
2,3,4,6,7,8-HxCDF	NV	NV	NV	1.21 U	--	0.443 U	--	**0.469 J**	--	--	**1.73**	--	--	--
2,3,4,7,8-PeCDF	NV	NV	NV	0.505 U	--	0.239 U	--	0.183 U	--	--	**0.557 J**	--	--	--
2,3,7,8-TCDD	NV	NV	NV	**2.7**	--	**1.85**	--	**2.36**	--	--	**2.16**	--	--	--
2,3,7,8-TCDF	NV	NV	NV	**1.55**	--	0.406 U	--	0.381 U	--	--	**7.75**	--	--	--
OCDD	NV	NV	NV	**790**	--	**475**	--	**189**	--	--	**1,010**	--	--	--
OCDF	NV	NV	NV	**33.1**	--	**14**	--	**10.9**	--	--	**36.8**	--	--	--
Total HpCDDs	NV	NV	NV	**275**	--	**150**	--	**73.7**	--	--	**340**	--	--	--
Total HpCDFs	NV	NV	NV	60.7 U	--	21.2 U	--	**17.4**	--	--	62.7 U	--	--	--
Total HxCDDs	NV	NV	NV	76.1 U	--	45.8 U	--	46.9 U	--	--	93 U	--	--	--
Total HxCDFs	NV	NV	NV	28.1 U	--	10.8 U	--	8.92 U	--	--	40.2 U	--	--	--
Total PeCDDs	NV	NV	NV	**26.5**	--	16.7 U	--	20.5 U	--	--	26.4 U	--	--	--
Total PeCDFs	NV	NV	NV	12.6 U	--	4.66 U	--	4.65 U	--	--	23.6 U	--	--	--

Table 6-3
2013-2015 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Investigation Area:	SCO for Protection of Benthic Organisms[1]		Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	Former Mill Area and Chehalis River										Wharf Area
Location:				CR-15C		CR-17D		CR-18B		CR-19D	CR-19F			CR-26
Sample Name:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		CR15C-SSD	CR15C-SBSD	CR17-D-SSD	CR17-D-SBSD	CR18B-SSD	CR18B-SBSD	CR19D-SSD-CONV	CR19F-SSD	CR19F-SBSD	CR19F-SBSD-DUP	CR26-SBSD
Collection Date:				10/14/2015	10/14/2015	10/15/2015	10/15/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/15/2015
Collection Depth (ft bml):				0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0-0.33	0.5-1.0	0.5-1.0	0.5-1.0
Percent Wood waste:				0	0	0	0	0	0	0	0	0	0	0
TOC:				Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	Inside	Inside	Inside
Total TCDDs	NV	NV	NV	20.3 U	--	12.4 U	--	15.9 U	--	--	20.6 U	--	--	--
Total TCDFs	NV	NV	NV	13.7 U	--	4.27 U	--	4.57 U	--	--	25.6 U	--	--	--
Dioxin/Furan TEQ[i][1]	NV	NV	5	**9.99 J**	--	**6.29 J**	--	**7.35 J**	--	--	**10.6 J**	--	--	--
TPH (mg/kg-dry)														
Gasoline-Range Hydrocarbons	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
Diesel-Range Hydrocarbons	340	340	NV	**77**	--	**24**	--	**44**	--	--	**93**	--	--	--
Motor-Oil Range Hydrocarbons	3,600	3,600	NV	**190**	--	**46**	--	**92**	--	--	**240**	--	--	--
Grain Size (%)														
Gravel	NV	NV	NV	--	--	--	--	--	--	1	--	--	--	--
Very coarse sand	NV	NV	NV	--	--	--	--	--	--	3.8	--	--	--	--
Coarse sand	NV	NV	NV	--	--	--	--	--	--	1.8	--	--	--	--
Medium sand	NV	NV	NV	--	--	--	--	--	--	2	--	--	--	--
Fine sand	NV	NV	NV	--	--	--	--	--	--	4.6	--	--	--	--
Very fine sand	NV	NV	NV	--	--	--	--	--	--	8.9	--	--	--	--
Coarse silt	NV	NV	NV	--	--	--	--	--	--	16	--	--	--	--
Medium silt	NV	NV	NV	--	--	--	--	--	--	20.1	--	--	--	--
Fine silt	NV	NV	NV	--	--	--	--	--	--	14.6	--	--	--	--
Very fine silt	NV	NV	NV	--	--	--	--	--	--	7.3	--	--	--	--
Coarse clay	NV	NV	NV	--	--	--	--	--	--	5.9	--	--	--	--
Medium clay	NV	NV	NV	--	--	--	--	--	--	3.4	--	--	--	--
Fine clay	NV	NV	NV	--	--	--	--	--	--	10.5	--	--	--	--
Total fines	NV	NV	NV	--	--	--	--	--	--	77.8	--	--	--	--
Asbestos (%)														
Asbestos	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
Pore Water Analysis														
Conductivity (uS/cm)	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--
Salinity (ppt)	NV	NV	NV	--	--	--	--	--	--	--	--	--	--	--

Table 6-3
2013-2015 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Notes

Shading (color key below) indicates values that exceed screening criteria. Non-detect results (U or UJ) are not evaluated against screening criteria. SCO for protection of benthic organisms are applied based on sample TOC results.

TOC results outside 0.5-3.5%

SCO for Protection of Benthic Organisms, Inside or Outside Organic Carbon 0.5-3.5%

SSL for Protection of Human Health and Higher Trophic Level Ecological Receptors

Bold is applied to detected results, with the exception of conventional parameters and grain size.

-- = not analyzed.
< = less than the limit of detection.
% = percent.
AET = apparent effects threshold.
cm = centimeter.
cPAH = carcinogenic PAH.
CSL = cleanup screening level.
ft bml = feet below mudline.
HpCDD = heptachlorodibenzo-p-dioxin.
HPAH = high-molecular-weight PAH.
HxCDD = hexachlorodibenzo-p-dioxin.
HxCDF = hexachlorodibenzofuran.
J = result is an estimated value.
LPAH = low-molecular-weight PAH.
mg/kg = milligrams per kilogram.
mg/L = milligrams per liter.
mg N/kg = milligrams of nitrogen per kilogram.
NV = no value.
OCDD = octachlorodibenzodioxin.
OCDF = octachlorodibenzofuran.
PAH = polycyclic aromatic hydrocarbon.
PCB = polychlorinated biphenyl.
PeCDD = pentachlorodibenzo-p-dioxin.
PeCDF = pentachlorodibenzofuran.
pg/g = picograms per gram (parts per trillion).
ppt = parts per thousand.
PQL = practical quantitation limit.
SIM = selective ion monitoring.
SCO = sediment cleanup objective.
SVOC = semivolatile organic compound. When samples were analyzed by both EPA methods 8270D and 8270D SIM, or when samples were reanalyzed, the higher detected value or lower non-detect value was used.
TEQ =-toxic equivalent quotient.
TCDD = tetrachlorodibenzo-p-dioxin.
TCDF = tetrachlorodibenzofuran.
TCLP = toxicity characteristic leaching procedure.
TOC = total organic carbon.
TPH = total petroleum hydrocarbon.
U = result is non-detect at method reporting limit.
UJ = result is non-detect at or above method reporting limit. Reported value is estimated.
ug/kg = micrograms per kilogram.
ug/kg-dry = micrograms per kilogram, dry weight.
ug/kg-OC = micrograms per kilogram, organic carbon normalized.
uS/cm = microsiemen = (micromhos) per centimeter.

[a]Screening level is equivalent to organic carbon-normalized marine criteria. Where organic carbon-normalized criteria are not available, screening level is the lowest marine or freshwater SCO or CSL.
[b]Screening level is the lowest of the following criteria: marine AET, marine sediment, or freshwater sediment SCO or CSL.
[c]Human health and higher trophic level ecological receptor screening levels are chosen from lowest of bioaccumulative and direct contact pathways. If the risk-based value is lower than natural background or PQL, the cleanup level defaults to the higher of natural background or PQL.
[d]TOC analysis was not performed. Assume TOC would be outside of the 0.5 to 3.5 percent range based on other samples collected from the same boring.
[e]TOC analysis was not performed. Assume TOC would be inside of the 0.5 to 3.5 percent range based on other samples collected from the same area.
(f)Total PAH is the sum of detected 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluorene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene. Non-detect results are not included in the sum. When all analytical results are non-detect, the highest detection limit is used.
[g]LPAH is the sum of detected acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene. Non-detect results are not included in the sum. When all analytical results are non-detect, the highest detection limit is used.
(h)HPAH is the sum of detected benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene. Non-detect results are not included in the sum. When all analytical results are non-detect, the highest detection limit is used.
[i]Total benzofluoranthenes are reported by the laboratory.
[j]cPAH TEQ is calculated with 2005 California EPA toxicity equivalence factors provided in table 6-1 of SCUM (Ecology, 2021). Non-detect results are included at one-half the detection limit. When all cPAHs are non-detect, the highest reported detection limit is shown.
[k]Total PCBs is the sum of all detected recolors. Non-detect results are not included in the sum. When all analytical results are non-detect, the highest detection limit is used.
[l]Dioxin/furan TEQ is calculated with 2005 World Health Organization toxic equivalence factors provided in table 6-2 of SCUM (Ecology, 2021). Non-detect results are included at one-half the detection limit.

Reference

[1]Ecology. 2021. Sediment cleanup user's manual (SCUM), guidance for implementing cleanup provisions of the sediment management standards, Chapter 173-204 WAC. Publication no. 12-09-057. Washington State Department of Ecology. Revised December 2021.

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Table 6-4
Wood Waste Parameters and Bioassay Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location		Preliminary Cleanup Standards[a]		CR-07	CR-24	CR-08A		CR-08B		CR-09A	CR-09B	CR-10	CR-01	CR-02	CR-03
Sample Name				CR-07-SSD-COMP	CR-24-SSD-COMP	CR08a-SSD-COMP	CR08A-SBSD	CR08b-SSD-COMP	CR08b-SBSD	CR09a-SSD-COMP	CR09b-SSD-COMP	CR10-SSD-COMP	CR01-10cm	CR02-10cm	CR03-10cm
Collection Date		Organic Carbon (0.5% to 3.5%)	Organic Carbon (<0.5% or	10/13/2015	10/13/2015	10/14/2015	10/15/2015	10/14/2015	10/15/2015	10/13/2015	10/13/2015	10/14/2015	11/08/2013	11/08/2013	11/08/2013
Collection Depth (ft bml)				0-0.33	0-0.33	0-0.33	18.3-20.0	0-0.33	8.0	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Percent Wood Waste				Trace	0	80	0	20	0	40	15	15	0	0	0
Conventional Parameters															
Total Organic Carbon (%)		NV	NV	1.09	1.56	1.92	1.29	2.05	3.08	4.39	2.99	2.94	2.06 J	3.21 J	2.91 J
Total Solids (%)		NV	NV	67.22	54.35	47.46	63.97	44.38	55.76	55.6	59.33	45.44	44.09	51.8	36.4
Total Volatile Solids (%)		NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Ammonia as Nitrogen (mg/kg)		230	230	--	--	--	--	--	--	--	--	--	--	--	--
Sulfide (mg/kg)		39	39	--	--	--	--	--	--	--	--	--	--	--	--
Pore Water Sulfide (mg/L)															
Laboratory Sulfide		NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
DGT Sulfide		NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Summary of Bioassay Results[b]															
SCO	Amphipod	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
	Polychaete	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
	Larval	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
CSL	Amphipod	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
	Polychaete	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
	Larval	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--

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Table 6-4
Wood Waste Parameters and Bioassay Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location		Preliminary Cleanup Standards[a]		CR-04			CR-05		CR-06		CR-11	CR-12	CR-13	CR-14	CR-11-14-COMP
Sample Name				CR04-10cm	CR04-2.5	CR04-5	CR05-10cm	CR05-2.5	CR06-10cm	CR06-2.5	CR11-SBSD-23	CR12-SBSD-15	CR13-SBSD-11	CR14-SBSD-12	CR11-14-SBSD-COMP
Collection Date		Organic	Organic	11/07/2013	11/08/2013	11/08/2013	11/08/2013	11/08/2013	11/07/2013	11/07/2013	10/13/2015	10/13/2015	10/13/2015	10/13/2015	10/13/2015
Collection Depth (ft bml)		Carbon (0.5%	Carbon	0-0.33	1-2.5	2.5-5	0-0.33	0.33-2.5	0-0.33	1-2.5	23	15	11	12	11-23
Percent Wood Waste		to 3.5%)	(<0.5% or	60	60	60	45	45	70	70	0	0	0	0	0
Conventional Parameters															
Total Organic Carbon (%)		NV	NV	31.4 J	--	16.5 J	13.6 J	--	35.6 J	49.5 J	0.415	3.33	2.5	3.22	--
Total Solids (%)		NV	NV	20.62	--	19.98	30.32	--	21.4	21.59	72.59	56.65	57.95	57.04	--
Total Volatile Solids (%)		NV	NV	59.91	--	38.2	36.49	--	60.05	69.23	--	--	--	--	--
Ammonia as Nitrogen (mg/kg)		230	230	0.47 U	--	15.2	7.21	--	1.37	14.0	--	--	--	--	--
Sulfide (mg/kg)		39	39	6.46	--	179	320	--	906	2,910	--	--	--	--	--
Pore Water Sulfide (mg/L)															
Laboratory Sulfide		NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
DGT Sulfide		NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Summary of Bioassay Results[b]															
SCO	Amphipod	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
	Polychaete	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
	Larval	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
CSL	Amphipod	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
	Polychaete	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
	Larval	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--

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Table 6-4
Wood Waste Parameters and Bioassay Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location		Preliminary Cleanup Standards[a]		CR-15C		CR-17D		CR-18B		CR-19D	CR-19F			CR-26	SE-01A
Sample Name				CR15C-SSD	CR15C-SBSD	CR17-D-SSD	CR17-D-SBSD	CR18B-SSD	CR18B-SBSD	CR19D-SSD-CONV	CR19F-SSD	CR19F-SBSD	CR19F-SBSD-DUP	CR26-SBSD	SE-01A-1.0-2.0
Collection Date		Organic Carbon (0.5%	Organic Carbon	10/14/2015	10/14/2015	10/15/2015	10/15/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/15/2015	09/25/2019
Collection Depth (ft bml)		to 3.5%)	(<0.5% or	0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0-0.33	0.5-1.0	0.5-1.0	0.5-1.0	1-2
Percent Wood Waste				0	0	0	0	0	0	0	0	0	0	0	20
Conventional Parameters															
Total Organic Carbon (%)		NV	NV	3.17	1.73	1.61	3.05	1.95	2.45	3.99	2.77	2.76	2.59	1.52	4.4
Total Solids (%)		NV	NV	35.1	57.47	52.1	48.09	46.44	47.88	39.38	49.31	50.3	51.43	46.69	51.9
Total Volatile Solids (%)		NV	NV	--	--	--	--	--	--	8.58	--	--	--	--	11.9 J
Ammonia as Nitrogen (mg/kg)		230	230	--	--	--	--	--	--	18.6	--	--	--	--	290 J
Sulfide (mg/kg)		39	39	--	--	--	--	--	--	605	--	--	--	--	865 J
Pore Water Sulfide (mg/L)															
Laboratory Sulfide		NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
DGT Sulfide		NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Summary of Bioassay Results[b]															
SCO	Amphipod	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
	Polychaete	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
	Larval	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
CSL	Amphipod	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
	Polychaete	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
	Larval	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--

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Table 6-4
Wood Waste Parameters and Bioassay Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location		Preliminary Cleanup Standards[a]		SE-02A	SE-03A	SE-05A	SE-06A	SE-07A	SE-08A	SE-08C	SE-10	SE-14	SE-15	SE-16	SE-17
Sample Name				SE-02A-2.5-3.5	SE-03A-0-1.0	SE-05A-2.0-3.0	SE-06A-0.5-1.5	SE-07A-0-1.0	SE-08A-0-1.0	SE-08C-3.2-4.2	SE-10-2.0-3.7	SE-14-0-0.33	SE-15-0-0.33	SE-16-0-0.33	SE-17-0-0.33
Collection Date		Organic Carbon (0.5% to 3.5%)	Organic Carbon (<0.5% or	09/26/2019	09/25/2019	09/23/2019	09/25/2019	09/26/2019	09/24/2019	09/24/2019	09/26/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019
Collection Depth (ft bml)				2-3.5	0-1	2-3	0.5-1.5	0-1	0-1	3-4.2	2-3.7	0-0.33	0-0.33	0-0.33	0-0.33
Percent Wood Waste				10	10	Trace	20	40	85	25	30	85	30	Trace	0
Conventional Parameters															
Total Organic Carbon (%)		NV	NV	3.3	2.3	2.3	3.2	6.3	6.8	7.1	7.9 J	5.50	4.70	1.50	2.30
Total Solids (%)		NV	NV	55.5	45.6	47.8	55.6	34	35.8	44	38.3	34.80	43.40	52.90	43.30
Total Volatile Solids (%)		NV	NV	7.94 J	8.11 J	7.49	9.92 J	20.7 J	31.7	19.8	30.1	12.50	14.40	5.35	6.80
Ammonia as Nitrogen (mg/kg)		230	230	230 J	168 J	47.1	408 J	7.73 J	8.65	36.3	5.37 J	15.20	5.75	8.43	10.70
Sulfide (mg/kg)		39	39	977	856 J	4,040 J	--	639	153 J	124 J	228 J	409	191	469	20
Pore Water Sulfide (mg/L)															
Laboratory Sulfide		NV	NV	--	--	--	--	--	--	--	--	0.13	--	0.05 U	--
DGT Sulfide		NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Summary of Bioassay Results[b]															
SCO	Amphipod	NV	NV	--	--	--	--	--	--	--	--	--	Pass	Pass	Pass
	Polychaete	NV	NV	--	--	--	--	--	--	--	--	--	Pass	Pass	Pass
	Larval	NV	NV	--	--	--	--	--	--	--	--	--	Pass	Pass	Pass
CSL	Amphipod	NV	NV	--	--	--	--	--	--	--	--	--	Pass	Pass	Pass
	Polychaete	NV	NV	--	--	--	--	--	--	--	--	--	Pass	Pass	Pass
	Larval	NV	NV	--	--	--	--	--	--	--	--	--	Pass	Pass	Pass

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Table 6-4
Wood Waste Parameters and Bioassay Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location		Preliminary Cleanup Standards[a]		SE-18	SE-19	SE-20	SE-21	SE-22	SE-23	SE-24	SE-25	SE-26	SE-27		SE-28
Sample Name				SE-18-0-0.33	SE-19-0-0.33	SE-20-0-0.33	SE-21-0-0.33	SE-22-0-0.33	SE-23-0-0.33	SE-24-0-0.33	SE-25-0-0.33	SE-26-0-0.33	SE-27-0-0.33	SE-27-0-0.33-DUP	SE-28-0-0.33
Collection Date		Organic Carbon (0.5% to 3.5%)	Organic Carbon (<0.5% or	09/27/2019	09/27/2019	09/25/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019
Collection Depth (ft bml)				0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Percent Wood Waste				5	0	0	10	10	15	25	80	80	10	10	75
Conventional Parameters															
Total Organic Carbon (%)		NV	NV	1.70	2	6.60	1.3	3.8	2.6	7.80	18	13.00	3.8	3.9	5.50
Total Solids (%)		NV	NV	46.30	41.5	36.80	59.4	33.4	45.4	35.50 J	40.6 J	42.40	39.4	38.3	36.00
Total Volatile Solids (%)		NV	NV	6.06	6.95	12.70	5.02	11.6	7.18	18.90 J	19	18.40	12.1	9.96	13.00
Ammonia as Nitrogen (mg/kg)		230	230	12.90	9.43	3.90	7.06	7.81	11.8	9.49	3.68	3.48	8.47	8.18	7.36
Sulfide (mg/kg)		39	39	691	924	2.70 U	359	937	856	281	267	3.21 U	394	396	22.70
Pore Water Sulfide (mg/L)															
Laboratory Sulfide		NV	NV	0.05 U	--	0.06 J	--	--	--	0.10	--	0.12	--	--	0.06
DGT Sulfide		NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Summary of Bioassay Results[b]															
SCO	Amphipod	NV	NV	Pass	--	Pass	--	--	--	Pass	--	Pass	--	--	--
	Polychaete	NV	NV	Pass	--	Pass	--	--	--	Pass	--	Pass	--	--	--
	Larval	NV	NV	Pass	--	Pass	--	--	--	Fail	--	Fail	--	--	--
CSL	Amphipod	NV	NV	Pass	--	Pass	--	--	--	Pass	--	Pass	--	--	--
	Polychaete	NV	NV	Pass	--	Pass	--	--	--	Pass	--	Pass	--	--	--
	Larval	NV	NV	Pass	--	Pass	--	--	--	Fail	--	Pass	--	--	--

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Table 6-4
Wood Waste Parameters and Bioassay Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location		Preliminary Cleanup Standards[a]		SE-29	SE-30	SE-31	SE-32	SE-33	SE-34	SE-35	SE-36	SE-37	SE-38	SE-39	SE-40	SE-41
Sample Name				SE-29-0-2.0	SE-30-2.5-4.5	SE-31-0-0.33	SE-32	SE-33	SE-34	SE-35	SE-36	SE-37	SE-38	SE-39	SE-40	SE-41
Collection Date		Organic	Organic	09/24/2019	09/26/2019	09/27/2019	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020
Collection Depth (ft bml)		Carbon (0.5%	Carbon	0-2	2-4.5	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Percent Wood Waste		to 3.5%)	(<0.5% or	80	20	35	Trace	10	5	Trace	10	25	50	90	0	20
Conventional Parameters																
Total Organic Carbon (%)		NV	NV	9.9	5.1	2.10	1.1	1.2	1.2	1.1	1.1	1.9	1.7	3.9	1	1.8
Total Solids (%)		NV	NV	42.9 J	47.6	48.80	46.4	54.1	53	50	49	46.2	49.6	25.5	77.6	43.4
Total Volatile Solids (%)		NV	NV	27.4 J	14.7	8.80	6.56	6.45	6.69	6.68	6.88	15.2	10.1	50.1	2.51	10.2
Ammonia as Nitrogen (mg/kg)		230	230	4.76	112	7.98	7.61	26.4	4.82	7.45	4.1	14.2	3.49	1.16	0.783	8.41
Sulfide (mg/kg)		39	39	1,510 J	492	397	337 J	473 J	921 J	447 J	546 J	204 J	365 J	2,110 J	392 J	567 J
Pore Water Sulfide (mg/L)																
Laboratory Sulfide		NV	NV	--	--	--	0.076	0.104	0.153	0.05 U	0.06 J	0.163	0.103	--	0.202	0.071
DGT Sulfide		NV	NV	--	--	--	0.0002	6.24	0.01	0.06	6.38	6.38	0.12	0.03	7.85	0.17
Summary of Bioassay Results[b]																
SCO	Amphipod	NV	NV	--	--	Pass	--	--	--	--	--	--	--	--	--	--
	Polychaete	NV	NV	--	--	Pass	--	--	--	--	--	--	--	--	--	--
	Larval	NV	NV	--	--	Pass	--	--	--	--	--	--	--	--	--	--
CSL	Amphipod	NV	NV	--	--	Pass	--	--	--	--	--	--	--	--	--	--
	Polychaete	NV	NV	--	--	Pass	--	--	--	--	--	--	--	--	--	--
	Larval	NV	NV	--	--	Pass	--	--	--	--	--	--	--	--	--	--

Table 6-4
Wood Waste Parameters and Bioassay Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Notes

-- = not analyzed.

TOC results outside 0.5-3.5%

Detected result exceeding preliminary cleanup standard, Inside or Outside Organic Carbon 0.5-3.5%

Bioassay failure of CSL or SCO.

% = percent.

CSL = cleanup screening level.

DGT = diffusive gradients in thin films.

J = result is an estimated value.

mg/kg = milligrams per kilogram.

mg/L = milligrams per liter.

NV = no value.

SCO = sediment cleanup objective.

U = result is non-detect at reporting limit.

[(a)]Preliminary cleanup standards are shown in Table 5-3.

[(b)]Bioassay results adapted from table 5-1 of Bioassay Testing Results; Sediment Quality Analysis: Seaport Landing Site, Aberdeen Washington January 8, 2020 report prepared by EcoAnalysts, Inc. Pass/fail performance criteria are provided in the report.

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Table 6-5
Site-Specific Wood Waste Cleanup Level Scoring
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location	Site-Specific Wood Waste Cleanup Level Scoring			CR-07	CR-24	CR-08A		CR-08B		CR-09A	CR-09B	CR-10	CR-01	CR-02	CR-03
Sample Name				CR-07-SSD-COMP	CR-24-SSD-COMP	CR08a-SSD-COMP	CR08A-SBSD	CR08b-SSD-COMP	CR08b-SBSD	CR09a-SSD-COMP	CR09b-SSD-COMP	CR10-SSD-COMP	CR01-10cm	CR02-10cm	CR03-10cm
Collection Date	**0 Point Range**	**1 Point Range**	**2 Point Range**	10/13/2015	10/13/2015	10/14/2015	10/15/2015	10/14/2015	10/15/2015	10/13/2015	10/13/2015	10/14/2015	11/08/2013	11/08/2013	11/08/2013
Collection Depth (ft bml)				0-0.33	0-0.33	0-0.33	18.3-20.0	0-0.33	8.0	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Wood Waste Cleanup Level Parameters															
Total Organic Carbon (%)	< 6	6 – 7	> 7	1.09	1.56	1.92	1.29	2.05	3.08	4.39	2.99	2.94	2.06 J	3.21 J	2.91 J
Total Volatile Solids (%)	< 14	14 – 16	> 16	--	--	--	--	--	--	--	--	--	--	--	--
Wood Waste (%)	< 25	25 – <50	≥ 50	Trace	0	80	0	20	0	40	15	15	0	0	0
Wood Waste Cleanup Level Scoring[(a)]	--	--	--	0	0	2	0	0	0	1	0	0	0	0	0

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Table 6-5
Site-Specific Wood Waste Cleanup Level Scoring
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location	Site-Specific Wood Waste Cleanup Level Scoring			CR-04			CR-05		CR-06		CR-11	CR-12	CR-13	CR-14	CR-11-14-COMP
Sample Name				CR04-10cm	CR04-2.5	CR04-5	CR05-10cm	CR05-2.5	CR06-10cm	CR06-2.5	CR11-SBSD-23	CR12-SBSD-15	CR13-SBSD-11	CR14-SBSD-12	CR11-14-SBSD-COMP
Collection Date	**0 Point**	**1 Point**	**2 Point**	11/07/2013	11/08/2013	11/08/2013	11/08/2013	11/08/2013	11/07/2013	11/07/2013	10/13/2015	10/13/2015	10/13/2015	10/13/2015	10/13/2015
Collection Depth (ft bml)	**Range**	**Range**	**Range**	0-0.33	1-2.5	2.5-5	0-0.33	0.33-2.5	0-0.33	1-2.5	23	15	11	12	11-23
Wood Waste Cleanup Level Parameters															
Total Organic Carbon (%)	< 6	6 – 7	> 7	31.4 J	--	16.5 J	13.6 J	--	35.6 J	49.5 J	0.415	3.33	2.5	3.22	--
Total Volatile Solids (%)	< 14	14 – 16	> 16	59.91	--	38.2	36.49	--	60.05	69.23	--	--	--	--	--
Wood Waste (%)	< 25	25 – <50	≥ 50	60	60	60	45	45	70	70	0	0	0	0	0
Wood Waste Cleanup Level Scoring[(a)]	--	--	--	6	2	6	5	1	6	6	0	0	0	0	0

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Table 6-5
Site-Specific Wood Waste Cleanup Level Scoring
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location	Site-Specific Wood Waste Cleanup Level Scoring			CR-15C		CR-17D		CR-18B		CR-19D	CR-19F			CR-26	SE-01A
Sample Name				CR15C-SSD	CR15C-SBSD	CR17-D-SSD	CR17-D-SBSD	CR18B-SSD	CR18B-SBSD	CR19D-SSD-CONV	CR19F-SSD	CR19F-SBSD	CR19F-SBSD-DUP	CR26-SBSD	SE-01A-1.0-2.0
Collection Date	**0 Point Range**	**1 Point Range**	**2 Point Range**	10/14/2015	10/14/2015	10/15/2015	10/15/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/15/2015	09/25/2019
Collection Depth (ft bml)				0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0-0.33	0.5-1.0	0.5-1.0	0.5-1.0	1-2
Wood Waste Cleanup Level Parameters															
Total Organic Carbon (%)	< 6	6 – 7	> 7	3.17	1.73	1.61	3.05	1.95	2.45	3.99	2.77	2.76	2.59	1.52	4.4
Total Volatile Solids (%)	< 14	14 – 16	> 16	--	--	--	--	--	--	8.58	--	--	--	--	11.9 J
Wood Waste (%)	< 25	25 – <50	≥ 50	0	0	0	0	0	0	0	0	0	0	0	20
Wood Waste Cleanup Level Scoring[(a)]	--	--	--	0	0	0	0	0	0	0	0	0	0	0	0

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Table 6-5
Site-Specific Wood Waste Cleanup Level Scoring
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location	Site-Specific Wood Waste Cleanup Level Scoring			SE-02A	SE-03A	SE-05A	SE-06A	SE-07A	SE-08A	SE-08C	SE-10	SE-14	SE-15	SE-16	SE-17
Sample Name				SE-02A-2.5-3.5	SE-03A-0-1.0	SE-05A-2.0-3.0	SE-06A-0.5-1.5	SE-07A-0-1.0	SE-08A-0-1.0	SE-08C-3.2-4.2	SE-10-2.0-3.7	SE-14-0-0.33	SE-15-0-0.33	SE-16-0-0.33	SE-17-0-0.33
Collection Date	**0 Point Range**	**1 Point Range**	**2 Point Range**	09/26/2019	09/25/2019	09/23/2019	09/25/2019	09/26/2019	09/24/2019	09/24/2019	09/26/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019
Collection Depth (ft bml)				2-3.5	0-1	2-3	0.5-1.5	0-1	0-1	3-4.2	2-3.7	0-0.33	0-0.33	0-0.33	0-0.33
Wood Waste Cleanup Level Parameters															
Total Organic Carbon (%)	< 6	6 – 7	> 7	3.3	2.3	2.3	3.2	6.3	6.8	7.1	7.9 J	5.50	4.70	1.50	2.30
Total Volatile Solids (%)	< 14	14 – 16	> 16	7.94 J	8.11 J	7.49	9.92 J	20.7 J	31.7	19.8	30.1	12.50	14.40	5.35	6.80
Wood Waste (%)	< 25	25 – <50	≥ 50	10	10	Trace	20	40	85	25	30	85	30	Trace	0
Wood Waste Cleanup Level Scoring[(a)]	--	--	--	0	0	0	0	4	5	5	5	2	2	0	0

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Table 6-5
Site-Specific Wood Waste Cleanup Level Scoring
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location	Site-Specific Wood Waste Cleanup Level Scoring			SE-18	SE-19	SE-20	SE-21	SE-22	SE-23	SE-24	SE-25	SE-26	SE-27		SE-28
Sample Name				SE-18-0-0.33	SE-19-0-0.33	SE-20-0-0.33	SE-21-0-0.33	SE-22-0-0.33	SE-23-0-0.33	SE-24-0-0.33	SE-25-0-0.33	SE-26-0-0.33	SE-27-0-0.33	SE-27-0-0.33-DUP	SE-28-0-0.33
Collection Date	**0 Point Range**	**1 Point Range**	**2 Point Range**	09/27/2019	09/27/2019	09/25/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019
Collection Depth (ft bml)				0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Wood Waste Cleanup Level Parameters															
Total Organic Carbon (%)	< 6	6 – 7	> 7	1.70	2	6.60	1.3	3.8	2.6	7.80	18	13.00	3.8	3.9	5.50
Total Volatile Solids (%)	< 14	14 – 16	> 16	6.06	6.95	12.70	5.02	11.6	7.18	18.90 J	19	18.40	12.1	9.96	13.00
Wood Waste (%)	< 25	25 – <50	≥ 50	5	0	0	10	10	15	25	80	80	10	10	75
Wood Waste Cleanup Level Scoring[(a)]	--	--	--	0	0	1	0	0	0	5	6	6	0	0	2

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Table 6-5
Site-Specific Wood Waste Cleanup Level Scoring
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location	Site-Specific Wood Waste Cleanup Level Scoring			SE-29	SE-30	SE-31	SE-32	SE-33	SE-34	SE-35	SE-36	SE-37	SE-38	SE-39	SE-40	SE-41
Sample Name				SE-29-0-2.0	SE-30-2.5-4.5	SE-31-0-0.33	SE-32	SE-33	SE-34	SE-35	SE-36	SE-37	SE-38	SE-39	SE-40	SE-41
Collection Date	**0 Point**	**1 Point**	**2 Point**	09/24/2019	09/26/2019	09/27/2019	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020
Collection Depth (ft bml)	**Range**	**Range**	**Range**	0-2	2-4.5	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Wood Waste Cleanup Level Parameters																
Total Organic Carbon (%)	< 6	6 – 7	> 7	9.9	5.1	2.10	1.1	1.2	1.2	1.1	1.1	1.9	1.7	3.9	1	1.8
Total Volatile Solids (%)	< 14	14 – 16	> 16	27.4 J	14.7	8.80	6.56	6.45	6.69	6.68	6.88	15.2	10.1	50.1	2.51	10.2
Wood Waste (%)	< 25	25 – <50	≥ 50	80	20	35	Trace	10	5	Trace	10	25	50	90	0	20
Wood Waste Cleanup Level Scoring[(a)]	--	--	--	6	1	1	0	0	0	0	0	2	2	4	0	0

Table 6-5
Site-Specific Wood Waste Cleanup Level Scoring
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

NOTES:
-- = not analyzed.
Site-specific wood waste cleanup level exceedance.
% = percent.
ft bml = feet below mudline.
J = result is an estimated value.
[(a)]Based on parameter ranges, sample locations are awarded either zero, one, or two points. Sample locations with a wood waste score equal to or greater than two are not in compliance with the site-specific wood waste cleanup level.

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Table 8-1
2013-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	Preliminary Cleanup Standards[a]		CR-07	CR-24	CR-08A		CR-08B		CR-09A	CR-09B	CR-10	CR-01	CR-02	CR-03
Sample Name:			CR-07-SSD-COMP	CR-24-SSD-COMP	CR08a-SSD-COMP	CR08A-SBSD	CR08b-SSD-COMP	CR08b-SBSD	CR09a-SSD-COMP	CR09b-SSD-COMP	CR10-SSD-COMP	CR01-10cm	CR02-10cm	CR03-10cm
Collection Date:	Organic Carbon (0.5% to 3.5%)[b]	Organic Carbon (<0.5% or >3.5%)[c]	10/13/2015	10/13/2015	10/14/2015	10/15/2015	10/14/2015	10/15/2015	10/13/2015	10/13/2015	10/14/2015	11/08/2013	11/08/2013	11/08/2013
Collection Depth (ft bml):			0-0.33	0-0.33	0-0.33	18.3-20.0	0-0.33	8.0	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Type:			Surface	Surface	Surface	Subsurface	Surface	Subsurface	Surface	Surface	Surface	Surface	Surface	Surface
Percent Wood waste:			Trace	0	80	0	20	0	40	15	15	0	0	0
TOC:			Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	Inside	Inside	Inside	Inside
Conventional Parameters														
Ammonia as Nitrogen (mg/kg)	230	230	--	--	--	--	--	--	--	--	--	--	--	--
Fixed Solids (%)	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Sulfide (mg/kg)	39	39	--	--	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon (%)	NV	NV	1.09	1.56	1.92	1.29	2.05	3.08	4.39	2.99	2.94	2.06 J	3.21 J	2.91 J
Total Solids (%)	NV	NV	67.22	54.35	47.46	63.97	44.38	55.76	55.6	59.33	45.44	44.09	51.8	36.4
Total Volatile Solids (%)	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
TCLP Metals (mg/L)														
Lead	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Total Metals (mg/kg-dry)														
Arsenic	11	11	20 U	20 U	**30**	**20**	**20**	**20**	9 U	9 U	**30**	10 U	9 U	10 U
Cadmium	0.8	0.8	0.8 U	0.9 U	0.4 U	0.7 U	0.4 U	0.7 U	0.4 U	**0.4**	0.4 U	**0.5**	**0.4**	0.5 U
Chromium	72	72	**43**	**49**	**52**	**39**	**42**	**40**	**31**	**39.9**	**42**	**40 J**	**38.5 J**	**48 J**
Copper	390	390	--	**81.5**	**134**	**57.8**	**61.1**	**55.3**	**40.8**	**49.2**	**54.8**	**58 J**	**56.3 J**	**65.4 J**
Lead	21	21	**11**	**21**	**30**	**8**	**14**	**10**	**8**	**10**	**11**	**7**	**9**	**8**
Mercury	0.2	0.2	**0.04**	**0.16**	**0.06**	0.03 U	**0.06**	**0.07**	**0.04**	**0.06**	**0.07**	**0.05**	**0.1**	**0.09**
Nickel	50	50	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	11	11	--	--	--	--	--	--	--	--	--	--	--	--
Silver	0.57	0.57	--	1 U	0.6 U	1 U	0.7 U	1 U	0.5 U	0.5 U	0.6 U	0.7 U	0.6 U	0.8 U
Zinc	410	410	--	**107**	**134**	**71**	**90**	**75**	**68**	**80**	**83**	**87**	**79**	**91**
Organic Chemicals (ug/kg-dry)														
2,4-Dimethylphenol	29	29	97 U	24 U	24 U	25 U	24 U	**17 J**	24 U	24 U	25 U	24 U	24 U	24 U
2-Methylphenol	63	63	19 U	**8.4**	4.8 U	5 U	4.8 U	4.9 U	**4 J**	**7.3**	**7.7**	4.8 U	4.9 U	**3.3 J**
3- & 4-Methylphenol (m,p-Cresol)	260	260	--	--	--	--	--	--	--	--	--	--	--	--
Benzoic acid	650	650	**170 J**	**680**	**180 J**	**110 J**	**330 J**	**290 J**	**230**	**380**	**210 J**	190 U	**240**	**180 J**
Benzyl alcohol	57	57	19 U	19 U	**27**	**17 J**	19 U	**50**	19 U	**58**	**22**	**15 J**	**43 J**	**43 J**
Dibenzofuran	200	200	**45**	**47**	**25**	**14 J**	**53**	**65**	19 U	19 U	**28**	**12 J**	**20**	19 U
Phenol	120	120	**18 J**	**100**	**35**	**22**	**71**	**53**	**130**	**200**	**51**	**24**	**94**	**43**
N-Nitrosodiphenylamine	NV	28	19 U	4.8 U	4.8 U	5 U	4.8 U	4.9 U	4.7 U	4.8 U	5 U	4.8 U	4.9 U	4.8 U
Organic Chemicals (ug/kg-OC)														
N-Nitrosodiphenylamine	11,000	NV	1,740 U	308 U	250 U	388 U	234 U	159 U	107 U	161 U	170 U	233 U	153 U	165 U
Phthalates (ug/kg-dry)														
Bis(2-ethylhexyl)phthalate	500	500	**58**	**66**	48 U	50 U	48 U	49 U	**43 J**	**39 J**	50 U	**29 J**	49 U	48 U
Butylbenzylphthalate	NV	63	19 U	4.8 U	4.8 U	5 U	**320**	4.9 U	**5.1**	4.8 U	5 U	4.8 U	4.9 U	4.8 U
Diethyl phthalate	NV	200	19 U	19 U	**19**	20 U	36 U	**25**	19 U	19 U	20 U	**56**	**20**	**36**
Dimethyl phthalate	NV	71	19 U	4.8 U	4.8 U	5 U	4.8 U	4.9 U	4.7 U	4.8 U	5 U	4.8 U	**3.1 J**	**2.5 J**
Di-n-butyl phthalate	380	380	19 U	**130**	19 U	20 U	19 U	20 U	19 U	19 U	20 U	19 U	20 U	19 U
Di-n-octyl phthalate	39	39	19 U	19 U	**710**	20 U	19 U	20 U	19 U	19 U	20 U	19 U	20 U	19 U
Phthalates (ug/kg-OC)														
Butylbenzylphthalate	4,900	NV	1,740 U	308 U	250 U	388 U	**15,600**	159 U	**116**	161 U	170 U	233 U	153 U	165 U
Diethyl phthalate	61,000	NV	1,740 U	1,220 U	**990**	1,550 U	1,760 U	**812**	433 U	635 U	680 U	**2,720**	**623**	**1,240**
Dimethyl phthalate	53,000	NV	1,740 U	308 U	250 U	388 U	234 U	159 U	107 U	161 U	170 U	233 U	**96.6 J**	**85.9 J**

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Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	Preliminary Cleanup Standards[a]		CR-07	CR-24	CR-08A		CR-08B		CR-09A	CR-09B	CR-10	CR-01	CR-02	CR-03
Sample Name:			CR-07-SSD-COMP	CR-24-SSD-COMP	CR08a-SSD-COMP	CR08A-SBSD	CR08b-SSD-COMP	CR08b-SBSD	CR09a-SSD-COMP	CR09b-SSD-COMP	CR10-SSD-COMP	CR01-10cm	CR02-10cm	CR03-10cm
Collection Date:	Organic Carbon (0.5% to 3.5%)[b]	Organic Carbon (<0.5% or >3.5%)[c]	10/13/2015	10/13/2015	10/14/2015	10/15/2015	10/14/2015	10/15/2015	10/13/2015	10/13/2015	10/14/2015	11/08/2013	11/08/2013	11/08/2013
Collection Depth (ft bml):			0-0.33	0-0.33	0-0.33	18.3-20.0	0-0.33	8.0	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Type:			Surface	Surface	Surface	Subsurface	Surface	Subsurface	Surface	Surface	Surface	Surface	Surface	Surface
Percent Wood waste:			Trace	0	80	0	20	0	40	15	15	0	0	0
TOC:			Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	Inside	Inside	Inside	Inside
Chlorinated Organics (ug/kg-dry)														
1,2,4-Trichlorobenzene	NV	31	19 U	4.8 U	4.8 U	5 U	4.8 U	4.9 U	4.7 U	4.8 U	**3 J**	4.8 U	4.9 U	4.8 U
1,2-Dichlorobenzene	NV	35	19 U	4.8 U	4.8 U	5 U	4.8 U	**1.8 J**	4.7 U	4.8 U	**3.3 J**	4.8 U	4.9 U	4.8 U
1,4-Dichlorobenzene	NV	110	19 U	4.8 U	**2.4 J**	5 U	4.8 U	4.9 U	**4.2 J**	4.8 U	**3.7 J**	4.8 U	**19** J	4.8 U
Hexachlorobenzene	NV	22	19 U	4.8 U	4.8 U	5 U	4.8 U	4.9 U	4.7 U	4.8 U	**3.3 J**	4.8 U	4.9 U	4.8 U
Hexachlorobutadiene	NV	11	19 U	4.8 U	4.8 U	5 U	4.8 U	4.9 U	4.7 U	4.8 U	**2.8 J**	4.8 U	4.9 U	4.8 U
Pentachlorophenol	360	360	97 U	**86 J**	**14 J**	20 U	**11 J**	20 U	19 UJ	19 UJ	**23**	19 U	20 U	19 U
Chlorinated Organics (ug/kg-OC)														
1,2,4-Trichlorobenzene	810	NV	1,740 U	308 U	250 U	388 U	234 U	159 U	107 U	161 U	**102 J**	233 U	153 U	165 U
1,2-Dichlorobenzene	2,300	NV	1,740 U	308 U	250 U	388 U	234 U	**58.4 J**	107 U	161 U	**112 J**	233 U	153 U	165 U
1,4-Dichlorobenzene	3,100	NV	1,740 U	308 U	**125 J**	388 U	234 U	159 U	**95.7 J**	161 U	**126 J**	233 U	**592 J**	165 U
Hexachlorobenzene	380	NV	1,740 U	308 U	250 U	388 U	234 U	159 U	107 U	161 U	**112 J**	233 U	153 U	165 U
Hexachlorobutadiene	3,900	NV	1,740 U	308 U	250 U	388 U	234 U	159 U	107 U	161 U	**95.2 J**	233 U	153 U	165 U
PAHs (ug/kg-dry)														
Total PAH[f]	17,000	17,000	**2,030 J**	**1,840 J**	**810 J**	**442 J**	**1,800**	**2,800**	**142 J**	**284 J**	**1,120 J**	**477 J**	**705 J**	**101 J**
Total LPAH[g]	NV	5,200	**434 J**	**418**	**259 J**	**344 J**	**615**	**1,740**	**71**	**77 J**	**448**	**114**	**488**	**42**
1-Methylnaphthalene	NV	NV	**18 J**	**16 J**	**16 J**	**13 J**	**29**	**50**	**9.5 J**	19 U	**15 J**	--	--	--
2-Methylnaphthalene	NV	670	**40**	19 U	**23**	20 U	19 U	**79**	19 U	19 U	**26**	19 U	**28**	19 U
Acenaphthene	NV	500	**35**	**25**	**16 J**	**18 J**	**51**	**75**	19 U	19 U	**24**	**14 J**	**20**	19 U
Acenaphthylene	NV	1,300	**16 J**	**19**	**14 J**	**56**	**51**	**300**	19 U	19 U	**59**	19 U	**68**	19 U
Anthracene	NV	960	**57**	**65**	**27**	**15 J**	**71**	**72**	19 U	**11 J**	**26**	**14 J**	**16 J**	19 U
Fluorene	NV	540	**48**	**29**	19 U	**15 J**	**52**	**66**	19 U	**14 J**	**29**	**14 J**	**15 J**	19 U
Naphthalene	NV	2,100	**88**	**120**	**110**	**180**	**170**	**800**	**45**	19 U	**200**	**25**	**280**	**23**
Phenanthrene	NV	1,500	**190**	**160**	**92**	**60**	**220**	**430**	**26**	**52**	**110**	**47**	**89**	**19**
Total HPAH[h]	NV	12,000	**1,540 J**	**1,400**	**512**	**85**	**1,150**	**923**	**61 J**	**207 J**	**631 J**	**363**	**189**	**59**
Benzo(a)anthracene	NV	1,300	**130**	**120**	**43**	20 U	**94**	**46**	19 U	**14 J**	**46**	**28**	**11 J**	19 U
Benzo(a)pyrene	NV	1,600	**67**	**84**	**37**	20 U	**67**	**44**	19 U	**12 J**	**32**	**21**	20 U	19 U
Benzo(ghi)perylene	NV	670	**57**	**56**	**28**	20 U	**54**	**44**	19 U	**14 J**	**29**	**14 J**	**15 J**	19 U
Chrysene	NV	1,400	**180**	**160**	**74**	20 U	**130**	**73**	**10 J**	**24**	**56**	**35**	**17 J**	19 U
Dibenzo(a,h)anthracene	NV	230	**18 J**	**19**	**9.5**	5 U	**12**	**6.4**	4.7 U	**3.9 J**	**8.5**	**3 J**	4.9 U	4.8 U
Fluoranthene	NV	1,700	**450**	**380**	**110**	**44**	**280**	**290**	**22**	**52**	**180**	**100**	**63**	**25**
Indeno(1,2,3-cd)pyrene	NV	600	**43**	**54**	**26**	20 U	**46**	**28**	19 U	**13 J**	**19 J**	19 U	20 U	19 U
Pyrene	NV	2,600	**360**	**300**	**84**	**41**	**250**	**300**	**17 J**	**40**	**150**	**110**	**61**	**21**
Benzo(b)fluoranthene	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Total benzofluoranthenes[i]	NV	3,200	**230**	**230**	**100**	40 U	**220**	**92**	**12 J**	**34 J**	**110**	**52**	**22 J**	**13 J**
cPAH TEQ[j][1]	21	21	**111 J**	**128**	**55.6**	40 U	**106**	**62**	**12.9 J**	**18.7 J**	**50.9 J**	**30.6 J**	**14.7 J**	**13 J**
PAHs (ug/kg-OC)														
2-Methylnaphthalene	38,000	NV	**3,670**	1,220 U	**1,200**	1,550 U	927 U	**2,560**	433 U	635 U	**884**	922 U	**872**	653 U
Total LPAH[g]	370,000	NV	**39,800 J**	**26,800**	**13,500 J**	**26,700 J**	**30,000**	**56,500**	**1,620**	**2,580 J**	**15,200**	**5,530**	**15,200**	**1,440**
Acenaphthene	16,000	NV	**3,210**	**1,600**	**833 J**	**1,400 J**	**2,490**	**2,440**	433 U	635 U	**816**	**680 J**	**623**	653 U
Acenaphthylene	66,000	NV	**1,470 J**	**1,220**	**729 J**	**4,340**	**2,490**	**9,740**	433 U	635 U	**2,010**	922 U	**2,120**	653 U
Anthracene	220,000	NV	**5,230**	**4,170**	**1,410**	**1,160 J**	**3,460**	**2,340**	433 U	**368 J**	**884**	**680 J**	**498 J**	653 U

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Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	Preliminary Cleanup Standards[a]		CR-07	CR-24	CR-08A		CR-08B		CR-09A	CR-09B	CR-10	CR-01	CR-02	CR-03
Sample Name:			CR-07-SSD-COMP	CR-24-SSD-COMP	CR08a-SSD-COMP	CR08A-SBSD	CR08b-SSD-COMP	CR08b-SBSD	CR09a-SSD-COMP	CR09b-SSD-COMP	CR10-SSD-COMP	CR01-10cm	CR02-10cm	CR03-10cm
Collection Date:	Organic Carbon (0.5% to 3.5%)[b]	Organic Carbon (<0.5% or >3.5%)[c]	10/13/2015	10/13/2015	10/14/2015	10/15/2015	10/14/2015	10/15/2015	10/13/2015	10/13/2015	10/14/2015	11/08/2013	11/08/2013	11/08/2013
Collection Depth (ft bml):			0-0.33	0-0.33	0-0.33	18.3-20.0	0-0.33	8.0	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Type:			Surface	Surface	Surface	Subsurface	Surface	Subsurface	Surface	Surface	Surface	Surface	Surface	Surface
Percent Wood waste:			Trace	0	80	0	20	0	40	15	15	0	0	0
TOC:			Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	Inside	Inside	Inside	Inside
PAHs (ug/kg-OC) cont.														
Fluorene	23,000	NV	**4,400**	**1,860**	990 U	**1,160 J**	**2,540**	**2,140**	433 U	**468 J**	**986**	**680 J**	**467 J**	653 U
Naphthalene	99,000	NV	**8,070**	**7,690**	**5,730**	**14,000**	**8,290**	**26,000**	**1,030**	635 U	**6,800**	**1,210**	**8,720**	**790**
Phenanthrene	100,000	NV	**17,400**	**10,300**	**4,790**	**4,650**	**10,700**	**14,000**	**592**	**1,740**	**3,740**	**2,280**	**2,770**	**653**
Total HPAH[h]	960,000	NV	**141,000 J**	**89,700**	**26,700**	**6,590**	**56,100**	**30,000**	**1,390 J**	**6,920 J**	**21,500 J**	**17,600**	**5,890**	**2,030**
Benzo(a)anthracene	110,000	NV	**11,900**	**7,690**	**2,240**	1,550 U	**4,590**	**1,490**	433 U	**468 J**	**1,560**	**1,360**	**343 J**	653 U
Benzo(a)pyrene	99,000	NV	**6,150**	**5,380**	**1,930**	1,550 U	**3,270**	**1,430**	433 U	**401 J**	**1,090**	**1,020**	623 U	653 U
Benzo(ghi)perylene	31,000	NV	**5,230**	**3,590**	**1,460**	1,550 U	**2,630**	**1,430**	433 U	**468 J**	**986**	**680 J**	**467 J**	653 U
Chrysene	110,000	NV	**16,500**	**10,300**	**3,850**	1,550 U	**6,340**	**2,370**	**228 J**	**803**	**1,900**	**1,700**	**530 J**	653 U
Dibenzo(a,h)anthracene	12,000	NV	**1,650 J**	**1,220**	**495**	388 U	**585**	**208**	107 U	**130 J**	**289**	**146 J**	153 U	165 U
Fluoranthene	160,000	NV	**41,300**	**24,400**	**5,730**	**3,410**	**13,700**	**9,420**	**501**	**1,740**	**6,120**	**4,850**	**1,960**	**859**
Indeno(1,2,3-cd)pyrene	34,000	NV	**3,940**	**3,460**	**1,350**	1,550 U	**2,240**	**909**	433 U	**435 J**	**646 J**	922 U	623 U	653 U
Pyrene	1,000,000	NV	**33,000**	**19,200**	**4,380**	**3,180**	**12,200**	**9,740**	**387 J**	**1,340**	**5,100**	**5,340**	**1,900**	**722**
Benzo(b)fluoranthene	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Total benzofluoranthenes[i]	230,000	NV	**21,100**	**14,700**	**5,210**	3,100 U	**10,700**	**2,990**	**273 J**	**1,140 J**	**3,740**	**2,520**	**685 J**	**447 J**
PCBs and Pesticides (ug/kg-dry)														
Aroclor 1016	NV	NV	19 U	19 U	19 U	18 U	18 U	18 U	18 U	19 U	19 U	18 U	19 U	19 U
Aroclor 1221	NV	NV	19 U	19 U	19 U	18 U	18 U	18 U	18 U	19 U	19 U	18 U	19 U	19 U
Aroclor 1232	NV	NV	19 U	19 U	19 U	18 U	18 U	18 U	18 U	19 U	19 U	23 U	38 U	46 U
Aroclor 1242	NV	NV	19 U	19 U	19 U	18 U	18 U	18 U	18 U	19 U	19 U	18 U	19 U	19 U
Aroclor 1248	NV	NV	19 U	19 U	19 U	18 U	18 U	18 U	18 U	19 U	19 U	18 U	19 U	19 U
Aroclor 1254	NV	NV	19 U	**30**	19 U	18 U	18 U	18 U	18 U	19 U	19 U	18 U	**12 J**	19 U
Aroclor 1260	NV	NV	19 U	**24**	19 U	18 U	**14 J**	18 U	18 U	19 U	19 U	18 U	19 U	19 U
Aroclor 1268	NV	NV	19 U	19 U	19 U	18 U	18 U	18 U	18 U	19 U	19 U	--	--	--
Total PCBs[k]	3.5	3.5	19 U	**54**	19 U	18 U	**14 J**	18 U	18 U	19 U	19 U	23 U	**12 J**	46 U
Carbazole	900	900	**24 J**	--	--	--	--	--	--	--	--	--	--	--
Additional SVOCs (ug/kg-dry)														
1,3-Dichlorobenzene	NV	NV	19 U	--	--	--	--	--	--	--	--	4.8 U	4.9 U	4.8 U
4-Methylphenol	NV	NV	**26**	**120**	**28 J**	**190 J**	**210**	**560 J**	**26**	19 U	**160 J**	**30**	**730**	**60**
Hexachlorocyclopentadiene	NV	NV	97 U	--	--	--	--	--	--	--	--	--	--	--
Dioxins/Furans (pg/g-dry)														
1,2,3,4,6,7,8-HpCDD	NV	NV	--	--	**583**	**14.5**	**955**	**12.5**	**95.4**	**107**	--	**211**	**201**	**66.1**
1,2,3,4,6,7,8-HpCDF	NV	NV	--	--	**33.1**	**1.26**	**75.8**	0.295 U	**14.6**	**23.9**	--	**31.9**	**113**	**24.7**
1,2,3,4,7,8,9-HpCDF	NV	NV	--	--	2.1 U	0.25 U	**3.72**	**0.0959 J**	**0.908 J**	**1.15**	--	**1.59**	**4.94**	**0.894 J**
1,2,3,4,7,8-HxCDD	NV	NV	--	--	**2.33**	0.583 U	**2.96**	**0.589 J**	**1.32**	**1.57**	--	**1.76**	**1.96**	**1.42**
1,2,3,4,7,8-HxCDF	NV	NV	--	--	**1.42**	**0.217 J**	**4.39**	**0.111 J**	0.991 U	1.16 U	--	**2.77**	**4.6**	**1.02**
1,2,3,6,7,8-HxCDD	NV	NV	--	--	**10.7**	**1.3**	**22.3**	**1.71**	**5.25**	**6.27**	--	**9.98**	**10.4**	**4.81**
1,2,3,6,7,8-HxCDF	NV	NV	--	--	**0.798 J**	**0.178 J**	**2.13**	**0.14 J**	**0.626 J**	**0.924 J**	--	**1.19**	**3.22**	**0.862 J**
1,2,3,7,8,9-HxCDD	NV	NV	--	--	**8.01**	**5.31**	**13.9**	**7.04**	**5.49**	**7.96**	--	**11.1**	**12.4**	**12.9**
1,2,3,7,8,9-HxCDF	NV	NV	--	--	0.0933 U	0.258 U	**1.62**	0.146 U	**0.395 J**	**0.42 J**	--	0.778 U	**0.886 J**	**0.268 J**
1,2,3,7,8-PeCDD	NV	NV	--	--	**2.87**	**1.76**	**4.81**	**2.68**	**1.99**	**3.16**	--	**3.93**	**4.53**	**5.08**
1,2,3,7,8-PeCDF	NV	NV	--	--	0.483 U	**0.141 J**	**0.978 J**	0.288 U	0.383 U	**0.394 J**	--	**0.683 J**	**0.804 J**	**0.508 J**

Table 8-1
2013-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	Preliminary Cleanup Standards[a]		CR-07	CR-24	CR-08A		CR-08B		CR-09A	CR-09B	CR-10	CR-01	CR-02	CR-03
Sample Name:			CR-07-SSD-COMP	CR-24-SSD-COMP	CR08a-SSD-COMP	CR08A-SBSD	CR08b-SSD-COMP	CR08b-SBSD	CR09a-SSD-COMP	CR09b-SSD-COMP	CR10-SSD-COMP	CR01-10cm	CR02-10cm	CR03-10cm
Collection Date:	Organic Carbon (0.5% to 3.5%)[b]	Organic Carbon (<0.5% or >3.5%)[c]	10/13/2015	10/13/2015	10/14/2015	10/15/2015	10/14/2015	10/15/2015	10/13/2015	10/13/2015	10/14/2015	11/08/2013	11/08/2013	11/08/2013
Collection Depth (ft bml):			0-0.33	0-0.33	0-0.33	18.3-20.0	0-0.33	8.0	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Type:			Surface	Surface	Surface	Subsurface	Surface	Subsurface	Surface	Surface	Surface	Surface	Surface	Surface
Percent Wood waste:			Trace	0	80	0	20	0	40	15	15	0	0	0
TOC:			Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	Inside	Inside	Inside	Inside
Dioxins/Furans (pg/g-dry) cont.														
2,3,4,6,7,8-HxCDF	NV	NV	--	--	**1.46**	**0.188 J**	**3.84**	**0.105 J**	**0.991**	**1.36**	--	**1.8**	**5.58**	**0.785 J**
2,3,4,7,8-PeCDF	NV	NV	--	--	**0.506 J**	**0.0704 J**	**1.06**	**0.201 J**	0.379 U	0.528 U	--	**0.814 J**	**1.13**	**0.594 J**
2,3,7,8-TCDD	NV	NV	--	--	**1.71**	**1.55**	**2.79**	**2.06**	**1.18**	2.06 U	--	**2.62**	**2.89**	**3.56**
2,3,7,8-TCDF	NV	NV	--	--	**1.06**	**0.088 J**	**2.48**	**0.529 J**	**0.831 J**	**1.63**	--	**1.96**	**2.18**	**1.34**
OCDD	NV	NV	--	--	**13,700 J**	**130**	**22,200 J**	45.4 U	**700**	**788**	--	**1,690**	**1,550**	**489**
OCDF	NV	NV	--	--	**73.9**	**6.41**	**128**	0.802 U	**23.8**	**33.8**	--	**51**	**211**	**36.4**
Total HpCDDs	NV	NV	--	--	**1,650**	**32.3**	**4120**	**26.3**	**225**	**273**	--	**485**	**433**	**167**
Total HpCDFs	NV	NV	--	--	126 U	3.43 U	243 U	0.643 U	**37.3**	58.9 U	--	87.1 U	**310**	**55.9**
Total HxCDDs	NV	NV	--	--	147 U	33.2 U	**321**	45.4 U	48.3 U	72.3 U	--	**97**	**114**	80.8 U
Total HxCDFs	NV	NV	--	--	44 U	1.27 U	119 U	0.888 U	22.2 U	30.8 U	--	52.5 U	**125**	24.4 U
Total PeCDDs	NV	NV	--	--	25.9 U	12.7 U	**38.2**	21.9 U	12.4 U	21 U	--	**25.8**	**34.9**	**30.6**
Total PeCDFs	NV	NV	--	--	12.8 U	0.428 U	35.9 U	2.08 U	10.6 U	16.5 U	--	18 U	47.6 U	13.2 U
Total TCDDs	NV	NV	--	--	23.9 U	12 U	25 U	21.4 U	8.55 U	15.4 U	--	17.4 U	28.1 U	24.7 U
Total TCDFs	NV	NV	--	--	10.9 U	0.656 U	21.7 U	10.7 U	6.42 U	12.5 U	--	12.4 U	33 U	16.7 U
Dioxin/Furan TEQ[(I)(1)]	5	5	--	--	**17.6 J**	**4.31 J**	**30.4 J**	**5.97 J**	**6.10 J**	**7.92 J**	--	**12.9 J**	**15.6 J**	**12.2 J**
TPH (mg/kg-dry)														
Gasoline-Range Hydrocarbons	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diesel-Range Hydrocarbons	340	340	**180**	**370**	--	**26**	**130**	**170**	--	--	--	--	--	--
Motor-Oil Range Hydrocarbons	3,600	3,600	**520**	**850**	--	**74**	**320**	**280**	--	--	--	--	--	--
Grain Size (%)														
Gravel	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Very coarse sand	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Coarse sand	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Medium sand	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Fine sand	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Very fine sand	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Coarse silt	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Medium silt	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Fine silt	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Very fine silt	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Coarse clay	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Medium clay	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Fine clay	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Total fines	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Sand, total	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Silt, total	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Clay, total	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Asbestos (%)														
Asbestos	NV	NV	--	--	<1	<1	<1	<1	--	--	--	--	--	--
Pore Water Analysis														
Conductivity (uS/cm)	NV	NV	--	--	--	--	--	--	--	--	--	**18,700**	**12,200**	**17,500**
Salinity (ppt)	NV	NV	--	--	--	--	--	--	--	--	--	**11**	**6.9**	**10.2**

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Table 8-1
2013-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	Preliminary Cleanup Standards[a]		CR-04			CR-05		CR-06		CR-11	CR-12	CR-13	CR-14	CR-11-14-COMP
Sample Name:			CR04-10cm	CR04-2.5	CR04-5	CR05-10cm	CR05-2.5	CR06-10cm	CR06-2.5	CR11-SBSD-23	CR12-SBSD-15	CR13-SBSD-11	CR14-SBSD-12	CR11-14-SBSD-COMP
Collection Date:	Organic Carbon (0.5% to 3.5%)[b]	Organic Carbon (<0.5% or >3.5%)[c]	11/07/2013	11/08/2013	11/08/2013	11/08/2013	11/08/2013	11/07/2013	11/07/2013	10/13/2015	10/13/2015	10/13/2015	10/13/2015	10/13/2015
Collection Depth (ft bml):			0-0.33	1-2.5	2.5-5	0-0.33	0.33-2.5	0-0.33	1-2.5	23	15	11	12	11-23
Type:			Surface	Subsurface	Subsurface	Surface	Subsurface	Surface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface
Percent Wood waste:			60	60	60	45	45	70	70	0	0	0	0	0
TOC:			Outside	--[d]	Outside	Outside	--[d]	Outside	Outside	Outside	Inside	Inside	Inside	--[e]
Conventional Parameters														
Ammonia as Nitrogen (mg/kg)	230	230	0.47 U	--	15.2	7.21	--	1.37	14.0	--	--	--	--	--
Fixed Solids (%)	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Sulfide (mg/kg)	39	39	6.46	--	179	320	--	906	2,910	--	--	--	--	--
Total Organic Carbon (%)	NV	NV	31.4 J	--	16.5 J	13.6 J	--	35.6 J	49.5 J	0.415	3.33	2.5	3.22	--
Total Solids (%)	NV	NV	20.62	--	19.98	30.32	--	21.4	21.59	72.59	56.65	57.95	57.04	--
Total Volatile Solids (%)	NV	NV	59.91	--	38.2	36.49	--	60.05	69.23	--	--	--	--	--
TCLP Metals (mg/L)														
Lead	NV	NV	--	--	--	--	--	--	--	--	--	--	--	0.1 U
Mercury	NV	NV	--	--	--	--	--	--	--	--	--	--	--	0.0001 U
Total Metals (mg/kg-dry)														
Arsenic	11	11	--	--	--	--	--	--	20 U	20 U	20 U	9 U	20 U	--
Cadmium	0.8	0.8	--	--	--	--	--	--	1 U	0.6 U	0.8 U	**0.4**	0.8 U	--
Chromium	72	72	--	--	--	--	--	--	**26 J**	**37**	**48**	**41.3**	**49**	--
Copper	390	390	--	--	--	--	--	--	**96 J**	**47**	**62.2**	**55.1**	**63**	--
Lead	21	21	--	--	--	--	--	--	**110**	6 U	**11**	**9**	**12**	--
Mercury	0.2	0.2	**6.2**	**0.5 J**	--	**0.16**	**0.5 J**	**0.55**	**0.53**	0.03 U	**0.09**	**0.07**	**0.09**	--
Nickel	50	50	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	11	11	--	--	--	--	--	--	--	--	--	--	--	--
Silver	0.57	0.57	--	--	--	--	--	--	1 U	1 U	1 U	0.5 U	1 U	--
Zinc	410	410	--	--	--	--	--	--	**237**	**78**	**86**	**76**	**90**	--
Organic Chemicals (ug/kg-dry)														
2,4-Dimethylphenol	29	29	530 UJ	400 UJ	--	290 UJ	440 UJ	--	350 U	23 U	24 U	24 U	24 U	--
2-Methylphenol	63	63	100 UJ	81 UJ	--	**44 J**	88 UJ	--	**45 J**	4.7 U	4.9 U	**7.2**	4.9 U	--
3- & 4-Methylphenol (m,p-Cresol)	260	260	--	--	--	--	--	--	--	--	--	--	--	--
Benzoic acid	650	650	**1,700 J**	3,200 UJ	--	**950 J**	3,500 UJ	--	**860 J**	190 U	**440**	**260**	**200**	--
Benzyl alcohol	57	57	420 UJ	320 UJ	--	230 UJ	350 UJ	--	280 U	19 U	**23**	**46**	**20**	--
Dibenzofuran	200	200	420 UJ	**210 J**	--	**310 J**	**230 J**	--	**490**	19 U	**40**	20 U	**20**	--
Phenol	120	120	**290 J**	**390 J**	**980 J**	**570 J**	**530 J**	**370 J**	**240 J**	**8.4 J**	**64**	**44**	**50**	--
N-Nitrosodiphenylamine	NV	28	100 UJ	81 UJ	--	58 UJ	88 UJ	--	70 U	4.7 U	4.9 UJ	4.9 U	4.9 U	--
Organic Chemicals (ug/kg-OC)														
N-Nitrosodiphenylamine	11,000	NV	318 UJ	--	--	426 UJ	--	--	141 U	1,130 U	147 UJ	196 U	152 U	--
Phthalates (ug/kg-dry)														
Bis(2-ethylhexyl)phthalate	500	500	1,000 UJ	**870 J**	--	**960 J**	**9,400 J**	--	**1,900**	47 U	49 U	49 U	49 U	--
Butylbenzylphthalate	NV	63	58 UJ	81 UJ	--	58 UJ	88 UJ	310 UJ	70 U	4.7 U	4.9 U	**7.3**	**4.7 J**	--
Diethyl phthalate	NV	200	420 UJ	320 UJ	--	230 UJ	350 UJ	--	**270 J**	19 U	20 U	20 U	20 U	--
Dimethyl phthalate	NV	71	100 UJ	81 UJ	--	58 UJ	88 UJ	--	70 U	4.7 U	4.9 U	4.9 U	4.9 U	--
Di-n-butyl phthalate	380	380	420 UJ	320 UJ	--	230 UJ	350 UJ	--	280 U	19 U	20 U	20 U	20 U	--
Di-n-octyl phthalate	39	39	420 UJ	320 UJ	--	230 UJ	350 UJ	--	280 U	19 U	20 U	20 U	20 U	--
Phthalates (ug/kg-OC)														
Butylbenzylphthalate	4,900	NV	185 UJ	--	--	426 UJ	--	871 UJ	141 U	1,130 U	147 U	**292**	**146 J**	--
Diethyl phthalate	61,000	NV	1,340 UJ	--	--	1,690 UJ	--	--	**545 J**	4,580 U	601 U	800 U	621 U	--
Dimethyl phthalate	53,000	NV	318 UJ	--	--	426 UJ	--	--	141 U	1,130 U	147 U	196 U	152 U	--

Table 8-1
2013-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	Preliminary Cleanup Standards[a]		CR-04			CR-05		CR-06		CR-11	CR-12	CR-13	CR-14	CR-11-14-COMP
Sample Name:			CR04-10cm	CR04-2.5	CR04-5	CR05-10cm	CR05-2.5	CR06-10cm	CR06-2.5	CR11-SBSD-23	CR12-SBSD-15	CR13-SBSD-11	CR14-SBSD-12	CR11-14-SBSD-COMP
Collection Date:	Organic Carbon (0.5% to 3.5%)[b]	Organic Carbon (<0.5% or >3.5%)[c]	11/07/2013	11/08/2013	11/08/2013	11/08/2013	11/08/2013	11/07/2013	11/07/2013	10/13/2015	10/13/2015	10/13/2015	10/13/2015	10/13/2015
Collection Depth (ft bml):			0-0.33	1-2.5	2.5-5	0-0.33	0.33-2.5	0-0.33	1-2.5	23	15	11	12	11-23
Type:			Surface	Subsurface	Subsurface	Surface	Subsurface	Surface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface
Percent Wood waste:			60	60	60	45	45	70	70	0	0	0	0	0
TOC:			Outside	--[d]	Outside	Outside	--[d]	Outside	Outside	Outside	Inside	Inside	Inside	--[e]
Chlorinated Organics (ug/kg-dry)														
1,2,4-Trichlorobenzene	NV	31	100 UJ	81 UJ	--	**43 J**	**74 J**	--	70 U	4.7 U	4.9 U	4.9 U	4.9 U	--
1,2-Dichlorobenzene	NV	35	100 UJ	81 UJ	--	58 UJ	88 UJ	--	70 U	4.7 U	4.9 U	4.9 U	4.9 U	--
1,4-Dichlorobenzene	NV	110	100 UJ	81 UJ	--	**1,000 J**	**540 J**	--	70 U	4.7 U	4.9 U	4.9 U	4.9 U	--
Hexachlorobenzene	NV	22	100 UJ	81 UJ	--	58 UJ	88 UJ	--	70 U	4.7 U	4.9 U	4.9 U	4.9 U	--
Hexachlorobutadiene	NV	11	100 UJ	81 UJ	--	58 UJ	88 UJ	--	70 U	4.7 U	4.9 U	4.9 U	4.9 U	--
Pentachlorophenol	360	360	**270 J**	**400 J**	--	230 UJ	350 UJ	1,500 UJ	**240 J**	19 UJ	20 UJ	20 UJ	20 UJ	--
Chlorinated Organics (ug/kg-OC)														
1,2,4-Trichlorobenzene	810	NV	318 UJ	--	--	**316 J**	--	--	141 U	1,130 U	147 U	196 U	152 U	--
1,2-Dichlorobenzene	2,300	NV	318 UJ	--	--	426 UJ	--	--	141 U	1,130 U	147 U	196 U	152 U	--
1,4-Dichlorobenzene	3,100	NV	318 UJ	--	--	**7,350 J**	--	--	141 U	1,130 U	147 U	196 U	152 U	--
Hexachlorobenzene	380	NV	318 UJ	--	--	426 UJ	--	--	141 U	1,130 U	147 U	196 U	152 U	--
Hexachlorobutadiene	3,900	NV	318 UJ	--	--	426 UJ	--	--	141 U	1,130 U	147 U	196 U	152 U	--
PAHs (ug/kg-dry)														
Total PAH[f]	17,000	17,000	**4,010 J**	**10,800 J**	--	**7,560 J**	**12,000 J**	--	**22,700**	**105 J**	**1,380 J**	**1,030 J**	**763 J**	--
Total LPAH[g]	NV	5,200	**740 J**	**1,360 J**	--	**2,290 J**	**1,850 J**	--	**7,810**	**19**	**819**	**654**	**432 J**	--
1-Methylnaphthalene	NV	NV	--	--	--	--	--	--	--	19 U	**24**	**22**	**16 J**	--
2-Methylnaphthalene	NV	670	420 UJ	320 UJ	--	**310**	350 UJ	--	**780**	19 U	**41**	20 U	**21**	--
Acenaphthene	NV	500	420 UJ	**180 J**	--	**210**	**390 J**	--	**490**	19 U	**41**	**31**	**20**	--
Acenaphthylene	NV	1,300	420 UJ	320 UJ	--	**170**	350 UJ	--	**520**	19 U	**110**	**110**	**61**	--
Anthracene	NV	960	420 UJ	**290 J**	--	**230**	**320 J**	--	**750**	19 U	**41**	**28**	**18 J**	--
Fluorene	NV	540	420 UJ	**180 J**	--	**260 J**	**230 J**	--	**650**	19 U	**47**	**35**	**23**	--
Naphthalene	NV	2,100	**420 J**	**340 J**	--	**720 J**	**440 J**	--	**1,800**	19 U	**370**	**300**	**190**	--
Phenanthrene	NV	1,500	**320 J**	**370 J**	--	**700 J**	**470 J**	--	**3,600**	**19**	**210**	**150**	**120**	--
Total HPAH[h]	NV	12,000	**3,270 J**	**9,460 J**	--	**4,960 J**	**10,200 J**	--	**14,100**	**86 J**	**494 J**	**351 J**	**294 J**	--
Benzo(a)anthracene	NV	1,300	**250 J**	**640 J**	--	**390**	**680 J**	--	**1,300**	**11 J**	**30**	**20**	**17 J**	--
Benzo(a)pyrene	NV	1,600	**300 J**	**680 J**	--	**340 J**	**530 J**	--	**1,200**	19 U	20 U	20 U	20 U	--
Benzo(ghi)perylene	NV	670	**230 J**	**660 J**	--	**260 J**	**300 J**	--	**590**	19 U	**30**	**30**	**20**	--
Chrysene	NV	1,400	**530 J**	**940 J**	--	**420 J**	**460 J**	--	**1,600**	**12 J**	**43**	**29**	**25**	--
Dibenzo(a,h)anthracene	NV	230	**120 J**	**360 J**	--	**94 J**	**190 J**	--	**150**	4.7 U	**6.3**	**4.3 J**	**3.2 J**	--
Fluoranthene	NV	1,700	**590 J**	**2,200 J**	--	**1,300 J**	**3,900 J**	--	**3,200**	**24**	**150**	**100**	**88**	--
Indeno(1,2,3-cd)pyrene	NV	600	420 UJ	**480 J**	--	**200 J**	**190 J**	--	**490**	19 U	**24**	**18 J**	**15 J**	--
Pyrene	NV	2,600	**700 J**	**1,800 J**	--	**1,300 J**	**3,100 J**	--	**3,600**	**23**	**150**	**110**	**87**	--
Benzo(b)fluoranthene	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Total benzofluoranthenes[i]	NV	3,200	**550 J**	**1,700 J**	--	**660**	**810 J**	--	**2,000**	**16 J**	**61**	**40**	**39**	--
cPAH TEQ[j][1]	21	21	**418 J**	**1,010 J**	--	**479 J**	**722 J**	--	**1,610**	**13.5 J**	**22.6**	**18.5 J**	**17.7 J**	--
PAHs (ug/kg-OC)														
2-Methylnaphthalene	38,000	NV	1,340 UJ	--	--	**2,280**	--	--	**1,580**	4,580 U	**1,230**	800 U	**652**	--
Total LPAH[g]	370,000	NV	**2,360 J**	--	--	**16,800 J**	--	--	**15,800**	**4,580**	**24,600**	**26,200**	**13,400 J**	--
Acenaphthene	16,000	NV	1,340 UJ	--	--	**1,540**	--	--	**990**	4,580 U	**1,230**	**1,240**	**621**	--
Acenaphthylene	66,000	NV	1,340 UJ	--	--	**1,250**	--	--	**1,050**	4,580 U	**3,300**	**4,400**	**1,890**	--
Anthracene	220,000	NV	1,340 UJ	--	--	**1,690**	--	--	**1,520**	4,580 U	**1,230**	**1,120**	**559 J**	--

Table 8-1
2013-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	Preliminary Cleanup Standards[a]		CR-04			CR-05		CR-06		CR-11	CR-12	CR-13	CR-14	CR-11-14-COMP
Sample Name:			CR04-10cm	CR04-2.5	CR04-5	CR05-10cm	CR05-2.5	CR06-10cm	CR06-2.5	CR11-SBSD-23	CR12-SBSD-15	CR13-SBSD-11	CR14-SBSD-12	CR11-14-SBSD-COMP
Collection Date:	Organic Carbon (0.5% to 3.5%)[b]	Organic Carbon (<0.5% or >3.5%)[c]	11/07/2013	11/08/2013	11/08/2013	11/08/2013	11/08/2013	11/07/2013	11/07/2013	10/13/2015	10/13/2015	10/13/2015	10/13/2015	10/13/2015
Collection Depth (ft bml):			0-0.33	1-2.5	2.5-5	0-0.33	0.33-2.5	0-0.33	1-2.5	23	15	11	12	11-23
Type:			Surface	Subsurface	Subsurface	Surface	Subsurface	Surface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface
Percent Wood waste:			60	60	60	45	45	70	70	0	0	0	0	0
TOC:			Outside	--[d]	Outside	Outside	--[d]	Outside	Outside	Outside	Inside	Inside	Inside	--[e]
PAHs (ug/kg-OC) cont.														
Fluorene	23,000	NV	1,340 UJ	--	--	**1,910 J**	--	--	**1,310**	4,580 U	**1,410**	**1,400**	**714**	--
Naphthalene	99,000	NV	**1,340 J**	--	--	**5,290 J**	--	--	**3,640**	4,580 U	**11,100**	**12,000**	**5,900**	--
Phenanthrene	100,000	NV	**1,020 J**	--	--	**5,150 J**	--	--	**7,270**	**4,580**	**6,310**	**6,000**	**3,730**	--
Total HPAH[h]	960,000	NV	**10,400 J**	--	--	**36,500 J**	--	--	**28,500**	**20,700 J**	**14,800 J**	**14,000 J**	**9,130 J**	--
Benzo(a)anthracene	110,000	NV	**796 J**	--	--	**2,870**	--	--	**2,630**	**2,650 J**	**901**	**800**	**528 J**	--
Benzo(a)pyrene	99,000	NV	**955 J**	--	--	**2,500 J**	--	--	**2,420**	4,580 U	601 U	800 U	621 U	--
Benzo(ghi)perylene	31,000	NV	**732 J**	--	--	**1,910 J**	--	--	**1,190**	4,580 U	**901**	**1,200**	**621**	--
Chrysene	110,000	NV	**1,690 J**	--	--	**3,090 J**	--	--	**3,230**	**2,890 J**	**1,290**	**1,160**	**776**	--
Dibenzo(a,h)anthracene	12,000	NV	**382 J**	--	--	**691 J**	--	--	**303**	1,130 U	**189**	**172 J**	**99.4 J**	--
Fluoranthene	160,000	NV	**1,880 J**	--	--	**9,560 J**	--	--	**6,460**	**5,780**	**4,500**	**4,000**	**2,730**	--
Indeno(1,2,3-cd)pyrene	34,000	NV	1,340 UJ	--	--	**1,470 J**	--	--	**990**	4,580 U	**721**	**720 J**	**466 J**	--
Pyrene	1,000,000	NV	**2,230 J**	--	--	**9,560 J**	--	--	**7,270**	**5,540**	**4,500**	**4,400**	**2,700**	--
Benzo(b)fluoranthene	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Total benzofluoranthenes[i]	230,000	NV	**1,750 J**	--	--	**4,850**	--	--	**4,040**	**3,860 J**	**1,830**	**1,600**	**1,210**	--
PCBs and Pesticides (ug/kg-dry)														
Aroclor 1016	NV	NV	20 UJ	19 UJ	--	20 UJ	19 UJ	--	20 U	17 U	20 U	20 U	20 U	--
Aroclor 1221	NV	NV	20 UJ	19 UJ	--	20 UJ	19 UJ	--	20 U	17 U	20 U	20 U	20 U	--
Aroclor 1232	NV	NV	20 UJ	19 UJ	--	20 UJ	19 UJ	--	20 U	17 U	20 U	20 U	20 U	--
Aroclor 1242	NV	NV	20 UJ	19 UJ	--	20 UJ	19 UJ	--	20 U	17 U	20 U	20 U	20 U	--
Aroclor 1248	NV	NV	29 UJ	48 UJ	--	29 UJ	97 UJ	--	99 U	17 U	20 U	20 U	20 U	--
Aroclor 1254	NV	NV	97 UJ	**440 J**	--	98 UJ	**490 J**	--	200 U	17 U	20 U	20 U	20 U	--
Aroclor 1260	NV	NV	**200 J**	**730 J**	--	**180 J**	**670 J**	--	**690**	17 U	20 U	20 U	20 U	--
Aroclor 1268	NV	NV	--	--	--	--	--	--	--	17 U	20 U	20 U	20 U	--
Total PCBs[k]	3.5	3.5	**200 J**	**1,170 J**	--	**180 J**	**1,160 J**	--	**690**	17 U	20 U	20 U	20 U	--
Carbazole	900	900	--	--	--	--	--	--	--	--	--	--	--	--
Additional SVOCs (ug/kg-dry)														
1,3-Dichlorobenzene	NV	NV	100 UJ	81 UJ	--	**620 J**	**280 J**	--	70 U	--	--	--	--	--
4-Methylphenol	NV	NV	420 UJ	320 UJ	--	**310 J**	**280 J**	--	**420**	19 U	**870 J**	**150**	**130**	--
Hexachlorocyclopentadiene	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Dioxins/Furans (pg/g-dry)														
1,2,3,4,6,7,8-HpCDD	NV	NV	**817**	**4,070**	--	**1,820**	**12,200**	**1,080**	**1,090**	**6.64**	--	--	--	--
1,2,3,4,6,7,8-HpCDF	NV	NV	**165**	**919**	--	**437**	**1,170**	**258**	**276**	0.317 U	--	--	--	--
1,2,3,4,7,8,9-HpCDF	NV	NV	7.55 U	**42.8**	--	**19.8**	**81.3**	**13.2**	**15.5**	0.0458 U	--	--	--	--
1,2,3,4,7,8-HxCDD	NV	NV	**4.26**	**32.5**	--	**11.2**	**24.5**	**12.7**	**8.21**	0.255 U	--	--	--	--
1,2,3,4,7,8-HxCDF	NV	NV	**7.26**	**35.9**	--	**15.3**	**115**	**18.1**	**21.7**	**0.0319 J**	--	--	--	--
1,2,3,6,7,8-HxCDD	NV	NV	**54.5**	**350**	--	**136**	**1,020**	**63.8**	**72.8**	0.631 U	--	--	--	--
1,2,3,6,7,8-HxCDF	NV	NV	**3.38**	**18.9**	--	**10.9**	**51.7**	**8.9**	**8.35**	0.0339 U	--	--	--	--
1,2,3,7,8,9-HxCDD	NV	NV	**10.2**	**48.1**	--	**29.9**	**98.1**	**16.5**	**15.4**	**2.76**	--	--	--	--
1,2,3,7,8,9-HxCDF	NV	NV	**2.45**	**14.6**	--	**6.11**	**62.9**	**4.79**	**4.66**	0.112 U	--	--	--	--
1,2,3,7,8-PeCDD	NV	NV	**4.34**	**18.8**	--	**13.9**	**34.1**	**9.35**	**8.27**	**1.02**	--	--	--	--
1,2,3,7,8-PeCDF	NV	NV	**2.06**	**12.4**	--	**4.73**	**41.4**	**3.28**	**3.24**	0.0398 U	--	--	--	--

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Table 8-1
2013-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	Preliminary Cleanup Standards[a]		CR-04			CR-05		CR-06		CR-11	CR-12	CR-13	CR-14	CR-11-14-COMP
Sample Name:			CR04-10cm	CR04-2.5	CR04-5	CR05-10cm	CR05-2.5	CR06-10cm	CR06-2.5	CR11-SBSD-23	CR12-SBSD-15	CR13-SBSD-11	CR14-SBSD-12	CR11-14-SBSD-COMP
Collection Date:	Organic Carbon (0.5% to 3.5%)[b]	Organic Carbon (<0.5% or >3.5%)[c]	11/07/2013	11/08/2013	11/08/2013	11/08/2013	11/08/2013	11/07/2013	11/07/2013	10/13/2015	10/13/2015	10/13/2015	10/13/2015	10/13/2015
Collection Depth (ft bml):			0-0.33	1-2.5	2.5-5	0-0.33	0.33-2.5	0-0.33	1-2.5	23	15	11	12	11-23
Type:			Surface	Subsurface	Subsurface	Surface	Subsurface	Surface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface
Percent Wood waste:			60	60	60	45	45	70	70	0	0	0	0	0
TOC:			Outside	--[d]	Outside	Outside	--[d]	Outside	Outside	Outside	Inside	Inside	Inside	--[e]
Dioxins/Furans (pg/g-dry) cont.														
2,3,4,6,7,8-HxCDF	NV	NV	**5.09**	**22.2**	--	**11.1**	**69.3**	**16.9**	**16.3**	0.0438 U	--	--	--	--
2,3,4,7,8-PeCDF	NV	NV	**3.43**	**15.7**	--	**5.82**	**43.5**	**5.96**	**5.87**	0.0418 U	--	--	--	--
2,3,7,8-TCDD	NV	NV	1.14 U	**3.97**	--	**3**	**5.26**	**2.09**	**2.11**	**0.936 J**	--	--	--	--
2,3,7,8-TCDF	NV	NV	**3.53**	**16**	--	**6.3**	**54.3**	**4.87**	**4.95**	0.0339 U	--	--	--	--
OCDD	NV	NV	**5,340 J**	**23,500 J**	--	**10,300 J**	**68,300 J**	**7,830 J**	**6,810 J**	**33.1**	--	--	--	--
OCDF	NV	NV	**476**	**1,900**	--	**863**	**3,100**	**680**	**652**	**1.08 J**	--	--	--	--
Total HpCDDs	NV	NV	**1,530**	**7,520**	--	**3,750**	**21,300**	**2,480**	**2,050**	**15.5**	--	--	--	--
Total HpCDFs	NV	NV	678 U	**3,910**	--	**1,560**	5,060 U	**950**	1,120 U	1.28 U	--	--	--	--
Total HxCDDs	NV	NV	350 U	1,540 U	--	1,010 U	**4,840**	742 U	783 U	18.1 U	--	--	--	--
Total HxCDFs	NV	NV	301 U	**2,130**	--	**853**	6,030 U	463 U	518 U	0.599 U	--	--	--	--
Total PeCDDs	NV	NV	68.7 U	133 U	--	334 U	862 U	**88.7**	67 U	**7.59**	--	--	--	--
Total PeCDFs	NV	NV	101 U	658 U	--	281 U	2,660 U	203 U	147 U	0.111 U	--	--	--	--
Total TCDDs	NV	NV	17.5 U	32.6 U	--	73.6 U	**180**	42.6 U	**28.7**	7.61 U	--	--	--	--
Total TCDFs	NV	NV	27.9 U	119 U	--	78.1 U	558 U	82.8 U	62.3 U	0.303 U	--	--	--	--
Dioxin/Furan TEQ[l][1]	5	5	**26.7 J**	**140 J**	--	**67.6 J**	**359 J**	**44.0 J**	**43.5 J**	**2.38 J**	--	--	--	--
TPH (mg/kg-dry)														
Gasoline-Range Hydrocarbons	--	--	--	--	--	--	--	--	54 UJ	--	--	--	--	--
Diesel-Range Hydrocarbons	340	340	**2,400 J**	**3,200 J**	--	**1,200 J**	**3,200 J**	--	**20,000**	7 U	--	--	--	--
Motor-Oil Range Hydrocarbons	3,600	3,600	**7,400 J**	**10,000 J**	--	**4,800 J**	**13,000 J**	--	**60,000**	**19**	--	--	--	--
Grain Size (%)														
Gravel	NV	NV	22.8	--	23.6	20.2	--	22.7	--	--	--	--	--	--
Very coarse sand	NV	NV	13.8	--	13	11.4	--	13	--	--	--	--	--	--
Coarse sand	NV	NV	14.2	--	10.7	13.2	--	15.7	--	--	--	--	--	--
Medium sand	NV	NV	8.5	--	6.1	10.5	--	11.9	--	--	--	--	--	--
Fine sand	NV	NV	3.7	--	3.2	6	--	5.1	--	--	--	--	--	--
Very fine sand	NV	NV	1.4	--	1.4	3.5	--	2	--	--	--	--	--	--
Coarse silt	NV	NV	7.2	--	1.3	8.1	--	4.1	--	--	--	--	--	--
Medium silt	NV	NV	5.9	--	10.6	7.7	--	5.1	--	--	--	--	--	--
Fine silt	NV	NV	6.2	--	8.9	5.1	--	4.5	--	--	--	--	--	--
Very fine silt	NV	NV	4.8	--	6.1	4.5	--	3.7	--	--	--	--	--	--
Coarse clay	NV	NV	2.9	--	4.3	2.1	--	2.7	--	--	--	--	--	--
Medium clay	NV	NV	2.6	--	3.7	2.4	--	2.1	--	--	--	--	--	--
Fine clay	NV	NV	6.1	--	7.2	5.4	--	7.4	--	--	--	--	--	--
Total fines	NV	NV	35.6	--	42.1	35.3	--	29.7	--	--	--	--	--	--
Sand, total	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Silt, total	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Clay, total	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Asbestos (%)														
Asbestos	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Pore Water Analysis														
Conductivity (uS/cm)	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--
Salinity (ppt)	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--

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Table 8-1
2013-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	Preliminary Cleanup Standards[a]		CR-15C		CR-17D		CR-18B		CR-19D	CR-19F			CR-26	SE-01A	SE-02A
Sample Name:			CR15C-SSD	CR15C-SBSD	CR17-D-SSD	CR17-D-SBSD	CR18B-SSD	CR18B-SBSD	CR19D-SSD-CONV	CR19F-SSD	CR19F-SBSD	CR19F-SBSD-DUP	CR26-SBSD	SE-01A-1.0-2.0	SE-02A-2.5-3.5
Collection Date:	Organic Carbon (0.5% to 3.5%)[b]	Organic Carbon (<0.5% or >3.5%)[c]	10/14/2015	10/14/2015	10/15/2015	10/15/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/15/2015	09/25/2019	09/26/2019
Collection Depth (ft bml):			0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0-0.33	0.5-1.0	0.5-1.0	0.5-1.0	1-2	2-3.5
Type:			Surface	Subsurface	Surface	Subsurface	Surface	Subsurface	Surface	Surface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface
Percent Wood waste:			0	0	0	0	0	0	0	0	0	0	0	20	10
TOC:			Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	Inside	Inside	Inside	Outside	Inside
Conventional Parameters															
Ammonia as Nitrogen (mg/kg)	230	230	--	--	--	--	--	--	18.6	--	--	--	--	290 J	230 J
Fixed Solids (%)	NV	NV	--	--	--	--	--	--	44.8	--	--	--	--	--	--
Sulfide (mg/kg)	39	39	--	--	--	--	--	--	605	--	--	--	--	865 J	977
Total Organic Carbon (%)	NV	NV	3.17	1.73	1.61	3.05	1.95	2.45	3.99	2.77	2.76	2.59	1.52	4.4	3.3
Total Solids (%)	NV	NV	35.1	57.47	52.1	48.09	46.44	47.88	39.38	49.31	50.3	51.43	46.69	51.9	55.5
Total Volatile Solids (%)	NV	NV	--	--	--	--	--	--	8.58	--	--	--	--	11.9 J	7.94 J
TCLP Metals (mg/L)															
Lead	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Metals (mg/kg-dry)															
Arsenic	11	11	**20**	**21**	**21**	**30**	**30**	**20**	--	**20**	**22**	**23**	**24**	--	--
Cadmium	0.8	0.8	0.5 U	0.3 U	0.4 U	0.4 U	0.4 U	0.4 U	--	0.4 U	0.4 U	0.3 U	0.4 U	--	--
Chromium	72	72	**40**	**34.5**	**34.4**	**40**	**41**	**36**	--	**41**	**50.5**	**51.3**	**39.3**	--	--
Copper	390	390	**51.9**	**54.7**	**51.1**	**58.2**	**62.7**	**53.4**	--	**53.1**	**60**	**53.3**	**55.9**	--	--
Lead	21	21	**11**	**9**	**9**	**12**	**10**	**10**	--	**11**	**13**	**14**	**11**	--	--
Mercury	0.2	0.2	0.06 U	**0.04**	**0.04**	**0.07**	0.05 U	**0.07**	--	**0.05**	**0.05**	**0.07**	**0.09**	--	**0.103**
Nickel	50	50	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	11	11	--	--	--	--	--	--	--	--	--	--	--	--	--
Silver	0.57	0.57	0.8 U	0.5 U	0.5 U	0.6 U	0.6 U	0.6 U	--	0.6 U	0.6 U	0.5 U	0.6 U	--	--
Zinc	410	410	**77**	**69**	**70**	**79**	**76**	**73**	--	**74**	**80**	**79**	**75**	--	--
Organic Chemicals (ug/kg-dry)															
2,4-Dimethylphenol	29	29	24 U	24 U	24 U	24 U	25 U	25 U	--	24 U	25 U	25 U	24 U	--	--
2-Methylphenol	63	63	4.9 U	4.9 U	4.8 U	4.9 U	5 U	5 U	--	4.8 U	5 U	5 U	**5.4**	--	--
3- & 4-Methylphenol (m,p-Cresol)	260	260	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzoic acid	650	650	**250 J**	**160 J**	**150 J**	**230 J**	**160 J**	**210 J**	--	**170 J**	**240**	**370**	**440**	--	--
Benzyl alcohol	57	57	20 U	20 U	**16 J**	**48**	20 U	20 U	--	19 U	**27**	**28**	**64**	--	--
Dibenzofuran	200	200	**24**	**21**	19 U	**84**	20 U	20 U	--	**15 J**	**25**	**28**	**25**	--	--
Phenol	120	120	**50**	20 U	**16 J**	**39**	**81**	20 U	**93 J+**	**89**	**47**	**68**	**76**	--	--
N-Nitrosodiphenylamine	NV	28	4.9 U	4.9 U	4.8 U	4.9 U	5 U	5 U	--	4.8 U	5 U	5 U	4.9 U	--	--
Organic Chemicals (ug/kg-OC)															
N-Nitrosodiphenylamine	11,000	NV	155 U	283 U	298 U	161 U	256 U	204 U	--	173 U	181 U	193 U	322 U	--	--
Phthalates (ug/kg-dry)															
Bis(2-ethylhexyl)phthalate	500	500	**29 J**	49 U	48 U	**38 J**	50 U	50 U	--	48 U	50 U	**32 J**	49 U	--	--
Butylbenzylphthalate	NV	63	4.9 U	4.9 U	**3.4 J**	4.9 U	**7.2**	**2.8 J**	--	**8.1**	**9.3**	**7.4**	4.9 U	--	--
Diethyl phthalate	NV	200	21 U	26 U	19 U	19 U	40 U	20 U	--	22 U	24 U	38 U	20 U	--	--
Dimethyl phthalate	NV	71	4.9 U	4.9 U	4.8 U	4.9 U	5 U	5 U	--	4.8 U	5 U	5 U	4.9 U	--	--
Di-n-butyl phthalate	380	380	20 U	20 U	19 U	19 U	20 U	20 U	--	19 U	20 U	20 U	20 U	--	--
Di-n-octyl phthalate	39	39	20 U	20 U	19 U	19 U	20 U	20 U	--	19 U	20 U	20 U	20 U	--	--
Phthalates (ug/kg-OC)															
Butylbenzylphthalate	4,900	NV	155 U	283 U	**211 J**	161 U	**369**	**114 J**	--	**292**	**337**	**286**	322 U	--	--
Diethyl phthalate	61,000	NV	662 U	1,500 U	1,180 U	623 U	2,050 U	816 U	--	794 U	870 U	1,470 U	1,320 U	--	--
Dimethyl phthalate	53,000	NV	155 U	283 U	298 U	161 U	256 U	204 U	--	173 U	181 U	193 U	322 U	--	--

MAUL FOSTER ALONGI

Table 8-1
2013-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	Preliminary Cleanup Standards[a]		CR-15C		CR-17D		CR-18B		CR-19D	CR-19F			CR-26	SE-01A	SE-02A
Sample Name:			CR15C-SSD	CR15C-SBSD	CR17-D-SSD	CR17-D-SBSD	CR18B-SSD	CR18B-SBSD	CR19D-SSD-CONV	CR19F-SSD	CR19F-SBSD	CR19F-SBSD-DUP	CR26-SBSD	SE-01A-1.0-2.0	SE-02A-2.5-3.5
Collection Date:	Organic Carbon (0.5% to 3.5%)[b]	Organic Carbon (<0.5% or >3.5%)[c]	10/14/2015	10/14/2015	10/15/2015	10/15/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/15/2015	09/25/2019	09/26/2019
Collection Depth (ft bml):			0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0-0.33	0.5-1.0	0.5-1.0	0.5-1.0	1-2	2-3.5
Type:			Surface	Subsurface	Surface	Subsurface	Surface	Subsurface	Surface	Surface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface
Percent Wood waste:			0	0	0	0	0	0	0	0	0	0	0	20	10
TOC:			Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	Inside	Inside	Inside	Outside	Inside
Chlorinated Organics (ug/kg-dry)															
1,2,4-Trichlorobenzene	NV	31	4.9 U	4.9 U	4.8 U	**4.8 J**	5 U	5 U	--	4.8 U	5 U	5 U	4.9 U	--	--
1,2-Dichlorobenzene	NV	35	4.9 U	4.9 U	4.8 U	**1.6 J**	5 U	5 U	--	4.8 U	5 U	5 U	4.9 U	--	--
1,4-Dichlorobenzene	NV	110	4.9 U	4.9 U	4.8 U	4.9 U	5 U	5 U	--	4.8 U	5 U	5 U	4.9 U	--	--
Hexachlorobenzene	NV	22	4.9 U	4.9 U	4.8 U	4.9 U	5 U	5 U	--	4.8 U	5 U	5 U	4.9 U	--	--
Hexachlorobutadiene	NV	11	4.9 U	4.9 U	4.8 U	4.9 U	5 U	5 U	--	4.8 U	5 U	5 U	4.9 U	--	--
Pentachlorophenol	360	360	20 UJ	20 UJ	19 U	**21**	20 U	20 U	--	19 U	20 UJ	20 UJ	20 UJ	--	--
Chlorinated Organics (ug/kg-OC)															
1,2,4-Trichlorobenzene	810	NV	155 U	283 U	298 U	**157 J**	256 U	204 U	--	173 U	181 U	193 U	322 U	--	--
1,2-Dichlorobenzene	2,300	NV	155 U	283 U	298 U	**52.5 J**	256 U	204 U	--	173 U	181 U	193 U	322 U	--	--
1,4-Dichlorobenzene	3,100	NV	155 U	283 U	298 U	161 U	256 U	204 U	--	173 U	181 U	193 U	322 U	--	--
Hexachlorobenzene	380	NV	155 U	283 U	298 U	161 U	256 U	204 U	--	173 U	181 U	193 U	322 U	--	--
Hexachlorobutadiene	3,900	NV	155 U	283 U	298 U	161 U	256 U	204 U	--	173 U	181 U	193 U	322 U	--	--
PAHs (ug/kg-dry)															
Total PAH[f]	17,000	17,000	**800 J**	**725 J**	**101 J**	**3,070**	**356 J**	**1,050 J**	--	**269 J**	**526 J**	**848 J**	**427 J**	--	--
Total LPAH[g]	NV	5,200	**255 J**	**196 J**	**32 J**	**1,160**	**66 J**	**118 J**	--	**131 J**	**258**	**340 J**	**166 J**	--	--
1-Methylnaphthalene	NV	NV	**15 J**	**18 J**	19 U	**23**	20 U	20 U	--	19 U	20 U	**13 J**	**11 J**	--	--
2-Methylnaphthalene	NV	670	**19 J**	**18 J**	19 U	**31**	20 U	20 U	--	**10 J**	**13 J**	**22**	20 U	--	--
Acenaphthene	NV	500	**38**	**37**	19 U	**420**	20 U	**16 J**	--	**12 J**	**27**	**31**	**29**	--	--
Acenaphthylene	NV	1,300	**15 J**	**15 J**	19 U	**20**	20 U	**17 J**	--	19 U	20 U	**18 J**	**9.7 J**	--	--
Anthracene	NV	960	**18 J**	**20**	19 U	**110**	20 U	**24**	--	**15 J**	**30**	**26**	**14 J**	--	--
Fluorene	NV	540	**29**	**20**	19 U	**140**	**11 J**	**12 J**	--	**12 J**	**29**	**27**	**23**	--	--
Naphthalene	NV	2,100	**64**	**35**	**13 J**	**110**	**29**	**22**	--	**56**	**62**	**98**	**51**	--	--
Phenanthrene	NV	1,500	**91**	**69**	**19**	**360**	**26**	**27**	--	**36**	**110**	**140**	**39**	--	--
Total HPAH[h]	NV	12,000	**511 J**	**493 J**	**68.9 J**	**1,850**	**290 J**	**932 J**	--	**128 J**	**255 J**	**473 J**	**250 J**	--	--
Benzo(a)anthracene	NV	1,300	**56**	**64**	19 U	**160**	**29**	**99**	--	**12 J**	**21**	**37**	**18 J**	--	--
Benzo(a)pyrene	NV	1,600	**31**	**35**	19 U	**81**	**12 J**	**68**	--	19 U	20 U	20 U	20 U	--	--
Benzo(ghi)perylene	NV	670	**23**	**14 J**	19 U	**36**	20 U	**27**	--	19 U	20 U	**15 J**	**13 J**	--	--
Chrysene	NV	1,400	**61**	**69**	**8.6 J**	**210**	**66**	**93**	--	**21**	**30**	**64**	**26**	--	--
Dibenzo(a,h)anthracene	NV	230	**4 J**	**4.3 J**	**2.3 J**	**15**	5 U	**8**	--	4.8 U	5 U	**3.1 J**	**3.1 J**	--	--
Fluoranthene	NV	1,700	**120**	**110**	**25**	**600**	**82**	**210**	--	**41**	**94**	**150**	**75**	--	--
Indeno(1,2,3-cd)pyrene	NV	600	**18 J**	**17 J**	19 U	**41**	20 U	**27**	--	19 U	20 U	**14 J**	**8.8 J**	--	--
Pyrene	NV	2,600	**98**	**80**	**20**	**470**	**62**	**220**	--	**35**	**83**	**130**	**70**	--	--
Benzo(b)fluoranthene	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Total benzofluoranthenes[i]	NV	3,200	**100**	**100**	**13 J**	**240**	**39 J**	**180**	--	**19 J**	**27 J**	**60**	**36 J**	--	--
cPAH TEQ[i][1]	21	21	**49.4 J**	**54.2 J**	**13 J**	**129**	**20.7 J**	**100**	--	**14 J**	**16.4 J**	**22.1 J**	**16.9 J**	--	--
PAHs (ug/kg-OC)															
2-Methylnaphthalene	38,000	NV	**599 J**	**1,040 J**	1,180 U	**1,020**	1,030 U	816 U	--	**361 J**	**471 J**	**849**	1,320 U	--	--
Total LPAH[g]	370,000	NV	**8,040 J**	**11,300 J**	**1,990 J**	**38,000**	**3,380 J**	**4,820 J**	--	**4,730 J**	**9,350**	**13,100 J**	**10,900 J**	--	--
Acenaphthene	16,000	NV	**1,200**	**2,140**	1,180 U	**13,800**	1,030 U	**653 J**	--	**433 J**	**978**	**1,200**	**1,910**	--	--
Acenaphthylene	66,000	NV	**473 J**	**867 J**	1,180 U	**656**	1,030 U	**694 J**	--	686 U	725 U	**695 J**	**638 J**	--	--
Anthracene	220,000	NV	**568 J**	**1,160**	1,180 U	**3,610**	1,030 U	**980**	--	**542 J**	**1,090**	**1,000**	**921 J**	--	--

MAUL FOSTER ALONGI

Table 8-1
2013-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	Preliminary Cleanup Standards[a]		CR-15C		CR-17D		CR-18B		CR-19D	CR-19F			CR-26	SE-01A	SE-02A
Sample Name:			CR15C-SSD	CR15C-SBSD	CR17-D-SSD	CR17-D-SBSD	CR18B-SSD	CR18B-SBSD	CR19D-SSD-CONV	CR19F-SSD	CR19F-SBSD	CR19F-SBSD-DUP	CR26-SBSD	SE-01A-1.0-2.0	SE-02A-2.5-3.5
Collection Date:	Organic Carbon (0.5% to 3.5%)[b]	Organic Carbon (<0.5% or >3.5%)[c]	10/14/2015	10/14/2015	10/15/2015	10/15/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/15/2015	09/25/2019	09/26/2019
Collection Depth (ft bml):			0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0-0.33	0.5-1.0	0.5-1.0	0.5-1.0	1-2	2-3.5
Type:			Surface	Subsurface	Surface	Subsurface	Surface	Subsurface	Surface	Surface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface
Percent Wood waste:			0	0	0	0	0	0	0	0	0	0	0	20	10
TOC:			Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	Inside	Inside	Inside	Outside	Inside
PAHs (ug/kg-OC) cont.															
Fluorene	23,000	NV	**915**	**1,160**	1,180 U	**4,590**	**564 J**	**490 J**	--	**433 J**	**1,050**	**1,040**	**1,510**	--	--
Naphthalene	99,000	NV	**2,020**	**2,020**	**807 J**	**3,610**	**1,490**	**898**	--	**2,020**	**2,250**	**3,780**	**3,360**	--	--
Phenanthrene	100,000	NV	**2,870**	**3,990**	**1,180**	**11,800**	**1,330**	**1,100**	--	**1,300**	**3,990**	**5,410**	**2,570**	--	--
Total HPAH[h]	960,000	NV	**16,100 J**	**28,500 J**	**4,280 J**	**60,700**	**14,900 J**	**38,000 J**	--	**4,620 J**	**9,240 J**	**18,300 J**	**16,400 J**	--	--
Benzo(a)anthracene	110,000	NV	**1,770**	**3,700**	1,180 U	**5,250**	**1,490**	**4,040**	--	**433 J**	**761**	**1430**	**1180 J**	--	--
Benzo(a)pyrene	99,000	NV	**978**	**2,020**	1,180 U	**2,660**	**615 J**	**2,780**	--	686 U	725 U	772 U	1,320 U	--	--
Benzo(ghi)perylene	31,000	NV	**726**	**809 J**	1,180 U	**1,180**	1,030 U	**1,100**	--	686 U	725 U	**579 J**	**855 J**	--	--
Chrysene	110,000	NV	**1,920**	**3,990**	**534 J**	**6,890**	**3,380**	**3,800**	--	**758**	**1,090**	**2,470**	**1,710**	--	--
Dibenzo(a,h)anthracene	12,000	NV	**126 J**	**249 J**	**143 J**	**492**	256 U	**327**	--	173 U	181 U	**120 J**	**204 J**	--	--
Fluoranthene	160,000	NV	**3,790**	**6,360**	**1,550**	**19,700**	**4,210**	**8,570**	--	**1,480**	**3,410**	**5,790**	**4,930**	--	--
Indeno(1,2,3-cd)pyrene	34,000	NV	**568 J**	**983 J**	1,180 U	**1,340**	1,030 U	**1,100**	--	686 U	725 U	**541 J**	**579 J**	--	--
Pyrene	1,000,000	NV	**3,090**	**4,620**	**1,240**	**15,400**	**3,180**	**8,980**	--	**1,260**	**3,010**	**5,020**	**4,610**	--	--
Benzo(b)fluoranthene	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Total benzofluoranthenes[i]	230,000	NV	**3,150**	**5,780**	**807 J**	**7,870**	**2,000 J**	**7,350**	--	**686 J**	**978 J**	**2,320**	**2,370 J**	--	--
PCBs and Pesticides (ug/kg-dry)															
Aroclor 1016	NV	NV	20 U	18 U	19 U	20 U	18 U	19 U	--	18 U	19 U	20 U	19 U	--	--
Aroclor 1221	NV	NV	20 U	18 U	19 U	20 U	18 U	19 U	--	18 U	19 U	20 U	19 U	--	--
Aroclor 1232	NV	NV	20 U	18 U	19 U	20 U	18 U	19 U	--	18 U	19 U	20 U	19 U	--	--
Aroclor 1242	NV	NV	20 U	18 U	19 U	20 U	18 U	19 U	--	18 U	19 U	20 U	19 U	--	--
Aroclor 1248	NV	NV	20 U	18 U	19 U	20 U	18 U	19 U	--	18 U	19 U	20 U	19 U	--	--
Aroclor 1254	NV	NV	20 U	18 U	19 U	**18 J**	18 U	19 U	--	18 U	19 U	20 U	19 U	--	--
Aroclor 1260	NV	NV	20 U	18 U	19 U	20 U	18 U	19 U	--	18 U	19 U	20 U	19 U	--	--
Aroclor 1268	NV	NV	20 U	18 U	19 U	20 U	18 U	19 U	--	18 U	19 U	20 U	19 U	--	--
Total PCBs[k]	3.5	3.5	20 U	18 U	19 U	**18 J**	18 U	19 U	--	18 U	19 U	20 U	19 U	--	--
Carbazole	900	900	--	--	--	--	--	--	--	--	--	--	--	--	--
Additional SVOCs (ug/kg-dry)															
1,3-Dichlorobenzene	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Methylphenol	NV	NV	**89**	**52**	19 UJ	**120 J**	**42**	20 U	--	19 U	**230**	**320**	**45**	--	--
Hexachlorocyclopentadiene	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Dioxins/Furans (pg/g-dry)				--											
1,2,3,4,6,7,8-HpCDD	NV	NV	**100**	--	**56.2**	--	**30.9**	--	--	**141**	--	--	--	--	--
1,2,3,4,6,7,8-HpCDF	NV	NV	**25.3**	--	**8.12**	--	**7.34**	--	--	**24.3**	--	--	--	--	--
1,2,3,4,7,8,9-HpCDF	NV	NV	0.959 U	--	0.483 U	--	**0.332 J**	--	--	**1.04**	--	--	--	--	--
1,2,3,4,7,8-HxCDD	NV	NV	**1.22**	--	0.736 U	--	**0.758 J**	--	--	**1.35**	--	--	--	--	--
1,2,3,4,7,8-HxCDF	NV	NV	1.25 U	--	**0.596 J**	--	0.424 U	--	--	**1.37**	--	--	--	--	--
1,2,3,6,7,8-HxCDD	NV	NV	**5.48**	--	**2.94**	--	**2.46**	--	--	**9.89**	--	--	--	--	--
1,2,3,6,7,8-HxCDF	NV	NV	**0.806 J**	--	**0.37 J**	--	0.294 U	--	--	**1.07**	--	--	--	--	--
1,2,3,7,8,9-HxCDD	NV	NV	**10**	--	**6.33**	--	**8**	--	--	**8.91**	--	--	--	--	--
1,2,3,7,8,9-HxCDF	NV	NV	0.338 U	--	0.324 U	--	0.226 U	--	--	0.571 U	--	--	--	--	--
1,2,3,7,8-PeCDD	NV	NV	**3.65**	--	**2.49**	--	**3.28**	--	--	**3.01**	--	--	--	--	--
1,2,3,7,8-PeCDF	NV	NV	**0.408 J**	--	0.213 U	--	0.157 U	--	--	0.613 U	--	--	--	--	--

MAUL FOSTER ALONGI

Table 8-1
2013-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	Preliminary Cleanup Standards[a]		CR-15C		CR-17D		CR-18B		CR-19D	CR-19F			CR-26	SE-01A	SE-02A
Sample Name:			CR15C-SSD	CR15C-SBSD	CR17-D-SSD	CR17-D-SBSD	CR18B-SSD	CR18B-SBSD	CR19D-SSD-CONV	CR19F-SSD	CR19F-SBSD	CR19F-SBSD-DUP	CR26-SBSD	SE-01A-1.0-2.0	SE-02A-2.5-3.5
Collection Date:	Organic Carbon (0.5% to 3.5%)[b]	Organic Carbon (<0.5% or >3.5%)[c]	10/14/2015	10/14/2015	10/15/2015	10/15/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/15/2015	09/25/2019	09/26/2019
Collection Depth (ft bml):			0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0-0.33	0.5-1.0	0.5-1.0	0.5-1.0	1-2	2-3.5
Type:			Surface	Subsurface	Surface	Subsurface	Surface	Subsurface	Surface	Surface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface
Percent Wood waste:			0	0	0	0	0	0	0	0	0	0	0	20	10
TOC:			Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	Inside	Inside	Inside	Outside	Inside
Dioxins/Furans (pg/g-dry) cont.				--											
2,3,4,6,7,8-HxCDF	NV	NV	1.21 U	--	0.443 U	--	**0.469 J**	--	--	**1.73**	--	--	--	--	--
2,3,4,7,8-PeCDF	NV	NV	0.505 U	--	0.239 U	--	0.183 U	--	--	**0.557 J**	--	--	--	--	--
2,3,7,8-TCDD	NV	NV	**2.7**	--	**1.85**	--	**2.36**	--	--	**2.16**	--	--	--	--	--
2,3,7,8-TCDF	NV	NV	**1.55**	--	0.406 U	--	0.381 U	--	--	**7.75**	--	--	--	--	--
OCDD	NV	NV	**790**	--	**475**	--	**189**	--	--	**1,010**	--	--	--	--	--
OCDF	NV	NV	**33.1**	--	**14**	--	**10.9**	--	--	**36.8**	--	--	--	--	--
Total HpCDDs	NV	NV	**275**	--	**150**	--	**73.7**	--	--	**340**	--	--	--	--	--
Total HpCDFs	NV	NV	60.7 U	--	21.2 U	--	**17.4**	--	--	62.7 U	--	--	--	--	--
Total HxCDDs	NV	NV	76.1 U	--	45.8 U	--	46.9 U	--	--	93 U	--	--	--	--	--
Total HxCDFs	NV	NV	28.1 U	--	10.8 U	--	8.92 U	--	--	40.2 U	--	--	--	--	--
Total PeCDDs	NV	NV	**26.5**	--	16.7 U	--	20.5 U	--	--	26.4 U	--	--	--	--	--
Total PeCDFs	NV	NV	12.6 U	--	4.66 U	--	4.65 U	--	--	23.6 U	--	--	--	--	--
Total TCDDs	NV	NV	20.3 U	--	12.4 U	--	15.9 U	--	--	20.6 U	--	--	--	--	--
Total TCDFs	NV	NV	13.7 U	--	4.27 U	--	4.57 U	--	--	25.6 U	--	--	--	--	--
Dioxin/Furan TEQ[i][1]	5	5	**9.99 J**	--	**6.29 J**	--	**7.35 J**	--	--	**10.6 J**	--	--	--	--	--
TPH (mg/kg-dry)															
Gasoline-Range Hydrocarbons	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diesel-Range Hydrocarbons	340	340	**77**	--	**24**	--	**44**	--	--	**93**	--	--	--	--	--
Motor-Oil Range Hydrocarbons	3,600	3,600	**190**	--	**46**	--	**92**	--	--	**240**	--	--	--	--	--
Grain Size (%)															
Gravel	NV	NV	--	--	--	--	--	--	1	--	--	--	--	--	--
Very coarse sand	NV	NV	--	--	--	--	--	--	3.8	--	--	--	--	--	--
Coarse sand	NV	NV	--	--	--	--	--	--	1.8	--	--	--	--	--	--
Medium sand	NV	NV	--	--	--	--	--	--	2	--	--	--	--	--	--
Fine sand	NV	NV	--	--	--	--	--	--	4.6	--	--	--	--	--	--
Very fine sand	NV	NV	--	--	--	--	--	--	8.9	--	--	--	--	--	--
Coarse silt	NV	NV	--	--	--	--	--	--	16	--	--	--	--	--	--
Medium silt	NV	NV	--	--	--	--	--	--	20.1	--	--	--	--	--	--
Fine silt	NV	NV	--	--	--	--	--	--	14.6	--	--	--	--	--	--
Very fine silt	NV	NV	--	--	--	--	--	--	7.3	--	--	--	--	--	--
Coarse clay	NV	NV	--	--	--	--	--	--	5.9	--	--	--	--	--	--
Medium clay	NV	NV	--	--	--	--	--	--	3.4	--	--	--	--	--	--
Fine clay	NV	NV	--	--	--	--	--	--	10.5	--	--	--	--	--	--
Total fines	NV	NV	--	--	--	--	--	--	77.8	--	--	--	--	--	--
Sand, total	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Silt, total	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Clay, total	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Asbestos (%)															
Asbestos	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Pore Water Analysis															
Conductivity (uS/cm)	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Salinity (ppt)	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--

MAUL FOSTER ALONGI

Table 8-1
2013-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	Preliminary Cleanup Standards[a]		SE-03A	SE-05A	SE-06A	SE-07A	SE-08A	SE-08C	SE-10	SE-14	SE-15	SE-16	SE-17	SE-18	SE-19
Sample Name:			SE-03A-0-1.0	SE-05A-2.0-3.0	SE-06A-0.5-1.5	SE-07A-0-1.0	SE-08A-0-1.0	SE-08C-3.2-4.2	SE-10-2.0-3.7	SE-14-0-0.33	SE-15-0-0.33	SE-16-0-0.33	SE-17-0-0.33	SE-18-0-0.33	SE-19-0-0.33
Collection Date:	Organic Carbon (0.5% to 3.5%)[b]	Organic Carbon (<0.5% or >3.5%)[c]	09/25/2019	09/23/2019	09/25/2019	09/26/2019	09/24/2019	09/24/2019	09/26/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019
Collection Depth (ft bml):			0-1	2-3	0.5-1.5	0-1	0-1	3-4.2	2-3.7	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Type:			Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Surface	Surface	Surface	Surface	Surface	Surface
Percent Wood waste:			10	Trace	20	40	85	25	30	85	30	Trace	0	5	0
TOC:			Inside	Inside	Inside	Outside	Outside	Outside	Outside	Outside	Outside	Inside	Inside	Inside	Inside
Conventional Parameters															
Ammonia as Nitrogen (mg/kg)	230	230	168 J	47.1	408 J	7.73 J	8.65	36.3	5.37 J	15.2	5.75	8.43	10.7	12.9	9.43
Fixed Solids (%)	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfide (mg/kg)	39	39	856 J	4,040 J	--	639	153 J	124 J	228 J	409	191	469	20	691	924
Total Organic Carbon (%)	NV	NV	2.3	2.3	3.2	6.3	6.8	7.1	7.9 J	5.5	4.7	1.5	2.3	1.7	2
Total Solids (%)	NV	NV	45.6	47.8	55.6	34	35.8	44	38.3	34.8	43.4	52.9	43.3	46.3	41.5
Total Volatile Solids (%)	NV	NV	8.11 J	7.49	9.92 J	20.7 J	31.7	19.8	30.1	12.5	14.4	5.35	6.8	6.06	6.95
TCLP Metals (mg/L)															
Lead	NV	NV	--	--	--	--	--	--	0.0065 U	--	--	--	--	--	--
Mercury	NV	NV	--	--	--	--	--	--	0.000007 U	--	--	--	--	--	--
Total Metals (mg/kg-dry)															
Arsenic	11	11	--	--	--	--	--	--	**5.47**	**8.63**	**6.2**	**4.91**	**7.09**	**5.93**	--
Cadmium	0.8	0.8	--	--	--	--	--	--	**0.595**	0.139 U	**0.175 J**	**0.143 J**	**0.151 J**	**0.169 J**	--
Chromium	72	72	--	--	--	--	--	--	**25.2**	**33.9**	**32**	**32.2**	**36.1**	**34.5**	--
Copper	390	390	--	--	--	--	--	--	**56.1**	**85.5**	**49.8**	**52**	**57.3**	**62.1**	--
Lead	21	21	--	--	--	--	--	--	**24.0**	**47.3**	**7.52**	**6.35**	**8.21**	**7.28**	--
Mercury	0.2	0.2	--	--	--	**0.226**	--	--	**0.129**	**0.0882**	**0.0402 J**	**0.0244 J**	**0.045 J**	**0.0386 J**	**0.0379 J**
Nickel	50	50	--	--	--	--	--	--	**25.1**	**27.9**	**21.8**	**26.1**	**27.2**	**30.1**	--
Selenium	11	11	--	--	--	--	--	--	**0.667 J**	**0.716 J**	**0.714 J**	**0.725 J**	**0.867 J**	**0.86 J**	--
Silver	0.57	0.57	--	--	--	--	--	--	**0.138 J**	0.139 U	**0.115 J**	0.0918 U	**0.119 J**	0.111 U	--
Zinc	410	410	--	--	--	--	--	--	**71.9**	**82.2**	**67.3**	**75.1**	**82.1**	**80.3**	--
Organic Chemicals (ug/kg-dry)															
2,4-Dimethylphenol	29	29	--	--	--	--	--	--	341 U	75.7 U	60.4 U	48.8 U	59 U	57 U	--
2-Methylphenol	63	63	--	--	--	--	--	--	170 U	37.8 U	30.2 U	24.4 U	29.5 U	28.4 U	--
3- & 4-Methylphenol (m,p-Cresol)	260	260	--	--	--	--	--	--	**309 J**	37.8 U	**157**	**28.4 J**	29.5 U	28.4 U	--
Benzoic acid	650	650	--	--	--	--	--	--	8,550 U	1,900 U	1,510 U	1,220 U	1,480 U	1,430 U	--
Benzyl alcohol	57	57	--	--	--	--	--	--	341 U	75.7 U	60.4 U	48.8 U	59 U	57 U	--
Dibenzofuran	200	200	--	--	--	--	--	--	68.1 U	15.1 U	**14.5 J**	9.74 U	**18.7 J**	11.4 U	--
Phenol	120	120	--	--	--	--	--	--	137 U	**71.5**	**58.3 J**	19.5 U	23.6 U	22.8 U	--
N-Nitrosodiphenylamine	NV	28	--	--	--	--	--	--	170 U	37.8 U	30.2 U	24.4 U	29.5 U	28.4 U	--
Organic Chemicals (ug/kg-OC)															
N-Nitrosodiphenylamine	11,000	NV	--	--	--	--	--	--	2,150 U	687 U	643 U	1,630 U	1,280 U	1,670 U	--
Phthalates (ug/kg-dry)															
Bis(2-ethylhexyl)phthalate	500	500	--	--	--	--	--	--	1,020 U	227 U	181 U	146 U	177 U	171 U	--
Butylbenzylphthalate	NV	63	--	--	--	--	--	--	341 U	75.7 U	60.4 U	48.8 U	59 U	57 U	--
Diethyl phthalate	NV	200	--	--	--	--	--	--	341 U	75.7 U	60.4 U	48.8 U	59 U	57 U	--
Dimethyl phthalate	NV	71	--	--	--	--	--	--	341 U	75.7 U	60.4 U	48.8 U	59 U	57 U	--
Di-n-butyl phthalate	380	380	--	--	--	--	--	--	341 U	75.7 U	60.4 U	48.8 U	59 U	57 U	--
Di-n-octyl phthalate	39	39	--	--	--	--	--	--	548 U	121 U	96.9 U	78.3 U	94.6 U	91.4 U	--
Phthalates (ug/kg-OC)															
Butylbenzylphthalate	4,900	NV	--	--	--	--	--	--	4,320 U	1,380 U	1,290 U	3,250 U	2,570 U	3,350 U	--
Diethyl phthalate	61,000	NV	--	--	--	--	--	--	4,320 U	1,380 U	1,290 U	3,250 U	2,570 U	3,350 U	--
Dimethyl phthalate	53,000	NV	--	--	--	--	--	--	4,320 U	1,380 U	1,290 U	3,250 U	2,570 U	3,350 U	--

MAUL FOSTER ALONGI

Table 8-1
2013-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	Preliminary Cleanup Standards[a]		SE-03A	SE-05A	SE-06A	SE-07A	SE-08A	SE-08C	SE-10	SE-14	SE-15	SE-16	SE-17	SE-18	SE-19
Sample Name:			SE-03A-0-1.0	SE-05A-2.0-3.0	SE-06A-0.5-1.5	SE-07A-0-1.0	SE-08A-0-1.0	SE-08C-3.2-4.2	SE-10-2.0-3.7	SE-14-0-0.33	SE-15-0-0.33	SE-16-0-0.33	SE-17-0-0.33	SE-18-0-0.33	SE-19-0-0.33
Collection Date:			09/25/2019	09/23/2019	09/25/2019	09/26/2019	09/24/2019	09/24/2019	09/26/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019
Collection Depth (ft bml):	Organic Carbon (0.5% to 3.5%)[b]	Organic Carbon (<0.5% or >3.5%)[c]	0-1	2-3	0.5-1.5	0-1	0-1	3-4.2	2-3.7	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Type:			Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Surface	Surface	Surface	Surface	Surface	Surface
Percent Wood waste:			10	Trace	20	40	85	25	30	85	30	Trace	0	5	0
TOC:			Inside	Inside	Inside	Outside	Outside	Outside	Outside	Outside	Outside	Inside	Inside	Inside	Inside
Chlorinated Organics (ug/kg-dry)															
1,2,4-Trichlorobenzene	NV	31	--	--	--	--	--	--	170 U	37.8 U	30.2 U	24.4 U	29.5 U	28.4 U	--
1,2-Dichlorobenzene	NV	35	--	--	--	--	--	--	170 U	37.8 U	30.2 U	24.4 U	29.5 U	28.4 U	--
1,4-Dichlorobenzene	NV	110	--	--	--	--	--	--	170 U	37.8 U	30.2 U	24.4 U	29.5 U	28.4 U	--
Hexachlorobenzene	NV	22	--	--	--	--	--	--	68.1 U	15.1 U	12 U	9.74 U	11.8 U	11.4 U	--
Hexachlorobutadiene	NV	11	--	--	--	--	--	--	170 U	37.8 U	30.2 U	24.4 U	29.5 U	28.4 U	--
Pentachlorophenol	360	360	--	--	--	--	--	--	681 U	151 U	120 U	97.4 U	118 U	114 U	--
Chlorinated Organics (ug/kg-OC)							--	--							
1,2,4-Trichlorobenzene	810	NV	--	--	--	--	--	--	2,150 U	687 U	643 U	1,630 U	1,280 U	1,670 U	--
1,2-Dichlorobenzene	2,300	NV	--	--	--	--	--	--	2,150 U	687 U	643 U	1,630 U	1,280 U	1,670 U	--
1,4-Dichlorobenzene	3,100	NV	--	--	--	--	--	--	2,150 U	687 U	643 U	1,630 U	1,280 U	1,670 U	--
Hexachlorobenzene	380	NV	--	--	--	--	--	--	862 U	275 U	255 U	649 U	513 U	671 U	--
Hexachlorobutadiene	3,900	NV	--	--	--	--	--	--	2,150 U	687 U	643 U	1,630 U	1,280 U	1,670 U	--
PAHs (ug/kg-dry)															
Total PAH[f]	17,000	17,000	--	--	--	--	--	--	**590 J**	**109 J**	**899 J**	**40.4 J**	**2,060 J**	22.8 U	--
Total LPAH[g]	NV	5,200	--	--	--	--	--	--	**137**	**55.2 J**	**93.8 J**	**13.6 J**	**1,010 J**	22.8 U	--
1-Methylnaphthalene	NV	NV	--	--	--	--	--	--	137 U	30.3 U	24.2 U	19.5 U	**70.6**	22.8 U	--
2-Methylnaphthalene	NV	670	--	--	--	--	--	--	137 U	30.3 U	24.2 U	19.5 U	**33.7 J**	22.8 U	--
Acenaphthene	NV	500	--	--	--	--	--	--	68.1 U	**15.4 J**	**48.7**	9.74 U	**126**	11.4 U	--
Acenaphthylene	NV	1,300	--	--	--	--	--	--	68.1 U	15.1 U	12 U	9.74 U	**22.9 J**	11.4 U	--
Anthracene	NV	960	--	--	--	--	--	--	68.1 U	15.1 U	**20.8 J**	9.74 U	**121**	11.4 U	--
Fluorene	NV	540	--	--	--	--	--	--	68.1 U	15.1 U	12 U	9.74 U	**87.5**	11.4 U	--
Naphthalene	NV	2,100	--	--	--	--	--	--	137 U	30.3 U	24.2 U	19.5 U	**77**	22.8 U	--
Phenanthrene	NV	1,500	--	--	--	--	--	--	68.1 U	**39.8**	**24.3**	**13.6 J**	**575**	11.4 U	--
Total HPAH[h]	NV	12,000	--	--	--	--	--	--	**590 J**	**53.5 J**	**805 J**	**26.8 J**	**945 J**	17.1 U	--
Benzo(a)anthracene	NV	1,300	--	--	--	--	--	--	68.1 U	30.3 U	**61.2**	9.74 U	**66.5**	11.4 U	--
Benzo(a)pyrene	NV	1,600	--	--	--	--	--	--	**167 J**	22.7 U	**45.8**	14.6 U	**38.7**	17.1 U	--
Benzo(ghi)perylene	NV	670	--	--	--	--	--	--	**73.4 J**	15.1 U	**18.3 J**	9.74 U	11.8 U	11.4 U	--
Chrysene	NV	1,400	--	--	--	--	--	--	68.1 U	**16.6 J**	**71.9**	9.74 U	**70.3**	11.4 U	--
Dibenzo(a,h)anthracene	NV	230	--	--	--	--	--	--	68.1 U	15.1 U	12 U	9.74 U	11.8 U	11.4 U	--
Fluoranthene	NV	1,700	--	--	--	--	--	--	**76.1 J**	**21.1 J**	**250**	**13.8 J**	**335**	11.4 U	--
Indeno(1,2,3-cd)pyrene	NV	600	--	--	--	--	--	--	68.1 U	15.1 U	**20.7 J**	9.74 U	11.8 U	11.4 U	--
Pyrene	NV	2,600	--	--	--	--	--	--	**152**	**15.8 J**	**210**	**13 J**	**401**	11.4 U	--
Benzo(b)fluoranthene	NV	NV	--	--	--	--	--	--	**121 J**	22.7 U	**90.7**	14.6 U	**33.9 J**	17.1 U	--
Benzo(k)fluoranthene	NV	NV	--	--	--	--	--	--	102 U	22.7 U	**36.5 J**	14.6 U	17.7 U	17.1 U	--
Total benzofluoranthenes[i]	NV	3,200	--	--	--	--	--	--	**121 J**	22.7 U	**127 J**	14.6 U	**33.9 J**	17.1 U	--
cPAH TEQ[j](1)	21	21	--	--	--	--	--	--	**195 J**	**16.8 J**	**68 J**	14.6 U	**51.5 J**	17.1 U	--
PAHs (ug/kg-OC)															
2-Methylnaphthalene	38,000	NV	--	--	--	--	--	--	1,730 U	551 U	515 U	1,300 U	**1,470 J**	1,340 U	--
Total LPAH[g]	370,000	NV	--	--	--	--	--	--	1,730 U	**1,000 J**	**2,000 J**	**907**	**43,900**	**1,340**	--
Acenaphthene	16,000	NV	--	--	--	--	--	--	862 U	**280 J**	**1,040**	649 U	**5,480**	671 U	--
Acenaphthylene	66,000	NV	--	--	--	--	--	--	862 U	275 U	255 U	649 U	**996 J**	671 U	--
Anthracene	220,000	NV	--	--	--	--	--	--	862 U	275 U	**443 J**	649 U	**5,260**	671 U	--

Table 8-1
2013-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	Preliminary Cleanup Standards[a]		SE-03A	SE-05A	SE-06A	SE-07A	SE-08A	SE-08C	SE-10	SE-14	SE-15	SE-16	SE-17	SE-18	SE-19
Sample Name:			SE-03A-0-1.0	SE-05A-2.0-3.0	SE-06A-0.5-1.5	SE-07A-0-1.0	SE-08A-0-1.0	SE-08C-3.2-4.2	SE-10-2.0-3.7	SE-14-0-0.33	SE-15-0-0.33	SE-16-0-0.33	SE-17-0-0.33	SE-18-0-0.33	SE-19-0-0.33
Collection Date:			09/25/2019	09/23/2019	09/25/2019	09/26/2019	09/24/2019	09/24/2019	09/26/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019
Collection Depth (ft bml):	Organic Carbon (0.5% to 3.5%)[b]	Organic Carbon (<0.5% or >3.5%)[c]	0-1	2-3	0.5-1.5	0-1	0-1	3-4.2	2-3.7	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Type:			Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Surface	Surface	Surface	Surface	Surface	Surface
Percent Wood waste:			10	Trace	20	40	85	25	30	85	30	Trace	0	5	0
TOC:			Inside	Inside	Inside	Outside	Outside	Outside	Outside	Outside	Outside	Inside	Inside	Inside	Inside
PAHs (ug/kg-OC) cont.															
Fluorene	23,000	NV	--	--	--	--	--	--	862 U	275 U	255 U	649 U	**3,800**	671 U	--
Naphthalene	99,000	NV	--	--	--	--	--	--	1,730 U	551 U	515 U	1,300 U	**3,350**	1,340 U	--
Phenanthrene	100,000	NV	--	--	--	--	--	--	862 U	**724**	**517**	**907 J**	**25,000**	671 U	--
Total HPAH[h]	960,000	NV	--	--	--	--	--	--	**7,470 J**	**973 J**	**17,100 J**	**1,790 J**	**41,100 J**	1,010 U	--
Benzo(a)anthracene	110,000	NV	--	--	--	--	--	--	862 U	551 U	**1,300**	649 U	**2,890**	671 U	--
Benzo(a)pyrene	99,000	NV	--	--	--	--	--	--	**2,110 J**	413 U	**974**	973 U	**1,680**	1,010 U	--
Benzo(ghi)perylene	31,000	NV	--	--	--	--	--	--	**929 J**	275 U	**389 J**	649 U	513 U	671 U	--
Chrysene	110,000	NV	--	--	--	--	--	--	862 U	**302 J**	**1,530**	649 U	**3,060**	671 U	--
Dibenzo(a,h)anthracene	12,000	NV	--	--	--	--	--	--	862 U	275 U	255 U	649 U	513 U	671 U	--
Fluoranthene	160,000	NV	--	--	--	--	--	--	**963 J**	**384 J**	**5,320**	**920 J**	**14,600**	671 U	--
Indeno(1,2,3-cd)pyrene	34,000	NV	--	--	--	--	--	--	862 U	275 U	**440 J**	649 U	513 U	671 U	--
Pyrene	1,000,000	NV	--	--	--	--	--	--	**1,920**	**287 J**	**4,470**	**867 J**	**17,400**	671 U	--
Benzo(b)fluoranthene	NV	NV	--	--	--	--	--	--	**1,530 J**	413 U	**1,930**	973 U	**1,470 J**	1,010 U	--
Benzo(k)fluoranthene	NV	NV	--	--	--	--	--	--	1,290 U	413 U	**777 J**	973 U	770 U	1,010 U	--
Total benzofluoranthenes[i]	230,000	NV	--	--	--	--	--	--	**1,530 J**	413 U	**2,710 J**	**973**	**1,470 J**	**1,010**	--
PCBs and Pesticides (ug/kg-dry)															
Aroclor 1016	NV	NV	--	--	--	--	--	--	2.15 U	5.75 UJ	4.57 U	2.02 U	2.07 U	2.03 U	--
Aroclor 1221	NV	NV	--	--	--	--	--	--	2.15 U	5.75 UJ	4.57 U	2.02 U	2.07 U	2.03 U	--
Aroclor 1232	NV	NV	--	--	--	--	--	--	2.15 U	5.75 UJ	4.57 U	2.02 U	2.07 U	2.03 U	--
Aroclor 1242	NV	NV	--	--	--	--	--	--	2.15 U	5.75 UJ	4.57 U	2.02 U	2.07 U	2.03 U	--
Aroclor 1248	NV	NV	--	--	--	--	--	--	2.15 U	5.75 UJ	4.57 U	2.02 U	2.07 U	2.03 U	--
Aroclor 1254	NV	NV	--	--	--	--	--	--	**5.86 J**	5.75 UJ	4.57 U	2.02 U	4.14 U	2.03 U	--
Aroclor 1260	NV	NV	--	--	--	--	--	--	**7.17 J**	**8.41 J**	4.57 U	2.02 U	4.14 U	2.03 U	--
Aroclor 1268	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Total PCBs[k]	3.5	3.5	--	--	--	--	--	--	**13.0 J**	**8.41 J**	4.57 U	2.02 U	4.14 U	2.03 U	--
Carbazole	900	900	--	--	--	--	--	--	--	--	--	--	--	--	--
Additional SVOCs (ug/kg-dry)															
1,3-Dichlorobenzene	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Methylphenol	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	NV	NV	--	--	--	--	--	--	341 U	75.7 U	60.4 U	48.8 U	59 U	57 U	--
Dioxins/Furans (pg/g-dry)															
1,2,3,4,6,7,8-HpCDD	NV	NV	--	--	--	--	--	--	--	**263**	--	--	--	--	--
1,2,3,4,6,7,8-HpCDF	NV	NV	--	--	--	--	--	--	--	**52.5**	--	--	--	--	--
1,2,3,4,7,8,9-HpCDF	NV	NV	--	--	--	--	--	--	--	2.34 UJ	--	--	--	--	--
1,2,3,4,7,8-HxCDD	NV	NV	--	--	--	--	--	--	--	**5.92 J**	--	--	--	--	--
1,2,3,4,7,8-HxCDF	NV	NV	--	--	--	--	--	--	--	2.61 UJ	--	--	--	--	--
1,2,3,6,7,8-HxCDD	NV	NV	--	--	--	--	--	--	--	**10**	--	--	--	--	--
1,2,3,6,7,8-HxCDF	NV	NV	--	--	--	--	--	--	--	1.66 UJ	--	--	--	--	--
1,2,3,7,8,9-HxCDD	NV	NV	--	--	--	--	--	--	--	**6.08 J**	--	--	--	--	--
1,2,3,7,8,9-HxCDF	NV	NV	--	--	--	--	--	--	--	0.641 U	--	--	--	--	--
1,2,3,7,8-PeCDD	NV	NV	--	--	--	--	--	--	--	2.46 UJK	--	--	--	--	--
1,2,3,7,8-PeCDF	NV	NV	--	--	--	--	--	--	--	1.26 UJ	--	--	--	--	--

Table 8-1
2013-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	Preliminary Cleanup Standards[a]		SE-03A	SE-05A	SE-06A	SE-07A	SE-08A	SE-08C	SE-10	SE-14	SE-15	SE-16	SE-17	SE-18	SE-19
Sample Name:			SE-03A-0-1.0	SE-05A-2.0-3.0	SE-06A-0.5-1.5	SE-07A-0-1.0	SE-08A-0-1.0	SE-08C-3.2-4.2	SE-10-2.0-3.7	SE-14-0-0.33	SE-15-0-0.33	SE-16-0-0.33	SE-17-0-0.33	SE-18-0-0.33	SE-19-0-0.33
Collection Date:			09/25/2019	09/23/2019	09/25/2019	09/26/2019	09/24/2019	09/24/2019	09/26/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019
Collection Depth (ft bml):	Organic Carbon (0.5% to 3.5%)[b]	Organic Carbon (<0.5% or >3.5%)[c]	0-1	2-3	0.5-1.5	0-1	0-1	3-4.2	2-3.7	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Type:			Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Surface	Surface	Surface	Surface	Surface	Surface
Percent Wood waste:			10	Trace	20	40	85	25	30	85	30	Trace	0	5	0
TOC:			Inside	Inside	Inside	Outside	Outside	Outside	Outside	Outside	Outside	Inside	Inside	Inside	Inside
Dioxins/Furans (pg/g-dry) cont.															
2,3,4,6,7,8-HxCDF	NV	NV	--	--	--	--	--	--	--	1.85 UJ	--	--	--	--	--
2,3,4,7,8-PeCDF	NV	NV	--	--	--	--	--	--	--	**1.23 J**	--	--	--	--	--
2,3,7,8-TCDD	NV	NV	--	--	--	--	--	--	--	**1.73**	--	--	--	--	--
2,3,7,8-TCDF	NV	NV	--	--	--	--	--	--	--	**1.75**	--	--	--	--	--
OCDD	NV	NV	--	--	--	--	--	--	--	**2,830**	--	--	--	--	--
OCDF	NV	NV	--	--	--	--	--	--	--	**116**	--	--	--	--	--
Total HpCDDs	NV	NV	--	--	--	--	--	--	--	**836 J**	--	--	--	--	--
Total HpCDFs	NV	NV	--	--	--	--	--	--	--	**180 J**	--	--	--	--	--
Total HxCDDs	NV	NV	--	--	--	--	--	--	--	**118 J**	--	--	--	--	--
Total HxCDFs	NV	NV	--	--	--	--	--	--	--	**64.7 J**	--	--	--	--	--
Total PeCDDs	NV	NV	--	--	--	--	--	--	--	33.8 UJK	--	--	--	--	--
Total PeCDFs	NV	NV	--	--	--	--	--	--	--	22.2 UJK	--	--	--	--	--
Total TCDDs	NV	NV	--	--	--	--	--	--	--	**14.1 J**	--	--	--	--	--
Total TCDFs	NV	NV	--	--	--	--	--	--	--	**14.1 J**	--	--	--	--	--
Dioxin/Furan TEQ[(I)(1)]	5	5	--	--	--	--	--	--	--	**10.1 J**	--	--	--	--	--
TPH (mg/kg-dry)															
Gasoline-Range Hydrocarbons	--	--	--	--	--	--	--	--	11.8 U	12.8 U	10 U	8.42 U	13.3 U	9.11 U	--
Diesel-Range Hydrocarbons	340	340	--	--	--	27.6 U	--	--	25.8 U	27.3 U	22.5 U	**18.5 J**	22.4 U	21.5 U	--
Motor-Oil Range Hydrocarbons	3,600	3,600	--	--	--	**644**	--	--	**898**	**384**	**374**	36.8 U	44.9 U	43 U	--
Grain Size (%)															
Gravel	NV	NV	--	--	--	--	--	--	15.5	22.4	25.4	0.39	0.55	0.02	--
Very coarse sand	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Coarse sand	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Medium sand	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Fine sand	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Very fine sand	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Coarse silt	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Medium silt	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Fine silt	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Very fine silt	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Coarse clay	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Medium clay	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Fine clay	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Total fines	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, total	NV	NV	--	--	--	--	--	--	29.4	27.3	21	41.8	18.5	38.8	--
Silt, total	NV	NV	--	--	--	--	--	--	39.5	41.2	42.4	42.4	56.9	43.8	--
Clay, total	NV	NV	--	--	--	--	--	--	15.7	9.2	11.2	15.4	24.1	17.4	--
Asbestos (%)															
Asbestos	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Pore Water Analysis															
Conductivity (uS/cm)	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Salinity (ppt)	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--

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Table 8-1
2013-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	Preliminary Cleanup Standards[a]		SE-20	SE-21	SE-22	SE-23	SE-24	SE-25	SE-26	SE-27		SE-28	SE-29	SE-30	SE-31
Sample Name:			SE-20-0-0.33	SE-21-0-0.33	SE-22-0-0.33	SE-23-0-0.33	SE-24-0-0.33	SE-25-0-0.33	SE-26-0-0.33	SE-27-0-0.33	SE-27-0-0.33-DUP	SE-28-0-0.33	SE-29-0-2.0	SE-30-2.5-4.5	SE-31-0-0.33
Collection Date:	Organic Carbon (0.5% to 3.5%)[b]	Organic Carbon (<0.5% or >3.5%)[c]	09/25/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/24/2019	09/26/2019	09/27/2019
Collection Depth (ft bml):			0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-2	2-4.5	0-0.33
Type:			Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Subsurface	Subsurface	Surface
Percent Wood waste:			0	10	10	15	25	80	80	10	10	75	80	20	35
TOC:			Outside	Inside	Outside	Inside	Outside	Outside	Outside	Outside	Outside	Outside	Outside	Outside	Inside
Conventional Parameters															
Ammonia as Nitrogen (mg/kg)	230	230	3.9	7.06	7.81	11.8	9.49	3.68	3.48	8.47	8.18	7.36	4.76	112	7.98
Fixed Solids (%)	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfide (mg/kg)	39	39	2.7 U	359	937	856	281	267	3.21 U	394	396	22.7	1,510 J	492	397
Total Organic Carbon (%)	NV	NV	6.6	1.3	3.8	2.6	7.8	18	13	3.8	3.9	5.5	9.9	5.1	2.1
Total Solids (%)	NV	NV	36.8	59.4	33.4	45.4	35.5 J	40.6 J	42.4	39.4	38.3	36	42.9 J	47.6	48.8
Total Volatile Solids (%)	NV	NV	12.7	5.02	11.6	7.18	18.9 J	19	18.4	12.1	9.96	13	27.4 J	14.7	8.8
TCLP Metals (mg/L)															
Lead	NV	NV	--	--	--	--	--	--	--	--	--	--	--	0.0065 U	--
Mercury	NV	NV	--	--	--	--	--	--	--	--	--	--	--	0.000007 U	--
Total Metals (mg/kg-dry)															
Arsenic	11	11	**7.96**	**4.49**	**6.97**	**8.51**	**8.26**	**8.84**	**5.11**	**7.49**	**7.57**	--	**7.45**	**7.52**	**6.07**
Cadmium	0.8	0.8	**0.239 J**	**0.118 J**	**0.201 J**	**0.513**	**0.216 J**	**0.725**	0.119 U	**0.154 J**	**0.188 J**	--	**0.188 J**	**0.246**	**0.165 J**
Chromium	72	72	**32.9**	**29.1**	**35.7**	**37.8**	**40**	**19.1**	**25.7**	**33.8**	**35.3**	--	**35.1**	**41.4**	**34.7**
Copper	390	390	**64.6**	**49.9**	**68.6**	**117**	**73.7**	**76.8**	**81.9**	**62.6**	**63.3**	--	**92.5**	**66**	**61.4**
Lead	21	21	**11.7**	**7.2**	**16.9**	**34.9**	**32.9**	**37.9**	**30.4**	**10.8**	**11.6**	--	**16.2 J**	**14.9**	**7.94**
Mercury	0.2	0.2	**0.069**	**0.0385 J**	**0.0528 J**	**0.0928**	**0.111**	**0.103**	**0.104**	**0.0366 J**	**0.0593**	**0.0827**	**0.107**	**0.0865**	**0.0443 J**
Nickel	50	50	**25.4**	**25.1**	**26.3**	**37.5**	**40.2**	**25.5**	**26**	**25.7**	**27.4**	--	**33.8**	**27.7**	**30.2**
Selenium	11	11	**0.941 J**	**0.63 J**	**1.01 J**	**0.798 J**	**0.797 J**	0.632 U	0.593 U	**0.896 J**	**0.987 J**	--	**0.644 J**	**0.993 J**	**0.845 J**
Silver	0.57	0.57	**0.144 J**	**0.0854 J**	0.147 U	**0.148 J**	**0.146 J**	0.126 U	0.119 U	0.124 U	0.129 U	--	0.116 U	**0.26**	**0.111 J**
Zinc	410	410	**142**	**64**	**136**	**136**	**93**	**98.6**	**76**	**80.5**	**88.1**	--	**84.6**	**98.3**	**74.7**
Organic Chemicals (ug/kg-dry)															
2,4-Dimethylphenol	29	29	71.8 U	44.4 U	79.3 U	142 U	74 U	325 U	153 U	65.6 U	68 U	--	153 U	138 U	53.8 U
2-Methylphenol	63	63	35.8 U	22.2 U	39.6 U	71.1 U	37 U	162 U	76.6 U	32.7 U	33.9 U	--	76.3 U	68.8 U	26.9 U
3- & 4-Methylphenol (m,p-Cresol)	260	260	**43.2 J**	**100**	39.6 U	71.1 U	**137**	162 U	**93.4 J**	**42.7 J**	**50.4 J**	--	**1,600**	**164**	**267**
Benzoic acid	650	650	1,800 U	1,110 U	1,990 U	3,560 U	1,850 UJ	8,130 U	3,840 U	1,640 U	1,700 U	--	3,830 U	3,450 U	1,350 U
Benzyl alcohol	57	57	71.8 U	44.4 U	79.3 U	142 U	74 U	325 U	153 U	65.6 U	68 U	--	153 U	138 U	53.8 U
Dibenzofuran	200	200	14.3 U	8.85 U	15.8 U	28.4 U	**21.1 J**	64.7 U	**33.9 J**	13.1 U	13.6 U	--	**145**	**35.6 J**	10.7 U
Phenol	120	120	28.7 U	**28.1 J**	31.7 U	57 U	**88.9**	130 U	**94.1 J**	26.2 U	**60.8**	--	**571 J**	**64.7 J**	**73.9**
N-Nitrosodiphenylamine	NV	28	35.8 U	22.2 U	39.6 U	71.1 U	37 U	162 U	76.6 U	32.7 U	33.9 U	--	76.3 U	68.8 U	26.9 U
Organic Chemicals (ug/kg-OC)															
N-Nitrosodiphenylamine	11,000	NV	542 U	1,710 U	1,040 U	2,730 U	474 U	900 U	589 U	861 U	869 U	--	771 U	1,350 U	1,280 U
Phthalates (ug/kg-dry)															
Bis(2-ethylhexyl)phthalate	500	500	215 U	133 U	238 U	427 U	222 U	974 U	460 U	197 U	204 U	--	458 U	413 U	161 U
Butylbenzylphthalate	NV	63	71.8 U	44.4 U	79.3 U	142 U	74 U	325 U	153 U	65.6 U	68 U	--	153 U	138 U	53.8 U
Diethyl phthalate	NV	200	71.8 U	44.4 U	79.3 U	142 U	74 U	325 U	153 U	65.6 U	68 U	--	153 U	138 U	53.8 U
Dimethyl phthalate	NV	71	71.8 U	44.4 U	79.3 U	142 U	74 U	325 U	153 U	65.6 U	68 U	--	153 U	138 U	53.8 U
Di-n-butyl phthalate	380	380	71.8 U	44.4 U	79.3 U	142 U	74 U	325 U	153 U	65.6 U	68 U	--	**213 J**	138 U	53.8 U
Di-n-octyl phthalate	39	39	115 U	71.2 U	127 U	228 U	119 U	521 U	246 U	105 U	109 U	--	245 U	221 U	86.3 U
Phthalates (ug/kg-OC)															
Butylbenzylphthalate	4,900	NV	1,090 U	3,420 U	2,090 U	5,460 U	949 U	1,810 U	1,180 U	1,730 U	1,740 U	--	1,550 U	2,710 U	2,560 U
Diethyl phthalate	61,000	NV	1,090 U	3,420 U	2,090 U	5,460 U	949 U	1,810 U	1,180 U	1,730 U	1,740 U	--	1,550 U	2,710 U	2,560 U
Dimethyl phthalate	53,000	NV	1,090 U	3,420 U	2,090 U	5,460 U	949 U	1,810 U	1,180 U	1,730 U	1,740 U	--	1,550 U	2,710 U	2,560 U

MAUL FOSTER ALONGI

Table 8-1
2013-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	Preliminary Cleanup Standards[a]		SE-20	SE-21	SE-22	SE-23	SE-24	SE-25	SE-26	SE-27		SE-28	SE-29	SE-30	SE-31
Sample Name:			SE-20-0-0.33	SE-21-0-0.33	SE-22-0-0.33	SE-23-0-0.33	SE-24-0-0.33	SE-25-0-0.33	SE-26-0-0.33	SE-27-0-0.33	SE-27-0-0.33-DUP	SE-28-0-0.33	SE-29-0-2.0	SE-30-2.5-4.5	SE-31-0-0.33
Collection Date:	Organic Carbon (0.5% to 3.5%)[b]	Organic Carbon (<0.5% or >3.5%)[c]	09/25/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/24/2019	09/26/2019	09/27/2019
Collection Depth (ft bml):			0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-2	2-4.5	0-0.33
Type:			Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Subsurface	Subsurface	Surface
Percent Wood waste:			0	10	10	15	25	80	80	10	10	75	80	20	35
TOC:			Outside	Inside	Outside	Inside	Outside	Outside	Outside	Outside	Outside	Outside	Outside	Outside	Inside
Chlorinated Organics (ug/kg-dry)															
1,2,4-Trichlorobenzene	NV	31	35.8 U	22.2 U	39.6 U	71.1 U	37 U	162 U	76.6 U	32.7 U	33.9 U	--	76.3 U	68.8 U	26.9 U
1,2-Dichlorobenzene	NV	35	35.8 U	22.2 U	39.6 U	71.1 U	37 U	162 U	76.6 U	32.7 U	33.9 U	--	76.3 U	68.8 U	26.9 U
1,4-Dichlorobenzene	NV	110	35.8 U	22.2 U	39.6 U	71.1 U	37 U	162 U	76.6 U	32.7 U	33.9 U	--	76.3 U	68.8 U	26.9 U
Hexachlorobenzene	NV	22	14.3 U	8.85 U	15.8 U	28.4 U	14.8 U	64.7 U	30.6 U	13.1 U	13.6 U	--	30.5 U	27.5 U	10.7 U
Hexachlorobutadiene	NV	11	35.8 U	22.2 U	39.6 U	71.1 U	37 U	162 U	76.6 U	32.7 U	33.9 U	--	76.3 U	68.8 U	26.9 U
Pentachlorophenol	360	360	143 U	88.5 U	158 U	284 U	148 U	647 U	306 U	131 U	136 U	--	305 U	275 U	107 U
Chlorinated Organics (ug/kg-OC)															
1,2,4-Trichlorobenzene	810	NV	542 U	1,710 U	1,040 U	2,730 U	474 U	900 U	589 U	861 U	869 U	--	771 U	1,350 U	1,280 U
1,2-Dichlorobenzene	2,300	NV	542 U	1,710 U	1,040 U	2,730 U	474 U	900 U	589 U	861 U	869 U	--	771 U	1,350 U	1,280 U
1,4-Dichlorobenzene	3,100	NV	542 U	1,710 U	1,040 U	2,730 U	474 U	900 U	589 U	861 U	869 U	--	771 U	1,350 U	1,280 U
Hexachlorobenzene	380	NV	217 U	681 U	416 U	1,090 U	190 U	359 U	235 U	345 U	349 U	--	308 U	539 U	510 U
Hexachlorobutadiene	3,900	NV	542 U	1,710 U	1,040 U	2,730 U	474 U	900 U	589 U	861 U	869 U	--	771 U	1,350 U	1,280 U
PAHs (ug/kg-dry)															
Total PAH[f]	17,000	17,000	**34.3 J**	**119 J**	**58.2 J**	**1,750 J**	**594 J**	**790 J**	**742 J**	**172 J**	**16.3 J**	--	**4,620 J**	**919 J**	**247 J**
Total LPAH[g]	NV	5,200	28.7 U	**83.2 J**	31.7 U	**296 J**	**223 J**	**64.8 J**	**267 J**	**18.1 J**	27.2 U	--	**1,460 J**	**395 J**	**160 J**
1-Methylnaphthalene	NV	NV	28.7 U	17.8 U	31.7 U	57 U	29.6 U	130 U	61.4 U	26.2 U	27.2 U	--	**76.7**	55.2 U	21.5 U
2-Methylnaphthalene	NV	670	28.7 U	17.8 U	31.7 U	57 U	29.6 U	130 U	61.4 U	26.2 U	27.2 U	--	**149**	55.2 U	21.5 U
Acenaphthene	NV	500	14.3 U	8.85 U	15.8 U	28.4 U	**29.3 J**	64.7 U	**40.8 J**	13.1 U	13.6 U	--	**135**	**148**	**37.2**
Acenaphthylene	NV	1,300	14.3 U	**14.5 J**	15.8 U	**37.6 J**	14.8 U	64.7 U	30.6 U	13.1 U	13.6 U	--	30.5 U	27.5 U	**19.6 J**
Anthracene	NV	960	14.3 U	8.85 U	15.8 U	**45.8 J**	**22.6 J**	64.7 U	30.6 U	13.1 U	13.6 U	--	**204**	**36.8 J**	10.7 U
Fluorene	NV	540	14.3 U	8.85 U	15.8 U	28.4 U	**24.2 J**	64.7 U	**38.6 J**	13.1 U	13.6 U	--	**136**	**61.8**	10.7 U
Naphthalene	NV	2,100	28.7 U	**49.2**	31.7 U	57 U	**69.8**	130 U	**75.2 J**	26.2 U	27.2 U	--	**491**	55.2 U	**74.2**
Phenanthrene	NV	1,500	14.3 U	**19.5**	15.8 U	**213**	**76.8**	**64.8 J**	**112**	**18.1 J**	13.6 U	--	**491 J**	**148**	**28.9**
Total HPAH[h]	NV	12,000	**34.3 J**	**35.8 J**	**58.2 J**	**1,450 J**	**371 J**	**725 J**	**475 J**	**154 J**	**16.3 J**	--	**2,940 J**	**524 J**	**87.4 J**
Benzo(a)anthracene	NV	1,300	14.3 U	8.85 U	15.8 U	**164**	**41.2**	**89 J**	**45.8 J**	**20.3 J**	13.6 U	--	**218**	**53.7 J**	**12.5 J**
Benzo(a)pyrene	NV	1,600	21.5 U	13.3 U	23.8 U	**163**	**31.8 J**	**111 J**	**66.5 J**	**23.6 J**	20.4 U	--	**154**	**43.8 J**	**17.3 J**
Benzo(ghi)perylene	NV	670	14.3 U	8.85 U	15.8 U	**77.8**	14.8 U	64.7 U	30.6 U	13.1 U	13.6 U	--	**68**	27.5 U	10.7 U
Chrysene	NV	1,400	14.3 U	8.85 U	15.8 U	**153**	**33.4**	64.7 U	**42.4 J**	**20.3 J**	13.6 U	--	**199**	**60.4**	10.7 U
Dibenzo(a,h)anthracene	NV	230	14.3 U	8.85 U	15.8 U	28.4 U	14.8 U	64.7 U	30.6 U	13.1 U	13.6 U	--	30.5 U	27.5 U	10.7 U
Fluoranthene	NV	1,700	**16.9 J**	**18.1**	**31.8**	**285**	**123**	**204**	**109**	**36.3**	13.6 U	--	**1,150 J**	**198**	**28**
Indeno(1,2,3-cd)pyrene	NV	600	14.3 U	8.85 U	15.8 U	**80.7**	14.8 U	64.7 U	**34 J**	13.1 U	13.6 U	--	**69.5**	27.5 U	10.7 U
Pyrene	NV	2,600	**17.4 J**	**17.7 J**	**26.4 J**	**305**	**113**	**184**	**102**	**32.4**	**16.3 J**	--	**823 J**	**168**	**29.6**
Benzo(b)fluoranthene	NV	NV	21.5 U	13.3 U	23.8 U	**153**	**28.6 J**	**137 J**	**75.4 J**	**20.8 J**	20.4 U	--	**180**	41.3 U	16.1 U
Benzo(k)fluoranthene	NV	NV	21.5 U	13.3 U	23.8 U	**68.1 J**	22.2 U	97.4 U	46 U	19.7 U	20.4 U	--	**75.8 J**	41.3 U	16.1 U
Total benzofluoranthenes[i]	NV	3,200	21.5 U	13.3 U	23.8 U	**221 J**	**28.6 J**	**137 J**	**75.4 J**	**20.8 J**	20.4 U	--	**256 J**	41.3 U	16.1 U
cPAH TEQ[i][1]	21	21	21.5 U	13.3 U	23.8 U	**213 J**	**41.7 J**	**145 J**	**86.3 J**	**30.2 J**	20.4 U	--	**212 J**	**56.7 J**	**21.3 J**
PAHs (ug/kg-OC)															
2-Methylnaphthalene	38,000	NV	435 U	1,370 U	834 U	2,190 U	379 U	722 U	472 U	689 U	697 U	--	**1,510**	1,080 U	1,020 U
Total LPAH[g]	370,000	NV	435 U	**6,400**	834 U	**11,400**	**2,860 J**	**360 J**	**2,050 J**	**476 J**	697 U	--	**14,700 J**	**7,750 J**	**7,620**
Acenaphthene	16,000	NV	217 U	681 U	416 U	1,090 U	**376 J**	359 U	**314 J**	345 U	349 U	--	**1,360**	**2,900**	**1,770**
Acenaphthylene	66,000	NV	217 U	**1,120 J**	416 U	**1,450 J**	190 U	359 U	235 U	345 U	349 U	--	308 U	539 U	**933 J**
Anthracene	220,000	NV	217 U	681 U	416 U	**1,760 J**	**290 J**	359 U	235 U	345 U	349 U	--	**2,060**	**722 J**	510 U

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Table 8-1
2013-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	Preliminary Cleanup Standards[a]		SE-20	SE-21	SE-22	SE-23	SE-24	SE-25	SE-26	SE-27		SE-28	SE-29	SE-30	SE-31
Sample Name:			SE-20-0-0.33	SE-21-0-0.33	SE-22-0-0.33	SE-23-0-0.33	SE-24-0-0.33	SE-25-0-0.33	SE-26-0-0.33	SE-27-0-0.33	SE-27-0-0.33-DUP	SE-28-0-0.33	SE-29-0-2.0	SE-30-2.5-4.5	SE-31-0-0.33
Collection Date:	Organic Carbon (0.5% to 3.5%)[b]	Organic Carbon (<0.5% or >3.5%)[c]	09/25/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/24/2019	09/26/2019	09/27/2019
Collection Depth (ft bml):			0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-2	2-4.5	0-0.33
Type:			Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Subsurface	Subsurface	Surface
Percent Wood waste:			0	10	10	15	25	80	80	10	10	75	80	20	35
TOC:			Outside	Inside	Outside	Inside	Outside	Outside	Outside	Outside	Outside	Outside	Outside	Outside	Inside
PAHs (ug/kg-OC) cont.															
Fluorene	23,000	NV	217 U	681 U	416 U	1,090 U	**310 J**	359 U	**297 J**	345 U	349 U	--	**1,370**	**1,210**	510 U
Naphthalene	99,000	NV	435 U	**3,780**	834 U	2,190 U	**895**	722 U	**578 J**	689 U	697 U	--	**4,960**	1,080 U	**3,530**
Phenanthrene	100,000	NV	217 U	**1,500**	416 U	**8,190**	**985**	**360 J**	**862**	**476 J**	349 U	--	**4,960 J**	**2,900**	**1,380**
Total HPAH[h]	960,000	NV	**520 J**	**2,750 J**	**1,530 J**	**55,800 J**	**4,760 J**	**4,030 J**	**3,650 J**	**4,050 J**	**418 J**	--	**29,700 J**	**10,300 J**	**4,160 J**
Benzo(a)anthracene	110,000	NV	217 U	681 U	416 U	**6,310**	**528**	**494 J**	**352 J**	**534 J**	349 U	--	**2,200**	**1,050 J**	**595 J**
Benzo(a)pyrene	99,000	NV	326 U	1,020 U	626 U	**6,270**	**408 J**	**617 J**	**512 J**	**621 J**	523 U	--	**1,560**	**859 J**	**824 J**
Benzo(ghi)perylene	31,000	NV	217 U	681 U	416 U	**2,990**	190 U	359 U	235 U	345 U	349 U	--	**687**	539 U	510 U
Chrysene	110,000	NV	217 U	681 U	416 U	**5,880**	**428**	359 U	**326 J**	**534 J**	349 U	--	**2,010**	**1,180**	510 U
Dibenzo(a,h)anthracene	12,000	NV	217 U	681 U	416 U	1,090 U	190 U	359 U	235 U	345 U	349 U	--	308 U	539 U	510 U
Fluoranthene	160,000	NV	**256 J**	**1,390**	**837**	**11,000**	**1,580**	**1,130**	**838**	**955**	349 U	--	**11,600 J**	**3,880**	**1,330**
Indeno(1,2,3-cd)pyrene	34,000	NV	217 U	681 U	416 U	**3,100**	190 U	359 U	**262 J**	345 U	349 U	--	**702**	539 U	510 U
Pyrene	1,000,000	NV	**264 J**	**1,360 J**	**695 J**	**11,700**	**1,450**	**1,020**	**785**	**853**	**418 J**	--	**8,310 J**	**3,290**	**1,410**
Benzo(b)fluoranthene	NV	NV	326 U	1,020 U	626 U	**5,880**	**367 J**	**761 J**	**580 J**	**547 J**	523 U	--	**1,820**	810 U	767 U
Benzo(k)fluoranthene	NV	NV	326 U	1,020 U	626 U	**2,620 J**	285 U	541 U	354 U	518 U	523 U	--	**766 J**	810 U	767 U
Total benzofluoranthenes[i]	230,000	NV	326 U	**1,020**	626 U	**8,500**	**367 J**	**761 J**	**580 J**	**547 J**	523 U	--	**2,580 J**	810 U	**767**
PCBs and Pesticides (ug/kg-dry)															
Aroclor 1016	NV	NV	2.12 U	3.36 U	2.04 U	4.39 U	5.6 U	4.56 U	4.42 U	2.07 UJ	1.92 UJ	--	11.6 U	7.24 U	3.96 U
Aroclor 1221	NV	NV	2.12 U	3.36 U	2.04 U	4.39 U	5.6 U	4.56 U	4.42 U	2.07 U	1.92 U	--	11.6 U	4.13 U	3.96 U
Aroclor 1232	NV	NV	2.12 U	3.36 U	2.04 U	4.39 U	5.6 U	4.56 U	4.42 U	2.07 U	1.92 U	--	11.6 U	17.6 U	3.96 U
Aroclor 1242	NV	NV	2.12 U	3.36 U	2.04 U	4.39 U	5.6 U	4.56 U	4.42 U	2.07 U	1.92 U	--	11.6 U	10.3 U	3.96 U
Aroclor 1248	NV	NV	2.12 U	3.36 U	2.04 U	4.39 U	5.6 U	4.56 U	4.42 U	2.07 U	1.92 U	--	11.6 U	13.4 U	3.96 U
Aroclor 1254	NV	NV	**2.38 J**	3.36 U	**3.74 J**	**8.09 J**	5.6 U	4.56 U	4.42 U	2.07 U	1.92 U	--	11.6 U	11.4 U	3.96 U
Aroclor 1260	NV	NV	**2.31 J**	**4.16 J**	**4.43 J**	4.39 U	**42.4**	**17.6**	**15.5**	**9.53**	**9.05**	--	**38.9**	**14.4**	3.96 U
Aroclor 1268	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Total PCBs[k]	3.5	3.5	**4.69 J**	**4.16 J**	**8.17 J**	**8.09 J**	**42.4**	**17.6**	**15.5**	**9.53**	**9.05**	--	**38.9**	**14.4**	3.96 U
Carbazole	900	900	--	--	--	--	--	--	--	--	--	--	--	--	--
Additional SVOCs (ug/kg-dry)															
1,3-Dichlorobenzene	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Methylphenol	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	NV	NV	71.8 U	44.4 U	79.3 U	142 U	74 U	325 U	153 U	65.6 U	68 U	--	153 U	138 U	53.8 U
Dioxins/Furans (pg/g-dry)															
1,2,3,4,6,7,8-HpCDD	NV	NV	--	**19.3**	**401**	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDF	NV	NV	--	**9.17**	**92.5**	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8,9-HpCDF	NV	NV	--	0.462 UJ	**4.41 J**	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDD	NV	NV	--	0.317 U	**8.61**	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDF	NV	NV	--	0.376 UJ	**3.54 J**	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDD	NV	NV	--	**0.85 J**	**19.4**	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDF	NV	NV	--	0.346 UJ	**2.79 J**	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDD	NV	NV	--	**1.14 J**	**14.8**	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDF	NV	NV	--	0.217 U	1.15 UJ	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDD	NV	NV	--	**0.643 J**	**4.75 J**	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDF	NV	NV	--	0.161 U	1.16 UJ	--	--	--	--	--	--	--	--	--	--

Table 8-1
2013-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	Preliminary Cleanup Standards[a]		SE-20	SE-21	SE-22	SE-23	SE-24	SE-25	SE-26	SE-27		SE-28	SE-29	SE-30	SE-31
Sample Name:			SE-20-0-0.33	SE-21-0-0.33	SE-22-0-0.33	SE-23-0-0.33	SE-24-0-0.33	SE-25-0-0.33	SE-26-0-0.33	SE-27-0-0.33	SE-27-0-0.33-DUP	SE-28-0-0.33	SE-29-0-2.0	SE-30-2.5-4.5	SE-31-0-0.33
Collection Date:	Organic Carbon (0.5% to 3.5%)[b]	Organic Carbon (<0.5% or >3.5%)[c]	09/25/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/24/2019	09/26/2019	09/27/2019
Collection Depth (ft bml):			0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-2	2-4.5	0-0.33
Type:			Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Subsurface	Subsurface	Surface
Percent Wood waste:			0	10	10	15	25	80	80	10	10	75	80	20	35
TOC:			Outside	Inside	Outside	Inside	Outside	Outside	Outside	Outside	Outside	Outside	Outside	Outside	Inside
Dioxins/Furans (pg/g-dry) cont.															
2,3,4,6,7,8-HxCDF	NV	NV	--	0.414 UJ	**4.24 J**	--	--	--	--	--	--	--	--	--	--
2,3,4,7,8-PeCDF	NV	NV	--	0.315 UJ	**2.15 J**	--	--	--	--	--	--	--	--	--	--
2,3,7,8-TCDD	NV	NV	--	0.341 U	**1.74**	--	--	--	--	--	--	--	--	--	--
2,3,7,8-TCDF	NV	NV	--	0.575 UJK	**1.89**	--	--	--	--	--	--	--	--	--	--
OCDD	NV	NV	--	**177**	**3,250**	--	--	--	--	--	--	--	--	--	--
OCDF	NV	NV	--	**13.4**	**262**	--	--	--	--	--	--	--	--	--	--
Total HpCDDs	NV	NV	--	**43.1**	**737**	--	--	--	--	--	--	--	--	--	--
Total HpCDFs	NV	NV	--	**23.5 J**	**259 J**	--	--	--	--	--	--	--	--	--	--
Total HxCDDs	NV	NV	--	**11.3 J**	**141 J**	--	--	--	--	--	--	--	--	--	--
Total HxCDFs	NV	NV	--	8.49 UJK	**107 J**	--	--	--	--	--	--	--	--	--	--
Total PeCDDs	NV	NV	--	**3.71 J**	**29.5 J**	--	--	--	--	--	--	--	--	--	--
Total PeCDFs	NV	NV	--	3.7 UJK	**40.4 J**	--	--	--	--	--	--	--	--	--	--
Total TCDDs	NV	NV	--	0.404 UJK	**14.1 J**	--	--	--	--	--	--	--	--	--	--
Total TCDFs	NV	NV	--	3.19 UJK	**16.8 J**	--	--	--	--	--	--	--	--	--	--
Dioxin/Furan TEQ[i][1]	5	5	--	**1.52 J**	**18.8 J**	--	--	--	--	--	--	--	--	--	--
TPH (mg/kg-dry)															
Gasoline-Range Hydrocarbons	--	--	13.4 U	6.71 U	16 U	9.01 U	27.9 U	10.1 U	9.64 U	11.5 U	13 U	--	9.53 U	7.95 U	7.73 U
Diesel-Range Hydrocarbons	340	340	26.7 U	**23.2 J**	29.9 U	21.2 U	28.1 U	24.1 U	23.4 U	24.2 U	25.9 U	--	23.2 U	20.6 U	20.4 U
Motor-Oil Range Hydrocarbons	3,600	3,600	**610**	33.1 U	**130**	**73.8 J**	**559**	**2,080**	**842**	**89.6 J**	**72.2 J**	--	**385**	**393**	**58.5 J**
Grain Size (%)															
Gravel	NV	NV	5.18	6.79	16.8	7.85	38.2	51	35	17.7	8.57	--	32.4	5.79	2.99
Very coarse sand	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Coarse sand	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Medium sand	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Fine sand	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Very fine sand	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Coarse silt	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Medium silt	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Fine silt	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Very fine silt	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Coarse clay	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Medium clay	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Fine clay	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Total fines	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Sand, total	NV	NV	9.74	46.2	13.6	38.4	14.3	33.2	37.2	15.8	17.3	--	26.8	11.4	44.4
Silt, total	NV	NV	58.5	33.5	49.2	39.2	39.2	12.8	20.7	51.8	53	--	33.3	56.2	36.6
Clay, total	NV	NV	26.6	13.5	20.4	14.6	8.3	3	7.1	14.7	21.2	--	7.5	26.6	15.9
Asbestos (%)															
Asbestos	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Pore Water Analysis															
Conductivity (uS/cm)	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Salinity (ppt)	NV	NV	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 8-1
2013-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	Preliminary Cleanup Standards[a]		SE-32	SE-33	SE-34	SE-35	SE-36	SE-37	SE-38	SE-39	SE-40	SE-41
Sample Name:			SE-32	SE-33	SE-34	SE-35	SE-36	SE-37	SE-38	SE-39	SE-40	SE-41
Collection Date:	Organic Carbon (0.5% to 3.5%)[b]	Organic Carbon (<0.5% or >3.5%)[c]	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020
Collection Depth (ft bml):			0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Type:			Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Percent Wood waste:			Trace	10	5	Trace	10	25	50	90	0	20
TOC:			Inside	Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	Inside
Conventional Parameters												
Ammonia as Nitrogen (mg/kg)	230	230	7.61	26.4	4.82	7.45	4.1	14.2	3.49	1.16	0.783	8.41
Fixed Solids (%)	NV	NV	--	--	--	--	--	--	--	--	--	--
Sulfide (mg/kg)	39	39	337 J	473 J	921 J	447 J	546 J	204 J	365 J	2,110 J	392 J	567 J
Total Organic Carbon (%)	NV	NV	1.1	1.2	1.2	1.1	1.1	1.9	1.7	3.9	1	1.8
Total Solids (%)	NV	NV	46.4	54.1	53	50	49	46.2	49.6	25.5	77.6	43.4
Total Volatile Solids (%)	NV	NV	6.56	6.45	6.69	6.68	6.88	15.2	10.1	50.1	2.51	10.2
TCLP Metals (mg/L)												
Lead	NV	NV	--	--	--	--	--	--	--	--	--	--
Mercury	NV	NV	--	--	--	--	--	--	--	--	--	--
Total Metals (mg/kg-dry)												
Arsenic	11	11	--	--	--	--	--	--	--	--	--	--
Cadmium	0.8	0.8	--	--	--	--	--	--	--	--	--	--
Chromium	72	72	--	--	--	--	--	--	--	--	--	--
Copper	390	390	--	--	--	--	--	--	--	--	--	--
Lead	21	21	--	--	--	--	--	--	--	--	--	--
Mercury	0.2	0.2	--	--	--	--	--	--	--	--	--	--
Nickel	50	50	--	--	--	--	--	--	--	--	--	--
Selenium	11	11	--	--	--	--	--	--	--	--	--	--
Silver	0.57	0.57	--	--	--	--	--	--	--	--	--	--
Zinc	410	410	--	--	--	--	--	--	--	--	--	--
Organic Chemicals (ug/kg-dry)												
2,4-Dimethylphenol	29	29	--	--	--	--	--	--	--	--	--	--
2-Methylphenol	63	63	--	--	--	--	--	--	--	--	--	--
3- & 4-Methylphenol (m,p-Cresol)	260	260	--	--	--	--	--	--	--	--	--	--
Benzoic acid	650	650	--	--	--	--	--	--	--	--	--	--
Benzyl alcohol	57	57	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	200	200	--	--	--	--	--	--	--	--	--	--
Phenol	120	120	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	NV	28	--	--	--	--	--	--	--	--	--	--
Organic Chemicals (ug/kg-OC)												
N-Nitrosodiphenylamine	11,000	NV	--	--	--	--	--	--	--	--	--	--
Phthalates (ug/kg-dry)												
Bis(2-ethylhexyl)phthalate	500	500	--	--	--	--	--	--	--	--	--	--
Butylbenzylphthalate	NV	63	--	--	--	--	--	--	--	--	--	--
Diethyl phthalate	NV	200	--	--	--	--	--	--	--	--	--	--
Dimethyl phthalate	NV	71	--	--	--	--	--	--	--	--	--	--
Di-n-butyl phthalate	380	380	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	39	39	--	--	--	--	--	--	--	--	--	--
Phthalates (ug/kg-OC)												
Butylbenzylphthalate	4,900	NV	--	--	--	--	--	--	--	--	--	--
Diethyl phthalate	61,000	NV	--	--	--	--	--	--	--	--	--	--
Dimethyl phthalate	53,000	NV	--	--	--	--	--	--	--	--	--	--

Table 8-1
2013-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	Preliminary Cleanup Standards[a]		SE-32	SE-33	SE-34	SE-35	SE-36	SE-37	SE-38	SE-39	SE-40	SE-41
Sample Name:			SE-32	SE-33	SE-34	SE-35	SE-36	SE-37	SE-38	SE-39	SE-40	SE-41
Collection Date:	Organic Carbon (0.5% to 3.5%)[b]	Organic Carbon (<0.5% or >3.5%)[c]	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020
Collection Depth (ft bml):			0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Type:			Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Percent Wood waste:			Trace	10	5	Trace	10	25	50	90	0	20
TOC:			Inside	Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	Inside
Chlorinated Organics (ug/kg-dry)												
1,2,4-Trichlorobenzene	NV	31	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	NV	35	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	NV	110	--	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	NV	22	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	NV	11	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	360	360	--	--	--	--	--	--	--	--	--	--
Chlorinated Organics (ug/kg-OC)												
1,2,4-Trichlorobenzene	810	NV	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	2,300	NV	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	3,100	NV	--	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	380	NV	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	3,900	NV	--	--	--	--	--	--	--	--	--	--
PAHs (ug/kg-dry)												
Total PAH[f]	17,000	17,000	--	--	--	--	--	--	--	--	--	--
Total LPAH[g]	NV	5,200	--	--	--	--	--	--	--	--	--	--
1-Methylnaphthalene	NV	NV	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	NV	670	--	--	--	--	--	--	--	--	--	--
Acenaphthene	NV	500	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	NV	1,300	--	--	--	--	--	--	--	--	--	--
Anthracene	NV	960	--	--	--	--	--	--	--	--	--	--
Fluorene	NV	540	--	--	--	--	--	--	--	--	--	--
Naphthalene	NV	2,100	--	--	--	--	--	--	--	--	--	--
Phenanthrene	NV	1,500	--	--	--	--	--	--	--	--	--	--
Total HPAH[h]	NV	12,000	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	NV	1,300	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	NV	1,600	--	--	--	--	--	--	--	--	--	--
Benzo(ghi)perylene	NV	670	--	--	--	--	--	--	--	--	--	--
Chrysene	NV	1,400	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	NV	230	--	--	--	--	--	--	--	--	--	--
Fluoranthene	NV	1,700	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	NV	600	--	--	--	--	--	--	--	--	--	--
Pyrene	NV	2,600	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	NV	NV	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	NV	NV	--	--	--	--	--	--	--	--	--	--
Total benzofluoranthenes[i]	NV	3,200	--	--	--	--	--	--	--	--	--	--
cPAH TEQ[j](1)	21	21	--	--	--	--	--	--	--	--	--	--
PAHs (ug/kg-OC)												
2-Methylnaphthalene	38,000	NV	--	--	--	--	--	--	--	--	--	--
Total LPAH[g]	370,000	NV	--	--	--	--	--	--	--	--	--	--
Acenaphthene	16,000	NV	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	66,000	NV	--	--	--	--	--	--	--	--	--	--
Anthracene	220,000	NV	--	--	--	--	--	--	--	--	--	--

Table 8-1
2013-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	Preliminary Cleanup Standards[a]		SE-32	SE-33	SE-34	SE-35	SE-36	SE-37	SE-38	SE-39	SE-40	SE-41
Sample Name:			SE-32	SE-33	SE-34	SE-35	SE-36	SE-37	SE-38	SE-39	SE-40	SE-41
Collection Date:	Organic Carbon (0.5% to 3.5%)[b]	Organic Carbon (<0.5% or >3.5%)[c]	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020
Collection Depth (ft bml):			0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Type:			Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Percent Wood waste:			Trace	10	5	Trace	10	25	50	90	0	20
TOC:			Inside	Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	Inside
PAHs (ug/kg-OC) cont.												
Fluorene	23,000	NV	--	--	--	--	--	--	--	--	--	--
Naphthalene	99,000	NV	--	--	--	--	--	--	--	--	--	--
Phenanthrene	100,000	NV	--	--	--	--	--	--	--	--	--	--
Total HPAH[h]	960,000	NV										
Benzo(a)anthracene	110,000	NV	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	99,000	NV	--	--	--	--	--	--	--	--	--	--
Benzo(ghi)perylene	31,000	NV	--	--	--	--	--	--	--	--	--	--
Chrysene	110,000	NV	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	12,000	NV	--	--	--	--	--	--	--	--	--	--
Fluoranthene	160,000	NV	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	34,000	NV	--	--	--	--	--	--	--	--	--	--
Pyrene	1,000,000	NV	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	NV	NV	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	NV	NV	--	--	--	--	--	--	--	--	--	--
Total benzofluoranthenes[i]	230,000	NV	--	--	--	--	--	--	--	--	--	--
PCBs and Pesticides (ug/kg-dry)												
Aroclor 1016	NV	NV	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	NV	NV	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	NV	NV	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	NV	NV	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	NV	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	NV	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	NV	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	NV	NV	--	--	--	--	--	--	--	--	--	--
Total PCBs[k]	3.5	3.5	--	--	--	--	--	--	--	--	--	--
Carbazole	900	900	--	--	--	--	--	--	--	--	--	--
Additional SVOCs (ug/kg-dry)												
1,3-Dichlorobenzene	NV	NV	--	--	--	--	--	--	--	--	--	--
4-Methylphenol	NV	NV	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	NV	NV	--	--	--	--	--	--	--	--	--	--
Dioxins/Furans (pg/g-dry)												
1,2,3,4,6,7,8-HpCDD	NV	NV	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDF	NV	NV	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8,9-HpCDF	NV	NV	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDD	NV	NV	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDF	NV	NV	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDD	NV	NV	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDF	NV	NV	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDD	NV	NV	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDF	NV	NV	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDD	NV	NV	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDF	NV	NV	--	--	--	--	--	--	--	--	--	--

Table 8-1
2013-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	Preliminary Cleanup Standards[a]		SE-32	SE-33	SE-34	SE-35	SE-36	SE-37	SE-38	SE-39	SE-40	SE-41
Sample Name:			SE-32	SE-33	SE-34	SE-35	SE-36	SE-37	SE-38	SE-39	SE-40	SE-41
Collection Date:	Organic Carbon (0.5% to 3.5%)[b]	Organic Carbon (<0.5% or >3.5%)[c]	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020
Collection Depth (ft bml):			0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Type:			Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Percent Wood waste:			Trace	10	5	Trace	10	25	50	90	0	20
TOC:			Inside	Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	Inside
Dioxins/Furans (pg/g-dry) cont.												
2,3,4,6,7,8-HxCDF	NV	NV	--	--	--	--	--	--	--	--	--	--
2,3,4,7,8-PeCDF	NV	NV	--	--	--	--	--	--	--	--	--	--
2,3,7,8-TCDD	NV	NV	--	--	--	--	--	--	--	--	--	--
2,3,7,8-TCDF	NV	NV	--	--	--	--	--	--	--	--	--	--
OCDD	NV	NV	--	--	--	--	--	--	--	--	--	--
OCDF	NV	NV	--	--	--	--	--	--	--	--	--	--
Total HpCDDs	NV	NV	--	--	--	--	--	--	--	--	--	--
Total HpCDFs	NV	NV	--	--	--	--	--	--	--	--	--	--
Total HxCDDs	NV	NV	--	--	--	--	--	--	--	--	--	--
Total HxCDFs	NV	NV	--	--	--	--	--	--	--	--	--	--
Total PeCDDs	NV	NV	--	--	--	--	--	--	--	--	--	--
Total PeCDFs	NV	NV	--	--	--	--	--	--	--	--	--	--
Total TCDDs	NV	NV	--	--	--	--	--	--	--	--	--	--
Total TCDFs	NV	NV	--	--	--	--	--	--	--	--	--	--
Dioxin/Furan TEQ[l][1]	5	5	--	--	--	--	--	--	--	--	--	--
TPH (mg/kg-dry)												
Gasoline-Range Hydrocarbons	--	--	--	--	--	--	--	--	--	--	--	--
Diesel-Range Hydrocarbons	340	340	--	--	--	--	--	--	--	--	--	--
Motor-Oil Range Hydrocarbons	3,600	3,600	--	--	--	--	--	--	--	--	--	--
Grain Size (%)												
Gravel	NV	NV	--	--	--	--	--	--	--	--	--	--
Very coarse sand	NV	NV	--	--	--	--	--	--	--	--	--	--
Coarse sand	NV	NV	--	--	--	--	--	--	--	--	--	--
Medium sand	NV	NV	--	--	--	--	--	--	--	--	--	--
Fine sand	NV	NV	--	--	--	--	--	--	--	--	--	--
Very fine sand	NV	NV	--	--	--	--	--	--	--	--	--	--
Coarse silt	NV	NV	--	--	--	--	--	--	--	--	--	--
Medium silt	NV	NV	--	--	--	--	--	--	--	--	--	--
Fine silt	NV	NV	--	--	--	--	--	--	--	--	--	--
Very fine silt	NV	NV	--	--	--	--	--	--	--	--	--	--
Coarse clay	NV	NV	--	--	--	--	--	--	--	--	--	--
Medium clay	NV	NV	--	--	--	--	--	--	--	--	--	--
Fine clay	NV	NV	--	--	--	--	--	--	--	--	--	--
Total fines	NV	NV	--	--	--	--	--	--	--	--	--	--
Sand, total	NV	NV	--	--	--	--	--	--	--	--	--	--
Silt, total	NV	NV	--	--	--	--	--	--	--	--	--	--
Clay, total	NV	NV	--	--	--	--	--	--	--	--	--	--
Asbestos (%)												
Asbestos	NV	NV	--	--	--	--	--	--	--	--	--	--
Pore Water Analysis												
Conductivity (uS/cm)	NV	NV	--	--	--	--	--	--	--	--	--	--
Salinity (ppt)	NV	NV	--	--	--	--	--	--	--	--	--	--

Table 8-1
2013-2020 Sediment Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Notes

Shading (color key below) indicates values that exceed PCSs. Non-detect results (U or UJ) are not evaluated against screening criteria. PCSs are applied based on sample TOC results.

Bold font is applied to detected results, with the exception of conventional parameters and grain size.

TOC results outside 0.5-3.5%

Detected result exceeding PCS, Inside or Outside Organic Carbon 0.5-3.5%

% = percent.
-- = not analyzed.
< = less than.
>= greater than.
AET = apparent effects threshold.
cm = centimeter.
cPAH = carcinogenic PAH.
ft bml = feet below mudline.
HPAH = high-molecular-weight PAH.
HpCDD = heptachlorodibenzo-p-dioxin.
HxCDD = hexachlorodibenzo-p-dioxin.
HxCDF = hexachlorodibenzofuran.
J = result is an estimated value.
J+ = result is an estimated value with a potential high bias.
K = result is an estimated maximum potential concentration.
LPAH = low-molecular-weight PAH.
mg/kg = milligrams per kilogram.
mg/kg-dry = milligrams per kilogram, dry weight.
mg/L = milligrams per liter.
NV = no value.
OCDD = octachlorodibenzodioxin.
OCDF = octachlorodibenzofuran.
PAH = polycyclic aromatic hydrocarbon.
PCB = polychlorinated biphenyl.
PCS = preliminary cleanup standard.
PeCDD = pentachlorodibenzo-p-dioxin.
PeCDF = pentachlorodibenzofuran.
pg/g-dry = picograms per gram, dry weight.
ppt = parts per thousand.
PQL = practical quantitation limit.
SCUM = Sediment Cleanup User's Manual.
SIM = selective ion monitoring.
SMS = sediment management standard.
SVOC = semivolatile organic compound.
TCDD = tetrachlorodibenzo-p-dioxin.
TCDF = tetrachlorodibenzofuran.
TCLP = toxicity characteristic leaching procedure.
TEQ = toxic equivalent quotient.
TOC = total organic carbon.
TPH = total petroleum hydrocarbons.
U = result is non-detect at detection limit or estimated detection limit.
ug/kg-dry = micrograms per kilogram, dry weight.
ug/kg-OC = micrograms per kilogram, organic carbon normalized.
UJ = result is non-detect with an estimated reporting limit.
uS/cm = microSiemens per centimeter.

[a]PCSs are shown in Table 5-3.

[b]Preliminary cleanup standard for sediment within the standard 0.5 to 3.5 percent TOC range is equivalent to the highest of natural background, PQL, or RBCs. RBCs are the lowest of SMS freshwater, SMS marine, and human health and higher trophic ecological receptors risk criteria.

[c]Preliminary cleanup standards for sediment outside of the standard 0.5 to 3.5 percent TOC range is equivalent to the highest of natural background, PQL, or RBCs. RBCs are the lowest of SMS freshwater, SMS marine, SMS marine AETs, and

[d]TOC analysis was not performed. Assume TOC would be outside of the 0.5 to 3.5 percent range based on other samples collected from the same boring.

[e]TOC analysis was not performed. Assume TOC would be inside of the 0.5 to 3.5 percent range based on other samples collected from the same area.

[f]Total PAH is the sum of detected 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluorene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene. Non-detect results are not included in the sum. When all analytical results are non-detect, the highest detection limit is used.

[g]LPAH is the sum of detected acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene. Non-detect results are not included in the sum. When all analytical results are non-detect, the highest detection limit is used.

[h]HPAH is the sum of detected benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene. Non-detect results are not included in the sum. When all analytical results are non-detect, the highest detection limit is used.

[i]Total benzofluoranthenes are reported by the laboratory for samples collected from 2013-2015.Total benzofluoranthenes are calculated as the sum of detected benzo(b)fluoranthene and benzo(k)fluoranthene for samples collected from 2019-2020. Non-detect results are not included in the sum. When both analytical results are non-detect, the highest detection limit is used.

[j]cPAH TEQ is calculated with 2005 California EPA toxicity equivalence factors provided in table 6-1 of SCUM (Ecology, 2021). Non-detect results are included at one-half the detection limit. When all cPAHs are non-detect, the highest reported detection limit is shown.

[k]Total PCBs is the sum of all detected recolors. Non-detect results are not included in the sum. When all analytical results are non-detect, the highest detection limit is used.

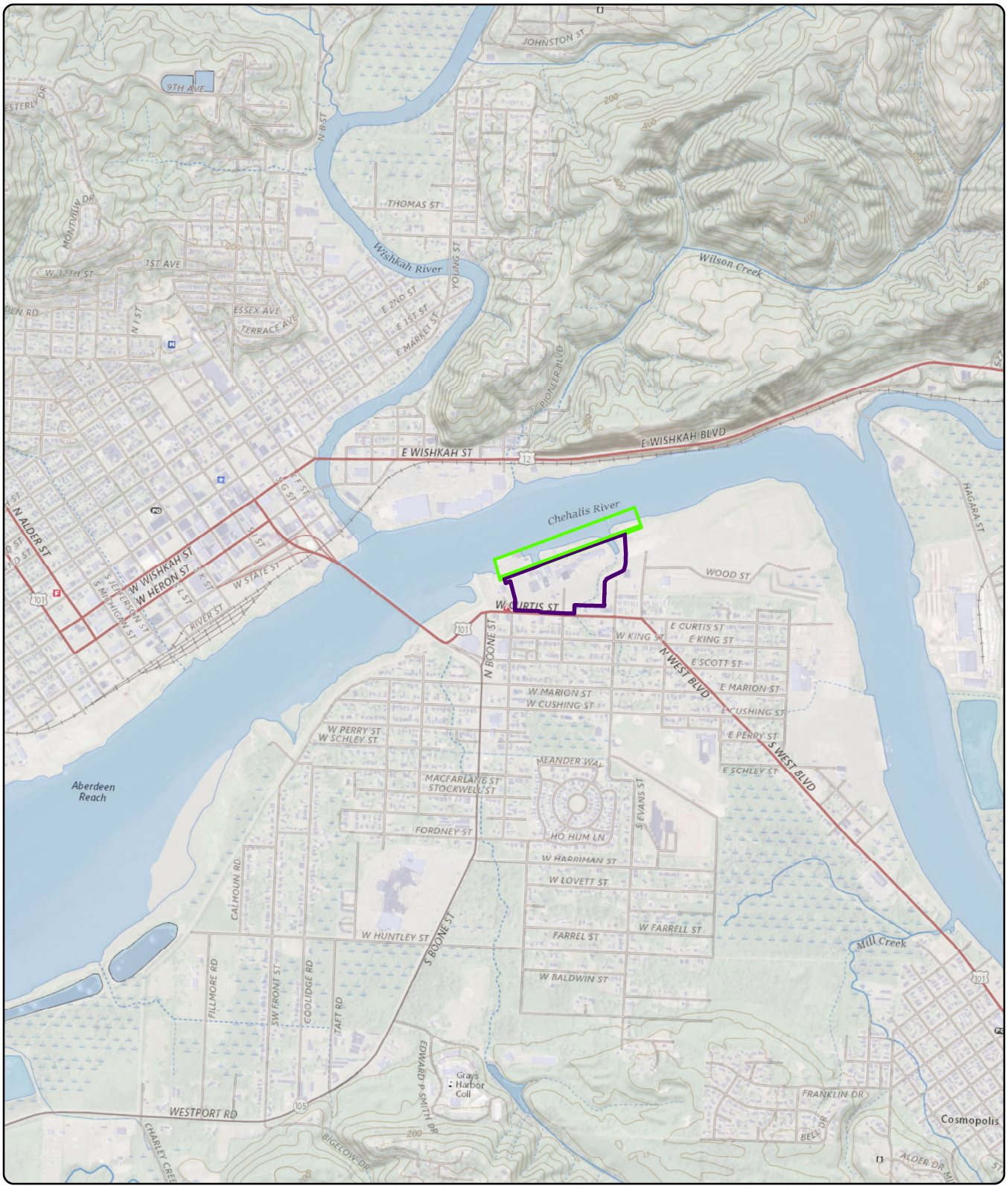
[l]Dioxin/furan TEQ is calculated with 2005 World Health Organization toxic equivalence factors provided in table 6-2 of SCUM (Ecology, 2021). Non-detect results are included at one-half the detection limit.

Reference

[1]Ecology. 2021. Sediment cleanup user's manual (SCUM), guidance for implementing cleanup provisions of the sediment management standards, Chapter 173-204 WAC. Publication no. 12-09-057. Washington State Department of Ecology. Revised December 2021.

FIGURES





Site Address: 500 N Custer Street, Aberdeen, Washington
Source: U.S. Geological Survey (1990) 7.5-minute topographic quadrangle: Aberdeen
Sections 9 and 10, township 17 north, range 9 west.

Legend

- The Property
- Approximate Aquatic Land Lease Area



Figure 1-1
Site Location

Weyerhaeuser Sawmill
Aberdeen/Seaport Landing Site
Aberdeen, Washington

0 1,000 2,000
Feet

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Path: X:\1044_02_14\04\Fig1_1_Property Location.mxd
Print Date: 4/26/2022
Reviewed by: mpollock
Produced By: abixby
Project: M1044.02.014

Path: X:\1044.02_14\04\Fig1-2_Site_Vicinity.mxd

Project: M1044.02.014 Produced By: obixby Reviewed By: mpollock Print Date: 4/26/2022

Figure 1-2
Site Vicinity and Area of In-Water Investigation

Weyerhaeuser Sawmill
Aberdeen/Seaport
Landing Site
Aberdeen, Washington

Chehalis River

Beach Area

Pocket Beach

Shannon Slough

029901100501

029901100100

027401900000

029901000101

027401900000

027401900000

027600300101

027600900000

027600800101

027600900101

027600900101

027400400000

027400100000

027400300100

027600800101

027400300100

027400200100

027400300700

027400200700

027400200900

027601800700

101

S.R. 105 (N. Boone St.)

N. Clark St.

U.S. 101 (W. Curtis St.)

W. Wood St.

N. Custer St.

W. King St.

N. Lewis St.

N. Lawrence St.

N. Evans St.

W. Scott St.

Legend

- Approximate Line of Ordinary High Water
- Area of In-Water Investigation
- The Property
- Approximate Aquatic Lease Area
- Tax Lot

0 100 200
Feet

Source:
Aerial photograph obtained from Mapbox; tax lot data obtained from Grays Harbor County.

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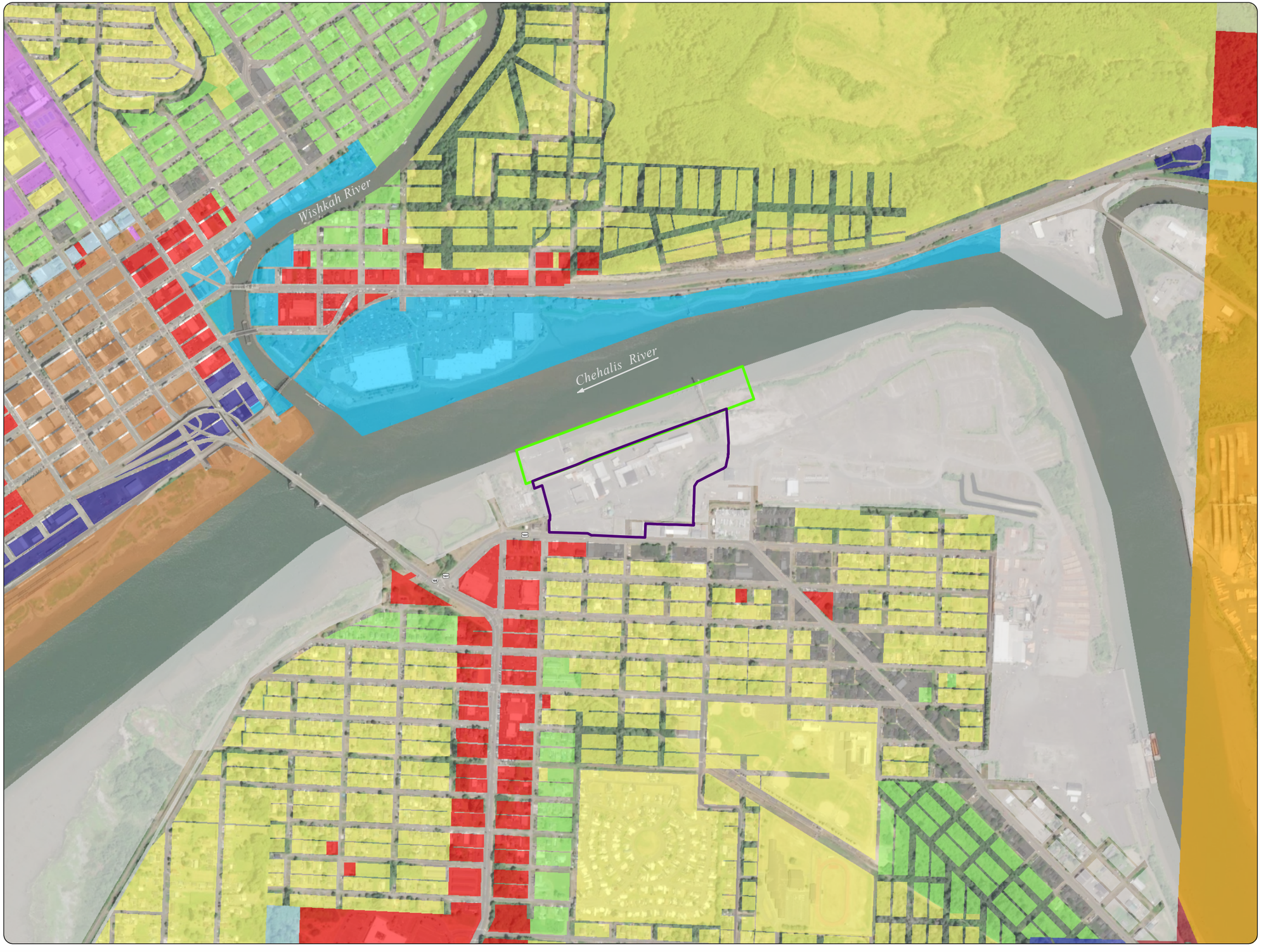

Figure 2-1
Zoning Designations

Weyerhaeuser Sawmill
Aberdeen/Seaport
Landing Site
Aberdeen, Washington

Legend

- The Property
- Approximate Aquatic Land Lease Area

Zoning Designation

- Aberdeen CD Downtown Commercial
- Aberdeen CG General Commercial
- Aberdeen CR Commercial/Residential
- Aberdeen I Industrial
- Aberdeen LI Light Industrial
- Aberdeen MI Major Institutional
- Aberdeen RM Multiple Family Residential
- Aberdeen RP Residential Professional
- Aberdeen RS Single Family Residential
- Aberdeen WD Waterfront Development
- Cosmopolis MU Mixed Use
- Cosmopolis WA Waterfront Use
- County C2 General Commercial
- County G5 General Development Five
- County I2 Industrial
- County R2 General Residential

0 440 880
Feet

Sources:
Aerial photograph obtained from Mapbox; zoning data obtained from Grays Harbor County.

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Path: X:\1044.02_1A\04\Fig2-1_Zoning_Designations.mxd
Print Date: 4/27/2022
Reviewed By: mpollock
Produced By: sturner
Project: M1044.02.014

Path: X:\1044_02_1404\Fig2-2_Historical_and_Current_Features.mxd

Wharf Area
Chehalis River
Wood Oil Tank
Boiler
Lumber Shed
Powerhouse
Transformer
Oil House
Beach Area
Historical Salmon Cannery
Chip Area Blower Building
Pocket Beach
Spray Room
Compressor Building
Wood Waste burner
Fuel & Chemical Storage Building
Chip Lift Truck
Diesel AST
Kilns
Maintenance Shop
Small Log Mill
Main Shipping Shed
Oil Tank & Chemical Storage Shed
Pee Wee Mill
Shannon Slough
Planer Building
Steam Cleaning Facility
Storage Shed
Water Treatment System
1906 Mill
Generator Shed & Diesel AST
Aberdeen Pad Transformer
Guard Shack UST
101
W. Curtis St.
N. Boone St.
Water Tank
Office
Guard Shed

Sources:
Aerial photograph obtained from Esri ArcGIS Online.
Parcels and roads obtained from Grays Harbor County.
Harbor lines obtained from Washington Department of Natural Resources.
Former features from Level I Environmental Site Assessment,
PES Environmental; August 13, 2010.
NOTES:
AST = aboveground storage tank.
UST = underground storage tank.
Aquatic land lease areas were digitized from print maps of Aberdeen tidelands dated March 22, 2001, and January 15, 1907, on file with the Office of the Commissioner of Public Lands in Olympia, Washington, and should be considered approximate.

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Legend

- Approximate Line of Ordinary High Water
- Former Mill
- Former Wharf Extension
- Existing Buildings/Features
- Former Buildings/Features
- Inner Harbor Line
- Outer Harbor Line
- The Property
- Approximate Aquatic Land Lease Area

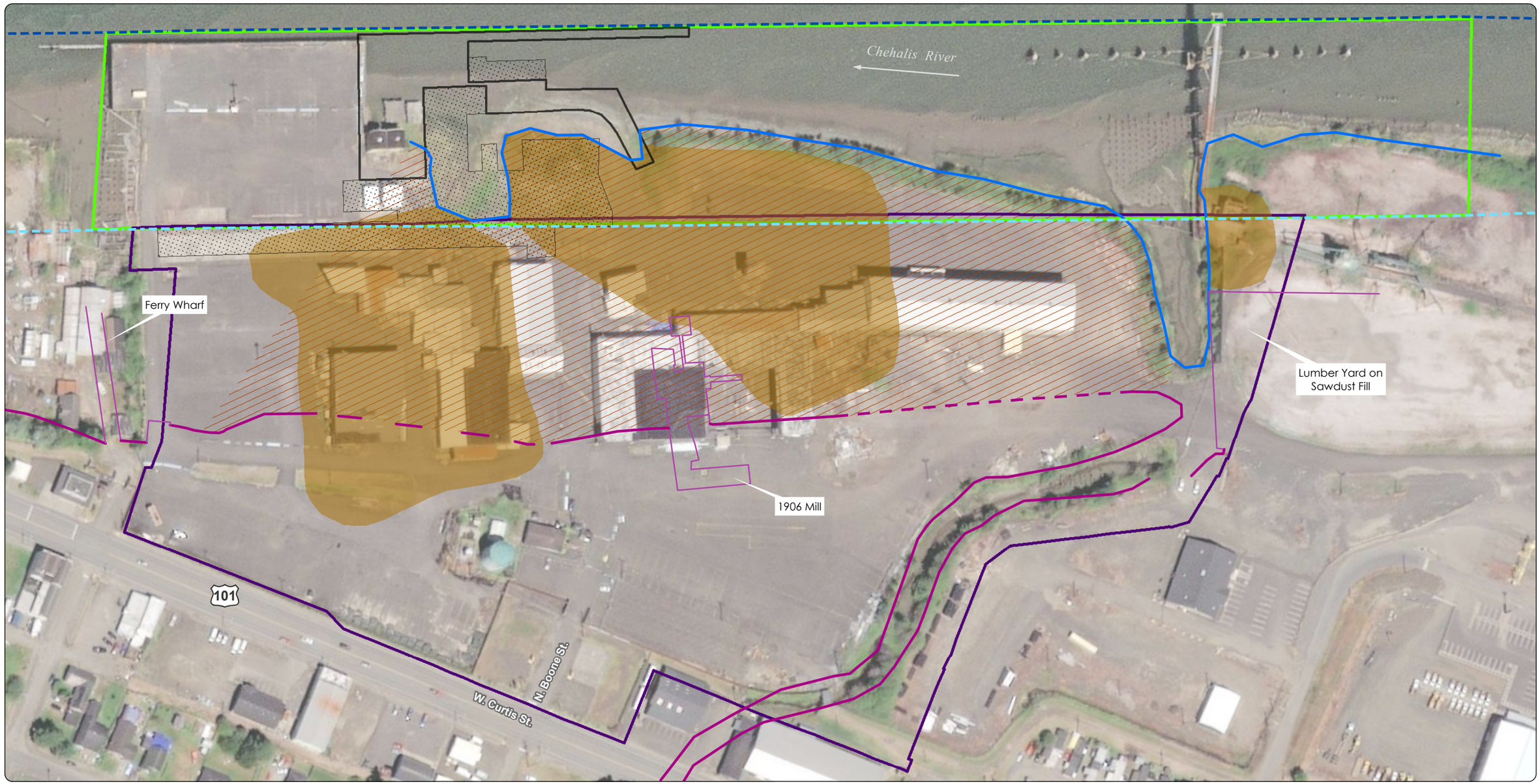
Figure 2-2
Historical and Current Site Features

Weyerhaeuser Sawmill Aberdeen/
Seaport Landing Site
Aberdeen, Washington

0 100 200
Feet

Project: M1044.02.014 Produced By: abixby Approved By: mpollock Print Date: 4/26/2022

Path: X:\1044_02_14\04\Fig2-3_Historical Fill Events and Shoreline Changes.mxd
Print Date: 4/27/2022
Reviewed by: mpollock
Produced By: stumer
Project: M1044.02.014



Source:
Aerial photograph obtained from Esri.
Parcels and roads obtained from Grays Harbor County.
Shorelines boundaries are approximate and derived from Sanborn Fire Insurance maps. Harbor lines obtained from Washington Department of Natural Resources. Extent of wood waste is approximate and derived from geologic logs.

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Legend

- Extent of Wood Waste
- The Property
- Approximate Aquatic Land Lease Area
- Inner Harbor Line
- Outer Harbor Line
- Approximate Line of Ordinary High Water
- Former Wharf Extension
- Former Mill
- Fill

Sanborn Boundaries, 1906 (approximate)

- Shoreline/Slough
- Built Structure

Figure 2-3
Historical Fill Events and Shoreline Changes
Weyerhaeuser Sawmill
Aberdeen/Seaport
Landing Site
Aberdeen, Washington

GRAYS HARBOR HISTORICAL SEAPORT

0 100 200
Feet

Path: X:\1044_02_14\04\Fig2-4_Historical_Sample_Locations.mxd
Print Date: 4/27/2022
Approved By: mstringer
Produced By: sturner
Project: M1044.02.014



NOTES:
Aquatic land lease areas were digitized from print maps of Aberdeen tidelands dated March 22, 2001, and January 15, 1907, on file with the Office of the Commissioner of Public Lands in Olympia, Washington, and should be considered approximate.

Source:
Aerial photograph obtained from Esri.

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Legend

- Catch Basin
- Oil/Water Separator
- Outfall
- Drain Pipe (with flow direction)
- Approximate Line of Ordinary High Water
- Composite Samples
- Approximate Aquatic Land Lease Area
- Former Mill
- Former Wharf Extension
- The Property
- Drainage Basin, Contributing Area

Previous Investigations

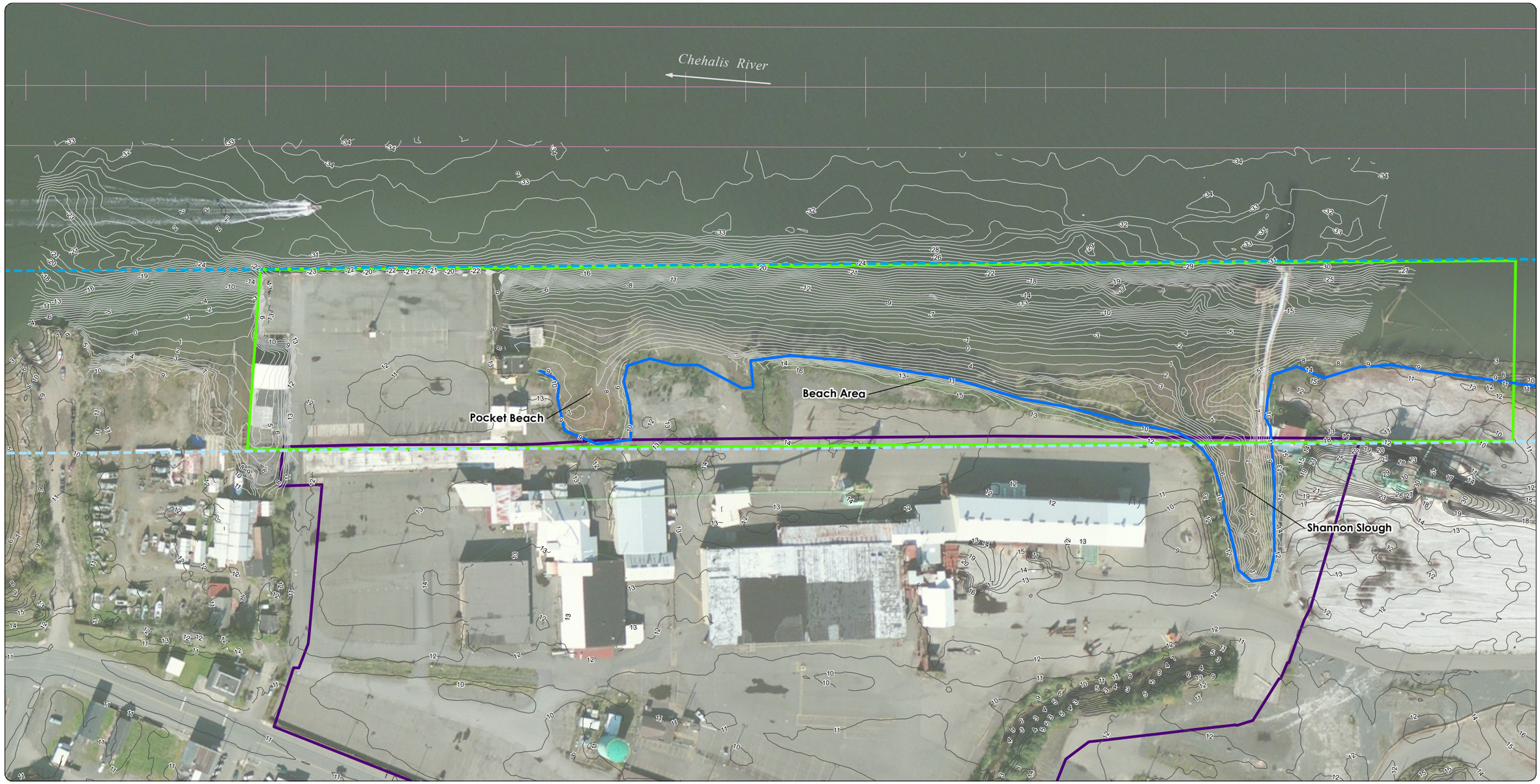
- 2013 Sediment Samples
- 2015 Soil and/or Groundwater Samples
- 2015 Sediment Samples
- 2015 Seep Sample
- 2016 Stormwater Sample

Figure 2-4
Previous Sample Locations

Weyerhaeuser Sawmill
Aberdeen/Seaport
Landing Site
Aberdeen, Washington

0 100 200
Feet

Path: X:\1044_02_14\041Fig3-1_Bathymetry.mxd



NOTES:
Aquatic land lease areas were digitized from print maps of Aberdeen tidelands dated March 22, 2001, and January 15, 1907, on file with the Office of the Commissioner of Public Lands in Olympia, Washington, and should be considered approximate.
NAVD 88 = North American Vertical Datum of 1988.

Sources:
Bathymetric survey performed in 2016; LiDAR survey performed in 2009; aerial photograph obtained from Esri; navigation channel obtained from Gray's Harbor GIS.

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Legend

- Approximate Line of Ordinary High Water
- Inner Harbor Line
- Outer Harbor Line
- Approximate Aquatic Land Lease Area
- The Property
- One-Foot Contour Bathymetry (NAVD 88)
- One-Foot Contour LiDAR (NAVD 88)
- Navigation Channel

Figure 3-1
Bathymetry and Topography

Weyerhaeuser Sawmill
Aberdeen/Seaport Landing Site
Aberdeen, Washington

0 100 200
Feet

Project: M1044.02.014 Produced By: stumer Reviewed by: mpollock Print Date: 4/28/2022



NOTES:
Aquatic land lease areas were digitized from print maps of Aberdeen tidelands dated March 22, 2001 and January 15, 1907 on file with the Office of the Commissioner of Public Lands in Olympia, Washington, and should be considered approximate.
Expanded Chemistry - See tables for analyses conducted at each location.
Source:
Aerial photograph obtained from Esri ArcGIS Online.

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Legend

- Radioisotope Analysis
- Visual Wood Waste and Wood Waste Chemistry
- Visual Wood Waste
- Visual Wood Waste and Expanded Chemistry
- The Property
- Approximate Aquatic Land Lease Area
- Former Mill
- Former Wharf Extension
- Approximate Line of Ordinary High Water

Figure 4-1
Subsurface Sediment Sampling Locations

Weyerhaeuser Sawmill
Aberdeen/Seaport Landing Site
Aberdeen, Washington

0 75 150
Feet

Path: X:\1044_02_2410\4\Fig4.1_Subsurface_Sediment_Sampling.mxd
Print Date: 4/27/2022
Approved By: mpollock
Produced By: abixby
Project: M1044.02.01

Path: X:\1044.02_14\DA\Fig4-2_Surface_Sediment_Locations.mxd
Print Date: 2/8/2023
Reviewed By: mpollock
Produced By: jroberts
Project: M1044.02.014



Notes
DGT = diffusive gradients in thin films
All locations are approximate.
Aquatic land lease areas were digitized from print maps of Aberdeen tidelands dated March 22, 2001 and January 15, 1907, on file with the Office of the Commissioner of Public Lands in Olympia, Washington, and should be considered approximate.
Surface is sediment collected in the top 10 centimeters (0 to 0.33 feet below the mudline).

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Data Source
Aerial photograph obtained from Esri ArcGIS Online.

Legend

- DGT Sample Locations
- Chemistry
- Chemistry and Bioassay
- Wood Waste Chemistry Only
- Possible Sulfide Bacterial Seep and Bacterial Mat
- Approximate Line of Ordinary High Water
- The Property
- Approximate Aquatic Land Lease Area
- Sediment Chemistry Sample for Background
- Former Mill
- Former Wharf Extension
- Approximate Visual Extent of Wood Waste

Figure 4-2
Surface Sediment Sampling Locations

Weyerhaeuser Sawmill
Aberdeen/Seaport Landing Site
Aberdeen, Washington

0 75 150
Feet

Path: X:\1044_02_14\04\Fig6_1_Sediment_Primary_Cleanup_Level.mxd
Print Date: 5/5/2022
Reviewed By: mpollock
Produced By: jelstrott
Project: M1044.04.014

CR-08B			
Depth	0-0.33	8	Units
Arsenic	20	20	mg/kg
Butylbenzyl-phthalate	451	9.25 U	ug/kg
cPAH TEQ	106	62	
Total PCBs	14 J	18 U	
DF TEQ	30 J	6 J	pg/g

SE-07A		
Depth	0-1	Units
Mercury	0	mg/kg

CR-18B			
Depth	0-0.33	0.5-10	Units
Arsenic	30	20	mg/kg
cPAH TEQ	21 J	100	ug/kg
DF TEQ	7.4 J	--	pg/g

CR-15C			
Depth	0-0.33	0.5-10	Units
Arsenic	20	21	mg/kg
cPAH TEQ	49 J	54 J	ug/kg
DF TEQ	10 J	--	pg/g

SE-23		
Depth	0-0.33	Units
Lead	35	mg/kg
Nickel	38	
cPAH TEQ	213 J	ug/kg
Total PCBs	8 J	

SE-29		
Depth	1-2	Units
Nickel	33.8	mg/kg
m,p-Cresol	1,600	ug/kg
Phenol	571 J	
cPAH TEQ	212 J	
Total PCBs	38.9	

CR-17D			
Depth	0-0.33	0.5-10	Units
Arsenic	21	30	mg/kg
cPAH TEQ	13 J	129	ug/kg
Total PCBs	19 U	18 J	

SE-30		
Depth	2-4.5	Units
Nickel	28	mg/kg
cPAH TEQ	57 J	ug/kg
Total PCBs	14	

SE-15			
Depth	0-0.33	Units	
cPAH TEQ	68 J	ug/kg	

CR-01		
Depth	0-0.33	Units
cPAH TEQ	31 J	ug/kg
DF TEQ	13 J	pg/g

SE-16		
Depth	0-0.33	Units
Nickel	26	mg/kg

CR-08A			
Depth	0-0.33	18.3-20	Units
Arsenic	30	20	mg/kg
Lead	30	8	
Di-n-octyl phthalate	710	20 U	ug/kg
cPAH TEQ	56	40 U	
DF TEQ	18 J	4.3 J	pg/g

CR-26		
Depth	0-0.33	Units
Arsenic	24	mg/kg
Benzyl alcohol	64	ug/kg

CR-19F			
Depth	0-0.33	0.5-10	Units
Arsenic	20	23	mg/kg
cPAH TEQ	14 J	22 J	ug/kg
DF TEQ	11 J	--	pg/g

SE-18		
Depth	0-0.33	Units
Nickel	30	mg/kg

SE-10		
Depth	2-3.7	Units
Lead	24.0	mg/kg
m,p-Cresol	309 J	ug/kg
cPAH TEQ	195 J	
Total PCB	13.0 J	

SE-31		
Depth	0-0.33	Units
Nickel	30	mg/kg
m,p-Cresol	267	ug/kg
cPAH TEQ	21 J	

SE-14		
Depth	0-0.33	Units
Lead	47	mg/kg
Nickel	28	
Total PCBs	8 J	ug/kg
DF TEQ	10 J	pg/g

CR-03		
Depth	0-0.33	Units
DF TEQ	12 J	pg/g

CR-07		
Depth	0-0.33	Units
cPAH TEQ	111	ug/kg

SE-21		
Depth	0-0.33	Units
Total PCBs	4.2 J	ug/kg

CR-24		
Depth	0-0.33	Units
Benzoic acid	680	ug/kg
cPAH TEQ	128	
Total PCBs	54	
DRO	370	mg/kg

CR-02		
Depth	0-0.33	Units
Total PCBs	12 J	ug/kg
DF TEQ	16 J	pg/g

SE-25		
Depth	0-0.33	Units
Lead	38	mg/kg
cPAH TEQ	145 J	ug/kg
Total PCBs	18	

CR-10		
Depth	0-0.33	Units
Arsenic	30	mg/kg
cPAH TEQ	51 J	ug/kg

SE-26		
Depth	0-0.33	Units
Lead	30	mg/kg
cPAH TEQ	86 J	ug/kg
Total PCBs	16	

CR-12		
Depth	15	Units
cPAH TEQ	23	ug/kg

SE-27		
Depth	0-0.33	Units
Nickel	27	mg/kg
cPAH TEQ	30 J	ug/kg
Total PCBs	10	

CR-09A		
Depth	0-0.33	Units
Phenol	130	ug/kg
DF TEQ	6.10 J	ug/kg

CR-06			
Depth	0-0.33	1-2.5	Units
Lead	--	110	mg/kg
Mercury	0.6	0.53	
Benzoic acid	--	860 J	ug/kg
Phenol	370 J	240 J	
Dibenzofuran	--	490	
Bis(2-ethylhexyl)-phthalate	--	1,900	
Diethylphthalate	--	270 J	
Total PAHs	--	22,700	
Total LPAHs	--	7,810	
2-Methyl-naphthalene	--	780	
Fluorene	--	650	
Phenanthrene	--	3,600	
Total HPAHs	--	14,100	
Chrysene	--	1,600	
Fluoranthene	--	3,200	
Pyrene	--	3,600	
cPAH TEQ	--	1,610	
Total PCBs	--	690	
DF TEQ	44.0 J	43.5 J	pg/g
DRO	--	20,000	mg/kg
ORO	--	60,000	

SE-24		
Depth	0-0.33	Units
Lead	33	mg/kg
Nickel	40	
cPAH TEQ	42 J	ug/kg
Total PCBs	42	

SE-17		
Depth	0-0.33	Units
Nickel	27	mg/kg
cPAH TEQ	51.5 J	ug/kg

SE-22		
Depth	0-0.33	Units
Nickel	26	mg/kg
Total PCBs	8.2 J	ug/kg
DF TEQ	19 J	pg/g

CR-09B		
Depth	0-0.33	Units
Benzyl alcohol	58	ug/kg

SE-20		
Depth	0-0.33	Units
Total PCBs	5 J	ug/kg

CR-04				
Depth	0-0.33	1-2.5	2.5-5	Units
Mercury	6.2	0.5 J	--	mg/kg
Benzoic acid	1,700 J	3,200 UJ	--	ug/kg
Phenol	290 J	390 J	980 J	
Dibenzofuran	420 UJ	210 J	--	
Bis(2-ethylhexyl)-phthalate	1,000 UJ	870 J	--	
Pentachloro-phenol	270 J	400 J	--	ug/kg
Dibenzo(a,h)-anthracene	120 J	360 J	--	
Fluoranthene	590 J	2,200 J	--	
cPAH TEQ	418 J	1,010 J	--	
Total PCBs	200 J	1,170 J	--	
DF TEQ	26.7 J	140 J	--	pg/g
DRO	2,400 J	3,200 J	--	mg/kg
ORO	7,400 J	10,000 J	--	

CR-05			
Depth	0-0.33	0.33-2.5	Units
Mercury	0.16	0.5 J	mg/kg
Benzoic acid	950 J	3,500 UJ	ug/kg
Phenol	570 J	530 J	
Dibenzofuran	310 J	230 J	
Bis(2-ethylhexyl)-phthalate	960 J	9,400 J	
1,2,4-Trichloro-benzene	43 J	74 J	
1,4-Dichloro-benzene	1,000 J	540 J	
Fluoranthene	1,300 J	3,900 J	
Pyrene	1,300 J	3,100 J	
cPAH TEQ	479 J	722 J	
Total PCBs	180 J	1,160 J	
DF TEQ	67.6 J	359 J	pg/g
DRO	1,200 J	3,200 J	mg/kg
ORO	4,800 J	13,000 J	

SE-03A, SE-38, SE-08A, SE-08C, CR-19D, SE-02A, SE-19, SE-05A, SE-41, SE-37, SE-40, SE-36, SE-35, SE-01A, SE-34, SE-33, SE-06A, SE-32, CR-14, CR-13, SE-39, SE-28, CR-11

NOTES;
All depths are in feet below mudline.
Conventional parameters are not shown on this figure.
Samples shown with no data have no screening level exceedances.

Source:
Aerial photograph obtained from Esri.

Acronyms and Abbreviations:
-- = not analyzed.
cPAH TEQ = carcinogenic PAH toxicity equivalent.
DF TEQ = dioxin/furan toxic equivalent quotient.
DRO = diesel-range organics.
HPAHs = high-molecular-weight PAHs.
J = result is estimated.
LPAHs = low-molecular-weight PAHs.
mg/kg = milligrams per kilogram.
m,p-cresol = 3- & 4-methylphenol.
ORO = oil-range organics.
PAHs = polycylic aromatic hydrocarbons.
PCBs = polychlorinated biphenyls.
pg/g = picograms per grams.
SCO = sediment cleanup objective.
SSL = site screening level.
U = result is not detected.
ug/kg = micrograms per kilogram.

Legend

- Sediment Sample
- Background Location
- Total Organic Carbon <0.5% or >3.5%

Exceedance and Detection Key
Benthic SCO exceedance
Human health SSL exceedance
Detected values are bolded

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Figure 6-1
Sediment Primary Cleanup Level Exceedances

Weyerhaeuser Sawmill
Aberdeen/Seaport
Landing Site
Aberdeen, Washington

0 100 200
Feet

Path: X:\1044_02_14\041Fig6-2A_Woodwaste_Parameters_Uncliver.mxd

SE-29		
Sample depth (feet bml)	0-2	
Total Organic Carbon (%)	9.9	
Total Solids (%)	42.9 J	
Total Volatile Solids (%)	27.4 J	
Ammonia as Nitrogen (mg/kg)	4.76	
Sulfide (mg/kg)	1,510 J	

CR-26		
Sample depth (feet bml)	0.5-1.0	
Total Organic Carbon (%)	1.52	
Total Solids (%)	46.69	

CR-08B		
Sample depth (feet bml)	0-0.33	8
Total Organic Carbon (%)	2.05	3.08
Total Solids (%)	44.38	55.76

SE-23	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	2.6
Total Solids (%)	45.4
Total Volatile Solids (%)	7.18
Ammonia as Nitrogen (mg/kg)	11.8
Sulfide (mg/kg)	856

CR-18B		
Sample depth (feet bml)	0-0.33	0.5-1.0
Total Organic Carbon (%)	1.95	2.45
Total Solids (%)	46.44	47.88

CR-17D		
Sample depth (feet bml)	0-0.33	0.5-1.0
Total Organic Carbon (%)	1.61	3.05
Total Solids (%)	52.1	48.09

SE-03A	
Sample depth (feet bml)	0-1
Total Organic Carbon (%)	2.3
Total Solids (%)	45.6
Total Volatile Solids (%)	8.11 J
Ammonia as Nitrogen (mg/kg)	168 J
Sulfide (mg/kg)	856 J

SE-41	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	1.8
Total Solids (%)	43.4
Total Volatile Solids (%)	10.2
Ammonia as Nitrogen (mg/kg)	8.41
Sulfide (mg/kg)	567 J
Pore Water Sulfide (mg/L)	0.071

SE-37	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	1.9
Total Solids (%)	46.2
Total Volatile Solids (%)	15.2
Ammonia as Nitrogen (mg/kg)	14.2
Sulfide (mg/kg)	204 J
Pore Water Sulfide (mg/L)	0.163

CR-08A		
Sample depth (feet bml)	0-0.33	18.3-20.0
Total Organic Carbon (%)	1.92	1.29
Total Solids (%)	47.46	63.97

SE-07A	
Sample depth (feet bml)	0-1
Total Organic Carbon (%)	6.3
Total Solids (%)	34
Total Volatile Solids (%)	20.7 J
Ammonia as Nitrogen (mg/kg)	7.73 J
Sulfide (mg/kg)	639

SE-38	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	1.7
Total Solids (%)	49.6
Total Volatile Solids (%)	10.1
Ammonia as Nitrogen (mg/kg)	3.49
Sulfide (mg/kg)	365 J
Pore Water Sulfide (mg/L)	0.103

CR-15C		
Sample depth (feet bml)	0-0.33	0.5-1.0
Total Organic Carbon (%)	3.17	1.73
Total Solids (%)	35.1	57.47

CR-01	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	2.06 J
Total Solids (%)	44.09

SE-24	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	7.8
Total Solids (%)	35.5 J
Total Volatile Solids (%)	18.9 J
Ammonia as Nitrogen (mg/kg)	9.49
Sulfide (mg/kg)	281
Pore Water Sulfide (mg/L)	0.10

SE-08C	
Sample depth (feet bml)	3-4.2
Total Organic Carbon (%)	7.1
Total Solids (%)	44
Total Volatile Solids (%)	19.8
Ammonia as Nitrogen (mg/kg)	36.3
Sulfide (mg/kg)	124 J

SE-40	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	1
Total Solids (%)	77.6
Total Volatile Solids (%)	2.51
Ammonia as Nitrogen (mg/kg)	0.783
Sulfide (mg/kg)	392 J
Porewater Sulfide (mg/L)	0.202

CR-07	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	1.09
Total Solids (%)	67.22

SE-36	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	1.1
Total Solids (%)	49
Total Volatile Solids (%)	6.88
Ammonia as Nitrogen (mg/kg)	4.1
Sulfide (mg/kg)	546 J
Pore Water Sulfide (mg/L)	0.06 J

SE-10	
Sample depth (feet bml)	2-3.7
Total Organic Carbon (%)	7.9 J
Total Solids (%)	38.3
Total Volatile Solids (%)	30.1
Ammonia as Nitrogen (mg/kg)	5.37 J
Sulfide (mg/kg)	228 J

SE-14	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	5.5
Total Solids (%)	34.8
Total Volatile Solids (%)	12.5
Ammonia as Nitrogen (mg/kg)	15.2
Sulfide (mg/kg)	409
Pore Water Sulfide (mg/L)	0.13

SE-25	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	18
Total Solids (%)	40.6 J
Total Volatile Solids (%)	19
Ammonia as Nitrogen (mg/kg)	3.68
Sulfide (mg/kg)	267

CR-24	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	1.56
Total Solids (%)	54.35

CR-14	
Sample depth (feet bml)	12
Total Organic Carbon (%)	3.22
Total Solids (%)	57.04

SE-27		
Sample depth (feet bml)	0-0.33	2-3.7
Total Organic Carbon (%)	3.8	7.9 J
Total Solids (%)	39.4	38.3
Total Volatile Solids (%)	12.1	30.1
Ammonia as Nitrogen (mg/kg)	8.47	5.37 J
Sulfide (mg/kg)	394	228 J

SE-15	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	4.7
Total Solids (%)	43.4
Total Volatile Solids (%)	14.4
Ammonia as Nitrogen (mg/kg)	5.75
Sulfide (mg/kg)	191

CR-09A	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	4.39
Total Solids (%)	55.6

CR-11	
Sample depth (feet bml)	23
Total Organic Carbon (%)	0.415
Total Solids (%)	72.59

SE-30	
Sample depth (feet bml)	2-4.5
Total Organic Carbon (%)	5.1
Total Solids (%)	47.6
Total Volatile Solids (%)	14.7
Ammonia as Nitrogen (mg/kg)	112
Sulfide (mg/kg)	492

SE-26		
Sample depth (feet bml)	0-0.33	
Total Organic Carbon (%)	13	
Total Solids (%)	42.4	
Total Volatile Solids (%)	18.4	
Ammonia as Nitrogen (mg/kg)	3.48	
Sulfide (mg/kg)	3.21 U	
Pore Water Sulfide (mg/L)	0.12	

CR-12		
Sample depth (feet bml)	15	
Total Organic Carbon (%)	3.33	
Total Solids (%)	56.65	

SE-39		
Sample depth (feet bml)	0-0.33	
Total Organic Carbon (%)	3.9	
Total Solids (%)	25.5	
Total Volatile Solids (%)	50.1	
Ammonia as Nitrogen (mg/kg)	1.16	
Sulfide (mg/kg)	2,110 J	

CR-04		
Sample depth (feet bml)	0-0.33	2.5-5
Total Organic Carbon (%)	31.4 J	16.5 J
Total Solids (%)	20.62	19.98
Total Volatile Solids (%)	59.91	38.2
Ammonia as Nitrogen (mg/kg)	0.47 U	15.2
Sulfide (mg/kg)	6.46	179

CR-13	
Sample depth (feet bml)	11
Total Organic Carbon (%)	2.5
Total Solids (%)	57.95

CR-06		
Sample depth (feet bml)	0-0.33	1-2.5
Total Organic Carbon (%)	35.6 J	49.5 J
Total Solids (%)	21.4	21.59
Total Volatile Solids (%)	60.05	69.23
Ammonia as Nitrogen (mg/kg)	1.37	14.0
Sulfide (mg/kg)	906	2,910

CR-05	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	13.6 J
Total Solids (%)	30.32
Total Volatile Solids (%)	36.49
Ammonia as Nitrogen (mg/kg)	7.21
Sulfide (mg/kg)	320

SE-08A	
Sample depth (feet bml)	0-1
Total Organic Carbon (%)	6.8
Total Solids (%)	35.8
Total Volatile Solids (%)	31.7
Ammonia as Nitrogen (mg/kg)	8.65
Sulfide (mg/kg)	153 J

CR-25 CR-26 CR-18B CR-15C CR-17D SE-03A SE-03B CR-01 SE-07B CR-08B CR-18A CR-08A SE-23 CR-15D CR-17C CR-19J CR-19C CR-19E SE-16 CR-19I SE-02A SE-30 CR-19A SE-15 CR-01 SE-08C SE-37 SE-08A SE-08B SE-08D SE-36 CR-19B CR-19D SE-29 SE-38 SE-41 SE-27 CR-15A CR-16C SE-40 CR-07 SE-24 CR-16B SE-10 CR-05 CR-14 CR-16A SE-25 CR-09A-BA01 CR-09A-BA02 CR-09A-BA04 CR-09A-BA03 CR-09B-BA06 CR-09B-BA05 CR-24 CR-14 SE-26 CR-12 SE-39 CR-13 CR-22 CR-04 CR-23 CR-06 CR-11 CR-21 CR-20 Chehalis River

Notes

Aquatic land lease areas were digitized from print maps of Aberdeen tidelands dated March 22, 2001, and January 15, 1907, on file with the Office of the Commissioner of Public Lands in Olympia, Washington, and should be considered approximate.
Surface is sediment collected in the top 10 centimeters (0 to 0.33 feet bml).
% = percent
bml = below mudline.
J = Result is an estimated value.
mg/kg = milligrams per kilogram.
mg/L = milligrams per liter.
U = Result is non-detect at reporting limit.

Data Sources

Aerial photograph obtained from Esri ArcGIS Online; parcels and roads obtained from Grays Harbor County.

Legend

- Surface Sample
- Subsurface Sample
- Approximate Aquatic Land Lease Area
- Approximate Line of Ordinary High Water

	Detected result exceeds preliminary cleanup standard, regardless of whether TOC is within standard 0.5 to 3.5 percent range.
	Total organic carbon outside of standard 0.5 to 3.5 percent range.

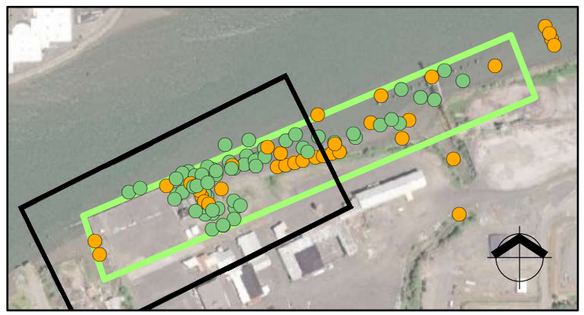

Figure 6-2A
Downriver Wood Waste Parameters

Weyerhaeuser Sawmill
Aberdeen/Seaport
Landing Site
Aberdeen, Washington

0 50 100
Feet

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Project: M1044.02.014 Produced By: jroberts Approved By: mpollock Print Date: 2/8/2023

Path: X:\1044 02 14\041Fig6-2B Woodwaste Parameters Upriver.mxd

SE-02A	
Sample depth (feet bml)	2-3.5
Total Organic Carbon (%)	3.3
Total Solids (%)	55.5
Total Volatile Solids (%)	7.94 J
Ammonia as Nitrogen (mg/kg)	230 J
Sulfide (mg/kg)	977

SE-18	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	1.7
Total Solids (%)	46.3
Total Volatile Solids (%)	6.06
Ammonia as Nitrogen (mg/kg)	12.9
Sulfide (mg/kg)	691
Porewater Sulfide (mg/L)	0.05 U

SE-34	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	1.2
Total Solids (%)	53
Total Volatile Solids (%)	6.69
Ammonia as Nitrogen (mg/kg)	4.82
Sulfide (mg/kg)	921J

CR-02	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	3.21J
Total Solids (%)	51.8

SE-33	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	1.2
Total Solids (%)	54.1
Total Volatile Solids (%)	6.45
Ammonia as Nitrogen (mg/kg)	26.4
Sulfide (mg/kg)	473 J

SE-31	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	2.1
Total Solids (%)	48.8
Total Volatile Solids (%)	8.8
Ammonia as Nitrogen (mg/kg)	7.98
Sulfide (mg/kg)	397

SE-06A	
Sample depth (feet bml)	0.5-1.5
Total Organic Carbon (%)	3.2
Total Solids (%)	55.6
Total Volatile Solids (%)	9.92 J
Ammonia as Nitrogen (mg/kg)	408 J

SE-9	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	2.0
Total Solids (%)	41.5
Total Volatile Solids (%)	6.95
Ammonia as Nitrogen (mg/kg)	9.43
Sulfide (mg/kg)	924

SE-05A	
Sample depth (feet bml)	2-3
Total Organic Carbon (%)	2.3
Total Solids (%)	47.8
Total Volatile Solids (%)	7.49
Ammonia as Nitrogen (mg/kg)	47.1
Sulfide (mg/kg)	4,040 J

CR-03	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	2.91J
Total Solids (%)	36.4

SE-21	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	1.3
Total Solids (%)	59.4
Total Volatile Solids (%)	5.02
Ammonia as Nitrogen (mg/kg)	7.06
Sulfide (mg/kg)	359

CR-19D	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	3.99
Total Solids (%)	39.38
Total Volatile Solids (%)	8.58
Ammonia as Nitrogen (mg/kg)	18.6
Sulfide (mg/kg)	605

SE-16	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	1.5
Total Solids (%)	52.9
Total Volatile Solids (%)	5.35
Ammonia as Nitrogen (mg/kg)	8.43
Sulfide (mg/kg)	469
Pore Water Sulfide (mg/L)	0.05 U

SE-35	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	1.1
Total Solids (%)	50
Total Volatile Solids (%)	6.68
Ammonia as Nitrogen (mg/kg)	7.45
Sulfide (mg/kg)	447 J
Pore Water Sulfide (mg/L)	0.05 U

CR-09B	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	2.99
Total Solids (%)	59.33

CR-19F			
Sample depth (feet bml)	0.5-1.0	0-0.33	0.5-1.0
Total Organic Carbon (%)	2.76	2.77	2.59
Total Solids (%)	50.3	49.31	51.43

SE-17	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	2.3
Total Solids (%)	43.3
Total Volatile Solids (%)	6.8
Ammonia as Nitrogen (mg/kg)	10.7
Sulfide (mg/kg)	20

SE-01A	
Sample depth (feet bml)	1-2
Total Organic Carbon (%)	4.4
Total Solids (%)	51.9
Total Volatile Solids (%)	11.9 J
Ammonia as Nitrogen (mg/kg)	290 J
Sulfide (mg/kg)	865 J

SE-22	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	3.8
Total Solids (%)	33.4
Total Volatile Solids (%)	11.6
Ammonia as Nitrogen (mg/kg)	7.81
Sulfide (mg/kg)	937

SE-28	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	5.5
Total Solids (%)	36
Total Volatile Solids (%)	13
Ammonia as Nitrogen (mg/kg)	7.36
Sulfide (mg/kg)	22.7
Pore Water Sulfide (mg/L)	0.06

SE-20	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	6.6
Total Solids (%)	36.8
Total Volatile Solids (%)	12.7
Ammonia as Nitrogen (mg/kg)	3.9
Sulfide (mg/kg)	2.7 U
Pore Water Sulfide (mg/L)	0.06 J

SE-32	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	1.1
Total Solids (%)	46.4
Total Volatile Solids (%)	6.56
Ammonia as Nitrogen (mg/kg)	7.61
Sulfide (mg/kg)	337 J

CR-10	
Sample depth (feet bml)	0-0.33
Total Organic Carbon (%)	2.94
Total Solids (%)	45.44

Notes

Aquatic land lease areas were digitized from print maps of Aberdeen tidelands dated March 22, 2001 and January 15, 1907, on file with the Office of the Commissioner of Public Lands in Olympia, Washington, and should be considered approximate.
Surface is sediment collected in the top 10 centimeters (0 to 0.33 feet bml).
% = percent.
bml = below mudline.
J = Result is an estimated value.
mg/kg = milligrams per kilogram.
mg/L = milligrams per liter.
U = Result is non-detect at reporting limit.

Data Sources

Aerial photograph obtained from Microsoft Bing;
parcels and roads obtained from Grays Harbor County.

Legend

- Surface Sample
- Subsurface Sample
- Approximate Aquatic Land Lease Area
- Approximate Line of Ordinary High Water

	Detected result exceeds preliminary cleanup standard, regardless of whether TOC is within standard 0.5 to 3.5 percent range.
	Total organic carbon outside of standard 0.5 to 3.5 percent range.

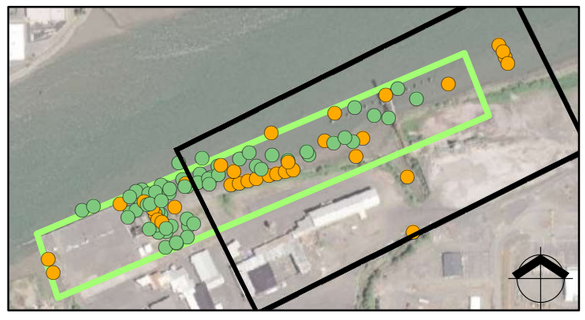

Figure 6-2B
Upriver Wood Waste Parameters

Weyerhaeuser Sawmill
Aberdeen/Seaport
Landing Site
Aberdeen, Washington

0 50 100
Feet

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Produced By: inberts Approved By: mpollock
Project: M1044.02.014

Path: X:\1044_02_14\04\Fig6-3_Bioassay_Results.mxd
Print Date: 5/3/2022
Reviewed By: mpollock
Produced By: jelliott
Project: M1044.01.014



NOTES:
AM = amphipod mortality.
CSL = cleanup screening level.
LD = larval development.
PG = polychaete growth.
SCO = sediment cleanup objective.
Aquatic land lease areas were digitized from print maps of Aberdeen tidelands dated March 22, 2001 and January 15, 1907 on file with the Office of the Commissioner of Public Lands in Olympia, Washington, and should be considered approximate.
Surface is sediment collected in the top 10 centimeters (0 to 0.33 feet below the mudline).

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Source:
Aerial imagery obtained from Esri.

Legend

AM | PG | LD

- Pass
- SCO Failure
- CSL Failure
- Surface Sample
- The Property
- Approximate Aquatic Land Lease Area
- Approximate Line of Ordinary High Water

Figure 6-3
Bioassay Results
Weyerhaeuser Sawmill
Aberdeen/Seaport Landing Site
Aberdeen, Washington

0 100 200
Feet

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Figure 7-1
Conceptual Site Model
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Primary Sources	Primary Release Mechanism	Secondary Sources	Tertiary Source	Point of Potential Contact	Exposure Route	Upland Receptors			Aquatic Lease Receptors		
						Occupational Workers	Construction Workers (Future Conditions)	Visitors (Future Conditions)	Visitors (Future Conditions)	Recreationists/Fishers	Aquatic Ecological Receptors[b]
Indeterminate source(s) related to upland operations	Leaching	Groundwater[a]		Surface water	Incidental ingestion Dermal contact	I I	I I	I I	I I	I I	✓ ✓
	Riverbank erosion	Chehalis River	Resuspension and deposition of sediment	Sediment and pore water	Incidental ingestion Dermal contact	I I	I I	I I	✓ ✓	✓ ✓	✓ ✓
	Stormwater runoff and outfall discharge			Tissue (via bioaccumulation)	Ingestion	∅	∅	∅	∅	✓	✓
Over-water sources (e.g., former sawmill)											
Background or ambient sources, including stormwater discharge to Shannon Slough and airborne deposition											

Notes

→ Primary pathway.

✓ Potentially complete exposure route.

∅ Incomplete exposure route.

I Insignificant exposure route.

[a] Property groundwater is not currently used as drinking water, and future use as drinking water is unlikely. However, the pathway is shown because demonstrations (e.g., beneficial use determination) and/or controls (e.g., institutional controls) are not currently in place.

[b] Aquatic ecological receptors include aquatic plants; benthos; fish; and piscivorous birds, shorebirds, and mammals.

Figure 7-2
Visible Percent Wood Waste in Surface and Subsurface Sediment

Weyerhaeuser Sawmill
Aberdeen/Seaport Landing Site
Aberdeen, Washington

Legend

Approximate Line of Ordinary High Water

Approximate Aquatic Land Lease Area

Total Percent Wood Content

- Not sampled
- No wood observed at depth interval
- < 0.5%
- 0.5 to 5%
- 5.1 to 10%
- 10.1 to 20%
- 20.1 to 50%
- 50.1 to 75%
- > 75%

Collected Sample Depth Interval

- < 0.3 foot
- 0.3 to 2 feet
- 2 to 4 feet
- 4 to 6 feet
- 6 to 8 feet
- 8 to 10 feet
- 10 to 12 feet
- 12 to 14 feet
- 14 to 16 feet
- 16 to 18 feet
- 18 to 20 feet
- 20 to 22 feet
- 22 to 24 feet
- 24 to 26 feet
- 26 to 28 feet

NOTES:
Aquatic land lease areas were digitized from print maps of Aberdeen tidelands dated March 22, 2001, and January 15, 1907, on file with the Office of the Commissioner of Public Lands in Olympia, Washington, and should be considered approximate.
Each sample location shown to the approximate depth sampled; top box represents sample station location.
Wood waste content based on visual inspection.

0 100 200
Feet

Source:
Aerial photograph obtained from Esri.

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Path: X:\1044_02_14\04\Fig7-2_Visible_Percent_Wood_Waste.mxd
Print Date: 5/3/2022
Reviewed By: mpollock
Produced By: jelstrott
Project: M1044.02.014

Path: X:\1044_02_14\04\Fig7-3A_Downriver_Estimated_Wood_Waste_Thickness.mxd
Print Date: 4/28/2022
Approved By: mstringer
Produced By: stumer
Project: M1044.02.014

Chehalis River

CR-25
CR-26
SE-03A
CR-18B
A'
SE-03B
SE-07B
CR-15C
CR08B-FB05 0.1
CR-15D 1.1
CR-17D
CR-18A 5.5
SE-12 1.8
CR-17C 0.5
CR-19J 6.0
SE-15
CR-19C 0.6
CR-19E 6.8
B
SE-07A 4.0
CR-15B 1.5
SE-30 2.5
CR-19A 5.0
CR-19I
SE-02A
CR08A-FB04 15.3
CR-15A 6.5
SE-29 2.3
SE-08A 1.3
SE-08B
SE-08B-RADIO
SE-08D 0.75
CR-16C 11.0
CR-19H
CR-16B 7.8
SE-08C 0.3
CR-19B 4.2
CR-19D 4.3
B'
SE-10 2.0
CR09A-BA01 2.0
CR-19G 3.5
CR-16A 8.0
CR-14 7.8
CR09A-BA03 2.0
RAU2-GA2 10.0
CR-05 3.5
CR09A-BA02 2.0
CR09A-BA04
CR-04 5.0
CR-13 6.2
CR09B-BA05
CR-12 9.5
CR-06 5.0
A
RAU2-GA1 3.0
CR-11 19.7

Layer Thickness

- 2 ft
- 3 ft
- 4 ft
- 5 ft
- 6 ft
- 7 ft
- 10 ft
- 19 ft

NOTES:
2019 sampling event did not reach bottom of wood waste layer.
Interpolation created using Natural Neighbor Spatial Analyst tool with ESRI ArcMap.
Intervals of no recovery in the first core drilled at a location were assumed to be sediment.
Significant is defined as greater than 25 percent wood waste by volume.
Surface samples were not included in the interpolation, with the exception of SE-28 and SE-31 to adequately represent visual observation of wood waste.
Wood waste thickness shown by numbers next to sample locations,

Legend

Sample Location Type

- Sample Location
- No Significant Wood Waste Accumulation Observed

- Cross Section
- Model Domain
- Approximate Line of Ordinary High Water

Figure 7-3A
Downriver Estimated Wood Waste Thickness

Weyerhaeuser Sawmill
Aberdeen/Seaport
Landing Site
Aberdeen, Washingto

0 50 100
Feet

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Source:
Aerial photograph obtained from Esri ArcGIS Online.



NOTES:
2019 sampling event did not reach bottom of wood waste layer.
Interpolation created using Natural Neighbor Spatial Analyst tool with ESRI ArcMap.
Intervals of no recovery in the first core drilled at a location were assumed to be sediment.
Significant is defined as greater than 25 percent wood waste by volume.
Surface samples were not included in the interpolation, with the exception of SE-28 and SE-31 to adequately represent visual observation of wood waste.
Wood waste thickness shown by numbers next to sample locations.

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Source:
Aerial photograph obtained from Esri ArcGIS Online.

Legend

Sample Location Type

- Subsurface
- Surface
- No Significant Wood Waste Accumulation Observed

- Total Thickness Unknown
- Model Domain
- Approximate Line of Ordinary High Water

Figure 7-3B
Upriver Estimated Wood Waste Thickness

Weyerhaeuser Sawmill
Aberdeen/Seaport Landing Site
Aberdeen, Washington

0 50 100
Feet

Path: X:\1044_02_14\041\Fig7-3B_Upriver_Estimated_Wood_Waste_Thickness.mxd
Project: M1044.02.014 Produced By: stumer Reviewed by: mpollock Print Date: 4/28/2022

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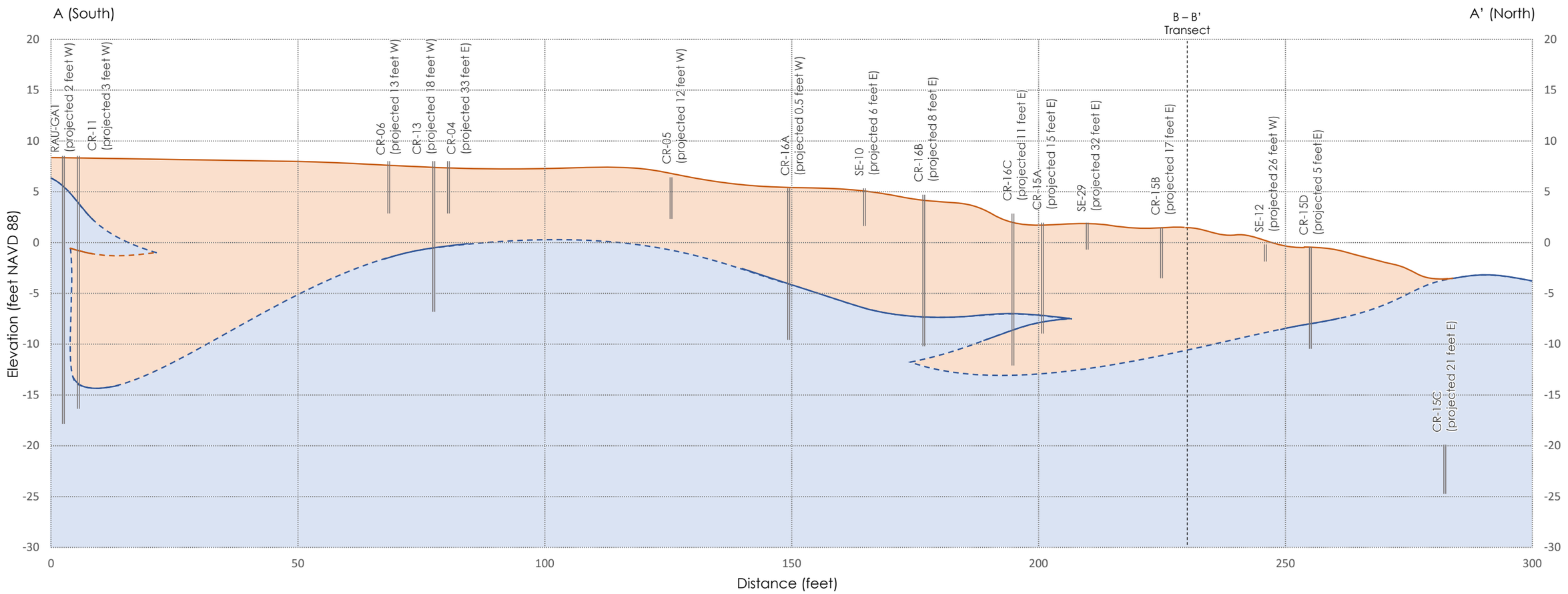
Figure 7-4
Geologic Cross Section A to A'
Weyerhaeuser Sawmill
Aberdeen/Seaport Landing Site
Aberdeen, WA



Legend

- Wood waste
- Sediment
- Borehole

Notes:
All feature locations are approximate.
Units are dashed where inferred.
Sediments containing greater than 25% wood waste are considered wood waste.
Vertical exaggeration is 2x.
NAVD 88 = North American Vertical Datum of 1988.

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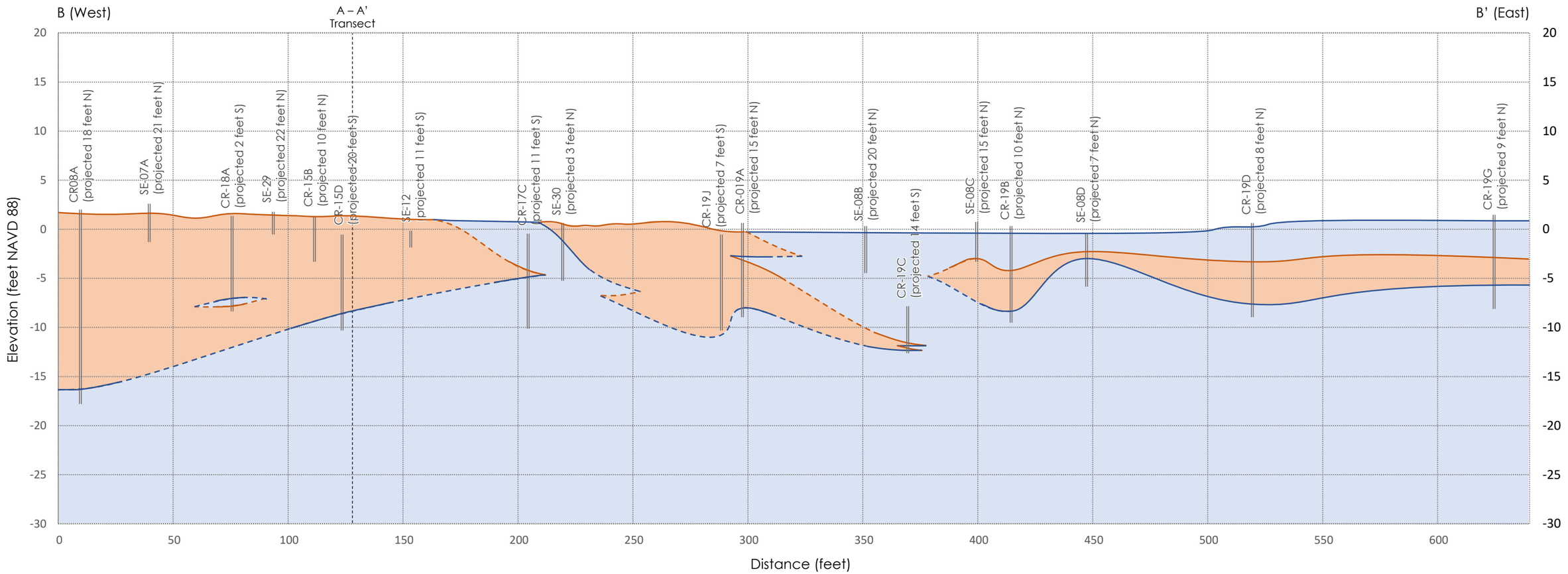
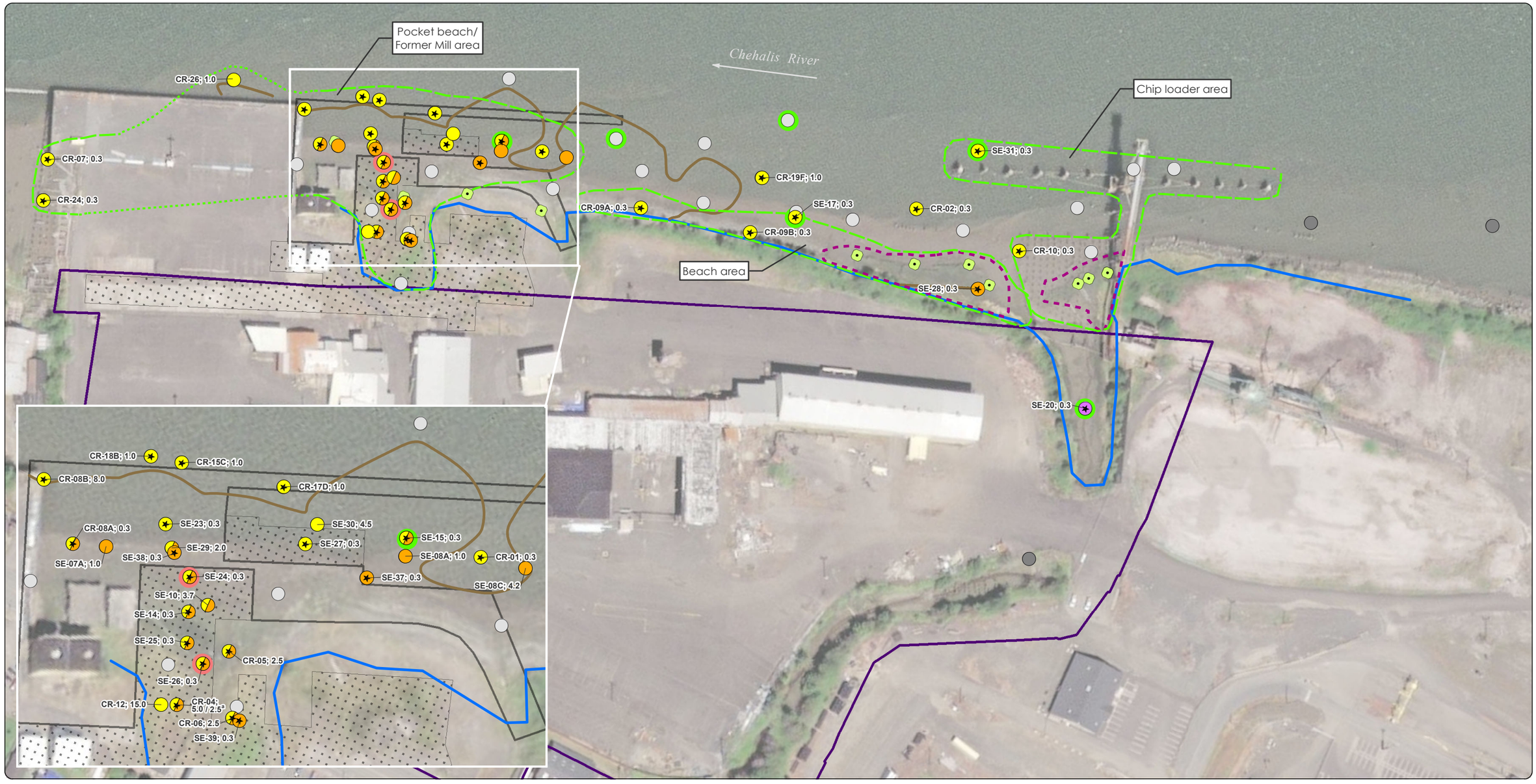
Figure 7-5
Geologic Cross Section B to B'
Weyerhaeuser Sawmill
Aberdeen/Seaport Landing Site
Aberdeen, WA



Legend

- Wood waste
- Sediment
- Borehole

Notes:
All feature locations are approximate.
Units are dashed where inferred.
Sediments containing greater than 25% wood waste are considered wood waste.
Vertical exaggeration is 5x.
NAVD 88 = North American Vertical Datum of 1988.



Notes
Chemical results for IHSs were compared to the preliminary cleanup standards in Table 5-3 of the remedial investigation report.
IHSs include arsenic, cPAH TEQ, total PCBs, and dioxin/furan TEQ.
Sample location labels are followed by the maximum exceedance depth in ft bml.
Wood waste exceedances were identified by comparing total organic carbon, total volatile solids, and estimated wood waste percentages to the three-part wood waste cleanup level presented in Appendix H of the remedial investigation report.

Data Source
Aerial photograph obtained from Esri ArcGIS Online.

Abbreviations
cPAH= carcinogenic polycyclic aromatic hydrocarbon toxic equivalent quotient.
dioxin/furan = polychlorinated dibenzo-p-dioxin and -furan.
ft bml = feet below mudline.
IHS = indicator hazardous substance.
PCBs = polychlorinated biphenyls.
TEQ = toxic equivalent quotient.
[a] At CR-04, the maximum wood waste exceedance depth is 5.0 ft bml and the maximum chemical exceedance depth is 2.5 ft bml.

Legend

- IHS Exceedance at Surface
- IHS Exceedance (Sample Name; Maximum Exceedance Depth)
- Wood Waste Exceedance
- Chemical Exceedance
- Background Locations
- IHS Exceedance Unrelated to Site
- Sample with No IHS Exceedance
- Possible Sulfide Bacterial Seep and Bacterial Mat
- Bioassay Pass
- Bioassay Fail
- Significant Wood Waste Extent
- Approximate Line of Ordinary High Water
- Approximate Visual Extent of Wood Waste
- Area of Concern
- Former Mill
- Former Wharf Extension
- The Property

Figure 8-1
Site-Related IHS Exceedances

Weyerhaeuser Sawmill
Aberdeen/Seaport Landing Site
Aberdeen, Washington

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APPENDIX A
STUDY AREA INVESTIGATION

FINAL STUDY AREA INVESTIGATION—AQUATIC LANDS LEASE

WEYERHAEUSER SAWMILL ABERDEEN/SEAPORT LANDING SITE

FACILITY SITE ID 1126, CLEANUP SITE ID 4987, AGREED ORDER ID 11225
WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES AQUATIC LANDS LEASE NO. 22-092275

Prepared for

GRAYS HARBOR HISTORICAL SEAPORT AUTHORITY

June 19, 2019
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FINAL STUDY AREA INVESTIGATION—AQUATIC LANDS LEASE

WEYERHAEUSER SAWMILL ABERDEEN/SEAPORT LANDING SITE
FACILITY SITE ID 1126, CLEANUP SITE ID 4987, AGREED ORDER 1125
WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES AQUATIC LANDS LEASE NO. 22-092275

The material and data in this report were prepared under the supervision and direction of the undersigned.

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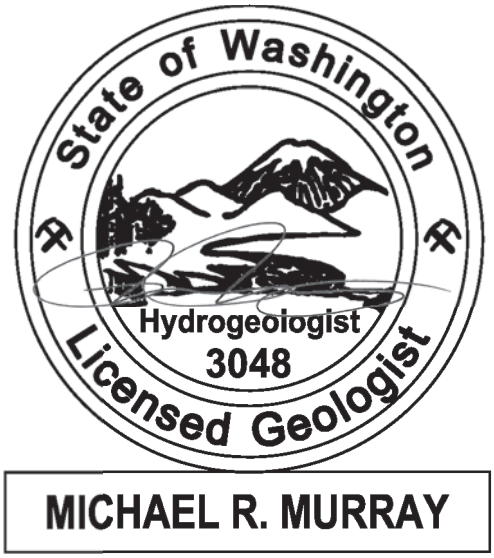

6/19/19

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CONTENTS

TABLES AND ILLUSTRATIONS V

ACRONYMS AND ABBREVIATIONS VI

1 INTRODUCTION 1
- 1.1 PURPOSE AND OBJECTIVES 1
- 1.2 REGULATORY FRAMEWORK 1
- 1.3 QUINAULT INDIAN NATION TREATY RIGHTS 2

2 BACKGROUND 3
- 2.1 LOCATION AND CURRENT PROPERTY CONDITIONS 3
- 2.2 PROPERTY HISTORY 3
- 2.3 SHORELINE MODIFICATIONS AND HISTORICAL FILL EVENTS 4
- 2.4 LEASED PROPERTY OPERATIONS 5
- 2.5 PREVIOUS INVESTIGATIONS 6

3 LEASED PROPERTY INVESTIGATION 10
- 3.1 OBJECTIVES AND APPROACH 10
- 3.2 FIELD INVESTIGATION 11

4 LEASED PROPERTY CONDITIONS 15
- 4.1 TOPOGRAPHY AND BATHYMETRY 15
- 4.2 GEOLOGY AND HYDROGEOLOGY 16
- 4.3 AQUATIC ENVIRONMENT AND BOTTOM SUBSTRATE 17
- 4.4 BENEFICIAL WATER AND LAND USES 19

5 CONCEPTUAL SITE MODEL 20
- 5.1 SOURCE CHARACTERIZATION 20
- 5.2 BACKGROUND SOURCES 21
- 5.3 FATE AND TRANSPORT OF CONTAMINANTS 21
- 5.4 POTENTIAL HUMAN HEALTH EXPOSURE SCENARIOS 22
- 5.5 POTENTIAL ECOLOGICAL RECEPTORS 24
- 5.6 TERRESTRIAL ECOLOGICAL EVALUATION 24

6 SCREENING LEVELS 24
- 6.1 SOIL 24
- 6.2 GROUNDWATER SEEP WATER, AND STORMWATER 25
- 6.3 SEDIMENT 25

7 ANALYTICAL RESULTS 28
- 7.1 SOIL 29
- 7.2 GROUNDWATER, SEEP WATER, AND STORMWATER 30
- 7.3 SEDIMENT 31

LIMITATIONS

REFERENCES

TABLES

FIGURES

APPENDIX A

SANBORN MAPS

APPENDIX B
FIELD METHODS

APPENDIX C
BORING LOGS

APPENDIX D
TERRESTRIAL ECOLOGICAL EVALUATION

APPENDIX E
SEDIMENT SCREENING LEVEL DEVELOPMENT FOR HUMAN HEALTH—DIRECT CONTACT

APPENDIX F
LABORATORY REPORTS (PROVIDED ON CD)

APPENDIX G
DATA VALIDATION MEMORANDA

TABLES AND ILLUSTRATIONS

FOLLOWING REPORT:

TABLES

3-1 SOIL, GROUNDWATER, AND SEEP SAMPLE DESCRIPTIONS AND ANALYSES

3-2 GROUNDWATER AND SEEP WATER FIELD PARAMETERS

3-3 SEDIMENT SAMPLE DESCRIPTIONS AND ANALYSES

6-1 BACKGROUND CHEHALIS RIVER SEDIMENT CONCENTRATIONS

7-1 SAMPLE SUMMARY

7-2 SOIL ANALYTICAL RESULTS AND SCREENING CRITERIA

7-3 GROUNDWATER, SEEP, AND STORMWATER ANALYTICAL RESULTS AND IN-WATER SCREENING CRITERIA

7-4 SEDIMENT ANALYTICAL RESULTS

7-5 SEDIMENT ANALYTICAL RESULTS AND SCREENING CRITERIA

7-6 WOODWASTE TOXICITY SCORING

FIGURES

1-1 PROPERTY LOCATION

1-2 PROPERTY VICINITY

1-3 HISTORICAL AND CURRENT PROPERTY FEATURES

2-1 SAMPLE LOCATIONS

2-2 SURFACE DRAINAGE FEATURES

4-1 BATHYMETRY AND TOPOGRAPHY

4-2 ESTIMATED WOODWASTE THICKNESS

4-3 ESTIMATED SEDIMENT THICKNESS OVERLYING WOODWASTE

4-4 WOODWASTE AND OVERLYING SEDIMENT CROSS SECTION

5-1 CONCEPTUAL SITE MODEL

6-1 BACKGROUND SAMPLE LOCATIONS

7-1 SEDIMENT MANAGEMENT STANDARD EXCEEDANCES

ACRONYMS AND ABBREVIATIONS

AET	Apparent effects threshold
ARI	Analytical Resources, Inc.
bgs	below ground surface
bml	below mudline
BTEX	benzene, toluene, ethylbenzene, and xylenes
cm	centimeter
COI	chemical of interest
cPAH	carcinogenic PAH
CSL	cleanup screening level
CSM	conceptual site model
CUL	cleanup level
dioxins	polychlorinated dibenzo-p-dioxins and -furans
DNR	Department of Natural Resources
dw	dry weight
Ecology	Washington State Department of Ecology
FS	feasibility study
GHHSA	Grays Harbor Historical Seaport Authority
leased Property	approximately 16.9-acre leased tidelands at the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site property
MFA	Maul Foster & Alongi, Inc.
mg/kg	milligrams per kilogram
MTCA	Model Toxics Control Act
NAPL	nonaqueous-phase liquids
NAVD-88	North American Vertical Datum of 1988
NPDES	National Pollutant Discharge Elimination System
OC	organic carbon-normalized
PARIS	Ecology Water Quality Permitting and Reporting Information System
PCP	pentachlorophenol
pg/g	picograms per gram
ppt	parts per thousand
QIN	Quinault Indian Nation
RI	remedial investigation
SAI	Study Area Investigation
SAIAA	Study Area Investigation and Alternatives Analysis
SAIC	Science Applications International Corporation
SCO	sediment cleanup objective

ACRONYMS AND ABBREVIATIONS (CONTINUED)

Site	Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site
SMS	Sediment Management Standards
SVOC	semivolatile organic compound
TEE	terrestrial ecological evaluation
TEQ	toxicity equivalence quotient
TOC	total organic carbon
TPH	total petroleum hydrocarbons
ug/kg	micrograms per kilogram
USEPA	U.S. Environmental Protection Agency
WAC	Washington Administrative Code
WQC	National Recommended Water Quality Criteria

1 INTRODUCTION

1.1 Purpose and Objectives

Maul Foster & Alongi, Inc. (MFA) has prepared this Study Area Investigation (SAI) Report for the Grays Harbor Historical Seaport Authority (GHHSA) to characterize nature and extent of environmental impacts at the approximately 16.9-acre leased tidelands (herein referred to as "the leased Property") at the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site. The Site is located adjacent to the Chehalis River at 500 North Custer Street in Aberdeen, Washington (see Figure 1-1). The Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site includes approximately 23.6 acres of upland property and the adjacent tidelands (i.e., the leased Property), which are leased from the Washington State Department of Natural Resources (DNR) under lease number 22-092275 (see Figure 1-2). Historically, the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site was used as a lumber mill by Weyerhaeuser and other wood products companies. The leased Property is proposed for future use as the homeport for the *Lady Washington* and *Hawaiian Chieftain* tall ships as part of a new maritime heritage facility called Seaport Landing.

Environmental sampling previously conducted in the former sawmill area and the lumber shed processing operations area (see Figure 1-3) indicates that hazardous substances have impacted sediments on the leased Property. Prior investigations indicate that polychlorinated dibenzo-p-dioxins and -furans (dioxins); semivolatile organic compounds (SVOCs), including polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), polychlorinated biphenyls (PCBs), metals including mercury, and woodwaste, are present in sediment on the leased Property.

This report describes results of investigations that have been conducted at the leased Property, including the most recent investigations in October 2015.[1] Prior investigations informed identification of chemicals of interest (COIs) for the leased Property as well as the approximate spatial extent of the 2015 investigation area. The purpose of the 2015 investigation was to generate data to characterize the nature and extent of contaminants in the leased Property media relative to appropriate cleanup levels (CULs). The results will inform additional characterization needs (data gaps) to be addressed as part of the forthcoming remedial investigation (RI) activities.

Note that this report addresses only the leased Property. The upland property will be evaluated separately.

1.2 Regulatory Framework

On August 17, 2015, the GHHSA entered into Agreed Order DE 11225 with Ecology. The order required the GHHSA to investigate the aquatic lease area and produce an SAI Report. This report has been prepared to satisfy the requirements of the Agreed Order.

[1] A stormwater sample collected in January 2016 is also discussed in this report.

The Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site is listed on Ecology's database as Facility Site ID 1126/Cleanup Site ID 4987. This SAI focuses on the leased Property and is not intended to be a complete RI for the Site as defined by the Washington State Department of Ecology (Ecology) under the Model Toxics Control Act (MTCA).

Weyerhaeuser assumed the aquatic land lease at the time of the property acquisition in 1955. A prior aquatic land lease (Aquatic Land Lease No. 22-A02150) was signed by DNR on September 13, 2001. Subsequently, GHHSA entered into a sublease agreement with Weyerhaeuser for the leased Property. In addition to the sublease agreement, DNR, Weyerhaeuser, and GHHSA jointly entered into a consent to sublease agreement that identifies a number of requirements to be completed before the termination of the master tideland lease. These include a requirement to submit an RI and feasibility study (FS) report for the leased Property. On April 14, 2017, the GHHSA entered into aquatic lands lease No. 22-092275 with the DNR. This tract borders the GHHSA-owned properties to the north, along the Chehalis River.

DNR requires "bookend" sediment sampling at the initiation and termination of an aquatic lease in order to differentiate baseline sediment conditions from impacts that may have occurred during the lease period, as well as to evaluate long-term trends in sediment conditions. On February 2, 2011, in correspondence with Weyerhaeuser, DNR requested sediment sampling and proposed a sampling approach for the leased Property. Floyd|Snider, consultant to Weyerhaeuser, proposed a reduction to the DNR-requested sampling in a proposal letter prepared for Weyerhaeuser on March 15, 2012 (Floyd|Snider, 2012). On March 26, 2012, DNR modified the Floyd|Snider proposed sediment sampling plan (DNR, 2012) by expanding the analyte list for three proposed surface sediment samples from the Chehalis River and requested three sediment core samples in the Former Mill Area, an area within the leased Property (see Figure 1-3).

MFA conducted sediment sampling on November 7-8, 2013, consistent with an Ecology and DNR-approved Sampling and Analysis Plan (MFA, 2013). The results of the investigation were provided to Ecology and DNR in a sediment sampling report on February 5, 2014 (MFA, 2014). On April 4, 2014, DNR requested an RI/FS for the leased Property (DNR, 2014). During a July 2, 2014 meeting between DNR, Ecology, the GHHSA, and MFA, an RI/FS work plan due date of October 2, 2014, was set. Comments on the sediment sampling report were received from Ecology by e-mail on July 9, 2014 (Ecology, 2014a), and these were addressed in the SAI work plan (MFA, 2015). Subsequent revisions to the sampling and analytical approach were made at the request of Ecology and are captured herein.

This SAI has been completed for the leased Property to address the substantive requirements of MTCA (Washington Administrative Code [WAC] 173-340) and the Sediment Management Standards (SMS) (WAC 173-204-550). This report was submitted to Ecology on April 11, 2017. MFA received comments on April 5, 2019, and is now submitting this revised report incorporating those comments.

1.3 Quinault Indian Nation Treaty Rights

The Quinault Indian Nation (QIN) is a sovereign Tribal government with federally protected treaty rights. Their 1856 treaty provides Quinault tribal members the right to harvest fish and shellfish in their usual and accustomed areas, which include Grays Harbor and streams that empty into Grays

Harbor. Harvest in Grays Harbor is conducted in tribally regulated gillnet fisheries via drift gillnetting or setnetting. Drift gillnetting consists of deploying a gillnet across the Chehalis River, perpendicular to the shoreline. Setnets are affixed to the Chehalis Riverbank on one end and secured with an anchor in the Chehalis at the other end.

Tribal fishing operations, including both drift gillnetting and setnetting methods, are conducted within the leased Property and directly offshore. Setnets are occasionally affixed to trees and other shoreline features along the shoreline within the leased Property. Any in-water activities have the potential to impact the QIN fishers' use of this portion of the Chehalis River for federally protected treaty fishing. GHHSA is negotiating a Memorandum of Agreement with the QIN to formalize coordination related to the Site. Further coordination with the QIN will help identify all potential fishing and harvesting uses in the area and will be described in the forthcoming RI report.

2 BACKGROUND

The background and physical setting descriptions below for the leased Property are summarized from site investigations, interviews with the GHHSA, and review of past environmental reports.

2.1 Location and Current Property Conditions

The Site is located in the alluvial meander plain of the Chehalis River in the northwestern margins of the Willapa Hills physiographic region of southwest Washington. Located at 500 North Custer Street in Aberdeen, the Site is approximately 2 miles upriver from Grays Harbor. The City of Aberdeen is situated in southwestern Washington, approximately 15 miles from the Pacific Ocean and approximately 70 air miles west-southwest of Tacoma, Washington. US Highway 101 and US Highway 105 are located less than 0.25 mile south of the site. The Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site property is situated in sections 9 and 10 of township 17 north, range 9 west, Willamette Base Meridian. It is bordered on the west by a former boatyard and marine service center, to the east by a log storage yard, to the north by the Chehalis River, and to the south by residential and commercial development.

2.2 Property History

The operational history of the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site property is detailed in a Level I environmental site assessment (PES, 2010). Sawmills had operated on the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site property, on both the uplands and leased Property, since before 1900. The South Aberdeen waterfront has been developed for commercial and industrial use since the early 1890s. The piling (commonly referred to as a pile field) at the mouth of Shannon Slough marks the location of an early Aberdeen salmon cannery. In the late 1890s, the Aberdeen Lumber sawmill was constructed on the upland property with logs rafted along the shoreline to feed the mill. Aberdeen Lumber was later sold, becoming Schafer Brothers Lumber and Door Co.

Mill #4. The business expanded, and so did its footprint. Schafer Brothers later sold the property to Simpson Timber Company.

Weyerhaeuser acquired the property in 1955 and operated several sawmills and associated support facilities through January 2009, when the mill known as the small log sawmill was permanently closed. Until the mid-1960s raw logs were brought to the mill in log rafts on the Chehalis River and tied up to pilings in the river in front of the Big Mill. After the mid-1960s, raw logs were brought to the mill by truck and staged on log decks at various locations in and adjacent to the property. The Big Mill was originally configured to manufacture shingles and slats for housing construction. During World War II, the Big Mill was converted for manufacturing ship keels for the war effort. The precursor to the small log mill was added in 1972; small log mill operations were performed in the upland portion of the site outside the leased Property. The last upgrade to the small log mill took place in 2003. In 2006, the Big Mill and attached finger pier were closed; the associated structures were removed between 2006 and 2008. This area is now known as the Former Mill Area. The small log mill continued to operate into early 2009. The GHHSA acquired the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site uplands on March 29, 2013. Currently, there are no active wood-products-manufacturing operations at the property. Historical and current site features are shown in Figure 1-3.

2.3 Shoreline Modifications and Historical Fill Events

Historical Sanborn maps from 1906, 1914, 1928, 1948, and 1989 provided in Appendix A offer insight into the development of the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site property. Specifically, the Sanborn maps depict development of mill-related structures on pilings in the Chehalis River, shoreline modifications resulting from filling events, and other important details regarding the composition of fill materials. Shoreline modifications since 1906 illustrated in the Sanborn maps in Appendix A are summarized below.

1906: The 1906 Sanborn maps show a mill and related structures extending into the Chehalis from Front Street between North Custer and Columbus streets. The structures are constructed on posts. These former mill structures were farther east than subsequent mill structures that formed the Former Mill Area. The 1906 mill and mill-related structures were in the approximate location of the present-day former Main Shipping Shed. While this particular area is not depicted in the 1914 Sanborns, by 1928 these mill structures no longer exist. In fact, new mill-related structures are constructed in the location of the area now referred to as the Former Mill Area (see Figure 1-3) to the west of Custer Street and extending approximately to Clark Street.

Shoreline on either side of the 1906 mill area is not fully depicted in the maps. However, the shoreline along Front Street at the mouth of the Shannon Slough is undeveloped. There is another mill to the east of the present-day Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site, just east of Lawrence Street. Sanborn maps show mill-related development consisting primarily of irregular lumber piles on planked fill or planked on sawdust.

1914: As noted above, the 1906 mill area is not visible in the 1914 Sanborn maps. However, the Sanborn maps show that the shoreline at the mouth of Shannon Slough has been modified to extend farther north into the Chehalis River, as it was filled in with irregular lumber piles.

1928: The 1928 Sanborn maps show further offshore development north into the Chehalis River. As noted in the 1906 description, the 1906 mill structures had been removed and the mill area shifted farther west between Custer and Clark streets. All of the structures shown are constructed on planks in the Chehalis River. The wharf that is currently on the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site is constructed as of 1928—the wharf and mill site are built on pilings. Shoreline to the east of the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site is relatively unchanged.

1948: As of 1948, the area between the planked over-water structures and Front Street between Clark and Custer have been filled in with refuse and planked. The over-water structures remain on planks. Shoreline to the east of the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site is relatively unchanged as of 1948.

1989: As of 1989, the entire former in-water area of the Chehalis north of Custer Street and to the east to Shannon Slough has been filled. According to the Sanborns, fill material in this area consisted of earth and rock and lumber piles on filled ground. The area east of Shannon Slough is shown as fill consisting of sawdust piles.

2.4 Leased Property Operations

Former facility operations in the leased Property area, with demonstrated or potential environmental impacts, are discussed below. These former operational areas of interest were carried forward for evaluation and characterization. Upland facility operations are not included in this discussion but are detailed in the Level I environmental site assessment (PES, 2010). The areas of interest identified below are shown on Figure 1-3.

2.4.1 Former Mill Area and Pocket Beach

The mill that appeared in the 1928 Sanborns between Custer and Clark streets was originally constructed on pilings over the Chehalis River and the pocket beach area. This area is referred to as the Former Mill Area. Mill facilities and equipment were installed over plank flooring. Before 1970, there was no spill protection to prevent spills on the flooring from falling into the river below. In the mid-1970s, Weyerhaeuser reportedly reworked the flooring to prevent releases through the planking. Beginning in approximately 1980, containment pans were installed beneath all mill hydraulic components.

The original mill at this site was closed in 2006 and was removed between 2006 and 2008, exposing the Chehalis River and the pocket beach. Over 1,000 creosoted wood pilings were also removed from this area during mill demolition. It is unknown whether these pilings were pulled out completely or removed to mudline. This data gap will be addressed during the RI. Creosote-treated piles can be harmful and toxic to aquatic species. Therefore, the removal of the creosote-treated pilings has been a major focus of DNR's Restoration Program and has also been used in the regulatory process to generate mitigation credits. Since removal of the mill and pilings and debris in the Chehalis River, the pocket beach area has been colonized by vegetation characteristic of wetland environments, such as cattail (*Typha sp.*) and rushes (*Juncus sp.*). This location in the river has also been observed to be a

depositional area with debris including loose pilings and household appliances floating downstream and becoming lodged against the wharf.

2.4.2 Lumber Shed

The lumber shed located in the northwest corner of the leased Property was used to store finished products. Historically, an iron fuel-oil tank was used to supply the fuel-oil-fired internal combustion engine powered cranes at the west end of the wharf. According to the GHHSA staff, a fire destroyed much of this area in 1965.

2.4.3 Former Boiler

Wood-fired boilers were located adjacent to the powerhouse at the east end of the wharf. The boilers contained asbestos that reportedly was removed during demolition of the mill. One transformer is currently present at the powerhouse and is not known to contain PCBs. The powerhouse has been cleaned and a vault below the powerhouse has been cleaned and filled with pea gravel. An oil house was also located next to the powerhouse.

2.4.4 Tidelands and Beach Area

Along the Chehalis River, the area between the Former Mill Area and the mouth of Shannon Slough consists of former tidal flats that historically were filled with unknown types and quantities of debris, including construction debris and woodwaste. See Section 2.3 for information detailing what is known, based on historical Sanborn maps, regarding these fill events.

2.4.5 Shannon Slough

Shannon Slough meanders from south to north across the eastern portion of the property and discharges into the Chehalis River next to the former chip area. Shannon Slough receives stormwater runoff from the property, upstream residential areas, and the highway. Currently, after passing through catch basins and oil/water separators, stormwater is discharged through various culverts directly into Shannon Slough or into the Chehalis River. The Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site National Pollutant Discharge Elimination System (NPDES) sampling location is at the outfall along the west bank of the slough. Releases of paint waste to Shannon Slough in 1989 resulted in a Clean Water Act conviction and subsequent remediation activities (PES, 2010). Shannon Slough discharges to the Chehalis River in the leased Property, forming a small deltaic feature. Multiple pilings are present in the mudflats along the northeastern portion of the slough. Information is not available regarding whether these pilings contain creosote. According to Sanborn Fire Insurance Maps (provided in Appendix A), the pilings have been on the Property since at least 1906. Given their age, it is reasonable to assume that the pilings were creosote-treated.

2.5 Previous Investigations

Environmental data collected at and in the vicinity of the leased Property, dating back to 1999, are summarized below. Historical and current sample locations are shown on Figure 2-1.

2.5.1 Ecology Sediment Investigation

In 1999, Ecology conducted a sediment quality investigation on the Chehalis River (Ecology, 1999). Two of the samples (7S and 14S) collected during this investigation came from the leased Property. Samples were analyzed for all SMS compounds and for the presence of wood debris. There were no exceedances of the SMS, and no woodwaste accumulations were observed. The absence of impacts at these locations helped inform the spatial sampling extent for the 2013 and 2015 investigations.

2.5.2 Level I Environmental Site Assessment

In August 2010, PES prepared an extensive Level I environmental site assessment report. The document summarized past releases of contaminants to the leased Property, including the following:

- In 1989, red-end paint wastes (containing 1,1,1-trichloroethane and naphthalene) were released to Shannon Slough, resulting in a U.S. Environmental Protection Agency (USEPA) fine and cleanup action. PAHs; pentachlorophenol (PCP); and benzene, toluene, ethylbenzene, and xylenes (BTEX) were detected in sediments, but PCBs were not.
- In 1992, storm system sediments (in catch basins and oil/water separators, located on the Seaport Authority property) were evaluated. Aroclor 1260 was detected at 959 micrograms per kilogram (ug/kg) at CB-1, located southwest of the planer. PAHs and BTEX were commonly detected in the storm system sediments, with dibenzofuran, phenol, and 2- and 4-methylphenol detected at the catch basin at the main shipping shed. Stormwater outfall locations were evaluated during a stormwater system evaluation conducted by MFA in May 2015. The results of this evaluation are presented in Section 2.5.7.
- Between 2006 and 2008, the Big Mill (which sat over the pocket beach area) was demolished. Over 1,000 piles were removed during the demolition.
- The facility stormwater pollution prevention plan significant spills report lists three spills: a June 2001 release of 17.5 gallons of hydraulic oil (with 1 gallon spilling into the Chehalis River); an August 2002 release of 4 gallons of hydraulic oil to the Chehalis River; and a March 2005 release of 50 gallons of diesel fuel to land near the stacker (in the upland area).
- The Big Mill, originally constructed in 1924, contained hydraulic equipment installed over plank flooring. Drip pans were installed under the hydraulic equipment in approximately 1980.

Numerous recognized environmental conditions were also identified in the Level I environmental site assessment for the upland Seaport Authority Property (PES, 2010).

2.5.3 Phase II Environmental Site Assessment

In April 2011, Science Applications International Corporation (SAIC) conducted a soil and sediment investigation at the leased Property (SAIC, 2011) on behalf of DNR. Three composited sediment samples were collected near the Wharf Area immediately downstream of the 1999 Ecology sample

location 7s (see Figure 2-1). The surface sediment samples were analyzed for all SMS constituents and for the presence of woodwaste and dioxins. Butyl benzyl phthalate was detected at a concentration slightly above the sediment cleanup objective (SCO). No accumulation of woodwaste was encountered. Surface sediment dioxins with a toxicity equivalence quotient (TEQ) of 6.1 picograms per gram (pg/g) were detected in the area. The absence of woodwaste and the low-level concentrations of SMS constituents in sediment at these locations helped inform the spatial sampling extent for the 2013 and 2015 investigations.

SAIC also collected surface and subsurface sediments in the Former Mill Area (see Figure 2-1). Fine wood debris was encountered in surface sediment at two of the three locations, with woodwaste observed in all subsurface sediment throughout the length of the cores (i.e., 5 feet below mudline [bml]). Surface and core sediment samples from all three locations were tested for SMS chemicals. A composite of the three surface samples was analyzed for dioxins. The reported dioxin TEQ was 68 pg/g. Two of the sample locations had initial surface mercury detections in excess of the SMS cleanup screening level (CSL). Subsequent averaging with split samples collected by Weyerhaeuser found that the surface mercury concentrations exceeded the sediment quality standard but were below the CSL. One of the sample locations had surface exceedances of the SMS CSL for bis(2-ethylhexyl) phthalate and 1,4-dichlorobenzene. There were also concentrations of several chemicals in subsurface sediment above SMS CSLs. Note, however, that surface sediments are the point of compliance under the SMS (Ecology, 2008). These results showed potential for woodwaste and chemical impacts in this area and informed additional investigations conducted in 2013 and 2015.

SAIC further collected six soil borings from the filled tidelands area to depths of 5 feet below ground surface (bgs) (see Figure 2-1 for locations SB1 through SB6; note that SB5 and SB6 are outside the leased Property). Generally, the soil cores were observed to have dark brown, sandy sawdust at a depth of approximately 4 to 5 feet bgs, overlain by light brown sawdust and wood chips. Soil samples were analyzed for MTCA Method A constituents (up to three sample depth horizons per location), and two composite soil samples from each of the filled tideland areas were analyzed for dioxins. No chemicals were detected above MTCA Method A criteria, with the exception of motor oil at 1.5 to 3 feet bgs and 3 to 5 feet bgs at sample location SB-6, which is outside the leased Property. The dioxin TEQs for the composite soil samples collected in the filled tidelands were 13.5 pg/g and 2.37 pg/g for the composite samples from locations SB1-SB3 and SB4-SB6, respectively.

2.5.4 Water Investigation Report

In January 2010, Floyd|Snider evaluated water quality at the upper pocket beach area under the Former Mill Area. After evaluating the seeps and river water, the study concluded that the water coming from the seeps does not have the same general chemical parameters as the river water, suggesting that the seeps are not bank storage of river water captured during high tide, but more likely are related to groundwater discharge. Analytical data showed low-level detections of metals and TPH at the stormwater outfall and seep locations, and samples were non-detect for volatile organic compounds. Also, the study indicated that an intermittent sheen previously observed at one of the seeps in 2009 was not observed during the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site visit in January 2010.

2.5.5 NPDES Data Review

When the facility was active, stormwater was managed under an NPDES industrial stormwater permit administered by Ecology (Permit Nos. SO3001015 and WAR001015). Data from the facility NPDES stormwater program obtained from the Ecology Water Quality Permitting and Reporting Information System (PARIS) were retrieved. Between 2003 and 2007, the facility had benchmark exceedances for pH, turbidity, biological oxygen demand, and zinc. MFA searched the PARIS database for NPDES data on August 1, 2014, and May 1, 2019; not all facility NPDES data were available in the database.

2.5.6 2013 Leased Property Sediment Sampling

In November 2013, MFA collected sediment samples from six locations in the Former Mill Area (pocket beach) and in the Chehalis River (see Figure 2-1). The 2013 investigation data were originally presented in the sediment sampling report (MFA, 2014) and the results are discussed herein alongside the results from the more recent October 2015 investigation. The sampling approach is briefly described below.

The Chehalis River surface sediment samples (CR-01 through CR-03) were analyzed for SMS constituents with marine criteria, dioxins, and total organic carbon (TOC). No impacts, including woodwaste, were observed in surface sediments collected in the Chehalis River portion of the leased Property. Therefore, analysis was not conducted for conventional parameters used to evaluate toxicity in sediment impacted with woodwaste.

DNR and Ecology requested sampling in the Former Mill Area to further delineate historical elevated concentrations of butyl benzyl phthalate, PCP, mercury, and dioxins (DNR, 2012). Sediment cores were analyzed using a tiered approach, and the list of analytes included mercury, dioxins, PCBs, SVOCs, and TPH. Analysis for conventional parameters (TOC, total volatile solids, total solids, ammonia, total sulfides, and percent fines) was conducted on surface sediment samples and some subsurface sediment containing more than 25 percent woodwaste by volume.

2.5.7 Stormwater System Evaluation

As discussed in Section 2.5.2, sediment contamination resulting from potential stormwater pathways present at the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site were noted in the PES report (PES, 2010). Based on this possibility, MFA conducted a stormwater system evaluation in May 2015. MFA's review of existing stormwater system plans available for the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site indicated inconsistences between "as-built" drawings of stormwater features at the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site and the actual location of features.

MFA field-verified the stormwater system features, including catch basins and outfalls, and recorded locations using a handheld global positioning system receiver. When possible, stormwater conveyance features were opened to verify diameter of pipe connections present and approximate direction of piping entering and leaving the feature. Locations of stormwater features observed at the leased Property are included in Figure 2-2.

Two catch basins with associated outfalls (OFs 2 and 14) were observed at the west of the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site and appeared to discharge on the neighboring Pakonen Boatyard facility (see Figure 2-2). The ultimate location of the outfall was not visually observed because of dense vegetation and high tide at the time of observation. The outlet from the catch basin attached to OF 14 is composed of a cement 8-inch-diameter pipe while OF 2 piping is composed of 12-inch-diameter corrugated metal pipe. No water was present in these catch basins during observation; however, indications of recent stormwater flow though these catch basins was observed. OF 2 drains an area where lumber was formerly stored and loaded onto ships, while OF 14 drains a driveway that accesses the site on the west side.

In the fall of 2015, MFA oversaw the cleaning of the site's stormwater catch basins, oil/water separators, and storm lines. The cleaning removed sediment and solids buildup from within the pipes, catch basins, and oil/water separators. Following cleaning of the system, a camera video inspection was performed to evaluate the existing conditions of the pipe network. Based on initial observations, the storm lines are in poor condition. MFA is currently working with the GHHSA on a design to improve/enhance the stormwater system at the site; the design will also allow the system to serve as a showcase for best management practices for stormwater. One stormwater sample was collected in the pocket beach area as part of this investigation in 2016; the results are included in the analysis below.

3 LEASED PROPERTY INVESTIGATION

MFA conducted the leased Property investigation in October 2015. The investigation included characterization of tideland soils, groundwater, seep water, and surface and subsurface sediments.

3.1 Objectives and Approach

Consistent with the SMS, and as stipulated in WAC 173-204-550, the purpose of this SAI was to collect, develop, and evaluate information sufficient to allow establishment of cleanup standards and selection of a cleanup action, should that be deemed necessary.

The investigation objectives related to hazardous substances included the following:

- Information gathering with respect to physical site features that have the potential to contribute to or transport contamination, e.g., storm drain system.
- Identification and characterization of significant hazardous substance source areas in the leased Property through a review of historical information; investigation results; and the collection of environmental samples for physical observation, field screening, and chemical analyses.
- Evaluation of contaminant migration pathways at the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site. Key elements relevant to contaminant migration include,

but are not limited to, the rate and direction of groundwater flow, preferential migration pathways, and sediment-river interactions.

- Determination of the nature, extent, and distribution of hazardous substances, focusing on the vertical and lateral extent of contamination.
- Identification of all current and reasonably likely future human and ecological receptors that may be exposed to hazardous substances.
- Evaluation of the risk to human health and the environment from releases of hazardous substances at or from the leased Property.
- Generation or use of data of sufficient quality for site characterization and risk assessment.
- Development of the information required for evaluating and designing source control measures or remedial actions to address contaminant releases, if deemed necessary.

The SAI scope was designed to address characterization needs resulting from the previous investigations described in Section 2.5. Additional characterization needs will be identified and will be addressed as part of forthcoming RI activities; evaluation of the need for and type of remedial actions will be described in the forthcoming FS. Potential sources of impacts and features of interest on the leased Property include the Chehalis River and the following areas (shown in Figure 1-3):

- Former Mill Area and pocket beach
- Lumber shed area
- Wharf area
- Former boiler area
- Tidelands and beach area
- Shannon Slough

3.2 Field Investigation

The SAI was conducted on the leased Property in general accordance with the SAI work plan (MFA, 2015) in October 2015. Four soil borings upgradient of the pocket beach were advanced using a GeoProbe® direct-push drill rig for soil and reconnaissance groundwater sampling. Surface and subsurface sediment samples were collected from the pocket beach and the Chehalis River, using manual and mechanically assisted (GeoProbe) sampling techniques from a barge, and an opportunistic seep sample was collected from the pocket beach area. The investigation included geologic characterization, observation of visually apparent impacts, and analysis of samples for COIs. Figure 2-1 shows sample locations, and the field sampling methodology is presented in Appendix B.

3.2.1 Soil and Reconnaissance Groundwater

Four borings (CR-20, 21, 22, and 23) were advanced in the tidelands area immediately upgradient of the pocket beach retaining wall. Samples from these upland borings were collected to assess potential for subsurface impacts associated with former mill operations in this area. Soil from these four borings

were evaluated in the field for visual impacts (e.g., woodwaste) and field screened using a photoionization detector. Soil boring logs are provided as Appendix C. Woodwaste impacts were observed at all boring locations, and one soil sample from each location was submitted to the laboratory for analysis for COIs; see Table 3-1 for soil descriptions.

Reconnaissance groundwater samples were collected from all four boring locations to evaluate potential upgradient sources to the pocket beach. Five-foot temporary well screens were installed in each respective boring location, and water quality parameters were collected prior to sampling as described in Appendix B. Groundwater sample details and associated COI analyses are provided in Table 3-1. Groundwater water quality parameters are provided in Table 3-2.

3.2.2 Seep Water and Stormwater

An opportunistic seep sample was collected from the pocket beach area location shown on Figure 2-1 during low tide as described in Appendix B. The seep sample was submitted to the laboratory for analysis for the COIs listed in Table 3-1. Water quality parameters were collected prior to sample collection (see Table 3-2).

One stormwater sample was collected in the pocket beach area in 2016 (STORM-01). Collection conditions for this sample (i.e.., conditions of runoff, drain location, and whether before or after drains were cleaned) are unknown and will be assessed during RI activities.

3.2.3 Sediment

Surface (0 to 0.33 feet bml) and subsurface sediment samples were collected in multiple areas within the leased Property according to methods described in Appendix B. Surface sediment locations were typically accessed during low tide when the sediment was exposed to characterize sediment conditions at the SMS-defined point of compliance (i.e., 0 to 10 centimeters [cm] bml or, equivalently, 0 to 0.33 feet bml). Subsurface sediment samples were collected to delineate the vertical and lateral extent of impacts observed previously in the Former Mill Area. Borings were advanced systematically along transects or in defined areas of interest in order to fully characterize extent of visual impacts, focusing specifically on the presence of woodwaste in sediment. If woodwaste was observed in a certain boring location, additional cores were advanced along transects (oriented either parallel or perpendicular to the shoreline) to delineate the extent of visual impacts (i.e., until woodwaste impacts were not observed at a location). Surface and shallow subsurface sediment samples were also typically collected for chemical analysis at the locations where woodwaste impacts were not observed to evaluate whether chemical impacts extended beyond visually observed impacts.

A summary of sample locations, date collected, sediment lithological descriptions, and associated COI analyses is presented in Table 3-3. The following sediment samples were collected, grouped by area of interest, with locations shown in Figure 2-1:

- **Pocket Beach (Former Mill Area):** Four borings (CR-11, 12, 13, and 14) were advanced in the pocket beach portion of the Former Mill Area. These cores were advanced, using a GeoProbe drill rig, to visually unimpacted sediment underlying the visual impacts. Visually

unimpacted sediment was present at depths ranging between 10 and 22 feet bml. Samples were collected from the respective areas of visually unimpacted sediment underlying visual impacts from each boring location and submitted to the laboratory for analysis. In addition, a sediment sample was collected from within the visual impacts from each core; this sample was then homogenized into one composite sample and sent to the laboratory in order to characterize the visually impacted material for possible future disposal. Sheen and associated nonaqueous-phase liquids (NAPL) were observed at borings CR-11, CR-12, and CR-14, within woodwaste accumulations.

- **CR-15 Transect (Former Mill Area):** Cores were stepped out along the CR-15 transect perpendicular to the shoreline until no visual impacts were observed in the sediment cores. Four borings in total were advanced along the CR-15 transect (CR-15A, B, C, and D). Non-visually-impacted sediment was observed only at the northernmost boring location, CR-15C. Note that although four borings were advanced along this transect, CR-15C is in fact the northernmost location. One surface and one subsurface sample from this core were collected and submitted to the laboratory for analysis as the CR-15 transect "clean" confirmation sample. Because of poor surface sediment recovery with the GeoProbe drill rig, surface sediment was collected using a manual PONAR sediment sampler at the same core location. Samples from all other cores in this transect were collected in approximately 5-foot intervals for archiving.

- **CR-16 Transect (Former Mill Area):** Cores were stepped out along the CR-16 transect perpendicular to the shoreline until no visual impacts were observed in the sediment cores. Three borings in total were advanced along the CR-16 transect (CR-16A, B, and C). However, cores consisted primarily of woodwaste at all of the locations along this transect. No additional borings were advanced to the north along this transect, as non-visually-impacted sediment was encountered along the CR-15, CR-17, and CR-18 transects (CR-17 and CR-18 are described below). The CR-15, CR-17, and CR-18 transects are expected to be representative of the northernmost extent of woodwaste impacts north of the pocket beach, and the surface and subsurface samples collected from the CR-16A location were submitted to the laboratory for archive. Because of poor surface sediment recovery with the GeoProbe drill rig, surface sediment was collected using a manual PONAR sediment sampler at the same core location. A slight sheen was observed at CR-16B.

- **CR-17 Transect (Former Mill Area and Chehalis River):** Cores were stepped out along the CR-17 transect perpendicular to the river shoreline until no visual impacts were observed in the sediment cores. Two borings in total were advanced along the CR-17 transect (CR-17C and D). Non-visually-impacted sediment was observed at the northernmost boring location, CR-17D. Note that, since boring locations CR-17A and CR-17B were not attempted during this investigation because boring CR-17C was the first location drilled along the transect and visual impacts were observed, cores along this transect were subsequently stepped out to the north to location CR-17D. One surface and one subsurface sample from CR-17D were collected and submitted to the laboratory for analysis. Samples from all other cores in this transect were collected in approximately 5-foot intervals for archiving. Because of poor surface sediment recovery with the GeoProbe

drill rig, surface sediment was collected using a manual PONAR sediment sampler at the same core location.

- **CR-18 Transect (Former Mill Area):** Cores were stepped out along the CR-18 transect perpendicular to the shoreline until no visual impacts were observed in the sediment cores. Two borings in total were advanced along the CR-18 transect (CR-18A and B). Non-visually-impacted sediment was observed at the northernmost boring location, CR-18B. One surface and one subsurface sample from CR-18B were collected and submitted to the laboratory for analysis. Samples from all other cores in this transect were collected in approximately 5-foot intervals for archiving. Because of poor surface sediment recovery with the GeoProbe drill rig, surface sediment was collected using a manual PONAR sediment sampler at the same core location.

- **CR-19 Transect (Former Mill Area and Chehalis River):** Cores were stepped out east along the CR-19 transect parallel to the river shoreline until no visual impacts were observed in the sediment cores. Cores were then stepped out perpendicular to the shore to delineate extent of visual impacts to the north. Ten borings in total were advanced along the CR-19 transect (CR-19A, B, C, D, E, F, G, H, I, and J). Non-visually-impacted sediment was observed at only two locations:

  – The easternmost boring location CR-19F, thus delineating the easternmost extent of visual impacts

  – The northeasternmost boring CR-19I, thus delineating the northeasternmost extent of visual impacts

  One surface and one subsurface sediment sample from CR-19F was collected and submitted to the laboratory for analysis. Samples from some other cores in this transect were collected in approximately 5-foot intervals for archiving. Because of poor surface sediment recovery with the GeoProbe drill rig, surface sediment was collected using a manual PONAR sediment sampler at the same core location.

- **Lumber Shed / OF-2:** Two composite surface samples were collected in the vicinity of the former lumber storage shed area (CR-07 and CR24). In addition, the CR-24 sublocations were in the direct discharge area of a Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site outfall (OF-2). Each sampling area consisted of four discrete sublocations, samples from which were field composited and submitted to the laboratory for analysis. Discrete surface material from each sublocation was archived. Trace amounts of woodwaste were observed at locations LS-02 and LS-03 (within the CR-07 sample group).

- **Wharf Area:** Cores were advanced along the northern edge of the existing over-water wharf to delineate visual impacts west of the Former Mill Area. Only non-visually-impacted sediment was encountered at both locations explored (CR-25 and CR-26); woodwaste was not observed. Cores could not be advanced farther east along the wharf because a large dredge barge, *The Patriot,* was continuously docked at the wharf during the 2015 investigation. Therefore, a confirmation surface and subsurface sample was collected from the easternmost location (CR-26) and the subsurface sample was submitted to the

laboratory for analysis. Because of poor surface sediment recovery with the GeoProbe drill rig, surface sediment was collected using a manual PONAR sediment sampler at the same core location.

- **Former Boiler Area:** Two composite surface samples were collected in the vicinity of the Former Boiler (CR-08A and CR08-B). Each composite area consisted of four discrete sublocations, samples from which were field composited and submitted to the laboratory for analysis. As these sample locations were not in an area exposed under any tidal conditions, surface samples were collected via PONAR grab sampler (methodology described in Appendix B). Discrete surface material from each sublocation was archived. Two borings were advanced in the former boiler area (CR08A-FB04 and CR08B-FB05). Woodwaste impacts were observed in subsurface sediment from both locations, with only trace amounts of surface woodwaste observed at FB-05 and FB-06 (within the CR-08B sample group). Samples were collected in the non-visually-impacted sediment beneath visual impacts at each location and submitted to the laboratory for analysis.
- **Beach Area:** Two composite surface samples were collected along the beach area east of the pocket beach (CR-09A and CR-09B). Each composite area consisted of four discrete sublocations, samples from which were field composited and submitted to the laboratory for analysis. Discrete surface material from each sublocation was archived. In addition, near surface material from 0.33 to 1 foot bml as well as 1 to 2 feet bml was collected from each sublocation and archived. Woodwaste was observed at all eight sublocations between the surface and 2 feet bml.
- **Shannon Slough:** One composite surface sample was collected in the intertidal area where Shannon Slough enters the Chehalis River. Sublocations were located along a north-south transect. This composite area consisted of four sublocations, samples from which were field composited and submitted to the laboratory for analysis. Discrete material from each sublocation was archived. Woodwaste was observed at all four sublocations between the surface and 0.33 feet bml.

4 LEASED PROPERTY CONDITIONS

Leased Property conditions, including topography; geology and hydrogeology; stormwater pathways; aquatic environment; and beneficial water and land uses are described below.

4.1 Topography and Bathymetry

Figure 4-1 shows the Leased Property and vicinity topography and bathymetry. According to the U.S. Geological Survey Aberdeen, Washington, 7.5-minute series topographic map, the leased Property is located at elevations near sea level along the shoreline up to approximately 20 feet above mean sea level. The topography northeast of Aberdeen gradually slopes upward toward the foothills and peaks of the Olympic Mountains. The topography to the east, southeast, and south consists of rolling hills.

Surface water bodies in the vicinity of the leased Property include the Chehalis River; the Wishkah River; one small, unnamed drainage channel that enters the Chehalis River beyond the east end of the Property; and Shannon Slough, which enters the Chehalis River at an embayment located in the middle of the leased Property. The Chehalis River is tidally influenced, and some areas of the leased Property are periodically submerged at high tide. All surface water drainages in the area ultimately discharge to the Chehalis River.

4.2 Geology and Hydrogeology

The Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site is located in the alluvial meander plain of the Chehalis River on the northwestern margins of the Willapa Hills physiographic region of southwestern Washington. The topography of the Willapa Hills is generally characterized by gentle rolling hills with straight, moderate slopes descending to wide valley floors.

The Chehalis River valley is filled with variable thicknesses of recent alluvium consisting of river-deposited gravels, sands, and silts. Near the ocean, the thicknesses of these alluvial deposits can be significant (more than 100 feet) because of valley filling as rising sea levels decrease the river's ability to transport sediments downstream. Well logs from resource protection wells in the vicinity of the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site indicate that alluvium in the area of the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site is at least 60 feet thick and consists of sands, silts, and clayey silts. Logs from borings located along State Highway 12 to the north indicate that the bedrock encountered below the alluvium is silt/sandstone.

Cross sections from a 1951 map of the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site provided by Weyerhaeuser indicate that much of the area of the main mill facilities was tideland prior to, and during, the early development of the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site in the late 1800s and early 1900s. Most of the early Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site structures were constructed on wood-piling support platforms.

The four upland soil borings advanced upgradient of the pocket beach area in 2015 indicate that silts and silty sands are present at depths of 8 to 9 feet bgs in upland areas (Table 3-1). The silts and silty sands were overlain by woodwaste (up to 80 percent by volume of primarily wood and bark chips) of varying thicknesses—occasionally woodwaste layers were over 5 feet thick. Woodwaste typically occurred around 4.5 to 5 feet bgs surrounding the pocket beach. This layer of woodwaste was overlain primarily by gravelly sands, comprising the layer to the ground surface.

On the shoreline where SAIC advanced borings on behalf of DNR in 2011, dark brown, sandy sawdust was observed at approximately 4 to 5 feet bgs, overlain by light brown sawdust and woodchips, with crushed gravel at the surface (SAIC, 2011).

Depth to groundwater in the upland areas of the leased Property is approximately 4 to 5 feet bgs. Based on geologic logs from previous environmental investigations, groundwater flow in the area is generally to the northwest; however, flow direction and gradient may be tidally affected. Groundwater likely discharges to the Chehalis River. A previous study determined that water originating from seeps in the pocket beach area had a different chemical signature than Chehalis River water, suggesting that the seeps do not represent bank storage of river water inundated during high tide (Floyd|Snider,

2010). An opportunistic seep sample was collected from an active seep along the western edge of the pocket beach area during the 2015 investigation. Water quality parameters, including conductivity and pH, collected for both the seep sample and nearby reconnaissance groundwater samples are similar to each other (see Table 3-2), and are all different from levels measured in Chehalis River pore water (locations CR-01 through CR-03, approximately 16,000 microsiemens/cm [MFA, 2015]), suggesting that the seep water is more similar to groundwater.

4.3 Aquatic Environment and Bottom Substrate

The Chehalis River offshore of the leased Property is a tidal river that is frequented by commercial and recreational fisherman and provides habitat to multiple fish species including Chinook, coho, and chum salmon and steelhead and bull trout (which is listed under the federal Endangered Species Act as threatened). Following removal of the mill, pilings, and debris in the Former Mill Area, the pocket beach area was colonized by vegetation characteristic of wetland environments, such as cattail and rushes. Whether saltwater species are present is unknown, but this will be evaluated as part of the RI. This section of the river has been observed to be a depositional area, with debris including loose pilings and household appliances floating downstream and becoming lodged against the wharf. The apparent depositional nature of this section of river is further discussed below. Along the Chehalis River, the area between the pocket beach and the mouth of Shannon Slough consists of former tidal flats that historically were filled with unknown types and quantities of debris, including construction debris and woodwaste. Shannon Slough meanders from south to north across the property and discharges to the Chehalis River, forming a small deltaic feature. Multiple pilings are present in the mudflats along the northeastern portion of the slough.

Salinity data in 2013 Chehalis River sediment samples (e.g., samples CR-01 through CR-03) indicate that this area is estuarine according to SMS guidance. SMS suggest that estuarine environments have salinity ranging from 0.5 to 25 parts per thousand (ppt). Samples collected in this area that were analyzed for salinity had salinity values ranging from 6.9 to 11 ppt.

Bathymetry data (see Figure 4-1) indicate that the riverbank slopes steeply, with the top of the riverbank at an elevation of approximately 13 feet NAVD-88, and the slope at approximately -30 feet North American Vertical Datum of 1988 (NAVD-88). Elevations in the pocket beach area range from approximately 9 feet NAVD-88 to 6 feet NAVD-88. The Chehalis River, which flows along the northern portion of the site, is tidally connected to Grays Harbor and the Pacific Ocean, resulting in a mixed semidiurnal tidal regime (i.e., two different high, and two different low tides per lunar day). During site visits in 2013 and 2015, MFA observed that the pocket beach and other beach features in the leased Property were fully inundated at high tide and exposed at low tide.

Selected sediment samples collected in 2013 and 2015 were analyzed for grain size distribution. Percentages of fines (silt and clay) were consistent within the pocket beach (CR-04 through CR-06), ranging from 29.7 percent in surface to 42.1 percent in subsurface sediment. Similarly, percent gravel was consistent and ranged from 20.2 percent to 23.6 percent. Surface sediment at CR-19D near the beach area showed higher percent fines (77.8 percent). In general, the presence of fines indicates areas of deposition, where surface water velocities may be lower, allowing fine particles to settle. Total fines data indicate that the beach area experiences more deposition than the pocket beach.

Sediment samples collected in 2013 and 2015 were analyzed for TOC. TOC concentrations at the Lumber Shed and Former Boiler areas ranged from 1.09 percent to 3.08 percent. Percent TOC was similar in the 2013 Chehalis River samples (CR-01 through CR-03) and the eastern portion of the leased Property (beach area and Shannon Slough), ranging from 2.06 to 4.39 percent. In contrast, percent TOC was substantially higher in the three samples (CR-04 through -06) collected in 2013 in the Former Mill Area, ranging from 13.6 percent to 49.5 percent in surface and subsurface sediments. These TOC concentrations are well above the range considered normal (0.5 to 3.5 percent) (Ecology, 2015). TOC concentrations in Former Mill Area samples collected in 2015 beyond the extent of visual impacts (e.g., woodwaste) ranged from 0.415 percent to 3.99 percent, with an average (2.47 percent) well within the range considered normal.

Sediment characteristics observed in borings are provided in Table 3-3 for locations throughout the leased Property.

Additional work to further characterize the depositional regime, as well as evaluation of the flooding regime, will be conducted as part of the RI.

4.3.1 Woodwaste

Woodwaste in large volumes can overwhelm the assimilative capacity of sediment and affect the aquatic environment physically, chemically, and biologically. Woodwaste impacts can result from: the physical presence of woodwaste, which prevents biota from thriving and recruiting in and on native, healthy substrate; decreased dissolved oxygen due to microbial decomposition, which can create an unhealthy or toxic environment for biota; and decomposition by-products such as sulfides, ammonia, and phenols, which can cause or contribute to toxicity. As a result, woodwaste can be considered a deleterious substance in the environment that is subject to cleanup, consistent with MTCA and SMS rules.

Significant accumulations of woodwaste (>25 percent) were observed in the Former Boiler Area and extend eastward from the Former Mill Area to and including the beach area (see Table 3-3). During the 2015 investigation, wood debris or other debris would in some cases obstruct the core liner and an additional boring was advanced nearby (typically within 5 to 10 feet) until a sample was obtained (see Appendix B for sampling methodology). In the recovered samples the material was generally compressed into the bottom of the liner, and therefore Table 3-3 often indicates "no recovery" of the first couple feet of sediment. However, visual observation confirmed that the upper material recovered within the liner is likely surface material because the material coloration was characteristic of surface sediment and the observations matched surface materials retrieved in the same location with a PONAR grab sampler. These observations helped inform the estimated extents of woodwaste at locations with significant accumulations. Figures 4-2, 4-3, and 4-4, respectively, show the estimated woodwaste thickness; the estimated surface sediment thickness overlying woodwaste; and a cross section showing woodwaste and overlying sediment thicknesses. These figures demonstrate that woodwaste extends from near the surface to significant depths (more than 10 feet) and that with distance from shore, the woodwaste thickness decreases and the sediment layer overlying the woodwaste increases.

4.4 Beneficial Water and Land Uses

Providing protection for the highest beneficial use (i.e., the use requiring the highest quality in the resource) of water will generally also provide protection for other existing and future beneficial uses of water. Based on hydrogeological conditions observed on the Site and on regional topography, the following surface water and shallow groundwater conditions are present in the area:

- Surface water in the region discharges to the Pacific Ocean.
- Shallow groundwater in the area appears to flow toward the Chehalis River.

There is no known beneficial use of groundwater at the leased Property. One water well within a 1-mile search radius of the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site was identified in the regulatory agency database search conducted by Environmental Data Resources, Inc., as part of the Level I environmental site assessment (PES, 2010). This well is a public water supply well operated by the City of Aberdeen. The well is located northwest of the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site, across the Chehalis River. Currently, there are no potable water wells on the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site, let alone the leased Property area. Groundwater monitoring wells installed in the past as part of previous investigations are still present, although in unknown condition. The condition of these monitoring wells will be addressed during the RI. According to Weyerhaeuser, all of the monitoring wells previously installed at the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site have been decommissioned. Groundwater under and near the leased Property is likely to remain unused for the indefinite future and the City of Aberdeen will continue to provide public water.

Shallow groundwater under and near the Property likely discharges to the Chehalis River, and current and reasonably likely future uses of the river include recreation, fishing, and fish and wildlife habitat. Grays Harbor provides habitat for a number of shellfish species, including clams, mussels, and Dungeness crab. There is limited information on the potential presence of shellfish in the Chehalis River upstream of the SR 101 bridge. Recent field investigation conducted as part of the environmental impact statement for the SR 520 Pontoon Construction facility, located approximately 1 mile downstream of the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site property, found softshell clams (*Mya arenaria*) in the lower intertidal zone.

As described above, the QIN tribal fishing operations, including both drift gillnetting and setnetting methods, are conducted directly offshore of the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site property and within the leased Property. It is unknown whether the QIN presently use the river for shellfish. This data gap will be addressed during the RI.

The Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site property is currently used by the GHHSA as their headquarters. The future-use plan for the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site is to develop a maritime heritage center with education, public access, tourism, and commercial uses. The leased Property is currently zoned by the City of Aberdeen for industrial use, but a land use and zoning change to waterfront mixed-use is in process. According to the DNR lease, the leased Property's permitted uses include moorage of vessels, public access, and education activities.

5 CONCEPTUAL SITE MODEL

The primary purpose of the conceptual site model (CSM) is to identify potential contaminant sources, evaluate contaminant fate and transport mechanisms, identify potential receptor groups, and describe pathways by which those receptors may be exposed to leased-Property-related chemicals in the environment.

Potential source areas and chemical release and transport mechanisms that can allow chemicals to migrate to potential receptors are summarized for the leased Property. In addition, a discussion of significant exposure points, pathways, and potential receptors for the leased Property is presented separately in individual sections. The human health and ecological CSM depicting exposure pathways and potential receptors is shown in Figure 5-1. Note that CSMs are dynamic, and the CSM will be reevaluated and updated as part of the forthcoming RI as additional information is obtained.

5.1 Source Characterization

Suspected historical sources of sediment impacts at the leased Property include releases from the overwater mill and upland operations related to wood processing. Potential historical sources are discussed in Section2.4, and include:

- Spills from the overwater sawmill hydraulic equipment previously located in the leased Property.
- Releases to sediment from overwater structures currently and formerly located in the leased Property.
- Releases from upland historical site operations that migrated to the leased aquatic land via stormwater or groundwater transport. Petroleum products, antifreeze, various oils and lubricants, boiler treatment chemicals, anti-sapstain mixtures (which contained PCP until approximately 1986), inks, red end paint (until the early 1990s), and paints and solvents were used and/or stored during historical sawmill operations. A trough is present in the planer/wood treatment building. It is unknown how this feature functioned. This data gap will be addressed during the RI.
- Wood-fired boilers and two wood-refuse burners identified at the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site. Operation of this equipment is associated with dioxin formation; the historical disposition of boiler ash at the site is unknown (PES, 2010).
- Historically, PCB-containing equipment supporting site operations was present. Note all PCB-containing transformers and light ballasts were removed from the site between 1990 and 2001, and USEPA identified no other PCB-containing equipment at the site in 2006 (PES, 2010).

- Background sources (further described below), including stormwater discharge to Shannon Slough.
- Accumulations of woodwaste from historical sawmill operations, including the chip loader and various processes in the Former Mill Area. Impacts from woodwaste include the physical presence of the woodwaste, decreased dissolved oxygen concentrations in sediment, and increased concentrations of woodwaste decomposition products, such as sulfides, ammonia, and phenols, that can cause or contribute to toxicity.

5.2 Background Sources

In addition to former mill-related sources, upstream or ubiquitous sources of chemicals and deleterious substances have the potential to impact the aquatic leased Property. The Chehalis River has a long history of industrial activity that could result in the release of contaminants and wood debris similar to what has been observed at the leased Property. Shannon Slough, which discharges to the Chehalis River, receives considerable stormwater input from roads and neighborhoods upgradient of the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site. Further, persistent organic pollutants such as dioxins, PCBs, and PAHs are known to be widespread in the environment.

Dioxins and PAHs can result from both natural and anthropogenic sources. The area around the leased Property is an urban environment where industrial activity has been conducted and a city has been established for over 100 years. In urban areas vehicle emissions, back-yard trash burning, structure fires, stormwater runoff, and other common events and activities can generate these chemicals (USEPA, 2006). Therefore, low levels are commonly present in sediment because of natural and/or non-point anthropogenic activities.

PCBs are a class of persistent, bioaccumulative, and toxic compounds that historically had a wide range of uses, including electrical transformers, hydraulic systems, lubricants, surface coatings, adhesives, plasticizers, inks, insulating materials, pesticides, and consumer products (Ecology, 2014b). In the Puget Sound, surface runoff is the largest pathway to aquatic environments, followed by wastewater treatment plants and air deposition. PCBs are ubiquitous throughout the natural environment, including sediment, and are found in animal tissue throughout the food chain.

Metals, including mercury, are naturally occurring elements in the environment, and can be concentrated by human activities. The distribution of naturally occurring metals is controlled by geologic processes that occur across different physiographic regions. Metals are commonly transferred to the marine environment from sewage treatment facilities, atmospheric deposition, and continental weathering.

5.3 Fate and Transport of Contaminants

The primary potential contaminant transport mechanisms operating at the leased Property are deposition to sediment from former facility operations, outfall discharge to sediments, stormwater runoff to sediments, atmospheric deposition to sediments, sediment erosion caused by waves, erosion of sediment caused by propeller wash, water current sediment erosion, and food chain transfer originating from impacted media.

Former facility operations are described in Section 2.4. Potential mechanisms of contaminant transport to the leased Property include stormwater flow from uplands (i.e., in the Former Mill upland area surrounding the pocket beach) to surface water and sediment. Stormwater discharges to leased Property sediments have the potential to transfer contaminants to areas adjacent to stormwater outfalls at the pocket beach and Shannon Slough, as well as through overland flow. Upstream runoff from residential, highway, and other properties may be impacting Shannon Slough.

Groundwater in the leased Property likely discharges to leased Property sediment and the Chehalis River (see Section 4.2). Groundwater discharge to surface water is therefore considered a complete transport pathway.

In sediments, physical transport of contaminants can be upward (advection/diffusion, ebullition), downward (advection/diffusion, burial), or lateral (resuspension/deposition); bioturbation caused by benthic organisms can further displace or mix contaminants. In water, contaminants can move by the same advective and diffusive forces operating in the sediment, by sorption to/from sediments resuspended by currents or scour events, or via bioturbation (e.g., releases from sediment to the water column). The relative importance of the above processes will vary, depending on the chemical and physical properties of a released contaminant. The properties of sediment and the dynamics of groundwater flow also shape contaminant fate and transport. The most significant site-specific transport mechanisms are discussed further below.

A number of processes, including water flow, wave erosion, and propeller wash, have the potential to impact sediment transport in the Chehalis River. Since this reach of the Chehalis River is tidally influenced, some sediment resuspension likely occurs during the ebb and flood of the tides. While wind waves may be a mechanism for erosion in the Chehalis River, these waves are likely to be a less significant transport mechanism than the larger wakes from passing vessels. Portions of the leased property in the Chehalis River are potentially vulnerable to erosion from propeller wash where vessels may operate now or in the future. Sediment resuspension and redistribution due to river and wave energy inputs is not expected to be a significant transport mechanism closer to shore in the pocket beach and beach areas, where presence of fines indicates a depositional environment.

5.4 Potential Human Health Exposure Scenarios

The primary purpose of the human health CSM is to identify potential receptor groups and to describe pathways by which those populations may be exposed to Property-related chemicals in the environment (USEPA, 1989). Populations that may be exposed to contaminants at a site and pathways by which these populations may come into contact with contaminants are identified. A complete pathway requires:

- A source and mechanism for release of constituents
- A transport or retention medium
- A potential environmental contact (exposure point) with the affected medium
- An exposure route at the exposure point

The CSM presented below shows potentially significant pathways and receptors under current and reasonable future leased Property scenarios. The evaluation of the leased Property focuses on the most important factors that may cause possible exposures.

The GHHSA staff currently occupies the office building and use other structures remaining on Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site. Public use and access to the leased Property upland portion are currently limited. The leased Property upland portion is proposed for future use as the homeport for the *Lady Washington* and *Hawaiian Chieftain* tall ships as part of a new maritime heritage facility called Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site. Users would include the public and staff who work at the facility. The Chehalis River is frequented by industrial marine users, fishers, and recreationists.

The principal human receptors who have the potential to contact leased Property media are further described below. As noted above, the CSM will be refined as part of RI activities as additional information regarding river uses is obtained.

Property users—Current and future users of the upland areas, occupational workers and public visitors, may come into contact with the leased Property soils. Occupational workers may come into contact with the Chehalis River while maintaining the area. Future visitors may come into contact with the leased Property soils while touring and exploring the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site. While these groups may also come into direct contact with leased Property sediment and surface water, the exposure is anticipated to be occasional and incidental. However, because development plans for the leased Property will evolve over time and the exposure of leased Property users to nearshore sediment and surface water may change over time, the exposure scenarios are considered potentially complete.

Recreationists—The water recreation scenario includes assorted beach and water activities, including activities related to operation of personal watercraft. Individuals may come into contact with sediment and surface water while operating vessels; however, adult exposure is expected to be generally limited to contact with sediment and surface water while entering and exiting the water. Swimming is not a common activity in the area, given boat traffic and dangerous currents; any limited swimming that does occur likely is significantly limited in duration and frequency, given Aberdeen weather conditions. Because of the strongly hydrophobic nature of the COIs, exposure via surface water is not expected to be a significant pathway. However, children may be exposed to sediment through direct contact if playing in nearshore beach areas. Current and reasonably likely future recreational use is not expected to change significantly in the foreseeable future.

Fishers—Areas directly offshore of the Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site property and within the leased Property are in the QIN's usual and accustomed tribal fishing area. Fishers generally angle near the leased Property by boat, using hook and line and/or large nets. The shoreline is not conducive to shore fishing. Fishers may include adults and children. Fish are caught for personal consumption by sport fishermen and tribes during permitted times of the year. Because of the strongly hydrophobic nature of the COIs, exposure to fishers via surface water is not expected to be a significant pathway. The primary exposure pathway for potential fishers is consumption of aquatic biota. Other exposure pathways relevant to fishers could include contact with sediment during net fishing or harvesting shellfish.

Further coordination with the QIN is needed and additional information on current fishing and harvesting uses will be obtained as part of the RI.

5.5 Potential Ecological Receptors

Water-dependent ecological receptors, including plants, benthic invertebrates, fish (piscivorous, omnivorous, and benthivorous), piscivorous mammals, and piscivorous raptors are the primary potential ecological receptors.

Relevant exposure media for ecological receptors include sediment and fish tissue (for receptors at higher trophic levels). Plants, benthic invertebrates, fish, birds, and mammals may all be exposed to chemicals present in sediment. Specifically, plants and benthic invertebrates may be exposed to chemicals through direct contact with and uptake from sediment; fish may be exposed to chemicals through direct contact with sediment and ingestion of food that has accumulated contaminants. Birds and mammals may be exposed to chemicals through incidental ingestion of sediment and consumption of food that has accumulated contaminants. Although birds and mammals may have some dermal exposure to chemicals in sediment, this exposure route is considered insignificant because of external protection such as fur and feathers.

5.6 Terrestrial Ecological Evaluation

A terrestrial ecological evaluation (TEE) was conducted to characterize potential risks to terrestrial ecological receptors that may be present in the leased Property uplands. The results of the TEE are provided in Appendix D. These results will be further evaluated in the context of any upland soil remedy proposed, to ensure that a selected remedy is protective of ecological receptors as well as of human health.

6 SCREENING LEVELS

Soil, groundwater, surface water, and sediment screening levels protective of human health and ecological receptors are described in the following sections.

6.1 Soil

Soil concentrations are evaluated relative to MTCA Method A and B soil CULs. Method A CULs rely on various endpoints described in WAC 173-340-900 Table 740-1 and are applicable for simple sites undergoing routine cleanup actions, or sites with relatively few hazardous substances. Method B CULs have been applied in cases where Method A CULs are unavailable. Method B CULs are applicable to all sites; generic default assumptions are used to calculate risk-based screening levels protective against direct contact via ingestion or dermal contact by humans, with target risk levels set at the MTCA acceptable risk level. In cases where cancer and noncancer effects values are available for a chemical,

the lower value is applied. Finally, metals concentrations are compared with natural background values.

6.2 Groundwater Seep Water, and Stormwater

As discussed in Section 4.2, groundwater likely discharges to the Chehalis River. Groundwater, seep water, and stormwater concentrations are therefore compared with surface water screening levels protective of human health and aquatic receptors. Specifically, water chemistry data are compared to the most stringent USEPA freshwater[2] National Recommended Water Quality Criteria (WQC) for the protection of aquatic life and human health in surface water (USEPA, 2019). Where WQC were not available, water data were compared to MTCA Method B screening surface water CULs. In cases where cancer and noncancer effects Method B CULs are available for a chemical, the lower value is applied. For TPH, the Method A CUL for groundwater was used. Note that groundwater is not used for drinking at the leased Property.

The seep sample results likely represent groundwater as it discharges to surface water and are also evaluated against the surface water screening levels.

6.3 Sediment

Sediment screening levels protective of ecological receptors and human health are described in the following sections. Sediment background conditions reflecting natural and/or regional sources are considered in the screening level development, consistent with recommendations and guidance provided in Ecology (2017).

6.3.1 Risk-based Benthic Criteria

Washington SMS marine benthic criteria are appropriate for marine and low-salinity sediments and were developed from regional databases that included a broad suite of metals and organics concentrations, as well as toxicity data for a variety of different tests and endpoints. The marine criteria were developed using the Apparent Effects Threshold (AET) approach. AETs were calculated separately based on biological testing toxicity and associated endpoints, with the lowest AET informing the SCO criteria representing a no-adverse-effects level for benthic communities, including no acute or chronic adverse direct toxicity effects. The second-lowest AET informs the CSL criteria representing a minimum-adverse-effects level for benthic communities.

The SMS marine SCO and CSL values are based on dry weight (dw) AETs for metals and polar organics and on AETs normalized to TOC for nonpolar organics (WAC 173-204-562). At sample locations where the TOC content is outside the range considered normal (i.e., 0.5 to 3.5 percent) it is recommended that nonpolar organics not be organic carbon-normalized (OC). It is recommended instead that the sample dw concentrations be compared with the dw AETs for nonpolar organics, as provided in Ecology (2017).

[2] According to Ecology's "Water Quality Atlas" application, waters in the vicinity of the site are considered to be fresh for the purposes of water quality criteria (Ecology, 2016).

Consistent with the above, the leased Property sediment data are compared with the applicable SCO and CSL (dw or OC) values to determine the potential for adverse effects to benthic receptors.

6.3.2 Background Concentrations

Developing site-specific risk-based CULs for human fish consumption, or ecological bioaccumulation risk pathways for bioaccumulative chemicals, requires site-specific sediment and tissue data to calculate a biota-sediment accumulation factor. No such data are available for the site. Even when site-specific data are available, risk-based screening levels for fish consumption are often below natural or regional background levels, or below laboratory practical quantitation limits, regardless of the exposure assumptions. In these situations, Ecology recommends using regional or natural background sediment concentrations for CULs of bioaccumulative chemicals for these pathways (Ecology, 2017).

To evaluate nearby concentrations of these compounds, existing Chehalis River sediment data collected within 1 mile of the leased Property were queried from Ecology's EIM database; 33 samples were identified, at 27 locations (see Table 6-1 and Figure 6-1). Minimum, maximum, and average concentrations are summarized below. Note that data from the nearby Chehalis River sediment are used for comparison purposes only, and the evaluation below is not considered a robust assessment of natural background or ambient concentrations:

- Twenty-five of the samples were analyzed for PCB Aroclors. These were not detected in any of the samples evaluated; however, many reporting limits were elevated compared to those currently achievable and attained for leased Property samples. Reporting limits ranged from 0.64 ug/kg to 69 ug/kg, with an average reporting limit of 21.5 ug/kg.
- Fourteen of the samples were analyzed for dioxins. Dioxin TEQs were calculated for the EIM data, resulting in a minimum TEQ of 0.35 pg/g, a maximum TEQ of 13 pg/g, and an average TEQ of 3.72 pg/g.
- Thirty-three of the samples were analyzed for mercury. Mercury concentrations ranged from not detected at a reporting limit of 0.02 milligram per kilogram (mg/kg) to a maximum concentration of 0.14 mg/kg. The average mercury concentration detected was 0.05 mg/kg.
- Thirty of the samples were analyzed for PAHs. PAHs were not detected in six samples. Three samples had anomalously high concentrations (more than 500 ug/kg) and were removed from consideration as background samples. Carcinogenic PAH (cPAH) TEQs were calculated, resulting in a minimum TEQ of 3 ug/kg and a maximum of 74 ug/kg. The average concentration of detections was 29.2 ug/kg.

This evaluation shows that diffuse background sources, such as atmospheric deposition or stormwater, may affect leased Property sediments. Therefore, risk-based fish ingestion screening levels and ecological screening levels for bioaccumulatives are not developed. However, human sediment direct contact and incidental ingestion screening levels for bioaccumulatives are often above background levels, and these are described in the following section. The need for additional risk-based criteria will be evaluated as part of the RI.

6.3.3 Sediment Direct Contact and Incidental Ingestion

This section describes the development of screening levels protective of a hypothetical recreationist exposed to sediments via direct contact and incidental ingestion. While exposure to sediments under current and future scenarios is anticipated to be occasional and incidental (see Section 5.4), development plans for the leased Property may evolve over time, and the exposure scenario is considered potentially complete. Specifically, the current evaluation accounts for a child's exposure to sediment while playing on the beach. Potential exposure to fishers through incidental ingestion or through direct contact while harvesting fish or shellfish is not evaluated at this time.

Sediment direct contact and incidental ingestion screening levels are developed for widespread bioaccumulative chemicals (PCBs, dioxins, mercury, and cPAHs) that are typically above natural background (Ecology, 2017) and are listed as persistent bioaccumulative toxins (WAC-173-333-310). Bioaccumulative chemicals have the potential to result in adverse effects as a result of repeated, long-term exposure. Models for deriving screening levels were developed for these chemical classes, using chemical-specific model parameters; results are provided in Appendix E. The screening levels protective of the child beach play scenario for cancer effects were calculated consistent with WAC 173-340-740 equation 740-5 and Equation 9-1 in Ecology (2017), using exposure parameters from Table 9-1 from Ecology (2017). Most of the screening levels were developed using the approach presented in SCUM II; screening levels for PCBs[3] were developed using toxicity values from the CLARC database.

$$SL_C = \frac{ARLc * BW * AT}{EF * ED[(IR * AB * SFo)/10^6\ mg/kg) + (SA * AF * ABS * SFd)/10^6\ mg/kg)]}$$

where:

SL_C is the sediment screening level for recreationists (mg/kg);

ARL_C is the acceptable risk level for individual carcinogens (unitless, $1*10^{-6}$);

BW is the body weight over the exposure duration (16 kg);

AT is the averaging time (75 years, or equivalently 23,375 days);

EF is the exposure frequency (41 days);

ED is the exposure duration (six years);

IR is the sediment ingestion rate (200 mg/day);

AB is the gastrointestinal absorption factor (unitless, chemical-specific);

SFo is the oral cancer potency factor ($[mg/kg\text{-}day]^{-1}$, chemical-specific);

GI is the gastrointestinal absorption conversion factor (unitless, chemical-specific);

SA is the dermal surface area (2,200 square centimeters [cm^2]);

[3] Ecology (2017) evaluates PCBs as congeners. Congener data are unavailable for the site, and the toxicity factor for PCBs as Aroclors from the CLARC database was applied.

AF is the adherence factor (0.2 mg/cm^2/day);

ABS is the dermal absorption fraction (unitless, chemical-specific); and

SFd is the dermal cancer potency factor ([mg/kg-day]$^{-1}$, derived as SFo/GI).

The resulting screening levels are 3,100 ug/kg for total PCBs, 100 pg/g for dioxin TEQ, and 850 ug/kg cPAH TEQ, protective against cancer effects. In addition, Ecology (2015) provides a screening level of 64 mg/kg for mercury (as methylmercury), based on noncancer effects.

Note that for PCBs, dioxins, and cPAHs, the noncancer-effects screening levels are higher (i.e., are less protective) than the cancer-effects screening levels (Ecology, 2015). The values derived above are therefore protective against both the cancer and noncancer endpoints. There is some uncertainty associated with several model parameters, including the exposure frequency and duration, the sediment ingestion rate, and the adherence factor. However, all model parameters are based on Ecology (2015) recommendations, and the screening levels are expected to be protective for a reasonable maximum exposure scenario of child beach play. Note that comparing a total mercury concentration to a methylmercury screening level will err on the side of being overly protective; this comparison assumes that 100 percent of the total mercury measured is in the form of methyl mercury, which is typically not the case.

6.3.4 Woodwaste Scoring

Three samples collected in 2013 containing more than 25 percent woodwaste by volume (Birkland, 1999) were analyzed for conventional sediment parameters, including total solids, total volatile solids, and TOC. The percent woodwaste volume was determined in the field by a geologist, based on visual observations, consistent with Unified Soil Classification System procedures. These parameters, along with other chemical analytes, including phenol, ammonia, and sulfide, are used to score each location according to Table A-3 of the draft DNR guidance (Integral, 2011). In addition, a surface (0 to 0.33 foot bml) sample was collected in 2015 (CR19D-SSD-CONV) for conventional parameters to inform whether buried woodwaste has the potential to significantly affect overlying surface sediments; significant woodwaste was observed in the subsurface beginning at approximately 4.2 feet bgs at this location. Woodwaste scores are tallied based on sediment parameter values and can result in determinations ranging from "Low Concern" to "High Concern."

7 ANALYTICAL RESULTS

Laboratory analyses of the 2015 investigation samples were performed by Analytical Resources, Inc. (ARI) in Tukwila, Washington, and NVL Laboratories in Seattle, Washington. Laboratory analytical reports are provided as Appendix F. Analytical data and the laboratory's internal quality assurance and quality control data were reviewed to assess whether they meet project-specific data quality objectives. This review was performed consistent with accepted USEPA procedures (USEPA, 2014a,b,c) and appropriate laboratory and method-specific guidelines (ARI, 2014; USEPA, 1986). The data validation memoranda summarizing data evaluation procedures, data usability, and deviations from specific field

and/or laboratory methods for the August 2015 investigation data are included as Appendix G. The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

Data collected between 2011 and 2015 are evaluated below. Table 7-1 summarizes the samples collected, locations, depths, and analyses performed.

7.1 Soil

Soil borings were advanced to approximately 5 feet bgs in the area immediately upgradient of the pocket beach and tidelands area (sample locations CR 20 through 23 and SB 1 through 6; see Figure 2-1). Since woodwaste was observed at all boring locations, one subsurface soil sample from each location was analyzed for COIs (see Table 3-1). Metals, PCBs, SVOCS, TPH, and dioxins/furans were detected in one or more samples. Soil analytical results and screening levels summarized in Table 7-2 are as follows:

- Except for chromium, metals are below the soil screening levels at all locations; however, concentrations are below Washington state-wide natural background conditions of 42 mg/kg (Ecology, 1994).
- Total PCBs were detected at CR-20 and CR-21. CR-20 (2,170 ug/kg) exceeds the soil screening level between 3.3 and 5 feet bgs, whereas CR-21 (163 ug/kg) between 3.5 and 5 feet bgs is well below the screening level of 1,000 ug/kg. PCBs were not detected at CR-22 and CR-23.
- SVOCs were generally not detected or are well below the screening levels, with the following exceptions: benzo(a)pyrene and cPAH TEQ exceedances at CR-20 and CR-21 between approximately 3.5 and 5 feet bgs. The results are less than an order of magnitude above the screening levels. Note that cPAH TEQs were not calculated for soil locations SB4, SB5, and SB6 because PAH reporting limits were significantly elevated.
- Soil concentrations for lube-oil-range TPH exceed the screening level at CR-20 and CR-21 between approximately 3.5 and 5 feet bgs, and at SB6 between 1.5 and 5 feet bgs. Note that SB6 is outside the leased Property boundary.
- Low-level dioxins lower than the screening level were detected at CR-21 and CR-23 (from 3.5 to 5 feet bgs and 1.5 to 3 feet bgs, respectively) and in composites from locations SB1 through SB6. Dioxin TEQs at CR-20 (90 pg/g) between 3.3 and 5 feet bgs and at CR-22 (35.8 pg/g) between 3 and 4.5 bgs are above the soil screening level of 13 pg/g.

Subsurface impacts associated with multiple COIs were observed at CR-20 and CR-21, located immediately south of the pocket beach inlet and within the Former Mill Area footprint. CR-22 and CR-23 are located northeast of the Former Mill Area footprint, in a former tidal flat area that has been filled. With the exception of low-level dioxins at CR-22, no impacts were observed at these locations.

Note that outside the leased Property boundary, at SB6, TPH exceeded CULs, and chemicals typically associated with TPH, such as PAHs, were not detected at elevated reporting limits.

7.2 Groundwater, Seep Water, and Stormwater

Reconnaissance groundwater samples were collected from four boring locations (CR-20, CR-21, CR-22, and CR23) to evaluate potential upgradient sources to the pocket beach. Five-foot temporary well screens were installed in each boring location. An opportunistic seep sample was also collected from the pocket beach area to assess whether discharge is representative of groundwater. One stormwater sample was collected (STORM-01). Collection conditions for this sample (i.e., conditions of runoff, drain location, and whether before or after drains were cleaned) will be determined during RI activities.

Groundwater data will be compared to groundwater screening levels as part of the upland RI. Based on the potential for discharge to the river, groundwater, seep water, and stormwater results were compared to surface water screening levels (see Section 6.2 for screening level discussion). The analytical data, associated screening levels, and results of the screening are summarized in Table 7-3 for groundwater, seep water, and stormwater. Summarized results of the screening are as follows:

- Groundwater and seep water:
  - Dissolved metals were not detected in groundwater or seep water. Total mercury was detected below the screening level at CR-21 and CR-22. Total chromium was detected at all groundwater locations except CR-20, at concentrations below the surface water screening level.
  - Total PCBs were non-detect at all locations.
  - SVOCs were not detected above the screening levels.
  - Diesel-range and/or lube-oil-range TPH concentrations exceed the screening levels at all locations for groundwater. Diesel-range and/or lube-oil-range TPH concentrations were detected in seep water. During future[upcoming?] investigations, the chromatograms will be requested from the laboratory to ensure that there are no biogenic interferences from woodwaste.
  - Dioxins/furans were not detected in any of the groundwater or seep water samples.
- Stormwater:
  - Dissolved chromium and zinc were detected below screening levels in stormwater. Total arsenic, chromium, copper, lead, mercury, and zinc were detected in the stormwater sample. The total arsenic level was above the human health WQC for surface water.
  - Total PCBs were non-detect at all locations.
  - SVOCs were not detected.
  - Diesel-range and/or lube-oil-range TPH concentrations were not detected in stormwater.

- Dioxins/furans were detected in the stormwater sample. The dioxin TEQ for the stormwater sample exceeded the human health WQC for 2,3,7,8-TCDD; however, it is noted that the result is well below the USEPA maximum contaminant level of 30 micrograms per liter.

COI concentrations in groundwater are generally non-detect or below the surface water screening levels, with the exception of total chromium, 1-methylnaphthalene, and TPH. Groundwater at the leased Property is not used for drinking water and therefore no associated risks are expected; groundwater potability will be evaluated as part of the upland RI work.

The results show that certain COIs detected in soil do not appear to leach to groundwater in appreciable amounts, e.g., PCBs and benzo(a)pyrene exceeded soil screening levels and were not detected in groundwater. In contrast, TPH was detected in both media, and groundwater discharge may constitute an ongoing source to the pocket beach river area. TPH was also detected in seep water; however, the seep concentrations are an order of magnitude lower than in groundwater (see Table 7-3), and may reflect some attenuation of groundwater before it reaches surface water and sediments.

7.3 Sediment

Surface and subsurface sediment samples were collected in multiple areas of interest within the leased Property and were analyzed for COIs. Sediment results were compared to the applicable SMS criteria (SCOs and CSLs), as well as background conditions (see Section 6.3.2) and direct-contact and incidental-ingestion screening levels (see Section 6.3.3). In some cases, conventional sediment parameters were analyzed to determine potential toxicity effects associated with woodwaste (see Section 6.3.4). Sediment analytical results are shown in Table 7-4 (dw basis as reported by the laboratory). Table 7-5 shows the data screening; data are presented as dw or OC, as dictated by the associated TOC content and SMS criteria (see Section 6.3.1). Sediment chemical exceedances are shown on Figure 7-1. The results are described in the following subsections by area of interest.

7.3.1 Former Mill Area/Pocket Beach

Surface and subsurface sediment samples were collected at multiple locations in the Former Mill Area/pocket beach (CR-04 through CR-06 and CR-11 through CR-14), as well as along transects (transects CR-15, -17, -18, and -19) that extend north and east of this area (see Figure 2-1). CR-04 through CR-06 samples were collected within the pocket beach fill. CR-04 was collected at three depths (0 to 0.33 foot, 1 to 2.5 feet, and 2.5 to 5 feet). CR-05 was collected at two depths (0 to 0.33 foot and 0.33 to 2.5 feet), and CR-06 was collected at two depths (0 to 0.33 foot and 1 to 2.5 feet). To determine if the substrate is clean, CR-11 through CR-14 were collected below the fill material, at depths ranging from 11 to 23 feet. CR-15 through CR-19 are transects taken in the shallow fill north of the pocket beach, each collected at two depths (0 to 0.33 foot and 0.5 to 1 foot). Woodwaste accumulation was observed at multiple locations (see Table 3-3 and Figure 4-2). Surface sediments are the point of compliance under the SMS; however, for discussion purposes, subsurface results are also compared with screening levels. Metals, PCBs, SVOCS, TPH, and dioxins were detected. Sediment analytical results and screening levels, summarized in Table 7-5, are as follows:

- Total metals are non-detect or are below the benthic sediment screening levels in surface and subsurface sediment samples impacted by woodwaste (locations CR-04, CR-05, and CR-06), with the following exceptions:
  - Mercury at CR-04 and CR-06. Mercury marginally exceeds the SCO (0.41 mg/kg dw), but not the CSL (0.59 mg/kg dw) in surface sediment at CR-06, whereas both criteria are exceeded in surface sediment at CR-04 (6.2 mg/kg dw). Mercury was also previously found to exceed SCO levels in 2011 in this area in sample locations SSFM2 and SSFM3 in the surface and subsurface.
  - Zinc exceeded the SCO, but not the CSL, in one sample collected in 2011 at location SCFM2 between 0 and 2.7 feet bml. Zinc concentrations did not exceed screening levels in the more recent, 2013 and 2015, sampling events.

  Total metals are non-detect or are below the SCO and CSL in subsurface samples collected just beyond the vertical extent of woodwaste impacts observed (e.g., CR-14) and in samples collected beyond the lateral extent of impacts (e.g., CR-18B).

  Mercury is well below the beach direct-contact screening level of 64 mg/kg dw in all sediment samples.

- In surface samples collected from locations impacted by woodwaste (CR-04 CR-05, and SCFM3A), total PCBs exceed the SCO (evaluated on a dw basis because of elevated TOC) but are below the CSL. Concentrations generally increase with depth (as observed in samples taken up to approximately 2.5 feet bml) in these samples.

  Total PCBs were not detected or were detected at concentrations below the SCO and the CSL in surface and subsurface sediment samples collected beyond the vertical or lateral extent of woodwaste impacts.

  Total PCBs are below the beach direct-contact screening level of 3,100 ug/kg dw in all sediment samples.

- Several SVOCs, including PAHs in some cases, exceeded the SCO and/or CSL in surface sediment at locations impacted by woodwaste (CR-04, CR-05, SSFM2 and SCFM3). SVOCs were not analyzed in surface sediment at CR-06 where woodwaste impacts were observed; SCO and CSL exceedances were observed at 1 to 2.5 feet bml at CR-06. Concentrations generally increase with depth (to approximately 2.5 feet bml) in these samples.

  SVOCs and PAHs are non-detect or are below the sediment screening levels in surface and subsurface sediment in all other samples collected beyond the vertical or lateral extent of woodwaste impacts, with the exception of 4-methyphenol at CR-12 at 15 feet bml.

  The cPAH TEQs are below the beach direct-contact screening level of 850 ug/kg dw in all surface sediment samples.

- The average dioxin TEQ concentration of 46.1 pg/g dioxin TEQ in surface locations impacted by woodwaste (i.e., at CR-04 through CR-06) is consistent with dioxin TEQs previously reported for this area (68 pg/g in 2011). Concentrations increase with depth (to approximately 2.5 feet bml, the maximum depth analyzed) at CR-04 but not at CR-06.

Surface sediment concentrations (average of 8.55 pg/g dioxin TEQ) are low level in surface samples collected beyond the lateral extent of woodwaste impacts (e.g., to the north and east of the Former Mill Area at CR-15C, CR-17D, CR-18B, and CR-19F). Similarly, the sample collected beyond the vertical extent of impacts at CR-11 (23 feet bml) is low level (2.38 pg/g).

Surface sediment concentrations are well below the beach direct-contact screening level of 100 pg/g dioxin TEQ.

- TPH was detected in the diesel- and motor-oil range in all samples collected at locations impacted by woodwaste (CR-04 and CR-06). All surface sediment locations except CR-05 were above the MTCA A soil residual saturation screening level (i.e., 2,000 mg/kg) and the diesel-range SMS freshwater sediment CSL (i.e., 510 mg/kg). Note that sheen, petroleum-hydrocarbon-like odor, and dark-colored water or water-NAPL mixtures were observed below approximately 1 foot bml at all these locations during the 2013 investigation, and concentrations typically increase with depth (to approximately 2.5 feet bml). During the 2015 investigation, sheen and associated NAPL were observed in subsurface (9 to 12 feet bml) woodwaste accumulations at borings CR-11, CR-12, and CR-14. The shallow NAPL impacts described during the 2013 investigation were not observed in the pocket beach area during the 2015 investigation, likely because of poor surface sediment recovery by the GeoProbe drill rig.

  TPH concentrations observed during the 2015 investigation in locations not impacted by woodwaste are well below the freshwater sediment CSL (510 mg/kg) in the sample collected beyond the vertical extent of impacts (CR-11, 23 feet bml) and are non-detect or are well below the freshwater CSL in surface samples collected beyond the lateral extent of woodwaste impacts (i.e., at CR-15C, CR-17D, CR-18B, and CR-19F, located north and east of the Former Mill Area). No NAPL was observed at these locations.

As a whole, the results show that sediment concentrations (for mercury, PCBs, and/or SVOCs including PAHs) generally exceed SCOs or CSLs and appear to correlate with areas impacted by significant woodwaste accumulation. However, further evaluation will be needed to determine to what extent sediment and woodwaste impacts correlate spatially. Concentrations of mercury, PCBs, cPAH TEQ, and dioxin TEQ are elevated relative to nearby Chehalis River samples (found in the EIM database) that may represent background condition (see Section 6.3.2). TPH is also elevated, and water-NAPL mixtures were observed. Surface sediment concentrations are below the human health beach direct-contact screening levels, and unacceptable risks via this pathway are not expected.

Samples were also collected for analysis at locations where woodwaste was not observed, including subsurface samples beyond the vertical extent of woodwaste impacts and surface sediment samples beyond the lateral extent of woodwaste accumulations. Chemical concentrations are typically below the SMS criteria in the subsurface samples where sediment with no woodwaste was encountered (i.e., samples CR-11 through CR-14). The lateral extent sample locations (CR-15C, CR-17D, CR-18B, and CR-19F) are north and east of the Former Mill Area, and the results show no exceedances of the SMS criteria or direct-contact screening levels in all samples (surface and near surface). In addition, PCBs were generally non-detect and cPAH and dioxin TEQs (average of 47 ug/kg and 8.55 pg/g, respectively) are similar to concentrations observed in other parts of the river (average TEQ of 29.2

ug/kg and 3.72 pg/g, respectively). These results therefore help delineate the northern lateral extent (also see the Wharf Area results discussed below) as well as the eastern lateral extent (also see the Tidelands/Beach Area and Shannon Slough results below) of chemical impacts (see Figure 7-1).

There is a need to profile the pocket beach area to inform waste disposal options. Specifically, toxicity characteristic leaching procedure evaluation of mercury and lead in sediments will be needed. In addition, the northern extent of elevated contaminant concentrations is not well-defined. Samples collected farthest north were analyzed and are below screening levels; however, additional sampling to the south (near the inner pocket beach) is needed to refine the extent. This will be evaluated as part of RI activities.

7.3.2 Lumber Shed Area

Two surface composite samples were collected in the lumber shed area (CR-07 and CR-24; see Figure 2-1). Metals, PCBs, SVOCS, and TPH were detected. Woodwaste is absent or was observed in trace amounts at all locations (see Table 3-3). Analytical results and screening levels, summarized in Table 7-5, are as follows.

- Total metals are non-detect or are below the benthic and beach direct-contact sediment screening levels.
- Total PCBs were detected at CR-24 (54 ug/kg dw; 3,462 ug/kg OC) at concentrations well below the OC SMS criteria and the direct-contact screening level (3,100 ug/kg dw). PCBs were not detected at CR-07.
- SVOCs were not detected or are well below the sediment screening levels, including the cPAH TEQ beach direct-contact screening level of 850 ug/kg dw.
- TPH was detected in the diesel- and motor-oil range in both samples at concentrations below the MTCA A soil residual saturation screening level (i.e., 2,000 mg/kg) and the freshwater sediment CSL (510 mg/kg).

The results show that sediment concentrations are below the benthic and beach direct-contact screening levels in this area. The PCB detection is consistent with the range of reporting limits (0.64 ug/kg to 69 ug/kg) for Chehalis River samples in the vicinity (see Section 6.3.2) and is somewhat higher than other investigation areas where PCBs were not detected. Similarly, the cPAH TEQ concentrations (average of 119 ug/kg) are somewhat elevated relative to nearby river concentrations (average TEQ of 29.2 ug/kg).

7.3.3 Wharf Area

A subsurface (0.5 to 1 foot bml) sample was collected at CR-26 in the wharf area in 2015 (see Figure 2-1), while several composites were collected in surface sediment in 2011 below the Wharf (DNR-SSDD-COMP, DNR-SSDF-COMP, DNR-SSDU-COMP, and DNR-SSD-SUPCOMP samples [the last sample is a composite of the original three samples]). Woodwaste was not observed in this area (see Table 3-3). Surface sediments are the point of compliance under the SMS; subsurface

concentrations are evaluated relative to SMS criteria for context only. Metals and SVOCS were detected. Analytical results and screening levels are summarized in Table 7-5 and are as follows.

- Total metals were non-detect or are below the benthic and beach direct-contact sediment screening levels.
- PCBs were not detected.
- SVOCs were not detected or are well below the sediment benthic screening levels, with the exception of benzyl alcohol and butyl benzyl phthalate. The concentration of benzyl alcohol (64 ug/kg dw) marginally exceeds the SMS SCO (57 ug/kg dw) and is below the SMS CSL (73 ug/kg dw). The butyl benzyl phthalate concentration (5,000 ug/kg-OC) marginally exceeds the SCO of 4,900 ug/kg-OC and is well below the CSL of 64,000 mg/kg-OC. The cPAH TEQ (17 ug/kg) is below the direct-contact screening level of 850 ug/kg dw.

The results show that sediment concentrations are generally below screening levels in this area, with the exception of butyl benzyl phthalate and benzyl alcohol, which marginally exceed the SMS SCO. The cPAH TEQ concentration is low level and similar to nearby river concentrations (average TEQ of 29.2 ug/kg).

7.3.4 Former Boiler Area

Surface and subsurface composite samples were collected at two locations in the Former Boiler area (see Figure 2-1)—specifically, two surface composites (CR08A and CR08B), and one core sample from below the visible woodwaste in each composite sample area. Significant woodwaste accumulation was observed to 18 feet deep in the core from CR-08A and to 7 feet deep in the core from CR-08B (see Table 3-3). Metals, PCBs, SVOCS, TPH, and dioxins were detected. Analytical results and screening levels, summarized in Table 7-5, are as follows:

- Total metals are non-detect or are below the benthic and beach direct-contact sediment levels in surface and subsurface sediment.
- Total PCBs were detected in surface sediment at CR-08B (14 ug/kg dw; 683 ug/kg OC) at concentrations well below the OC SMS criteria and the beach direct-contact screening level. PCBs were not detected in the subsurface or in surface sediment at CR-08A.
- SVOCs were not detected or are well below the sediment screening levels, with the exception of butyl benzyl phthalate in surface sediment at CR-08B. The concentration exceeds the SMS SCO and is below the SMS CSL. The cPAH TEQs (range: 56 to 106 ug/kg) are below the beach direct-contact screening level of 850 ug/kg dw.
- Dioxin TEQs ranged from 17.6 pg/g to 30.4 pg/g in surface sediment; subsurface concentrations are lower (approximately 5 pg/g). The concentrations are well below the direct-contact screening level of 100 pg/g dioxin TEQ.
- TPH was detected in the diesel- and motor-oil range in surface and subsurface samples at concentrations (ranging from 26 to 320 mg/kg dw) below the MTCA A soil residual

saturation screening level (i.e., 2,000 mg/kg) and the freshwater sediment SCO (340 mg/kg).

The results show that surface sediment concentrations are generally below screening levels in this area, with the exception of butyl benzyl phthalate, which exceeds the SMS SCO at CR-08B. The PCB detection is low level and consistent with the range of reporting limits (0.64 ug/kg to 69 ug/kg) reported for Chehalis River samples in the vicinity (see Section 6.3.2), whereas surface sediment cPAH and dioxin TEQ concentrations are slightly elevated when compared to nearby river concentrations (average TEQ of 29.2 ug/kg and 3.72 pg/g, respectively).

7.3.5 Tidelands and Beach Area

Two surface composite samples were collected in this area (CR-09A and CR-09B; see Figure 2-1). Significant woodwaste accumulation was observed to the full depth of the 2-foot cores at CR-09A, and to a lesser extent in the 2-foot cores at CR0-9B (see Table 3-3). Metals, SVOCS, and dioxins were detected. Analytical results and screening levels are summarized in Table 7-5 and are as follows:

- Total metals are non-detect or are below the benthic and beach direct-contact sediment levels at all locations.
- Total PCBs were not detected.
- SVOCs were not detected or are well below the sediment benthic screening levels, with the exception of benzyl alcohol in surface sediment at CR-09B. The concentration (58 ug/kg dw) marginally exceeds the SMS SCO (57 ug/kg dw) and is below the SMS CSL (73 ug/kg dw). The cPAH TEQs (average of 16 ug/kg) are below the beach direct-contact screening level of 850 ug/kg dw.
- Dioxin TEQs ranged from 6.10 pg/g to 7.92 pg/g in surface sediment. The concentrations are well below the beach direct-contact screening level of 100 pg/g dioxin TEQ.

The results show that sediment concentrations are generally below screening levels in this area, with the exception of benzyl alcohol, which exceeds the SMS SCO at CR-09B. Surface sediment cPAH and dioxin TEQ concentrations are low level and are similar to nearby river concentrations (average TEQ of 29.2 ug/kg and 3.72 pg/g, respectively).

7.3.6 Shannon Slough

A composite surface sample (CR-10) was collected in the mouth of the slough (see Figure 2-1). Approximately 15 percent woodwaste (an amount not considered significant) was observed in all four composite points (see Table 3-3). Metals and SVOCS were detected. Analytical results and screening levels are summarized in Table 7-5 and are as follows:

- Total metals are non-detect or are below the benthic and beach direct-contact sediment screening levels.
- Total PCBs were not detected.

- SVOCs were not detected or are well below the benthic and beach direct-contact sediment screening levels.

The results show that sediment concentrations are below benthic and beach direct-contact screening levels in this area. The surface sediment cPAH TEQ concentration of 51 ug/kg is low level but slightly higher than nearby river concentrations (average TEQ of 29.2 ug/kg); samples from this area were not analyzed for dioxins.

7.3.7 Chehalis River (2013)

Three surface samples (CR-01 through CR-03) were collected in deeper water in the river in 2013 (see Figure 2-1). Woodwaste was not observed (in surface sediment) at these locations (see Table 3-3). Metals, PCBs, SVOCS, and dioxins were detected. Analytical results and screening levels are summarized in Table 7-5 and are as follows:

- Total metals are non-detect or are below the benthic and beach sediment screening levels at all locations.
- Total PCBs were not detected in CR-01 and CR-03. Total PCBs were detected in surface sediment at CR-02 (12 ug/kg dw; 374 ug/kg OC) at concentrations well below the OC SMS criteria and the beach direct-contact screening level.
- SVOCs were not detected or are well below the sediment screening levels, with the exception of 4-methylphenol in CR-02. The concentration (730 ug/kg dw) is marginally above the SMS SCO and CSL (670 ug/kg dw for both criteria). The cPAH TEQs (average of 19 ug/kg) are well below the beach direct-contact screening level of 850 ug/kg dw.
- Dioxin TEQs ranged from 12.2 pg/g to 15.6 pg/g in surface sediment. The concentrations are well below the beach direct-contact screening level of 100 pg/g dioxin TEQ.

The results show that sediment concentrations are generally below screening levels in this area, with the exception of 4-methylphenol at CR-02. Surface sediment cPAH TEQ concentrations (average of 19 ug/kg) are low level and are similar to nearby river concentrations (average TEQ of 29.2 ug/kg). Surface sediment dioxin TEQ is slightly elevated compared to nearby river concentrations (3.72 pg/g).

7.3.8 Woodwaste Scoring Results

The samples collected in 2013 in the Former Mill Area contained more than 25 percent woodwaste by volume and were scored for woodwaste impacts. Woodwaste was consistently observed under offshore of the GHHSA beneath sediment. The thickest layers of woodwaste beneath sediment were observed in the Former Boiler Area and in the pocket beach area of the Former Mill Area (see Figure 4-2). These areas both contain layers of woodwaste that are over 12 feet thick, buried beneath less than 5 feet of sediment. Farther from shore, both the woodwaste layer and the layer of overlying sediment generally become thinner.

Woodwaste scores, shown in Table 7-6, range from "Medium Concern" to "High Concern" at the Former Mill Area locations (CR-04 through CR-06). These results show potential for aquatic toxicity

associated with woodwaste in the Former Mill Area. In addition, a surface (0 to 0.33 foot bml) sample collected in 2015 (CR19D-SSD-CONV) was evaluated to inform whether buried woodwaste has the potential to significantly affect overlying surface sediments (see Section 6.3.4). Conventional parameters such as TOC and total volatile solids (TVS) are significantly lower at CR-19D, and this location scored as "Low Concern." The limited woodwaste-related data from the area to the east indicates that woodwaste-related toxicity in that area may not be of concern. The results also show that in areas where woodwaste is buried (in the case of CR-19D, woodwaste was observed approximately 4 feet bml), parameters associated with woodwaste and with potential for toxicity (i.e., ammonia and sulfides) may be found at concentrations similar to those measured in the Former Mill Area. Further, higher concentrations of chemicals associated with woodwaste (e.g., benzoic acid, phenols, benzyl alcohol, PAHs) are correlated with areas where more woodwaste was observed. Outside the Former Mill Area/pocket beach area, exceedances of these woodwaste-related chemicals in sediment were infrequent.

Additional woodwaste delineation efforts, and potential for associated toxicity, will be addressed as part of RI activities. Potential data gap areas include the area north of transect CR-19 and the area near the chip loader (chip area blower building vicinity). In addition, prior sampling focused on delineating the bottom extent of woodwaste, and additional data (and sampling approaches specific to that objective) refining the top of woodwaste extent may be needed. Specific approaches, including additional woodwaste physical extent sampling, bioassays, pore water sampling, and sediment chemistry, will be considered in addressing remaining data gaps.

LIMITATIONS

The services undertaken in completing this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

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TABLES



Table 3-1
Soil, Groundwater, and Seep Sample Descriptions and Analyses
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Sample Location	Lithologic Description (bgs)	PID Reading (ppm)	Sample ID	Matrix	Depth (bgs)	Notes	Depth to Water (feet bgs)	Analytical Suite (Soil)	Analytical Suite (Water)
CR-20	**0.0 to 3.0 feet:** No recovery.	NA	NA	NA	NA	NA	NA	NA	NA
	3.0 to 3.3 feet: Clayey sand; dark brown; 40% fines, high plasticity; 40% sand; 20% gravel; trace organic material; moist.	NA	NA	NA	NA	NA	NA	NA	NA
	3.3 to 7.0 feet: Sandy gravel; brownish gray; 30% sand, fine to coarse; 70% gravel, medium to coarse, subangular. **@ 4.0 feet:** Clay lens; reddish brown. **@ 5.0 to 5.3 feet:** Wood waste; 80% wood waste, primarily large woodchips; 20% black silty sand.	NA	CR20-S-5.0 CR20-GW-5.0	S GW	3.3 to 5.0 feet 5.0 feet	Composited soil from 3.3 to 5.0 feet (above the wood waste) in order to obtain enough sample volume. PID instrument did not function for this boring because of rain. Temporary screen set from 3.0 to 8.0 feet.	4	Total Metals TPH PAHs Phenol PCBs Dioxins/Furans SVOC	Total Metals Dissolved Metals PCBs SVOC Mercury TPH
	7.0 to 7.5 feet: Concrete.	NA	NA	NA	NA	NA	NA	NA	NA
	7.5 to 10.0 feet: No recovery.	NA	NA	NA	NA	NA	NA	NA	NA
CR-21	**0.0 to 3.0 feet:** No recovery.	NA	NA	NA	NA	NA	NA	NA	NA
	3.0 to 4.8 feet: Gravelly sand; brown; 10% fines, nonplastic; 40% sand, fine to medium; 50% gravel, subangular (rock fragments), medium to large; moist. **4.8 to 5.0 feet:** Wood waste; 80% wood waste, primarily large woodchips; 20% black silty sand.	102.9 at 4.0 feet bgs	CR21-S-5.0 CR21-GW-10.0	S GW	3.5 to 5.0 feet 10.0 feet	Composited soil from 3.5 to 5.0 feet (above the wood waste) in order to obtain enough sample volume. Temporary screen set from 5.0 to 10.0 feet.	4.8	Total Metals TPH PAHs Phenol PCBs Dioxins/Furans SVOC	Total Metals Dissolved Metals PCBs SVOC Mercury TPH
	5.0 to 8.5 feet: No recovery.	NA	NA	NA	NA	NA	NA	NA	NA
	8.5 to 10.0 feet: Silty sand; blackish brown; 30% fines, nonplastic to medium plasticity; 50% sand, fine to medium; 20% gravel, medium, subrounded; wet.	53.5 at 8.5 feet bgs	NA	NA	NA	NA	NA	NA	NA

Table 3-1
Soil, Groundwater, and Seep Sample Descriptions and Analyses
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Sample Location	Lithologic Description (bgs)	PID Reading (ppm)	Sample ID	Matrix	Depth (bgs)	Notes	Depth to Water (feet bgs)	Analytical Suite (Soil)	Analytical Suite (Water)
CR-22	**0.0 to 2.0 feet:** No recovery.	NA	NA	NA	NA	NA	NA	NA	NA
	2.0 to 3.0 feet: Well graded sand; brown; 20% fines, nonplastic; 60% sand, fine to coarse; 20% gravel, subangular; rock shards, some organic material.	NA	NA	NA	NA	NA	NA	NA	NA
	3.0 to 4.5 feet: Silty sand; reddish brown; 40% fines, medium plasticity; 60% sand, coarse; trace gravel. **4.5 to 4.8 feet:** Wood waste lens, primarily bark chips and large wood chips.	2.0 at 3.0 feet bgs	CR22-S-3.0 CR22-GW-9.0	S GW	3.0 to 4.5 feet 9.0 feet	Composited material from 1.5 to 3.0 feet to obtain sufficient sample volume for soil sample. Temporary screen set from 4.0 to 9.0 feet bgs.	4.7	Total Metals Phenol PAHs PCBs SVOC Mercury TPH Dioxins/Furans	Total Metals Dissolved Metals PCBs SVOC Mercury TPH
	4.8 to 5.0 feet: Poorly graded sand; gray; 10% fines; 90% sand, medium, poorly graded; saturated (FILL).	NA	NA	NA	NA	NA	NA	NA	NA
	5.0 to 7.0 feet: No recovery.	NA	NA	NA	NA	NA	NA	NA	NA
	7.0 to 8.0 feet: Poorly graded sand; gray; 10% fines; 90% sand, medium, poorly graded; saturated (FILL).	NA	NA	NA	NA	NA	NA	NA	NA
	8.0 to 9.0 feet: Wood waste.	NA	NA	NA	NA	NA	NA	NA	NA
	9.0 to 10.0 feet: Silt w/ wood waste; grayish brown; 70% fines, nonplastic; 30% wood waste, primarily bark chips.	8.8 at 10.0 feet bgs	NA	NA	NA	NA	NA	NA	NA
CR-23	**0.0 to 1.0 feet:** No recovery.	NA	NA	NA	NA	NA	NA	NA	NA
	1.0 to 1.5 feet: Gravelly silt; brown; 40% fines, high plasticity; 10% sand; 25% gravel, subrounded, large; 25% wood waste, primarily large woodchips and bark pieces.	NA	NA	NA	NA	NA	NA	NA	NA
	1.5 to 2.5 feet: Gravelly sand; grayish brown; 20% fines; 50% sand; 30% gravel, fine to medium, subrounded to subangular.	NA	CR23-S-3.0 CR23-GW-6.0	S GW	1.5 to 3.0 feet 6.0 feet	Composited material from 1.5 to 3.0 feet to obtain sufficient sample volume. Temporary screen set from 1.0 to 6.0 feet bgs.	4.8	Total Metals Phenol PAHs PCBs SVOC Mercury TPH Dioxins/Furans	Total Metals Dissolved Metals PCBs SVOC Mercury TPH
	2.5 to 3.0 feet: Gravel w/ sand; 10% fines, 20% sand; 70% gravel, fine to large.	30.8 at 2.5 feet bgs							
	3.0 to 4.0 feet: Poorly graded sand; gray; 20% fines; 70% sand, poorly graded, medium; 10% gravel (FILL).	57.7 at 4.0 feet bgs	NA	NA	NA	NA	NA	NA	NA

Table 3-1
Soil, Groundwater, and Seep Sample Descriptions and Analyses
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Sample Location	Lithologic Description (bgs)	PID Reading (ppm)	Sample ID	Matrix	Depth (bgs)	Notes	Depth to Water (feet bgs)	Analytical Suite (Soil)	Analytical Suite (Water)
CR-23	**4.0 to 5.0 feet:** Wood waste; 80% wood waste; 20% gray sandy silt.	NA	NA	NA	NA	NA	NA	NA	NA
	5.0 to 7.5 feet: No recovery.	NA	NA	NA	NA	NA	NA	NA	NA
	7.5 to 9.0 feet: Wood waste; 80% wood waste; 20% gray sandy silt.	NA	NA	NA	NA	NA	NA	NA	NA
	9.0 to 10.0 feet: Silt w/ wood waste; dark brown; 70% fines, medium plasticity; 30% wood waste, primarily bark chips.	NA	NA	NA	NA	NA	NA	NA	NA
SEEP-01	NA	NA	NA	Seep Water	NA	NA	NA	NA	PCBs SVOC Mercury TPH

NOTES:
bgs = below ground surface.
GW = groundwater.
ID = identification.
NA = not applicable.
PAH = polycyclic aromatic hydrocarbon.
PCB = polychlorinated biphenyls.
PID = photoionization detector.
ppm = parts per million.
SVOC = semivolatile organic compound.
TPH = total petroleum hydrocrabons.

Table 3-2
Groundwater and Seep Water Field Parameters
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Location:	CR-20	CR-21	CR-22	CR-23	SEEP-01
Sample Name:	CR20-GW-5.0	CR21-GW-10	CR22-GW-9.0	CR23-GW-6.0	Seep-01
Collection Date:	10/12/2015	10/12/2015	10/13/2015	10/13/2015	10/12/2015
Collection Depth (temporary well screen midpoint, ft bgs):	5.5	7.5	6.5	3.5	0
Field Parameters					
Conductivity (uS/cm)	805	539	741	887	587
pH	6.82	5.75	5.99	6.10	6.52
Temperature (°C)	17.6	16.9	17.2	17.6	16.6
Turbidity (NTU)	20.3	107	118	196	5.51

NOTES:
°C = degrees Celsius.
ft bgs = feet below ground surface.
NTU = nephelometric turbidity units.
uS/cm = microsiemens per centimeter.

Table 3-3
Sediment Sample Descriptions and Analyses
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Sample Location	Boring / Surface Sample Sublocation	Lithologic Description (bgs/bml)	PID Reading (ppm)	Sample ID	Depth (bgs/bml)	Notes	Analytical Suite
Lumber Shed							
CR-07	LS-01	**0.0 to 0.3 feet:** Sand w/ gravel; grayish brown; 60% sand, well graded but mostly coarse; 40% gravel, large, subrounded.	NA	LS01	0-0.33 feet bml	NA	***Archive***
	LS-02	**0.0 to 0.3 feet:** Silt; grayish brown; 80% fines, medium plasticity; 10% sand, 10% gravel, large, subrounded; trace wood waste.	NA	LS02	0-0.33 feet bml	NA	***Archive***
	LS-03	**0.0 to 0.3 feet:** Silt; grayish brown; 80% fines, medium plasticity; 10% sand, 10% gravel, large, subrounded; trace wood waste.	NA	LS03	0-0.33 feet bml	NA	***Archive***
	LS-04	**0.0 to 0.3 feet:** Sand w/ gravel; grayish brown; 60% sand, well graded but mostly coarse; 40% gravel, large, subrounded.	NA	LS04	0-0.33 feet bml	NA	***Archive***
	CR-07-SSD-COMP	NA	NA	LS04	0-0.33 feet bml	Composite sample from all four sublocations	Total Metals TOC PAHs PCBs SVOC Mercury TPH ***Archive***
CR-24	LS-05	**0.0 to 0.1 feet:** Sand w/ cobbles; reddish brown.	NA	NA	NA	NA	NA
		0.1 to 0.3 feet: Sand; gray; 10% fines, 80% sand, poorly graded, medium; 10% cobbles, subrounded.	NA	LS05	0-0.33 feet bml	NA	***Archive***
	LS-06	**0.0 to 0.3 feet:** Silty clay; black; 80% fines, high plasticity; 10% sand, poorly graded, medium; 10% cobbles, subrounded.	NA	LS06	0-0.33 feet bml	NA	***Archive***
	LS-07	**0.0 to 0.3 feet:** Silty clay; grayish brown; 80% fines, high plasticity; 10% sand, poorly graded, medium; 10% cobbles, subrounded.	NA	LS07	0-0.33 feet bml	NA	***Archive***
	LS-08	**0.0 to 0.3 feet:** Silty clay; grayish brown; 80% fines, high plasticity; 10% sand, poorly graded, medium; 10% cobbles, subrounded.	NA	LS08	0-0.33 feet bml	NA	***Archive***
	CR-24-SSD-COMP	NA	NA	CR-24-SSD-COMP	0-0.33 feet bml	Composite sample from all four sublocations	Total Metals TOC PAHs PCBs +J7+A8:J26+J7+A8:J26+J7+A8:J26+ A8:J26

Table 3-3
Sediment Sample Descriptions and Analyses
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Sample Location	Boring / Surface Sample Sublocation	Lithologic Description (bgs/bml)	PID Reading (ppm)	Sample ID	Depth (bgs/bml)	Notes	Analytical Suite
Former Boiler							
	FB-01	**0.0 to 0.3 feet:** Silt; brownish black; 80% fines, 20% gravel, subrounded; trace organic and biological material, trace algae on surface sediment.	NA	FB01	0-0.33 feet bml	NA	***Archive***
	FB-02	**0.0 to 0.3 feet:** Silt; brownish black; 80% fines, 20% gravel, subrounded; trace organic and biological material.	NA	FB02	0-0.33 feet bml	NA	***Archive***
	FB-03	**0.0 to 0.3 feet:** Gravelly sand; reddish brown; 10% fines; 50% sand, medium to coarse; 40% gravel, fine to large, subrounded.	NA	FB03	0-0.33 feet bml	NA	***Archive***
	FB-04	**0.0 to 0.3 feet:** Silt w/ gravel; brown to black; 80% fines; 20% gravel, subrounded, medium to large. **@ 3 cm:** Thin, red-orange layer of iron staining.	NA	FB04	0-0.33 feet bml	NA	***Archive***
CR-08A	CR08A-SSD-COMP	NA	NA	CR08A-SSD-COMP	0-0.33 feet bml	Composite sample from all four sublocations	Total Metals TOC Phenol PAHs PCBs SVOC Mercury Asbestos TPH Dioxins/Furans Archive
	CR08A-FB04	**0.0 to 3.0 feet:** No recovery.	NA	NA	NA	NA	NA
		3.0 to 5.0 feet: Sawdust; 80% sawdust, reddish brownish black; 20% sand, medium to coarse.	NA	NA	NA	NA	NA
		5.0 to 9.5 feet: No recovery.	NA	NA	NA	NA	NA
		9.5 to 15.0 feet: Sawdust; 80% sawdust, reddish brownish black; 20% sand, medium to coarse.	NA	NA	NA	NA	NA
		15.0 to 17.0 feet: No recovery.	NA	NA	NA	NA	NA
		17.0 to 18.3 feet: Sawdust; 80% sawdust, reddish brownish black; 20% sand, medium to coarse. **@ 17.0 to 17.2 feet:** Occasional brick shards.	NA	NA	NA	NA	NA

Table 3-3
Sediment Sample Descriptions and Analyses
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Sample Location	Boring / Surface Sample Sublocation	Lithologic Description (bgs/bml)	PID Reading (ppm)	Sample ID	Depth (bgs/bml)	Notes	Analytical Suite
CR-08A	CR08A-FB04	**18.3 to 20.0 feet:** Silty sand; gray; 40% fines, medium plasticity; 60% sand, fine to medium.	NA	CR08A-SBSD	18.3 -20.0 feet bml	Composited material from 18.3 to 20.0 feet in order to obtain sufficient sample volume	Total Metals TOC Phenol PAHs PCBs SVOC Mercury TPH Dioxins/Furans Archive
CR-08B	FB-05	**0.0 to 0.3 feet:** Silty sand; dark grayish brown; 40% fines, medium plasticity; 50% sand; 10% gravel; trace woody debris.	NA	FB05	0-0.33 feet bml	NA	***Archive***
	FB-06	**0.0 to 0.3 feet:** Silty sand; gray; 40% fines, medium plasticity; 60% sand; trace woody debris.	NA	FB06	0-0.33 feet bml	NA	***Archive***
	FB-07	**0.0 to 0.3 feet:** Silty sand; grayish brown; 40% fines, medium plasticity; 60% sand; trace gravel.	NA	FB07	0-0.33 feet bml	NA	***Archive***
	FB-08	**0.0 to 0.3 feet:** Silty sand; grayish brown; 40% fines, medium plasticity; 60% sand; trace gravel.	NA	FB08	0-0.33 feet bml	NA	***Archive***
	CR08B-SSD-COMP	NA	NA	CR08B-SSD-COMP	0-0.33 feet bml	Composite sample from all four sublocations	Total Metals TOC Phenol PAHs PCBs SVOC Mercury Asbestos TPH Dioxins/Furans Archive
	CR08B-FB05	**0.0 to 3.5 feet:** No recovery.	NA	NA	NA	NA	NA
		3.5 to 7.0 feet: Sandy silt; gray; 50% fines; 30% sand, very fine; 20% wood waste, primarily sawdust and wood chips. **@ 4.5 to 4.6 feet:** Sawdust; 80% sawdust, 20% sandy silt.	NA	NA	NA	NA	NA

Table 3-3
Sediment Sample Descriptions and Analyses
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Sample Location	Boring / Surface Sample Sublocation	Lithologic Description (bgs/bml)	PID Reading (ppm)	Sample ID	Depth (bgs/bml)	Notes	Analytical Suite
CR-08B	CR08B-FB05	**7.0 to 10.0 feet:** Sandy silt; gray; 60% fines; 40% sand, very fine.	NA	CR08B-SBSD	8.0 feet bml	NA	Total Metals TOC Phenol PAHs PCBs SVOC Mercury TPH Dioxins/Furans Archive
Chehalis River							
CR-01 (2013 Sample)	CR-01	**0.0 to 0.33 feet:** Gray silty sand (SM);, loose, trace organic debris.	NA	CR01-10cm	0-0.33 feet bml	NA	Total Metals TOC Phenol PAHs PCBs SVOC Mercury Dioxins/Furans
CR-02 (2013 Sample)	CR-02	**0.0 to 0.33 feet:** Gray to tan silty sand (SM);, loose, trace organic debris;, tan mottles.	NA	CR02-10cm	0-0.33 feet bml	NA	Total Metals TOC Phenol PAHs PCBs SVOC Mercury Dioxins/Furans
CR-03 (2013 Sample)	CR-03	**0.0 to 0.33 feet:** Gray silty sand (SM);, loose, trace organic debris.	NA	CR03-10cm	0-0.33 feet bml	NA	Total Metals TOC Phenol PAHs PCBs SVOC Mercury Dioxins/Furans

Table 3-3
Sediment Sample Descriptions and Analyses
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Sample Location	Boring / Surface Sample Sublocation	Lithologic Description (bgs/bml)	PID Reading (ppm)	Sample ID	Depth (bgs/bml)	Notes	Analytical Suite
Beach Area							
CR-09A	BA-01	**0.0 to 2.0 feet:** 30% gravel, angular; 40% wood waste, sawdust, and bark; 30% silty sand, gray on top and reddish tan towards 2.0 feet.	NA	BA01-0-10cm BA01-10cm-1 BA01-1-2	0-0.33 feet bml 0.33-1 ft bml 1-2 ft bml	NA	***Archive***
	BA-02	**0.0 to 2.0 feet:** 20% gravel, angular; 50% wood waste, sawdust, and bark; 30% silty sand, gray.	NA	BA02-0-10cm BA02-10cm-1 BA02-1-2	0-0.33 feet bml 0.33-1 ft bml 1-2 ft bml	NA	***Archive***
	BA-03	**0.0 to 2.0 feet:** 20% gravel, angular; 50% wood waste, sawdust, and bark; 30% silty sand, gray.	NA	BA03-0-10cm BA03-10cm-1 BA03-1-2	0-0.33 feet bml 0.33-1 ft bml 1-2 ft bml	NA	***Archive***
	BA-04	**0.0 to 2.0 feet:** 30% gravel, angular; 20% wood waste, sawdust and bark; 50% silty sand, gray.	NA	BA04-0-10cm BA04-10cm-1 BA04-1-2	0-0.33 feet bml 0.33-1 ft bml 1-2 ft bml	NA	***Archive***
	CR09A-SSD-COMP	NA	NA	CR09A-SSD-COMP	0-0.33 feet bml	Composite sample from all four sublocations	Total Metals TOC PAHs PCBs SVOC Mercury Dioxins/Furans Archive
CR-09B	BA-05	**0.0 to 2.0 feet:** 30% gravel, angular; 20% wood waste, sawdust, and bark; 50% silty sand, gray.	NA	BA05-0-10cm BA05-10cm-1 BA05-1-2	0-0.33 feet bml 0.33-1 ft bml 1-2 ft bml	NA	***Archive***
	BA-06	**0.0 to 2.0 feet:** 30% gravel, angular; 15% wood waste, sawdust, and bark; 55% silty sand, gray.	NA	BA06-0-10cm BA06-10cm-1 BA06-1-2	0-0.33 feet bml 0.33-1 ft bml 1-2 ft bml	NA	***Archive***
	BA-07	**0.0 to 2.0 feet:** 30% gravel, angular; 15% wood waste, sawdust, and bark; 55% silty sand, gray.	NA	BA07-0-10cm BA07-10cm-1 BA07-1-2	0-0.33 feet bml 0.33-1 ft bml 1-2 ft bml	NA	***Archive***
	BA-08	**0.0 to 2.0 feet:** 30% gravel, angular; 15% wood waste, sawdust, and bark; 55% silty sand, gray.	NA	BA08-0-10cm BA08-10cm-1 BA08-1-2	0-0.33 feet bml 0.33-1 ft bml 1-2 ft bml	NA	***Archive***
	CR09B-SSD-COMP	NA	NA	CR09B-SSD-COMP	0-0.33 feet bml	Composite sample from all four sublocations	Total Metals TOC PAHs PCBs SVOC Mercury Dioxins/Furans Archive

Table 3-3
Sediment Sample Descriptions and Analyses
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Sample Location	Boring / Surface Sample Sublocation	Lithologic Description (bgs/bml)	PID Reading (ppm)	Sample ID	Depth (bgs/bml)	Notes	Analytical Suite
Shannon Slough							
CR-10	SM-01	**0.0 to 2.0 feet:** 30% gravel, angular; 15% wood waste, sawdust, and bark; 55% silty sand, gray.	NA	SM-01	0-0.33 feet bml	NA	***Archive***
	SM-02	**0.0 to 2.0 feet:** 30% gravel, angular; 15% wood waste, sawdust, and bark; 55% silty sand, gray.	NA	SM-02	0-0.33 feet bml	NA	***Archive***
	SM-03	**0.0 to 2.0 feet:** 30% gravel, angular; 15% wood waste, sawdust, and bark; 55% silty sand, gray.	NA	SM-03	0-0.33 feet bml	NA	***Archive***
	SM-04	**0.0 to 2.0 feet:** 30% gravel, angular; 15% wood waste, sawdust, and bark; 55% silty sand, gray.	NA	SM-04	0-0.33 feet bml	NA	***Archive***
	CR10-SSD-COMP	NA	NA	CR10-SSD-COMP	0-0.33 feet bml	Composite sample from all four sublocations	Total Metals Phenol TOC PAHs PCBs SVOC Mercury Archive
Former Mill Area and Chehalis River							
CR-04 (2013 Sample)	CR-04	**0.0 to 5.0 feet:** Tan sandy silt (ML) with 50% to 75% wood waste;, wet, medium density; pockets of dark-colored water/product mixture at 2.5 feet bml. Angular lumber and construction debris.	NA	CR04-10cm CR04-2.5 CR04-2.5-5	0-0.33 feet bml 1-2.5 ft bml 2.5-5 ft bml	Only conventionals analyzed at CR-04-2.5-5	Total Metals TOC Phenol PAHs PCBs SVOC Mercury Dioxins/Furans TPH Conventionals
CR-05 (2013 Sample)	CR-05	**0.0 to 3.5 feet:** Tan silty sand (ML) with 10% to 80% wood waste under 4 mm; wet, medium density; pockets of black-colored water/product mixture. Angular lumber and construction debris.	NA	CR05-10cm CR05-2.5	0-0.33 feet bml 0.33-2.5 ft bml	NA	Total Metals TOC Phenol PAHs PCBs SVOC Mercury Dioxins/Furans TPH Conventionals

Table 3-3
Sediment Sample Descriptions and Analyses
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Sample Location	Boring / Surface Sample Sublocation	Lithologic Description (bgs/bml)	PID Reading (ppm)	Sample ID	Depth (bgs/bml)	Notes	Analytical Suite
CR-06 (2013 Sample)	CR-06	**0.0 to 5.0 feet:** Tan silty sand (ML) with 70% wood waste under 4 mm; wet, medium density; pockets of black-colored water/product mixture; angular lumber and construction debris.	NA	CR-06-10cm CR06-2.5	0-0.33 feet bml 1-2.5 ft bml	NA	Total Metals TOC Phenol PAHs PCBs SVOC Mercury Dioxins/Furans TPH Conventionals
CR-11	CR-11	**0.0 to 2.8 feet:** No recovery.	NA	NA	NA	NA	NA
		2.8 to 5.0 feet: Wood waste; tan to black; hydrocarbon-like odor.	NA	NA	NA	NA	NA
		5.0 to 5.8 feet: No recovery.	NA	NA	NA	NA	NA
		5.8 to 6.4 feet: Sand; gray; 100% sand, medium.	NA	NA	NA	NA	NA
		6.4 feet to 9.4 feet: Sandy silt; gray; 50% fines, plastic; 30% sand; 20% woody debris. **@ 8.8 feet:** Sand lens.	NA	NA	NA	NA	NA
		9.4 to 10.0 feet: Wood waste; 80% woodwaste; 20% gray sandy silt.	NA	NA	NA	NA	NA
		10.0 to 11.2 feet: No recovery.	NA	NA	NA	NA	NA
	CR-11	**11.2 to 22.5 feet:** Wood waste; 80% woodwaste; 20% gray sandy silt; wet. **@12.0 feet:** Sheen.	17.2 at 12.0 feet bgs	NA	NA	NA	NA
	CR-11	**22.5 to 25.0 feet:** Sandy silt; plastic fines.	6.4 at 25.0 feet bgs	CR11-SBSD-23	23	NA	Total Metals TOC PAHs PCBs SVOC Mercury TPH-Dx Dioxins/Furans Archive

Table 3-3
Sediment Sample Descriptions and Analyses
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Sample Location	Boring / Surface Sample Sublocation	Lithologic Description (bgs/bml)	PID Reading (ppm)	Sample ID	Depth (bgs/bml)	Notes	Analytical Suite
CR-12	CR-12	**0.0 to 2.8 feet:** No recovery.	NA	NA	NA	NA	NA
		2.8 to 5.0 feet: Wood waste; sawdust, lumber, some silt; sulfur odor; wet.	NA	NA	NA	NA	NA
		5.0 to 7.0 feet: No recovery.	NA	NA	NA	NA	NA
		7.0 to 10.0 feet: Wood waste; sawdust, lumber, some silt; sulfur odor; wet.	NA	NA	NA	NA	NA
		10.0 to 11.9 feet: No recovery.	NA	NA	NA	NA	NA
		11.9 to 12.3 feet: Wood waste; sawdust, lumber, some silt; sheen; sulfur odor; wet.	98.7 at 12.0 feet bgs	NA	NA	NA	NA
		12.3 to 13.8 feet: 80% silty sand; 20% wood waste.	NA	NA	NA	NA	NA
		13.8 to 15.0 feet: Sandy silt; gray; 60% fines, plastic; 40% sand, fine, micaceous.	10.1 at 15.0 feet bgs	CR12-SBSD-15	15	NA	Total Metals TOC PAHs PCBs SVOC Mercury Archive
CR-13	CR-13	**0.0 to 2.5 feet:** No recovery.	NA	NA	NA	NA	NA
		2.5 to 5.0 feet: Wood waste (lumber); slight sulfur odor; wet.	NA	NA	NA	NA	NA
		5.0 to 6.8 feet: No recovery.	NA	NA	NA	NA	NA
		6.8 to 8.7 feet: Wood waste (lumber); slight sulfur odor; wet.	NA	NA	NA	NA	NA
		8.7 to 10.0 feet: Sandy silt; gray; 60% fines, plastic; 40% sand, fine, micaceous.	2.0 at 8.0 feet bgs	NA	NA	NA	NA
		10.0 to 11.1 feet: No recovery.	NA	NA	NA	NA	NA
		11.1 to 15.0 feet: Sandy silt; gray; 60% fines, plastic; 40% sand, fine, micaceous.	1.7 at 11.0 feet bgs	CR13-SBSD-11	11	NA	Total Metals TOC PAHs PCBs SVOC Mercury Archive

Table 3-3
Sediment Sample Descriptions and Analyses
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Sample Location	Boring / Surface Sample Sublocation	Lithologic Description (bgs/bml)	PID Reading (ppm)	Sample ID	Depth (bgs/bml)	Notes	Analytical Suite
CR-14	CR-14	**0.0 to 1.5 feet:** No recovery.	NA	NA	NA	NA	NA
		1.5 to 5.0 feet: Tan sawdust; sulfur odor; wet.	NA	NA	NA	NA	NA
		5.0 to 7.2 feet: No recovery.	NA	NA	NA	NA	NA
		7.2 to 9.3 feet: Tan sawdust; sulfur odor; sheen and hydrocarbon product at bottom; wet.	102 at 8.0 feet bgs	NA	NA	NA	NA
		9.3 to 10.0 feet: Sandy silt; gray; 70% fines, plastic; 30% sand, fine; slight sulfur odor; slightly micaceous.	NA	NA	NA	NA	NA
		10.0 to 12.0 feet: No recovery.	NA	NA	NA	NA	NA
		12.0 to 15.0 feet: Sandy silt; gray; 70% fines, plastic; 30% sand, fine, micaceous.	0.0 at 14.0 feet bgs	CR14-SBSD-12	12	NA	Total Metals TOC PAHs PCBs SVOC Mercury Archive
NA	CR11-14-SBSD-COMP	NA	NA	CR11-14-SBSD-COMP	NA	Composite sample from CR11-14 sampled from within visual impacts.	TCLP Lead and Mercury ***Archive***
CR-15A	CR-15A	**0.0 to 4.5 feet:** No recovery.	NA	NA	NA	NA	NA
		4.5 to 5.0 feet: Sawdust.	NA	CR15A-5	5	NA	***Archive***
		5.0 to 7.0 feet: No recovery.	NA	NA	NA	NA	NA
		7.0 to 9.2 feet: Wood waste. 70% wood waste, primarily woodchips and sawdust; 30% blackish brown sandy silt.	NA	NA	NA	NA	NA
		9.2 to 9.5 feet: Sandy silt lens.	NA	NA	NA	NA	NA
		9.5 to 11.0 feet: Wood waste. 70% wood waste, primarily woodchips and sawdust; 30% blackish brown sandy silt.	NA	CR15A-11	11	NA	***Archive***
CR-15B	CR-15B	**0.0 to 3.5 feet**: No recovery.	NA	NA	NA	NA	NA
		3.5 to 5.0 feet: Wood waste. 70% wood waste, primarily woodchips; 30% brownish black sandy silt.	NA	CR15B-0-10cm CR15b-5	0-0.33 feet bml 5.0 feet bml	Could not drill through wood encountered at 5.0 feet bml. Likely wood boards.	***Archive***

Table 3-3
Sediment Sample Descriptions and Analyses
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Sample Location	Boring / Surface Sample Sublocation	Lithologic Description (bgs/bml)	PID Reading (ppm)	Sample ID	Depth (bgs/bml)	Notes	Analytical Suite
CR-15C	CR-15C	**0.0 to 0.3 feet:** No recovery.	NA	NA	NA	NA	NA
		0.3 to 5.0 feet: Silty sand; blackish gray; 30% fines, fine, medium plasticity; 70% sand, fine.	NA	CR15C-SSD CR15C-SBSD CR15C-5.0	0-0.33 feet bml 0.5-1.0 feet bml 5.0??	Sample from 5.0 is purely an archive sample.	Total Metals TOC PAHs PCBs SVOC Mercury TPH Dioxins/Furans Archive
CR-15D	CR-15D	**0.0 to 7.0 feet:** No recovery.	NA	NA	NA	NA	NA
		7.0 to 8.1 feet: Wood waste; 80% wood waste; 20% gray sandy silt.	NA	NA	NA	NA	NA
		8.1 to 10.0 feet: Sandy silt; grayish brown; 70% fines, medium to high plasticity; 30% sand, fine; some wood waste and other organic material.	NA	NA	NA	NA	NA
CR-16A	CR-16A	**0.0 to 1.5 feet:** No recovery.	NA	NA	NA	NA	NA
		1.5 to 5.0 feet: Sawdust; 80% sawdust with reddish brown wood waste; 20% sandy silt.	NA	CR16A-0-10cm CR16A-5	0-0.33 feet bml 5.0 feet bml	NA	***Archive***
		5.0 to 8.5 feet: No recovery.	NA	NA	NA	NA	NA
		8.5 to 9.5 feet: Sawdust; 80% sawdust with reddish brown wood waste; 20% sandy silt.	NA	NA	NA	NA	NA
		9.5 to 10.0 feet: Sandy silt; dark gray; 50% fines, high plasticity; 35% sand, poorly graded, fine; 15% wood waste and organic debris.	NA	NA	NA	NA	NA
	CR-16A	**10.0 to 12.0 feet:** No recovery.	NA	NA	NA	NA	NA
		12.0 to 15.0 feet: Sandy silt; gray; 70% fines, plastic; 30% sand, fine.	NA	CR16A-14	14.0 feet bml	NA	***Archive***

Table 3-3
Sediment Sample Descriptions and Analyses
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Sample Location	Boring / Surface Sample Sublocation	Lithologic Description (bgs/bml)	PID Reading (ppm)	Sample ID	Depth (bgs/bml)	Notes	Analytical Suite
CR-16B	CR-16B	**0.0 to 4.2 feet:** No recovery.	NA	NA	NA	NA	NA
		4.2 to 5.0 feet: Sawdust; reddish brown; 70% sawdust and some wood debris; 30% sandy silt.	NA	CR16B-0-10cm	0-0.33 feet bml	NA	***Archive***
		5.0 to 6.5 feet: No recovery.	NA	NA	NA	NA	NA
		6.5 to 10.0 feet: Sawdust; reddish brown; 70% sawdust and wood waste; 30% sandy silt; slight sheen.	NA	CR16B-10.0	10	NA	***Archive***
		10.0 to 11.0 feet: No recovery.	NA	NA	NA	NA	NA
		11.0 to 12.0 feet: Sawdust; reddish brown; 70% sawdust and wood waste; 30% sandy silt; slight sheen.	NA	NA	NA	NA	NA
		12.0 to 15.0 feet: Fine sand w/ silt; gray; 20% fines, medium to high plasticity; 80% sand, fine to medium.	NA	CR16B-13.0	13	NA	***Archive***
CR-16C	CR-16C	**0.0 to 4.0 feet:** No recovery.	NA	NA	NA	NA	NA
		4.0 to 5.0 feet: Wood waste; 80% wood waste; 20% gray sandy silt.	NA	NA	NA	NA	NA
		5.0 to 8.5 feet: No recovery.	NA	NA	NA	NA	NA
		8.5 to 9.8 feet: Wood waste; 80% wood waste; 20% gray sandy silt.	NA	NA	NA	NA	NA
		9.8 to 10.0 feet: Fine sand w/ silt; gray; 20% fines, medium plasticity to high plasticity; 80% sand, fine to medium.	NA	NA	NA	NA	NA
		10.0 to 13.0 feet: No recovery.	NA	NA	NA	NA	NA
		13.0 to 15.0 feet: Wood waste; 80% wood waste; 20% gray sandy silt.	NA	NA	NA	Material was likely sloughing; therefore, this segment may not be representative of the subsurface.	NA
		15.0 to 20.0 feet: Little recovery.	NA	NA	NA	Virtually no recovery. Intense sloughing.	NA

Table 3-3
Sediment Sample Descriptions and Analyses
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Sample Location	Boring / Surface Sample Sublocation	Lithologic Description (bgs/bml)	PID Reading (ppm)	Sample ID	Depth (bgs/bml)	Notes	Analytical Suite
CR-17C	CR-17C	**0.0 to 2.5 feet:** No recovery.	NA	NA	NA	NA	NA
		2.5 to 4.5 feet: Sandy silt; grayish brown; 60% fines, 40% sand, very fine. **@ 4.0 to 4.5 feet:** Large chunks of wood chips and bark pieces.	NA	CR17C-0-10cm	0-0.33 feet bml	NA	***Archive***
		4.5 to 5.0 feet: Silty sand; grayish brown; 40% fines, high plasticity; 60% sand, very fine; trace wood waste.	NA	NA	NA	NA	NA
		5.0 to 8.0 feet: No recovery.	NA	NA	NA	NA	NA
		8.0 to 10.0 feet: Silty sand; grayish brown; 40% fines, high plasticity; 60% sand, very fine; trace wood waste.	NA	CR17C-9.5	9.5 feet bml	NA	***Archive***
CR-17D	CR-17D	**0.0 to 2.0 feet:** No recovery.	NA	NA	NA	NA	NA
		2.0 to 5.0 feet: Silty sand; grayish brown; 40% fines, high plasticity; 60% sand, very fine.	NA	CR17D-SSD CR17D-SBSD	0-0.33 feet bml 0.5-1.0 feet bml	Obtained extra sample volume for CR17D-SSD via ponar grab.	Total Metals TOC PAHs PCBs SVOC Mercury TPH Dioxins/Furans Archive
CR-18A	CR-18A	**0.0 to 4.5 feet:** No recovery.	NA	NA	NA	NA	NA
		4.5 to 5.0 feet: 100% wood waste, primarily wood chips and bark.	NA	NA	NA	NA	NA
		5.0 to 7.8 feet: No recovery.	NA	NA	NA	NA	NA
		7.8 to 8.7 feet: Wood waste; 80% wood waste, 20% silty sand.	NA	NA	NA	NA	NA
		8.7 to 9.5 feet: Sandy silt; grayish black; 60% fines, plastic; 40% sand, fine.	NA	CR18A-9.0	9.0 feet bml	NA	***Archive***
		9.5 to 10.0 feet: Wood waste; 80% wood waste, 20% silty sand.	NA	NA	NA	NA	NA
CR-18B	CR-18B	**0.0 to 3.0 feet:** No recovery.	NA	NA	NA	NA	NA
		3.0 to 12.0 feet: Silty sand; blackish brownish gray; 40% fines; 60% sand, very fine.	NA	CR18B-SSD CR18B-SBSD	0-0.33 feet bml 0.5-1.0 feet bml	Unable to collect archive samples because there were no other sample containers.	Total Metals TOC Phenol PAHs PCBs SVOC Mercury TPH Dioxins/Furans

Table 3-3
Sediment Sample Descriptions and Analyses
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Sample Location	Boring / Surface Sample Sublocation	Lithologic Description (bgs/bml)	PID Reading (ppm)	Sample ID	Depth (bgs/bml)	Notes	Analytical Suite
CR-19A	CR-19A	**0.0 to 3.0 feet:** No recovery.	NA	NA	NA	NA	NA
		3.0 to 3.7 feet: Sandy silt w/ wood waste; gray; 40% fines, loose; 30% sand; 30% wood waste.	NA	NA	NA	NA	NA
		3.7 to 4.0 feet: Sandy silt; grayish brown; 60% fines, 40% sand, very fine.	NA	NA	NA	Did not collect archive sample from this location as it did not provide any new information.	NA
		4.0 to 5.0 feet: Sawdust; 80% sawdust; 20% sandy silt.	NA	NA	NA	NA	NA
		5.0 to 8.0 feet: No recovery.	NA	NA	NA	NA	NA
		8.0 to 9.0 feet: Wood waste; 70% wood waste; 30% gray sandy silt.	NA	NA	NA	NA	NA
		9.0 to 10.0 feet: Silty Sand w/ wood waste; 80% gray silty sand, 20% wood waste.	NA	NA	NA	NA	NA
CR-19B	CR-19B	**0.0 to 2.0 feet**: No recovery.	NA	NA	NA	NA	NA
		2.0 to 4.5 feet: Silty sand; grayish brown; 40% fines, high plasticity; 60% sand, very fine, loose from 2.0 to 3.0 feet, then becomes denser; occasional chunks of wood waste.	NA	CR19B-0-10cm	0-0.33 feet bml	NA	***Archive***
		4.5 to 5.0 feet: Sawdust; 80% sawdust; 20% silty sand.	NA	NA	NA	NA	NA
		5.0 to 7.5 feet: No recovery.	NA	NA	NA	NA	NA
		7.5 to 8.7 feet: Sawdust; 80% sawdust; 20% silty sand.	NA	NA	NA	NA	NA
		8.7 to 10.0 feet: Sandy silt; grayish black; 50% fines, plastic; 35% sand, fine; 15% wood waste, primarily large chunks.	NA	CR19B-10	10	NA	***Archive***
CR-19C	CR-19C	**0.0 to 2.4 feet:** No recovery.	NA	NA	NA	NA	NA
		2.4 to 5.0 feet: Silty sand; blackish brown; 40% fines, high plasticity; 60% sand, very fine. **@ 4.0 to 4.1 feet:** Large chunks of woodchips and wood waste. **@ 4.5 to 4.6 feet:** Large chunks of woodchips and wood waste.	NA	NA	NA	It is uncertain whether this woodwaste is associated with former mill activities.	NA

Table 3-3
Sediment Sample Descriptions and Analyses
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Sample Location	Boring / Surface Sample Sublocation	Lithologic Description (bgs/bml)	PID Reading (ppm)	Sample ID	Depth (bgs/bml)	Notes	Analytical Suite
CR-19D	CR-19D	**0.0 to 1.0 feet**: No recovery.	NA	NA	NA	NA	NA
		1.0 to 4.2 feet: Silty sand; blackish gray; 40% fines, high plasticity; 60% sand, very fine, loose from 1.0 to 2.0 feet, then becomes denser.	NA	CR19D-0-10cm CR19D-SSD-CONV	0-0.33 feet bml	Both samples were collected from 0-10cm bml. Additional sample volume was obtained via ponar.	***Archive*** Conventionals
		4.2 to 5.0 feet: Sawdust; tannish brown; 80% sawdust and some wood debris; 20% sandy silt.	NA	NA	NA	NA	NA
		5.0 to 7.5 feet: No recovery.	NA	NA	NA	NA	NA
		7.5 to 8.5 feet: Sawdust; tannish brown; 80% sawdust and some wood debris; 20% sandy silt.	NA	NA	NA	NA	NA
		8.5 to 10.0 feet: Silty sand; grayish black; 40% fines, high plasticity; 60% sand, very fine; trace wood waste.	NA	CR19D-9.0	9.0 feet bml	NA	***Archive***
CR-19E	CR-19E	**0.0 to 3.2 feet:** No recovery.	NA	NA	NA	NA	NA
		3.2 to 5.0 feet: Silty sand w/ wood waste; brownish black; 60% wood waste, 40% silty sand.	NA	NA	NA	NA	NA
		5.0 to 7.7 feet: No recovery.	NA	NA	NA	NA	NA
		7.7 to 8.5 feet: Silty sand w/ wood waste; brownish black; 60% wood waste, 40% silty sand.	NA	NA	NA	NA	NA
		8.5 to 9.5 feet: Wood waste; 80% wood waste, 20% silty sand.	NA	NA	NA	NA	NA
		9.5 to 10.0 feet: Silty sand w/ wood waste; brownish black; 60% wood waste, 40% silty sand.	NA	NA	NA	Did not collect archive sample from this location as it did not provide any new information.	NA
CR-19F	CR-19F	**0.0 to 2.5 feet:** No recovery.	NA	NA	NA	NA	NA
		2.5 to 10.0 feet: Silty sand; grayish brown; 40% fines; 60% sand; loose from approximately 2.5 to 3.5 feet, then becomes denser.	NA	CR19F-SSD CR19F-SBSD CR19F-SBSD-DUP CR19F-5 CR19F-9.0	0-0.33 feet bml 0.5-1.0 feet bml 5.0 feet bml 9.0 feet bml	NA	Total Metals TOC Phenol PAHs PCBs SVOC Mercury TPH Dioxins/Furans Archive

Table 3-3
Sediment Sample Descriptions and Analyses
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Sample Location	Boring / Surface Sample Sublocation	Lithologic Description (bgs/bml)	PID Reading (ppm)	Sample ID	Depth (bgs/bml)	Notes	Analytical Suite
CR-19G	CR-19G	**0.0 to 2.5 feet:** No recovery.	NA	NA	NA	NA	NA
		2.5 to 7.5 feet: Silty sand; grayish brown; 35% fines; 50% sand; 15% wood chips. **@ 4.0 to 7.5 feet:** Wood chips increase to approximately 40%. Individual chips are up to 2 inches long.	NA	CR19G-0-10cm	0-0.33 feet bml	NA	***Archive***
		7.5 to 10.0 feet: Silty sand; grayish brown; 40% fines; 60% sand; dense.	NA	NA	NA	NA	NA
CR-19H	CR-19H	**0.0 to 5.0 feet:** No recovery.	NA	NA	NA	No recovery. Did not log or sample.	NA
CR-19I	CR-19I	**0.0 to 1.0 feet:** No recovery.	NA	NA	NA	NA	NA
		1.0 to 10.0 feet: Silty sand; grayish brown; 40% fines, medium plasticity; 60% sand, very fine to fine; loose to 3.0 feet, then becomes denser.	NA	NA	NA	Did not collect sample because already obtained clean confirmation samples to the east.	NA
CR-19J	CR-19J	**0.0 to 4.0 feet:** No recovery.	NA	NA	NA	NA	NA
		4.0 to 5.0 feet: 60% silty sand, gray; 40% wood waste, primarily large chips.	NA	NA	NA	NA	NA
		5.0 to 8.7 feet: No recovery.	NA	NA	NA	NA	NA
		8.7 to 10.0 feet: Wood waste; 70% wood waste, 30% silty sand, brownish black.	NA	NA	NA	NA	NA
Wharf Area							
CR-25	CR-25	**0.0 to 1.0 feet:** No recovery.	NA	NA	NA	NA	NA
		1.0 to 5.0 feet: Silty sand; blackish gray; 20% fines; 80% sand, very fine to fine.		CR25-0-10cm CR25-5	0-0.33 feet bml 5.0 feet bml	NA	***Archive***
CR-26	CR-26	**0.0 to 1.0 feet:** No recovery.	NA	NA	NA	NA	NA
		1.0 to 5.0 feet: Silty sand; blackish gray; 30% fines, high plasticity; 70% sand, very fine to fine.	NA	CR26-SSD CR26-SBSD	0-0.33 feet bml 0.5 -1.0 feet bml	NA	Total Metals TOC Phenol PAHs PCBs SVOC Mercury Archive

Table 3-3
Sediment Sample Descriptions and Analyses
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Notes:

bgs = below ground surface.

bml = below mudline.

cm = centimeter.

ID = identification.

NA = not applicable.

PAH = polycyclic aromatic hydrocarbon.

PCB = polychlorinated biphenyl.

PID = photoionization detector.

ppm = parts per million.

SVOC = semivolatile organic compound.

TCLP = Toxicity Characteristic Leaching Procedure.

TOC = total organic carbon.

TPH = total petroleum hydrocarbon.

Table 6-1
Background Chehalis River Sediment Concentrations
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Location:	2S	8S	11S	12S	13S	AB7	GRAYS00C9	GRAYS00C10	GRAYS00C11	GRAYS0199-C6	GRAYS0199-C7	GRAYS0199-C8	GRAYS0199-C9
Sample Name:	98148242	98148248	98148252	98148253	98148254	56-S	C9	C10	C11	C6	C7	C8	C9
Sample Replicate:	--	--	--	--	--	--	--	--	--	--	--	--	--
Collection Date:	3/31/1998	3/31/1998	3/31/1998	3/31/1998	3/31/1998	7/7/2008	7/19/2000	7/20/2000	7/20/2000	6/9/2004	6/9/2004	6/9/2004	6/7/2004
Collection Depth (ft bgs):	0.3	0.3	0.3	0.3	0.3	0.8	0.3	0.3	0.3	0.5	0.5	0.5	0.5
Total Metals (mg/kg)													
Mercury	0.074	0.096	0.139	0.06	0.035	0.025	0.05 U	0.07 U	0.06 U	0.03	0.02	0.01 B	0.01 B
PCBs (ug/kg)													
Total PCBs	--	--	--	--	--	5.5 U	36 U	37 U	38 U	9.9 U	20 U	20 U	9.8 U
Dioxin/Furans (pg/g)													
Dioxin TEQ	--	--	--	--	--	0.42	--	--	--	--	--	--	--
cPAHs (ug/kg)													
cPAH TEQ	43 J	62 J	1068	588	3341	7.0 [b] J	19 U	30 J	16 J	9.9 U	7.0 J	8.3 J	16 J

Table 6-1
Background Chehalis River Sediment Concentrations
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Location:	GRAYS0199-C10	GRAYS0199-C11	GRAYS0319-C2	GRAYS0319-C3	GRAYS0319-C14	GRAYS0319-C15	GRAYS0319-C16	GRAYS0319-C17	GRAYS0319-C18	PGHO&M9642	PGHO&M9642
Sample Name:	C10	C11	AB22	AB23	SA24	SA25	SA26	SA27	SA28	C1/1[a]	C1/1[a]
Sample Replicate:	--	--	--	--	--	--	--	--	--	1	2
Collection Date:	6/7/2004	6/7/2004	11/8/2011	11/8/2011	11/9/2011	11/9/2011	11/9/2011	11/9/2011	11/9/2011	2/2/1996	2/2/1996
Collection Depth (ft bgs):	0.5	1.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.5
Total Metals (mg/kg)											
Mercury	0.02	0.01 B	0.03 U	0.03 U	0.03 U	0.02 U	0.06	0.03 U	0.03 U	0.04 U	0.03 U
PCBs (ug/kg)											
Total PCBs	20 U	20 U	9.5 U	9.5 U	9.6 U	9.6 U	9.9 U	9.8 U	9.6 U	53 U	--
Dioxin/Furans (pg/g)											
Dioxin TEQ	--	--	1.6	0.84	1.4	1.4	7.8	1.2	1.3	--	--
cPAHs (ug/kg)											
cPAH TEQ	10 U	9.9 U□	19 U	20 U	19 U	19 U	19 U	19 U	19 U	26 U	--

Table 6-1
Background Chehalis River Sediment Concentrations
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Location:	SA8	SA9	SA9-R	SA9-R	WBCGH0257-C1	WBCGH0257-C1	WEYER92C1	WEYER92C1	WEYER93C1
Sample Name:	64-S	72-S	72-R	72-S	DMMU 1[a]	DMMU 1[a]	C1[a]	C1[a]	C1
Sample Replicate:	--	--	--	--	1	2	1	2	--
Collection Date:	7/7/2008	7/7/2008	1/26/2009	1/26/2009	4/25/2008	4/25/2008	3/2/1992	3/2/1992	1/9/1993
Collection Depth (ft bgs):	0.3	0.3	0.3	0.3	0.3	0.3	1.7	1.7	2.9
Total Metals (mg/kg)									
Mercury	0.008 T	0.046	0.032	0.032	0.08	0.08	0.08	0.1	0.12
PCBs (ug/kg)									
Total PCBs	5.7 U	5.7 U	--	0.64 U	25 U	--	69 U	69 U	26 U
Dioxin/Furans (pg/g)									
Dioxin TEQ	0.35	1.6	--	--	4.2	--	13	10	6.4
cPAHs (ug/kg)									
cPAH TEQ	25	12 J	--	2.9 J	47 J	--	55	74	34 J

Table 6-1
Background Chehalis River Sediment Concentrations
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

NOTES:

-- = not analyzed or not available.

cPAH = carcinogenic PAH.

ft bgs = feet below ground surface.

J = result is estimated.

mg/kg = milligrams per kilogram.

PAH = polycyclic aromatic hydrocarbon.

pg/g = picograms per gram (parts per trillion).

T = calculated result.

TEQ = toxicity equivalence.

ug/kg = micrograms per kilogram.

U = result is non-detect at method reporting limit.

[a]Samples C1 from location WEYER92C1 (upriver location), DMMU 1, and C1/1 have two sets of results identified as lab replicate 1 and lab replicate 2. Results associated with lab replicate 1 are assumed to be for the primary field sample, and results associated with lab replicate 2 are assumed to be for a replicate sample (either a field or laboratory replicate). TEQ is the highest reporting limit value when all carcinogenic contituents are non-detect.

[b]Sample GH08-AB7-49-56-S from location AB cPAH TEQ was calculated with benzo(b)fluoranthene but not benzo(k)fluoranthene or total benzofluoranthenes, because only benzo(b)fluoranthene was available.

Table 7-1
Sample Summary
Seaport Landing Aquatic Lands Lease
Aberdeen, Washington

Sample Location	Sample ID	Sample Type	Collection Depth	Composite Sample ID	Composite Analysis	Analysis	X Coordinate (Easting)	Y Coordinate (Northing)
2011 Sediment Sampling - Dock Area (SAIC)								
DNR-SSDF	DF-comp-g1	Surface Grab	0-10 cm bml	DNR-SSDF-COMP[a]	Composite samples DNR-SSDF-COMP, DNR-SSD-COMP, and DNR-SSDU-COMP analyzed for SMS, TOC, Dioxins/Furans. Composite sample DNR-SSD-SUPCOMP analyzed only for Dioxins/Furans.	*Archive*	816535.4	615382.8
	DF-comp-g2	Surface Grab	0-10 cm bml			*Archive*	816587.3	615399.6
	DF-comp-g3	Surface Grab	0-10 cm bml			*Archive*	816654.7	615426.7
	DF-comp-g4	Surface Grab	0-10 cm bml			*Archive*	816702.7	615452.1
DNR-SSDD	DD-comp-g2	Surface Grab	0-10 cm bml	DNR-SSDD-COMP[a]		*Archive*	816597.4	615384.2
	DD-comp-g1	Surface Grab	0-10 cm bml			*Archive*	816540.4	615365.5
DNR-SSDU	DU-comp-g1	Surface Grab	0-10 cm bml	DNR-SSDU-COMP[a]		*Archive*	816661.1	615412.6
	DU-comp-g2	Surface Grab	0-10 cm bml			*Archive*	816710.1	615432.5
2011 Sediment Sampling - Former Mill Area (SAIC)								
SSFM1/SCFM1	DNR-SSFM1	Surface Grab	0-10 cm bml	DNR-SSFM1-COMP	Composite sample DNR-SSFM1-COMP analyzed only for Dioxins/Furans.	SMS, TOC, Dioxins/Furans	816927.6	615411.7
	DNR-SCFM1A	Sediment Core	0-2.5 ft bml			SMS, TOC, Dioxins/Furans		
	DNR-SCFM1B	Sediment Core	2.5-5 ft bml			*Archive*		
SSFM2/SCFM2	DNR-SSFM2	Surface Grab	0-10 cm bml			SMS, TOC, Dioxins/Furans	816917.7	615341.3
	DNR-SCFM2A	Sediment Core	0-2.7 ft bml			SMS, TOC, Dioxins/Furans		
	DNR-SCFM2B	Sediment Core	2.7-4.6 ft bml			SMS, TOC, Dioxins/Furans		
SSFM3/SCFM3	DNR-SSFM3	Surface Grab	0-10 cm bml			SMS, TOC, Dioxins/Furans	816993.8	615375.3
	DNR-SCFM3A	Sediment Core	0-3.0 ft bml			SMS, TOC, Dioxins/Furans		
	DNR-SCFM3B	Sediment Core	3.0-4.2 ft bml			*Archive*		
2011 Soil Boring - Filled Tidelands (SAIC)								
SB1	DNR-SB1A	Soil Boring	4.25-5 ft bgs	DNR-SB123B-COMP	Composite sample DNR-SB123B-COMP analyzed only for Dioxins/Furans.	SMS, Sb, Se, Pesticides, SVOCs, TPH-Dx/Gx, VOCs	817396.8	615547.2
	DNR-SB1B	Soil Boring	0-4.25 ft bgs			SMS, Sb, Se, Pesticides, SVOCs, TPH-Dx/Gx, VOCs		
SB2	DNR-SB2A	Soil Boring	0-3.75 ft bgs			SMS, Sb, Se, Pesticides, SVOCs, TPH-Dx/Gx, VOCs	817607.5	615592.4
	DNR-SB2B	Soil Boring	3.75-5 ft bgs			SMS, Sb, Se, Pesticides, SVOCs, TPH-Dx/Gx, VOCs		
SB3	DNR-SB3A	Soil Boring	0-3.5 ft bgs			SMS, Sb, Se, Pesticides, SVOCs, TPH-Dx/Gx, VOCs	817746.2	615611.4
	DNR-SB3B	Soil Boring	3.5-4.25 ft bgs			SMS, Sb, Se, Pesticides, SVOCs, TPH-Dx/Gx, VOCs		
	DNR-SB3C	Soil Boring	4.25-5 ft bgs			SMS, Sb, Se, Pesticides, SVOCs, TPH-Dx/Gx, VOCs		
SB4	DNR-SB4A	Soil Boring	0-2.75 ft bgs	DNR-SB456B-COMP	Composite sample DNR-SB456B-COMP analyzed only for Dioxins/Furans.	SMS, Sb, Se, Pesticides, SVOCs, TPH-Dx/Gx, VOCs	818211.3	615863.9
	DNR-SB4B	Soil Boring	2.75-5 ft bgs			SMS, Sb, Se, Pesticides, SVOCs, TPH-Dx/Gx, VOCs		
SB5	DNR-SB5A	Soil Boring	4-5 ft bgs			SMS, Sb, Se, Pesticides, SVOCs, TPH-Dx/Gx, VOCs	818463.1	615892.4
	DNR-SB5B	Soil Boring	0-4 ft bgs			SMS, Sb, Se, Pesticides, SVOCs, TPH-Dx/Gx, VOCs		
SB6	DNR-SB6A	Soil Boring	1.5-3 ft bgs			SMS (with no chlorobenzenes), Sb, Se, Pesticides, SVOCs, TPH-Dx/Gx, VOCs	818653.1	615950.9
	DNR-SB6B	Soil Boring	0-1.5 ft bgs			SMS, Sb, Se, Pesticides, SVOCs, TPH-Dx/Gx, VOCs		
	DNR-SB6C	Soil Boring	3-5 ft bgs			SMS, Sb, Se, Pesticides, SVOCs, TPH-Dx/Gx, VOCs		
1998 Chehalis River								
7S (Weyerhaeuser Sawmill)	98148247	Surface Grab	0-0.33 ft bml			Metals, SVOCs, TOC, Grain Size	816725.3	615520.4
14S (Chip Facility Ditch)	98148255	Surface Grab	0-0.33 ft bml			Metals, SVOCs, TOC, Grain Size	817787.0	615810.5
2013 Chehalis River								
CR-01	CR01-10cm	Surface Grab	0-0.33 ft bml			SMS, Dioxins/Furans, TOC, Pore water conductivity/salinity	817108.7	615592.3
CR-02	CR02-10cm	Surface Grab	0-0.33 ft bml			SMS, Dioxins/Furans, TOC, Pore water conductivity/salinity	817677.5	615747.8
CR-03	CR03-10cm	Surface Grab	0-0.33 ft bml			SMS, Dioxins/Furans, TOC, Pore water conductivity/salinity	818247.9	615977.6

Table 7-1
Sample Summary
Seaport Landing Aquatic Lands Lease
Aberdeen, Washington

Sample Location	Sample ID	Sample Type	Collection Depth	Composite Sample ID	Composite Analysis	Analysis	X Coordinate (Easting)	Y Coordinate (Northing)
Lumber Shed								
CR-07	LS01	Surface Grab	0-0.33 ft bml	CR-07-SSD-COMP	Composite sample analyzed for Hg, As, Cd, Cr, Pb, PCB Aroclors, TPH-Dx, SVOCs, TOC.	*Archive*	816410.3	615268.1
	LS02	Surface Grab	0-0.33 ft bml			*Archive*	816434.0	615275.5
	LS03	Surface Grab	0-0.33 ft bml			*Archive*	816415.9	615251.6
	LS04	Surface Grab	0-0.33 ft bml			*Archive*	816439.6	615259.0
CR-24	LS05	Surface Grab	0-0.33 ft bml	CR-24-SSD-COMP	Composite sample analyzed for SMS, TPH-Dx, TOC.	*Archive*	816430.0	615206.7
	LS06	Surface Grab	0-0.33 ft bml			*Archive*	816455.3	615214.3
	LS07	Surface Grab	0-0.33 ft bml			*Archive*	816441.3	615169.4
	LS08	Surface Grab	0-0.33 ft bml			*Archive*	816465.9	615176.6
Former Boiler								
CR-08A	FB01	Surface Grab	0-0.33 ft bml	CR08A-SSD-COMP	Composite sample analyzed for SMS, Dioxins/Furans, TOC.	*Archive*	816763.5	615451.3
	FB02	Surface Grab	0-0.33 ft bml			*Archive*	816774.1	615431.8
	FB03	Surface Grab	0-0.33 ft bml			*Archive*	816780.9	615409.3
	FB04	Surface Grab	0-0.33 ft bml			*Archive*	816788.2	615462.2
	CR08A-FB04	Soil Boring	18.3-20.0 ft bml	CR08A-SBSD		SMS, Dioxins/Furans, TPH-Dx, TOC		
CR-08B	FB05	Surface Grab	0-0.33 ft bml	CR08B-SSD-COMP	Composite sample analyzed for SMS, Dioxins/Furans, TPH-Dx, TOC.	*Archive*	816743.6	615502.0
	FB06	Surface Grab	0-0.33 ft bml			*Archive*	816761.6	615510.0
	FB07	Surface Grab	0-0.33 ft bml			*Archive*	816752.8	615481.8
	FB08	Surface Grab	0-0.33 ft bml			*Archive*	816770.8	615489.8
	CR08B-FB05	Soil Boring	8.0 ft bml	CR08B-SBSD		SMS, Dioxins/Furans, TPH-Dx		
Beach Area								
CR-09A	BA01-0-10cm	Surface Grab	0-0.33 ft bml	CR09A-SSD-COMP (0-0.33 ft bml samples only)	Composite sample analyzed for SMS, Dioxins/Furans, TOC	*Archive*	817246.5	615567.5
	BA01-10cm-1	Subsurface Grab	0.33-1 ft bml			*Archive*		
	BA01-1-2	Subsurface Grab	1-2 ft bml			*Archive*		
	BA02-0-10cm	Surface Grab	0-0.33 ft bml			*Archive*	817284.9	615574.7
	BA02-10cm-1	Subsurface Grab	0.33-1 ft bml			*Archive*		
	BA02-1-2	Subsurface Grab	1-2 ft bml			*Archive*		
	BA03-0-10cm	Surface Grab	0-0.33 ft bml			*Archive*	817324.9	615582.8
	BA03-10cm-1	Subsurface Grab	0.33-1 ft bml			*Archive*		
	BA03-1-2	Subsurface Grab	1-2 ft bml			*Archive*		
	BA04-0-10cm	Surface Grab	0-0.33 ft bml			*Archive*	817363.2	615590.1
	BA04-10cm-1	Subsurface Grab	0.33-1 ft bml			*Archive*		
	BA04-1-2	Subsurface Grab	1-2 ft bml			*Archive*		
CR-09B	BA05-0-10cm	Surface Grab	0-0.33 ft bml	CR09B-SSD-COMP (0-0.33 ft bml samples only)	Composite sample analyzed for SMS, Dioxins/Furans, TOC	*Archive*	817419.8	615601.7
	BA05-10cm-1	Subsurface Grab	0.33-1 ft bml			*Archive*		
	BA05-1-2	Subsurface Grab	1-2 ft bml			*Archive*		
	BA06-0-10cm	Surface Grab	0-0.33 ft bml			*Archive*	817455.9	615609.0
	BA06-10cm-1	Subsurface Grab	0.33-1 ft bml			*Archive*		
	BA06-1-2	Subsurface Grab	1-2 ft bml			*Archive*		
	BA07-0-10cm	Surface Grab	0-0.33 ft bml			*Archive*	817494.3	615616.3
	BA07-10cm-1	Subsurface Grab	0.33-1 ft bml			*Archive*		
	BA07-1-2	Subsurface Grab	1-2 ft bml			*Archive*		
	BA08-0-10cm	Surface Grab	0-0.33 ft bml			*Archive*	817530.6	615622.1
	BA08-10cm-1	Subsurface Grab	0.33-1 ft bml			*Archive*		
	BA08-1-2	Subsurface Grab	1-2 ft bml			*Archive*		

Table 7-1
Sample Summary
Seaport Landing Aquatic Lands Lease
Aberdeen, Washington

Sample Location	Sample ID	Sample Type	Collection Depth	Composite Sample ID	Composite Analysis	Analysis	X Coordinate (Easting)	Y Coordinate (Northing)
Shannon Slough								
CR-10	SM-01	Surface Grab	0-0.33 ft bml	CR10-SSD-COMP	Composite sample analyzed for SMS, TOC	*Archive*	817850.5	615752.9
	SM-02	Surface Grab	0-0.33 ft bml			*Archive*	817862.7	615733.0
	SM-03	Surface Grab	0-0.33 ft bml			*Archive*	817874.9	615712.5
	SM-04	Surface Grab	0-0.33 ft bml			*Archive*	817887.9	615691.9
Former Mill Area and Chehalis River								
CR-04	CR04-10cm	Sediment Core	0-0.33 ft bml			Hg, PCB Aroclors, Dioxin/Furans, SVOCs, TPH-Dx, Ammonia-N, Sulfide, TOC, TVS, Grain Size	816947.228	615369.500
	CR04-2.5	Sediment Core	1-2.5 ft bml			Hg, PCB Aroclors, Dioxins/Furans, SVOCs, TPH-Dx		
	CR04-2.5-5	Sediment Core	2.5-5 ft bml			Phenol, Ammonia-N, Sulfide, TOC, TVS, Grain Size		
CR-05	CR05-10cm	Sediment Core	0-0.33 ft bml			Hg, PCB Aroclors, Dioxin/Furans, SVOCs, TPH-Dx, Ammonia-N, Sulfide, TOC, TVS, Grain Size	816990.438	615478.297
	CR05-2.5	Sediment Core	0.33-2.5 ft bml			Hg, PCB Aroclors, Dioxin/Furans, SVOCs, TPH-Dx		
CR-06	CR-06-10cm	Sediment Core	0-0.33 ft bml			Hg, Dioxin/Furans, Phenol, Butylbenzylphthalate, PCP, Ammonia-N, Sulfide, TOC, TVS, Grain Size	817048.694	615391.877
	CR06-2.5	Sediment Core	1-2.5 ft bml			SMS, Dioxin/Furans, TPH-Dx, Ammonia-N, Sulfide, TOC, TVS		
CR-11	CR11-SBSD-23	Sediment Core	23.0 ft bml	CR11-14-SBSD-COMP (composited from sediment core samples CR11-SBSD-23, CR12-SBSD-15, CR13-SBSD-11, and CR14-SBSD-12)	Composite sample analyzed for TCLP Hg and Pb	SMS, Dioxins/Furans, TPH-Dx, TOC	816991.9	615315.6
CR-12	CR12-SBSD-15	Sediment Core	15.0 ft bml			SMS, TOC	816912.0	615368.0
CR-13	CR13-SBSD-11	Sediment Core	11.0 ft bml			SMS, TOC	816971.4	615392.6
CR-14	CR14-SBSD-12	Sediment Core	12.0 ft bml			SMS, TOC	816903.9	615401.5
CR-15A	CR15A-5	Sediment Core	5.0 ft bml			*Archive*	816889.4	615491.3
	CR15A-11	Sediment Core	11.0 ft bml			*Archive*		
CR-15B	CR15B-0-10cm	Surface Grab	0-0.33 ft bml			*Archive*	816876.6	615511.6
	CR15b-5	Sediment Core	5.0 ft bml			*Archive*		
CR-15C	CR15C-SSD	Surface Grab	0-0.33 ft bml			SMS, Dioxins/Furans, TPH-Dx, TOC	816844.6	615562.5
	CR15C-SBSD	Sediment Core	0.5-1.0 ft bml			SMS, TOC		
	CR15C-5.0	Sediment Core	5.0 ft bml			*Archive*		
CR-15D	NA	Sediment Core	NA			Visual observation only	816875.2	615544.1
CR-16A	CR16A-0-10cm	Surface Grab	0-0.33 ft bml			*Archive*	816925.0	615448.6
	CR16A-5	Sediment Core	5.0 ft bml			*Archive*		
	CR16A-14	Sediment Core	14.0 ft bml			*Archive*		
CR-16B	CR16B-0-10cm	Surface Grab	0-0.33 ft bml			*Archive*	816906.2	615470.1
	CR16B-10.0	Sediment Core	10.0 ft bml			*Archive*		
	CR16B-13.0	Sediment Core	13.0 ft bml			*Archive*		
CR-16C	NA	Sediment Core	NA			Visual observation only	816894.7	615487.4
CR-17C	CR17C-0-10cm	Surface Grab	0-0.33 ft bml			*Archive*	816953.1	615568.1
	CR17C-9.5	Sediment Core	9.5 ft bml			*Archive*		
CR-17D	CR17D-SSD	Surface Grab	0-0.33 ft bml			SMS, Dioxins/Furans, TPH-Dx, TOC	816931.9	615579.0
	CR17D-SBSD	Sediment Core	0.5-1.0 ft bml			SMS, TOC		
CR-18A	CR18A-9.0	Sediment Core	9.0 ft bml			*Archive*	816840.1	615504.3
CR-18B	CR18B-SSD	Surface Grab	0-0.33 ft bml			SMS, Dioxins/Furans, TPH-Dx, TOC	816818.6	615556.8
	CR18B-SBSD	Sediment Core	0.5-1.0 ft bml			SMS, TOC		
CR-19A	NA	Sediment Core	NA			Visual observation only	817044.9	615580.1
CR-19B	CR19B-0-10cm	Surface Grab	0-0.33 ft bml			*Archive*	817160.8	615606.2
	CR19B-10	Sediment Core	10.0 ft bml			*Archive*		

Table 7-1
Sample Summary
Seaport Landing Aquatic Lands Lease
Aberdeen, Washington

Sample Location	Sample ID	Sample Type	Collection Depth	Composite Sample ID	Composite Analysis	Analysis	X Coordinate (Easting)	Y Coordinate (Northing)
CR-19C	NA	Sediment Core	NA			Visual observation only	817110.6	615622.2
CR-19D	CR19D-0-10cm	Surface Grab	0-0.33 ft bml		Both samples were collected from 0-10cm bml. Additional sample volume was obtained via ponar.	*Archive*	817263.7	615628.3
	CR19D-SSD-CONV	Surface Grab				Ammonia-N, Sulfide, TOC, Fixed Solids, TVS		
	CR19D-9.0	Sediment Core	9.0 ft bml			*Archive*		
CR-19E	NA	Sediment Core	NA			Visual observation only	817191.5	615653.0
CR-19F	CR19F-SSD	Surface Grab	0-0.33 ft bml			SMS, Dioxins/Furans, TPH-Dx, TOC	817438.3	615694.3
	CR19F-SBSD	Sediment Core	0.5-1.0 ft bml			SMS, TOC		
	CR19F-SBSD-DUP	Sediment Core	0.5-1.0 ft bml			SMS, TOC		
	CR19F-5	Sediment Core	5.0 ft bml			*Archive*		
	CR19F-9.0	Sediment Core	9.0 ft bml			*Archive*		
CR-19G	CR19G-0-10cm	Surface Grab	0-0.33 ft bml			*Archive*	817365.8	615647.6
CR-19H	NA	Sediment Core	NA			Visual observation only	817306.1	615651.0
CR-19I	NA	Sediment Core	NA			Visual observation only	817290.7	615683.1
CR-19J	NA	Sediment Core	NA			Visual observation only	817030.8	615599.6
Wharf Area								
CR-25	CR25-0-10cm	Surface Grab	0-0.33 ft bml			*Archive*	816572.5	615481.4
	CR25-5	Sediment Core	5.0 ft bml			*Archive*		
CR-26	CR26-SSD	Surface Grab	0-0.33 ft bml			*Archive*	816624.6	615498.9
	CR26-SBSD	Sediment Core	0.5 -1.0 ft bml			SMS		
2015 - Upland								
CR-20	CR20-S-5.0	Soil Boring	3.3-5.0 ft bgs			Hg, As, Cd, Cr, Pb, Dioxins/Furans, PCB Aroclors, TPH-Dx, SVOCs	816940.8	615297.8
	CR20-GW-5.0	Groundwater Boring	5.0 ft bgs			Hg, As, Cd, Cr, Pb, PCB Aroclors, TPH-Dx, SVOCs		
CR-21	CR21-S-5.0	Soil Boring	3.5-5.0 ft bgs			Hg, As, Cd, Cr, Pb, Dioxins/Furans, PCB Aroclors, TPH-Dx, SVOCs	817042.3	615341.0
	CR21-GW-10.0	Groundwater Boring	10.0 ft bgs			Hg, As, Cd, Cr, Pb, PCB Aroclors, TPH-Dx, SVOCs		
CR-22	CR22-S-3.0	Soil Boring	3.0-4.5 ft bgs			Hg, As, Cd, Cr, Pb, Dioxins/Furans, PCB Aroclors, TPH-Dx, SVOCs	817044.4	615423.7
	CR22-GW-9.0	Groundwater Boring	9.0 ft bgs			Hg, As, Cd, Cr, Pb, PCB Aroclors, TPH-Dx, SVOCs		
CR-23	CR23-S-3.0	Soil Boring	1.5-3.0 ft bgs			Hg, As, Cd, Cr, Pb, Dioxins/Furans, PCB Aroclors, TPH-Dx, SVOCs	817073.4	615401.6
	CR23-GW-6.0	Groundwater Boring	6.0 ft bgs			Hg, As, Cd, Cr, Pb, PCB Aroclors, TPH-Dx, SVOCs		
SEEP-01	SEEP-01	Surface Water	NA			Hg, PCB Aroclors, TPH-Dx, SVOCs	816918.5	615313.4
Storm-01	Storm-01	Stormwater	NA			SMS, Dioxins/Furans, TPH-Dx	816931.4	615330.4
2015 - Upland - Outside DNR Lease Area								
B01	B01-S-4.5	Soil Boring	4.5 ft bgs			Hg, As, Cd, Cr, Pb, HCID, SVOCs, VOCs	817175.8	615194.5
	B01-GW-10.0	Groundwater Boring	10.0 ft bgs			Hg, As, Cd, Cr, Pb, HCID, SVOCs, VOCs		
B02	B02-S-5.0	Soil Boring	5.0 ft bgs			Hg, As, Cd, Cr, Pb, HCID, TPH-Dx, SVOCs, VOCs	817111.2	615305.6
	B02-GW-6	Groundwater Boring	6.0 ft bgs			Hg, As, Cd, Cr, Pb, HCID, TPH-Dx, SVOCs, VOCs		
B03	B03-S-5.0	Soil Boring	5.0 ft bgs			Hg, As, Cd, Cr, Pb, HCID, TPH-Dx, SVOCs, VOCs	817070.2	615137.7
	B03-GW-10	Groundwater Boring	10.0 ft bgs			Hg, As, Cd, Cr, Pb, HCID, TPH-Dx, SVOCs, VOCs		

NOTES:

Composite sample DNR-SSFM1-COMP analyzed only for Dioxins/Furans.

Coordinates are Washington State Plane South, NAD83 feet.

Ammonia-N = ammonia as nitrogen.

As = arsenic.

Cd = cadmium.

cm bml = centimeters below mudline.

Cr = chromium.

DNR = Department of Natural Resources.

ft bgs = feet below ground surface.

ft bml = feet below mudline.

ID = identification.

HCID = hydrocarbon identification.

Hg = mercury.

NA = not applicable.

Pb = lead.

PCB = polychlorinated biphenyls.

PCP = pentachlorophenol.

Sb = antimony.

Se = selenium.

SMS = sediment management standards.

SVOCs = semivolatile organic compounds.

TCLP = Toxicity Characteristic Leaching Procedure.

TOC = total organic carbon.

TPH-Dx = diesel- and lube oil-range total petroleum hydrocarbons.

TPH-Gx = gasoline-range total petroleum hydrocarbons.

TVS = total volatile solids.

VOCs = volatile organic compounds.

[a]DNR-SSDF-COM, DNR-SSDD-COMP, and DNR-SSDU-COMP were further composited as sample DNR-SSD-SUPCOMP.

Table 7-2
Soil Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

		Location:	CR-20	CR-21	CR-22	CR-23	SB1		SB2		SB3		
		Sample Name:	CR20-S-5.0	CR21-S-5.0	CR22-S-3.0	CR23-S-3.0	DNR-SB1B	DNR-SB1A	DNR-SB2A	DNR-SB2B	DNR-SB3A	DNR-SB3B	DNR-SB3C
		Collection Date:	10/12/2015	10/12/2015	10/13/2015	10/13/2015	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011
		Collection Depth (ft bgs):	3.3 - 5.0	3.5 - 5.0	3.0 - 4.5	1.5 - 3.0	0 - 4.25	4.25 - 5	0 - 3.75	3.57 - 5	0 - 3.5	3.5 - 4.25	4.25 - 5
	MTCA A Soil CUL	MTCA B Soil CUL											
Total Metals (mg/kg)													
Antimony	NV	3200	--	--	--	--	3.3 U	5.2 U	3.2 U	4.9 U	5 U	3.5 U	3.2 U
Arsenic	20	0.67	10 U	10 U	10 U	6 U	3.3 U	5.2 U	3.2 U	4.9 U	5 U	3.5 U	3.2 U
Cadmium	2	80	0.6 U	0.5 U	0.6 U	0.2 U	0.55 UL	0.87 UL	0.54 UL	0.82 UL	0.83 UL	0.58 UL	0.53 UL
Chromium	19/2000[a]	240/120000[a]	**71 J**	**32 J**	**37**	**35.5**	**3.5**	**3.8**	**4**	**7.3**	6.6	**19**	**5.3**
Copper	NV	3200	--	--	--	--	**11**	**8.1**	**11**	**12**	14	**26**	**10**
Lead	250	NV	--	--	--	--	**2.6**	**3.3**	**2.8**	**5.9**	5.2	**5.4**	**4.8**
Mercury	2	NV	0.03 U	**0.02**	**0.09**	0.02 U	**0.023**	**0.043**	**0.04**	0.026 U	0.041	**0.021**	**0.046**
Selenium	NV	400	--	--	--	--	5.5 U	8.7 U	5.4 U	8.2 U	8.3 U	5.8 U	5.3 U
Silver	NV	400	--	--	--	--	**1.6**	1.7 U	**1.1**	**1.6**	**1.8**	**2.3**	**1.2**
Zinc	NV	24000	--	--	--	--	**32**	**30**	**25**	**54**	**45**	**43**	**25**
PCBs (ug/kg)													
Aroclor 1016	NV	5600	19 U	17 U	19 U	17 U	11 U	21 U	13 U	17 U	19 U	12 U	14 U
Aroclor 1221	NV	NV	19 U	17 U	19 U	17 U	11 U	21 U	13 U	17 U	19 U	12 U	14 U
Aroclor 1232	NV	NV	19 U	17 U	19 U	17 U	11 U	21 U	13 U	17 U	19 U	12 U	14 U
Aroclor 1242	NV	NV	19 U	17 U	19 U	17 U	11 U	21 U	13 U	17 U	19 U	12 U	14 U
Aroclor 1248	NV	NV	**530**	**34**	19 U	17 U	11 U	21 U	13 U	17 U	19 U	12 U	14 U
Aroclor 1254	NV	500	**710 J**	**73 J**	19 U	17 U	11 U	21 U	13 U	17 U	19 U	12 U	14 U
Aroclor 1260	NV	500	**930**	**56**	19 U	17 U	11 U	21 U	13 U	17 U	19 U	12 U	14 U
Aroclor 1268	NV	NV	19 U	17 U	19 U	17 U	--	--	--	--	--	--	--
Total PCBs	1000	500	**2170 J**	**163 J**	19 U	17 U	11 U	21 U	13 U	17 U	19 U	12 U	14 U
SVOCs (ug/kg)													
1,2,4-Trichlorobenzene	NV	34000	280 U	92 U	38 U	19 U	1.9 UH	8.9 U*	5.5 U*	5.3 U*	6 U*	3.3 U	8.8 U*
1,2-Dichlorobenzene	NV	7200000	280 U	92 U	38 U	19 U	0.96 UH	4.4 U*	2.7 U*	2.6 U*	3 U*	1.6 U	4.4 U*
1,3-Dichlorobenzene	NV	NV	280 U	92 U	38 U	19 U	0.96 UH	4.4 U*	2.7 U*	2.6 U*	3 U*	1.6 U	4.4 U*
1,4-Dichlorobenzene	NV	190000	280 U	92 U	38 U	19 U	0.96 UH	4.4 U*	2.7 U*	2.6 U*	3 U*	1.6 U	4.4 U*
1-Methylnaphthalene	NV	34000	280 U	92 U	38 U	19 U	35 U	64 U	42 U	53 U	56 U	37 U	43 U
2,4,5-Trichlorophenol	NV	8000000	1400 U	460 U	190 U	93 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U
2,4,6-Trichlorophenol	NV	80000	1400 U	460 U	190 U	93 U	170 U	320 U	210 U	270 U	280 U	180 U	220 U
2,4-Dichlorophenol	NV	240000	1400 U	460 U	190 U	93 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U
2,4-Dimethylphenol	NV	1600000	1400 U	460 U	190 U	93 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U
2,4-Dinitrophenol	NV	160000	2800 U	920 U	380 U	190 U	1200 U	2100 U	1400 U	1800 U	1900 U	1200 U	1400 U
2,4-Dinitrotoluene	NV	3200	1400 U	460 U	190 U	93 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U
2,6-Dinitrotoluene	NV	670	1400 U	460 U	190 U	93 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U
2-Chloronaphthalene	NV	6400000	280 U	92 U	38 U	19 U	23 U	43 U	28 U	35 U	37 U	24 U	29 U
2-Chlorophenol	NV	400000	280 U	92 U	38 U	19 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U

Table 7-2
Soil Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

		Location:	CR-20	CR-21	CR-22	CR-23	SB1		SB2		SB3		
		Sample Name:	CR20-S-5.0	CR21-S-5.0	CR22-S-3.0	CR23-S-3.0	DNR-SB1B	DNR-SB1A	DNR-SB2A	DNR-SB2B	DNR-SB3A	DNR-SB3B	DNR-SB3C
		Collection Date:	10/12/2015	10/12/2015	10/13/2015	10/13/2015	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011
		Collection Depth (ft bgs):	3.3 - 5.0	3.5 - 5.0	3.0 - 4.5	1.5 - 3.0	0 - 4.25	4.25 - 5	0 - 3.75	3.57 - 5	0 - 3.5	3.5 - 4.25	4.25 - 5
	MTCA A Soil CUL	MTCA B Soil CUL											
2-Methylnaphthalene	NV	320000	280 U	**46 J**	**26 J**	19 U	23 U	43 U	28 U	35 U	37 U	24 U	**59**
2-Methylphenol	NV	NV	280 U	92 U	38 U	19 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U
2-Nitroaniline	NV	800000	1400 U	460 U	190 U	93 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U
2-Nitrophenol	NV	NV	280 U	92 U	38 U	19 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U
3,3-Dichlorobenzidine	NV	2200	1400 R	460 R	190 R	93 R	230 U	430 U	280 U	350 U	370 U	240 U	290 U
3,4-Methylphenol	NV	80000	--	--	--	--	230 U	430 U	280 U	350 U	370 U	240 U	**680**
3-Nitroaniline	NV	NV	1400 R	460 R	190 R	93 R	120 U	210 U	140 U	180 U	190 U	120 U	140 U
4,6-Dinitro-2-methylphenol	NV	NV	2800 U	920 U	380 U	190 U	1200 U	2100 U	1400 U	1800 U	1900 U	1200 U	1400 U
4-Bromophenylphenyl ether	NV	NV	280 U	92 U	38 U	19 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U
4-Chloro-3-methylphenol	NV	NV	1400 U	460 U	190 U	93 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U
4-Chloroaniline	NV	5000	1400 R	460 R	190 R	93 R	120 U	210 U	140 U	180 U	190 U	120 U	140 U
4-Chlorophenylphenyl ether	NV	NV	280 U	92 U	38 U	19 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U
4-Methylphenol	NV	NV	280 U	**92**	38 U	19 U	--	--	--	--	--	--	--
4-Nitroaniline	NV	NV	1400 U	460 U	190 U	93 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U
4-Nitrophenol	NV	NV	1400 U	460 U	190 U	93 U	1200 U	2100 U	1400 U	1800 U	1900 U	1200 U	1400 U
Acenaphthene	NV	4800000	**140 J**	**420**	38 U	19 U	23 U	43 U	28 U	35 U	37 U	24 U	29 U
Acenaphthylene	NV	NV	280 U	92 U	38 U	19 U	23 U	43 U	28 U	35 U	37 U	24 U	29 U
Anthracene	NV	24000000	280 U	**150**	38 U	19 U	23 U	43 U	28 U	35 U	37 U	24 U	29 U
Benzo(a)anthracene	NV	1400	**140 J**	**210**	**21 J**	19 U	29 U	53 U	**48**	44 U	46 U	31 U	36 U
Benzo(a)pyrene	100	140	**160 J**	**180**	**28 J**	19 U	**46**	64 U	**58**	53 U	56 U	37 U	43 U
Benzo(b)fluoranthene	NV	1370	--	--	--	--	**95**	43 U	**110**	35 U	37 U	24 U	29 U
Benzo(ghi)perylene	NV	NV	280 U	92 U	**32 J**	19 U	**52**	53 U	35 U	44 U	46 U	31 U	36 U
Benzo(k)fluoranthene	NV	13700	--	--	--	--	29 U	53 U	35 U	44 U	46 U	31 U	36 U
Benzoic acid	NV	320000000	2800 U	920 U	380 U	190 U	2900 U	5300 U	3500 U	4400 U	4600 U	3100 U	3600 U
Benzyl alcohol	NV	8000000	280 U	92 U	38 U	19 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U
Bis(2-chloro-1-methylethyl)ether	NV	14000	280 U	92 U	38 U	19 U	170 U	320 U	210 U	270 U	280 U	180 U	220 U
Bis(2-chloroethoxy)methane	NV	NV	280 U	92 U	38 U	19 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U
Bis(2-chloroethyl)ether	NV	910	280 U	92 U	38 U	19 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U
Bis(2-ethylhexyl)phthalate	NV	71000	**570 J**	230 U	**3100**	47 U	1700 U	3200 U	2100 U	2700 U	2800 U	1800 U	2200 U
Butylbenzylphthalate	NV	530000	280 U	92 U	38 U	19 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U
Carbazole	NV	NV	280 UJ	92 UJ	38 UJ	19 UJ	170 U	320 U	210 U	270 U	280 U	180 U	220 U
Chrysene	NV	140000	**470**	**480**	**75**	19 U	**49**	53 U	**170**	44 U	46 U	**49**	36 U
Dibenzo(a,h)anthracene	NV	140	280 U	92 U	38 U	19 U	46 U	86 U	56 U	71 U	74 U	49 U	58 U
Dibenzofuran	NV	80000	280 U	**100**	38 U	19 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U
Diethyl phthalate	NV	64000000	280 U	92 U	38 U	19 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U
Dimethyl phthalate	NV	NV	280 U	92 U	38 U	19 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U

Table 7-2
Soil Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

		Location:	CR-20	CR-21	CR-22	CR-23	SB1		SB2		SB3		
		Sample Name:	CR20-S-5.0	CR21-S-5.0	CR22-S-3.0	CR23-S-3.0	DNR-SB1B	DNR-SB1A	DNR-SB2A	DNR-SB2B	DNR-SB3A	DNR-SB3B	DNR-SB3C
		Collection Date:	10/12/2015	10/12/2015	10/13/2015	10/13/2015	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011
		Collection Depth (ft bgs):	3.3 - 5.0	3.5 - 5.0	3.0 - 4.5	1.5 - 3.0	0 - 4.25	4.25 - 5	0 - 3.75	3.57 - 5	0 - 3.5	3.5 - 4.25	4.25 - 5
	MTCA A Soil CUL	MTCA B Soil CUL											
Di-n-butyl phthalate	NV	8000000	280 U	92 U	38 U	19 U	230 U	430 U	280 U	350 U	370 U	240 U	290 U
Di-n-octyl phthalate	NV	800000	280 U	92 U	38 U	19 U	230 U	430 U	280 U	350 U	370 U	240 U	290 U
Fluoranthene	NV	3200000	**600**	**640**	**28 J**	**11 J**	**35**	43 U	**71**	35 U	37 U	**200**	**42**
Fluorene	NV	3200000	**160 J**	**300**	38 U	19 U	23 U	43 U	28 U	35 U	37 U	24 U	29 U
Hexachlorobenzene	NV	630	280 U	92 U	38 U	19 U	58 U	110 U	69 U	88 U	93 U	61 U	72 U
Hexachlorobutadiene	NV	13000	280 U	92 U	38 U	19 U	0.96 UH	4.4 U*	2.7 U*	2.6 U*	3 U*	1.6 U	4.4 U*
Hexachlorocyclopentadiene	NV	480000	1400 U	460 U	190 U	93 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U
Hexachloroethane	NV	25000	280 U	92 U	38 U	19 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U
Indeno(1,2,3-cd)pyrene	NV	1400	280 U	92 U	38 U	19 U	46 U	86 U	56 U	71 U	74 U	49 U	58 U
Isophorone	NV	1100000	280 U	92 U	38 U	19 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U
Naphthalene	5000	1600000	280 U	**65 J**	**270**	19 U	4.8 UH	22 U*	14 U*	13 U*	15 U*	8.2 U	**63**
Nitrobenzene	NV	160000	280 U	92 U	38 U	19 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U
N-Nitrosodiphenylamine	NV	200000	280 U	92 U	38 U	19 U	58 U	110 U	69 U	88 U	93 U	61 U	72 U
N-Nitrosodipropylamine	NV	140	280 U	92 U	38 U	19 U	120 U	210 U	140 U	180 U	190 U	120 U	140 U
Pentachlorophenol	NV	2500	1400 U	460 U	190 U	93 U	230 U	430 U	280 U	350 U	370 U	240 U	290 U
Phenanthrene	NV	NV	**510**	**920**	**23 J**	**11 J**	23 U	43 U	**62**	35 U	37 U	24 U	**100**
Phenol	NV	24000000	280 UJ	92 UJ	38 UJ	19 UJ	120 U	210 U	140 U	180 U	190 U	120 U	140 U
Pyrene	NV	2400000	**530**	**610**	**30 J**	**11 J**	**38**	43 U	**85**	35 U	37 U	**140**	**81**
Total Benzofluoranthenes	NV	1400[b]	**300 J**	**320**	**62 J**	37 U	--	--	--	--	--	--	--
cPAH TEQ	190[d]	NV	**240 J**	**250**	**41 J**	37 U	**63.5**	**48.3**	**82.9**	**40.0**	**42.1**	**28.2**	**32.5**
Dioxins and Furans (pg/g)													
1,2,3,4,6,7,8-HpCDD	NV	NV	**2650**	**373**	**1260**	**26**	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDF	NV	NV	**653**	**37.9**	**188**	**2.97**	--	--	--	--	--	--	--
1,2,3,4,7,8,9-HpCDF	NV	NV	**32**	**1.48**	12.5 U	0.221 U	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDD	NV	NV	**36.1**	**3.49**	**8.65**	0.193 U	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDF	NV	NV	**17**	**2.11**	**4.09 J**	**0.114 J**	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDD	NV	NV	**184**	**23.6**	**38.2**	**1.54**	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDF	NV	NV	**9.97**	**1.55**	**4.2 J**	0.153 U	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDD	NV	NV	**16.7**	**8.09**	**12.1**	**2.35**	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDF	NV	NV	**8.52**	**1.3**	**1.82 J**	0.155 U	--	--	--	--	--	--	--
1,2,3,7,8-PeCDD	NV	NV	**10.8**	**1.97**	**3.14 J**	**1.31**	--	--	--	--	--	--	--
1,2,3,7,8-PeCDF	NV	NV	4.85 U	**0.859 J**	**1.08 J**	0.0558 U	--	--	--	--	--	--	--
2,3,4,6,7,8-HxCDF	NV	NV	**40**	**1.58**	**7.81**	0.133 U	--	--	--	--	--	--	--
2,3,4,7,8-PeCDF	NV	NV	**5.51**	0.727 U	**0.807 J**	0.0598 U	--	--	--	--	--	--	--
2,3,7,8-TCDD	NV	13	**6.42**	0.467 U	1.41 U	**1.68**	--	--	--	--	--	--	--
2,3,7,8-TCDF	NV	NV	**5.07**	0.657 U	**0.552 J**	0.0538 U	--	--	--	--	--	--	--

Table 7-2
Soil Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

		Location:	CR-20	CR-21	CR-22	CR-23	SB1		SB2		SB3		
		Sample Name:	CR20-S-5.0	CR21-S-5.0	CR22-S-3.0	CR23-S-3.0	DNR-SB1B	DNR-SB1A	DNR-SB2A	DNR-SB2B	DNR-SB3A	DNR-SB3B	DNR-SB3C
		Collection Date:	10/12/2015	10/12/2015	10/13/2015	10/13/2015	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011
		Collection Depth (ft bgs):	3.3 - 5.0	3.5 - 5.0	3.0 - 4.5	1.5 - 3.0	0 - 4.25	4.25 - 5	0 - 3.75	3.57 - 5	0 - 3.5	3.5 - 4.25	4.25 - 5
	MTCA A Soil CUL	MTCA B Soil CUL											
OCDD	NV	NV	**18400**	**2480**	**30800 J**	**298**	--	--	--	--	--	--	--
OCDF	NV	NV	**1490**	**42.8**	**412**	**4.82**	--	--	--	--	--	--	--
Total HpCDDs	NV	NV	**4760**	**708**	**2900**	**52.5**	--	--	--	--	--	--	--
Total HpCDFs	NV	NV	3080 U	**114**	695 U	10.2 U	--	--	--	--	--	--	--
Total HxCDDs	NV	NV	843 U	**117**	**205**	27.3 U	--	--	--	--	--	--	--
Total HxCDFs	NV	NV	1340 U	95.5 U	**243**	5.78 U	--	--	--	--	--	--	--
Total PeCDDs	NV	NV	**140**	14.9 U	**18.2**	**13.3**	--	--	--	--	--	--	--
Total PeCDFs	NV	NV	316 U	36.3 U	48.6 U	**0.846**	--	--	--	--	--	--	--
Total TCDDs	NV	NV	79.6 U	4.89 U	13.6 U	11.4 U	--	--	--	--	--	--	--
Total TCDFs	NV	NV	50.9 U	7.08 U	5.25 U	0.103 U	--	--	--	--	--	--	--
Dioxin TEQ	13	NV	**90.0**	**11.4 J**	**35.8 J**	**3.82 J**	--	--	--	--	--	--	--
TPH (mg/kg)													
Gasoline-rRange Hydrocarbons	30/100	NV	--	--	--	--	4.7 U	11 U	5.6 U	7.1 U	11 U	7.3 U	**8.1**
Diesel-rRange Hydrocarbons	2000	NV	**480**	**620**	**120**	**21**	**61 Y**	**1100 Z**	**83 Y**	**230 Z**	**270 Z**	**67 Z**	**440 Z**
Lube Oil-rRange Hydrocarbons	2000	NV	**2600**	**3600**	**980**	**51**	**540**	**1000 Y**	**940**	**700 Y**	**780 Y**	**190 Y**	**630 Y**
Pesticides (ug/kg)													
Aldrin	NV	59	--	--	--	--	1.1 U	2.1 U	1.3 U	1.7 U	1.9 U	1.2 U	1.4 U
Alpha-BHC	NV	160	--	--	--	--	1.1 U	2.1 U	1.3 U	1.7 U	1.9 U	1.2 U	1.4 U
Beta-BHC	NV	556	--	--	--	--	1.1 U	2.1 U	1.3 U	1.7 U	1.9 U	1.2 U	1.4 U
Delta-BHC	NV	NV	--	--	--	--	1.1 U	2.1 U	1.3 U	1.7 U	1.9 U	1.2 U	1.4 U
Lindane	10	910	--	--	--	--	1.1 U	2.1 U	1.3 U	1.7 U	1.9 U	1.2 U	1.4 U
cis-Chlordane	NV	NV	--	--	--	--	1.1 U	2.1 U	1.3 U	1.7 U	1.9 U	1.2 U	1.4 U
Gamma-Chlordane	NV	NV	--	--	--	--	1.1 U	2.1 U	1.3 U	1.7 U	1.9 U	1.2 U	1.4 U
Chlordane	NV	2900	--	--	--	--	1.1 U	2.1 U	1.3 U	1.7 U	1.9 U	1.2 U	1.4 U
4,4'-DDD	NV	4200	--	--	--	--	2.3 U	4.2 U	2.7 U^	3.5 U^	3.8 U^	2.4 U^	2.8 U^
4,4'-DDE	NV	2900	--	--	--	--	2.3 U^	4.2 U	2.7 U^	3.5 U	3.8 U	2.4 U	2.8 U
4,4'-DDT	3000	2900	--	--	--	--	2.3 U^	4.2 U^	2.7 U^	3.5 U^	3.8 U^	2.4 U^	2.8 U^
Total DDTs	NV	NV	--	--	--	--	2.3 U	4.2 U	2.7 U	3.5 U	3.8 U	2.4 U	2.8 U
Dieldrin	NV	63	--	--	--	--	2.3 U^	4.2 U	2.7 U^	3.5 U	3.8 U	2.4 U	2.8 U
Endosulfan I	NV	480000	--	--	--	--	1.1 U	2.1 U	1.3 U	1.7 U	1.9 U	1.2 U	1.4 U
Endosulfan II	NV	480000	--	--	--	--	2.3 U^	4.2 U	2.7 U^	3.5 U	3.8 U	2.4 U	2.8 U
Endosulfan Sulfate	NV	NV	--	--	--	--	2.3 U	4.2 U	2.7 U	3.5 U	3.8 U	2.4 U	2.8 U
Endrin	NV	24000	--	--	--	--	2.3 U	4.2 U	2.7 U	3.5 U	3.8 U	2.4 U	2.8 U
Endrin Aldehyde	NV	NV	--	--	--	--	2.3 U	4.2 U	2.7 U	3.5 U	3.8 U	2.4 U	2.8 U
Endrin Ketone	NV	NV	--	--	--	--	2.3 U	4.2 U	2.7 U	3.5 U	3.8 U	2.4 U	2.8 U
Heptachlor	NV	220	--	--	--	--	1.1 U	2.1 U	1.3 U	1.7 U	1.9 U	1.2 U	1.4 U

Table 7-2
Soil Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

		Location:	CR-20	CR-21	CR-22	CR-23	SB1		SB2		SB3		
		Sample Name:	CR20-S-5.0	CR21-S-5.0	CR22-S-3.0	CR23-S-3.0	DNR-SB1B	DNR-SB1A	DNR-SB2A	DNR-SB2B	DNR-SB3A	DNR-SB3B	DNR-SB3C
		Collection Date:	10/12/2015	10/12/2015	10/13/2015	10/13/2015	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011
		Collection Depth (ft bgs):	3.3 - 5.0	3.5 - 5.0	3.0 - 4.5	1.5 - 3.0	0 - 4.25	4.25 - 5	0 - 3.75	3.57 - 5	0 - 3.5	3.5 - 4.25	4.25 - 5
	MTCA A Soil CUL	MTCA B Soil CUL											
Heptachlor Epoxide	NV	110	--	--	--	--	1.1 U	2.1 U	1.3 U	1.7 U	1.9 U	1.2 U	1.4 U
Methoxychlor	NV	400000	--	--	--	--	11 U	21 U	13 U	17 U	19 U	12 U	14 U
Toxaphene	NV	910	--	--	--	--	110 U^	210 U^	130 U^	170 U^	190 U^	120 U^	140 U^
VOCs (ug/kg)													
1,1,1,2-Tetrachloroethane	NV	39000	--	--	--	--	0.96 UH	4.4 U*	2.7 U*	2.6 U*	3 U*	1.6 U	4.4 U*
1,1,1-Trichloroethane	2000	160000000	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
1,1,2,2-Tetrachloroethane	NV	5000	--	--	--	--	1.9 UH	8.9 U*	5.5 U*	5.3 U*	6 U*	3.3 U	8.8 U*
1,1,2-Trichloroethane	NV	18000	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
1,1-Dichloroethane	NV	180000	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
1,1-Dichloroethene	NV	4000000	--	--	--	--	4.8 UH	22 U	14 U	13 U	15 U	8.2 U	22 U
1,1-Dichloropropene	NV	NV	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
1,2,3-Trichlorobenzene	NV	NV	--	--	--	--	1.9 UH	8.9 U*	5.5 U*	5.3 U*	6 U*	3.3 U	8.8 U*
1,2,3-Trichloropropane	NV	33	--	--	--	--	0.96 UH	4.4 U*	2.7 U*	2.6 U*	3 U*	1.6 U	4.4 U*
1,2,4-Trimethylbenzene	NV	NV	--	--	--	--	**3.2**	8.9 U*	5.5 U*	5.3 U*	6 U*	3.3 U	8.8 U*
1,2-Dibromo-3-chloropropane	NV	1250	--	--	--	--	1.9 UJH	8.9 U*	5.5 U*	5.3 U*	6 U*	3.3 U	8.8 U*
1,2-Dichloroethane	NV	11000	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
1,2-Dichloropropane	NV	28000	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
1,3,5-Trimethylbenzene	NV	800000	--	--	--	--	4.8 UH	22 U*	14 U*	13 U*	15 U*	8.2 U	22 U*
1,3-Dichloropropane	NV	NV	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
2,2-Dichloropropane	NV	NV	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
2-Chlorotoluene	NV	1600000	--	--	--	--	1.9 UH	8.9 U*	5.5 U*	5.3 U*	6 U*	3.3 U	8.8 U*
4-Chlorotoluene	NV	NV	--	--	--	--	1.9 UH	8.9 U*	5.5 U*	5.3 U*	6 U*	3.3 U	8.8 U*
Benzene	30	18200	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
Bromobenzene	NV	NV	--	--	--	--	1.9 UH	8.9 U*	5.5 U*	5.3 U*	6 U*	3.3 U	8.8 U*
Bromochloromethane	NV	NV	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
Bromoform	NV	130000	--	--	--	--	0.96 UH	4.4 U*	2.7 U*	2.6 U*	3 U*	1.6 U	4.4 U*
Bromomethane	NV	110000	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
Carbon Tetrachloride	NV	14000	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
Chlorobenzene	NV	1600000	--	--	--	--	0.96 UH	4.4 U*	2.7 U*	2.6 U*	3 U*	1.6 U	4.4 U*
Chlorodibromomethane	NV	12000	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
Chloroethane	NV	NV	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
Chloroform	NV	32000	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
Chloromethane	NV	NV	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
cis-1,2-Dichloroethene	NV	160000	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
cis-1,3-Dichloropropene	NV	10000[c]	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
Cumene	NV	800000	--	--	--	--	1.9 UH	8.9 U*	5.5 U*	**8.3 ***	6 U*	3.3 U	8.8 U*

Table 7-2
Soil Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

		Location:	CR-20	CR-21	CR-22	CR-23	SB1		SB2		SB3		
		Sample Name:	CR20-S-5.0	CR21-S-5.0	CR22-S-3.0	CR23-S-3.0	DNR-SB1B	DNR-SB1A	DNR-SB2A	DNR-SB2B	DNR-SB3A	DNR-SB3B	DNR-SB3C
		Collection Date:	10/12/2015	10/12/2015	10/13/2015	10/13/2015	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011
		Collection Depth (ft bgs):	3.3 - 5.0	3.5 - 5.0	3.0 - 4.5	1.5 - 3.0	0 - 4.25	4.25 - 5	0 - 3.75	3.57 - 5	0 - 3.5	3.5 - 4.25	4.25 - 5
	MTCA A Soil CUL	MTCA B Soil CUL											
Dibromomethane	NV	800000	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
Dichlorobromomethane	NV	16000	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
Dichlorodifluoromethane (CFC-12)	NV	16000000	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
Ethylbenzene	6000	8000000	--	--	--	--	0.96 UH	4.4 U*	2.7 U*	2.6 U*	3 U*	1.6 U	4.4 U*
Ethylene Dibromide	5	500	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
Methyl t-butyl ether	100	556000	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
Methylene Chloride	20	500000	--	--	--	--	14 UH	67 U	41 U	40 U	45 U	25 U	66 U
m, p-Xylene	NV	16000000	--	--	--	--	1.9 UH	8.9 U*	5.5 U*	5.3 U*	6 U*	3.3 U	8.8 U*
n-Butylbenzene	NV	4000000	--	--	--	--	1.9 UH	8.9 U*	5.5 U*	5.3 U*	6 U*	3.3 U	8.8 U*
n-Propylbenzene	NV	8000000	--	--	--	--	0.96 UH	4.4 U*	2.7 U*	2.6 U*	3 U*	1.6 U	4.4 U*
o-Xylene	NV	16000000	--	--	--	--	0.96 UH	4.4 U*	2.7 U*	2.6 U*	3 U*	1.6 U	4.4 U*
p-Isopropyltoluene	NV	NV	--	--	--	--	**50**	**25 ***	5.5 U*	**70 ***	6 U*	3.3 U	**23 ***
sec-Butylbenzene	NV	8000000	--	--	--	--	1.9 UH	8.9 U*	5.5 U*	5.3 U*	6 U*	3.3 U	8.8 U*
Styrene	NV	16000000	--	--	--	--	1.9 UH	8.9 U*	5.5 U*	5.3 U*	6 U*	3.3 U	8.8 U*
tert-Butylbenzene	NV	8000000	--	--	--	--	1.9 UH	8.9 U*	5.5 U*	5.3 U*	6 U*	3.3 U	8.8 U*
Tetrachloroethene	50	480000	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
Toluene	7000	6400000	--	--	--	--	1.9 UH	8.9 U	5.5 U	**9.1**	6 U	3.3 U	8.8 U
trans-1,2-Dichloroethene	NV	1600000	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
trans-1,3-Dichloropropene	NV	10000[c]	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
Trichloroethene	30	12000	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
Trichlorofluoromethane (CFC-11)	NV	24000000	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
Vinyl Chloride	NV	240000	--	--	--	--	0.96 UH	4.4 U	2.7 U	2.6 U	3 U	1.6 U	4.4 U
Total Xylenes	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 7-2
Soil Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

		Location:	SB1, SB2, SB3	SB4		SB5		SB6			SB4, SB5, SB6
		Sample Name:	DNR-SB123B-COMP	DNR-SB4A	DNR-SB4B	DNR-SB5B	DNR-SB5A	DNR-SB6B	DNR-SB6A	DNR-SB6C	DNR-SB456B-COMP
		Collection Date:	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011
		Collection Depth (ft bgs):	NA	0 - 2.7	2.75 - 5	0 - 4	4 - 5	0 - 1.5	1.5 - 3	3 - 5	NA
	MTCA A Soil CUL	MTCA B Soil CUL									
Total Metals (mg/kg)											
Antimony	NV	3200	--	12 U	8.2 U	11 U	15 U	8.2 U	5.4 U	14 U	--
Arsenic	20	0.67	--	12 U	8.2 U	11 U	15 U	8.2 U	5.4 U	14 U	--
Cadmium	2	80	--	1.9 U	1.4 U	1.8 U	2.5 U	1.4 UL	0.89 U	2.4 U	--
Chromium	19/2000[a]	240/120000[a]	--	5 U	3.6 U	4.6 U	6.6 U	**11**	**3.5**	6.1 U	--
Copper	NV	3200	--	**12**	**5**	3.5 U	**5.7**	**35**	**8.3**	**5.2**	--
Lead	250	NV	--	5.8 U	4.1 U	5.3 U	7.6 U	**12**	2.7 U	7.1 U	--
Mercury	2	NV	--	0.073 U	0.053 U	0.054 U	0.061 U	0.049 U	**0.041**	0.068 U	--
Selenium	NV	400	--	19 U	14 U	18 U	25 U	14 U	8.9 U	24 U	--
Silver	NV	400	--	3.9 U	2.7 U	3.5 U	5 U	**7.1**	1.8 U	4.7 U	--
Zinc	NV	24000	--	**29**	**9.7**	**10**	**18**	**120**	**30**	**18**	--
PCBs (ug/kg)											
Aroclor 1016	NV	5600	--	45 U	34 U	37 U	55 U	35 U	24 U	50 U	--
Aroclor 1221	NV	NV	--	45 U	34 U	37 U	55 U	35 U	24 U	50 U	--
Aroclor 1232	NV	NV	--	45 U	34 U	37 U	55 U	35 U	24 U	50 U	--
Aroclor 1242	NV	NV	--	45 U	34 U	37 U	55 U	35 U	24 U	50 U	--
Aroclor 1248	NV	NV	--	45 U	34 U	37 U	55 U	35 U	24 U	50 U	--
Aroclor 1254	NV	500	--	45 U	34 U	37 U	55 U	35 U	24 U	50 U	--
Aroclor 1260	NV	500	--	45 U	34 U	37 U	55 U	35 U	24 U	50 U	--
Aroclor 1268	NV	NV	--	--	--	--	--	--	--	--	--
Total PCBs	1000	500	--	45 U	34 U	37 U	55 U	35 U	24 U	50 U	--
SVOCs (ug/kg)											
1,2,4-Trichlorobenzene	NV	34000	--	24 U*	7.8 U*	17 U	26 U*	6.4 U	--	10 U*	--
1,2-Dichlorobenzene	NV	7200000	--	12 U*	3.9 U*	8.3 U	13 U*	3.2 U	--	5.2 U*	--
1,3-Dichlorobenzene	NV	NV	--	12 U*	3.9 U*	8.3 U	13 U*	3.2 U	--	5.2 U*	--
1,4-Dichlorobenzene	NV	190000	--	12 U*	3.9 U*	8.3 U	13 U*	3.2 U	--	5.2 U*	--
1-Methylnaphthalene	NV	34000	--	280 U	210 U	230 U	340 U	100 U	140 U	300 U	--
2,4,5-Trichlorophenol	NV	8000000	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
2,4,6-Trichlorophenol	NV	80000	--	1400 U	1000 U	1100 U	1700 U	520 U	720 U	1500 U	--
2,4-Dichlorophenol	NV	240000	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
2,4-Dimethylphenol	NV	1600000	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
2,4-Dinitrophenol	NV	160000	--	9300 U	6900 U	7500 U	11000 U	3500 U	4800 U	9900 U	--
2,4-Dinitrotoluene	NV	3200	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
2,6-Dinitrotoluene	NV	670	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
2-Chloronaphthalene	NV	6400000	--	190 U	140 U	150 U	220 U	69 U	95 U	200 U	--
2-Chlorophenol	NV	400000	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--

Table 7-2
Soil Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

		Location:	SB1, SB2, SB3	SB4		SB5		SB6			SB4, SB5, SB6
		Sample Name:	DNR-SB123B-COMP	DNR-SB4A	DNR-SB4B	DNR-SB5B	DNR-SB5A	DNR-SB6B	DNR-SB6A	DNR-SB6C	DNR-SB456B-COMP
		Collection Date:	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011
		Collection Depth (ft bgs):	NA	0 - 2.7	2.75 - 5	0 - 4	4 - 5	0 - 1.5	1.5 - 3	3 - 5	NA
	MTCA A Soil CUL	MTCA B Soil CUL									
2-Methylnaphthalene	NV	320000	--	190 U	140 U	150 U	220 U	69 U	95 U	200 U	--
2-Methylphenol	NV	NV	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
2-Nitroaniline	NV	800000	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
2-Nitrophenol	NV	NV	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
3,3-Dichlorobenzidine	NV	2200	--	1900 U	1400 U	1500 U	2200 U	690 U	950 U	2000 U	--
3,4-Methylphenol	NV	80000	--	1900 U	1400 U	1500 U	2200 U	690 U	950 U	2000 U	--
3-Nitroaniline	NV	NV	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
4,6-Dinitro-2-methylphenol	NV	NV	--	9300 U	6900 U	7500 U	11000 U	3500 U	4800 U	9900 U	--
4-Bromophenylphenyl ether	NV	NV	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
4-Chloro-3-methylphenol	NV	NV	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
4-Chloroaniline	NV	5000	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
4-Chlorophenylphenyl ether	NV	NV	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
4-Methylphenol	NV	NV	--	--	--	--	--	--	--	--	--
4-Nitroaniline	NV	NV	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
4-Nitrophenol	NV	NV	--	9300 U	6900 U	7500 U	11000 U	3500 U	4800 U	9900 U	--
Acenaphthene	NV	4800000	--	190 U	140 U	150 U	220 U	69 U	95 U	200 U	--
Acenaphthylene	NV	NV	--	190 U	140 U	150 U	220 U	69 U	95 U	200 U	--
Anthracene	NV	24000000	--	190 U	140 U	150 U	220 U	69 U	95 U	200 U	--
Benzo(a)anthracene	NV	1400	--	230 U	170 U	190 U	280 U	86 U	120 U	250 U	--
Benzo(a)pyrene	100	140	--	280 U	210 U	230 U	340 U	100 U	140 U	300 U	--
Benzo(b)fluoranthene	NV	1370	--	190 U	140 U	150 U	220 U	69 U	95 U	200 U	--
Benzo(ghi)perylene	NV	NV	--	230 U	170 U	190 U	280 U	86 U	120 U	250 U	--
Benzo(k)fluoranthene	NV	13700	--	230 U	170 U	190 U	280 U	86 U	120 U	250 U	--
Benzoic acid	NV	320000000	--	23000 U	17000 U	19000 U	28000 U	8600 U	12000 U	25000 U	--
Benzyl alcohol	NV	8000000	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
Bis(2-chloro-1-methylethyl)ether	NV	14000	--	1400 U	1000 U	1100 U	1700 U	520 U	720 U	1500 U	--
Bis(2-chloroethoxy)methane	NV	NV	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
Bis(2-chloroethyl)ether	NV	910	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
Bis(2-ethylhexyl)phthalate	NV	71000	--	14000 U	10000 U	11000 U	17000 U	5200 U	7200 U	15000 U	--
Butylbenzylphthalate	NV	530000	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
Carbazole	NV	NV	--	1400 U	1000 U	1100 U	1700 U	520 U	720 U	1500 U	--
Chrysene	NV	140000	--	230 U	170 U	190 U	280 U	86 U	120 U	250 U	--
Dibenzo(a,h)anthracene	NV	140	--	370 U	280 U	300 U	450 U	140 U	190 U	400 U	--
Dibenzofuran	NV	80000	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
Diethyl phthalate	NV	64000000	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
Dimethyl phthalate	NV	NV	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--

Table 7-2
Soil Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

		Location:	SB1, SB2, SB3	SB4		SB5		SB6			SB4, SB5, SB6
		Sample Name:	DNR-SB123B-COMP	DNR-SB4A	DNR-SB4B	DNR-SB5B	DNR-SB5A	DNR-SB6B	DNR-SB6A	DNR-SB6C	DNR-SB456B-COMP
		Collection Date:	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011
		Collection Depth (ft bgs):	NA	0 - 2.7	2.75 - 5	0 - 4	4 - 5	0 - 1.5	1.5 - 3	3 - 5	NA
	MTCA A Soil CUL	MTCA B Soil CUL									
Di-n-butyl phthalate	NV	8000000	--	1900 U	1400 U	1500 U	2200 U	690 U	950 U	2000 U	--
Di-n-octyl phthalate	NV	800000	--	1900 U	1400 U	1500 U	2200 U	690 U	950 U	2000 U	--
Fluoranthene	NV	3200000	--	190 U	140 U	150 U	220 U	69 U	**140**	200 U	--
Fluorene	NV	3200000	--	190 U	140 U	150 U	220 U	69 U	95 U	200 U	--
Hexachlorobenzene	NV	630	--	460 U	340 U	380 U	560 U	170 U	240 U	500 U	--
Hexachlorobutadiene	NV	13000	--	12 U*	3.9 U*	8.3 U	13 U*	3.2 U	--	5.2 U*	--
Hexachlorocyclopentadiene	NV	480000	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
Hexachloroethane	NV	25000	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
Indeno(1,2,3-cd)pyrene	NV	1400	--	370 U	280 U	300 U	450 U	140 U	190 U	400 U	--
Isophorone	NV	1100000	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
Naphthalene	5000	1600000	--	59 U*	19 U*	41 U	64 U*	16 U	25 U*	26 U*	--
Nitrobenzene	NV	160000	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
N-Nitrosodiphenylamine	NV	200000	--	460 U	340 U	380 U	560 U	170 U	240 U	500 U	--
N-Nitrosodipropylamine	NV	140	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
Pentachlorophenol	NV	2500	--	1900 U	1400 U	1500 U	2200 U	690 U	950 U	2000 U	--
Phenanthrene	NV	NV	--	190 U	140 U	150 U	220 U	69 U	**170**	200 U	--
Phenol	NV	24000000	--	930 U	690 U	750 U	1100 U	350 U	480 U	990 U	--
Pyrene	NV	2400000	--	190 U	140 U	150 U	220 U	69 U	**120**	200 U	--
Total Benzofluoranthenes	NV	1400[b]	--	--	--	--	--	--	--	--	--
cPAH TEQ	190[d]	NV	--	NC	NC	NC	NC	NC	NC	NC	--
Dioxins and Furans (pg/g)											
1,2,3,4,6,7,8-HpCDD	NV	NV	**600**	--	--	--	--	--	--	--	**55**
1,2,3,4,6,7,8-HpCDF	NV	NV	**32**	--	--	--	--	--	--	--	7.3 U
1,2,3,4,7,8,9-HpCDF	NV	NV	6.7 U	--	--	--	--	--	--	--	0.92 U
1,2,3,4,7,8-HxCDD	NV	NV	**4.4 J**	--	--	--	--	--	--	--	1.6 U
1,2,3,4,7,8-HxCDF	NV	NV	**4.6 J**	--	--	--	--	--	--	--	0.75 U
1,2,3,6,7,8-HxCDD	NV	NV	**19**	--	--	--	--	--	--	--	2.1 U
1,2,3,6,7,8-HxCDF	NV	NV	1.7 U	--	--	--	--	--	--	--	0.57 U
1,2,3,7,8,9-HxCDD	NV	NV	**7.8**	--	--	--	--	--	--	--	1.3 U
1,2,3,7,8,9-HxCDF	NV	NV	1.1 U	--	--	--	--	--	--	--	0.74 U
1,2,3,7,8-PeCDD	NV	NV	2.1 U	--	--	--	--	--	--	--	1 U
1,2,3,7,8-PeCDF	NV	NV	0.89 U	--	--	--	--	--	--	--	0.9 U
2,3,4,6,7,8-HxCDF	NV	NV	1.5 U	--	--	--	--	--	--	--	0.55 U
2,3,4,7,8-PeCDF	NV	NV	1.1 U	--	--	--	--	--	--	--	0.95 U
2,3,7,8-TCDD	NV	13	0.49 U	--	--	--	--	--	--	--	0.94 U
2,3,7,8-TCDF	NV	NV	1.5 U	--	--	--	--	--	--	--	1.9 U

Table 7-2
Soil Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

			Location:	SB1, SB2, SB3	SB4		SB5		SB6			SB4, SB5, SB6
			Sample Name:	DNR-SB123B-COMP	DNR-SB4A	DNR-SB4B	DNR-SB5B	DNR-SB5A	DNR-SB6B	DNR-SB6A	DNR-SB6C	DNR-SB456B-COMP
			Collection Date:	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011
			Collection Depth (ft bgs):	NA	0 - 2.7	2.75 - 5	0 - 4	4 - 5	0 - 1.5	1.5 - 3	3 - 5	NA
	MTCA A Soil CUL	MTCA B Soil CUL										
OCDD	NV	NV		**5900**	--	--	--	--	--	--	--	**570**
OCDF	NV	NV		**74**	--	--	--	--	--	--	--	**23 J**
Total HpCDDs	NV	NV		**1500**	--	--	--	--	--	--	--	**100**
Total HpCDFs	NV	NV		**110**	--	--	--	--	--	--	--	**16**
Total HxCDDs	NV	NV		**120**	--	--	--	--	--	--	--	4.6 U
Total HxCDFs	NV	NV		**73**	--	--	--	--	--	--	--	4.3 U
Total PeCDDs	NV	NV		2.1 U	--	--	--	--	--	--	--	1 U
Total PeCDFs	NV	NV		**7.5**	--	--	--	--	--	--	--	1.5 U
Total TCDDs	NV	NV		0.49 U	--	--	--	--	--	--	--	1.1 U
Total TCDFs	NV	NV		1.5 U	--	--	--	--	--	--	--	1.9 U
Dioxin TEQ	13	NV		**13**	--	--	--	--	--	--	--	**2.4**
TPH (mg/kg)												
Gasoline-rRange Hydrocarbons	30/100	NV		--	31 U	14 U	15 U	31 U	15 U	19 U	20 U	--
Diesel-rRange Hydrocarbons	2000	NV		--	220 U	180 U	180 U	260 U	85 U	**610 Y**	**320 Y**	--
Lube Oil-rRange Hydrocarbons	2000	NV		--	440 U	**1700**	**560**	530 U^	**220**	**2200**	**2300**	--
Pesticides (ug/kg)												
Aldrin	NV	59		--	4.5 U	3.4 U	3.7 U	5.5 U	3.5 U	2.4 U	5 U	--
Alpha-BHC	NV	160		--	4.5 U	3.4 U	3.7 U	5.5 U	3.5 U	2.4 U	5 U	--
Beta-BHC	NV	556		--	4.5 U	3.4 U	3.7 U	5.5 U	3.5 U	2.4 U	5 U	--
Delta-BHC	NV	NV		--	4.5 U	3.4 U	3.7 U	5.5 U	3.5 U	2.4 U	5 U	--
Lindane	10	910		--	4.5 U	3.4 U	3.7 U	5.5 U	3.5 U	2.4 U	5 U	--
cis-Chlordane	NV	NV		--	4.5 U	3.4 U	3.7 U	5.5 U	3.5 U	2.4 U	5 U	--
Gamma-Chlordane	NV	NV		--	4.5 U	3.4 U	3.7 U	5.5 U	3.5 U	2.4 U	5 U	--
Chlordane	NV	2900		--	4.5 U	3.4 U	3.7 U	5.5 U	3.5 U	2.4 U	5 U	--
4,4'-DDD	NV	4200		--	9 U^	6.8 U^	7.4 U^	11 U^	7 U^	4.9 U^	10 U^	--
4,4'-DDE	NV	2900		--	9 U	6.8 U	7.4 U	11 U	7 U	4.9 U	10 U	--
4,4'-DDT	3000	2900		--	9 U^	6.8 U^	7.4 U^	11 U^	7 U^	4.9 U^	10 U^	--
Total DDTs	NV	NV		--	9 U	6.8 U	7.4 U	11 U	7 U	4.9 U	10 U	--
Dieldrin	NV	63		--	9 U	6.8 U	7.4 U	11 U	7 U^	4.9 U	10 U	--
Endosulfan I	NV	480000		--	4.5 U	3.4 U	3.7 U	5.5 U	3.5 U	2.4 U	5 U	--
Endosulfan II	NV	480000		--	9 U	6.8 U	7.4 U	11 U	7 U^	4.9 U	10 U	--
Endosulfan Sulfate	NV	NV		--	9 U	6.8 U	7.4 U	11 U	7 U	4.9 U	10 U	--
Endrin	NV	24000		--	9 U	6.8 U	7.4 U	11 U	7 U	4.9 U	10 U	--
Endrin Aldehyde	NV	NV		--	9 U	6.8 U	7.4 U	11 U	7 U	4.9 U	10 U	--
Endrin Ketone	NV	NV		--	9 U	6.8 U	7.4 U	11 U	7 U	4.9 U	10 U	--
Heptachlor	NV	220		--	4.5 U	3.4 U	3.7 U	5.5 U	3.5 U	2.4 U	5 U	--

Table 7-2
Soil Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

		Location:	SB1, SB2, SB3	SB4		SB5		SB6			SB4, SB5, SB6
		Sample Name:	DNR-SB123B-COMP	DNR-SB4A	DNR-SB4B	DNR-SB5B	DNR-SB5A	DNR-SB6B	DNR-SB6A	DNR-SB6C	DNR-SB456B-COMP
		Collection Date:	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011
		Collection Depth (ft bgs):	NA	0 - 2.7	2.75 - 5	0 - 4	4 - 5	0 - 1.5	1.5 - 3	3 - 5	NA
	MTCA A Soil CUL	MTCA B Soil CUL									
Heptachlor Epoxide	NV	110	--	4.5 U	3.4 U	3.7 U	5.5 U	3.5 U	2.4 U	5 U	--
Methoxychlor	NV	400000	--	45 U	34 U	37 U	55 U	35 U	24 U	50 U	--
Toxaphene	NV	910	--	450 U^	340 U^	370 U	550 U^	350 U^	240 U	500 U	--
VOCs (ug/kg)											
1,1,1,2-Tetrachloroethane	NV	39000	--	12 U*	3.9 U*	8.3 U	13 U*	3.2 U	5 U*	5.2 U*	--
1,1,1-Trichloroethane	2000	160000000	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--
1,1,2,2-Tetrachloroethane	NV	5000	--	24 U*	7.8 U*	17 U	26 U*	6.4 U	10 U*	10 U*	--
1,1,2-Trichloroethane	NV	18000	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--
1,1-Dichloroethane	NV	180000	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--
1,1-Dichloroethene	NV	4000000	--	59 U	19 U	41 U	64 U	16 U	25 U	26 U	--
1,1-Dichloropropene	NV	NV	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--
1,2,3-Trichlorobenzene	NV	NV	--	24 U*	7.8 U*	17 U	26 U*	6.4 U	10 U*	10 U*	--
1,2,3-Trichloropropane	NV	33	--	12 U*	3.9 U*	8.3 U	13 U*	3.2 U	5 U*	5.2 U*	--
1,2,4-Trimethylbenzene	NV	NV	--	24 U*	7.8 U*	17 U	26 U*	6.4 U	10 U*	10 U*	--
1,2-Dibromo-3-chloropropane	NV	1250	--	24 U*	7.8 U*	17 U	26 U*	6.4 U	10 UJ*	10 U*	--
1,2-Dichloroethane	NV	11000	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--
1,2-Dichloropropane	NV	28000	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--
1,3,5-Trimethylbenzene	NV	800000	--	59 U*	19 U*	41 U	64 U*	16 U	25 U*	26 U*	--
1,3-Dichloropropane	NV	NV	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--
2,2-Dichloropropane	NV	NV	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--
2-Chlorotoluene	NV	1600000	--	24 U*	7.8 U*	17 U	26 U*	6.4 U	10 U*	10 U*	--
4-Chlorotoluene	NV	NV	--	24 U*	7.8 U*	17 U	26 U*	6.4 U	10 U*	10 U*	--
Benzene	30	18200	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--
Bromobenzene	NV	NV	--	24 U*	7.8 U*	17 U	26 U*	6.4 U	10 U*	10 U*	--
Bromochloromethane	NV	NV	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--
Bromoform	NV	130000	--	12 U*	3.9 U*	8.3 U	13 U*	3.2 U	5 U*	5.2 U*	--
Bromomethane	NV	110000	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--
Carbon Tetrachloride	NV	14000	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--
Chlorobenzene	NV	1600000	--	12 U*	3.9 U*	8.3 U	13 U*	3.2 U	5 U*	5.2 U*	--
Chlorodibromomethane	NV	12000	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--
Chloroethane	NV	NV	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--
Chloroform	NV	32000	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--
Chloromethane	NV	NV	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--
cis-1,2-Dichloroethene	NV	160000	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--
cis-1,3-Dichloropropene	NV	10000[c]	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--
Cumene	NV	800000	--	24 U*	**9.6 ***	17 U	26 U*	6.4 U	10 U*	**19 ***	--

Table 7-2
Soil Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

			Location:	SB1, SB2, SB3	SB4		SB5		SB6			SB4, SB5, SB6
			Sample Name:	DNR-SB123B-COMP	DNR-SB4A	DNR-SB4B	DNR-SB5B	DNR-SB5A	DNR-SB6B	DNR-SB6A	DNR-SB6C	DNR-SB456B-COMP
			Collection Date:	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011	April-2011
			Collection Depth (ft bgs):	NA	0 - 2.7	2.75 - 5	0 - 4	4 - 5	0 - 1.5	1.5 - 3	3 - 5	NA
	MTCA A Soil CUL	MTCA B Soil CUL										
Dibromomethane	NV	800000	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--	
Dichlorobromomethane	NV	16000	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--	
Dichlorodifluoromethane (CFC-12)	NV	16000000	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--	
Ethylbenzene	6000	8000000	--	12 U*	7.6 *	8.3 U	13 U*	3.2 U	5 U*	**35 ***	--	
Ethylene Dibromide	5	500	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--	
Methyl t-butyl ether	100	556000	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--	
Methylene Chloride	20	500000	--	180 U	58 U	120 U	190 U	48 U	76 U	78 U	--	
m, p-Xylene	NV	16000000	--	24 U*	**14 ***	17 U	26 U*	6.4 U	10 U*	**15 ***	--	
n-Butylbenzene	NV	4000000	--	24 U*	7.8 U*	17 U	26 U*	6.4 U	10 U*	10 U*	--	
n-Propylbenzene	NV	8000000	--	12 U*	3.9 U*	8.3 U	13 U*	3.2 U	5 U*	5.2 U*	--	
o-Xylene	NV	16000000	--	12 U*	**5 ***	8.3 U	13 U*	3.2 U	5 U*	5.2 U*	--	
p-Isopropyltoluene	NV	NV	--	24 U*	**42 ***	17 U	26 U*	6.4 U	79 *	120 *	--	
sec-Butylbenzene	NV	8000000	--	24 U*	7.8 U*	17 U	26 U*	6.4 U	10 U*	10 U*	--	
Styrene	NV	16000000	--	24 U*	7.8 U*	17 U	26 U*	6.4 U	10 U*	10 U*	--	
tert-Butylbenzene	NV	8000000	--	24 U*	7.8 U*	17 U	26 U*	6.4 U	10 U*	10 U*	--	
Tetrachloroethene	50	480000	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--	
Toluene	7000	6400000	--	24 U	**68**	17 U	26 U	6.4 U	**11**	**19**	--	
trans-1,2-Dichloroethene	NV	1600000	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--	
trans-1,3-Dichloropropene	NV	10000[c]	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--	
Trichloroethene	30	12000	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--	
Trichlorofluoromethane (CFC-11)	NV	24000000	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--	
Vinyl Chloride	NV	240000	--	12 U	3.9 U	8.3 U	13 U	3.2 U	5 U	5.2 U	--	
Total Xylenes	--	--	--	-- U	**19**	17 U	26 U	6.4 U	10 U	**15**	--	

Table 7-2
Soil Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

NOTES:

Detections are in **bold** font.

Results that exceed MTCA CULs are shaded except for arsenic and chromium because concentrations of these metals are below natural background conditions. Non-detect results are not evaluated against ~~cleanup levels~~ CULs.

-- = not analyzed.

^ = data qualifier as shown in 2011 SAIC Weyerhaeuser Aquatic Lands Lease Confirmatory Sampling Data Report. Data qualifier definition unavailable.

* = internal standard or LCS/LCSD exceeds control limits.

cPAH = carcinogenic PAHs.

CUL - cleanup level.

ft bgs = feet below ground surface.

J = result is an estimated value.

LCS = laboratory control sample.

LCSD = LCS duplicate.

mg/kg = milligrams per kilogram (parts per million).

MTCA = Model Toxics Control Act

MTCA A = MTCA Method A soil, unrestricted land use.

MTCA B = MTCA Method B soil, lower of available direct contact cancer or non-cancer value.

NC = not calculated due to significantly elevated reporting limits.

NV = no value.

PAH = polycyclic aromatic hydrocarbons.

PAH TEQ = PAH toxicity equivalence, based on benzo(a)pyrene.

PCBs = polychlorinated biphenyls.

pg/g = picograms per gram.

R = result is rejected.

SAIC = Science Applications International Corporation.

SVOCs = semivolatile organic compounds

TEQ = toxicity equivalence quotient.

TPH = total petroleum hydrocarbon.

U = result is non-detect.

ug/kg = micrograms per kilogram.

UH = the result is non-detect and was prepared or analyzed beyond the specified holding time.

UL = data qualifier as shown in 2011 SAIC Weyerhaeuser Aquatic Lands Lease Confirmatory Sampling Data Report. Data qualifier definition unavailable.

VOCs = volatile organic compounds.

Y = the chromatographic response resembles a typical fuel pattern (from a general Test America lab report qualifier definition page).

Z = data qualifier as shown in 2011 SAIC Weyerhaeuser Aquatic Lands Lease Confirmatory Sampling Data Report. Data qualifier definition unavailable.

[a]Value is for hexavalent chromium/trivalent chromium.

[b]Value is for benzo(b)fluoranthene.

[c]Value is for 1,3-dichloropropene.

[d]Value was updated from 100 ug/kg based on personal communication with the Washington Department of Ecology in 2019.

Table 7-3
Groundwater, Seep, and Stormwater Analytical Results and In-Water Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Location:	Surface Water SLV[a]	SLV Source	CR-20	CR-21	CR-22	CR-23	SEEP-01	STORM-01
Sample Name:			CR20-GW-5.0	CR21-GW-10	CR22-GW-9.0	CR23-GW-6.0	Seep-01	Storm-01
Collection Date:			10/12/2015	10/12/2015	10/13/2015	10/13/2015	10/12/2015	1/12/2016
Collection Depth (well screen midpoint, ft bgs):			5.5	7.5	6.5	3.5	0	NA
Dissolved Metals (ug/L)								
Arsenic	150[b]	EPA AQ CCC	50 U	50 U	50 U	50 U	--	0.2 U
Cadmium	0.72[b]	EPA AQ CCC	2 U	2 U	2 U	2 U	--	0.1 U
Chromium	74[b,c]	EPA AQ CCC	5 U	5 U	5 U	5 U	--	**1**
Copper	11[b,d]	EPA AQ BLM[c]	--	--	--	--	--	0.5 U
Lead	3.2[b]	EPA AQ CCC	--	--	--	--	--	0.1 U
Mercury	0.77[b]	EPA AQ CCC	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Silver	26000	MTCA B SW	--	--	--	--	--	0.2 U
Zinc	17000	MTCA B SW	--	--	--	--	--	**37**
Total Metals (ug/L)								
Arsenic	0.018	EPA HH WO	50 U	50 U	50 U	50 U	--	**0.6**
Cadmium	41[e]	MTCA B SW	2 U	2 U	2 U	2 U	--	0.1 U
Chromium	240000[c]	MTCA B SW	5 U	**66**	**13**	**11**	--	**1.2**
Copper	1300	EPA HH WO	--	--	--	--	--	**4.3**
Lead	NV	NV	20 U	20 U	20 U	20 U	--	**2**
Mercury	NV	NV	0.1 U	**0.1**	**0.1**	0.1 U	0.1 U	**0.2**
Silver	3.2	EPA AQ CMC	--	--	--	--	--	0.2 U
Zinc	120	EPA AQ CCC/CMC	--	--	--	--	--	**60**
PCBs (ug/L)								
Aroclor 1016	0.0030	MTCA B SW	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor 1221	NV	NV	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor 1232	NV	NV	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor 1242	NV	NV	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor 1248	NV	NV	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor 1254	0.00010	MTCA B SW	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor 1260	NV	NV	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor 1268	NV	NV	1 U	1 U	1 U	1 U	1 U	1 U
Total PCBs	0.000064	EPA HH WO/O	1 U	1 U	1 U	1 U	1 U	1 U
SVOCs (ug/L)								
1,2,4-Trichlorobenzene	0.071	EPA HH WO	1 U	1 U	1 U	1 U	1 U	1.1 U
1,2-Dichlorobenzene	1000	EPA HH WO	1 U	1 U	1 U	1 U	1 U	1.1 U
1,3-Dichlorobenzene	7	EPA HH WO	1 U	1 U	1 U	1 U	1 U	--
1,4-Dichlorobenzene	300	EPA HH WO	1 U	1 U	1 U	1 U	1 U	1.1 U
1-Methylnaphthalene	NV	NV	1 U	1 U	**1.7**	**2**	1 U	--
2,4,5-Trichlorophenol	300	EPA HH WO	5 U	5 U	5 U	5 U	5 U	--
2,4,6-Trichlorophenol	1.5	EPA HH WO	3 U	3 U	3 U	3 U	3 U	--
2,4-Dichlorophenol	10	EPA HH WO	3 U	3 U	3 U	3 U	3 U	--
2,4-Dimethylphenol	100	EPA HH WO	3 U	3 U	3 U	3 U	3 U	3.3 U

Table 7-3
Groundwater, Seep, and Stormwater Analytical Results and In-Water Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Location:	Surface Water SLV[a]	SLV Source	CR-20	CR-21	CR-22	CR-23	SEEP-01	STORM-01
Sample Name:			CR20-GW-5.0	CR21-GW-10	CR22-GW-9.0	CR23-GW-6.0	Seep-01	Storm-01
Collection Date:			10/12/2015	10/12/2015	10/13/2015	10/13/2015	10/12/2015	1/12/2016
Collection Depth (well screen midpoint, ft bgs):			5.5	7.5	6.5	3.5	0	NA
2,4-Dinitrophenol	10	EPA HH WO	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ	--
2,4-Dinitrotoluene	0.049	EPA HH WO	3 U	3 U	3 U	3 U	3 U	--
2,6-Dinitrotoluene	NV	NV	3 U	3 U	3 U	3 U	3 U	--
2-Chloronaphthalene	800	EPA HH WO	1 U	1 U	1 U	1 U	1 U	--
2-Chlorophenol	30	EPA HH WO	1 U	1 U	1 U	1 U	1 U	--
2-Methylnaphthalene	NV	NV	1 U	1 U	**1.7**	**2**	1 U	1.1 U
2-Methylphenol	NV	NV	1 U	1 U	1 U	1 U	1 U	1.1 U
2-Nitroaniline	NV	NV	3 U	3 U	3 U	3 U	3 U	--
2-Nitrophenol	NV	NV	3 U	3 U	3 U	3 U	3 U	--
3,3-Dichlorobenzidine	0.049	EPA HH WO	5 U	5 U	5 U	5 U	5 U	--
3-Nitroaniline	NV	NV	3 U	3 U	3 U	3 U	3 U	--
4,6-Dinitro-2-methylphenol	2	EPA HH WO	10 U	10 U	10 U	10 U	10 U	--
4-Bromophenylphenyl ether	NV	NV	1 U	1 U	1 U	1 U	1 U	--
4-Chloro-3-methylphenol	500	EPA HH WO	3 U	3 U	3 U	3 U	3 U	--
4-Chloroaniline	NV	NV	5 U	5 U	5 U	5 U	5 U	--
4-Chlorophenylphenyl ether	NV	NV	1 U	1 U	1 U	1 U	1 U	--
4-Methylphenol	NV	NV	2 U	2 U	2 U	**1.4 J**	2 U	2.2 U
4-Nitroaniline	NV	NV	3 U	3 U	3 U	3 U	3 U	--
4-Nitrophenol	NV	NV	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	--
Acenaphthene	70	EPA HH WO	1 U	1 U	**4.1**	**0.8 J**	1 U	1.1 U
Acenaphthylene	NV	NV	1 U	1 U	1 U	1 U	1 U	1.1 U
Anthracene	300	EPA HH WO	1 U	1 U	1 U	1 U	1 U	1.1 U
Benzo(a)anthracene	0.0012	EPA HH WO	1 U	1 U	1 U	1 U	1 U	1.1 U
Benzo(a)pyrene	0.00012	EPA HH WO	1 U	1 U	1 U	1 U	1 U	1.1 U
Benzo(ghi)perylene	NV	NV	1 U	1 U	1 U	1 U	1 U	1.1 U
Benzoic acid	NV	NV	20 UJ	20 UJ	20 UJ	**14 J**	20 UJ	22 U
Benzyl alcohol	NV	NV	2 U	2 U	2 U	2 U	2 U	2.2 U
Bis(2-chloro-1-methylethyl)ether	200	EPA HH WO	1 U	1 U	1 U	1 U	1 U	--
Bis(2-chloroethoxy)methane	NV	NV	1 U	1 U	1 U	1 U	1 U	--
Bis(2-chloroethyl)ether	0.03	EPA HH WO	1 U	1 U	1 U	1 U	1 U	--
Bis(2-ethylhexyl)phthalate	0.32	EPA HH WO	3 U	3 U	3 U	3 U	3 U	3.3 U
Butylbenzylphthalate	0.10	EPA HH WO	1 U	1 U	1 U	1 U	1 U	1.1 U
Carbazole	NV	NV	1 U	1 U	**0.7 J**	1 U	1 U	--
Chrysene	0.12	EPA HH WO	1 U	1 U	1 U	1 U	1 U	1.1 U
Dibenzo(a,h)anthracene	0.00012	EPA HH WO	1 U	1 U	1 U	1 U	1 U	1.1 U
Dibenzofuran	NV	NV	1 U	1 U	**1.4**	1 U	1 U	1.1 U
Diethyl phthalate	600	EPA HH WO/O	1 U	1 U	1 U	1 U	1 U	1.1 U
Dimethyl phthalate	2000	EPA HH WO/O	1 U	1 U	1 U	1 U	1 U	1.1 U
Di-n-butyl phthalate	20	EPA HH WO	1 U	1 U	1 U	1 U	1 U	1.1 U

Table 7-3
Groundwater, Seep, and Stormwater Analytical Results and In-Water Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Location:	Surface Water SLV[a]	SLV Source	CR-20	CR-21	CR-22	CR-23	SEEP-01	STORM-01
Sample Name:			CR20-GW-5.0	CR21-GW-10	CR22-GW-9.0	CR23-GW-6.0	Seep-01	Storm-01
Collection Date:			10/12/2015	10/12/2015	10/13/2015	10/13/2015	10/12/2015	1/12/2016
Collection Depth (well screen midpoint, ft bgs):			5.5	7.5	6.5	3.5	0	NA
Di-n-octyl phthalate	NV	NV	1 U	1 U	1 U	1 U	1 U	1.1 U
Fluoranthene	20	EPA HH WO/O	1 U	1 U	**0.7 J**	1 U	1 U	1.1 U
Fluorene	50	EPA HH WO	1 U	1 U	**2**	1 U	1 U	1.1 U
Hexachlorobenzene	0.000079	EPA HH WO/O	1 U	1 U	1 U	1 U	1 U	1.1 U
Hexachlorobutadiene	0.01	EPA HH WO/O	3 U	3 U	3 U	3 U	3 U	3.3 U
Hexachlorocyclopentadiene	4	EPA HH WO/O	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	--
Hexachloroethane	0.1	EPA HH WO/O	2 U	2 U	2 U	2 U	2 U	--
Indeno(1,2,3-cd)pyrene	0.0012	EPA HH WO	1 U	1 U	1 U	1 U	1 U	1.1 U
Isophorone	34	EPA HH WO	1 U	1 U	1 U	1 U	1 U	--
Naphthalene	4700	MTCA B SW	1 U	1 U	**13**	**5.5**	1 U	1.1 U
Nitrobenzene	10	EPA HH WO	1 U	1 U	1 U	1 U	1 U	--
N-Nitrosodiphenylamine	3.3	EPA HH WO	1 U	1 U	1 U	1 U	1 U	1.1 U
N-Nitrosodipropylamine	0.005	EPA HH WO	1 U	1 U	1 U	1 U	1 U	--
Pentachlorophenol	0.03	EPA HH WO	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	11 U
Phenanthrene	NV	NV	1 U	1 U	**1.7**	**0.6 J**	1 U	1.1 U
Phenol	4000	EPA HH WO	1 U	1 U	1 U	1 U	1 U	1.1 U
Pyrene	20	EPA HH WO	1 U	1 U	**0.5 J**	1 U	1 U	1.1 U
Total Benzofluoranthenes	0.0012[e]	EPA HH WO	2 U	2 U	2 U	2 U	2 U	2.2 U
TPH (ug/L)								
Diesel-range Hydrocarbons	500	MTCA A GW	**1000**	**720**	**450**	**3400 J**	**220**	100 U
Lube Oil-range Hydrocarbons	500	MTCA A GW	**1600**	**3100**	**960**	**3200 J**	**330**	200 U
Dioxins/Furans (pg/L)								
Dioxin/Furan TEQ	0.005[f]	EPA HH WO	--	--	--	--	--	**7.25 J**

Table 7-3
Groundwater, Seep, and Stormwater Analytical Results and In-Water Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

NOTES:
Detections are in **bold** font.
Results that exceed screening levels are shaded. Non-detect results are not evaluated against screening levels.
BLM = biotic ligand model.
CUL = cleanup level.
EPA AQ BLM = USEPA national recommended water quality criteria for freshwater aquatic life, biotic ligand model.
EPA AQ CCC = USEPA national recommended water quality criteria for freshwater aquatic life, criterion continuous concentration.
EPA AQ CCC/CMC = USEPA national recommended water quality criteria for freshwater aquatic life. The criterion continuous concentration and criterion maximum concentrations are equivalent.
EPA AQ CMC = USEPA national recommended water quality criteria for freshwater aquatic life, criterion maximum concentration.
EPA HH WO = USEPA national recommended water quality criteria for human health, consumption of water and organism.
EPA HH WO/O = USEPA national recommended water quality criteria for human health. The consumption of water and organism and consumption of water criteria are equivalent.
ft bgs = feet below ground surface.
J = result is an estimated value.
MTCA = Model Toxics Control Act.
MTCA A GW = MTCA Method A CUL for groundwater.
MTCA B SW = MTCA Method B, lower of available cancer or non-cancer CUL for surface water.
NA = not applicable.
NV = no value.
PCB = polychlorinated biphenyl.
pg/L = picogram per liter.
SLV = screening level value.
SVOC = semivolatile organic compound.
TEQ = toxicity equivalence quotient.
Total PCBs = sum of PCB Aroclors. The highest non-detect value is used when all constituents are non-detect.
TPH = total petroleum hydrocarbon.
U = result is non-detect at method reporting limit.
ug/L = micrograms per liter.
UJ = result is non-detect at or above method reporting limit. Reported value is estimated.
USEPA = U.S. Environmental Protection Agency.

[a]SLV is lower of available USEPA national recommended water quality criteria for freshwater aquatic life or human health. MTCA B SW CUL is provided when USEPA criteria are not available. MTCA A GW CUL provided for TPH.

[b]Freshwater criterion is expressed in terms of the dissolved metal in the water column.

[c]Value is for trivalent chromium.

[d]Freshwater chronic ambient water quality criteria generated using the BLM. Water quality parameters used as inputs to the BLM were measured by the Washington Department of Ecology in Longfellow Creek in 2012 and are reported here: https://fortress.wa.gov/ecy/publications/documents/1303041.pdf.

[e]Value is for MTCA B nonpotable surface water.

[e]Value is for benzo(b)fluoranthene, as a value for total benzofluoranthenes is not available.

[f]Value is for 2,3,7,8-TCDD.

Table 7-4
Sediment Analytical Results
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	Lumber Shed		Former Boiler				Beach Area		Shannon Slough
Location:	CR-07	CR-24	CR-08A		CR-08B		CR-09A	CR-09B	CR-10
Sample Name:	CR-07-SSD-COMP	CR-24-SSD-COMP	CR08a-SSD-COMP	CR08A-SBSD	CR08b-SSD-COMP	CR08b-SBSD	CR09a-SSD-COMP	CR09b-SSD-COMP	CR10-SSD-COMP
Collection Date:	10/13/2015	10/13/2015	10/14/2015	10/15/2015	10/14/2015	10/15/2015	10/13/2015	10/13/2015	10/14/2015
Collection Depth (ft bml):	0-0.33	0-0.33	0-0.33	18.3-20.0	0-0.33	8.0	0-0.33	0-0.33	0-0.33
Dioxins/Furans (pg/g)									
1,2,3,4,6,7,8-HpCDD	--	--	**583**	**14.5**	**955**	12.5	**95.4**	**107**	--
1,2,3,4,6,7,8-HpCDF	--	--	**33.1**	**1.26**	**75.8**	0.295 U	**14.6**	**23.9**	--
1,2,3,4,7,8,9-HpCDF	--	--	2.1 U	0.25 U	**3.72**	0.0959 J	**0.908 J**	**1.15**	--
1,2,3,4,7,8-HxCDD	--	--	**2.33**	0.583 U	**2.96**	0.589 J	**1.32**	**1.57**	--
1,2,3,4,7,8-HxCDF	--	--	**1.42**	**0.217 J**	**4.39**	0.111 J	0.991 U	1.16 U	--
1,2,3,6,7,8-HxCDD	--	--	**10.7**	**1.3**	**22.3**	1.71	**5.25**	**6.27**	--
1,2,3,6,7,8-HxCDF	--	--	**0.798 J**	**0.178 J**	**2.13**	0.14 J	**0.626 J**	**0.924 J**	--
1,2,3,7,8,9-HxCDD	--	--	**8.01**	**5.31**	**13.9**	7.04	**5.49**	**7.96**	--
1,2,3,7,8,9-HxCDF	--	--	0.0933 U	0.258 U	**1.62**	0.146 U	**0.395 J**	**0.42 J**	--
1,2,3,7,8-PeCDD	--	--	**2.87**	**1.76**	**4.81**	2.68	**1.99**	**3.16**	--
1,2,3,7,8-PeCDF	--	--	0.483 U	**0.141 J**	**0.978 J**	0.288 U	0.383 U	**0.394 J**	--
2,3,4,6,7,8-HxCDF	--	--	**1.46**	**0.188 J**	**3.84**	0.105 J	**0.991**	**1.36**	--
2,3,4,7,8-PeCDF	--	--	**0.506 J**	**0.0704 J**	**1.06**	0.201 J	0.379 U	0.528 U	--
2,3,7,8-TCDD	--	--	**1.71**	**1.55**	**2.79**	2.06	**1.18**	2.06 U	--
2,3,7,8-TCDF	--	--	**1.06**	**0.088 J**	**2.48**	0.529 J	**0.831 J**	**1.63**	--
OCDD	--	--	**13700 J**	**130**	**22200 J**	45.4 U	**700**	**788**	--
OCDF	--	--	**73.9**	**6.41**	**128**	0.802 U	**23.8**	**33.8**	--
Total HpCDDs	--	--	**1650**	**32.3**	**4120**	26.3	**225**	**273**	--
Total HpCDFs	--	--	126 U	3.43 U	243 U	0.643 U	**37.3**	58.9 U	--
Total HxCDDs	--	--	147 U	33.2 U	**321**	45.4 U	48.3 U	72.3 U	--
Total HxCDFs	--	--	44 U	1.27 U	119 U	0.888 U	22.2 U	30.8 U	--
Total PeCDDs	--	--	25.9 U	12.7 U	**38.2**	21.9 U	12.4 U	21 U	--
Total PeCDFs	--	--	12.8 U	0.428 U	35.9 U	2.08 U	10.6 U	16.5 U	--
Total TCDDs	--	--	23.9 U	12 U	25 U	21.4 U	8.55 U	15.4 U	--
Total TCDFs	--	--	10.9 U	0.656 U	21.7 U	10.7 U	6.42 U	12.5 U	--
Dioxin TEQ	--	--	**17.6**	**4.31**	**30.4**	**5.97**	**6.10**	**7.92**	--
Total Metals (mg/kg)									
Arsenic	20 U	20 U	**30**	**20**	**20**	20	9 U	9 U	**30**
Cadmium	0.8 U	0.9 U	0.4 U	0.7 U	0.4 U	0.7 U	0.4 U	**0.4**	0.4 U
Chromium	**43**	**49**	**52**	**39**	**42**	40	**31**	**39.9**	**42**
Copper	--	**81.5**	**134**	**57.8**	**61.1**	55.3	**40.8**	**49.2**	**54.8**
Lead	**11**	**21**	**30**	**8**	**14**	10	**8**	**10**	**11**
Mercury	**0.04**	**0.16**	**0.06**	0.03 U	**0.06**	0.07	**0.04**	**0.06**	**0.07**
Silver	--	1 U	0.6 U	1 U	0.7 U	1 U	0.5 U	0.5 U	0.6 U
Zinc	--	**107**	**134**	**71**	**90**	75	**68**	**80**	**83**

Table 7-4
Sediment Analytical Results
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	Lumber Shed		Former Boiler				Beach Area		Shannon Slough
Location:	CR-07	CR-24	CR-08A		CR-08B		CR-09A	CR-09B	CR-10
Sample Name:	CR-07-SSD-COMP	CR-24-SSD-COMP	CR08a-SSD-COMP	CR08A-SBSD	CR08b-SSD-COMP	CR08b-SBSD	CR09a-SSD-COMP	CR09b-SSD-COMP	CR10-SSD-COMP
Collection Date:	10/13/2015	10/13/2015	10/14/2015	10/15/2015	10/14/2015	10/15/2015	10/13/2015	10/13/2015	10/14/2015
Collection Depth (ft bml):	0-0.33	0-0.33	0-0.33	18.3-20.0	0-0.33	8.0	0-0.33	0-0.33	0-0.33
TCLP Metals (mg/L)									
Lead	--	--	--	--	--	--	--	--	--
Mercury	--	--	--	--	--	--	--	--	--
PCBs (ug/kg)									
Aroclor 1016	19 U	19 U	19 U	18 U	18 U	18 U	18 U	19 U	19 U
Aroclor 1221	19 U	19 U	19 U	18 U	18 U	18 U	18 U	19 U	19 U
Aroclor 1232	19 U	19 U	19 U	18 U	18 U	18 U	18 U	19 U	19 U
Aroclor 1242	19 U	19 U	19 U	18 U	18 U	18 U	18 U	19 U	19 U
Aroclor 1248	19 U	19 U	19 U	18 U	18 U	18 U	18 U	19 U	19 U
Aroclor 1254	19 U	**30**	19 U	18 U	18 U	18 U	18 U	19 U	19 U
Aroclor 1260	19 U	**24**	19 U	18 U	**14 J**	18 U	18 U	19 U	19 U
Aroclor 1268	19 U	19 U	19 U	18 U	18 U	18 U	18 U	19 U	19 U
Total PCBs[a]	19 U	**54**	19 U	18 U	**14 J**	18 U	18 U	19 U	19 U
SVOCs (ug/kg)									
1,2,4-Trichlorobenzene	19 U	4.8 U	4.8 U	5 U	4.8 U	4.9 U	4.7 U	4.8 U	**3 J**
1,2-Dichlorobenzene	19 U	4.8 U	4.8 U	5 U	4.8 U	1.8 J	4.7 U	4.8 U	**3.3 J**
1,3-Dichlorobenzene	19 U	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	19 U	4.8 U	**2.4 J**	5 U	4.8 U	4.9 U	**4.2 J**	4.8 U	**3.7 J**
2,4-Dimethylphenol	97 U	24 U	24 U	25 U	24 U	**17 J**	24 U	24 U	25 U
2-Methylphenol	19 U	**8.4**	4.8 U	5 U	4.8 U	4.9 U	**4 J**	**7.3**	**7.7**
3,4-Methylphenol	--	--	--	--	--	--	--	--	--
4-Methylphenol	**26**	**120**	**28 J**	**190 J**	**210**	**560 J**	**26**	19 U	**160 J**
Benzoic acid	**170 J**	**680**	**180 J**	**110 J**	**330 J**	**290 J**	**230**	**380**	**210 J**
Benzyl alcohol	19 U	19 U	**27**	**17 J**	19 U	**50**	19 U	**58**	**22**
Bis(2-ethylhexyl)phthalate	**58**	**66**	48 U	50 U	48 U	49 U	**43 J**	**39 J**	50 U
Butylbenzylphthalate	19 U	4.8 U	4.8 U	5 U	**320**	4.9 U	**5.1**	4.8 U	5 U
Dibenzofuran	**45**	**47**	**25**	**14 J**	**53**	**65**	19 U	19 U	**28**
Diethylphthalate	19 U	19 U	**19**	20 U	36 U	**25**	19 U	19 U	20 U
Dimethyl phthalate	19 U	4.8 U	4.8 U	5 U	4.8 U	4.9 U	4.7 U	4.8 U	5 U
Di-n-butyl phthalate	19 U	**130**	19 U	20 U	19 U	20 U	19 U	19 U	20 U
Di-n-octyl phthalate	19 U	19 U	**710**	20 U	19 U	20 U	19 U	19 U	20 U
Hexachlorobenzene	19 U	4.8 U	4.8 U	5 U	4.8 U	4.9 U	4.7 U	4.8 U	**3.3 J**
Hexachlorobutadiene	19 U	4.8 U	4.8 U	5 U	4.8 U	4.9 U	4.7 U	4.8 U	**2.8 J**
N-Nitrosodiphenylamine	19 U	4.8 U	4.8 U	5 U	4.8 U	4.9 U	4.7 U	4.8 U	5 U
Pentachlorophenol	97 U	**86 J**	**14 J**	20 U	**11 J**	20 U	19 UJ	19 UJ	**23**
Phenol	**18 J**	**100**	**35**	**22**	**71**	**53**	**130**	**200**	**51**

Table 7-4
Sediment Analytical Results
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	Lumber Shed		Former Boiler				Beach Area		Shannon Slough
Location:	CR-07	CR-24	CR-08A		CR-08B		CR-09A	CR-09B	CR-10
Sample Name:	CR-07-SSD-COMP	CR-24-SSD-COMP	CR08a-SSD-COMP	CR08A-SBSD	CR08b-SSD-COMP	CR08b-SBSD	CR09a-SSD-COMP	CR09b-SSD-COMP	CR10-SSD-COMP
Collection Date:	10/13/2015	10/13/2015	10/14/2015	10/15/2015	10/14/2015	10/15/2015	10/13/2015	10/13/2015	10/14/2015
Collection Depth (ft bml):	0-0.33	0-0.33	0-0.33	18.3-20.0	0-0.33	8.0	0-0.33	0-0.33	0-0.33
PAHs (ug/kg)									
1-Methylnaphthalene	**18 J**	**16 J**	**16 J**	**13 J**	**29**	**50**	**9.5 J**	19 U	**15 J**
2-Methylnaphthalene	**40**	19 U	**23**	20 U	19 U	**79**	19 U	19 U	**26**
Acenaphthene	**35**	**25**	**16 J**	**18 J**	**51**	**75**	19 U	19 U	**24**
Acenaphthylene	**16 J**	**19**	**14 J**	**56**	**51**	**300**	19 U	19 U	**59**
Anthracene	**57**	**65**	**27**	**15 J**	**71**	**72**	19 U	**11 J**	**26**
Benzo(a)anthracene	**130**	**120**	**43**	20 U	**94**	**46**	19 U	**14 J**	**46**
Benzo(a)pyrene	**67**	**84**	**37**	20 U	**67**	**44**	19 U	**12 J**	**32**
Benzo(ghi)perylene	**57**	**56**	**28**	20 U	**54**	**44**	19 U	**14 J**	**29**
Chrysene	**180**	**160**	**74**	20 U	**130**	**73**	**10 J**	**24**	**56**
Dibenzo(a,h)anthracene	**18 J**	**19**	**9.5**	5 U	**12**	**6.4**	4.7 U	**3.9 J**	**8.5**
Fluoranthene	**450**	**380**	**110**	**44**	**280**	**290**	**22**	**52**	**180**
Fluorene	**48**	**29**	19 U	**15 J**	**52**	**66**	19 U	**14 J**	**29**
Indeno(1,2,3-cd)pyrene	**43**	**54**	**26**	20 U	**46**	**28**	19 U	**13 J**	**19 J**
Naphthalene	**88**	**120**	**110**	**180**	**170**	**800**	**45**	19 U	**200**
Phenanthrene	**190**	**160**	**92**	**60**	**220**	**430**	**26**	**52**	**110**
Pyrene	**360**	**300**	**84**	**41**	**250**	**300**	**17 J**	**40**	**150**
Total Benzofluoranthenes	**230**	**230**	**100**	40 U	**220**	**92**	**12 J**	**34 J**	**110**
Total HPAHs	**1535 J**	**1403**	**512**	**85**	**1153**	**923**	**61 J**	**207 J**	**631 J**
Total LPAHs	**434 J**	**418**	**259 J**	**344 J**	**615**	**1743**	**71**	**96 J**	**448**
cPAH TEQ	**111 J**	**128**	**56**	ND	**106**	**62**	**13 J**	**19 J**	**51 J**
Petroleum Hydrocarbons (mg/kg)									
Gasoline	--	--	--	--	--	--	--	--	--
Diesel	**180**	**370**	--	**26**	**130**	**170**	--	--	--
Motor-Oil Range	**520**	**850**	--	**74**	**320**	**280**	--	--	--
Conventionals									
Ammonia (as N) (mg N/kg)	--	--	--	--	--	--	--	--	--
Sulfide (mg/kg)	--	--	--	--	--	--	--	--	--
Total Organic Carbon (%)	**1.09**	**1.56**	**1.92**	**1.29**	**2.05**	**3.08**	**4.39**	**2.99**	**2.94**
Total Volatile Solids (%)	--	--	--	--	--	--	--	--	--
Fixed Solids (%)	--	--	--	--	--	--	--	--	--
Total Solids (%)	**67.22**	**54.35**	**47.46**	**63.97**	**44.38**	**55.76**	**55.6**	**59.33**	**45.44**
Grain Size (%)									
Gravel	--	--	--	--	--	--	--	--	--
Very coarse sand	--	--	--	--	--	--	--	--	--
Coarse sand	--	--	--	--	--	--	--	--	--
Medium sand	--	--	--	--	--	--	--	--	--
Fine sand	--	--	--	--	--	--	--	--	--

Table 7-4
Sediment Analytical Results
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	Lumber Shed		Former Boiler				Beach Area		Shannon Slough
Location:	CR-07	CR-24	CR-08A		CR-08B		CR-09A	CR-09B	CR-10
Sample Name:	CR-07-SSD-COMP	CR-24-SSD-COMP	CR08a-SSD-COMP	CR08A-SBSD	CR08b-SSD-COMP	CR08b-SBSD	CR09a-SSD-COMP	CR09b-SSD-COMP	CR10-SSD-COMP
Collection Date:	10/13/2015	10/13/2015	10/14/2015	10/15/2015	10/14/2015	10/15/2015	10/13/2015	10/13/2015	10/14/2015
Collection Depth (ft bml):	0-0.33	0-0.33	0-0.33	18.3-20.0	0-0.33	8.0	0-0.33	0-0.33	0-0.33
Very fine sand	--	--	--	--	--	--	--	--	--
Coarse silt	--	--	--	--	--	--	--	--	--
Medium silt	--	--	--	--	--	--	--	--	--
Fine silt	--	--	--	--	--	--	--	--	--
Very fine silt	--	--	--	--	--	--	--	--	--
Coarse clay	--	--	--	--	--	--	--	--	--
Medium clay	--	--	--	--	--	--	--	--	--
Fine clay	--	--	--	--	--	--	--	--	--
Total fines	--	--	--	--	--	--	--	--	--
Asbestos (%)									
Asbestos	--	--	<1	<1	<1	<1	--	--	--
Pore Water Analysis									
Conductivity (uS/cm)	--	--	--	--	--	--	--	--	--
Salinity (ppt)	--	--	--	--	--	--	--	--	--

Table 7-4
Sediment Analytical Results
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	Chehalis River (2013)			Former Mill Area and Chehalis River						
Location:	CR-01	CR-02	CR-03	CR-04			CR-05		CR-06	
Sample Name:	CR01-10cm	CR02-10cm	CR03-10cm	CR04-10cm	CR04-2.5	CR04-5	CR05-10cm	CR05-2.5	CR06-10cm	CR06-2.5
Collection Date:	11/08/2013	11/08/2013	11/08/2013	11/07/2013	11/08/2013	11/08/2013	11/08/2013	11/08/2013	11/07/2013	11/07/2013
Collection Depth (ft bml):	0-0.33	0-0.33	0-0.33	0-0.33	1-2.5	2.5-5	0-0.33	0.33-2.5	0-0.33	1-2.5
Dioxins/Furans (pg/g)										
1,2,3,4,6,7,8-HpCDD	**211**	**201**	**66.1**	**817**	**4070**	--	**1820**	**12200**	**1080**	**1090**
1,2,3,4,6,7,8-HpCDF	**31.9**	**113**	**24.7**	**165**	**919**	--	**437**	**1170**	**258**	**276**
1,2,3,4,7,8,9-HpCDF	**1.59**	**4.94**	**0.894 J**	7.55 U	**42.8**	--	**19.8**	**81.3**	**13.2**	**15.5**
1,2,3,4,7,8-HxCDD	**1.76**	**1.96**	**1.42**	**4.26**	**32.5**	--	**11.2**	**24.5**	**12.7**	**8.21**
1,2,3,4,7,8-HxCDF	**2.77**	**4.6**	**1.02**	**7.26**	**35.9**	--	**15.3**	**115**	**18.1**	**21.7**
1,2,3,6,7,8-HxCDD	**9.98**	**10.4**	**4.81**	**54.5**	**350**	--	**136**	**1020**	**63.8**	**72.8**
1,2,3,6,7,8-HxCDF	**1.19**	**3.22**	**0.862 J**	**3.38**	**18.9**	--	**10.9**	**51.7**	**8.9**	**8.35**
1,2,3,7,8,9-HxCDD	**11.1**	**12.4**	**12.9**	**10.2**	**48.1**	--	**29.9**	**98.1**	**16.5**	**15.4**
1,2,3,7,8,9-HxCDF	0.778 U	**0.886 J**	**0.268 J**	**2.45**	**14.6**	--	**6.11**	**62.9**	**4.79**	**4.66**
1,2,3,7,8-PeCDD	**3.93**	**4.53**	**5.08**	**4.34**	**18.8**	--	**13.9**	**34.1**	**9.35**	**8.27**
1,2,3,7,8-PeCDF	**0.683 J**	**0.804 J**	**0.508 J**	**2.06**	**12.4**	--	**4.73**	**41.4**	**3.28**	**3.24**
2,3,4,6,7,8-HxCDF	**1.8**	**5.58**	**0.785 J**	**5.09**	**22.2**	--	**11.1**	**69.3**	**16.9**	**16.3**
2,3,4,7,8-PeCDF	**0.814 J**	**1.13**	**0.594 J**	**3.43**	**15.7**	--	**5.82**	**43.5**	**5.96**	**5.87**
2,3,7,8-TCDD	**2.62**	**2.89**	**3.56**	1.14 U	**3.97**	--	**3**	**5.26**	**2.09**	**2.11**
2,3,7,8-TCDF	**1.96**	**2.18**	**1.34**	**3.53**	**16**	--	**6.3**	**54.3**	**4.87**	**4.95**
OCDD	**1690**	**1550**	**489**	**5340 J**	**23500 J**	--	**10300 J**	**68300 J**	**7830 J**	**6810 J**
OCDF	**51**	**211**	**36.4**	**476**	**1900**	--	**863**	**3100**	**680**	**652**
Total HpCDDs	**485**	**433**	**167**	**1530**	**7520**	--	**3750**	**21300**	**2480**	**2050**
Total HpCDFs	87.1 U	**310**	**55.9**	678 U	**3910**	--	**1560**	5060 U	**950**	1120 U
Total HxCDDs	**97**	**114**	80.8 U	350 U	1540 U	--	1010 U	**4840**	742 U	783 U
Total HxCDFs	52.5 U	**125**	24.4 U	301 U	**2130**	--	**853**	6030 U	463 U	518 U
Total PeCDDs	**25.8**	**34.9**	**30.6**	68.7 U	133 U	--	334 U	862 U	**88.7**	67 U
Total PeCDFs	18 U	47.6 U	13.2 U	101 U	658 U	--	281 U	2660 U	203 U	147 U
Total TCDDs	17.4 U	28.1 U	24.7 U	17.5 U	32.6 U	--	73.6 U	**180**	42.6 U	**28.7**
Total TCDFs	12.4 U	33 U	16.7 U	27.9 U	119 U	--	78.1 U	558 U	82.8 U	62.3 U
Dioxin TEQ	**12.9**	**15.6**	**12.2**	**26.7**	**140**	--	**67.6**	**359**	**44.0**	**43.5**
Total Metals (mg/kg)										
Arsenic	10 U	9 U	10 U	--	--	--	--	--	--	20 U
Cadmium	**0.5**	**0.4**	0.5 U	--	--	--	--	--	--	1 U
Chromium	**40 J**	**38.5 J**	**48 J**	--	--	--	--	--	--	**26** J
Copper	**58 J**	**56.3 J**	**65.4 J**	--	--	--	--	--	--	**96** J
Lead	**7**	**9**	**8**	--	--	--	--	--	--	**110**
Mercury	**0.05**	**0.1**	**0.09**	**6.2**	**0.5 J**	--	**0.16**	**0.5** J	**0.55**	**0.53**
Silver	0.7 U	0.6 U	0.8 U	--	--	--	--	--	--	1 U
Zinc	**87**	**79**	**91**	--	--	--	--	--	--	**237**

Table 7-4
Sediment Analytical Results
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	Chehalis River (2013)			Former Mill Area and Chehalis River						
Location:	CR-01	CR-02	CR-03	CR-04			CR-05		CR-06	
Sample Name:	CR01-10cm	CR02-10cm	CR03-10cm	CR04-10cm	CR04-2.5	CR04-5	CR05-10cm	CR05-2.5	CR06-10cm	CR06-2.5
Collection Date:	11/08/2013	11/08/2013	11/08/2013	11/07/2013	11/08/2013	11/08/2013	11/08/2013	11/08/2013	11/07/2013	11/07/2013
Collection Depth (ft bml):	0-0.33	0-0.33	0-0.33	0-0.33	1-2.5	2.5-5	0-0.33	0.33-2.5	0-0.33	1-2.5
TCLP Metals (mg/L)										
Lead	--	--	--	--	--	--	--	--	--	--
Mercury	--	--	--	--	--	--	--	--	--	--
PCBs (ug/kg)										
Aroclor 1016	18 U	19 U	19 U	20 UJ	19 UJ	--	20 UJ	19 UJ	--	20 U
Aroclor 1221	18 U	19 U	19 U	20 UJ	19 UJ	--	20 UJ	19 UJ	--	20 U
Aroclor 1232	23 U	38 U	46 U	20 UJ	19 UJ	--	20 UJ	19 UJ	--	20 U
Aroclor 1242	18 U	19 U	19 U	20 UJ	19 UJ	--	20 UJ	19 UJ	--	20 U
Aroclor 1248	18 U	19 U	19 U	29 UJ	48 UJ	--	29 UJ	97 UJ	--	99 U
Aroclor 1254	18 U	**12 J**	19 U	97 UJ	**440 J**	--	98 UJ	**490 J**	--	200 U
Aroclor 1260	18 U	19 U	19 U	**200 J**	**730 J**	--	**180 J**	**670 J**	--	**690**
Aroclor 1268	--	--	--	--	--	--	--	--	--	--
Total PCBs[a]	23 U	**12 J**	46 U	**200 J**	**1170 J**	--	**180 J**	**1160 J**	--	**690**
SVOCs (ug/kg)										
1,2,4-Trichlorobenzene	4.8 U	4.9 U	4.8 U	100 UJ	81 UJ	--	**43 J**	**74 J**	--	70 U
1,2-Dichlorobenzene	4.8 U	4.9 U	4.8 U	100 UJ	81 UJ	--	58 UJ	88 UJ	--	70 U
1,3-Dichlorobenzene	4.8 U	4.9 U	4.8 U	100 UJ	81 UJ	--	**620 J**	**280 J**	--	70 U
1,4-Dichlorobenzene	4.8 U	**19** J	4.8 U	100 UJ	81 UJ	--	**1000 J**	**540 J**	--	70 U
2,4-Dimethylphenol	24 U	24 U	24 U	530 UJ	400 UJ	--	290 UJ	440 UJ	--	350 U
2-Methylphenol	4.8 U	4.9 U	**3.3 J**	100 UJ	81 UJ	--	**44 J**	88 UJ	--	**45 J**
3,4-Methylphenol	--	--	--	--	--	--	--	--	--	--
4-Methylphenol	**30**	**730**	**60**	420 UJ	320 UJ	--	**310 J**	**280 J**	--	**420**
Benzoic acid	190 U	**240**	**180 J**	**1700 J**	3200 UJ	--	**950 J**	3500 UJ	--	**860 J**
Benzyl alcohol	**15 J**	**43 J**	**43** J	420 UJ	320 UJ	--	230 UJ	350 UJ	--	280 U
Bis(2-ethylhexyl)phthalate	**29 J**	49 U	48 U	1000 UJ	**870 J**	--	**960 J**	**9400 J**	--	**1900**
Butylbenzylphthalate	4.8 U	4.9 U	4.8 U	58 UJ	81 UJ	--	58 UJ	88 UJ	310 UJ	70 U
Dibenzofuran	**12 J**	**20**	19 U	420 UJ	**210 J**	--	**310 J**	**230 J**	--	**490**
Diethylphthalate	**56**	**20**	**36**	420 UJ	320 UJ	--	230 UJ	350 UJ	--	**270 J**
Dimethyl phthalate	4.8 U	**3.1 J**	**2.5 J**	100 UJ	81 UJ	--	58 UJ	88 UJ	--	70 U
Di-n-butyl phthalate	19 U	20 U	19 U	420 UJ	320 UJ	--	230 UJ	350 UJ	--	280 U
Di-n-octyl phthalate	19 U	20 U	19 U	420 UJ	320 UJ	--	230 UJ	350 UJ	--	280 U
Hexachlorobenzene	4.8 U	4.9 U	4.8 U	100 UJ	81 UJ	--	58 UJ	88 UJ	--	70 U
Hexachlorobutadiene	4.8 U	4.9 U	4.8 U	100 UJ	81 UJ	--	58 UJ	88 UJ	--	70 U
N-Nitrosodiphenylamine	4.8 U	4.9 U	4.8 U	100 UJ	81 UJ	--	58 UJ	88 UJ	--	70 U
Pentachlorophenol	19 U	20 U	19 U	**270 J**	**400 J**	--	230 UJ	350 UJ	1500 UJ	**240 J**
Phenol	**24**	**94**	**43**	**290 J**	**390 J**	**980** J	**570 J**	**530 J**	**370 J**	**240 J**

Table 7-4
Sediment Analytical Results
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	Chehalis River (2013)			Former Mill Area and Chehalis River						
Location:	CR-01	CR-02	CR-03	CR-04			CR-05		CR-06	
Sample Name:	CR01-10cm	CR02-10cm	CR03-10cm	CR04-10cm	CR04-2.5	CR04-5	CR05-10cm	CR05-2.5	CR06-10cm	CR06-2.5
Collection Date:	11/08/2013	11/08/2013	11/08/2013	11/07/2013	11/08/2013	11/08/2013	11/08/2013	11/08/2013	11/07/2013	11/07/2013
Collection Depth (ft bml):	0-0.33	0-0.33	0-0.33	0-0.33	1-2.5	2.5-5	0-0.33	0.33-2.5	0-0.33	1-2.5
PAHs (ug/kg)										
1-Methylnaphthalene	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	19 U	**28**	19 U	420 UJ	320 UJ	--	**310**	350 UJ	--	**780**
Acenaphthene	**14 J**	**20**	19 U	420 UJ	**180 J**	--	**210**	**390 J**	--	**490**
Acenaphthylene	19 U	**68**	19 U	420 UJ	320 UJ	--	**170**	350 UJ	--	**520**
Anthracene	**14 J**	**16 J**	19 U	420 UJ	**290 J**	--	**230**	**320 J**	--	**750**
Benzo(a)anthracene	**28**	**11 J**	19 U	**250 J**	**640 J**	--	**390**	**680 J**	--	**1300**
Benzo(a)pyrene	**21**	20 U	19 U	**300 J**	**680 J**	--	**340 J**	**530 J**	--	**1200**
Benzo(ghi)perylene	**14 J**	**15 J**	19 U	**230 J**	**660 J**	--	**260 J**	**300 J**	--	**590**
Chrysene	**35**	**17 J**	19 U	**530 J**	**940 J**	--	**420 J**	**460 J**	--	**1600**
Dibenzo(a,h)anthracene	**3 J**	4.9 U	4.8 U	**120 J**	**360 J**	--	**94 J**	**190 J**	--	**150**
Fluoranthene	**100**	**63**	**25**	**590 J**	**2200 J**	--	**1300 J**	**3900 J**	--	**3200**
Fluorene	**14 J**	**15 J**	19 U	420 UJ	**180 J**	--	**260 J**	**230 J**	--	**650**
Indeno(1,2,3-cd)pyrene	19 U	20 U	19 U	420 UJ	**480 J**	--	**200 J**	**190 J**	--	**490**
Naphthalene	**25**	**280**	**23**	**420 J**	**340 J**	--	**720 J**	**440 J**	--	**1800**
Phenanthrene	**47**	**89**	**19**	**320 J**	**370 J**	--	**700 J**	**470 J**	--	**3600**
Pyrene	**110**	**61**	**21**	**700 J**	**1800 J**	--	**1300 J**	**3100 J**	--	**3600**
Total Benzofluoranthenes	**52**	**22 J**	**13 J**	**550 J**	**1700 J**	--	**660**	**810 J**	--	**2000**
Total HPAHs	**363**	**189**	**59**	**3270 J**	**9460 J**	--	**4964 J**	**10160 J**	--	**14130**
Total LPAHs	**114**	**488**	**42**	**740 J**	**1360 J**	--	**2290 J**	**1850 J**	--	**7810**
cPAH TEQ	**31**	**15**	**13**	**418 J**	**1007 J**	--	**479 J**	**722 J**	--	**1610**
Petroleum Hydrocarbons (mg/kg)										
Gasoline	--	--	--	--	--	--	--	--	--	54 UJ
Diesel	--	--	--	**2400 J**	**3200 J**	--	**1200 J**	**3200 J**	--	**20000**
Motor-Oil Range	--	--	--	**7400 J**	**10000 J**	--	**4800 J**	**13000 J**	--	**60000**
Conventionals										
Ammonia (as N) (mg N/kg)	--	--	--	0.47 U	--	**15.2**	**7.21**	--	**1.37**	**14.0**
Sulfide (mg/kg)	--	--	--	**6.46**	--	**179**	**320**	--	**906**	**2910**
Total Organic Carbon (%)	**2.06 J**	**3.21 J**	**2.91 J**	**31.4 J**	--	**16.5 J**	**13.6 J**	--	**35.6 J**	**49.5 J**
Total Volatile Solids (%)	--	--	--	**59.91**	--	**38.2**	**36.49**	--	**60.05**	**69.23**
Fixed Solids (%)	--	--	--	--	--	--	--	--	--	--
Total Solids (%)	**44.09**	**51.8**	**36.4**	**20.62**	--	**19.98**	**30.32**	--	**21.4**	**21.59**
Grain Size (%)										
Gravel	--	--	--	**22.8**	--	**23.6**	**20.2**	--	**22.7**	--
Very coarse sand	--	--	--	**13.8**	--	**13**	**11.4**	--	**13**	--
Coarse sand	--	--	--	**14.2**	--	**10.7**	**13.2**	--	**15.7**	--
Medium sand	--	--	--	**8.5**	--	**6.1**	**10.5**	--	**11.9**	--
Fine sand	--	--	--	**3.7**	--	**3.2**	**6**	--	**5.1**	--

Table 7-4
Sediment Analytical Results
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	Chehalis River (2013)			Former Mill Area and Chehalis River						
Location:	CR-01	CR-02	CR-03	CR-04			CR-05		CR-06	
Sample Name:	CR01-10cm	CR02-10cm	CR03-10cm	CR04-10cm	CR04-2.5	CR04-5	CR05-10cm	CR05-2.5	CR06-10cm	CR06-2.5
Collection Date:	11/08/2013	11/08/2013	11/08/2013	11/07/2013	11/08/2013	11/08/2013	11/08/2013	11/08/2013	11/07/2013	11/07/2013
Collection Depth (ft bml):	0-0.33	0-0.33	0-0.33	0-0.33	1-2.5	2.5-5	0-0.33	0.33-2.5	0-0.33	1-2.5
Very fine sand	--	--	--	**1.4**	--	**1.4**	**3.5**	--	**2**	--
Coarse silt	--	--	--	**7.2**	--	**1.3**	**8.1**	--	**4.1**	--
Medium silt	--	--	--	**5.9**	--	**10.6**	**7.7**	--	**5.1**	--
Fine silt	--	--	--	**6.2**	--	**8.9**	**5.1**	--	**4.5**	--
Very fine silt	--	--	--	**4.8**	--	**6.1**	**4.5**	--	**3.7**	--
Coarse clay	--	--	--	**2.9**	--	**4.3**	**2.1**	--	**2.7**	--
Medium clay	--	--	--	**2.6**	--	**3.7**	**2.4**	--	**2.1**	--
Fine clay	--	--	--	**6.1**	--	**7.2**	**5.4**	--	**7.4**	--
Total fines	--	--	--	**35.6**	--	**42.1**	**35.3**	--	**29.7**	--
Asbestos (%)										
Asbestos	--	--	--	--	--	--	--	--	--	--
Pore Water Analysis										
Conductivity (uS/cm)	**18700**	**12200**	**17500**	--	--	--	--	--	--	--
Salinity (ppt)	**11**	**6.9**	**10.2**	--	--	--	--	--	--	--

Table 7-4
Sediment Analytical Results
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	Former Mill Area and Chehalis River										
Location:	CR-11	CR-12	CR-13	CR-14	CR-11-14-COMP	CR-15C		CR-17D		CR-18B	
Sample Name:	CR11-SBSD-23	CR12-SBSD-15	CR13-SBSD-11	CR14-SBSD-12	CR11-14-SBSD-COMP	CR15C-SSD	CR15C-SBSD	CR17-D-SSD	CR17-D-SBSD	CR18B-SSD	CR18B-SBSD
Collection Date:	10/13/2015	10/13/2015	10/13/2015	10/13/2015	10/13/2015	10/14/2015	10/14/2015	10/15/2015	10/15/2015	10/16/2015	10/16/2015
Collection Depth (ft bml):	23	15	11	12	11-23	0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0.5-1.0
Dioxins/Furans (pg/g)							--				
1,2,3,4,6,7,8-HpCDD	**6.64**	--	--	--	--	100	--	**56.2**	--	**30.9**	--
1,2,3,4,6,7,8-HpCDF	0.317 U	--	--	--	--	25.3	--	**8.12**	--	**7.34**	--
1,2,3,4,7,8,9-HpCDF	0.0458 U	--	--	--	--	0.959 U	--	0.483 U	--	**0.332 J**	--
1,2,3,4,7,8-HxCDD	0.255 U	--	--	--	--	1.22	--	0.736 U	--	**0.758 J**	--
1,2,3,4,7,8-HxCDF	**0.0319 J**	--	--	--	--	1.25 U	--	**0.596 J**	--	0.424 U	--
1,2,3,6,7,8-HxCDD	0.631 U	--	--	--	--	5.48	--	**2.94**	--	**2.46**	--
1,2,3,6,7,8-HxCDF	0.0339 U	--	--	--	--	0.806 J	--	**0.37 J**	--	0.294 U	--
1,2,3,7,8,9-HxCDD	**2.76**	--	--	--	--	10	--	**6.33**	--	**8**	--
1,2,3,7,8,9-HxCDF	0.112 U	--	--	--	--	0.338 U	--	0.324 U	--	0.226 U	--
1,2,3,7,8-PeCDD	**1.02**	--	--	--	--	3.65	--	**2.49**	--	**3.28**	--
1,2,3,7,8-PeCDF	0.0398 U	--	--	--	--	0.408 J	--	0.213 U	--	0.157 U	--
2,3,4,6,7,8-HxCDF	0.0438 U	--	--	--	--	1.21 U	--	0.443 U	--	**0.469 J**	--
2,3,4,7,8-PeCDF	0.0418 U	--	--	--	--	0.505 U	--	0.239 U	--	0.183 U	--
2,3,7,8-TCDD	**0.936 J**	--	--	--	--	2.7	--	**1.85**	--	**2.36**	--
2,3,7,8-TCDF	0.0339 U	--	--	--	--	1.55	--	0.406 U	--	0.381 U	--
OCDD	**33.1**	--	--	--	--	790	--	**475**	--	**189**	--
OCDF	**1.08 J**	--	--	--	--	33.1	--	**14**	--	**10.9**	--
Total HpCDDs	**15.5**	--	--	--	--	275	--	**150**	--	**73.7**	--
Total HpCDFs	1.28 U	--	--	--	--	60.7 U	--	21.2 U	--	**17.4**	--
Total HxCDDs	18.1 U	--	--	--	--	76.1 U	--	45.8 U	--	46.9 U	--
Total HxCDFs	0.599 U	--	--	--	--	28.1 U	--	10.8 U	--	8.92 U	--
Total PeCDDs	**7.59**	--	--	--	--	26.5	--	16.7 U	--	20.5 U	--
Total PeCDFs	0.111 U	--	--	--	--	12.6 U	--	4.66 U	--	4.65 U	--
Total TCDDs	7.61 U	--	--	--	--	20.3 U	--	12.4 U	--	15.9 U	--
Total TCDFs	0.303 U	--	--	--	--	13.7 U	--	4.27 U	--	4.57 U	--
Dioxin TEQ	**2.38**	--	--	--	--	**9.99**	--	**6.29**	--	**7.35**	--
Total Metals (mg/kg)											
Arsenic	20 U	20 U	9 U	20 U	--	20	21	**21**	**30**	**30**	**20**
Cadmium	0.6 U	0.8 U	**0.4**	0.8 U	--	0.5 U	0.3 U	0.4 U	0.4 U	0.4 U	0.4 U
Chromium	**37**	**48**	**41.3**	**49**	--	40	34.5	**34.4**	**40**	**41**	**36**
Copper	**47**	**62.2**	**55.1**	**63**	--	51.9	54.7	**51.1**	**58.2**	**62.7**	**53.4**
Lead	6 U	**11**	**9**	**12**	--	11	9	**9**	**12**	**10**	**10**
Mercury	0.03 U	**0.09**	**0.07**	**0.09**	--	0.06 U	0.04	**0.04**	**0.07**	0.05 U	**0.07**
Silver	1 U	1 U	0.5 U	1 U	--	0.8 U	0.5 U	0.5 U	0.6 U	0.6 U	0.6 U
Zinc	**78**	**86**	**76**	**90**	--	77	69	**70**	**79**	**76**	**73**

Table 7-4
Sediment Analytical Results
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	Former Mill Area and Chehalis River										
Location:	CR-11	CR-12	CR-13	CR-14	CR-11-14-COMP	CR-15C		CR-17D		CR-18B	
Sample Name:	CR11-SBSD-23	CR12-SBSD-15	CR13-SBSD-11	CR14-SBSD-12	CR11-14-SBSD-COMP	CR15C-SSD	CR15C-SBSD	CR17-D-SSD	CR17-D-SBSD	CR18B-SSD	CR18B-SBSD
Collection Date:	10/13/2015	10/13/2015	10/13/2015	10/13/2015	10/13/2015	10/14/2015	10/14/2015	10/15/2015	10/15/2015	10/16/2015	10/16/2015
Collection Depth (ft bml):	23	15	11	12	11-23	0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0.5-1.0
TCLP Metals (mg/L)											
Lead	--	--	--	--	0.1 U	--	--	--	--	--	--
Mercury	--	--	--	--	0.0001 U	--	--	--	--	--	--
PCBs (ug/kg)											
Aroclor 1016	17 U	20 U	20 U	20 U	--	20 U	18 U	19 U	20 U	18 U	19 U
Aroclor 1221	17 U	20 U	20 U	20 U	--	20 U	18 U	19 U	20 U	18 U	19 U
Aroclor 1232	17 U	20 U	20 U	20 U	--	20 U	18 U	19 U	20 U	18 U	19 U
Aroclor 1242	17 U	20 U	20 U	20 U	--	20 U	18 U	19 U	20 U	18 U	19 U
Aroclor 1248	17 U	20 U	20 U	20 U	--	20 U	18 U	19 U	20 U	18 U	19 U
Aroclor 1254	17 U	20 U	20 U	20 U	--	20 U	18 U	19 U	**18 J**	18 U	19 U
Aroclor 1260	17 U	20 U	20 U	20 U	--	20 U	18 U	19 U	20 U	18 U	19 U
Aroclor 1268	17 U	20 U	20 U	20 U	--	20 U	18 U	19 U	20 U	18 U	19 U
Total PCBs[a]	17 U	20 U	20 U	20 U	--	20 U	18 U	19 U	**18 J**	18 U	19 U
SVOCs (ug/kg)											
1,2,4-Trichlorobenzene	4.7 U	4.9 U	4.9 U	4.9 U	--	4.9 U	4.9 U	4.8 U	**4.8 J**	5 U	5 U
1,2-Dichlorobenzene	4.7 U	4.9 U	4.9 U	4.9 U	--	4.9 U	4.9 U	4.8 U	**1.6 J**	5 U	5 U
1,3-Dichlorobenzene	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	4.7 U	4.9 U	4.9 U	4.9 U	--	4.9 U	4.9 U	4.8 U	4.9 U	5 U	5 U
2,4-Dimethylphenol	23 U	24 U	24 U	24 U	--	24 U	24 U	24 U	24 U	25 U	25 U
2-Methylphenol	4.7 U	4.9 U	**7.2**	4.9 U	--	4.9 U	4.9 U	4.8 U	4.9 U	5 U	5 U
3,4-Methylphenol	--	--	--	--	--	--	--	--	--	--	--
4-Methylphenol	19 U	**870 J**	**150**	**130**	--	**89**	**52**	19 UJ	**120 J**	**42**	20 U
Benzoic acid	190 U	**440**	**260**	**200**	--	**250 J**	**160 J**	**150 J**	**230 J**	**160 J**	**210 J**
Benzyl alcohol	19 U	**23**	**46**	**20**	--	20 U	20 U	**16 J**	**48**	20 U	20 U
Bis(2-ethylhexyl)phthalate	47 U	49 U	49 U	49 U	--	**29 J**	49 U	48 U	**38 J**	50 U	50 U
Butylbenzylphthalate	4.7 U	4.9 U	**7.3**	**4.7 J**	--	4.9 U	4.9 U	**3.4 J**	4.9 U	**7.2**	**2.8 J**
Dibenzofuran	19 U	**40**	20 U	**20**	--	**24**	**21**	19 U	**84**	20 U	20 U
Diethylphthalate	19 U	20 U	20 U	20 U	--	21 U	26 U	19 U	19 U	40 U	20 U
Dimethyl phthalate	4.7 U	4.9 U	4.9 U	4.9 U	--	4.9 U	4.9 U	4.8 U	4.9 U	5 U	5 U
Di-n-butyl phthalate	19 U	20 U	20 U	20 U	--	20 U	20 U	19 U	19 U	20 U	20 U
Di-n-octyl phthalate	19 U	20 U	20 U	20 U	--	20 U	20 U	19 U	19 U	20 U	20 U
Hexachlorobenzene	4.7 U	4.9 U	4.9 U	4.9 U	--	4.9 U	4.9 U	4.8 U	4.9 U	5 U	5 U
Hexachlorobutadiene	4.7 U	4.9 U	4.9 U	4.9 U	--	4.9 U	4.9 U	4.8 U	4.9 U	5 U	5 U
N-Nitrosodiphenylamine	4.7 U	4.9 UJ	4.9 U	4.9 U	--	4.9 U	4.9 U	4.8 U	4.9 U	5 U	5 U
Pentachlorophenol	19 UJ	20 UJ	20 UJ	20 UJ	--	20 UJ	20 UJ	19 U	**21**	20 U	20 U
Phenol	**8.4 J**	**64**	**44**	**50**	--	**50**	20 U	**16 J**	**39**	**81**	20 U

Table 7-4
Sediment Analytical Results
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	Former Mill Area and Chehalis River										
Location:	CR-11	CR-12	CR-13	CR-14	CR-11-14-COMP	CR-15C		CR-17D		CR-18B	
Sample Name:	CR11-SBSD-23	CR12-SBSD-15	CR13-SBSD-11	CR14-SBSD-12	CR11-14-SBSD-COMP	CR15C-SSD	CR15C-SBSD	CR17-D-SSD	CR17-D-SBSD	CR18B-SSD	CR18B-SBSD
Collection Date:	10/13/2015	10/13/2015	10/13/2015	10/13/2015	10/13/2015	10/14/2015	10/14/2015	10/15/2015	10/15/2015	10/16/2015	10/16/2015
Collection Depth (ft bml):	23	15	11	12	11-23	0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0.5-1.0
PAHs (ug/kg)											
1-Methylnaphthalene	19 U	**24**	**22**	**16 J**	--	**15 J**	**18 J**	19 U	**23**	20 U	20 U
2-Methylnaphthalene	19 U	**41**	20 U	**21**	--	**19 J**	**18 J**	19 U	**31**	20 U	20 U
Acenaphthene	19 U	**41**	**31**	**20**	--	**38**	**37**	19 U	**420**	20 U	**16 J**
Acenaphthylene	19 U	**110**	**110**	**61**	--	**15 J**	**15 J**	19 U	**20**	20 U	**17 J**
Anthracene	19 U	**41**	**28**	**18 J**	--	**18 J**	**20**	19 U	**110**	20 U	**24**
Benzo(a)anthracene	**11 J**	**30**	**20**	**17 J**	--	**56**	**64**	19 U	**160**	**29**	**99**
Benzo(a)pyrene	19 U	20 U	20 U	20 U	--	**31**	**35**	19 U	**81**	**12 J**	**68**
Benzo(ghi)perylene	19 U	**30**	**30**	**20**	--	**23**	**14 J**	19 U	**36**	20 U	**27**
Chrysene	**12 J**	**43**	**29**	**25**	--	**61**	**69**	**8.6 J**	**210**	**66**	**93**
Dibenzo(a,h)anthracene	4.7 U	**6.3**	**4.3 J**	**3.2 J**	--	**4 J**	**4.3 J**	**2.3 J**	**15**	5 U	**8**
Fluoranthene	**24**	**150**	**100**	**88**	--	**120**	**110**	**25**	**600**	**82**	**210**
Fluorene	19 U	**47**	**35**	**23**	--	**29**	**20**	19 U	**140**	**11 J**	**12 J**
Indeno(1,2,3-cd)pyrene	19 U	**24**	**18 J**	**15 J**	--	**18 J**	**17 J**	19 U	**41**	20 U	**27**
Naphthalene	19 U	**370**	**300**	**190**	--	**64**	**35**	**13 J**	**110**	**29**	**22**
Phenanthrene	**19**	**210**	**150**	**120**	--	**91**	**69**	**19**	**360**	**26**	**27**
Pyrene	**23**	**150**	**110**	**87**	--	**98**	**80**	**20**	**470**	**62**	**220**
Total Benzofluoranthenes	**16 J**	**61**	**40**	**39**	--	**100**	**100**	**13 J**	**240**	**39 J**	**180**
Total HPAHs	**86 J**	**494 J**	**351 J**	**294 J**	--	**511 J**	**493.3 J**	**68.9 J**	**1853**	**290 J**	**932 J**
Total LPAHs	**19**	**819**	**654**	**432 J**	--	**255 J**	**196 J**	**32 J**	**1160**	**66 J**	**118 J**
cPAH TEQ	**14 J**	**23**	**19 J**	**18 J**	--	**49 J**	**54 J**	**13 J**	**129**	**21 J**	**100**
Petroleum Hydrocarbons (mg/kg)											
Gasoline	--	--	--	--	--	--	--	--	--	--	--
Diesel	7 U	--	--	--	--	**77**	--	**24**	--	**44**	--
Motor-Oil Range	**19**	--	--	--	--	**190**	--	**46**	--	**92**	--
Conventionals											
Ammonia (as N) (mg N/kg)	--	--	--	--	--	--	--	--	--	--	--
Sulfide (mg/kg)	--	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon (%)	**0.415**	**3.33**	**2.5**	**3.22**	--	**3.17**	**1.73**	**1.61**	**3.05**	**1.95**	**2.45**
Total Volatile Solids (%)	--	--	--	--	--	--	--	--	--	--	--
Fixed Solids (%)	--	--	--	--	--	--	--	--	--	--	--
Total Solids (%)	**72.59**	**56.65**	**57.95**	**57.04**	--	**35.1**	**57.47**	**52.1**	**48.09**	**46.44**	**47.88**
Grain Size (%)											
Gravel	--	--	--	--	--	--	--	--	--	--	--
Very coarse sand	--	--	--	--	--	--	--	--	--	--	--
Coarse sand	--	--	--	--	--	--	--	--	--	--	--
Medium sand	--	--	--	--	--	--	--	--	--	--	--
Fine sand	--	--	--	--	--	--	--	--	--	--	--

Table 7-4
Sediment Analytical Results
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	Former Mill Area and Chehalis River										
Location:	CR-11	CR-12	CR-13	CR-14	CR-11-14-COMP	CR-15C		CR-17D		CR-18B	
Sample Name:	CR11-SBSD-23	CR12-SBSD-15	CR13-SBSD-11	CR14-SBSD-12	CR11-14-SBSD-COMP	CR15C-SSD	CR15C-SBSD	CR17-D-SSD	CR17-D-SBSD	CR18B-SSD	CR18B-SBSD
Collection Date:	10/13/2015	10/13/2015	10/13/2015	10/13/2015	10/13/2015	10/14/2015	10/14/2015	10/15/2015	10/15/2015	10/16/2015	10/16/2015
Collection Depth (ft bml):	23	15	11	12	11-23	0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0.5-1.0
Very fine sand	--	--	--	--	--	--	--	--	--	--	--
Coarse silt	--	--	--	--	--	--	--	--	--	--	--
Medium silt	--	--	--	--	--	--	--	--	--	--	--
Fine silt	--	--	--	--	--	--	--	--	--	--	--
Very fine silt	--	--	--	--	--	--	--	--	--	--	--
Coarse clay	--	--	--	--	--	--	--	--	--	--	--
Medium clay	--	--	--	--	--	--	--	--	--	--	--
Fine clay	--	--	--	--	--	--	--	--	--	--	--
Total fines	--	--	--	--	--	--	--	--	--	--	--
Asbestos (%)											
Asbestos	--	--	--	--	--	--	--	--	--	--	--
Pore Water Analysis											
Conductivity (uS/cm)	--	--	--	--	--	--	--	--	--	--	--
Salinity (ppt)	--	--	--	--	--	--	--	--	--	--	--

Table 7-4
Sediment Analytical Results
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	Former Mill Area and Chehalis River				Wharf Area
Location:	CR-19D	CR-19F			CR-26
Sample Name:	CR19D-SSD-CONV	CR19F-SSD	CR19F-SBSD	CR19F-SBSD-DUP	CR26-SBSD
Collection Date:	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/15/2015
Collection Depth (ft bml):	0-0.33	0-0.33	0.5-1.0	0.5-1.0	0.5-1.0
Dioxins/Furans (pg/g)					
1,2,3,4,6,7,8-HpCDD	--	**141**	--	--	--
1,2,3,4,6,7,8-HpCDF	--	**24.3**	--	--	--
1,2,3,4,7,8,9-HpCDF	--	**1.04**	--	--	--
1,2,3,4,7,8-HxCDD	--	**1.35**	--	--	--
1,2,3,4,7,8-HxCDF	--	**1.37**	--	--	--
1,2,3,6,7,8-HxCDD	--	**9.89**	--	--	--
1,2,3,6,7,8-HxCDF	--	**1.07**	--	--	--
1,2,3,7,8,9-HxCDD	--	**8.91**	--	--	--
1,2,3,7,8,9-HxCDF	--	0.571 U	--	--	--
1,2,3,7,8-PeCDD	--	**3.01**	--	--	--
1,2,3,7,8-PeCDF	--	0.613 U	--	--	--
2,3,4,6,7,8-HxCDF	--	**1.73**	--	--	--
2,3,4,7,8-PeCDF	--	**0.557 J**	--	--	--
2,3,7,8-TCDD	--	**2.16**	--	--	--
2,3,7,8-TCDF	--	**7.75**	--	--	--
OCDD	--	**1010**	--	--	--
OCDF	--	**36.8**	--	--	--
Total HpCDDs	--	**340**	--	--	--
Total HpCDFs	--	62.7 U	--	--	--
Total HxCDDs	--	93 U	--	--	--
Total HxCDFs	--	40.2 U	--	--	--
Total PeCDDs	--	26.4 U	--	--	--
Total PeCDFs	--	23.6 U	--	--	--
Total TCDDs	--	20.6 U	--	--	--
Total TCDFs	--	25.6 U	--	--	--
Dioxin TEQ	--	**10.6**	--	--	--
Total Metals (mg/kg)					
Arsenic	--	**20**	**22**	**23**	**24**
Cadmium	--	0.4 U	0.4 U	0.3 U	0.4 U
Chromium	--	**41**	**50.5**	**51.3**	**39.3**
Copper	--	**53.1**	**60**	**53.3**	**55.9**
Lead	--	**11**	**13**	**14**	**11**
Mercury	--	**0.05**	**0.05**	**0.07**	**0.09**
Silver	--	0.6 U	0.6 U	0.5 U	0.6 U
Zinc	--	**74**	**80**	**79**	**75**

Table 7-4
Sediment Analytical Results
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	Former Mill Area and Chehalis River				Wharf Area
Location:	CR-19D	CR-19F			CR-26
Sample Name:	CR19D-SSD-CONV	CR19F-SSD	CR19F-SBSD	CR19F-SBSD-DUP	CR26-SBSD
Collection Date:	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/15/2015
Collection Depth (ft bml):	0-0.33	0-0.33	0.5-1.0	0.5-1.0	0.5-1.0
TCLP Metals (mg/L)					
Lead	--	--	--	--	--
Mercury	--	--	--	--	--
PCBs (ug/kg)					
Aroclor 1016	--	18 U	19 U	20 U	19 U
Aroclor 1221	--	18 U	19 U	20 U	19 U
Aroclor 1232	--	18 U	19 U	20 U	19 U
Aroclor 1242	--	18 U	19 U	20 U	19 U
Aroclor 1248	--	18 U	19 U	20 U	19 U
Aroclor 1254	--	18 U	19 U	20 U	19 U
Aroclor 1260	--	18 U	19 U	20 U	19 U
Aroclor 1268	--	18 U	19 U	20 U	19 U
Total PCBs[a]	--	18 U	19 U	20 U	19 U
SVOCs (ug/kg)					
1,2,4-Trichlorobenzene	--	4.8 U	5 U	5 U	4.9 U
1,2-Dichlorobenzene	--	4.8 U	5 U	5 U	4.9 U
1,3-Dichlorobenzene	--	--	--	--	--
1,4-Dichlorobenzene	--	4.8 U	5 U	5 U	4.9 U
2,4-Dimethylphenol	--	24 U	25 U	25 U	24 U
2-Methylphenol	--	4.8 U	5 U	5 U	**5.4**
3,4-Methylphenol	--	--	--	--	--
4-Methylphenol	--	19 U	**230**	**320**	**45**
Benzoic acid	--	**170 J**	**240**	**370**	**440**
Benzyl alcohol	--	19 U	**27**	**28**	**64**
Bis(2-ethylhexyl)phthalate	--	48 U	50 U	**32 J**	49 U
Butylbenzylphthalate	--	**8.1**	**9.3**	**7.4**	4.9 U
Dibenzofuran	--	**15 J**	**25**	**28**	**25**
Diethylphthalate	--	22 U	24 U	38 U	20 U
Dimethyl phthalate	--	4.8 U	5 U	5 U	4.9 U
Di-n-butyl phthalate	--	19 U	20 U	20 U	20 U
Di-n-octyl phthalate	--	19 U	20 U	20 U	20 U
Hexachlorobenzene	--	4.8 U	5 U	5 U	4.9 U
Hexachlorobutadiene	--	4.8 U	5 U	5 U	4.9 U
N-Nitrosodiphenylamine	--	4.8 U	5 U	5 U	4.9 U
Pentachlorophenol	--	19 U	20 UJ	20 UJ	20 UJ
Phenol	**93 J+**	**89**	**47**	**68**	**76**

Table 7-4
Sediment Analytical Results
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	Former Mill Area and Chehalis River				Wharf Area
Location:	CR-19D	CR-19F			CR-26
Sample Name:	CR19D-SSD-CONV	CR19F-SSD	CR19F-SBSD	CR19F-SBSD-DUP	CR26-SBSD
Collection Date:	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/15/2015
Collection Depth (ft bml):	0-0.33	0-0.33	0.5-1.0	0.5-1.0	0.5-1.0
PAHs (ug/kg)					
1-Methylnaphthalene	--	19 U	20 U	**13 J**	**11 J**
2-Methylnaphthalene	--	**10 J**	**13 J**	**22**	20 U
Acenaphthene	--	**12 J**	**27**	**31**	**29**
Acenaphthylene	--	19 U	20 U	**18 J**	**9.7 J**
Anthracene	--	**15 J**	**30**	**26**	**14 J**
Benzo(a)anthracene	--	**12 J**	**21**	**37**	**18 J**
Benzo(a)pyrene	--	19 U	20 U	20 U	20 U
Benzo(ghi)perylene	--	19 U	20 U	**15 J**	**13 J**
Chrysene	--	**21**	**30**	**64**	**26**
Dibenzo(a,h)anthracene	--	4.8 U	5 U	**3.1 J**	**3.1 J**
Fluoranthene	--	**41**	**94**	**150**	**75**
Fluorene	--	**12 J**	**29**	**27**	**23**
Indeno(1,2,3-cd)pyrene	--	19 U	20 U	**14 J**	**8.8 J**
Naphthalene	--	**56**	**62**	**98**	**51**
Phenanthrene	--	**36**	**110**	**140**	**39**
Pyrene	--	**35**	**83**	**130**	**70**
Total Benzofluoranthenes	--	**19 J**	**27 J**	**60**	**36 J**
Total HPAHs	--	**128 J**	**255 J**	**493.1 J**	**249.9 J**
Total LPAHs	--	**131 J**	**258**	**340 J**	**165.7 J**
cPAH TEQ	--	**14 J**	**16 J**	**22 J**	**17 J**
Petroleum Hydrocarbons (mg/kg)					
Gasoline	--	--	--	--	--
Diesel	--	**93**	--	--	--
Motor-Oil Range	--	**240**	--	--	--
Conventionals					
Ammonia (as N) (mg N/kg)	**18.6**	--	--	--	--
Sulfide (mg/kg)	**605**	--	--	--	--
Total Organic Carbon (%)	**3.99**	**2.77**	**2.76**	**2.59**	**1.52**
Total Volatile Solids (%)	**8.58**	--	--	--	--
Fixed Solids (%)	**44.8**	--	--	--	--
Total Solids (%)	**39.38**	**49.31**	**50.3**	**51.43**	**46.69**
Grain Size (%)					
Gravel	**1**	--	--	--	--
Very coarse sand	**3.8**	--	--	--	--
Coarse sand	**1.8**	--	--	--	--
Medium sand	**2**	--	--	--	--
Fine sand	**4.6**	--	--	--	--

Table 7-4
Sediment Analytical Results
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	Former Mill Area and Chehalis River				Wharf Area
Location:	CR-19D	CR-19F			CR-26
Sample Name:	CR19D-SSD-CONV	CR19F-SSD	CR19F-SBSD	CR19F-SBSD-DUP	CR26-SBSD
Collection Date:	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/15/2015
Collection Depth (ft bml):	0-0.33	0-0.33	0.5-1.0	0.5-1.0	0.5-1.0
Very fine sand	**8.9**	--	--	--	--
Coarse silt	**16**	--	--	--	--
Medium silt	**20.1**	--	--	--	--
Fine silt	**14.6**	--	--	--	--
Very fine silt	**7.3**	--	--	--	--
Coarse clay	**5.9**	--	--	--	--
Medium clay	**3.4**	--	--	--	--
Fine clay	**10.5**	--	--	--	--
Total fines	**77.8**	--	--	--	--
Asbestos (%)					
Asbestos	--	--	--	--	--
Pore Water Analysis					
Conductivity (uS/cm)	--	--	--	--	--
Salinity (ppt)	--	--	--	--	--

Table 7-4
Sediment Analytical Results
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

NOTES:
Detections are in **bold** font.
-- = not analyzed.
< = less than the limit of detection.
cm = centimeter.
cPAH = carcinogenic PAH.
ft bml = feet below mudline.
HPAH = high-molecular-weight PAH.
J = result is an estimated value.
LPAH = low-molecular-weight PAH.
mg/kg = milligrams per kilogram.
mg/L = milligrams per liter.
mg N/kg = milligrams of nitrogen per kilogram.
ND = not detected.
PAH = polycyclic aromatic hydrocarbon.
PCB = polychlorinated biphenyl.
pg/g = picograms per gram (parts per trillion).
ppt = parts per thousand.
SIM = selective ion monitoring.
SVOC = semivolatile organic compound. When samples were analyzed by both 8270D and 8270D SIM methods, or when samples were reanalyzed, the higher detected value or lower non-detect value was used.
TEQ = toxicity equivalence quotient.
TCLP = toxicity characteristic leaching procedure.
Total PCBs = sum of PCB Aroclors.
U = result is non-detect at method reporting limit.
UJ = result is non-detect at or above method reporting limit. Reported value is estimated.
ug/kg = micrograms per kilogram.
uS/cm = microSiemen = (micromhos) per centimeter.
[a]Calculated value. Only detected values are summed.

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Lumber Shed		Former Boiler			
Location:					CR-07	CR-24	CR-08A		CR-08B	
Sample Name:					CR-07-SSD-COMP	CR-24-SSD-COMP	CR08a-SSD-COMP	CR08A-SBSD	CR08b-SSD-COMP	CR08b-SBSD
Collection Date:	SCO—Dry Weight	CSL—Dry Weight	SCO—Organic Carbon	CSL—Organic Carbon	10/13/2015	10/13/2015	10/14/2015	10/15/2015	10/14/2015	10/15/2015
Collection Depth (ft bml):					0-0.33	0-0.33	0-0.33	18.3-20.0	0-0.33	8.0
Conventionals (%)										
Total Organic Carbon	NV	NV	NV	NV	**1.09**	**1.56**	**1.92**	**1.29**	**2.05**	**3.08**
PCBs (ug/kg-OC)										
Total PCBs[b]	NA	NA	12000	65000	1743 U	**3462**	990 U	1395 U	**683 J**	584 U
SVOCs (ug/kg-OC)										
1,2,4-Trichlorobenzene	NA	NA	810	1800	1743 U	308 U	250 U	388 U	234 U	159 U
1,2-Dichlorobenzene	NA	NA	2300	2300	1743 U	308 U	250 U	388 U	234 U	**58 J**
1,4-Dichlorobenzene	NA	NA	3100	9000	1743 U	308 U	**125 J**	388 U	234 U	159 U
Bis(2-ethylhexyl)phthalate	NA	NA	47000	78000	**5321**	**4231**	2500 U	3876 U	2341 U	1591 U
Butylbenzylphthalate	NA	NA	4900	64000	1743 U	308 U	250 U	388 U	**15610**	159 U
Dibenzofuran	NA	NA	15000	58000	**4128**	**3013**	**1302**	**1085 J**	**2585**	**2110**
Diethylphthalate	NA	NA	61000	110000	1743 U	1218 U	**990**	1550 U	1756 U	**812**
Dimethyl phthalate	NA	NA	53000	53000	1743 U	308 U	250 U	388 U	234 U	159 U
Di-n-butyl phthalate	NA	NA	220000	1700000	1743 U	**8333**	990 U	1550 U	927 U	649 U
Di-n-octyl phthalate	NA	NA	58000	4500000	1743 U	1218 U	**36979**	1550 U	927 U	649 U
Hexachlorobenzene	NA	NA	380	2300	1743 U	308 U	250 U	388 U	234 U	159 U
Hexachlorobutadiene	NA	NA	3900	6200	1743 U	308 U	250 U	388 U	234 U	159 U
N-Nitrosodiphenylamine	NA	NA	11000	11000	1743 U	308 U	250 U	388 U	234 U	159 U
PAHs (ug/kg-OC)										
2-Methylnaphthalene	NA	NA	38000	64000	**3670**	1218 U	**1198**	1550 U	927 U	**2565**
Acenaphthene	NA	NA	16000	57000	**3211**	**1603**	**833 J**	**1395 J**	**2488**	**2435**
Acenaphthylene	NA	NA	66000	66000	**1468 J**	**1218**	**729 J**	**4341**	**2488**	**9740**
Anthracene	NA	NA	220000	1200000	**5229**	**4167**	**1406**	**1163 J**	**3463**	**2338**
Benzo(a)anthracene	NA	NA	110000	270000	**11927**	**7692**	**2240**	1550 U	**4585**	**1494**
Benzo(a)pyrene	NA	NA	99000	210000	**6147**	**5385**	**1927**	1550 U	**3268**	**1429**
Benzo(ghi)perylene	NA	NA	31000	78000	**5229**	**3590**	**1458**	1550 U	**2634**	**1429**
Chrysene	NA	NA	110000	460000	**16514**	**10256**	**3854**	1550 U	**6341**	**2370**
Dibenzo(a,h)anthracene	NA	NA	12000	33000	**1651 J**	**1218**	**495**	388 U	**585**	**208**
Fluoranthene	NA	NA	160000	1200000	**41284**	**24359**	**5729**	**3411**	**13659**	**9416**
Fluorene	NA	NA	23000	79000	**4404**	**1859**	990 U	**1163 J**	**2537**	**2143**
Indeno(1,2,3-cd)pyrene	NA	NA	34000	88000	**3945**	**3462**	**1354**	1550 U	**2244**	**909**
Naphthalene	NA	NA	99000	170000	**8073**	**7692**	**5729**	**13953**	**8293**	**25974**
Phenanthrene	NA	NA	100000	480000	**17431**	**10256**	**4792**	**4651**	**10732**	**13961**
Pyrene	NA	NA	1000000	1400000	**33028**	**19231**	**4375**	**3178**	**12195**	**9740**
Total Benzofluoranthenes	NA	NA	230000	450000	**21101**	**14744**	**5208**	3101 U	**10732**	**2987**
Total HPAHs[b]	NA	NA	960000	5300000	**140826 J**	**89936**	**26641 J**	**6589 J**	**56244**	**29981**
Total LPAHs[b]	NA	NA	370000	780000	**39817 J**	**26795**	**13490**	**26667**	**30000**	**56591**
PCBs—dry weight (ug/kg)										
Aroclor 1016	NV	NV	NA	NA	19 U	19 U	19 U	18 U	18 U	18 U
Aroclor 1221	NV	NV	NA	NA	19 U	19 U	19 U	18 U	18 U	18 U

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Lumber Shed		Former Boiler			
Location:					CR-07	CR-24	CR-08A		CR-08B	
Sample Name:					CR-07-SSD-COMP	CR-24-SSD-COMP	CR08a-SSD-COMP	CR08A-SBSD	CR08b-SSD-COMP	CR08b-SBSD
Collection Date:	SCO—Dry	CSL—Dry	SCO—Organic	CSL—Organic	10/13/2015	10/13/2015	10/14/2015	10/15/2015	10/14/2015	10/15/2015
Aroclor 1232	NV	NV	NA	NA	19 U	19 U	19 U	18 U	18 U	18 U
Aroclor 1242	NV	NV	NA	NA	19 U	19 U	19 U	18 U	18 U	18 U
Aroclor 1248	NV	NV	NA	NA	19 U	19 U	19 U	18 U	18 U	18 U
Aroclor 1254	NV	NV	NA	NA	19 U	**30**	19 U	18 U	18 U	18 U
Aroclor 1260	NV	NV	NA	NA	19 U	**24**	19 U	18 U	**14 J**	18 U
Aroclor 1268	NV	NV	NA	NA	19 U	19 U	19 U	18 U	18 U	18 U
Total PCBs[b]	130	1000	NA	NA	19 U	**54**	19 U	18 U	**14 J**	18 U
SVOCs—dry weight (ug/kg)										
1,2,4-Trichlorobenzene	31	51	NA	NA	19 U	4.8 U	4.8 U	5 U	4.8 U	4.9 U
1,2-Dichlorobenzene	35	50	NA	NA	19 U	4.8 U	4.8 U	5 U	4.8 U	**1.8 J**
1,4-Dichlorobenzene	110	110	NA	NA	19 U	4.8 U	**2.4 J**	5 U	4.8 U	4.9 U
Bis(2-ethylhexyl)phthalate	1300	1900	NA	NA	**58**	**66**	48 U	50 U	48 U	49 U
Butylbenzylphthalate	63	900	NA	NA	19 U	4.8 U	4.8 U	5 U	**320**	4.9 U
Dibenzofuran	540	540	NA	NA	**45**	**47**	**25**	**14 J**	**53**	**65**
Diethylphthalate	200	>1200	NA	NA	19 U	19 U	**19**	20 U	36 U	**25**
Dimethyl phthalate	71	160	NA	NA	19 U	4.8 U	4.8 U	5 U	4.8 U	4.9 U
Di-n-butyl phthalate	1400	1400	NA	NA	19 U	**130**	19 U	20 U	19 U	20 U
Di-n-octyl phthalate	6200	6200	NA	NA	19 U	19 U	**710**	20 U	19 U	20 U
Hexachlorobenzene	22	70	NA	NA	19 U	4.8 U	4.8 U	5 U	4.8 U	4.9 U
Hexachlorobutadiene	11	120	NA	NA	19 U	4.8 U	4.8 U	5 U	4.8 U	4.9 U
N-Nitrosodiphenylamine	28	40	NA	NA	19 U	4.8 U	4.8 U	5 U	4.8 U	4.9 U
PAHs—dry weight (ug/kg)										
2-Methylnaphthalene	670	670	NA	NA	**40**	19 U	**23**	20 U	19 U	**79**
Acenaphthene	500	500	NA	NA	**35**	**25**	**16 J**	**18 J**	**51**	**75**
Acenaphthylene	1300	1300	NA	NA	**16 J**	**19**	**14 J**	**56**	**51**	**300**
Anthracene	960	960	NA	NA	**57**	**65**	**27**	**15 J**	**71**	**72**
Benzo(a)anthracene	1300	1600	NA	NA	**130**	**120**	**43**	20 U	**94**	**46**
Benzo(a)pyrene	1600	1600	NA	NA	**67**	**84**	**37**	20 U	**67**	**44**
Benzo(ghi)perylene	670	720	NA	NA	**57**	**56**	**28**	20 U	**54**	**44**
Chrysene	1400	2800	NA	NA	**180**	**160**	**74**	20 U	**130**	**73**
Dibenzo(a,h)anthracene	230	230	NA	NA	**18 J**	**19**	**9.5**	5 U	**12**	**6.4**
Fluoranthene	1700	2500	NA	NA	**450**	**380**	**110**	**44**	**280**	**290**
Fluorene	540	540	NA	NA	**48**	**29**	19 U	**15 J**	**52**	**66**
Indeno(1,2,3-cd)pyrene	600	690	NA	NA	**43**	**54**	**26**	20 U	**46**	**28**
Naphthalene	2100	2100	NA	NA	**88**	**120**	**110**	**180**	**170**	**800**
Phenanthrene	1500	1500	NA	NA	**190**	**160**	**92**	**60**	**220**	**430**
Pyrene	2600	3300	NA	NA	**360**	**300**	**84**	**41**	**250**	**300**
Total Benzofluoranthenes	3200	3600	NA	NA	**230**	**230**	**100**	40 U	**220**	**92**
Total HPAHs[b]	12000	17000	NA	NA	**1535 J**	**1403**	**512**	**85**	**1153**	**923**
Total LPAHs[b]	5200	5200	NA	NA	**434 J**	**418**	**259 J**	**344 J**	**615**	**1743**

Table 7-5
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Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Lumber Shed		Former Boiler			
Location:					CR-07	CR-24	CR-08A		CR-08B	
Sample Name:					CR-07-SSD-COMP	CR-24-SSD-COMP	CR08a-SSD-COMP	CR08A-SBSD	CR08b-SSD-COMP	CR08b-SBSD
Collection Date:	SCO—Dry	CSL—Dry	SCO—Organic	CSL—Organic	10/13/2015	10/13/2015	10/14/2015	10/15/2015	10/14/2015	10/15/2015
Total Metals—dry weight (mg/kg)										
Arsenic	57	93	NA	NA	20 U	20 U	**30**	**20**	**20**	20
Cadmium	5.1	6.7	NA	NA	0.8 U	0.9 U	0.4 U	0.7 U	0.4 U	0.7 U
Chromium	260	270	NA	NA	**43**	**49**	**52**	**39**	**42**	40
Copper	390	390	NA	NA	--	**81.5**	**134**	**57.8**	**61.1**	55.3
Lead	450	530	NA	NA	**11**	**21**	**30**	**8**	**14**	10
Mercury	0.41	0.59	NA	NA	**0.04**	**0.16**	**0.06**	0.03 U	**0.06**	0.07
Silver	6.1	6.1	NA	NA	--	1 U	0.6 U	1 U	0.7 U	1 U
Zinc	410	960	NA	NA	--	**107**	**134**	**71**	**90**	75
SVOCs—dry weight (ug/kg)										
1,3-Dichlorobenzene	NA	NA	NA	NA	19 U	--	--	--	--	--
2,4-Dimethylphenol	29	29	NA	NA	97 U	24 U	24 U	25 U	24 U	**17 J**
2-Methylphenol	63	63	NA	NA	19 U	**8.4**	4.8 U	5 U	4.8 U	4.9 U
3,4-Methylphenol	NA	NA	NA	NA	--	--	--	--	--	--
4-Methylphenol	670	670	NA	NA	**26**	**120**	**28 J**	**190 J**	**210**	**560 J**
Benzoic acid	650	650	NA	NA	**170 J**	**680**	**180 J**	**110 J**	**330 J**	**290 J**
Benzyl alcohol	57	73	NA	NA	19 U	19 U	**27**	**17 J**	19 U	**50**
Pentachlorophenol	360	690	NA	NA	97 U	**86 J**	**14 J**	20 U	**11 J**	20 U
Phenol	420	1200	NA	NA	**18 J**	**100**	**35**	**22**	**71**	**53**
PAHs—dry weight (ug/kg)										
1-Methylnaphthalene	NV	NV	NA	NA	**18 J**	**16 J**	**16 J**	**13 J**	**29**	**50**
TCLP Metals (mg/L)										
Lead	NA	NA	NA	NA	--	--	--	--	--	--
Mercury	NA	NA	NA	NA	--	--	--	--	--	--
Dioxins/Furans—dry weight (pg/g)										
1,2,3,4,6,7,8-HpCDD	NV	NV	NA	NA	--	--	**583**	**14.5**	**955**	12.5
1,2,3,4,6,7,8-HpCDF	NV	NV	NA	NA	--	--	**33.1**	**1.26**	**75.8**	0.295 U
1,2,3,4,7,8,9-HpCDF	NV	NV	NA	NA	--	--	2.1 U	0.25 U	**3.72**	0.0959 J
1,2,3,4,7,8-HxCDD	NV	NV	NA	NA	--	--	**2.33**	0.583 U	**2.96**	0.589 J
1,2,3,4,7,8-HxCDF	NV	NV	NA	NA	--	--	**1.42**	**0.217 J**	**4.39**	0.111 J
1,2,3,6,7,8-HxCDD	NV	NV	NA	NA	--	--	**10.7**	**1.3**	**22.3**	1.71
1,2,3,6,7,8-HxCDF	NV	NV	NA	NA	--	--	**0.798 J**	**0.178 J**	**2.13**	0.14 J
1,2,3,7,8,9-HxCDD	NV	NV	NA	NA	--	--	**8.01**	**5.31**	**13.9**	7.04
1,2,3,7,8,9-HxCDF	NV	NV	NA	NA	--	--	0.0933 U	0.258 U	**1.62**	0.146 U
1,2,3,7,8-PeCDD	NV	NV	NA	NA	--	--	**2.87**	**1.76**	**4.81**	2.68
1,2,3,7,8-PeCDF	NV	NV	NA	NA	--	--	0.483 U	**0.141 J**	**0.978 J**	0.288 U
2,3,4,6,7,8-HxCDF	NV	NV	NA	NA	--	--	**1.46**	**0.188 J**	**3.84**	0.105 J
2,3,4,7,8-PeCDF	NV	NV	NA	NA	--	--	**0.506 J**	**0.0704 J**	**1.06**	0.201 J
2,3,7,8-TCDD	NV	NV	NA	NA	--	--	**1.71**	**1.55**	**2.79**	2.06
2,3,7,8-TCDF	NV	NV	NA	NA	--	--	**1.06**	**0.088 J**	**2.48**	0.529 J
OCDD	NV	NV	NA	NA	--	--	**13700 J**	**130**	**22200 J**	45.4 U

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Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Lumber Shed		Former Boiler			
Location:					CR-07	CR-24	CR-08A		CR-08B	
Sample Name:					CR-07-SSD-COMP	CR-24-SSD-COMP	CR08a-SSD-COMP	CR08A-SBSD	CR08b-SSD-COMP	CR08b-SBSD
Collection Date:	SCO—Dry	CSL—Dry	SCO—Organic	CSL—Organic	10/13/2015	10/13/2015	10/14/2015	10/15/2015	10/14/2015	10/15/2015
OCDF	NV	NV	NA	NA	--	--	**73.9**	**6.41**	**128**	0.802 U
Total HpCDDs	NV	NV	NA	NA	--	--	**1650**	**32.3**	**4120**	26.3
Total HpCDFs	NV	NV	NA	NA	--	--	126 U	3.43 U	243 U	0.643 U
Total HxCDDs	NV	NV	NA	NA	--	--	147 U	33.2 U	**321**	45.4 U
Total HxCDFs	NV	NV	NA	NA	--	--	44 U	1.27 U	119 U	0.888 U
Total PeCDDs	NV	NV	NA	NA	--	--	25.9 U	12.7 U	**38.2**	21.9 U
Total PeCDFs	NV	NV	NA	NA	--	--	12.8 U	0.428 U	35.9 U	2.08 U
Total TCDDs	NV	NV	NA	NA	--	--	23.9 U	12 U	25 U	21.4 U
Total TCDFs	NV	NV	NA	NA	--	--	10.9 U	0.656 U	21.7 U	10.7 U
Dioxin TEQ	NV	NV	NA	NA	--	--	**17.6**	**4.31**	**30.4**	**5.97**
Petroleum Hydrocarbons—dry weight (mg/kg)										
Gasoline	NV	NV	NV	NV	--	--	--	--	--	--
Diesel	NV	NV	NV	NV	**180**	**370**	--	**26**	**130**	**170**
Motor-Oil Range	NV	NV	NV	NV	**520**	**850**	--	**74**	**320**	**280**
Conventionals										
Ammonia (as N) (mg N/kg)	NV	NV	NV	NV	--	--	--	--	--	--
Sulfide (mg/kg)	NV	NV	NV	NV	--	--	--	--	--	--
Total Volatile Solids (%)	NV	NV	NV	NV	--	--	--	--	--	--
Fixed Solids (%)	NV	NV	NV	NV	--	--	--	--	--	--
Total solids (%)	NV	NV	NV	NV	**67.22**	**54.35**	**47.46**	**63.97**	**44.38**	**55.76**
Grain Size (%)										
Gravel	NV	NV	NV	NV	--	--	--	--	--	--
Very coarse sand	NV	NV	NV	NV	--	--	--	--	--	--
Coarse sand	NV	NV	NV	NV	--	--	--	--	--	--
Medium sand	NV	NV	NV	NV	--	--	--	--	--	--
Fine sand	NV	NV	NV	NV	--	--	--	--	--	--
Very fine sand	NV	NV	NV	NV	--	--	--	--	--	--
Coarse silt	NV	NV	NV	NV	--	--	--	--	--	--
Medium silt	NV	NV	NV	NV	--	--	--	--	--	--
Fine silt	NV	NV	NV	NV	--	--	--	--	--	--
Very fine silt	NV	NV	NV	NV	--	--	--	--	--	--
Coarse clay	NV	NV	NV	NV	--	--	--	--	--	--
Medium clay	NV	NV	NV	NV	--	--	--	--	--	--
Fine clay	NV	NV	NV	NV	--	--	--	--	--	--
Total fines	NV	NV	NV	NV	--	--	--	--	--	--
Asbestos (%)										
Asbestos	NV	NV	NV	NV	--	--	<1	<1	<1	<1
Pore Water Analysis										
Conductivity (uS/cm)	NV	NV	NV	NV	--	--	--	--	--	--
Salinity (ppt)	NV	NV	NV	NV	--	--	--	--	--	--

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Beach Area		Shannon Slough	Chehalis River (2013)		
Location:					CR-09A	CR-09B	CR-10	CR-01	CR-02	CR-03
Sample Name:					CR09a-SSD-COMP	CR09b-SSD-COMP	CR10-SSD-COMP	CR01-10cm	CR02-10cm	CR03-10cm
Collection Date:	SCO—Dry Weight	CSL—Dry Weight	SCO—Organic Carbon	CSL—Organic Carbon	10/13/2015	10/13/2015	10/14/2015	11/08/2013	11/08/2013	11/08/2013
Collection Depth (ft bml):					0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Conventionals (%)										
Total Organic Carbon	NV	NV	NV	NV	**4.39**	**2.99**	**2.94**	**2.06 J**	**3.21 J**	**2.91 J**
PCBs (ug/kg-OC)										
Total PCBs[b]	NA	NA	12000	65000	410 U	635 U	646 U	1117 U	**374 J**	1581 U
SVOCs (ug/kg-OC)										
1,2,4-Trichlorobenzene	NA	NA	810	1800	107 U	161 U	**102 J**	233 U	153 U	165 U
1,2-Dichlorobenzene	NA	NA	2300	2300	107 U	161 U	**112 J**	233 U	153 U	165 U
1,4-Dichlorobenzene	NA	NA	3100	9000	**96 J**	161 U	**126 J**	233 U	**592 J**	165 U
Bis(2-ethylhexyl)phthalate	NA	NA	47000	78000	**979 J**	**1304 J**	1701 U	**1408 J**	1526 U	1649 U
Butylbenzylphthalate	NA	NA	4900	64000	**116**	161 U	170 U	233 U	153 U	165 U
Dibenzofuran	NA	NA	15000	58000	433 U	635 U	**952**	**583 J**	**623**	653 U
Diethylphthalate	NA	NA	61000	110000	433 U	635 U	680 U	**2718**	**623**	**1237**
Dimethyl phthalate	NA	NA	53000	53000	107 U	161 U	170 U	233 U	**97 J**	**86 J**
Di-n-butyl phthalate	NA	NA	220000	1700000	433 U	635 U	680 U	922 U	623 U	653 U
Di-n-octyl phthalate	NA	NA	58000	4500000	433 U	635 U	680 U	922 U	623 U	653 U
Hexachlorobenzene	NA	NA	380	2300	107 U	161 U	**112 J**	233 U	153 U	165 U
Hexachlorobutadiene	NA	NA	3900	6200	107 U	161 U	**95 J**	233 U	153 U	165 U
N-Nitrosodiphenylamine	NA	NA	11000	11000	107 U	161 U	170 U	233 U	153 U	165 U
PAHs (ug/kg-OC)										
2-Methylnaphthalene	NA	NA	38000	64000	433 U	635 U	**884**	922 U	**872**	653 U
Acenaphthene	NA	NA	16000	57000	433 U	635 U	**816**	**680 J**	**623**	653 U
Acenaphthylene	NA	NA	66000	66000	433 U	635 U	**2007**	922 U	**2118**	653 U
Anthracene	NA	NA	220000	1200000	433 U	**368 J**	**884**	**680 J**	**498 J**	653 U
Benzo(a)anthracene	NA	NA	110000	270000	433 U	**468 J**	**1565**	**1359**	**343 J**	653 U
Benzo(a)pyrene	NA	NA	99000	210000	433 U	**401 J**	**1088**	**1019**	623 U	653 U
Benzo(ghi)perylene	NA	NA	31000	78000	433 U	**468 J**	**986**	**680 J**	**467 J**	653 U
Chrysene	NA	NA	110000	460000	**228 J**	**803**	**1905**	**1699**	**530 J**	653 U
Dibenzo(a,h)anthracene	NA	NA	12000	33000	107 U	**130 J**	**289**	**146 J**	**153** U	165 U
Fluoranthene	NA	NA	160000	1200000	**501**	**1739**	**6122**	**4854**	**1963**	**859**
Fluorene	NA	NA	23000	79000	433 U	**468 J**	**986**	**680 J**	**467 J**	653 U
Indeno(1,2,3-cd)pyrene	NA	NA	34000	88000	433 U	**435 J**	**646 J**	922 U	623 U	653 U
Naphthalene	NA	NA	99000	170000	**1025**	635 U	**6803**	**1214**	**8723**	**790**
Phenanthrene	NA	NA	100000	480000	**592**	**1739**	**3741**	**2282**	**2773**	**653**
Pyrene	NA	NA	1000000	1400000	**387 J**	**1338**	**5102**	**5340**	**1900**	**722**
Total Benzofluoranthenes	NA	NA	230000	450000	**273 J**	**1137 J**	**3741**	**2524**	**685 J**	**447 J**
Total HPAHs[b]	NA	NA	960000	5300000	**1390**	**6920 J**	**21446**	**17621**	**5888**	**2027**
Total LPAHs[b]	NA	NA	370000	780000	**1617 J**	**3211 J**	**15238 J**	**5534**	**15202**	**1443**
PCBs—dry weight (ug/kg)										
Aroclor 1016	NV	NV	NA	NA	18 U	19 U	19 U	18 U	19 U	19 U
Aroclor 1221	NV	NV	NA	NA	18 U	19 U	19 U	18 U	19 U	19 U

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Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Beach Area		Shannon Slough	Chehalis River (2013)		
Location:					CR-09A	CR-09B	CR-10	CR-01	CR-02	CR-03
Sample Name:					CR09a-SSD-COMP	CR09b-SSD-COMP	CR10-SSD-COMP	CR01-10cm	CR02-10cm	CR03-10cm
Collection Date:	SCO—Dry	CSL—Dry	SCO—Organic	CSL—Organic	10/13/2015	10/13/2015	10/14/2015	11/08/2013	11/08/2013	11/08/2013
Aroclor 1232	NV	NV	NA	NA	18 U	19 U	19 U	23 U	38 U	46 U
Aroclor 1242	NV	NV	NA	NA	18 U	19 U	19 U	18 U	19 U	19 U
Aroclor 1248	NV	NV	NA	NA	18 U	19 U	19 U	18 U	19 U	19 U
Aroclor 1254	NV	NV	NA	NA	18 U	19 U	19 U	18 U	**12 J**	19 U
Aroclor 1260	NV	NV	NA	NA	18 U	19 U	19 U	18 U	19 U	19 U
Aroclor 1268	NV	NV	NA	NA	18 U	19 U	19 U	--	--	--
Total PCBs[b]	130	1000	NA	NA	18 U	19 U	19 U	23 U	**12 J**	46 U
SVOCs—dry weight (ug/kg)										
1,2,4-Trichlorobenzene	31	51	NA	NA	4.7 U	4.8 U	**3 J**	4.8 U	4.9 U	4.8 U
1,2-Dichlorobenzene	35	50	NA	NA	4.7 U	4.8 U	**3.3 J**	4.8 U	4.9 U	4.8 U
1,4-Dichlorobenzene	110	110	NA	NA	**4.2 J**	4.8 U	**3.7 J**	4.8 U	**19 J**	4.8 U
Bis(2-ethylhexyl)phthalate	1300	1900	NA	NA	**43 J**	**39 J**	50 U	**29 J**	49 U	48 U
Butylbenzylphthalate	63	900	NA	NA	**5.1**	4.8 U	5 U	4.8 U	4.9 U	4.8 U
Dibenzofuran	540	540	NA	NA	19 U	19 U	**28**	**12 J**	**20**	19 U
Diethylphthalate	200	>1200	NA	NA	19 U	19 U	20 U	**56**	**20**	**36**
Dimethyl phthalate	71	160	NA	NA	4.7 U	4.8 U	5 U	4.8 U	3.1 J	**2.5 J**
Di-n-butyl phthalate	1400	1400	NA	NA	19 U	19 U	20 U	19 U	20 U	19 U
Di-n-octyl phthalate	6200	6200	NA	NA	19 U	19 U	20 U	19 U	20 U	19 U
Hexachlorobenzene	22	70	NA	NA	4.7 U	4.8 U	**3.3 J**	4.8 U	4.9 U	4.8 U
Hexachlorobutadiene	11	120	NA	NA	4.7 U	4.8 U	**2.8 J**	4.8 U	4.9 U	4.8 U
N-Nitrosodiphenylamine	28	40	NA	NA	4.7 U	4.8 U	5 U	4.8 U	4.9 U	4.8 U
PAHs—dry weight (ug/kg)										
2-Methylnaphthalene	670	670	NA	NA	19 U	19 U	**26**	19 U	**28**	19 U
Acenaphthene	500	500	NA	NA	19 U	19 U	**24**	**14 J**	**20**	19 U
Acenaphthylene	1300	1300	NA	NA	19 U	19 U	**59**	19 U	**68**	19 U
Anthracene	960	960	NA	NA	19 U	**11 J**	**26**	**14 J**	**16 J**	19 U
Benzo(a)anthracene	1300	1600	NA	NA	19 U	**14 J**	**46**	**28**	**11 J**	19 U
Benzo(a)pyrene	1600	1600	NA	NA	19 U	**12 J**	**32**	**21**	20 U	19 U
Benzo(ghi)perylene	670	720	NA	NA	19 U	**14 J**	**29**	**14 J**	**15 J**	19 U
Chrysene	1400	2800	NA	NA	**10 J**	**24**	**56**	**35**	**17 J**	19 U
Dibenzo(a,h)anthracene	230	230	NA	NA	4.7 U	**3.9 J**	**8.5**	**3 J**	4.9 U	4.8 U
Fluoranthene	1700	2500	NA	NA	**22**	**52**	**180**	**100**	**63**	**25**
Fluorene	540	540	NA	NA	19 U	**14 J**	**29**	**14 J**	**15 J**	19 U
Indeno(1,2,3-cd)pyrene	600	690	NA	NA	19 U	**13 J**	**19 J**	19 U	20 U	19 U
Naphthalene	2100	2100	NA	NA	**45**	19 U	**200**	**25**	**280**	**23**
Phenanthrene	1500	1500	NA	NA	**26**	**52**	**110**	**47**	**89**	**19**
Pyrene	2600	3300	NA	NA	**17 J**	**40**	**150**	**110**	**61**	**21**
Total Benzofluoranthenes	3200	3600	NA	NA	**12 J**	**34 J**	**110**	**52**	**22 J**	**13 J**
Total HPAHs[b]	12000	17000	NA	NA	**61 J**	**207 J**	**631 J**	**363**	**189**	**59**
Total LPAHs[b]	5200	5200	NA	NA	**71**	**96 J**	**448**	**114**	**488**	**42**

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Beach Area		Shannon Slough	Chehalis River (2013)		
Location:					CR-09A	CR-09B	CR-10	CR-01	CR-02	CR-03
Sample Name:					CR09a-SSD-COMP	CR09b-SSD-COMP	CR10-SSD-COMP	CR01-10cm	CR02-10cm	CR03-10cm
Collection Date:	SCO—Dry	CSL—Dry	SCO—Organic	CSL—Organic	10/13/2015	10/13/2015	10/14/2015	11/08/2013	11/08/2013	11/08/2013
Total Metals—dry weight (mg/kg)										
Arsenic	57	93	NA	NA	9 U	9 U	**30**	10 U	9 U	10 U
Cadmium	5.1	6.7	NA	NA	0.4 U	**0.4**	0.4 U	**0.5**	**0.4**	0.5 U
Chromium	260	270	NA	NA	**31**	**39.9**	**42**	**40 J**	**38.5 J**	**48 J**
Copper	390	390	NA	NA	**40.8**	**49.2**	**54.8**	**58 J**	**56.3 J**	**65.4 J**
Lead	450	530	NA	NA	**8**	**10**	**11**	**7**	**9**	**8**
Mercury	0.41	0.59	NA	NA	**0.04**	**0.06**	**0.07**	**0.05**	**0.1**	**0.09**
Silver	6.1	6.1	NA	NA	0.5 U	0.5 U	0.6 U	0.7 U	0.6 U	0.8 U
Zinc	410	960	NA	NA	**68**	**80**	**83**	**87**	**79**	**91**
SVOCs—dry weight (ug/kg)										
1,3-Dichlorobenzene	NA	NA	NA	NA	--	--	--	4.8 U	4.9 U	4.8 U
2,4-Dimethylphenol	29	29	NA	NA	24 U	24 U	25 U	24 U	24 U	24 U
2-Methylphenol	63	63	NA	NA	**4 J**	**7.3**	**7.7**	4.8 U	4.9 U	**3.3 J**
3,4-Methylphenol	NA	NA	NA	NA	--	--	--	--	--	--
4-Methylphenol	670	670	NA	NA	**26**	19 U	**160 J**	**30**	**730**	**60**
Benzoic acid	650	650	NA	NA	**230**	**380**	**210 J**	190 U	**240**	**180 J**
Benzyl alcohol	57	73	NA	NA	19 U	**58**	**22**	**15 J**	**43 J**	**43 J**
Pentachlorophenol	360	690	NA	NA	19 UJ	19 UJ	**23**	19 U	20 U	19 U
Phenol	420	1200	NA	NA	**130**	**200**	**51**	**24**	**94**	**43**
PAHs—dry weight (ug/kg)										
1-Methylnaphthalene	NV	NV	NA	NA	**9.5 J**	19 U	**15 J**	--	--	--
TCLP Metals (mg/L)										
Lead	NA	NA	NA	NA	--	--	--	--	--	--
Mercury	NA	NA	NA	NA	--	--	--	--	--	--
Dioxins/Furans—dry weight (pg/g)										
1,2,3,4,6,7,8-HpCDD	NV	NV	NA	NA	**95.4**	**107**	--	**211**	**201**	**66.1**
1,2,3,4,6,7,8-HpCDF	NV	NV	NA	NA	**14.6**	**23.9**	--	**31.9**	**113**	**24.7**
1,2,3,4,7,8,9-HpCDF	NV	NV	NA	NA	**0.908 J**	**1.15**	--	**1.59**	**4.94**	**0.894 J**
1,2,3,4,7,8-HxCDD	NV	NV	NA	NA	**1.32**	**1.57**	--	**1.76**	**1.96**	**1.42**
1,2,3,4,7,8-HxCDF	NV	NV	NA	NA	0.991 U	1.16 U	--	**2.77**	**4.6**	**1.02**
1,2,3,6,7,8-HxCDD	NV	NV	NA	NA	**5.25**	**6.27**	--	**9.98**	**10.4**	**4.81**
1,2,3,6,7,8-HxCDF	NV	NV	NA	NA	**0.626 J**	**0.924 J**	--	**1.19**	**3.22**	**0.862 J**
1,2,3,7,8,9-HxCDD	NV	NV	NA	NA	**5.49**	**7.96**	--	**11.1**	**12.4**	**12.9**
1,2,3,7,8,9-HxCDF	NV	NV	NA	NA	**0.395 J**	**0.42 J**	--	0.778 U	**0.886 J**	**0.268 J**
1,2,3,7,8-PeCDD	NV	NV	NA	NA	**1.99**	**3.16**	--	**3.93**	**4.53**	**5.08**
1,2,3,7,8-PeCDF	NV	NV	NA	NA	0.383 U	**0.394 J**	--	**0.683 J**	**0.804 J**	**0.508 J**
2,3,4,6,7,8-HxCDF	NV	NV	NA	NA	**0.991**	**1.36**	--	**1.8**	**5.58**	**0.785 J**
2,3,4,7,8-PeCDF	NV	NV	NA	NA	0.379 U	0.528 U	--	**0.814 J**	**1.13**	**0.594 J**
2,3,7,8-TCDD	NV	NV	NA	NA	**1.18**	2.06 U	--	**2.62**	**2.89**	**3.56**
2,3,7,8-TCDF	NV	NV	NA	NA	**0.831 J**	**1.63**	--	**1.96**	**2.18**	**1.34**
OCDD	NV	NV	NA	NA	**700**	**788**	--	**1690**	**1550**	**489**

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Beach Area		Shannon Slough	Chehalis River (2013)		
Location:					CR-09A	CR-09B	CR-10	CR-01	CR-02	CR-03
Sample Name:					CR09a-SSD-COMP	CR09b-SSD-COMP	CR10-SSD-COMP	CR01-10cm	CR02-10cm	CR03-10cm
Collection Date:	SCO—Dry	CSL—Dry	SCO—Organic	CSL—Organic	10/13/2015	10/13/2015	10/14/2015	11/08/2013	11/08/2013	11/08/2013
OCDF	NV	NV	NA	NA	**23.8**	**33.8**	--	**51**	**211**	**36.4**
Total HpCDDs	NV	NV	NA	NA	**225**	**273**	--	**485**	**433**	**167**
Total HpCDFs	NV	NV	NA	NA	**37.3**	58.9 U	--	87.1 U	**310**	**55.9**
Total HxCDDs	NV	NV	NA	NA	48.3 U	72.3 U	--	**97**	**114**	80.8 U
Total HxCDFs	NV	NV	NA	NA	22.2 U	30.8 U	--	52.5 U	**125**	24.4 U
Total PeCDDs	NV	NV	NA	NA	12.4 U	21 U	--	**25.8**	**34.9**	**30.6**
Total PeCDFs	NV	NV	NA	NA	10.6 U	16.5 U	--	18 U	47.6 U	13.2 U
Total TCDDs	NV	NV	NA	NA	8.55 U	15.4 U	--	17.4 U	28.1 U	24.7 U
Total TCDFs	NV	NV	NA	NA	6.42 U	12.5 U	--	12.4 U	33 U	16.7 U
Dioxin TEQ	NV	NV	NA	NA	**6.10**	**7.92**	--	**12.9**	**15.6**	**12.2**
Petroleum Hydrocarbons—dry weight (mg/kg)										
Gasoline	NV	NV	NV	NV	--	--	--	--	--	--
Diesel	NV	NV	NV	NV	--	--	--	--	--	--
Motor-Oil Range	NV	NV	NV	NV	--	--	--	--	--	--
Conventionals										
Ammonia (as N) (mg N/kg)	NV	NV	NV	NV	--	--	--	--	--	--
Sulfide (mg/kg)	NV	NV	NV	NV	--	--	--	--	--	--
Total Volatile Solids (%)	NV	NV	NV	NV	--	--	--	--	--	--
Fixed Solids (%)	NV	NV	NV	NV	--	--	--	--	--	--
Total solids (%)	NV	NV	NV	NV	**55.6**	**59.33**	**45.44**	**44.09**	**51.8**	**36.4**
Grain Size (%)										
Gravel	NV	NV	NV	NV	--	--	--	--	--	--
Very coarse sand	NV	NV	NV	NV	--	--	--	--	--	--
Coarse sand	NV	NV	NV	NV	--	--	--	--	--	--
Medium sand	NV	NV	NV	NV	--	--	--	--	--	--
Fine sand	NV	NV	NV	NV	--	--	--	--	--	--
Very fine sand	NV	NV	NV	NV	--	--	--	--	--	--
Coarse silt	NV	NV	NV	NV	--	--	--	--	--	--
Medium silt	NV	NV	NV	NV	--	--	--	--	--	--
Fine silt	NV	NV	NV	NV	--	--	--	--	--	--
Very fine silt	NV	NV	NV	NV	--	--	--	--	--	--
Coarse clay	NV	NV	NV	NV	--	--	--	--	--	--
Medium clay	NV	NV	NV	NV	--	--	--	--	--	--
Fine clay	NV	NV	NV	NV	--	--	--	--	--	--
Total fines	NV	NV	NV	NV	--	--	--	--	--	--
Asbestos (%)										
Asbestos	NV	NV	NV	NV	--	--	--	--	--	--
Pore Water Analysis										
Conductivity (uS/cm)	NV	NV	NV	NV	--	--	--	**18700**	**12200**	**17500**
Salinity (ppt)	NV	NV	NV	NV	--	--	--	**11**	**6.9**	**10.2**

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Former Mill Area/Pocket Beach and Chehalis River						
Location:					Old Mill North	Old Mill North	Old Mill North	Old Mill West	Old Mill East	Old Mill West	Old Mill West
Sample Name:					DNR-SSFM1	DNR-SCFM1A	DNR-SSFM1-COMP	DNR-SSFM2	DNR-SSFM3	DNR-SCFM2A	DNR-SCFM2B
Collection Date:	SCO—Dry Weight	CSL—Dry Weight	SCO—Organic Carbon	CSL—Organic Carbon	Apr-11	Apr-11	Apr-11	Apr-11	Apr-11	Apr-11	Apr-11
Collection Depth (ft bml):					0-0.33	0-2.5	0-0.33	0-0.33	0-0.33	0-2.7	2.7-4.6
Conventionals (%)											
Total Organic Carbon	NV	NV	NV	NV	**25**	**28**	--	**32**	**30**	**21**	**40**
PCBs (ug/kg-OC)											
Total PCBs[b]	NA	NA	12000	65000	160 U	**50**	--	178 U	213 U	**162 P**	16 U
SVOCs (ug/kg-OC)											
1,2,4-Trichlorobenzene	NA	NA	810	1800	84 U	82 U	--	94 U	110 U	114 U	80 U
1,2-Dichlorobenzene	NA	NA	2300	2300	84 U	82 U	--	94 U	110 U	114 U	80 U
1,4-Dichlorobenzene	NA	NA	3100	9000	84 U	82 U	--	**406**	110 U	**2000**	80 U
Bis(2-ethylhexyl)phthalate	NA	NA	47000	78000	2520 U	2429 U	--	**12188**	3267 U	**4286**	2425 U
Butylbenzylphthalate	NA	NA	4900	64000	168 U	161 U		188 U	217 U	229 U	160 U
Dibenzofuran	NA	NA	15000	58000	**300**	**607**	--	**244**	**600**	**857**	160 U
Diethylphthalate	NA	NA	61000	110000	168 U	161 U	--	188 U	217 U	229 U	160 U
Dimethyl phthalate	NA	NA	53000	53000	168 U	161 U	--	188 U	217 U	229 U	160 U
Di-n-butyl phthalate	NA	NA	220000	1700000	336 U	325 U	--	375 U	433 U	**457**	325 U
Di-n-octyl phthalate	NA	NA	58000	4500000	336 U	325 U	--	375 U	**1067**	**1952**	**375**
Hexachlorobenzene	NA	NA	380	2300	84 U	82 U	--	94 U	110 U	114 U	80 U
Hexachlorobutadiene	NA	NA	3900	6200	84 U	82 U	--	94 U	110 U	114 U	80 U
N-Nitrosodiphenylamine	NA	NA	11000	11000	84 U	82 U	--	94 U	110 U	114 U	80 U
PAHs (ug/kg-OC)											
2-Methylnaphthalene	NA	NA	38000	64000	**188**	**207**	--	**66**	**467**	**1238**	**183**
Acenaphthene	NA	NA	16000	57000	**680**	**1286**	--	**81**	**533**	**1000**	**243**
Acenaphthylene	NA	NA	66000	66000	**180**	**189**	--	**116**	**500**	**857**	**128**
Anthracene	NA	NA	220000	1200000	**276**	**429**	--	**375**	**767**	**1000**	**113**
Benzo(a)anthracene	NA	NA	110000	270000	**840**	**929**	--	**875**	**1933**	**3476**	**300**
Benzo(a)pyrene	NA	NA	99000	210000	**520**	**929**	--	**531**	**1633**	**2571**	**450**
Benzo(ghi)perylene	NA	NA	31000	78000	**272**	**429**	--	**406**	**967**	**1190**	**250**
Chrysene	NA	NA	110000	460000	**920**	**1214**	--	**1313**	**2333**	**3762**	**525**
Dibenzo(a,h)anthracene	NA	NA	12000	33000	68 U	**132**	--	75 U	**277**	**410**	65 U
Fluoranthene	NA	NA	160000	1200000	**2920**	**3571**	--	**3125**	**4333**	**7143**	**800**
Fluorene	NA	NA	23000	79000	**440**	**1071**	--	**194**	**567**	**952**	**198**
Indeno(1,2,3-cd)pyrene	NA	NA	34000	88000	**244**	**464**	--	**344**	**733**	**1048**	**243**
Naphthalene	NA	NA	99000	170000	**520**	**357**	--	**109**	**867**	**3857**	**525**
Phenanthrene	NA	NA	100000	480000	**680**	**3214**	--	**813**	**3667**	**4238**	**600**
Pyrene	NA	NA	1000000	1400000	**2440**	**2750**	--	**2344**	**4667**	**7143**	**1200**
Total Benzofluoranthenes	NA	NA	230000	450000	**1240**	**2143**	--	**2156**	**4000**	**7143**	65 U
Total HPAHs[b]	NA	NA	960000	5300000	**9396**	**12561**	--	**11094**	**20877**	**33886**	**3768**
Total LPAHs[b]	NA	NA	370000	780000	**2776**	**6546**	--	**1688**	**6900**	**11905**	**1805**
PCBs—dry weight (ug/kg)											
Aroclor 1016	NV	NV	NA	NA	40 U	4.5 U	--	57 U	64 U	4.7 U	6.5 U
Aroclor 1221	NV	NV	NA	NA	40 U	4.5 U	--	57 U	64 U	4.7 U	6.5 U

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Former Mill Area/Pocket Beach and Chehalis River						
Location:					Old Mill North	Old Mill North	Old Mill North	Old Mill West	Old Mill East	Old Mill West	Old Mill West
Sample Name:					DNR-SSFM1	DNR-SCFM1A	DNR-SSFM1-COMP	DNR-SSFM2	DNR-SSFM3	DNR-SCFM2A	DNR-SCFM2B
Collection Date:	SCO—Dry	CSL—Dry	SCO—Organic	CSL—Organic	Apr-11	Apr-11	Apr-11	Apr-11	Apr-11	Apr-11	Apr-11
Aroclor 1232	NV	NV	NA	NA	40 U	4.5 U	--	57 U	64 U	4.7 U	6.5 U
Aroclor 1242	NV	NV	NA	NA	40 U	4.5 U	--	57 U	64 U	4.7 U	6.5 U
Aroclor 1248	NV	NV	NA	NA	40 U	4.5 U	--	57 U	64 U	4.7 U	6.5 U
Aroclor 1254	NV	NV	NA	NA	40 U	4.5 U	--	57 U	64 U	4.7 U	6.5 U
Aroclor 1260	NV	NV	NA	NA	40 U	**14**	--	57 U	64 U	**34 P**	6.5 U
Aroclor 1268	NV	NV	NA	NA	--	--	--	--	--	--	--
Total PCBs[b]	130	1000	NA	NA	40 U	**14**	--	57 U	64 U	**34**	6.5 U
SVOCs—dry weight (ug/kg)											
1,2,4-Trichlorobenzene	31	51	NA	NA	21 U	23 U	--	30 U	33 U	24 U	32 U
1,2-Dichlorobenzene	35	50	NA	NA	21 U	23 U	--	30 U	33 U	24 U	32 U
1,4-Dichlorobenzene	110	110	NA	NA	21 U	23 U	--	**130**	33 U	**420**	32 U
Bis(2-ethylhexyl)phthalate	1300	1900	NA	NA	630 U	680 U	--	**3900**	980 U	**900**	970 U
Butylbenzylphthalate	63	900	NA	NA	42 U	45 U		60 U	65 U	48 U	64 U
Dibenzofuran	540	540	NA	NA	**75**	**170**	--	**78**	**180**	**180**	64 U
Diethylphthalate	200	>1200	NA	NA	42 U	45 U	--	60 U	65 U	48 U	64 U
Dimethyl phthalate	71	160	NA	NA	42 U	45 U	--	60 U	65 U	48 U	64 U
Di-n-butyl phthalate	1400	1400	NA	NA	84 U	91 U	--	120 U	130 U	**96**	130 U
Di-n-octyl phthalate	6200	6200	NA	NA	84 U	91 U	--	120 U	**320**	**410**	**150**
Hexachlorobenzene	22	70	NA	NA	21 U	23 U	--	30 U	33 U	24 U	32 U
Hexachlorobutadiene	11	120	NA	NA	21 U	23 U	--	30 U	33 U	24 U	32 U
N-Nitrosodiphenylamine	28	40	NA	NA	21 U	23 U	--	30 U	33 U	24 U	32 U
PAHs—dry weight (ug/kg)											
2-Methylnaphthalene	670	670	NA	NA	**47**	**58**	--	**21**	**140**	**260**	**73**
Acenaphthene	500	500	NA	NA	**170**	**360**	--	**26**	**160**	**210**	**97**
Acenaphthylene	1300	1300	NA	NA	**45**	**53**	--	**37**	**150**	**180**	**51**
Anthracene	960	960	NA	NA	**69**	**120**	--	**120**	**230**	**210**	**45**
Benzo(a)anthracene	1300	1600	NA	NA	**210**	**260**	--	**280**	**580**	**730**	**120**
Benzo(a)pyrene	1600	1600	NA	NA	**130**	**260**	--	**170**	**490**	**540**	**180**
Benzo(ghi)perylene	670	720	NA	NA	**68**	**120**	--	**130**	**290**	**250**	**100**
Chrysene	1400	2800	NA	NA	**230**	**340**	--	**420**	**700**	**790**	**210**
Dibenzo(a,h)anthracene	230	230	NA	NA	17 U	**37**	--	24 U	**83**	**86**	26 U
Fluoranthene	1700	2500	NA	NA	**730**	**1000**	--	**1000**	**1300**	**1500**	**320**
Fluorene	540	540	NA	NA	**110**	**300**	--	**62**	**170**	**200**	**79**
Indeno(1,2,3-cd)pyrene	600	690	NA	NA	**61**	**130**	--	**110**	**220**	**220**	**97**
Naphthalene	2100	2100	NA	NA	**130**	**100**	--	**35**	**260**	**810**	**210**
Phenanthrene	1500	1500	NA	NA	**170**	**900**	--	**260**	**1100**	**890**	**240**
Pyrene	2600	3300	NA	NA	**610**	**770**	--	**750**	**1400**	**1500**	**480**
Total Benzofluoranthenes	3200	3600	NA	NA	**310**	**600**	--	**690**	**1200**	**1500**	26 U
Total HPAHs[b]	12000	17000	NA	NA	**2349**	**3517**	--	**3550**	**6263**	**7116**	**1507**
Total LPAHs[b]	5200	5200	NA	NA	**694**	**1833**	--	**540**	**2070**	**2500**	**722**

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Former Mill Area/Pocket Beach and Chehalis River						
Location:					Old Mill North	Old Mill North	Old Mill North	Old Mill West	Old Mill East	Old Mill West	Old Mill West
Sample Name:					DNR-SSFM1	DNR-SCFM1A	DNR-SSFM1-COMP	DNR-SSFM2	DNR-SSFM3	DNR-SCFM2A	DNR-SCFM2B
Collection Date:	SCO—Dry	CSL—Dry	SCO—Organic	CSL—Organic	Apr-11	Apr-11	Apr-11	Apr-11	Apr-11	Apr-11	Apr-11
Total Metals—dry weight (mg/kg)											
Arsenic	57	93	NA	NA	**12**	8.2 U	--	16 U	18 U	10 U	17 U
Cadmium	5.1	6.7	NA	NA	**3.3**	1.4 U	--	2.7 U	3 U	1.7 U	2.9 U
Chromium	260	270	NA	NA	**60**	**19**	--	**21**	**24**	**35**	**9.5**
Copper	390	390	NA	NA	**120**	**76**	--	**73**	**100**	**85**	**25**
Lead	450	530	NA	NA	**31**	**260**	--	**46**	**99**	**180**	**24**
Mercury	0.41	0.59	NA	NA	**0.19**	**0.18**	--	**1.2**	**0.77**	**2.5**	**2**
Silver	6.1	6.1	NA	NA	3.8 U	2.7 U	--	5.4 U	6 U	3.3 U	5.7 U
Zinc	410	960	NA	NA	**120**	**120**	--	**310**	**230**	**580**	**67**
SVOCs—dry weight (ug/kg)											
1,3-Dichlorobenzene	NA	NA	NA	NA	--	--	--	--	--	--	--
2,4-Dimethylphenol	29	29	NA	NA	42 U	45 U	--	60 U	65 U	48 U	64 U
2-Methylphenol	63	63	NA	NA	42 U	45 U	--	60 U	65 U	48 U	64 U
3,4-Methylphenol	NA	NA	NA	NA	**150**	**210**	--	120 U	**650**	**240**	**1100**
4-Methylphenol	670	670	NA	NA	--	--	--	--	--	--	--
Benzoic acid	650	650	NA	NA	1100 U	1100 U	--	1500 U	1600 U	1200 U	1600 U
Benzyl alcohol	57	73	NA	NA	42 U	45 U	--	60 U	65 U	48 U	64 U
Pentachlorophenol	360	690	NA	NA	84 U	91 U	--	120 U	130 U	**2100**	**180**
Phenol	420	1200	NA	NA	42 U	**52**	--	60 U	**77**	**130**	**230**
PAHs—dry weight (ug/kg)											
1-Methylnaphthalene	NV	NV	NA	NA	--	--	--	--	--	--	--
TCLP Metals (mg/L)											
Lead	NA	NA	NA	NA	--	--	--	--	--	--	--
Mercury	NA	NA	NA	NA	--	--	--	--	--	--	--
Dioxins/Furans—dry weight (pg/g)											
1,2,3,4,6,7,8-HpCDD	NV	NV	NA	NA	--	--	2400	--	--	--	--
1,2,3,4,6,7,8-HpCDF	NV	NV	NA	NA	--	--	290	--	--	--	--
1,2,3,4,7,8,9-HpCDF	NV	NV	NA	NA	--	--	**12 JQ**	--	--	--	--
1,2,3,4,7,8-HxCDD	NV	NV	NA	NA	--	--	**13 JQ**	--	--	--	--
1,2,3,4,7,8-HxCDF	NV	NV	NA	NA	--	--	**22 J**	--	--	--	--
1,2,3,6,7,8-HxCDD	NV	NV	NA	NA	--	--	**180**	--	--	--	--
1,2,3,6,7,8-HxCDF	NV	NV	NA	NA	--	--	9.5 U	--	--	--	--
1,2,3,7,8,9-HxCDD	NV	NV	NA	NA	--	--	**39**	--	--	--	--
1,2,3,7,8,9-HxCDF	NV	NV	NA	NA	--	--	3.9 U	--	--	--	--
1,2,3,7,8-PeCDD	NV	NV	NA	NA	--	--	11 U	--	--	--	--
1,2,3,7,8-PeCDF	NV	NV	NA	NA	--	--	4.5 U	--	--	--	--
2,3,4,6,7,8-HxCDF	NV	NV	NA	NA	--	--	8.9 U	--	--	--	--
2,3,4,7,8-PeCDF	NV	NV	NA	NA	--	--	7.5 U	--	--	--	--
2,3,7,8-TCDD	NV	NV	NA	NA	--	--	**2.7 J**	--	--	--	--
2,3,7,8-TCDF	NV	NV	NA	NA	--	--	**5.3 CON**	--	--	--	--
OCDD	NV	NV	NA	NA	--	--	**16000**	--	--	--	--

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Former Mill Area/Pocket Beach and Chehalis River						
Location:					Old Mill North	Old Mill North	Old Mill North	Old Mill West	Old Mill East	Old Mill West	Old Mill West
Sample Name:					DNR-SSFM1	DNR-SCFM1A	DNR-SSFM1-COMP	DNR-SSFM2	DNR-SSFM3	DNR-SCFM2A	DNR-SCFM2B
Collection Date:	SCO—Dry	CSL—Dry	SCO—Organic	CSL—Organic	Apr-11	Apr-11	Apr-11	Apr-11	Apr-11	Apr-11	Apr-11
OCDF	NV	NV	NA	NA	--	--	**690**	--	--	--	--
Total HpCDDs	NV	NV	NA	NA	--	--	**5400**	--	--	--	--
Total HpCDFs	NV	NV	NA	NA	--	--	**1200**	--	--	--	--
Total HxCDDs	NV	NV	NA	NA	--	--	**1400**	--	--	--	--
Total HxCDFs	NV	NV	NA	NA	--	--	**630**	--	--	--	--
Total PeCDDs	NV	NV	NA	NA	--	--	**53**	--	--	--	--
Total PeCDFs	NV	NV	NA	NA	--	--	**120**	--	--	--	--
Total TCDDs	NV	NV	NA	NA	--	--	**19**	--	--	--	--
Total TCDFs	NV	NV	NA	NA	--	--	**56**	--	--	--	--
Dioxin TEQ	NV	NV	NA	NA	--	--	**68**	--	--	--	--
Petroleum Hydrocarbons—dry weight (mg/kg)											
Gasoline	NV	NV	NV	NV	--	--	--	--	--	--	--
Diesel	NV	NV	NV	NV	--	--	--	--	--	--	--
Motor-Oil Range	NV	NV	NV	NV	--	--	--	--	--	--	--
Conventionals											
Ammonia (as N) (mg N/kg)	NV	NV	NV	NV	**25**	**28**	--	**32**	**30**	**21**	**40**
Sulfide (mg/kg)	NV	NV	NV	NV	**24**	**22**	--	**17**	**15**	**21**	**15**
Total Volatile Solids (%)	NV	NV	NV	NV	--	--	--	--	--	--	--
Fixed Solids (%)	NV	NV	NV	NV	--	--	--	--	--	--	--
Total solids (%)	NV	NV	NV	NV	**24**	**22**	**21.7**	**17**	**15**	**21**	**15**
Grain Size (%)											
Gravel	NV	NV	NV	NV	--	--	--	--	--	--	--
Very coarse sand	NV	NV	NV	NV	--	--	--	--	--	--	--
Coarse sand	NV	NV	NV	NV	--	--	--	--	--	--	--
Medium sand	NV	NV	NV	NV	--	--	--	--	--	--	--
Fine sand	NV	NV	NV	NV	--	--	--	--	--	--	--
Very fine sand	NV	NV	NV	NV	--	--	--	--	--	--	--
Coarse silt	NV	NV	NV	NV	--	--	--	--	--	--	--
Medium silt	NV	NV	NV	NV	--	--	--	--	--	--	--
Fine silt	NV	NV	NV	NV	--	--	--	--	--	--	--
Very fine silt	NV	NV	NV	NV	--	--	--	--	--	--	--
Coarse clay	NV	NV	NV	NV	--	--	--	--	--	--	--
Medium clay	NV	NV	NV	NV	--	--	--	--	--	--	--
Fine clay	NV	NV	NV	NV	--	--	--	--	--	--	--
Total fines	NV	NV	NV	NV	--	--	--	--	--	--	--
Asbestos (%)											
Asbestos	NV	NV	NV	NV	--	--	--	--	--	--	--
Pore Water Analysis											
Conductivity (uS/cm)	NV	NV	NV	NV	--	--	--	--	--	--	--
Salinity (ppt)	NV	NV	NV	NV	--	--	--	--	--	--	--

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Former Mill Area/Pocket Beach and Chehalis River					
Location:					Old Mill East	CR-04	CR-04	CR-04	CR-05	CR-05
Sample Name:					DNR-SCFM3A	CR04-10cm	CR04-2.5	CR04-5	CR05-10cm	CR05-2.5
Collection Date:	SCO—Dry Weight	CSL—Dry Weight	SCO—Organic Carbon	CSL—Organic Carbon	Apr-11	11/07/2013	11/08/2013	11/08/2013	11/08/2013	11/08/2013
Collection Depth (ft bml):					0-3.0	0-0.33	1-2.5	2.5-5	0-0.33	0.33-2.5
Conventionals (%)										
Total Organic Carbon	NV	NV	NV	NV	**31**	**31.4 J**	--	**16.5 J**	**13.6 J**	--
PCBs (ug/kg-OC)										
Total PCBs[b]	NA	NA	12000	65000	**1290**	NA	NA	--	NA	NA
SVOCs (ug/kg-OC)										
1,2,4-Trichlorobenzene	NA	NA	810	1800	**645**	NA	NA	--	NA	NA
1,2-Dichlorobenzene	NA	NA	2300	2300	419 U	NA	NA	--	NA	NA
1,4-Dichlorobenzene	NA	NA	3100	9000	419 U	NA	NA	--	NA	NA
Bis(2-ethylhexyl)phthalate	NA	NA	47000	78000	12581 U	NA	NA	--	NA	NA
Butylbenzylphthalate	NA	NA	4900	64000	839 U	NA	NA	--	NA	NA
Dibenzofuran	NA	NA	15000	58000	**1129**	NA	NA	--	NA	NA
Diethylphthalate	NA	NA	61000	110000	839 U	NA	NA	--	NA	NA
Dimethyl phthalate	NA	NA	53000	53000	839 U	NA	NA	--	NA	NA
Di-n-butyl phthalate	NA	NA	220000	1700000	1677 U	NA	NA	--	NA	NA
Di-n-octyl phthalate	NA	NA	58000	4500000	**2871**	NA	NA	--	NA	NA
Hexachlorobenzene	NA	NA	380	2300	419 U	NA	NA	--	NA	NA
Hexachlorobutadiene	NA	NA	3900	6200	419 U	NA	NA	--	NA	NA
N-Nitrosodiphenylamine	NA	NA	11000	11000	419 U	NA	NA	--	NA	NA
PAHs (ug/kg-OC)										
2-Methylnaphthalene	NA	NA	38000	64000	**419**	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	16000	57000	**3548**	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	66000	66000	**277**	NA	NA	NA	NA	NA
Anthracene	NA	NA	220000	1200000	**1032**	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	110000	270000	**2258**	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	99000	210000	**1323**	NA	NA	NA	NA	NA
Benzo(ghi)perylene	NA	NA	31000	78000	**806**	NA	NA	NA	NA	NA
Chrysene	NA	NA	110000	460000	**2290**	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	12000	33000	323 U	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	160000	1200000	**10645**	NA	NA	NA	NA	NA
Fluorene	NA	NA	23000	79000	**1645**	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	34000	88000	**645**	NA	NA	NA	NA	NA
Naphthalene	NA	NA	99000	170000	**903**	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	100000	480000	**1806**	NA	NA	NA	NA	NA
Pyrene	NA	NA	1000000	1400000	**8710**	NA	NA	NA	NA	NA
Total Benzofluoranthenes	NA	NA	230000	450000	323 U	NA	NA	NA	NA	NA
Total HPAHs[b]	NA	NA	960000	5300000	**26677**	NA	NA	NA	NA	NA
Total LPAHs[b]	NA	NA	370000	780000	**9213**	NA	NA	NA	NA	NA
PCBs—dry weight (ug/kg)										
Aroclor 1016	NV	NV	NA	NA	5.3 U	20 UJ	19 UJ	--	20 UJ	19 UJ
Aroclor 1221	NV	NV	NA	NA	5.3 U	20 UJ	19 UJ	--	20 UJ	19 UJ

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Former Mill Area/Pocket Beach and Chehalis River					
Location:					Old Mill East	CR-04	CR-04	CR-04	CR-05	CR-05
Sample Name:					DNR-SCFM3A	CR04-10cm	CR04-2.5	CR04-5	CR05-10cm	CR05-2.5
Collection Date:	SCO—Dry	CSL—Dry	SCO—Organic	CSL—Organic	Apr-11	11/07/2013	11/08/2013	11/08/2013	11/08/2013	11/08/2013
Aroclor 1232	NV	NV	NA	NA	5.3 U	20 UJ	19 UJ	--	20 UJ	19 UJ
Aroclor 1242	NV	NV	NA	NA	5.3 U	20 UJ	19 UJ	--	20 UJ	19 UJ
Aroclor 1248	NV	NV	NA	NA	5.3 U	29 UJ	48 UJ	--	29 UJ	97 UJ
Aroclor 1254	NV	NV	NA	NA	5.3 U	97 UJ	**440 J**	--	98 UJ	**490 J**
Aroclor 1260	NV	NV	NA	NA	**400**	**200 J**	**730 J**	--	**180 J**	**670 J**
Aroclor 1268	NV	NV	NA	NA	--	--	--	--	--	--
Total PCBs[b]	130	1000	NA	NA	**400**	**200 J**	**1170 J**	--	**180 J**	**1160 J**
SVOCs—dry weight (ug/kg)										
1,2,4-Trichlorobenzene	31	51	NA	NA	**200**	100 UJ	81 UJ	--	**43 J**	**74 J**
1,2-Dichlorobenzene	35	50	NA	NA	130 U	100 UJ	81 UJ	--	58 UJ	88 UJ
1,4-Dichlorobenzene	110	110	NA	NA	130 U	100 UJ	81 UJ	--	**1000 J**	**540 J**
Bis(2-ethylhexyl)phthalate	1300	1900	NA	NA	3900 U	1000 UJ	**870 J**	--	**960 J**	**9400 J**
Butylbenzylphthalate	63	900	NA	NA	260 U	58 UJ	81 UJ	--	58 UJ	88 UJ
Dibenzofuran	540	540	NA	NA	**350**	420 UJ	**210 J**	--	**310 J**	**230 J**
Diethylphthalate	200	>1200	NA	NA	260 U	420 UJ	320 UJ	--	230 UJ	350 UJ
Dimethyl phthalate	71	160	NA	NA	260 U	100 UJ	81 UJ	--	58 UJ	88 UJ
Di-n-butyl phthalate	1400	1400	NA	NA	520 U	420 UJ	320 UJ	--	230 UJ	350 UJ
Di-n-octyl phthalate	6200	6200	NA	NA	**890**	420 UJ	320 UJ	--	230 UJ	350 UJ
Hexachlorobenzene	22	70	NA	NA	130 U	100 UJ	81 UJ	--	58 UJ	88 UJ
Hexachlorobutadiene	11	120	NA	NA	130 U	100 UJ	81 UJ	--	58 UJ	88 UJ
N-Nitrosodiphenylamine	28	40	NA	NA	130 U	100 UJ	81 UJ	--	58 UJ	88 UJ
PAHs—dry weight (ug/kg)										
2-Methylnaphthalene	670	670	NA	NA	**130**	420 UJ	320 UJ	--	**310**	350 UJ
Acenaphthene	500	500	NA	NA	**1100**	420 UJ	**180 J**	--	**210**	**390 J**
Acenaphthylene	1300	1300	NA	NA	**86**	420 UJ	320 UJ	--	**170**	350 UJ
Anthracene	960	960	NA	NA	**320**	420 UJ	**290 J**	--	**230**	**320 J**
Benzo(a)anthracene	1300	1600	NA	NA	**700**	**250 J**	**640 J**	--	**390**	**680 J**
Benzo(a)pyrene	1600	1600	NA	NA	**410**	**300 J**	**680 J**	--	**340 J**	**530 J**
Benzo(ghi)perylene	670	720	NA	NA	**250**	**230 J**	**660 J**	--	**260 J**	**300 J**
Chrysene	1400	2800	NA	NA	**710**	**530 J**	**940 J**	--	**420 J**	**460 J**
Dibenzo(a,h)anthracene	230	230	NA	NA	100 U	**120 J**	**360 J**	--	**94 J**	**190 J**
Fluoranthene	1700	2500	NA	NA	**3300**	**590 J**	**2200 J**	--	**1300 J**	**3900 J**
Fluorene	540	540	NA	NA	**510**	420 UJ	**180 J**	--	**260 J**	**230 J**
Indeno(1,2,3-cd)pyrene	600	690	NA	NA	**200**	420 UJ	**480 J**	--	**200 J**	**190 J**
Naphthalene	2100	2100	NA	NA	**280**	**420 J**	**340 J**	--	**720 J**	**440 J**
Phenanthrene	1500	1500	NA	NA	**560**	**320 J**	**370 J**	--	**700 J**	**470 J**
Pyrene	2600	3300	NA	NA	**2700**	**700 J**	**1800 J**	--	**1300 J**	**3100 J**
Total Benzofluoranthenes	3200	3600	NA	NA	100 U	**550 J**	**1700 J**	--	**660**	**810 J**
Total HPAHs[b]	12000	17000	NA	NA	**8270**	**3270 J**	**9460 J**	--	**4964 J**	**10160 J**
Total LPAHs[b]	5200	5200	NA	NA	**2856**	**740 J**	**1360 J**	--	**2290 J**	**1850 J**

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Former Mill Area/Pocket Beach and Chehalis River					
Location:					Old Mill East	CR-04	CR-04	CR-04	CR-05	CR-05
Sample Name:					DNR-SCFM3A	CR04-10cm	CR04-2.5	CR04-5	CR05-10cm	CR05-2.5
Collection Date:	SCO—Dry	CSL—Dry	SCO—Organic	CSL—Organic	Apr-11	11/07/2013	11/08/2013	11/08/2013	11/08/2013	11/08/2013
Total Metals—dry weight (mg/kg)										
Arsenic	57	93	NA	NA	14 U	--	--	--	--	--
Cadmium	5.1	6.7	NA	NA	2.3 U	--	--	--	--	--
Chromium	260	270	NA	NA	**27**	--	--	--	--	--
Copper	390	390	NA	NA	**84**	--	--	--	--	--
Lead	450	530	NA	NA	**68**	--	--	--	--	--
Mercury	0.41	0.59	NA	NA	**0.54**	**6.2**	**0.5 J**	--	**0.16**	**0.5 J**
Silver	6.1	6.1	NA	NA	4.7 U	--	--	--	--	--
Zinc	410	960	NA	NA	**250**	--	--	--	--	--
SVOCs—dry weight (ug/kg)										
1,3-Dichlorobenzene	NA	NA	NA	NA	--	100 UJ	81 UJ	--	**620 J**	**280 J**
2,4-Dimethylphenol	29	29	NA	NA	260 U	530 UJ	400 UJ	--	290 UJ	440 UJ
2-Methylphenol	63	63	NA	NA	260 U	100 UJ	81 UJ	--	**44 J**	88 UJ
3,4-Methylphenol	NA	NA	NA	NA	520 U	--	--	--	--	--
4-Methylphenol	670	670	NA	NA	--	420 UJ	320 UJ	--	**310 J**	**280 J**
Benzoic acid	650	650	NA	NA	6500 U	**1700 J**	3200 UJ	--	**950 J**	3500 UJ
Benzyl alcohol	57	73	NA	NA	260 U	420 UJ	320 UJ	--	230 UJ	350 UJ
Pentachlorophenol	360	690	NA	NA	520 U	**270 J**	**400 J**	--	230 UJ	350 UJ
Phenol	420	1200	NA	NA	260 U	**290 J**	**390 J**	**980 J**	**570 J**	**530 J**
PAHs—dry weight (ug/kg)										
1-Methylnaphthalene	NV	NV	NA	NA	--	--	--	--	--	--
TCLP Metals (mg/L)										
Lead	NA	NA	NA	NA	--	--	--	--	--	--
Mercury	NA	NA	NA	NA	--	--	--	--	--	--
Dioxins/Furans—dry weight (pg/g)										
1,2,3,4,6,7,8-HpCDD	NV	NV	NA	NA	--	**817**	**4070**	--	**1820**	**12200**
1,2,3,4,6,7,8-HpCDF	NV	NV	NA	NA	--	**165**	**919**	--	**437**	**1170**
1,2,3,4,7,8,9-HpCDF	NV	NV	NA	NA	--	7.55 U	**42.8**	--	**19.8**	**81.3**
1,2,3,4,7,8-HxCDD	NV	NV	NA	NA	--	**4.26**	**32.5**	--	**11.2**	**24.5**
1,2,3,4,7,8-HxCDF	NV	NV	NA	NA	--	**7.26**	**35.9**	--	**15.3**	**115**
1,2,3,6,7,8-HxCDD	NV	NV	NA	NA	--	**54.5**	**350**	--	**136**	**1020**
1,2,3,6,7,8-HxCDF	NV	NV	NA	NA	--	**3.38**	**18.9**	--	**10.9**	**51.7**
1,2,3,7,8,9-HxCDD	NV	NV	NA	NA	--	**10.2**	**48.1**	--	**29.9**	**98.1**
1,2,3,7,8,9-HxCDF	NV	NV	NA	NA	--	**2.45**	**14.6**	--	**6.11**	**62.9**
1,2,3,7,8-PeCDD	NV	NV	NA	NA	--	**4.34**	**18.8**	--	**13.9**	**34.1**
1,2,3,7,8-PeCDF	NV	NV	NA	NA	--	**2.06**	**12.4**	--	**4.73**	**41.4**
2,3,4,6,7,8-HxCDF	NV	NV	NA	NA	--	**5.09**	**22.2**	--	**11.1**	**69.3**
2,3,4,7,8-PeCDF	NV	NV	NA	NA	--	**3.43**	**15.7**	--	**5.82**	**43.5**
2,3,7,8-TCDD	NV	NV	NA	NA	--	1.14 U	**3.97**	--	**3**	**5.26**
2,3,7,8-TCDF	NV	NV	NA	NA	--	**3.53**	**16**	--	**6.3**	**54.3**
OCDD	NV	NV	NA	NA	--	**5340 J**	**23500 J**	--	**10300 J**	**68300 J**

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Former Mill Area/Pocket Beach and Chehalis River					
Location:					Old Mill East	CR-04	CR-04	CR-04	CR-05	CR-05
Sample Name:					DNR-SCFM3A	CR04-10cm	CR04-2.5	CR04-5	CR05-10cm	CR05-2.5
Collection Date:	SCO—Dry	CSL—Dry	SCO—Organic	CSL—Organic	Apr-11	11/07/2013	11/08/2013	11/08/2013	11/08/2013	11/08/2013
OCDF	NV	NV	NA	NA	--	**476**	**1900**	--	**863**	**3100**
Total HpCDDs	NV	NV	NA	NA	--	**1530**	**7520**	--	**3750**	**21300**
Total HpCDFs	NV	NV	NA	NA	--	678 U	**3910**	--	**1560**	5060 U
Total HxCDDs	NV	NV	NA	NA	--	350 U	1540 U	--	1010 U	**4840**
Total HxCDFs	NV	NV	NA	NA	--	301 U	**2130**	--	**853**	6030 U
Total PeCDDs	NV	NV	NA	NA	--	68.7 U	133 U	--	334 U	862 U
Total PeCDFs	NV	NV	NA	NA	--	101 U	658 U	--	281 U	2660 U
Total TCDDs	NV	NV	NA	NA	--	17.5 U	32.6 U	--	73.6 U	**180**
Total TCDFs	NV	NV	NA	NA	--	27.9 U	119 U	--	78.1 U	558 U
Dioxin TEQ	NV	NV	NA	NA	--	**26.7**	**140**	--	**67.6**	**359**
Petroleum Hydrocarbons—dry weight (mg/kg)										
Gasoline	NV	NV	NV	NV	--	--	--	--	--	--
Diesel	NV	NV	NV	NV	--	**2400 J**	**3200 J**	**--**	**1200 J**	**3200 J**
Motor-Oil Range	NV	NV	NV	NV	--	**7400 J**	**10000 J**	**--**	**4800 J**	**13000 J**
Conventionals										
Ammonia (as N) (mg N/kg)	NV	NV	NV	NV	**31**	0.47 U	--	**15.2**	**7.21**	--
Sulfide (mg/kg)	NV	NV	NV	NV	**19**	**6.46**	--	**179**	**320**	--
Total Volatile Solids (%)	NV	NV	NV	NV	--	**59.91**	--	**38.2**	**36.49**	--
Fixed Solids (%)	NV	NV	NV	NV	--	--	--	--	--	--
Total solids (%)	NV	NV	NV	NV	**19**	**20.62**	--	**19.98**	**30.32**	--
Grain Size (%)										
Gravel	NV	NV	NV	NV	--	**22.8**	--	**23.6**	**20.2**	--
Very coarse sand	NV	NV	NV	NV	--	**13.8**	--	**13**	**11.4**	--
Coarse sand	NV	NV	NV	NV	--	**14.2**	--	**10.7**	**13.2**	--
Medium sand	NV	NV	NV	NV	--	**8.5**	--	**6.1**	**10.5**	--
Fine sand	NV	NV	NV	NV	--	**3.7**	--	**3.2**	**6**	--
Very fine sand	NV	NV	NV	NV	--	**1.4**	--	**1.4**	**3.5**	--
Coarse silt	NV	NV	NV	NV	--	**7.2**	--	**1.3**	**8.1**	--
Medium silt	NV	NV	NV	NV	--	**5.9**	--	**10.6**	**7.7**	--
Fine silt	NV	NV	NV	NV	--	**6.2**	--	**8.9**	**5.1**	--
Very fine silt	NV	NV	NV	NV	--	**4.8**	--	**6.1**	**4.5**	--
Coarse clay	NV	NV	NV	NV	--	**2.9**	--	**4.3**	**2.1**	--
Medium clay	NV	NV	NV	NV	--	**2.6**	--	**3.7**	**2.4**	--
Fine clay	NV	NV	NV	NV	--	**6.1**	--	**7.2**	**5.4**	--
Total fines	NV	NV	NV	NV	--	**35.6**	--	**42.1**	**35.3**	--
Asbestos (%)										
Asbestos	NV	NV	NV	NV	--	--	--	--	--	--
Pore Water Analysis										
Conductivity (uS/cm)	NV	NV	NV	NV	--	--	--	--	--	--
Salinity (ppt)	NV	NV	NV	NV	--	--	--	--	--	--

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Former Mill Area/Pocket Beach and Chehalis River						
Location:					CR-06	CR-06	CR-11	CR-12	CR-13	CR-14	CR-11-14-COMP
Sample Name:					CR06-10cm	CR06-2.5	CR11-SBSD-23	CR12-SBSD-15	CR13-SBSD-11	CR14-SBSD-12	CR11-14-SBSD-COMP
Collection Date:	SCO—Dry Weight	CSL—Dry Weight	SCO—Organic Carbon	CSL—Organic Carbon	11/07/2013	11/07/2013	10/13/2015	10/13/2015	10/13/2015	10/13/2015	10/13/2015
Collection Depth (ft bml):					0-0.33	1-2.5	23	15	11	12	11-23
Conventionals (%)											
Total Organic Carbon	NV	NV	NV	NV	**35.6 J**	**49.5 J**	**0.415**	**3.33**	**2.5**	**3.22**	--
PCBs (ug/kg-OC)											
Total PCBs[b]	NA	NA	12000	65000	--	NA	4096 U	601 U	800 U	621 U	--
SVOCs (ug/kg-OC)											
1,2,4-Trichlorobenzene	NA	NA	810	1800	--	NA	1133 U	147 U	196 U	152 U	--
1,2-Dichlorobenzene	NA	NA	2300	2300	--	NA	1133 U	147 U	196 U	152 U	--
1,4-Dichlorobenzene	NA	NA	3100	9000	--	NA	1133 U	147 U	196 U	152 U	--
Bis(2-ethylhexyl)phthalate	NA	NA	47000	78000	--	NA	11325 U	1471 U	1960 U	1522 U	--
Butylbenzylphthalate	NA	NA	4900	64000	--	NA	1133 U	147 U	**292**	**146 J**	--
Dibenzofuran	NA	NA	15000	58000	--	NA	4578 U	**1201**	800 U	**621**	--
Diethylphthalate	NA	NA	61000	110000	--	NA	4578 U	601 U	800 U	621 U	--
Dimethyl phthalate	NA	NA	53000	53000	--	NA	1133 U	147 U	196 U	152 U	--
Di-n-butyl phthalate	NA	NA	220000	1700000	--	NA	4578 U	601 U	800 U	621 U	--
Di-n-octyl phthalate	NA	NA	58000	4500000	--	NA	4578 U	601 U	800 U	621 U	--
Hexachlorobenzene	NA	NA	380	2300	--	NA	1133 U	147 U	196 U	152 U	--
Hexachlorobutadiene	NA	NA	3900	6200	--	NA	1133 U	147 U	196 U	152 U	--
N-Nitrosodiphenylamine	NA	NA	11000	11000	--	NA	1133 U	147 UJ	196 U	152 U	--
PAHs (ug/kg-OC)											
2-Methylnaphthalene	NA	NA	38000	64000	NA	NA	4578 U	**1231**	800 U	**652**	--
Acenaphthene	NA	NA	16000	57000	NA	NA	4578 U	**1231**	**1240**	**621**	--
Acenaphthylene	NA	NA	66000	66000	NA	NA	4578 U	**3303**	**4400**	**1894**	--
Anthracene	NA	NA	220000	1200000	NA	NA	4578 U	**1231**	**1120**	**559 J**	--
Benzo(a)anthracene	NA	NA	110000	270000	NA	NA	**2651 J**	**901**	**800**	**528 J**	--
Benzo(a)pyrene	NA	NA	99000	210000	NA	NA	4578 U	601 U	800 U	621 U	--
Benzo(ghi)perylene	NA	NA	31000	78000	NA	NA	4578 U	**901**	**1200**	**621**	--
Chrysene	NA	NA	110000	460000	NA	NA	**2892 J**	**1291**	**1160**	**776**	--
Dibenzo(a,h)anthracene	NA	NA	12000	33000	NA	NA	1133 U	**189**	**172 J**	**99 J**	--
Fluoranthene	NA	NA	160000	1200000	NA	NA	**5783**	**4505**	**4000**	**2733**	--
Fluorene	NA	NA	23000	79000	NA	NA	4578 U	**1411**	**1400**	**714**	--
Indeno(1,2,3-cd)pyrene	NA	NA	34000	88000	NA	NA	4578 U	**721**	**720 J**	**466 J**	--
Naphthalene	NA	NA	99000	170000	NA	NA	4578 U	**11111**	**12000**	**5901**	--
Phenanthrene	NA	NA	100000	480000	NA	NA	**4578**	**6306**	**6000**	**3727**	--
Pyrene	NA	NA	1000000	1400000	NA	NA	**5542**	**4505**	**4400**	**2702**	--
Total Benzofluoranthenes	NA	NA	230000	450000	NA	NA	**3855 J**	**1832**	**1600**	**1211**	--
Total HPAHs[b]	NA	NA	960000	5300000	NA	NA	**20723**	**14844**	**14052**	**9137 J**	--
Total LPAHs[b]	NA	NA	370000	780000	NA	NA	**4578 J**	**24595**	**26160 J**	**13416 J**	--
PCBs—dry weight (ug/kg)											
Aroclor 1016	NV	NV	NA	NA	--	20 U	17 U	20 U	20 U	20 U	--
Aroclor 1221	NV	NV	NA	NA	--	20 U	17 U	20 U	20 U	20 U	--

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Former Mill Area/Pocket Beach and Chehalis River						
Location:					CR-06	CR-06	CR-11	CR-12	CR-13	CR-14	CR-11-14-COMP
Sample Name:					CR06-10cm	CR06-2.5	CR11-SBSD-23	CR12-SBSD-15	CR13-SBSD-11	CR14-SBSD-12	CR11-14-SBSD-COMP
Collection Date:	SCO—Dry	CSL—Dry	SCO—Organic	CSL—Organic	11/07/2013	11/07/2013	10/13/2015	10/13/2015	10/13/2015	10/13/2015	10/13/2015
Aroclor 1232	NV	NV	NA	NA	--	20 U	17 U	20 U	20 U	20 U	--
Aroclor 1242	NV	NV	NA	NA	--	20 U	17 U	20 U	20 U	20 U	--
Aroclor 1248	NV	NV	NA	NA	--	99 U	17 U	20 U	20 U	20 U	--
Aroclor 1254	NV	NV	NA	NA	--	200 U	17 U	20 U	20 U	20 U	--
Aroclor 1260	NV	NV	NA	NA	--	**690**	17 U	20 U	20 U	20 U	--
Aroclor 1268	NV	NV	NA	NA	--	--	17 U	20 U	20 U	20 U	--
Total PCBs[b]	130	1000	NA	NA	--	**690**	17 U	20 U	20 U	20 U	--
SVOCs—dry weight (ug/kg)											
1,2,4-Trichlorobenzene	31	51	NA	NA	--	70 U	4.7 U	4.9 U	4.9 U	4.9 U	--
1,2-Dichlorobenzene	35	50	NA	NA	--	70 U	4.7 U	4.9 U	4.9 U	4.9 U	--
1,4-Dichlorobenzene	110	110	NA	NA	--	70 U	4.7 U	4.9 U	4.9 U	4.9 U	--
Bis(2-ethylhexyl)phthalate	1300	1900	NA	NA	--	**1900**	47 U	49 U	49 U	49 U	--
Butylbenzylphthalate	63	900	NA	NA	310 UJ	70 U	4.7 U	4.9 U	**7.3**	**4.7 J**	--
Dibenzofuran	540	540	NA	NA	--	**490**	19 U	**40**	20 U	**20**	--
Diethylphthalate	200	>1200	NA	NA	--	**270 J**	19 U	20 U	20 U	20 U	--
Dimethyl phthalate	71	160	NA	NA	--	70 U	4.7 U	4.9 U	4.9 U	4.9 U	--
Di-n-butyl phthalate	1400	1400	NA	NA	--	280 U	19 U	20 U	20 U	20 U	--
Di-n-octyl phthalate	6200	6200	NA	NA	--	280 U	19 U	20 U	20 U	20 U	--
Hexachlorobenzene	22	70	NA	NA	--	70 U	4.7 U	4.9 U	4.9 U	4.9 U	--
Hexachlorobutadiene	11	120	NA	NA	--	70 U	4.7 U	4.9 U	4.9 U	4.9 U	--
N-Nitrosodiphenylamine	28	40	NA	NA	--	70 U	4.7 U	4.9 UJ	4.9 U	4.9 U	--
PAHs—dry weight (ug/kg)											
2-Methylnaphthalene	670	670	NA	NA	--	**780**	19 U	**41**	20 U	**21**	--
Acenaphthene	500	500	NA	NA	--	**490**	19 U	**41**	**31**	**20**	--
Acenaphthylene	1300	1300	NA	NA	--	**520**	19 U	**110**	**110**	**61**	--
Anthracene	960	960	NA	NA	--	**750**	19 U	**41**	**28**	**18 J**	--
Benzo(a)anthracene	1300	1600	NA	NA	--	**1300**	**11 J**	**30**	**20**	**17 J**	--
Benzo(a)pyrene	1600	1600	NA	NA	--	**1200**	19 U	20 U	20 U	20 U	--
Benzo(ghi)perylene	670	720	NA	NA	--	**590**	19 U	**30**	**30**	**20**	--
Chrysene	1400	2800	NA	NA	--	**1600**	**12 J**	**43**	**29**	**25**	--
Dibenzo(a,h)anthracene	230	230	NA	NA	--	**150**	4.7 U	**6.3**	**4.3 J**	**3.2 J**	--
Fluoranthene	1700	2500	NA	NA	--	**3200**	**24**	**150**	**100**	**88**	--
Fluorene	540	540	NA	NA	--	**650**	19 U	**47**	**35**	**23**	--
Indeno(1,2,3-cd)pyrene	600	690	NA	NA	--	**490**	19 U	**24**	**18 J**	**15 J**	--
Naphthalene	2100	2100	NA	NA	--	**1800**	19 U	**370**	**300**	**190**	--
Phenanthrene	1500	1500	NA	NA	--	**3600**	**19**	**210**	**150**	**120**	--
Pyrene	2600	3300	NA	NA	--	**3600**	**23**	**150**	**110**	**87**	--
Total Benzofluoranthenes	3200	3600	NA	NA	--	**2000**	**16 J**	**61**	**40**	**39**	--
Total HPAHs[b]	12000	17000	NA	NA	--	**14130**	**86 J**	**494 J**	**351 J**	**294 J**	--
Total LPAHs[b]	5200	5200	NA	NA	--	**7810**	**19**	**819**	**654**	**432 J**	--

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Former Mill Area/Pocket Beach and Chehalis River						
Location:					CR-06	CR-06	CR-11	CR-12	CR-13	CR-14	CR-11-14-COMP
Sample Name:					CR06-10cm	CR06-2.5	CR11-SBSD-23	CR12-SBSD-15	CR13-SBSD-11	CR14-SBSD-12	CR11-14-SBSD-COMP
Collection Date:	SCO—Dry	CSL—Dry	SCO—Organic	CSL—Organic	11/07/2013	11/07/2013	10/13/2015	10/13/2015	10/13/2015	10/13/2015	10/13/2015
Total Metals—dry weight (mg/kg)											
Arsenic	57	93	NA	NA	--	20 U	20 U	20 U	9 U	20 U	--
Cadmium	5.1	6.7	NA	NA	--	1 U	0.6 U	0.8 U	**0.4**	0.8 U	--
Chromium	260	270	NA	NA	--	**26 J**	**37**	**48**	**41.3**	**49**	--
Copper	390	390	NA	NA	--	**96 J**	**47**	**62.2**	**55.1**	**63**	--
Lead	450	530	NA	NA	--	**110**	6 U	**11**	**9**	**12**	--
Mercury	0.41	0.59	NA	NA	**0.55**	**0.53**	0.03 U	**0.09**	**0.07**	**0.09**	--
Silver	6.1	6.1	NA	NA	--	1 U	1 U	1 U	0.5 U	1 U	--
Zinc	410	960	NA	NA	--	**237**	**78**	**86**	**76**	**90**	--
SVOCs—dry weight (ug/kg)											
1,3-Dichlorobenzene	NA	NA	NA	NA	--	70 U	--	--	--	--	--
2,4-Dimethylphenol	29	29	NA	NA	--	350 U	23 U	24 U	24 U	24 U	--
2-Methylphenol	63	63	NA	NA	--	**45 J**	4.7 U	4.9 U	**7.2**	4.9 U	--
3,4-Methylphenol	NA	NA	NA	NA	--	--	--	--	--	--	--
4-Methylphenol	670	670	NA	NA	--	**420**	19 U	**870 J**	**150**	**130**	--
Benzoic acid	650	650	NA	NA	--	**860 J**	190 U	**440**	**260**	**200**	--
Benzyl alcohol	57	73	NA	NA	--	280 U	19 U	**23**	**46**	**20**	--
Pentachlorophenol	360	690	NA	NA	1500 UJ	**240 J**	19 UJ	20 UJ	20 UJ	20 UJ	--
Phenol	420	1200	NA	NA	**370 J**	**240 J**	**8.4 J**	**64**	**44**	**50**	--
PAHs—dry weight (ug/kg)											
1-Methylnaphthalene	NV	NV	NA	NA	--	--	19 U	**24**	**22**	**16 J**	--
TCLP Metals (mg/L)											
Lead	NA	NA	NA	NA	--	--	--	--	--	--	0.1 U
Mercury	NA	NA	NA	NA	--	--	--	--	--	--	0.0001 U
Dioxins/Furans—dry weight (pg/g)											
1,2,3,4,6,7,8-HpCDD	NV	NV	NA	NA	**1080**	**1090**	**6.64**	--	--	--	--
1,2,3,4,6,7,8-HpCDF	NV	NV	NA	NA	**258**	**276**	0.317 U	--	--	--	--
1,2,3,4,7,8,9-HpCDF	NV	NV	NA	NA	**13.2**	**15.5**	0.0458 U	--	--	--	--
1,2,3,4,7,8-HxCDD	NV	NV	NA	NA	**12.7**	**8.21**	0.255 U	--	--	--	--
1,2,3,4,7,8-HxCDF	NV	NV	NA	NA	**18.1**	**21.7**	**0.0319 J**	--	--	--	--
1,2,3,6,7,8-HxCDD	NV	NV	NA	NA	**63.8**	**72.8**	0.631 U	--	--	--	--
1,2,3,6,7,8-HxCDF	NV	NV	NA	NA	**8.9**	**8.35**	0.0339 U	--	--	--	--
1,2,3,7,8,9-HxCDD	NV	NV	NA	NA	**16.5**	**15.4**	**2.76**	--	--	--	--
1,2,3,7,8,9-HxCDF	NV	NV	NA	NA	**4.79**	**4.66**	0.112 U	--	--	--	--
1,2,3,7,8-PeCDD	NV	NV	NA	NA	**9.35**	**8.27**	**1.02**	--	--	--	--
1,2,3,7,8-PeCDF	NV	NV	NA	NA	**3.28**	**3.24**	0.0398 U	--	--	--	--
2,3,4,6,7,8-HxCDF	NV	NV	NA	NA	**16.9**	**16.3**	0.0438 U	--	--	--	--
2,3,4,7,8-PeCDF	NV	NV	NA	NA	**5.96**	**5.87**	0.0418 U	--	--	--	--
2,3,7,8-TCDD	NV	NV	NA	NA	**2.09**	**2.11**	**0.936 J**	--	--	--	--
2,3,7,8-TCDF	NV	NV	NA	NA	**4.87**	**4.95**	0.0339 U	--	--	--	--
OCDD	NV	NV	NA	NA	**7830 J**	**6810 J**	**33.1**	--	--	--	--

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Former Mill Area/Pocket Beach and Chehalis River						
Location:					CR-06	CR-06	CR-11	CR-12	CR-13	CR-14	CR-11-14-COMP
Sample Name:					CR06-10cm	CR06-2.5	CR11-SBSD-23	CR12-SBSD-15	CR13-SBSD-11	CR14-SBSD-12	CR11-14-SBSD-COMP
Collection Date:	SCO—Dry	CSL—Dry	SCO—Organic	CSL—Organic	11/07/2013	11/07/2013	10/13/2015	10/13/2015	10/13/2015	10/13/2015	10/13/2015
OCDF	NV	NV	NA	NA	**680**	**652**	**1.08 J**	--	--	--	--
Total HpCDDs	NV	NV	NA	NA	**2480**	**2050**	**15.5**	--	--	--	--
Total HpCDFs	NV	NV	NA	NA	**950**	1120 U	1.28 U	--	--	--	--
Total HxCDDs	NV	NV	NA	NA	742 U	783 U	18.1 U	--	--	--	--
Total HxCDFs	NV	NV	NA	NA	463 U	518 U	0.599 U	--	--	--	--
Total PeCDDs	NV	NV	NA	NA	**88.7**	67 U	**7.59**	--	--	--	--
Total PeCDFs	NV	NV	NA	NA	203 U	147 U	0.111 U	--	--	--	--
Total TCDDs	NV	NV	NA	NA	42.6 U	**28.7**	7.61 U	--	--	--	--
Total TCDFs	NV	NV	NA	NA	82.8 U	62.3 U	0.303 U	--	--	--	--
Dioxin TEQ	NV	NV	NA	NA	**44.0**	**43.5**	**2.38**	--	--	--	--
Petroleum Hydrocarbons—dry weight (mg/kg)											
Gasoline	NV	NV	NV	NV	--	54 UJ	--	--	--	--	--
Diesel	NV	NV	NV	NV	--	**20000**	7 U	--	--	--	--
Motor-Oil Range	NV	NV	NV	NV	--	**60000**	**19**	--	--	--	--
Conventionals											
Ammonia (as N) (mg N/kg)	NV	NV	NV	NV	**1.37**	**14.0**	--	--	--	--	--
Sulfide (mg/kg)	NV	NV	NV	NV	**906**	**2910**	--	--	--	--	--
Total Volatile Solids (%)	NV	NV	NV	NV	**60.05**	**69.23**	--	--	--	--	--
Fixed Solids (%)	NV	NV	NV	NV	--	--	--	--	--	--	--
Total solids (%)	NV	NV	NV	NV	**21.4**	**21.59**	**72.59**	**56.65**	**57.95**	**57.04**	--
Grain Size (%)											
Gravel	NV	NV	NV	NV	**22.7**	--	--	--	--	--	--
Very coarse sand	NV	NV	NV	NV	**13**	--	--	--	--	--	--
Coarse sand	NV	NV	NV	NV	**15.7**	--	--	--	--	--	--
Medium sand	NV	NV	NV	NV	**11.9**	--	--	--	--	--	--
Fine sand	NV	NV	NV	NV	**5.1**	--	--	--	--	--	--
Very fine sand	NV	NV	NV	NV	**2**	--	--	--	--	--	--
Coarse silt	NV	NV	NV	NV	**4.1**	--	--	--	--	--	--
Medium silt	NV	NV	NV	NV	**5.1**	--	--	--	--	--	--
Fine silt	NV	NV	NV	NV	**4.5**	--	--	--	--	--	--
Very fine silt	NV	NV	NV	NV	**3.7**	--	--	--	--	--	--
Coarse clay	NV	NV	NV	NV	**2.7**	--	--	--	--	--	--
Medium clay	NV	NV	NV	NV	**2.1**	--	--	--	--	--	--
Fine clay	NV	NV	NV	NV	**7.4**	--	--	--	--	--	--
Total fines	NV	NV	NV	NV	**29.7**	--	--	--	--	--	--
Asbestos (%)											
Asbestos	NV	NV	NV	NV	--	--	--	--	--	--	--
Pore Water Analysis											
Conductivity (uS/cm)	NV	NV	NV	NV	--	--	--	--	--	--	--
Salinity (ppt)	NV	NV	NV	NV	--	--	--	--	--	--	--

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Former Mill Area/Pocket Beach and Chehalis River					
Location:					CR-15C		CR-17D		CR-18B	
Sample Name:					CR15C-SSD	CR15C-SBSD	CR17-D-SSD	CR17-D-SBSD	CR18B-SSD	CR18B-SBSD
Collection Date:	SCO—Dry Weight	CSL—Dry Weight	SCO—Organic Carbon	CSL—Organic Carbon	10/14/2015	10/14/2015	10/15/2015	10/15/2015	10/16/2015	10/16/2015
Collection Depth (ft bml):					0-0.33	0.5-1.0	0-0.33	0.5-1.0	0-0.33	0.5-1.0
Conventionals (%)										
Total Organic Carbon	NV	NV	NV	NV	**3.17**	**1.73**	**1.61**	**3.05**	**1.95**	**2.45**
PCBs (ug/kg-OC)										
Total PCBs[b]	NA	NA	12000	65000	631 U	1040 U	1180 U	**590 J**	923 U	776 U
SVOCs (ug/kg-OC)										
1,2,4-Trichlorobenzene	NA	NA	810	1800	155 U	283 U	298 U	**157 J**	256 U	204 U
1,2-Dichlorobenzene	NA	NA	2300	2300	155 U	283 U	298 U	**52 J**	256 U	204 U
1,4-Dichlorobenzene	NA	NA	3100	9000	155 U	283 U	298 U	161 U	256 U	204 U
Bis(2-ethylhexyl)phthalate	NA	NA	47000	78000	**915 J**	2832 U	2981 U	**1246 J**	2564 U	2041 U
Butylbenzylphthalate	NA	NA	4900	64000	155 U	283 U	**211 J**	161 U	**369**	**114 J**
Dibenzofuran	NA	NA	15000	58000	**757**	**1214**	1180 U	**2754**	1026 U	816 U
Diethylphthalate	NA	NA	61000	110000	662 U	1503 U	1180 U	623 U	2051 U	816 U
Dimethyl phthalate	NA	NA	53000	53000	155 U	283 U	298 U	161 U	256 U	204 U
Di-n-butyl phthalate	NA	NA	220000	1700000	631 U	1156 U	1180 U	623 U	1026 U	816 U
Di-n-octyl phthalate	NA	NA	58000	4500000	631 U	1156 U	1180 U	623 U	1026 U	816 U
Hexachlorobenzene	NA	NA	380	2300	155 U	283 U	298 U	161 U	256 U	204 U
Hexachlorobutadiene	NA	NA	3900	6200	155 U	283 U	298 U	161 U	256 U	204 U
N-Nitrosodiphenylamine	NA	NA	11000	11000	155 U	283 U	298 U	161 U	256 U	204 U
PAHs (ug/kg-OC)										
2-Methylnaphthalene	NA	NA	38000	64000	**599 J**	**1040 J**	1180 U	**1016**	1026 U	816 U
Acenaphthene	NA	NA	16000	57000	**1199**	**2139**	1180 U	**13770**	1026 U	**653 J**
Acenaphthylene	NA	NA	66000	66000	**473 J**	**867 J**	1180 U	**656**	1026 U	**694 J**
Anthracene	NA	NA	220000	1200000	**568 J**	**1156**	1180 U	**3607**	1026 U	**980**
Benzo(a)anthracene	NA	NA	110000	270000	**1767**	**3699**	1180 U	**5246**	**1487**	**4041**
Benzo(a)pyrene	NA	NA	99000	210000	**978**	**2023**	1180 U	**2656**	**615 J**	**2776**
Benzo(ghi)perylene	NA	NA	31000	78000	**726**	**809 J**	1180 U	**1180**	1026 U	**1102**
Chrysene	NA	NA	110000	460000	**1924**	**3988**	**534 J**	**6885**	**3385**	**3796**
Dibenzo(a,h)anthracene	NA	NA	12000	33000	**126 J**	**249 J**	**143 J**	**492**	256 U	**327**
Fluoranthene	NA	NA	160000	1200000	**3785**	**6358**	**1553**	**19672**	**4205**	**8571**
Fluorene	NA	NA	23000	79000	**915**	**1156**	1180 U	**4590**	**564 J**	**490 J**
Indeno(1,2,3-cd)pyrene	NA	NA	34000	88000	**568 J**	**983 J**	1180 U	**1344**	1026 U	**1102**
Naphthalene	NA	NA	99000	170000	**2019**	**2023**	**807 J**	**3607**	**1487**	**898**
Phenanthrene	NA	NA	100000	480000	**2871**	**3988**	**1180**	**11803**	**1333**	**1102**
Pyrene	NA	NA	1000000	1400000	**3091**	**4624**	**1242**	**15410**	**3179**	**8980**
Total Benzofluoranthenes	NA	NA	230000	450000	**3155**	**5780**	**807 J**	**7869**	**2000 J**	**7347**
Total HPAHs[b]	NA	NA	960000	5300000	**16120 J**	**28514 J**	**4280 J**	**60754**	**14872 J**	**38041 J**
Total LPAHs[b]	NA	NA	370000	780000	**8044 J**	**11329 J**	**1988 J**	**38033**	**3385 J**	**4816**
PCBs—dry weight (ug/kg)										
Aroclor 1016	NV	NV	NA	NA	20 U	18 U	19 U	20 U	18 U	19 U
Aroclor 1221	NV	NV	NA	NA	20 U	18 U	19 U	20 U	18 U	19 U

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Former Mill Area/Pocket Beach and Chehalis River					
Location:					CR-15C		CR-17D		CR-18B	
Sample Name:					CR15C-SSD	CR15C-SBSD	CR17-D-SSD	CR17-D-SBSD	CR18B-SSD	CR18B-SBSD
Collection Date:	SCO—Dry	CSL—Dry	SCO—Organic	CSL—Organic	10/14/2015	10/14/2015	10/15/2015	10/15/2015	10/16/2015	10/16/2015
Aroclor 1232	NV	NV	NA	NA	20 U	18 U	19 U	20 U	18 U	19 U
Aroclor 1242	NV	NV	NA	NA	20 U	18 U	19 U	20 U	18 U	19 U
Aroclor 1248	NV	NV	NA	NA	20 U	18 U	19 U	20 U	18 U	19 U
Aroclor 1254	NV	NV	NA	NA	20 U	18 U	19 U	**18 J**	18 U	19 U
Aroclor 1260	NV	NV	NA	NA	20 U	18 U	19 U	20 U	18 U	19 U
Aroclor 1268	NV	NV	NA	NA	20 U	18 U	19 U	20 U	18 U	19 U
Total PCBs[b]	130	1000	NA	NA	20 U	18 U	19 U	**18 J**	18 U	19 U
SVOCs—dry weight (ug/kg)										
1,2,4-Trichlorobenzene	31	51	NA	NA	4.9 U	4.9 U	4.8 U	**4.8 J**	5 U	5 U
1,2-Dichlorobenzene	35	50	NA	NA	4.9 U	4.9 U	4.8 U	**1.6 J**	5 U	5 U
1,4-Dichlorobenzene	110	110	NA	NA	4.9 U	4.9 U	4.8 U	4.9 U	5 U	5 U
Bis(2-ethylhexyl)phthalate	1300	1900	NA	NA	**29 J**	49 U	48 U	**38 J**	50 U	50 U
Butylbenzylphthalate	63	900	NA	NA	4.9 U	4.9 U	**3.4 J**	4.9 U	**7.2**	**2.8 J**
Dibenzofuran	540	540	NA	NA	**24**	**21**	19 U	**84**	20 U	20 U
Diethylphthalate	200	>1200	NA	NA	21 U	26 U	19 U	19 U	40 U	20 U
Dimethyl phthalate	71	160	NA	NA	4.9 U	4.9 U	4.8 U	4.9 U	5 U	5 U
Di-n-butyl phthalate	1400	1400	NA	NA	20 U	20 U	19 U	19 U	20 U	20 U
Di-n-octyl phthalate	6200	6200	NA	NA	20 U	20 U	19 U	19 U	20 U	20 U
Hexachlorobenzene	22	70	NA	NA	4.9 U	4.9 U	4.8 U	4.9 U	5 U	5 U
Hexachlorobutadiene	11	120	NA	NA	4.9 U	4.9 U	4.8 U	4.9 U	5 U	5 U
N-Nitrosodiphenylamine	28	40	NA	NA	4.9 U	4.9 U	4.8 U	4.9 U	5 U	5 U
PAHs—dry weight (ug/kg)										
2-Methylnaphthalene	670	670	NA	NA	**19 J**	**18 J**	19 U	**31**	20 U	20 U
Acenaphthene	500	500	NA	NA	**38**	**37**	19 U	**420**	20 U	**16 J**
Acenaphthylene	1300	1300	NA	NA	**15 J**	**15 J**	19 U	**20**	20 U	**17 J**
Anthracene	960	960	NA	NA	**18 J**	**20**	19 U	**110**	20 U	**24**
Benzo(a)anthracene	1300	1600	NA	NA	**56**	**64**	19 U	**160**	**29**	**99**
Benzo(a)pyrene	1600	1600	NA	NA	**31**	**35**	19 U	**81**	**12 J**	**68**
Benzo(ghi)perylene	670	720	NA	NA	**23**	**14 J**	19 U	**36**	20 U	**27**
Chrysene	1400	2800	NA	NA	**61**	**69**	**8.6 J**	**210**	**66**	**93**
Dibenzo(a,h)anthracene	230	230	NA	NA	**4 J**	**4.3 J**	**2.3 J**	**15**	5 U	**8**
Fluoranthene	1700	2500	NA	NA	**120**	**110**	**25**	**600**	**82**	**210**
Fluorene	540	540	NA	NA	**29**	**20**	19 U	**140**	**11 J**	**12 J**
Indeno(1,2,3-cd)pyrene	600	690	NA	NA	**18 J**	**17 J**	19 U	**41**	20 U	**27**
Naphthalene	2100	2100	NA	NA	**64**	**35**	**13 J**	**110**	**29**	**22**
Phenanthrene	1500	1500	NA	NA	**91**	**69**	**19**	**360**	**26**	**27**
Pyrene	2600	3300	NA	NA	**98**	**80**	**20**	**470**	**62**	**220**
Total Benzofluoranthenes	3200	3600	NA	NA	**100**	**100**	**13 J**	**240**	**39 J**	**180**
Total HPAHs[b]	12000	17000	NA	NA	**511 J**	**493.3 J**	**68.9 J**	**1853**	**290 J**	**932 J**
Total LPAHs[b]	5200	5200	NA	NA	**255 J**	**196 J**	**32 J**	**1160**	**66 J**	**118 J**

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Former Mill Area/Pocket Beach and Chehalis River					
Location:					CR-15C		CR-17D		CR-18B	
Sample Name:					CR15C-SSD	CR15C-SBSD	CR17-D-SSD	CR17-D-SBSD	CR18B-SSD	CR18B-SBSD
Collection Date:	SCO—Dry	CSL—Dry	SCO—Organic	CSL—Organic	10/14/2015	10/14/2015	10/15/2015	10/15/2015	10/16/2015	10/16/2015
Total Metals—dry weight (mg/kg)										
Arsenic	57	93	NA	NA	20	21	**21**	**30**	**30**	**20**
Cadmium	5.1	6.7	NA	NA	0.5 U	0.3 U	0.4 U	0.4 U	0.4 U	0.4 U
Chromium	260	270	NA	NA	40	34.5	**34.4**	**40**	**41**	**36**
Copper	390	390	NA	NA	51.9	54.7	**51.1**	**58.2**	**62.7**	**53.4**
Lead	450	530	NA	NA	11	9	**9**	**12**	**10**	**10**
Mercury	0.41	0.59	NA	NA	0.06 U	0.04	**0.04**	**0.07**	0.05 U	**0.07**
Silver	6.1	6.1	NA	NA	0.8 U	0.5 U	0.5 U	0.6 U	0.6 U	0.6 U
Zinc	410	960	NA	NA	77	69	**70**	**79**	**76**	**73**
SVOCs—dry weight (ug/kg)										
1,3-Dichlorobenzene	NA	NA	NA	NA	--	--	--	--	--	--
2,4-Dimethylphenol	29	29	NA	NA	24 U	24 U	24 U	24 U	25 U	25 U
2-Methylphenol	63	63	NA	NA	4.9 U	4.9 U	4.8 U	4.9 U	5 U	5 U
3,4-Methylphenol	NA	NA	NA	NA	--	--	--	--	--	--
4-Methylphenol	670	670	NA	NA	**89**	**52**	19 UJ	**120 J**	**42**	20 U
Benzoic acid	650	650	NA	NA	**250 J**	**160 J**	**150 J**	**230 J**	**160 J**	**210 J**
Benzyl alcohol	57	73	NA	NA	20 U	20 U	**16 J**	**48**	20 U	20 U
Pentachlorophenol	360	690	NA	NA	20 UJ	20 UJ	19 U	**21**	20 U	20 U
Phenol	420	1200	NA	NA	**50**	20 U	**16 J**	**39**	**81**	20 U
PAHs—dry weight (ug/kg)										
1-Methylnaphthalene	NV	NV	NA	NA	**15 J**	**18 J**	19 U	**23**	20 U	20 U
TCLP Metals (mg/L)										
Lead	NA	NA	NA	NA	--	--	--	--	--	--
Mercury	NA	NA	NA	NA	--	--	--	--	--	--
Dioxins/Furans—dry weight (pg/g)										
1,2,3,4,6,7,8-HpCDD	NV	NV	NA	NA	100	--	**56.2**	--	**30.9**	--
1,2,3,4,6,7,8-HpCDF	NV	NV	NA	NA	25.3	--	**8.12**	--	**7.34**	--
1,2,3,4,7,8,9-HpCDF	NV	NV	NA	NA	0.959 U	--	0.483 U	--	**0.332 J**	--
1,2,3,4,7,8-HxCDD	NV	NV	NA	NA	1.22	--	0.736 U	--	**0.758 J**	--
1,2,3,4,7,8-HxCDF	NV	NV	NA	NA	1.25 U	--	**0.596 J**	--	0.424 U	--
1,2,3,6,7,8-HxCDD	NV	NV	NA	NA	5.48	--	**2.94**	--	**2.46**	--
1,2,3,6,7,8-HxCDF	NV	NV	NA	NA	0.806 J	--	**0.37 J**	--	0.294 U	--
1,2,3,7,8,9-HxCDD	NV	NV	NA	NA	10	--	**6.33**	--	**8**	--
1,2,3,7,8,9-HxCDF	NV	NV	NA	NA	0.338 U	--	0.324 U	--	0.226 U	--
1,2,3,7,8-PeCDD	NV	NV	NA	NA	3.65	--	**2.49**	--	**3.28**	--
1,2,3,7,8-PeCDF	NV	NV	NA	NA	0.408 J	--	0.213 U	--	0.157 U	--
2,3,4,6,7,8-HxCDF	NV	NV	NA	NA	1.21 U	--	0.443 U	--	**0.469 J**	--
2,3,4,7,8-PeCDF	NV	NV	NA	NA	0.505 U	--	0.239 U	--	0.183 U	--
2,3,7,8-TCDD	NV	NV	NA	NA	2.7	--	**1.85**	--	**2.36**	--
2,3,7,8-TCDF	NV	NV	NA	NA	1.55	--	0.406 U	--	0.381 U	--
OCDD	NV	NV	NA	NA	790	--	**475**	--	**189**	--

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Former Mill Area/Pocket Beach and Chehalis River					
Location:					CR-15C		CR-17D		CR-18B	
Sample Name:					CR15C-SSD	CR15C-SBSD	CR17-D-SSD	CR17-D-SBSD	CR18B-SSD	CR18B-SBSD
Collection Date:	SCO—Dry	CSL—Dry	SCO—Organic	CSL—Organic	10/14/2015	10/14/2015	10/15/2015	10/15/2015	10/16/2015	10/16/2015
OCDF	NV	NV	NA	NA	33.1	--	**14**	--	**10.9**	--
Total HpCDDs	NV	NV	NA	NA	275	--	**150**	--	**73.7**	--
Total HpCDFs	NV	NV	NA	NA	60.7 U	--	21.2 U	--	**17.4**	--
Total HxCDDs	NV	NV	NA	NA	76.1 U	--	45.8 U	--	46.9 U	--
Total HxCDFs	NV	NV	NA	NA	28.1 U	--	10.8 U	--	8.92 U	--
Total PeCDDs	NV	NV	NA	NA	26.5	--	16.7 U	--	20.5 U	--
Total PeCDFs	NV	NV	NA	NA	12.6 U	--	4.66 U	--	4.65 U	--
Total TCDDs	NV	NV	NA	NA	20.3 U	--	12.4 U	--	15.9 U	--
Total TCDFs	NV	NV	NA	NA	13.7 U	--	4.27 U	--	4.57 U	--
Dioxin TEQ	NV	NV	NA	NA	**9.99**	--	**6.29**	--	**7.35**	--
Petroleum Hydrocarbons—dry weight (mg/kg)										
Gasoline	NV	NV	NV	NV	--	--	--	--	--	--
Diesel	NV	NV	NV	NV	**77**	--	**24**	--	**44**	--
Motor-Oil Range	NV	NV	NV	NV	**190**	--	**46**	--	**92**	--
Conventionals										
Ammonia (as N) (mg N/kg)	NV	NV	NV	NV	--	--	--	--	--	--
Sulfide (mg/kg)	NV	NV	NV	NV	--	--	--	--	--	--
Total Volatile Solids (%)	NV	NV	NV	NV	--	--	--	--	--	--
Fixed Solids (%)	NV	NV	NV	NV	--	--	--	--	--	--
Total solids (%)	NV	NV	NV	NV	**35.1**	**57.47**	**52.1**	**48.09**	**46.44**	**47.88**
Grain Size (%)										
Gravel	NV	NV	NV	NV	--	--	--	--	--	--
Very coarse sand	NV	NV	NV	NV	--	--	--	--	--	--
Coarse sand	NV	NV	NV	NV	--	--	--	--	--	--
Medium sand	NV	NV	NV	NV	--	--	--	--	--	--
Fine sand	NV	NV	NV	NV	--	--	--	--	--	--
Very fine sand	NV	NV	NV	NV	--	--	--	--	--	--
Coarse silt	NV	NV	NV	NV	--	--	--	--	--	--
Medium silt	NV	NV	NV	NV	--	--	--	--	--	--
Fine silt	NV	NV	NV	NV	--	--	--	--	--	--
Very fine silt	NV	NV	NV	NV	--	--	--	--	--	--
Coarse clay	NV	NV	NV	NV	--	--	--	--	--	--
Medium clay	NV	NV	NV	NV	--	--	--	--	--	--
Fine clay	NV	NV	NV	NV	--	--	--	--	--	--
Total fines	NV	NV	NV	NV	--	--	--	--	--	--
Asbestos (%)										
Asbestos	NV	NV	NV	NV	--	--	--	--	--	--
Pore Water Analysis										
Conductivity (uS/cm)	NV	NV	NV	NV	--	--	--	--	--	--
Salinity (ppt)	NV	NV	NV	NV	--	--	--	--	--	--

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Former Mill Area/Pocket Beach and Chehalis River				
Location:					CR-19D	CR-19F	CR-19F		CR-26
Sample Name:					CR19D-SSD-CONV	CR19F-SSD	CR19F-SBSD	CR19F-SBSD-DUP	CR26-SBSD
Collection Date:	SCO—Dry Weight	CSL—Dry Weight	SCO—Organic Carbon	CSL—Organic Carbon	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/15/2015
Collection Depth (ft bml):					0-0.33	0-0.33	0.5-1.0	0.5-1.0	0.5-1.0
Conventionals (%)									
Total Organic Carbon	NV	NV	NV	NV	**3.99**	**2.77**	**2.76**	**2.59**	**1.52**
PCBs (ug/kg-OC)									
Total PCBs[b]	NA	NA	12000	65000	--	650 U	688 U	772 U	1250 U
SVOCs (ug/kg-OC)									
1,2,4-Trichlorobenzene	NA	NA	810	1800	--	173 U	181 U	193 U	322 U
1,2-Dichlorobenzene	NA	NA	2300	2300	--	173 U	181 U	193 U	322 U
1,4-Dichlorobenzene	NA	NA	3100	9000	--	173 U	181 U	193 U	322 U
Bis(2-ethylhexyl)phthalate	NA	NA	47000	78000	--	1733 U	1812 U	**1236 J**	3224 U
Butylbenzylphthalate	NA	NA	4900	64000	--	**292**	**337**	**286**	322 U
Dibenzofuran	NA	NA	15000	58000	--	**542 J**	**906**	**1081**	**1645**
Diethylphthalate	NA	NA	61000	110000	--	794 U	870 U	1467 U	1316 U
Dimethyl phthalate	NA	NA	53000	53000	--	173 U	181 U	193 U	322 U
Di-n-butyl phthalate	NA	NA	220000	1700000	--	686 U	725 U	772 U	1316 U
Di-n-octyl phthalate	NA	NA	58000	4500000	--	686 U	725 U	772 U	1316 U
Hexachlorobenzene	NA	NA	380	2300	--	173 U	181 U	193 U	322 U
Hexachlorobutadiene	NA	NA	3900	6200	--	173 U	181 U	193 U	322 U
N-Nitrosodiphenylamine	NA	NA	11000	11000	--	173 U	181 U	193 U	322 U
PAHs (ug/kg-OC)									
2-Methylnaphthalene	NA	NA	38000	64000	--	**361 J**	**471 J**	**849**	1316 U
Acenaphthene	NA	NA	16000	57000	--	**433 J**	**978**	**1197**	**1908**
Acenaphthylene	NA	NA	66000	66000	--	686 U	725 U	**695 J**	**638 J**
Anthracene	NA	NA	220000	1200000	--	**542 J**	**1087**	**1004**	**921 J**
Benzo(a)anthracene	NA	NA	110000	270000	--	**433 J**	**761**	**1429**	**1184 J**
Benzo(a)pyrene	NA	NA	99000	210000	--	686 U	725 U	772 U	1316 U
Benzo(ghi)perylene	NA	NA	31000	78000	--	686 U	725 U	**579 J**	**855 J**
Chrysene	NA	NA	110000	460000	--	**758**	**1087**	**2471**	**1711**
Dibenzo(a,h)anthracene	NA	NA	12000	33000	--	173 U	181 U	**120 J**	**204 J**
Fluoranthene	NA	NA	160000	1200000	--	**1480**	**3406**	**5792**	**4934**
Fluorene	NA	NA	23000	79000	--	**433 J**	**1051**	**1042**	**1513**
Indeno(1,2,3-cd)pyrene	NA	NA	34000	88000	--	686 U	725 U	**541 J**	**579 J**
Naphthalene	NA	NA	99000	170000	--	**2022**	**2246**	**3784**	**3355**
Phenanthrene	NA	NA	100000	480000	--	**1300**	**3986**	**5405**	**2566**
Pyrene	NA	NA	1000000	1400000	--	**1264**	**3007**	**5019**	**4605**
Total Benzofluoranthenes	NA	NA	230000	450000	--	**686 J**	**978 J**	**2317**	**2368 J**
Total HPAHs[b]	NA	NA	960000	5300000	--	**4621 J**	**9239**	**19039 J**	**16441 J**
Total LPAHs[b]	NA	NA	370000	780000	--	**4729 J**	**9348 J**	**13127 J**	**10901 J**
PCBs—dry weight (ug/kg)									
Aroclor 1016	NV	NV	NA	NA	--	18 U	19 U	20 U	19 U
Aroclor 1221	NV	NV	NA	NA	--	18 U	19 U	20 U	19 U

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Former Mill Area/Pocket Beach and Chehalis River				
Location:					CR-19D	CR-19F	CR-19F		CR-26
Sample Name:					CR19D-SSD-CONV	CR19F-SSD	CR19F-SBSD	CR19F-SBSD-DUP	CR26-SBSD
Collection Date:	SCO—Dry	CSL—Dry	SCO—Organic	CSL—Organic	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/15/2015
Aroclor 1232	NV	NV	NA	NA	--	18 U	19 U	20 U	19 U
Aroclor 1242	NV	NV	NA	NA	--	18 U	19 U	20 U	19 U
Aroclor 1248	NV	NV	NA	NA	--	18 U	19 U	20 U	19 U
Aroclor 1254	NV	NV	NA	NA	--	18 U	19 U	20 U	19 U
Aroclor 1260	NV	NV	NA	NA	--	18 U	19 U	20 U	19 U
Aroclor 1268	NV	NV	NA	NA	--	18 U	19 U	20 U	19 U
Total PCBs[b]	130	1000	NA	NA	--	18 U	19 U	20 U	19 U
SVOCs—dry weight (ug/kg)									
1,2,4-Trichlorobenzene	31	51	NA	NA	--	4.8 U	5 U	5 U	4.9 U
1,2-Dichlorobenzene	35	50	NA	NA	--	4.8 U	5 U	5 U	4.9 U
1,4-Dichlorobenzene	110	110	NA	NA	--	4.8 U	5 U	5 U	4.9 U
Bis(2-ethylhexyl)phthalate	1300	1900	NA	NA	--	48 U	50 U	**32 J**	49 U
Butylbenzylphthalate	63	900	NA	NA	--	**8.1**	**9.3**	**7.4**	4.9 U
Dibenzofuran	540	540	NA	NA	--	**15 J**	**25**	**28**	**25**
Diethylphthalate	200	>1200	NA	NA	--	22 U	24 U	38 U	20 U
Dimethyl phthalate	71	160	NA	NA	--	4.8 U	5 U	5 U	4.9 U
Di-n-butyl phthalate	1400	1400	NA	NA	--	19 U	20 U	20 U	20 U
Di-n-octyl phthalate	6200	6200	NA	NA	--	19 U	20 U	20 U	20 U
Hexachlorobenzene	22	70	NA	NA	--	4.8 U	5 U	5 U	4.9 U
Hexachlorobutadiene	11	120	NA	NA	--	4.8 U	5 U	5 U	4.9 U
N-Nitrosodiphenylamine	28	40	NA	NA	--	4.8 U	5 U	5 U	4.9 U
PAHs—dry weight (ug/kg)									
2-Methylnaphthalene	670	670	NA	NA	--	**10 J**	**13 J**	**22**	20 U
Acenaphthene	500	500	NA	NA	--	**12 J**	**27**	**31**	**29**
Acenaphthylene	1300	1300	NA	NA	--	19 U	20 U	**18 J**	**9.7 J**
Anthracene	960	960	NA	NA	--	**15 J**	**30**	**26**	**14 J**
Benzo(a)anthracene	1300	1600	NA	NA	--	**12 J**	**21**	**37**	**18 J**
Benzo(a)pyrene	1600	1600	NA	NA	--	19 U	20 U	20 U	20 U
Benzo(ghi)perylene	670	720	NA	NA	--	19 U	20 U	**15 J**	**13 J**
Chrysene	1400	2800	NA	NA	--	**21**	**30**	**64**	**26**
Dibenzo(a,h)anthracene	230	230	NA	NA	--	4.8 U	5 U	**3.1 J**	**3.1 J**
Fluoranthene	1700	2500	NA	NA	--	**41**	**94**	**150**	**75**
Fluorene	540	540	NA	NA	--	**12 J**	**29**	**27**	**23**
Indeno(1,2,3-cd)pyrene	600	690	NA	NA	--	19 U	20 U	**14 J**	**8.8 J**
Naphthalene	2100	2100	NA	NA	--	**56**	**62**	**98**	**51**
Phenanthrene	1500	1500	NA	NA	--	**36**	**110**	**140**	**39**
Pyrene	2600	3300	NA	NA	--	**35**	**83**	**130**	**70**
Total Benzofluoranthenes	3200	3600	NA	NA	--	**19 J**	**27 J**	**60**	**36 J**
Total HPAHs[b]	12000	17000	NA	NA	--	**128 J**	**255 J**	**493.1 J**	**249.9 J**
Total LPAHs[b]	5200	5200	NA	NA	--	**131 J**	**258**	**340 J**	**165.7 J**

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Former Mill Area/Pocket Beach and Chehalis River				
Location:					CR-19D	CR-19F	CR-19F		CR-26
Sample Name:					CR19D-SSD-CONV	CR19F-SSD	CR19F-SBSD	CR19F-SBSD-DUP	CR26-SBSD
Collection Date:	SCO—Dry	CSL—Dry	SCO—Organic	CSL—Organic	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/15/2015
Total Metals—dry weight (mg/kg)									
Arsenic	57	93	NA	NA	**--**	**20**	**22**	**23**	**24**
Cadmium	5.1	6.7	NA	NA	--	0.4 U	0.4 U	0.3 U	0.4 U
Chromium	260	270	NA	NA	--	**41**	**50.5**	**51.3**	**39.3**
Copper	390	390	NA	NA	--	**53.1**	**60**	**53.3**	**55.9**
Lead	450	530	NA	NA	--	**11**	**13**	**14**	**11**
Mercury	0.41	0.59	NA	NA	--	**0.05**	**0.05**	**0.07**	**0.09**
Silver	6.1	6.1	NA	NA	--	0.6 U	0.6 U	0.5 U	0.6 U
Zinc	410	960	NA	NA	--	**74**	**80**	**79**	**75**
SVOCs—dry weight (ug/kg)									
1,3-Dichlorobenzene	NA	NA	NA	NA	--	--	--	--	--
2,4-Dimethylphenol	29	29	NA	NA	--	24 U	25 U	25 U	24 U
2-Methylphenol	63	63	NA	NA	--	4.8 U	5 U	5 U	**5.4**
3,4-Methylphenol	NA	NA	NA	NA	--	--	--	--	--
4-Methylphenol	670	670	NA	NA	--	19 U	**230**	**320**	**45**
Benzoic acid	650	650	NA	NA	--	**170 J**	**240**	**370**	**440**
Benzyl alcohol	57	73	NA	NA	--	19 U	**27**	**28**	**64**
Pentachlorophenol	360	690	NA	NA	--	19 U	20 UJ	20 UJ	20 UJ
Phenol	420	1200	NA	NA	**93 J+**	**89**	**47**	**68**	**76**
PAHs—dry weight (ug/kg)									
1-Methylnaphthalene	NV	NV	NA	NA	--	19 U	20 U	**13 J**	**11 J**
TCLP Metals (mg/L)									
Lead	NA	NA	NA	NA	--	--	--	--	--
Mercury	NA	NA	NA	NA	--	--	--	--	--
Dioxins/Furans—dry weight (pg/g)									
1,2,3,4,6,7,8-HpCDD	NV	NV	NA	NA	--	**141**	--	--	--
1,2,3,4,6,7,8-HpCDF	NV	NV	NA	NA	--	**24.3**	--	--	--
1,2,3,4,7,8,9-HpCDF	NV	NV	NA	NA	--	**1.04**	--	--	--
1,2,3,4,7,8-HxCDD	NV	NV	NA	NA	--	**1.35**	--	--	--
1,2,3,4,7,8-HxCDF	NV	NV	NA	NA	--	**1.37**	--	--	--
1,2,3,6,7,8-HxCDD	NV	NV	NA	NA	--	**9.89**	--	--	--
1,2,3,6,7,8-HxCDF	NV	NV	NA	NA	--	**1.07**	--	--	--
1,2,3,7,8,9-HxCDD	NV	NV	NA	NA	--	**8.91**	--	--	--
1,2,3,7,8,9-HxCDF	NV	NV	NA	NA	--	0.571 U	--	--	--
1,2,3,7,8-PeCDD	NV	NV	NA	NA	--	**3.01**	--	--	--
1,2,3,7,8-PeCDF	NV	NV	NA	NA	--	0.613 U	--	--	--
2,3,4,6,7,8-HxCDF	NV	NV	NA	NA	--	**1.73**	--	--	--
2,3,4,7,8-PeCDF	NV	NV	NA	NA	--	**0.557 J**	--	--	--
2,3,7,8-TCDD	NV	NV	NA	NA	--	**2.16**	--	--	--
2,3,7,8-TCDF	NV	NV	NA	NA	--	**7.75**	--	--	--
OCDD	NV	NV	NA	NA	--	**1010**	--	--	--

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Former Mill Area/Pocket Beach and Chehalis River				
Location:					CR-19D	CR-19F	CR-19F		CR-26
Sample Name:					CR19D-SSD-CONV	CR19F-SSD	CR19F-SBSD	CR19F-SBSD-DUP	CR26-SBSD
Collection Date:	SCO—Dry	CSL—Dry	SCO—Organic	CSL—Organic	10/16/2015	10/16/2015	10/16/2015	10/16/2015	10/15/2015
OCDF	NV	NV	NA	NA	--	**36.8**	--	--	--
Total HpCDDs	NV	NV	NA	NA	--	**340**	--	--	--
Total HpCDFs	NV	NV	NA	NA	--	62.7 U	--	--	--
Total HxCDDs	NV	NV	NA	NA	--	93 U	--	--	--
Total HxCDFs	NV	NV	NA	NA	--	40.2 U	--	--	--
Total PeCDDs	NV	NV	NA	NA	--	26.4 U	--	--	--
Total PeCDFs	NV	NV	NA	NA	--	23.6 U	--	--	--
Total TCDDs	NV	NV	NA	NA	--	20.6 U	--	--	--
Total TCDFs	NV	NV	NA	NA	--	25.6 U	--	--	--
Dioxin TEQ	NV	NV	NA	NA	--	**10.6**	--	--	--
Petroleum Hydrocarbons—dry weight (mg/kg)									
Gasoline	NV	NV	NV	NV	--	--	--	--	--
Diesel	NV	NV	NV	NV	--	**93**	--	--	--
Motor-Oil Range	NV	NV	NV	NV	--	**240**	--	--	--
Conventionals									
Ammonia (as N) (mg N/kg)	NV	NV	NV	NV	**18.6**	--	--	--	--
Sulfide (mg/kg)	NV	NV	NV	NV	**605**	--	--	--	--
Total Volatile Solids (%)	NV	NV	NV	NV	**8.58**	--	--	--	--
Fixed Solids (%)	NV	NV	NV	NV	**44.8**	--	--	--	--
Total solids (%)	NV	NV	NV	NV	**39.38**	**49.31**	**50.3**	**51.43**	**46.69**
Grain Size (%)									
Gravel	NV	NV	NV	NV	**1**	--	--	--	--
Very coarse sand	NV	NV	NV	NV	**3.8**	--	--	--	--
Coarse sand	NV	NV	NV	NV	**1.8**	--	--	--	--
Medium sand	NV	NV	NV	NV	**2**	--	--	--	--
Fine sand	NV	NV	NV	NV	**4.6**	--	--	--	--
Very fine sand	NV	NV	NV	NV	**8.9**	--	--	--	--
Coarse silt	NV	NV	NV	NV	**16**	--	--	--	--
Medium silt	NV	NV	NV	NV	**20.1**	--	--	--	--
Fine silt	NV	NV	NV	NV	**14.6**	--	--	--	--
Very fine silt	NV	NV	NV	NV	**7.3**	--	--	--	--
Coarse clay	NV	NV	NV	NV	**5.9**	--	--	--	--
Medium clay	NV	NV	NV	NV	**3.4**	--	--	--	--
Fine clay	NV	NV	NV	NV	**10.5**	--	--	--	--
Total fines	NV	NV	NV	NV	**77.8**	--	--	--	--
Asbestos (%)									
Asbestos	NV	NV	NV	NV	--	--	--	--	--
Pore Water Analysis									
Conductivity (uS/cm)	NV	NV	NV	NV	--	--	--	--	--
Salinity (ppt)	NV	NV	NV	NV	--	--	--	--	--

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Wharf Area			
Location:					Downstream Dock	Dock Front	Upstream Dock	Composite
Sample Name:					DNR-SSDD-COMP	DNR-SSDF-COMP	DNR-SSDU-COMP	DNR-SSD-SUPCOMP[c]
Collection Date:	SCO—Dry Weight	CSL—Dry Weight	SCO—Organic Carbon	CSL—Organic Carbon	Apr-11	Apr-11	Apr-11	Apr-11
Collection Depth (ft bml):					0-0.33	0-0.33	0-0.33	0-0.33
Conventionals (%)								
Total Organic Carbon	NV	NV	NV	NV	**1.2**	**2.4**	**0.65**	--
PCBs (ug/kg-OC)								
Total PCBs[b]	NA	NA	12000	65000	1000 U	875 U	1846 U	--
SVOCs (ug/kg-OC)								
1,2,4-Trichlorobenzene	NA	NA	810	1800	333 U	333 U	338 U	--
1,2-Dichlorobenzene	NA	NA	2300	2300	333 U	333 U	338 U	--
1,4-Dichlorobenzene	NA	NA	3100	9000	333 U	333 U	338 U	--
Bis(2-ethylhexyl)phthalate	NA	NA	47000	78000	10000 U	10000 U	10308 U	--
Butylbenzylphthalate	NA	NA	4900	64000	667 U	**5000**	692 U	--
Dibenzofuran	NA	NA	15000	58000	**750**	**1125** H	692 U	--
Diethylphthalate	NA	NA	61000	110000	667 U	667 U	692 U	--
Dimethyl phthalate	NA	NA	53000	53000	667 U	667 U	692 U	--
Di-n-butyl phthalate	NA	NA	220000	1700000	1333 U	1333 U	1369 U	--
Di-n-octyl phthalate	NA	NA	58000	4500000	1333 U	1333 U	1369 U	--
Hexachlorobenzene	NA	NA	380	2300	333 U	333 U	338 U	--
Hexachlorobutadiene	NA	NA	3900	6200	333 U	333 U	338 U	--
N-Nitrosodiphenylamine	NA	NA	11000	11000	333 U	333 U	338 U	--
PAHs (ug/kg-OC)								
2-Methylnaphthalene	NA	NA	38000	64000	**308**	**542** H	137 U	--
Acenaphthene	NA	NA	16000	57000	**650**	**1833** H	**308**	--
Acenaphthylene	NA	NA	66000	66000	**308**	**292** H	**231**	--
Anthracene	NA	NA	220000	1200000	**4333**	**1667** H	**877**	--
Benzo(a)anthracene	NA	NA	110000	270000	**5917**	**8750** H	**3538**	--
Benzo(a)pyrene	NA	NA	99000	210000	**5083**	**8750** H	**3538**	--
Benzo(ghi)perylene	NA	NA	31000	78000	**2583**	**3167** H	**1846**	--
Chrysene	NA	NA	110000	460000	**10833**	**13333** H	**6154**	--
Dibenzo(a,h)anthracene	NA	NA	12000	33000	**917**	**1292** H	**492**	--
Fluoranthene	NA	NA	160000	1200000	**16667**	**8750** H	**4000**	--
Fluorene	NA	NA	23000	79000	**2833**	**1625** H	**415**	--
Indeno(1,2,3-cd)pyrene	NA	NA	34000	88000	**2583**	**3292** H	**1692**	--
Naphthalene	NA	NA	99000	170000	133 U	**417**	137 U	--
Phenanthrene	NA	NA	100000	480000	**9167**	**5417** H	**1692**	--
Pyrene	NA	NA	1000000	1400000	**14167**	**8750** H	**4154**	--
Total Benzofluoranthenes	NA	NA	230000	450000	**12500**	**16667** H	**7077**	--
Total HPAHs[b]	NA	NA	960000	5300000	**71250**	**72750**	**32492**	--
Total LPAHs[b]	NA	NA	370000	780000	**17292**	**11250**	**3523**	--
PCBs—dry weight (ug/kg)								
Aroclor 1016	NV	NV	NA	NA	12 U	21 U	12 U	--
Aroclor 1221	NV	NV	NA	NA	12 U	21 U	12 U	--

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Wharf Area			
Location:					Downstream Dock	Dock Front	Upstream Dock	Composite
Sample Name:					DNR-SSDD-COMP	DNR-SSDF-COMP	DNR-SSDU-COMP	DNR-SSD-SUPCOMP[c]
Collection Date:	SCO—Dry	CSL—Dry	SCO—Organic	CSL—Organic	Apr-11	Apr-11	Apr-11	Apr-11
Aroclor 1232	NV	NV	NA	NA	12 U	21 U	12 U	--
Aroclor 1242	NV	NV	NA	NA	12 U	21 U	12 U	--
Aroclor 1248	NV	NV	NA	NA	12 U	21 U	12 U	--
Aroclor 1254	NV	NV	NA	NA	12 U	21 U	12 U	--
Aroclor 1260	NV	NV	NA	NA	12 U	21 U	12 U	--
Aroclor 1268	NV	NV	NA	NA	--	--	--	--
Total PCBs[b]	130	1000	NA	NA	12 U	21 U	12 U	--
SVOCs—dry weight (ug/kg)								
1,2,4-Trichlorobenzene	31	51	NA	NA	4 U	8 U	2.2 U	--
1,2-Dichlorobenzene	35	50	NA	NA	4 U	8 U	2.2 U	--
1,4-Dichlorobenzene	110	110	NA	NA	4 U	8 U	2.2 U	--
Bis(2-ethylhexyl)phthalate	1300	1900	NA	NA	120 U	240 U	67 U	--
Butylbenzylphthalate	63	900	NA	NA	8 U	120	4.5 U	
Dibenzofuran	540	540	NA	NA	**9**	**27 H**	4.5 U	--
Diethylphthalate	200	>1200	NA	NA	8 U	16 U	4.5 U	--
Dimethyl phthalate	71	160	NA	NA	8 U	16 U	4.5 U	--
Di-n-butyl phthalate	1400	1400	NA	NA	16 U	32 U	8.9 U	--
Di-n-octyl phthalate	6200	6200	NA	NA	16 U	32 U	8.9 U	--
Hexachlorobenzene	22	70	NA	NA	4 U	8 U	2.2 U	--
Hexachlorobutadiene	11	120	NA	NA	4 U	8 U	2.2 U	--
N-Nitrosodiphenylamine	28	40	NA	NA	4 U	8 U	2.2 U	--
PAHs—dry weight (ug/kg)								
2-Methylnaphthalene	670	670	NA	NA	**3.7**	**13 H**	0.89 U	--
Acenaphthene	500	500	NA	NA	**7.8**	**44 H**	**2**	--
Acenaphthylene	1300	1300	NA	NA	**3.7**	**7 H**	**1.5**	--
Anthracene	960	960	NA	NA	**52**	**40 H**	**5.7**	--
Benzo(a)anthracene	1300	1600	NA	NA	**71**	**210 H**	**23**	--
Benzo(a)pyrene	1600	1600	NA	NA	**61**	**210 H**	**23**	--
Benzo(ghi)perylene	670	720	NA	NA	**31**	**76 H**	**12**	--
Chrysene	1400	2800	NA	NA	**130**	**320 H**	**40**	--
Dibenzo(a,h)anthracene	230	230	NA	NA	**11**	**31 H**	**3.2**	--
Fluoranthene	1700	2500	NA	NA	**200**	**210 H**	**26**	--
Fluorene	540	540	NA	NA	**34**	**39 H**	**2.7**	--
Indeno(1,2,3-cd)pyrene	600	690	NA	NA	**31**	**79 H**	**11**	--
Naphthalene	2100	2100	NA	NA	1.6 U	**10**	0.89 U	--
Phenanthrene	1500	1500	NA	NA	**110**	**130 H**	**11**	--
Pyrene	2600	3300	NA	NA	**170**	**210 H**	**27**	--
Total Benzofluoranthenes	3200	3600	NA	NA	**150**	**400 H**	**46**	--
Total HPAHs[b]	12000	17000	NA	NA	**855**	**1746 H**	**211.2**	--
Total LPAHs[b]	5200	5200	NA	NA	**207.5**	**270 H**	**22.9**	--

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Wharf Area			
Location:					Downstream Dock	Dock Front	Upstream Dock	Composite
Sample Name:					DNR-SSDD-COMP	DNR-SSDF-COMP	DNR-SSDU-COMP	DNR-SSD-SUPCOMP[c]
Collection Date:	SCO—Dry	CSL—Dry	SCO—Organic	CSL—Organic	Apr-11	Apr-11	Apr-11	Apr-11
Total Metals—dry weight (mg/kg)								
Arsenic	57	93	NA	NA	3.3 U	5.9 U	2.7 U	--
Cadmium	5.1	6.7	NA	NA	**1.7**	0.98 U	0.45 U	--
Chromium	260	270	NA	NA	**14**	**28**	**13**	--
Copper	390	390	NA	NA	**39**	**61**	**43**	--
Lead	450	530	NA	NA	**3.7**	**9.1**	**6.1**	--
Mercury	0.41	0.59	NA	NA	**0.025**	**0.074**	0.018 U	--
Silver	6.1	6.1	NA	NA	1.1 U	2 U	0.9 U	--
Zinc	410	960	NA	NA	**41**	**75**	**39**	--
SVOCs—dry weight (ug/kg)								
1,3-Dichlorobenzene	NA	NA	NA	NA	--	--	--	--
2,4-Dimethylphenol	29	29	NA	NA	8 U	16 U	4.5 U	--
2-Methylphenol	63	63	NA	NA	8 U	16 U	4.5 U	--
3,4-Methylphenol	NA	NA	NA	NA	16 U	32 U	8.9 U	--
4-Methylphenol	670	670	NA	NA	--	--	--	--
Benzoic acid	650	650	NA	NA	200 U	400 U	110 U	--
Benzyl alcohol	57	73	NA	NA	8 U	16 U	4.5 U	--
Pentachlorophenol	360	690	NA	NA	16 U	32 U	8.9 U	--
Phenol	420	1200	NA	NA	8 U	16 U	4.5 U	--
PAHs—dry weight (ug/kg)								
1-Methylnaphthalene	NV	NV	NA	NA	--	--	--	--
TCLP Metals (mg/L)								
Lead	NA	NA	NA	NA	--	--	--	--
Mercury	NA	NA	NA	NA	--	--	--	--
Dioxins/Furans—dry weight (pg/g)								
1,2,3,4,6,7,8-HpCDD	NV	NV	NA	NA	--	--	--	250
1,2,3,4,6,7,8-HpCDF	NV	NV	NA	NA	--	--	--	10
1,2,3,4,7,8,9-HpCDF	NV	NV	NA	NA	--	--	--	1.5 U
1,2,3,4,7,8-HxCDD	NV	NV	NA	NA	--	--	--	1.1 U
1,2,3,4,7,8-HxCDF	NV	NV	NA	NA	--	--	--	1.5 U
1,2,3,6,7,8-HxCDD	NV	NV	NA	NA	--	--	--	**5.5 J**
1,2,3,6,7,8-HxCDF	NV	NV	NA	NA	--	--	--	0.43 U
1,2,3,7,8,9-HxCDD	NV	NV	NA	NA	--	--	--	**3.7 J**
1,2,3,7,8,9-HxCDF	NV	NV	NA	NA	--	--	--	0.59 U
1,2,3,7,8-PeCDD	NV	NV	NA	NA	--	--	--	0.75 U
1,2,3,7,8-PeCDF	NV	NV	NA	NA	--	--	--	0.49 U
2,3,4,6,7,8-HxCDF	NV	NV	NA	NA	--	--	--	0.43 U
2,3,4,7,8-PeCDF	NV	NV	NA	NA	--	--	--	0.53 U
2,3,7,8-TCDD	NV	NV	NA	NA	--	--	--	**0.65 J**
2,3,7,8-TCDF	NV	NV	NA	NA	--	--	--	0.43 U
OCDD	NV	NV	NA	NA	--	--	--	**1700**

Table 7-5
Sediment Analytical Results and Screening Criteria
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

Investigation Area:	SMS Marine Cleanup Screening Levels				Wharf Area			
Location:					Downstream Dock	Dock Front	Upstream Dock	Composite
Sample Name:					DNR-SSDD-COMP	DNR-SSDF-COMP	DNR-SSDU-COMP	DNR-SSD-SUPCOMP[c]
Collection Date:	SCO—Dry	CSL—Dry	SCO—Organic	CSL—Organic	Apr-11	Apr-11	Apr-11	Apr-11
OCDF	NV	NV	NA	NA	--	--	--	**19**
Total HpCDDs	NV	NV	NA	NA	--	--	--	**1300**
Total HpCDFs	NV	NV	NA	NA	--	--	--	**40**
Total HxCDDs	NV	NV	NA	NA	--	--	--	**93**
Total HxCDFs	NV	NV	NA	NA	--	--	--	**21**
Total PeCDDs	NV	NV	NA	NA	--	--	--	1.7 U
Total PeCDFs	NV	NV	NA	NA	--	--	--	**1.5** U
Total TCDDs	NV	NV	NA	NA	--	--	--	**1.5**
Total TCDFs	NV	NV	NA	NA	--	--	--	0.43 U
Dioxin TEQ	NV	NV	NA	NA	--	--	--	**5.4**
Petroleum Hydrocarbons—dry weight (mg/kg)								
Gasoline	NV	NV	NV	NV	--	--	--	--
Diesel	NV	NV	NV	NV	--	--	--	--
Motor-Oil Range	NV	NV	NV	NV	--	--	--	--
Conventionals								
Ammonia (as N) (mg N/kg)	NV	NV	NV	NV	**1.2**	**2.4**	**0.65**	--
Sulfide (mg/kg)	NV	NV	NV	NV	**84**	**45**	**80**	--
Total Volatile Solids (%)	NV	NV	NV	NV	--	--	--	--
Fixed Solids (%)	NV	NV	NV	NV	--	--	--	--
Total solids (%)	NV	NV	NV	NV	**84**	**45**	**80**	**79.1**
Grain Size (%)								
Gravel	NV	NV	NV	NV	--	--	--	--
Very coarse sand	NV	NV	NV	NV	--	--	--	--
Coarse sand	NV	NV	NV	NV	--	--	--	--
Medium sand	NV	NV	NV	NV	--	--	--	--
Fine sand	NV	NV	NV	NV	--	--	--	--
Very fine sand	NV	NV	NV	NV	--	--	--	--
Coarse silt	NV	NV	NV	NV	--	--	--	--
Medium silt	NV	NV	NV	NV	--	--	--	--
Fine silt	NV	NV	NV	NV	--	--	--	--
Very fine silt	NV	NV	NV	NV	--	--	--	--
Coarse clay	NV	NV	NV	NV	--	--	--	--
Medium clay	NV	NV	NV	NV	--	--	--	--
Fine clay	NV	NV	NV	NV	--	--	--	--
Total fines	NV	NV	NV	NV	--	--	--	--
Asbestos (%)								
Asbestos	NV	NV	NV	NV	--	--	--	--
Pore Water Analysis								
Conductivity (uS/cm)	NV	NV	NV	NV	--	--	--	--
Salinity (ppt)	NV	NV	NV	NV	--	--	--	--

NOTES:

Detections are in **bold** font.

Detections that exceed marine benthic criteria are shaded gray. Non-detect results are not screened against criteria.

-- = not analyzed.

< = less than the limit of detection.

CSL = cleanup screening level.

ft bml = feet below mudline.

HPAH = high-molecular-weight PAH.

J = result is an estimated value.

LPAH = low-molecular-weight PAH.

mg N/kg = milligrams of nitrogen per kilogram.

mg/kg = milligrams per kilogram.

mg/L = milligrams per liter.

NA = not applicable.

NV = no value.

OC =organic carbon.

PAH = polycyclic aromatic hydrocarbon.

PCB = polychlorinated biphenyl.

pg/g = picograms per gram (parts per trillion).

ppt = parts per thousand.

SIM = selective ion monitoring.

SMS = Sediment Management Standards.

SVOC = semivolatile organic compound. When samples were analyzed by both 8270D and 8270D SIM methods, or when samples were reanalyzed, the higher detected value or lower non-detect value was used.

TEQ = toxicity equivalence quotient.

TCLP = toxicity characteristic leaching procedure.

Total PCBs = sum of PCB Aroclors.

U = result is non-detect at method reporting limit.

ug/kg = micrograms per kilogram.

UJ = result is non-detect at or above method reporting limit. Reported value is estimated.

uS/cm = microSiemen =(micromhos) per centimeter.

WAC = Washington Administrative Code.

[a]Dry weight AET values are used when TOC results are outside the range of 0.5 to 3.5%.

[b]Calculated value. Only detected values are summed.

[c]DNR-SSD-SUPCOMP is a composite sample of DNR-SSDD, DNR-SSDF, and DNR-SSDU composites.

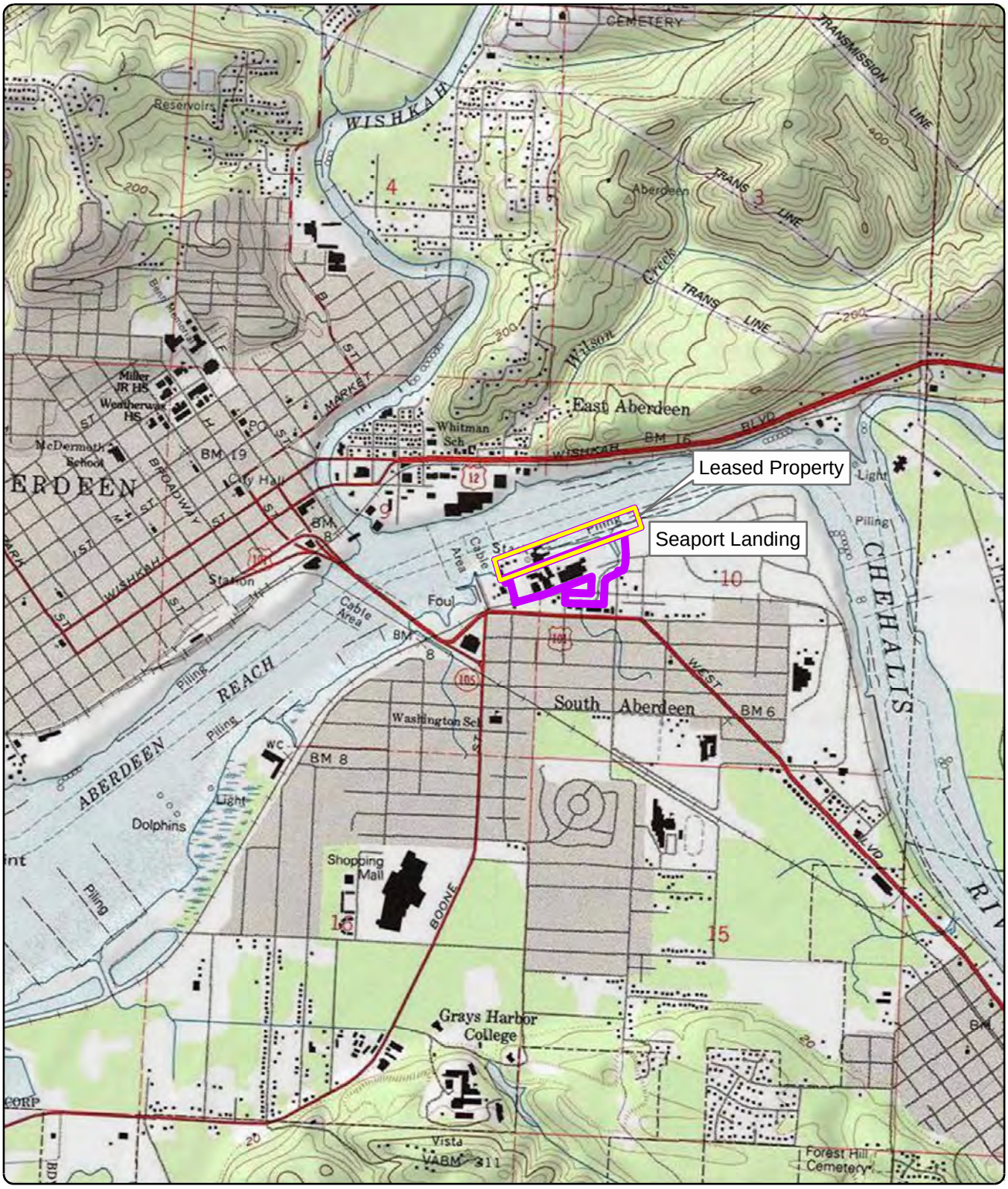
Table 7-6
Woodwaste Toxicity Scoring
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

			Location:		CR-04		CR-05		CR-06		CR-06		CR-19D	
			Sample Name:		CR04-10cm	CR04-5	CR05-10cm	CR06-10cm	CR06-2.5	CR19D-SSD-CONV				
			Collection Date:		11/07/2013	11/08/2013	11/08/2013	11/07/2013	11/07/2013	10/16/2015				
			Collection Depth (ft bgs):		0-0.33	4-5	0-0.33	0-0.33	1-2.5	0-0.33				
	Woodwaste Scoring Criteria (DNR, 2011)													
	Score Criteria Level 1	Score Criteria Level 2		Points		Points		Points		Points		Points		Points
Phenol	420	1,200	290 J	0	980 J	1	570 J	1	370 J	0	240 J	0	93 J	0
Ammonia (as N) (mg N/kg)	≥30<40	≥40	0.47 U	0	15.2	0	7.21	0	1.37	0	14.0	0	18.6	0
Sulfide (mg/kg)	≥200<300	≥300	6.46	0	179	0	320	2	906	2	2910	2	605	2
Total Organic Carbon (%)	≥5<10	≥10	31.4 J	2	16.5 J	2	13.6 J	2	35.6 J	2	49.5 J	2	3.99	0
Total Volatile Solids (%)	≥10<15	>15	59.91	2	38.2	2	36.49	2	60.05	2	69.23	2	8.58	0
Total Solids (%)	≤50≥40	<40	20.62	2	19.98	2	30.32	2	21.4	2	21.59	2	39.38	2
Total Score														
				6		7		9		8		8		4

NOTES:
<5 = low concern.
≥5 < 6 = low medium concern.
≥6 < 7 = medium concern.
>7 = high concern.
ft bgs = feet below ground surface.
J = result is an estimated value.
mg N/kg = milligrams of nitrogen per kilogram.
mg/kg = milligrams per kilogram.
U = result is non-detect at method reporting limit.

FIGURES





Site Address: 500 North Custer Street, Aberdeen, Washington
Source: US Geological Survey (1990) 7.5-minute topographic quadrangle: Aberdeen
Section 9 & 10, Township 17 North, Range 9 West

Approximate Aquatic Lease Area

Seaport Authority Property



Figure 1-1
Property Location
Aberdeen, Washington

0 1,000 2,000
Feet

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Project: 0863.01.05 Produced By: mjosef Approved By: M. Novak Print Date: 1/4/2017
Path: X:\1044.02.01-02 Grays Harbor Seaport Authority\Projects\Seaport_Landing_RI_FS\Fig1-1_Property Location_MJ.mxd

Path: X:\0863.01 Harbor Architects\002\Fig. Aberdeen South Waterfront Tideland Aquatic Lease Areas w Lease Numbers.mxd
Print Date: 8/17/2015
Approved By: mstringer
Produced By: jmiller
Project: 0863.01.01-02



Source: Aerial photograph obtained from Esri ArcGIS Online; parcels and roads obtained from Grays Harbor County; harbor lines obtained from Washington Dept. of Natural Resources.

Produced by Maul Foster & Alongi, Inc.

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Legend

Approximate Aquatic Lease Areas (with Lease Number)

- *Pakonen Boatyard*
- *Seaport Authority*

- Inner Harbor Line
- Outer Harbor Line

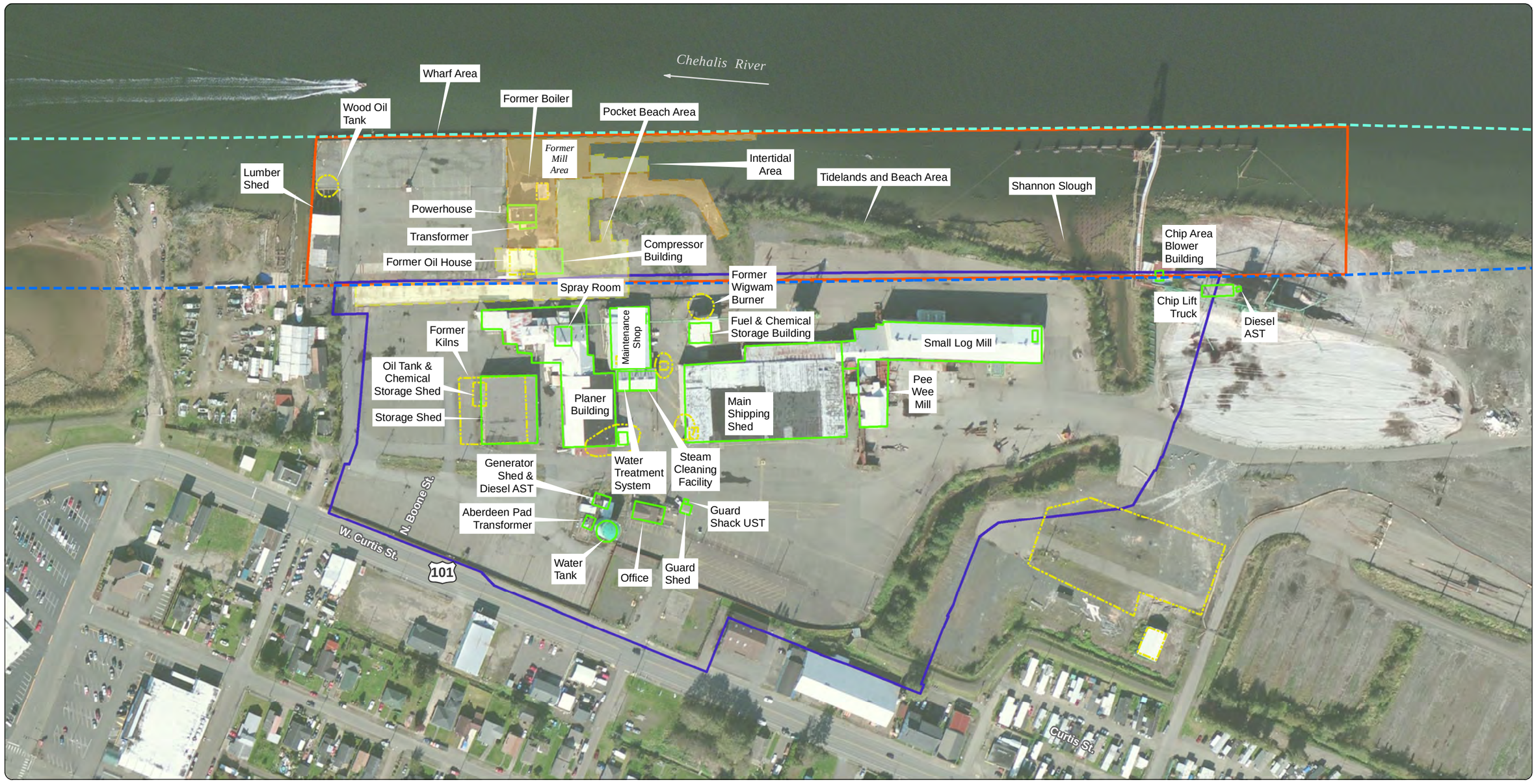
Notes:

1. Areas of property ownership have been generalized based on taxlot information obtained from the County and a purchase sale agreement for the Seaport Authority property, and should be considered approximate.
2. Aquatic lease areas were digitized from print maps of the Aberdeen tidelands dated Mar. 22, 2001 and Jan. 15, 1907 on file with the Office of the Commissioner of Public Lands in Olympia, Washington, and should be considered approximate.

Figure 1-2
Property Vicinity

Aberdeen, Washington

0 100 200
Feet



Source:
Aerial photograph obtained from Esri ArcGIS Online.
Parcels and roads obtained from Grays Harbor County.
Harbor lines obtained from Washington Dept. of Natural Resources.
Former features from Level I Environmental Site Assessment,
PES Environmental; August 13, 2010.

Legend

- Former Mill
- Former Wharf Extension
- Existing Buildings/Features
- Former Buildings/Features
- Inner Harbor Line
- Outer Harbor Line
- Seaport Authority Property
- Leased Property Area

Figure 1-3
Historical and Current Property Features
Aberdeen, Washington

0 100 200
Feet

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Path: X:\1044.02.01-02 Grays Harbor Seaport Authority\Projects\Seaport_Landing_R1_FSFig3_Property Features_MJ.mxd
Print Date: 1/4/2017
Approved By: mstringer
Produced By: rroberts
Project: 0863.01.01-02

Path: X:\1044.02.01-02 Grays Harbor Seaport Authority\Projects\Seaport_Landing_RI_FS\Fig2-1_SampleLocationsLabeled_02.mxd
Print Date: 5/22/2019
Approved By: mstringer
Produced By: aguse
Project: 0963.01.01-02



Source: Aerial photograph obtained from Esri ArcGIS Online; parcels and roads obtained from Grays Harbor County; harbor lines obtained from Washington Dept. of Natural Resources.

- Approximate Aquatic Lease Area
- Seaport Authority Property
- Former Mill
- Former Wharf Extension
- Catch Basin
- Oil/Water Separator
- Outfall
- Drain Pipe (with flow direction)

Study

- 1998 Sediment Samples
- 2011 Sediment Samples
- 2013 Sediment Samples
- 2015 Upland Samples
- 2015 Sediment Samples

Notes:
1. GHHSA = Grays Harbor Historical Seaport Authority.
2. Aquatic lease areas were digitized from print maps of Aberdeen tidelands dated Mar. 22, 2001 and Jan. 15, 1907 on file with the Office of the Commissioner of Public Lands in Olympia, Washington, and should be considered approximate.

Figure 2-1
Sample Locations

Aberdeen, Washington

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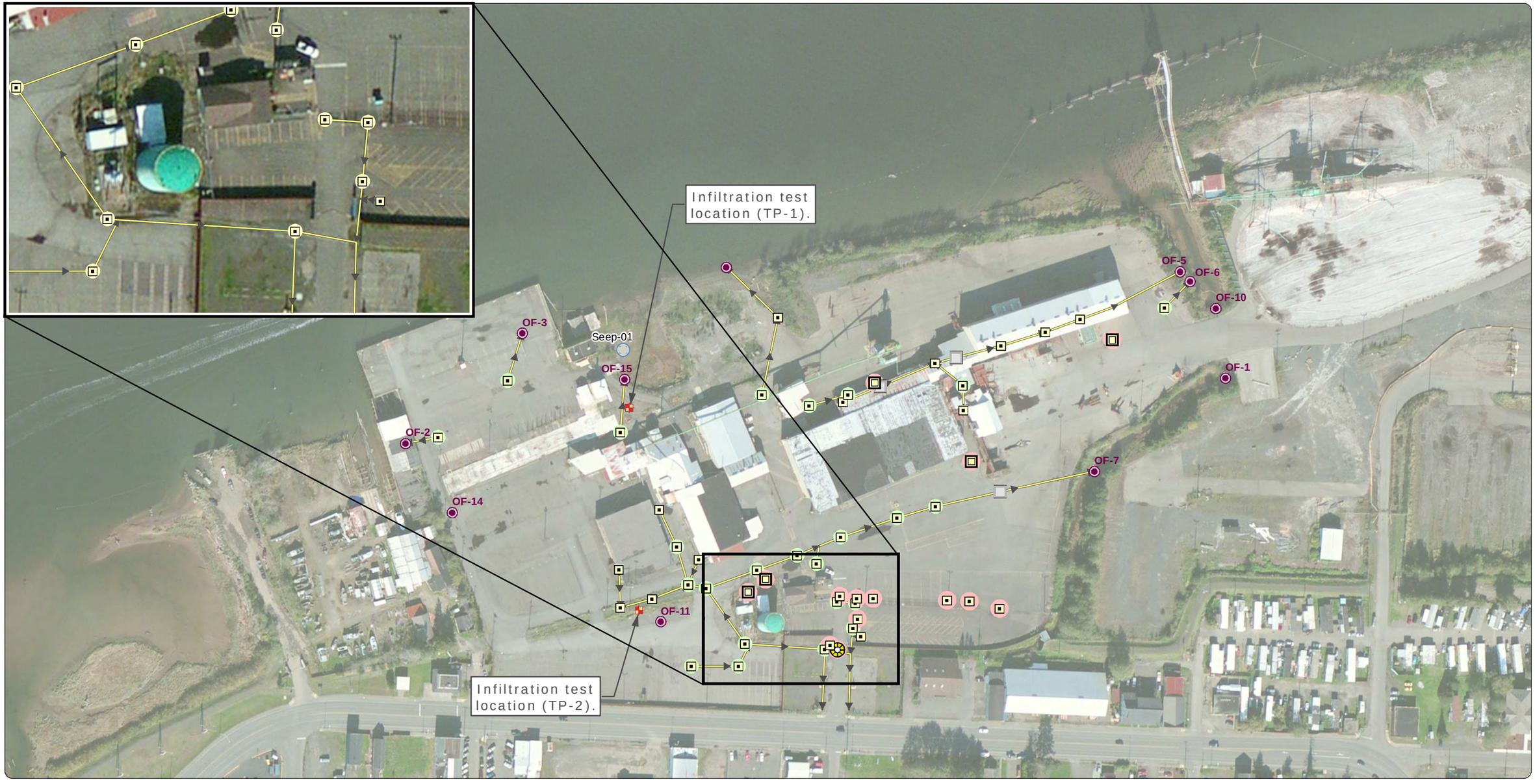
0 100 200
Feet

Path: X:\1044.02.01-02 Grays Harbor Seaport Authority\Projects\Fig2-2_Surface Drainage Features.mxd
Print Date: 02/17/2016
Approved By: mnovak
Produced By: jmiller
Project: 1044.02.02-01



Source: Aerial photograph obtained from Esri ArcGIS Online; 1993 stormwater features digitized from Level I Environmental Site Assessment report, Appendix A-2 (PES Environmental, Inc., 2010); 2000 stormwater features digitized from plan set of existing storm drainage system and grading and drainage plan prepared by Berglund, Schmidt, and Assoc., Inc.

Legend

- Catch Basin
- Electrical Vault
- Sanitary Manhole
- Drain Pipe (with flow direction)
- Infiltration Test Location (10/27/15)
- Oil/Water Separator
- Outfall (field verified)
- Verified
- GPS located

Note: All features are approximate.

Figure 2-2
Surface Drainage Features
Aberdeen, Washington

0 100 200
Feet

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Chehalis River

Intertidal Area

Lumber Shed

Powerhouse

Beach Area

Shannon Slough

Storage Shed

Source:
Bathymetric survey performed in 2016.
LiDAR survey performed in 2009.
Aerial photograph obtained from Esri ArcGIS Online.
Parcels and roads obtained from Grays Harbor County.
Shorelines boundaries are approximate and derived from Sanborn maps.
Harbor lines obtained from Washington Dept. of Natural Resources.
Former features from Level I Environmental Site Assessment,
PES Environmental; August 13, 2010.

Legend

- Inner Harbor Line
- Outer Harbor Line
- Approximate Aquatic Lease Area
- One Foot Contour Bathymetry (NAVD88)
- One Foot Contour LiDAR (NAVD88)

Figure 4-1
Bathymetry and Topography

Aberdeen, Washington

0 100 200
Feet

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Project: 0863.01.01-02 Produced By: estrandhagen Approved By: mstringer Print Date: 4/5/2017

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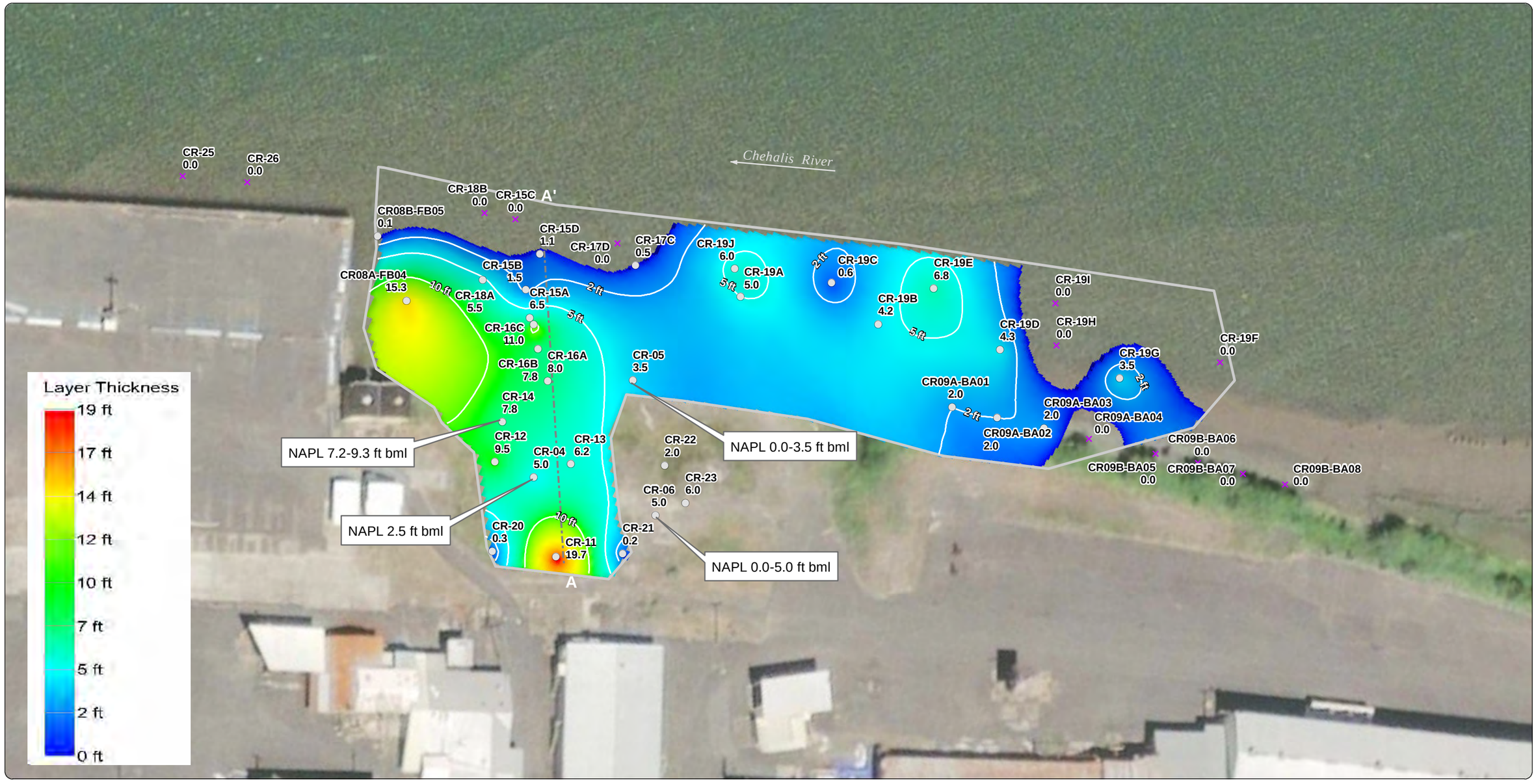
Produced By: estrandhagen Approved By: mstringer Print Date: 5/7/2019
Project: 0863.01.01-02



Source: Aerial photograph obtained from Esri ArcGIS Online; parcels and roads obtained from Grays Harbor County; harbor lines obtained from Washington Dept. of Natural Resources.

Sample Location

- Woodwaste Thickness (Feet)
- Cross Section Profile (Figure 4-4)
- No significant woodwaste accumulation observed
- Model Domain

Notes:
1. GHHSA = Grays Harbor Historical Seaport Authority.
2. Aquatic lease areas were digitized from print maps of Aberdeen tidelands dated Mar. 22, 2001 and Jan. 15, 1907 on file with the Office of the Commissioner of Public Lands in Olympia, Washington, and should be considered approximate.
3. Signficant is defined as greater than 25% woodwaste by volume.
4. Intervals of no recovery in the first core drilled at a location were assumed to be sediment.

Figure 4-2
Estimated Woodwaste Thickness

Aberdeen, Washington

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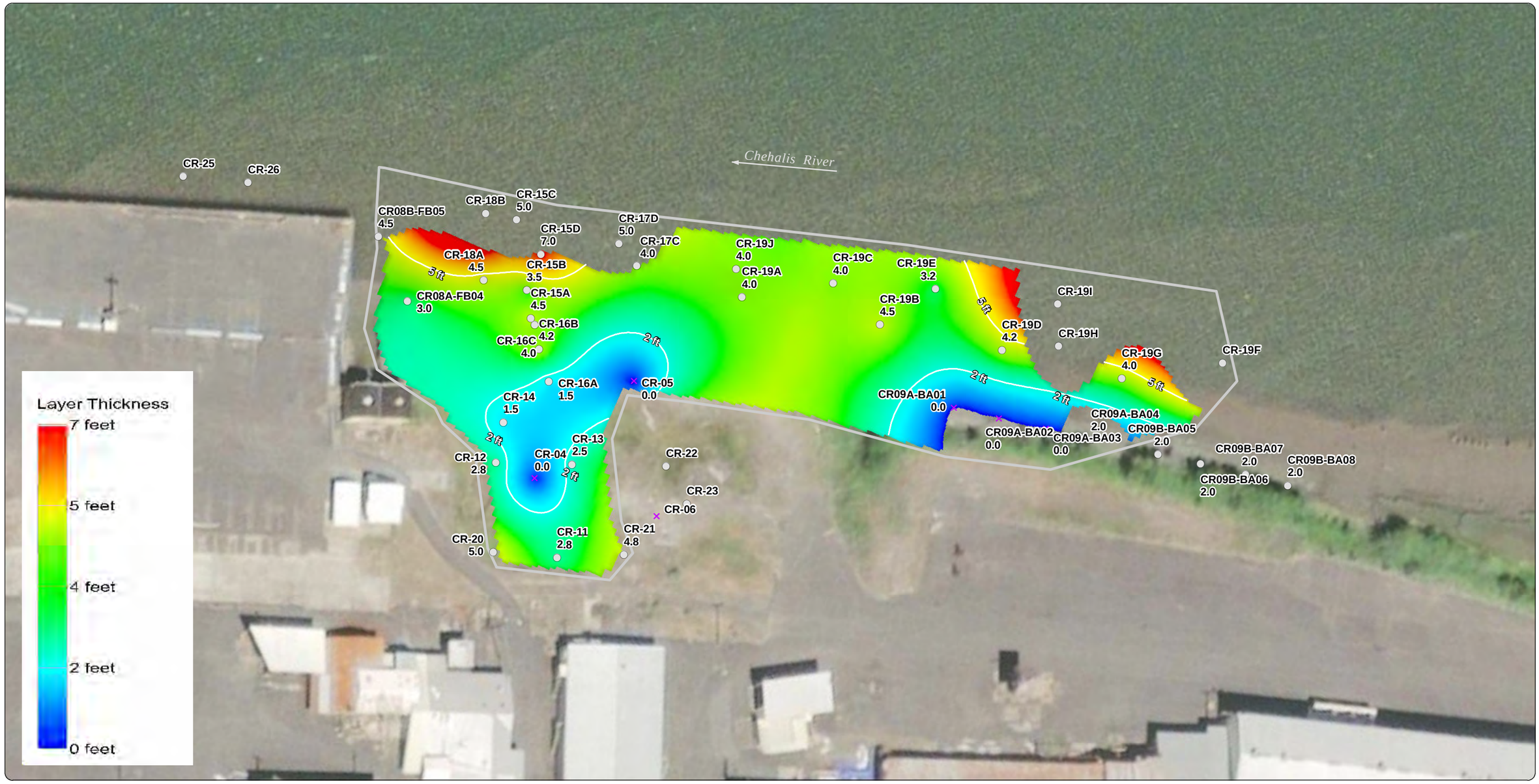
GRAYS HARBOR HISTORICAL SEAPORT

0 75 150
Feet

Path: X:\1044.02.01-02 Grays Harbor Seaport Authority\Projects\EVS_Model\Fig4_3_sed_thickness_ww_domain.mxd
Print Date: 5/7/2019
Produced By: estrandhagen Approved By: mstringer
Project: 0863.01.01-02



Source: Aerial photograph obtained from Esri ArcGIS Online; parcels and roads obtained from Grays Harbor County; harbor lines obtained from Washington Dept. of Natural Resources.

Sample Location

- Sediment Thickness (Feet)
- Model Domain
- × No Sediment Accumulation Observed

Notes:

1. GHHSA = Grays Harbor Historical Seaport Authority.
2. Aquatic lease areas were digitized from print maps of Aberdeen tidelands dated Mar. 22, 2001 and Jan. 15, 1907 on file with the Office of the Commissioner of Public Lands in Olympia, Washington, and should be considered approximate.
3. Signficant is defined as greater than 25% woodwaste by volume.
4. Intervals of no recovery in the first core drilled at a location were assumed to be sediment.
5. See Figure 4-2 for extent of woodwaste.

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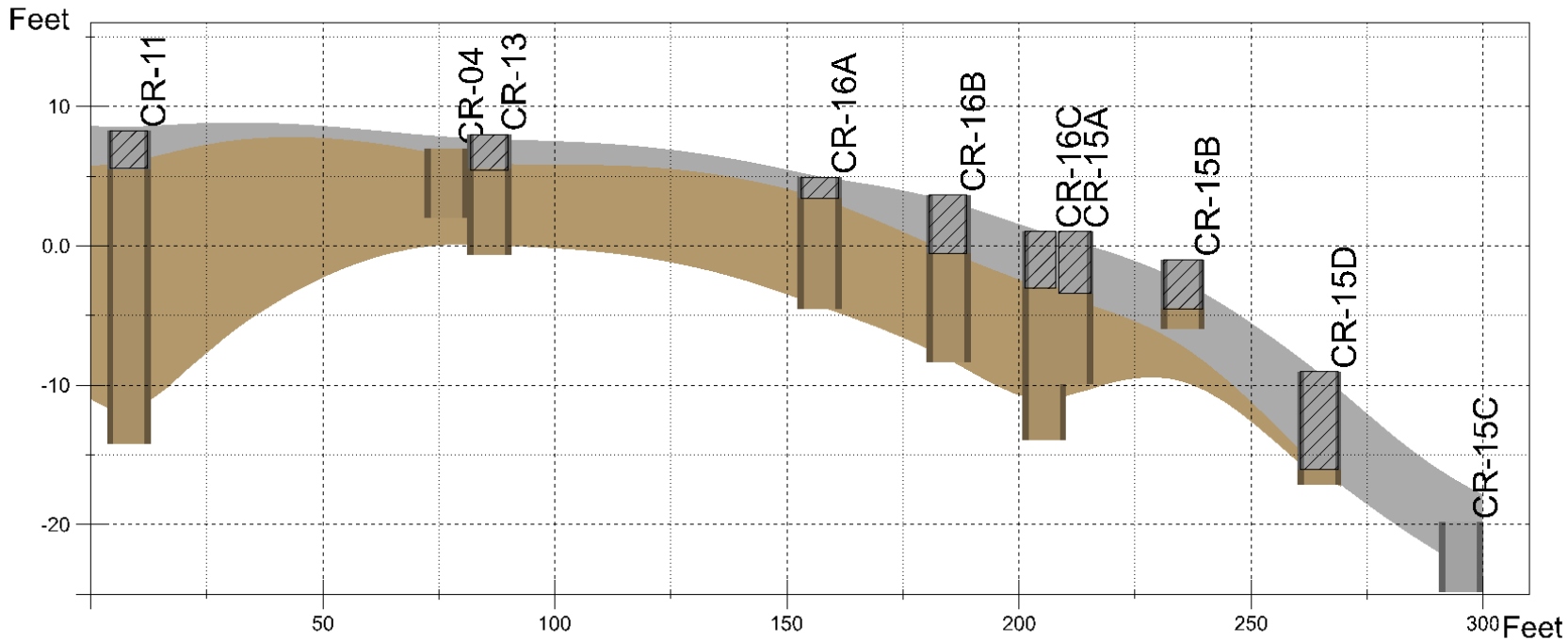
Figure 4-3
Estimated Sediment Thickness Overlying Woodwaste

Aberdeen, Washington

GRAYS HARBOR HISTORICAL SEAPORT

0 75 150
Feet



Legend

- Wood Debris
- Sediment
- No Recovery

Figure 4-4
Woodwaste and Overlying Sediment Cross-Section

Aberdeen, Washington

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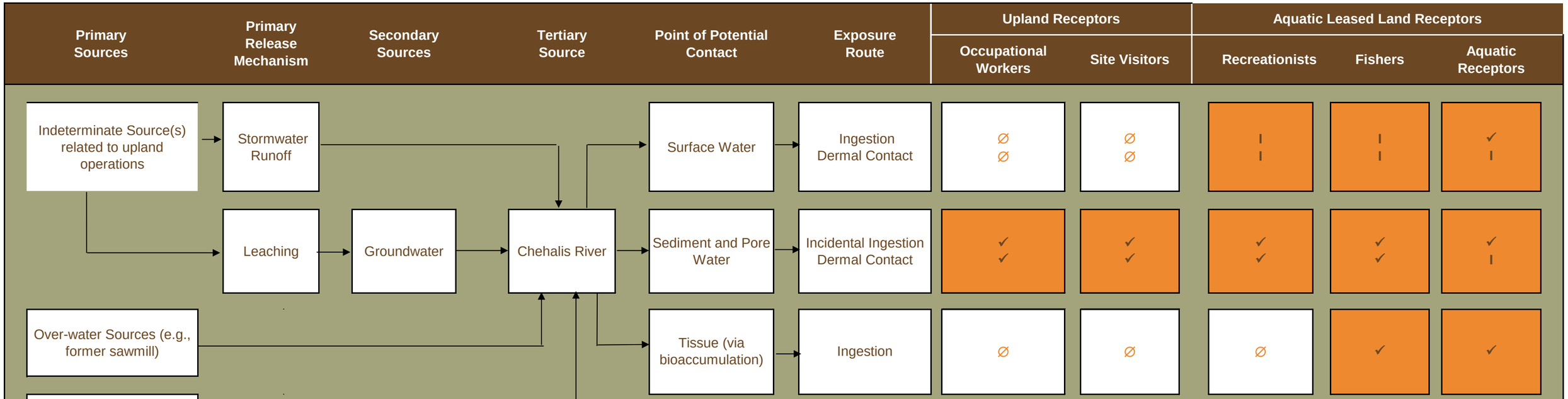
GRAYS HARBOR HISTORICAL SEAPORT

0 225 450
Feet

Project: 1044.01 Produced By: estrandhagen Approved By: mnovak Print Date: 4/4/2017 Path: X:\1044.02.01-02 Grays Harbor Seaport Authority\Projects\EVS_Model\Fig4-4_Woodwaste and Overlying Sediment Cross-Section.ai

Figure 5-1
Conceptual Site Model
Seaport Landing Aquatic Land Lease
Aberdeen, Washington

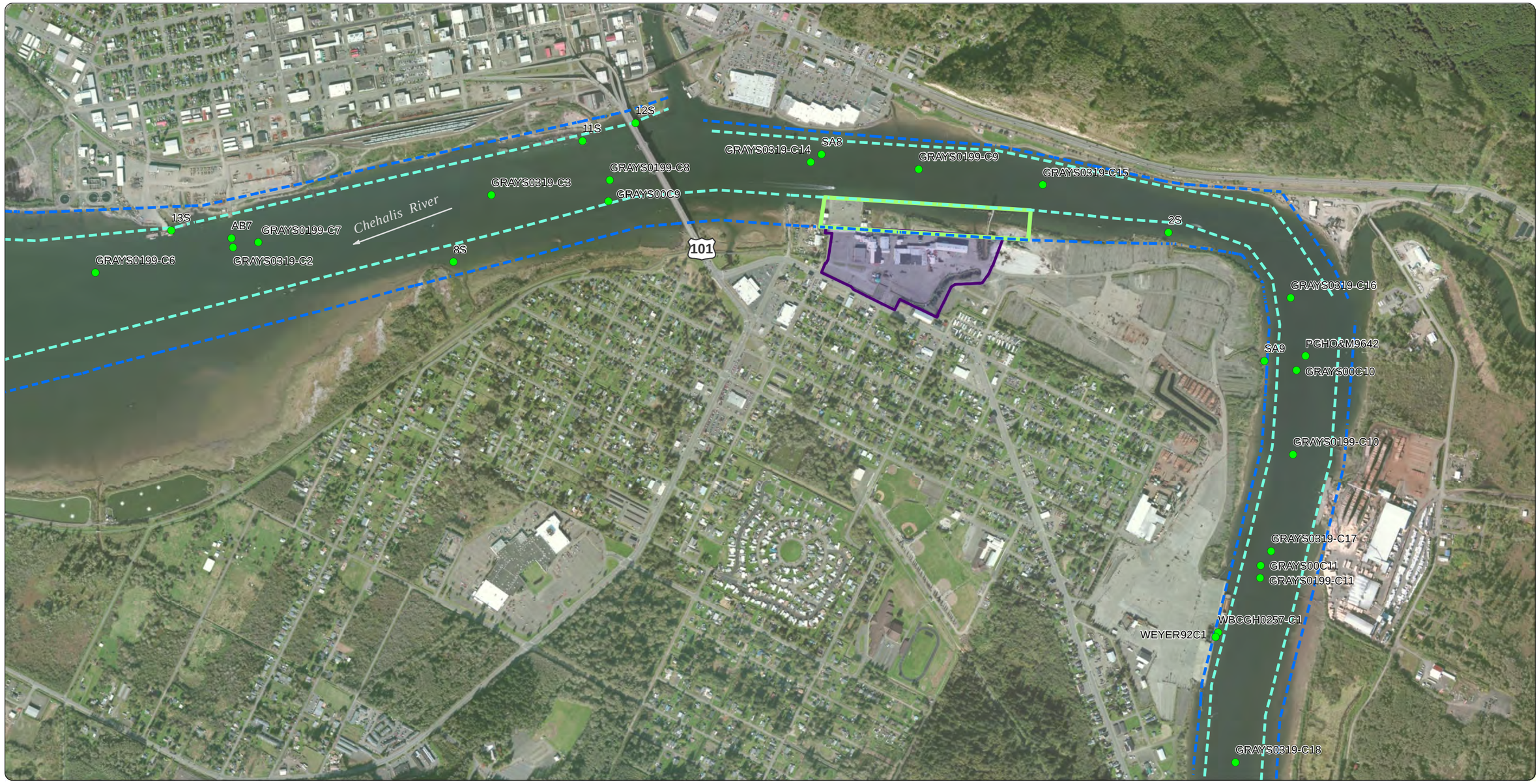


Notes:

Primary pathway →
Potentially Complete exposure route ✓
Incomplete exposure route ∅
Insignificant exposure route I

Aquatic receptors include aquatic plants, benthic invertebrates, fish, and piscivorous birds and mammals.

Path: X:\1044.02.01-02 Grays Harbor Seaport Authority\Projects\Seaport_Landing_RI_FS\Fig6-1_BackgroundLocationsLabeled_01.mxd
Print Date: 5/22/2019
Approved By: mstringer
Produced By: aguse
Project: 0863.01.01-02



Source: Aerial photograph obtained from Esri ArcGIS Online; parcels and roads obtained from Grays Harbor County; harbor lines obtained from Washington Dept. of Natural Resources.

Approximate Aquatic Lease Area
Background Sediment Samples
Seaport Authority
Inner Harbor Line
Outer Harbor Line

Figure 6-1
Background Sample Locations

Aberdeen, Washington

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Notes:
1. GHHSA = Grays Harbor Historical Seaport Authority.
2. Aquatic lease areas were digitized from print maps of Aberdeen tidelands dated Mar. 22, 2001 and Jan. 15, 1907 on file with the Office of the Commissioner of Public Lands in Olympia, Washington, and should be considered approximate.

GRAYS HARBOR HISTORICAL SEAPORT

0 500 1,000
Feet



Notes:
1. GHHSA = Grays Harbor Historical Seaport Authority.
2. Aquatic lease areas were digitized from print maps of Aberdeen tidelands dated Mar. 22, 2001 and Jan. 15, 1907 on file with the Office of the Commissioner of Public Lands in Olympia, Washington, and should be considered approximate.
3. TPH exceedance is of Model Toxics Control Act Method A Cleanup Level.
4. Surface is sediment collected in the top 10 centimeters (0 to 0.33 feet below the mudeline).
5. TEQ = toxicity equivalence quotient
6. pg/g-dw = picograms per gram - dry weight

Source: Aerial photograph obtained from Esri ArcGIS Online; parcels and roads obtained from Grays Harbor County; harbor lines obtained from Washington Dept. of Natural Resources.

- Appoximate Aquatic Lease Area
- Seaport Authority Property
- Former Mill
- Former Wharf Extension
- Historical Surface Sample Location (PES Phase II, April 2011)
- Composite Surface Sample

Surface Sediment Sample Locations

- No Exceedances
- No Exceedances - Not Analyzed for TPH
- SCO Exceedance
- SCO and CSL Exceedance

Composite Surface Sediment Sample Locations

- No Exceedances - Not Analyzed for TPH
- No Exceedances - Not Analyzed for Dioxin TEQ
- No Exceedances - Not Analyzed for Dioxin TEQ or TPH
- SCO Exceedance

Figure 7-1
Sediment Management Standard Exceedances

Aberdeen, Washington

0 75 150
Feet

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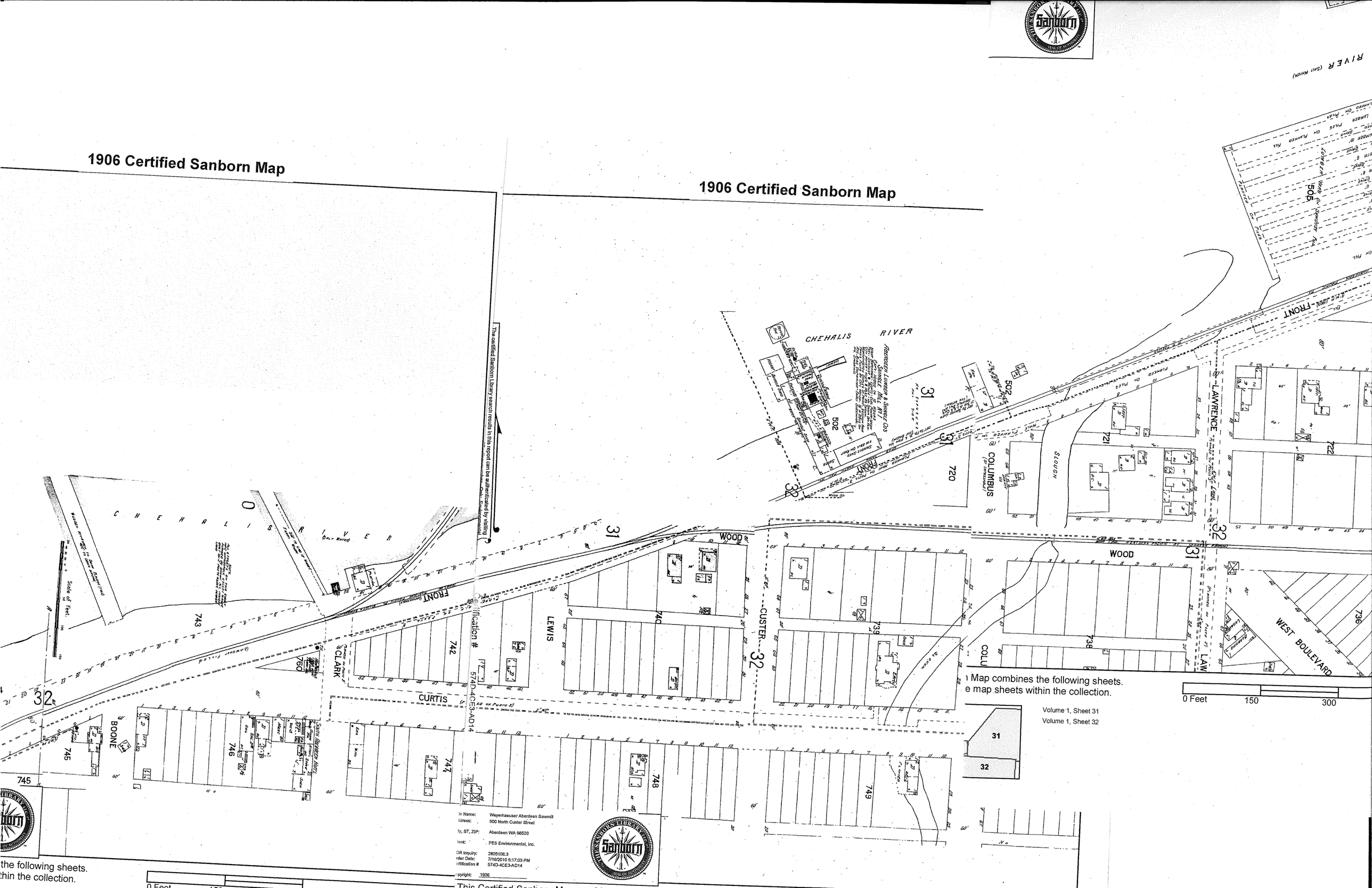
Print Date: 5/22/2019
Approved By: mstringer
Produced By: aguse
Project: 1044.02.01-05

APPENDIX A

SANBORN MAPS

1906 Certified Sanborn Map

1906 Certified Sanborn Map



The certified Sanborn Library search results in this report can be authenticated by visiting www.sanborn.com/authenticate.

Name: Weyerhaeuser Aberdeen Sawmill
Address: 500 North Custer Street
City, ST, ZIP: Aberdeen WA 98520
Client: PES Environmental, Inc.
SDR Inquiry: 2805106.3
Order Date: 7/16/2010 5:17:03 PM
Certification # 574D-4CE3-AD14
Copyright: 1906

Map combines the following sheets.
e map sheets within the collection.

Volume 1, Sheet 31
Volume 1, Sheet 32

0 Feet 150 300

the following sheets.
hin the collection.

This Certified Sanborn Map

1914 Certified Sanborn Map

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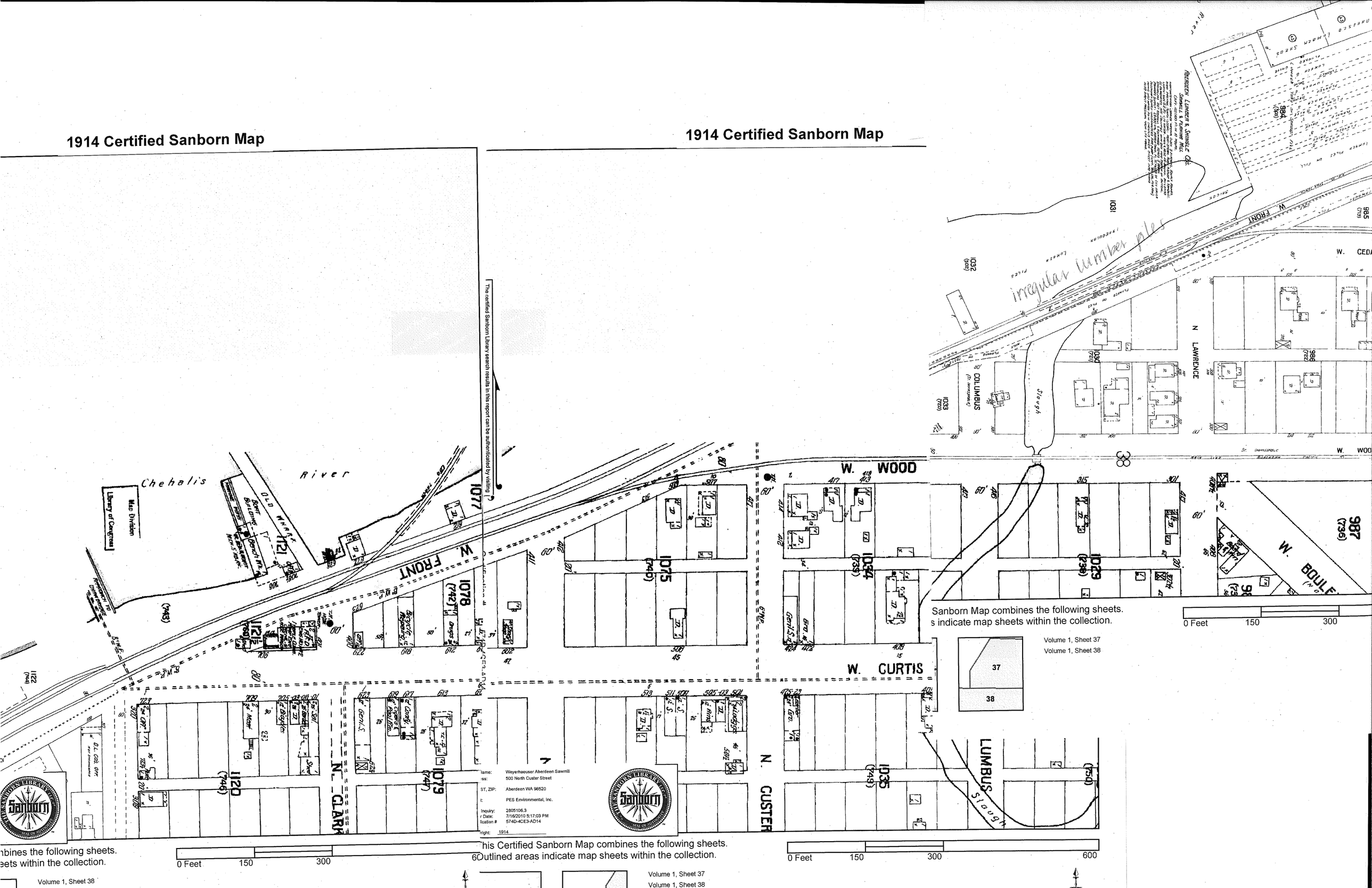

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Volume 1, Sheet 37
Volume 1, Sheet 38

Sanborn Map combines the following sheets.
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Volume 1, Sheet 37
Volume 1, Sheet 38

1914 Certified Sanborn Map

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Volume 1, Sheet 38

1928 Certified Sanborn Map

Site Name:	Aquatic Lands Enhancement
Address:	500 North Custer Street
City, ST, ZIP:	Aberdeen WA 98520
Client:	PES Environmental, Inc.
EDR Inquiry:	2798202.3
Order Date:	6/22/2010 11:57:39 AM
Certification #	0D28-4C72-80D8
Copyright:	1928

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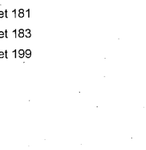
Volume 1, Sheet 181
Volume 1, Sheet 198
Volume 1, Sheet 199

Sanborn Map combines the following sheets.
s indicate map sheets within the collection.



Volume 1, Sheet 181
Volume 1, Sheet 183
Volume 1, Sheet 199

0 Feet 150 300

0 Feet 150

1948 Certified Sanborn Map

1948 Certified Sanborn Map

1948 Certified Sanborn Map

Site Name: Aquatic Lands Lease
Address: 500 North Custer Street
City, ST, ZIP: Aberdeen WA 98520
Client: PES Environmental, Inc.
EDR Inquiry: 2798202.3
Order Date: 6/22/2010 11:57:39 AM
Certification #: 0D28-4C72-80D8
Copyright: 1948

Site Name: Aquatic Lands Lease
Address: 500 North Custer Street
City, ST, ZIP: Aberdeen WA 98520
Client: PES Environmental, Inc.
EDR Inquiry: 2798202.3
Order Date: 6/22/2010 11:57:39 AM
Certification #: 0D28-4C72-80D8
Copyright: 1948

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Certification # 0D28-4C72-80D8

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Outlined areas indicate map sheets within the collection.

Volume 1, Sheet 181
Volume 1, Sheet 183
Volume 1, Sheet 199

This Certified Sanborn Map combines the following sheets.
Outlined areas indicate map sheets within the collection.

Volume 1, Sheet 181
Volume 1, Sheet 198

0 Feet 150 300 600

0 Feet 150 300

1989 Certified Sanborn Map

1989 Certified Sanborn Map

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Certification # 574D-4CE3-AD14

Site Name: Weyerhaeuser Aberdeen Sawmill
Address: 500 North Custer Street
City, ST, ZIP: Aberdeen WA 98520
Client: PES Environmental, Inc.
EDR Inquiry: 2805106.3
Order Date: 7/16/2010 5:17:03 PM
Certification #: 574D-4CE3-AD14
Copyright: 1989

This Certified Sanborn Map combines the following sheets.
Outlined areas indicate map sheets within the collection.

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APPENDIX B

FIELD METHODS



SEAPORT LANDING LEASED PROPERTY RI/FS FIELD METHODS

This document describes the methods employed for soil, groundwater, sediment, and seep sampling during the leased in-water property of the Seaport Landing site field effort in October 2015.

All sampling procedures and quality assurance and quality control protocols were conducted consistent with the sampling and analysis plan, and were consistent with the Model Toxics Control Act stipulated in Washington Administrative Code (WAC) 173-340 and with Sediment Management Standards in WAC 173-204-550.

1 SOIL SAMPLING

Public and private utility-location services were used to identify locatable utilities in the subsurface sampling area before initiation of field-sampling activities. Upland borings were advanced with a GeoProbe® 7822DT Heavy Duty drilling rig operated by Cascade Drilling, LP, using industry-standard drilling techniques.

Soil samples were field screened, collected, and documented at each boring location, as described in the subsections below.

1.1 Field Screening

Soil was field-screened through visual observation and a photoionization detector (PID). Small amounts of soil from selected depths were placed in individual food-grade ziplock bags. The bags were labeled according to their boring location and depth, sealed, and were left in the sun for at least ten minutes to release potential volatile constituents into the sealed bag. The tip of the PID was then placed in each bag to take a reading. All PID readings were recorded in the field notebook.

Soil that had noticeable staining and/or a PID reading above the background level was considered contaminated. Selected soil samples with elevated field-screening results were submitted to the laboratory to be analyzed for contaminants of interest.

1.2 Soil Sampling

Soil samples were collected for lithologic description, field screening, and chemical analyses, as described below. Selected soil samples were containerized and submitted for laboratory analysis. Samples were prepared, handled, and documented as follows:

- All non-disposable equipment used for soil sampling was made of stainless steel and was decontaminated before its use at each sampling location.

- At each boring location, continutous soil cores were collected and observed in the field to document soil lithology, color, moisture content, and sensory evidence of impairment.
- Freshly exposed soil for volatile organic compound (VOC) analysis was transferred directly into laboratory-supplied containers, using the appropriate U.S. Environmental Protection Agency 5035A sampling procedures, preservatives, and containers.
- Soil that was analyzed for nonvolatile constituents was transferred directly from the sampling device into the appropriate laboratory-supplied glass jars, using new, uncontaminated-gloved hands or decontaminated, stainless steel spoons, trowels, or knives.
- Large particles (i.e., larger than 0.25 inch) were removed before the samples were placed in their appropriate laboratory-supplied containers, which were then placed into coolers filled with ice.

Soil sampling information was documented in field notes and is integrated in boring logs.

2 GROUNDWATER SAMPLING

Reconnaissance groundwater samples were collected from four exploratory borings. Water level measurements included measuring the depth to water to the nearest 0.01 foot below ground surface using an electronic water level meter.

At each of the four soil boring locations, temporary wells were installed using the GeoProbe® direct-push drill rig described above. This consisted of placing a five foot long 0.010-inch machine slot polyvinyl chloride screen and riser into the boring. Screened intervals for each temporary well depended on the depth to water observed during drilling in each particular boring. The system was allowed to rest until the water level stabilized. Groundwater samples were collected from each temporary well, using a peristaltic pump with new, disposable, polyethylene tubing. Prior to sampling, one set of groundwater parameters were collected at each well using a multiparameter handheld meter including temperature, pH, specific conductance, and turbidity. Groundwater was pumped directly into laboratory-supplied containers specific to the analysis required, and placed into coolers filled with ice.

For samples that were analyzed for dissolved metals, single-use disposable 0.47 micron filters were used to field filter groundwater directly into laboratory-supplied sample containers containing a nitric acid preservative. All groundwater field parameters and field observations were logged in the field notebook.

3 SEDIMENT SAMPLING

3.1 Surface Sediment Samples

Surface sediment sampling methodology depended on whether the sampling locations were exposed during low tide, or if they were in portions of the Chehalis River which were constantly underwater.

Low Tide-Exposed Surface Sediment Sampling Locations

Surface sediment samples in locations exposed at low tide were collected manually using decontaminated equipment including stainless steel scoops, trowels, or knives. Sample stations were field located using a Trimble GeoXH differential global positioning unit (DGPS). In sample locations where only the top 10 cm of sediment was sampled, surface sediment to 10 cm bml was recovered with a decontaminated stainless steel spoon. Sediments that were composited were placed into a decontaminated stainless steel bowl, the samples were homogenized, placed into laboratory-supplied sampling containers, and placed into coolers filled with ice.

Sample stations exposed at low tide that included sediment collection for depths to two feet (such as CR-09B and CR-09A) were collected from holes dug out using decontaminated stainless steel shovels and measured with a tape measure to ensure proper depth. Sediment from the proper depths were collected from within the holes using a decontaminated stainless steel spoon.

Underwater Surface Sediment Sampling

Surface sediments were collected in underwater areas using a Ponar (a surface-deployed grab sampler), or from the appropriate depth in the sediment cores advanced by the GeoProbe® drill rig referenced above. Sampling methodology involving the drill rig is described in Section 3.2.

Surface sediment samples retrieved using a Ponar were deployed without the use of winches from a support vessel. The Ponar device was equipped with self-releasing pinch-pins with heavy duty hinges to scoop up surficial sediment when the device contacts the surface. The speed of the grab sampler's descent was controlled to minimize disturbing the sediment. The speed of ascent was also controlled to minimize loss of sediment from washout. Sediment samples were inspected upon retrieval to ensure that the grab sampler was completely closed and that it retained all sediment, including surficial fines.

Upon retrieval of an acceptable sediment sample, excess water was decanted from the Ponar, and the upper 0 to 10 centimeters of sediment below mudline was collected, placed in a decontaminated stainless steel bowl, and composited using a decontaminated stainless steel spoon. Sediment that was in contact with the sides of the sampler was not collected. Once composited, sediment was placed in the laboratory-provided containers, and placed into coolers filled with ice. Equipment was decontaminated between sampling locations.

Sediment samples were described in the field notebook following sample collection.

3.2 Subsurface Sediment Sampling

Subsurface sediment sampling was conducted using a GeoProbe® direct-push drill rig, which allowed for recovery of a continuous sediment profile, using the GeoProbe® Macro Core sampling system containing a 2.25 inch diameter acetate liner. Drive depths and recovery depths were recorded in the field notebook.

The direct-push rig was placed on a work barge to allow positioning over submerged sediment sample locations. The barge was maneuvered to the proposed sample stations using a tug boat. Spuds were used as necessary to hold the barge in place temporarily during drilling. A new acetate liner was secured to the drill rig tooling and deployed from the vessel for each boring location. A lead line was used to confirm water depth at each location, and the GeoProbe® rig advanced tooling up to 20 feet bml (or to refusal). Once back on the support vessel, the acetate liner was separated from the tooling.

In some cases, wood or other debris would clog up the acetate core liner and the boring would be rejected. The barge was shifted slightly and a replacement boring was advanced nearby (typically within five to ten feet). Following retrieval of an acceptable core, excess water was removed from the top of the acetate core liner and the core was placed horizontally on a flat work table. The acetate liner was then cut open longitudinally with a utility knife exposing the continuous sediment core. The cores were divided longitudinally and described, noting features such as sheen, percentage and type of woody debris, and biological features, and then photographed. Sediment was sampled from the appropriate depth, with care being taken not to sample material in contact with the acetate liner.

Laboratory-supplied sampling containers were filled at each sample location, and placed into coolers filled with ice. The size and quantity of sampling containers were specified by the analytical laboratory.

4 SEEP SAMPLING

One opportunistic seep sample was collected in the pocket beach area during low tide. The sample was taken from a location close to an observed emergence point i.e., a pool. Photos, written descriptions, and GPS coordinates of the identified seep were collected. Water was decanted directly into laboratory supplied sampling containers by placing the container in a depression directly downstream of the seep outlet. The sample containers were then placed into coolers filled with ice.

APPENDIX C

BORING LOGS

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-08A**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/14/2015 to 10/15/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**20.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 3.0 feet: No recovery.
2									
3									
4									3.0 to 5.0 feet: Woodwaste; reddish brownish black; 80% woodwaste; 20% sand, medium to coarse.
5									
6									5.0 to 9.5 feet: No recovery.
7									
8									
9									
10									9.5 to 15.0 feet: Woodwaste; reddish brownish black; 80% woodwaste; 20% sand, medium to coarse.
11									
12									
13									
14									
15									15.0 to 17.0 feet: No recovery.
16									
17									17.0 to 18.3 feet: Woodwaste; reddish brownish black; 80% woodwaste; 20% sand, medium to coarse.
18									@ 17.1 feet: brick.
19				**GP**		**CR08A-SBSD**			18.3 to 20.0 feet: SILTY SAND (SM); gray; 40% fines, medium plasticity; 60% sand, fine to medium.
20									

NOTES:

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-08B**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/14/2015 to 10/15/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**10.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 3.5: No recovery.
2									
3									
4									3.5 to 7.0 feet: SANDY SILT (MLS); gray; 50% fines; 30% sand, fine; 20% woodwaste.
5									@ 4.5 to 4.6 feet: Woodwaste; 80% woodwaste; 20% sandy silt.
6									
7									7.0 to 10.0 feet: SANDY SILT (MLS); gray; 60% fines; 40% sand, fine.
8				**GP**		**CR08B-SBSD**			
9									
10									

NOTES:

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-11**	**1 of 2**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/13/2015 to 10/13/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**25.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 2.8 feet: No recovery.
2									
3									2.8 to 5.0 feet: Woodwaste; tan to black; hydrocarbon-like odor.
4									
5									5.0 to 5.8 feet: No recovery.
6									5.8 to 6.4 feet: SAND (SP); gray; 100% sand, medium.
7									6.4 to 9.4 feet: SANDY SILT (MLS); gray; 50% fines, plastic; 30% sand; 20% woodwaste.
8									
9									@ 8.8 feet: Sand lens.
10									9.4 to 10.0 feet: Woodwaste; 80% woodwaste; 20% sandy silt, gray.
11									10.0 to 11.2 feet: No recovery.
12									11.2 to 22.5 feet: Woodwaste; 80% woodwaste; 20% sandy silt, gray.
13						**PID = 17.2 ppm**			@ 12.0 feet: Sheen.
14									
15									
16									
17									
18									
19									
20									

NOTES:

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-11**	**2 of 2**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Sample Data: Percent Recovery	Sample Data: Collection Method	Sample Data: Number	Sample Data: Name (Type)	Sample Data: Blows/6"	Lithologic Column	Soil Description
21									
22									
23				GRAB		CR11-SBSD-23			22.5 to 25.0 feet: SANDY SILT (MLS); plastic.
24									
25						PID = 6.4 ppm			

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-12**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/13/2015 to 10/13/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**15.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 2.8 feet: No recovery.
2									
3									2.8 to 5.0 feet: Woodwaste; trace silt; wet.
4									
5									5.0 to 7.0 feet: No recovery.
6									
7									7.0 to 10.0 feet: Woodwaste; trace silt; sulfer odor; wet.
8									
9									
10									10.0 to 11.9 feet: No recovery.
11									
12						**PID = 98.7 ppm**			11.9 to 12.3 feet: Woodwaste; trace silt; sulfur odor; wet.
13									12.3 to 13.8; SILTY SAND (SM); 80% silty sand; 20% woodwaste.
14						**PID = 10.1 ppm**			13.8 to 15.0 feet: SANDY SILT (MLS); gray; 60% fines, plastic; 40% sand, fine, micaceous.
15				**GP**		**CR12-SBSD-15**			

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-13**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/13/2015 to 10/13/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**15.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 2.5 feet: No recovery.
2									
3									2.5 to 5.0 feet: Woodwaste; slight sulfur odor; wet.
4									
5									5.0 to 6.8 feet: No recovery.
6									
7									6.8 to 8.7 feet: Woodwaste; slight sulfur odor; wet.
8					**PID = 2.0 ppm**				
9									8.7 to 10.0 feet: SANDY SILT (MLS)
10									10.0 to 11.1 feet: No recovery.
11					**PID = 1.7 ppm**				11.1 to 15.0 feet: SANDY SILT (MLS); gray; 60% fines, plastic; 40% sand, fine, micaceous.
12				**GP**	**CR13-SBSD-11**				
13									
14									
15									

NOTES:

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-14**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/13/2015 to 10/13/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**15.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 1.5 feet: No recovery.
2									1.5 to 5.0 feet: Woodwaste; sulfur odor; wet.
3									
4									
5									
6									5.0 to 7.2 feet: No recovery.
7									
8						**PID = 102 ppm**			7.2 to 9.3 feet: Woodwaste; tan; sulfur odor; sheen; hydrocarbon product; wet.
9									
10									9.3 to 10.0 feet: SANDY SILT (MLS); gray; 70% fines, plastic; 30% sand, fine; slight sulfur odor; micaceous.
11									10.0 to 12.0 feet: No recovery.
12				**GP**		**CR14-SBSD-12**			12.0 to 15.0 feet: SANDY SILT (MLS); gray; 70% fines, plastic; 30% sand, fine, micaceous.
13									
14						**PID = 0.0 ppm**			
15									

NOTES:

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-15A**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/14/2015 to 10/14/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**11.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 4.5 feet: No recovery.
2									
3									
4									
5									4.5 to 5.0 feet: Woodwaste.
				GP		**CR15A-5**			5.0 to 7.0 feet: No recovery.
6									
7									7.0 to 9.2 feet: Woodwaste; 70% woodwaste; 30% sandy silt, blackish brown.
8									
9									
10									9.2 to 9.5 feet: SANDY SILT (MLS)
									9.5 to 11.0 feet: Woodwaste; 70% woodwaste; 30% sandy silt, blackish brown.
11				**GP**		**CR15A-11**			

NOTES:

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-15B**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/14/2015 to 10/14/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**5.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1				**GP**		**CR15B-0-10cm**			*0.0 to 3.5 feet: No recovery.*
2									
3									
4									*3.5 to 5.0 feet: Woodwaste; 70% woodwaste; 30% sandy silt, blackish brown.*
5				**GP**		**CR15B-5**			

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-15C**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/14/2015 to 10/14/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**5.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1				GP		CR15C-SSD			0.0 to 0.3 feet: No recovery.
				GP		CR15C-SBSD			0.3 to 5.0 feet: SILTY SAND (MLS); blackish gray; 30% fines, fine, medium plasticity; 70% sand, fine.
2									
3									
4									
5				GP		CR15C-5.0			

NOTES:

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-15D**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/15/2015 to 10/15/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**10.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1–10									0.0 to 7.0 feet: No recovery.
7									7.0 to 8.1 feet: Woodwaste; 80% woodwaste; 20% sandy silt, gray.
8–10									8.1 to 10.0 feet: SANDY SILT (MLS); grayish brown; 70% fines, medium to high plasticity; 30% sand, fine; trace woodwaste; trace organic material.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-16A**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/15/2015 to 10/15/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**15.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Sample Data: Percent Recovery	Sample Data: Collection Method	Sample Data: Number	Sample Data: Name (Type)	Sample Data: Blows/6"	Lithologic Column	Soil Description
1				**CS**		**CR16A-0-10cm**			*0.0 to 1.5 feet: No recovery.*
2									*1.5 to 5.0 feet: Woodwaste; 80% woodwaste, reddish brown; 20% sandy silt.*
3									
4									
5				**GP**		**CR16A-5**			*5.0 to 8.5 feet: No Recovery.*
6									
7									
8									
9									*8.5 to 9.5 feet: Woodwaste; 80% woodwaste, reddish brown; 20% sandy silt.*
10									*9.5 to 10.0 feet: SANDY SILT (MLS); dark gray; 50% fines, high plasticity; 35% sand, poorly graded, fine; 15% woodwaste and organic debris.*
11									*10.0 to 12.0 feet: No recovery.*
12									*12.0 to 15.0 feet: SANDY SILT (MLS); gray; 70% fines, plastic; 30% sand, fine.*
13									
14				**GP**		**CR16A-14**			
15									

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-16B**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/15/2015 to 10/15/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**15.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1				**CS**		**CR16B-0-10cm**			*0.0 to 4.2 feet: No recovery.*
2									
3									
4									
5									*4.2 to 5.0 feet: Woodwaste; reddish brown; 70% woodwaste; 30% sandy silt.*
6									*5.0 to 6.5 feet: No recovery.*
7									*6.5 to 10.0 feet: Woodwaste; reddish brown; 80% woodwaste; 20% sandy silt; slight sheen.*
8									
9									
10				**GP**		**CR16B-10.0**			*10.0 to 11.0 feet: No recovery.*
11									*11.0 to 12.0 feet: Woodwaste; reddish brown; 80% woodwaste; 20% sandy silt; slight sheen.*
12									*12.0 to 15.0 feet: SILTY SAND (SM); gray; 20% fines, medium to high plasticity; 80% sand, fine to medium.*
13				**GP**		**CR16B-13.0**			
14									
15									

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-16C**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/15/2015 to 10/15/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**15.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 4.0 feet: No recovery.
2									
3									
4									
5									4.0 to 5.0 feet: Woodwaste; 80% woodwaste; 20% sandy silt, gray.
6									5.0 to 8.5 feet: No recovery.
7									
8									
9									8.5 to 9.8 feet: Woodwaste; 80% woodwaste; 20% sandy silt, gray.
10									9.8 to 10.0 feet: SILTY SAND (SM); gray; 20% fines, medium to high plasticity; 80% sand, fine to medium.
11									10.0 to 13.0 feet: No recovery.
12									
13									
14									13.0 to 15.0 feet: Woodwaste; 80% woodwaste; 20% sandy silt, gray.
15									

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-17C**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/15/2015 to 10/15/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**10.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1				**CS**		**CR17C-0-10cm**			*0.0 to 2.5 feet: No recovery.*
2									
3									*2.5 to 4.0 feet: SANDY SILT (MLS); grayish brown; 60% fines; 40% sand, fine.*
4									*4.0 to 4.5 feet: Woodwaste.*
5									*4.5 to 5.0 feet: SILTY SAND (SM); grayish brown; 40% fines, high plasticity; 60% sand; fine, trace woodwaste.*
6									*5.0 to 8.0 feet: No recovery.*
7									
8									*8.0 to 10.0 feet: SILTY SAND (SM); grayish brown; 40% fines, high plasticity; 60% sand; fine, trace woodwaste.*
9									
10				**GP**		**CR17C-9.5**			

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-17D**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/15/2015 to 10/15/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**5.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1				**CS**		**CR17D-SSD**			*0.0 to 2.0 feet: No recovery.*
				CS		**CR17D-SBSD**			
2									*2.0 to 5.0 feet: SILTY SAND (SM); grayish brown; 40% fines, high plasticity; 60% sand, fine.*
3									
4									
5									

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-18A**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/16/2015 to 10/16/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**10.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 4.5 feet: No recovery.
2									
3									
4									
5									4.5 to 5.0 feet: Woodwaste; 100% woodwaste.
									5.0 to 7.8 feet: No recovery.
6									
7									
8									7.8 to 8.7 feet: Woodwaste; 80% woodwaste; 20% silty sand.
9				**GP**		**CR18A-9.0**			8.7 to 9.5 feet: SANDY SILT (MLS); grayish black; 60% fines, plastic; 40% sand, fine.
10									9.5 to 10.0 feet: Woodwaste; 80% woodwaste; 20% silty sand.

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-18B**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/16/2015 to 10/16/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**12.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1				CS		CR18B-SSD			0.0 to 3.0 feet: No recovery.
				CS		CR18B-SBSD			
2									
3									
4									3.0 to 12.0 feet: SILTY SAND (SM); blackish brownish gray; 40% fines; 60% sand, fine.
5									
6									
7									
8									
9									
10									
11									
12									

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-19A**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/16/2015 to 10/16/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**10.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 3.0 feet: No recovery.
2									
3									
4									3.0 to 3.7 feet: SANDY SILT with woodwaste (MLS); gray; 40% fine, loose; 30% sand; 30% woodwaste.
									3.7 to 4.0 feet: SANDY SILT (MLS); grayish brown; 60% fines; 40% sand, fine.
5									4.0 to 5.0 feet: Woodwaste; 80% woodwaste; 20% sandy silt.
6									5.0 to 8.0 feet: No recovery.
7									
8									
9									8.0 to 9.0 feet: Woodwaste; 70% woodwaste; 30% sandy silt, gray.
10									9.0 to 10.0 feet: SILTY SAND with woodwaste (SM); gray; 80% silty sand; 20% woodwaste.

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-19B**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/16/2015 to 10/16/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**10.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1				**CS**		**CR19B-0-10cm**			*0.0 to 2.0 feet: No recovery.*
2									
3									*2.0 to 4.5 feet: SILTY SAND (SM); grayish brown; 40% fines, high plasticity; 60% sand; fine, loose from 2.0 to 3.0 feet; trace woodwaste.*
4									
5									*4.5 to 5.0 feet: Woodwaste; 80% woodwaste; 20% silty sand.*
6									*5.0 to 7.5 feet: No recovery.*
7									
8									*7.5 to 8.7 feet: Woodwaste; 80% woodwaste; 20% silty sand.*
9									*8.7 to 10.0 feet: SANDY SILT (MLS); grayish black; 50% fines, plastic; 35% sand, fine; 15% woodwaste, coarse chucks.*
10				**GP**		**CR19B-10**			

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-19C**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/16/2015 to 10/16/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**5.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 2.4 feet: No recovery.
2									
3									2.4 to 5.0 feet: SILTY SAND (SM); blackish brown; 40% fines, high plasticity; 60% sand, fine; trace woodwaste.
4									@ 4.0 to 4.1 feet: Woodwaste.
5									@ 4.5 to 4.6 feet: Woodwaste.

NOTES:

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-19D**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/16/2015 to 10/16/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**10.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1					**CR19D-0-10cm and CR19D-SSD-CONV**				*0.0 to 1.0 feet: No recovery.*
2									*1.0 to 4.2 feet: SILTY SAND (SM); blackish gray; 40% fines, high plasticity; 60% sand, fine; loose from 1.0 to 2.0 feet.*
3									
4									
5									*4.2 to 5.0 feet: Woodwaste; tannish brown; 80% woodwaste; 20% sandy silt.*
6									*5.0 to 7.5 feet: No recovery.*
7									
8									*7.5 to 8.5 feet: Woodwaste; tannish brown; 80% woodwaste; 20% sandy silt.*
9				**GP**		**CR19D-9.0**			*8.5 to 10.0 feet: SILT SAND (SM); grayish black; 40% fines, high plasticity;*
10									

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-19E**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/16/2015 to 10/16/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**10.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 3.2 feet: No recovery.
2									
3									
4									3.2 to 5.0 feet: Woodwaste with SILTY SAND; 60% woodwaste; 40% silty sand.
5									5.0 to 7.7 feet: No recovery.
6									
7									
8									7.7 to 8.5 feet: Woodwaste with SILTY SAND; brownish black; 60% woodwaste; 40% silty sand.
9									8.5 to 9.5 feet: Woodwaste; 80% woodwaste; 20% silty sand.
10									9.5 to 10.0 feet: Woodwaste with SILTY SAND; brownish black; 60% woodwaste; 40% silty sand.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-19F**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/16/2015 to 10/16/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**10.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1				CS		CR19F-SSD			0.0 to 2.5 feet: No recovery.
				CS		CR19F-SBSD			
						CR19F-SBSD-DUP			
2									
3									2.5 feet: to 10.0 feet: SILTY SAND (SM); grayish brown; 40% fines; 60% sand, loose from 2.5 to 3.5 feet then becomes dense.
4									
5				GP		CR19F-5			
6									
7									
8									
9				GP		CR19F-9.0			
10									

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-19G**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/16/2015 to 10/16/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**10.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1				**CS**		**CR19G-0-10cm**			*0.0 to 2.5 feet: No recovery.*
2									
3									*2.5 to 4.5 feet: SILTY SAND (SM); grayish brown; 35% fines; 50% sand; 15% woodwaste.*
4									
5									*4.5 to 7.5 feet: SILTY SAND with Woodwaste (SM); grayish brown; 60% silty sand; 40% woodwaste.*
6									
7									
8									*7.5 to 10.0 feet: SILTY SAND (SM); grayish brown; 40% fines; 60% sand, dense.*
9									
10									

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-19I**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/16/2015 to 10/16/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**10.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 1.0 feet: No recovery.
2									1.0 to 10.0 feet: SILTY SAND (SM); grayish brown; 40% fines, medium plasticity; 60% sand, fine; dense. @ 1.0 to 3.0 feet: loose.
3									
4									
5									
6									
7									
8									
9									
10									

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-19J**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/16/2015 to 10/16/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**10.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 4.0 feet: No recovery.
2									
3									
4									
5									4.0 to 5.0 feet: SILTY SAND with Woodwaste (SM); 60% silty sand; 40% woodwaste.
6									5.0 to 8.7 feet: No recovery.
7									
8									
9									8.7 to 10.0 feet: Woodwaste; 30% silty sand, borwnish black; 70% woodwaste.
10									

NOTES:

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-20**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/12/2015 to 10/12/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**10.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 3.0 feet: No recovery.
2									
3									
4				GP		CR20-S-5.0			3.0 to 3.3 feet: CLAYEY SAND (SC); dark brown; 40% fines, high plasticity; 40% sand; 20% gravel; trace organic material; moist. 3.3 to 7.0 feet: SANDY GRAVEL (GWS); brownish gray; 30% sand, fine to coarse; 70% gravel, medium to coarse, subangular. @ 4.0 feet: Clay lens; reddish brown.
5				GP		CR20-GW-5.0			@ 5.0 to 5.3 feet: Woodwaste; 80% woodwaste, primarily large woodchips; 20% black silty sand.
6									
7									7.0 to 7.5 feret: CONCRETE.
8									7.5 to 10.0 feet: No recovery.
9									
10									

NOTES:

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-21**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/12/2015 to 10/12/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**10.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 3.0 feet: No recovery.
2									
3									
4				GP		CR21-S-5.0 PID = 102.9 ppm			3.0 to 4.8 feet: GRAVELLY SAND (SPG); brown; 10% fines, nonplastic; 40% sand, fine to medium; 50% gravel, subangular (rock fragments), medium to large; moist.
5									@ 4.8 to 5.0 feet: Woodwaste; 80% woodwaste, primarily large woodchips; 20% black silty sand.
6									5.0 to 8.5 feet: No recovery.
7									
8									
9						PID = 53.5 ppm			8.5 to 10.0 feet: SILTY SAND (SM); blackish brown; 30% fines, nonplastic to medium plasticity; 50% sand, fine to medium; 20% gravel, medium, subrounded; wet.
10				GP		CR21-GW-10.0			

NOTES:

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-22**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/13/2015 to 10/13/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**10.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 2.0 feet: No recovery.
2									
3				GP		CR22-S-3.0 PID = 2.0 ppm			2.0 to 3.0 feet: WELL GRADED SAND (SW); brown; 20% fines, nonplastic; 60% sand, fine to coarse; 20% gravel, subangular; rock shards, some organic material.
4									3.0 to 4.5 feet: SILTY SAND (SM); reddish brown, 40% fines, medium plasticity; 60% sand, coarse; trace gravel.
5									@ 4.5 to 4.8 feet: Woodwaste lens, primarily bark chips and large wood chips.
6									4.8 to 5.0 feet: POORLY GRADED SAND (SP); gray; 10% fines, 90% sand, medium, poorly graded; saturated. (FILL) 5.0 to 7.0 feet: No recovery.
7									
8									7.0 to 8.0 feet: POORLY GRADED SAND (SP); gray; 10% fines, 90% sand, medium, poorly graded; saturated. (FILL)
9									8.0 to 9.0 feet: Woodwaste.
10				GP		PID = 8.8 ppm			9.0 to 10.0 feet: SILT w/ WOODWASTE (ML); grayish brown; 70% fines, nonplastic; 30% woodwaste, primarily bark chips .

NOTES:

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-23**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/13/2015 to 10/13/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**10.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 1.0 feet: No recovery.
2				GP		CR23-S-3.0 PID = 30.8 ppm			1.0 to 1.5 feet: GRAVELLY SILT (MLG); brown; 40% fines, high plasticity; 10% sand; 25% gravel, subrounded, large; 25% woodwaste, primarily large woodchips and bark pieces.
3									1.5 to 2.5 feet: GRAVELLY SAND (SPG); grayish brown; 20% fines; 50% sand; 30% gravel, fine to medium, subrounded to subangular.
4						PID = 57.7 ppm			2.5 to 3.0 feet: GRAVEL w/ SAND (GW); 10% fines, 20% sand; 70% gravel, fine to large. 3.0 to 4.0 feet: POORLY GRADED SAND (SP); gray; 20% fines; 70% sand, poorly graded, medium; 10% gravel. (FILL)
5									4.0 to 5.0 feet: Woodwaste; 80% woodwaste; 20% gray sandy silt.
6									5.0 to 7.5 feet: No recovery.
7									
8									7.5 to 9.0 feet: Woodwaste; 80% woodwaste; 20% gray sandy silt.
9									
10									9.0 to 10.0 feet: SILT w/ WOODWASTE (ML); dark brown; 70% fines, medium plasticity; 30% woodwaste, primarily bark chips.

NOTES:

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-25**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/15/2015 to 10/15/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**5.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1				**CS**		**CR25-0-10cm**			*0.0 to 1.0 feet: No recovery.*
2									*1.0 to 5.0 feet: SILTY SAND (SM): blackish gray; 20% fines; 80% sand, fine.*
3									
4									
5				**GP**		**CR25-5**			

NOTES:

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.01	**CR-26**	**1 of 1**

Project Name	**Seaport Landing**	TOC Elevation (feet)	**Mudline**
Project Location	**500 North Custer Street, Aberdeen, WA**	Surface Elevation (feet)	
Start/End Date	**10/15/2015 to 10/15/2015**	Northing	
Driller/Equipment	**Cascade Drilling, LP/GeoProbe Track rig**	Easting	
Geologist/Engineer	**M. Murray**	Hole Depth	**5.0-feet**
Sample Method	**GeoProbe**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Sample Data: Percent Recovery	Sample Data: Collection Method	Sample Data: Number	Sample Data: Name (Type)	Sample Data: Blows/6"	Lithologic Column	Soil Description
1				CS		CR26-SSD			0.0 to 1.0 feet: No recovery.
				CS		CR26-SBSD			1.0 to 5.0 feet: SILTY SAND (SM); blackish gray; 30% fines, high plasticity; 70% sand, fine.
2									
3									
4									
5									

NOTES:

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APPENDIX D

TERRESTRIAL ECOLOGICAL EVALUATION

REDACTED



APPENDIX E

SEDIMENT SCREENING LEVEL DEVELOPMENT FOR HUMAN HEALTH—DIRECT CONTACT

Table
Sediment Screening Level Development For Human Health - Direct Contact

Model Parameter	Description	Total PCBs (ug/kg)	cPAH TEQ (ug/kg)	Dioxin TEQ (pg/g)
SC_C[a]	Risk-based sediment concentration	3.1E+03	8.5E+02	1.0E+02
RISK	Acceptable cancer risk (unitless)	1E-06	1E-06	1E-06
BW	Average body weight over the exposure duration (kg)	16	16	16
AT	Averaging time (day)	27375	27375	27375
EF	Exposure frequency (day/year)	41	41	41
ED	Exposure duration (years)	6	6	6
SIR	Soil ingestion rate (mg/day)	200	200	200
AB	Gastrointestinal absorption fraction (unitless)	1	1	0.6
SFo[b]	Oral cancer potency factor (mg/kg/day)	2.0E+00	7.3E+00	1.3E+05
SFd[c]	Dermal cancer potency factor (mg/kg/day) derived by SFo/GI	4.0E+00	1.5E+01	1.6E+05
GI	Gastrointestinal absorption conversion factor (unitless)	0.5	0.5	0.8
SA	Dermal surface area (cm^2)	2200	2200	2200
AF	Adherence factor ($mg/cm^2/day$)	0.2	0.2	0.2
ABS	Dermal absorption fraction (unitless)	0.1	0.1	0.03

NOTES:

Model parameters based on recommended exposure factors in Ecology (2017), Table 9-1.

cm^2 = square centimeter.

kg = kilogram(s).

$mg/cm^2/day$ = milligrams per square centimeter per day.

mg/day = milligrams per day.

mg/kg = milligrams per kilogram.

mg/kg/day = milligrams per kilogram per day.

PCB = polychlorinated biphenyl.

pg/g = picograms per gram.

TEQ = toxicity equivalent.

[a]SC_C derived using Equation 9-1 from Ecology (2017).

[b]Obtained from Ecology CLARC database.

[a]Derived using Equation 9-3 from Ecology (2017).

APPENDIX F

LABORATORY REPORTS
(PROVIDED ON CD)

Analytical Resources, Incorporated
Analytical Chemists and Consultants

23 November 2015

Madi Novak
Maul, Foster and Alongi, Inc
2001 NW 19th Avenue
Suite 200
Portland, OR 97209

RE: Project: Seaport Landing
ARI Job No.: AON0

Dear Madi:

Please find enclosed the original chain of custody records and the final results for the samples from the project referenced above. Three soil samples and two water samples were received on October 14, 2015. The samples were analyzed for SVOCs, dioxins/furans, PCBs, NWTPH-Dx, TOC and total metals as requested.

The percent differences (%Ds) for phenol and carbazole were not within control limits for the CCAL that bracketed the 10/28/15 SVOC analyses of the soil samples. All positive results for these compounds have been flagged with a "Q" qualifier to denote the high %Ds.

The %Ds for several compounds were not within control limits for the CCAL that bracketed the 10/23/15 SVOC analyses of the water samples. All positive results for these compounds have been flagged with a "Q" qualifier to denote the high %Ds.

The percent recovery for the surrogate, d14-p-terphenyl, was low following the SVOC analysis of sample CR23-GW-6.0. Since one acid surrogate and one base/neutral surrogate is permitted to be recovered outside of established QC limits, no corrective actions were taken.

The percent recoveries for 4-chloroaniline and 3-nitroaniline were low and 3,3'-dichlorobenzidine was not recovered following the analysis of the LCS associated with the soil samples. Since all of these compounds are known ton be reactive and recover poorly, no corrective actions were taken.

The RPDs for three compounds were high following the analyses of the LCS/LCSD associated with the analyses of the water samples. Since the individual percent recoveries were within established QC limits for these compounds, no corrective actions were taken.

The %D for Aroclor 1242 was not within control limits for one column for the CCAL that bracketed the 10/23/15 PCB analyses of these samples. The %D for Aroclor 1242 was within acceptable QC limits for the secondary column. The secondary column only was used for the quantitation of Aroclor 1242.

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Novak, Maul, Foster and Alongi, Inc.
Seaport Landing
Sediment
AON0

23 November 2015

The percent recovery for the surrogate, o-terphenyl, was slightly low following the NWTPH-Dx analysis of sample CR23-GW-6.0. Since the QC limits are advisory and the percent recovery was low by <3%, no corrective actions were taken.

The remaining analyses proceeded without incident of note.

An electronic copy of this package will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

cc: file AON0

Enclosures

MDH/mdh

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: AONB	Turn-around Requested: Standard.	Page: 5 of 5	
ARI Client Company: Maul Foster + Alongi	Phone: (503) 501-5212	Date: 10/13	Ice Present? yes
Client Contact: Madi Norak		No. of Coolers:	Cooler Temps:
Client Project Name: Seaport Landing			
Client Project #: 1044.02.01-02	Samplers: RD, JP, MRM		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: TPH	metals	PAH	PCB	SVOA	TOC	Mercury	Archive	Notes/Comments: Phenol	Dioxin/Furan	Dissolved metals
CR-07-SSD-comp	10/13/15	1000	S	4	X	X	X	X	X	X	X	X			
CR23-S-9.0	10/13/15	1320	S	5	X	X	X	X	X		X		X	X	
CR22-S-3.0	10/13/15	1400	S	5	X	X	X	X	X		X		X	X	
CR23-GW-6.0	10/13/15	1310	GW	8	X	X		X	X		X				X
CR22-GW-9.0	10/13/15	1345	GW	8	X	X		X	X		X				X

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Roxanne Degens	Printed Name: Archie Tripp	Printed Name:	Printed Name: Emily Litwin
	Company: MFA	Company: M.C. 12a C	Company:	Company: ARI
	Date & Time: 10/14/15 1020	Date & Time: 10/14/15 10:20	Date & Time:	Date & Time: 10/14/15 1235

AONB : 00000

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Maul Foster

COC No(s): _____ (NA)

Assigned ARI Job No: AONO

Project Name: _____

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry): 5.2 4.3 5.8 5.0 4.1

Time: _____

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D002565

Cooler Accepted by: UL Date: 10/14/15 Time: 1235

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ... Bubble Wrap (Wet Ice) Gel Packs (Baggies) (Foam Block) Paper Other: _____			
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	(YES)	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	(NA)		

Was Sample Split by ARI : (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: UL Date: 10/15/15 Time: 1008

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm
• •	• • •	● ● ●

Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

PRESERVATION VERIFICATION 10/16/15
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **AON0**

PC: Mark
VTSR: 10/14/15

Inquiry Number: NONE
Analysis Requested: 10/14/15
Contact: Novak, Madi
Client: Maul Foster & Alongi
Logged by: EL
Sample Set Used: Yes-490
Validatable Package: No
Deliverables:

Project #: 1044.02.01-02
Project: Seaport Landing
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	TPHD <2	Fe2+ <2	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
15-19095 **AON0D**	CR23-GW-6.0						TOT PRES															
15-19096 **AON0E**	CR22-GW-9.0						TOT PRES															
15-19097 **AON0F**	CR23-GW-6.0						DIS PRES									Y						
15-19098 **AON0G**	CR22-GW-9.0						DIS PRES									Y						

AON0 : 00005

Checked By LN Date 10/16/15

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: AON0
Client: Maul Foster & Alongi
Project Event: 1044.02.01-02
Project Name: Seaport Landing

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	CR-07-SSD-COMP	AON0A	15-19092	Soil	10/13/15 10:00	10/14/15 12:35
2.	CR23-S-3.0	AON0B	15-19093	Soil	10/13/15 13:20	10/14/15 12:35
3.	CR22-S-3.0	AON0C	15-19094	Soil	10/13/15 14:00	10/14/15 12:35
4.	CR23-GW-6.0	AON0D	15-19095	Ground Wate	10/13/15 13:10	10/14/15 12:35
5.	CR22-GW-9.0	AON0E	15-19096	Ground Wate	10/13/15 13:45	10/14/15 12:35
6.	CR23-GW-6.0	AON0F	15-19097	Ground Wate	10/13/15 13:10	10/14/15 12:35
7.	CR22-GW-9.0	AON0G	15-19098	Ground Wate	10/13/15 13:45	10/14/15 12:35

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 2/14/2011

Inorganic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Duplicate RPD is not within established control limits

B — Reported value is less than the CRDL but ≥ the Reporting Limit

N — Matrix Spike recovery not within established control limits

NA — Not Applicable, analyte not spiked

H — The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible

L — Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Flagged value is not within established control limits

B — Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.

J — Estimated concentration when the value is less than ARI's established reporting limits

D — The spiked compound was not detected due to sample extract dilution

E — Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

Q — Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).

AON0 : 00007

S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte

NA The flagged analyte was not analyzed for

NR Spiked compound recovery is not reported due to chromatographic interference

NS The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

EMPC Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

X Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**

Z Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

AON0 : 00008

Geotechnical Data

A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F Samples were frozen prior to particle size determination

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighting

AON0 : 00009

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: CR-07-SSD-COMP**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AON0A
LIMS ID: 15-19092
Matrix: Soil
Data Release Authorized: MW
Reported: 11/03/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/21/15
Date Analyzed: 10/28/15 17:46
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.30 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 35.6%

CAS Number	Analyte	LOQ	Result
108-95-2	**Phenol**	**19**	**18 J**
111-44-4	Bis-(2-Chloroethyl) Ether	19	< 19 U
95-57-8	2-Chlorophenol	19	< 19 U
541-73-1	1,3-Dichlorobenzene	19	< 19 U
106-46-7	1,4-Dichlorobenzene	19	< 19 U
100-51-6	Benzyl Alcohol	19	< 19 U
95-50-1	1,2-Dichlorobenzene	19	< 19 U
95-48-7	2-Methylphenol	19	< 19 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	19	< 19 U
106-44-5	**4-Methylphenol**	**19**	**26**
621-64-7	N-Nitroso-Di-N-Propylamine	19	< 19 U
67-72-1	Hexachloroethane	19	< 19 U
98-95-3	Nitrobenzene	19	< 19 U
78-59-1	Isophorone	19	< 19 U
88-75-5	2-Nitrophenol	19	< 19 U
105-67-9	2,4-Dimethylphenol	97	< 97 U
65-85-0	**Benzoic Acid**	**190**	**170 J**
111-91-1	bis(2-Chloroethoxy) Methane	19	< 19 U
120-83-2	2,4-Dichlorophenol	97	< 97 U
120-82-1	1,2,4-Trichlorobenzene	19	< 19 U
91-20-3	**Naphthalene**	**19**	**88**
106-47-8	4-Chloroaniline	97	< 97 U
87-68-3	Hexachlorobutadiene	19	< 19 U
59-50-7	4-Chloro-3-methylphenol	97	< 97 U
91-57-6	**2-Methylnaphthalene**	**19**	**40**
77-47-4	Hexachlorocyclopentadiene	97	< 97 U
88-06-2	2,4,6-Trichlorophenol	97	< 97 U
95-95-4	2,4,5-Trichlorophenol	97	< 97 U
91-58-7	2-Chloronaphthalene	19	< 19 U
88-74-4	2-Nitroaniline	97	< 97 U
131-11-3	Dimethylphthalate	19	< 19 U
208-96-8	**Acenaphthylene**	**19**	**16 J**
99-09-2	3-Nitroaniline	97	< 97 U
83-32-9	**Acenaphthene**	**19**	**35**
51-28-5	2,4-Dinitrophenol	190	< 190 U
100-02-7	4-Nitrophenol	97	< 97 U
132-64-9	**Dibenzofuran**	**19**	**45**

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: CR-07-SSD-COMP**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AON0A
LIMS ID: 15-19092
Matrix: Soil
Date Analyzed: 10/28/15 17:46

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result
606-20-2	2,6-Dinitrotoluene	97	< 97 U
121-14-2	2,4-Dinitrotoluene	97	< 97 U
84-66-2	Diethylphthalate	19	< 19 U
7005-72-3	4-Chlorophenyl-phenylether	19	< 19 U
86-73-7	**Fluorene**	**19**	**48**
100-01-6	4-Nitroaniline	97	< 97 U
534-52-1	4,6-Dinitro-2-Methylphenol	190	< 190 U
86-30-6	N-Nitrosodiphenylamine	19	< 19 U
101-55-3	4-Bromophenyl-phenylether	19	< 19 U
118-74-1	Hexachlorobenzene	19	< 19 U
87-86-5	Pentachlorophenol	97	< 97 U
85-01-8	**Phenanthrene**	**19**	**190**
86-74-8	**Carbazole**	**19**	**24**
120-12-7	**Anthracene**	**19**	**57**
84-74-2	Di-n-Butylphthalate	19	< 19 U
206-44-0	**Fluoranthene**	**19**	**450**
129-00-0	**Pyrene**	**19**	**360**
85-68-7	Butylbenzylphthalate	19	< 19 U
91-94-1	3,3'-Dichlorobenzidine	97	< 97 U
56-55-3	**Benzo(a)anthracene**	**19**	**130**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**48**	**58**
218-01-9	**Chrysene**	**19**	**180**
117-84-0	Di-n-Octyl phthalate	19	< 19 U
50-32-8	**Benzo(a)pyrene**	**19**	**67**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**19**	**43**
53-70-3	**Dibenz(a,h)anthracene**	**19**	**18 J**
191-24-2	**Benzo(g,h,i)perylene**	**19**	**57**
90-12-0	**1-Methylnaphthalene**	**19**	**18 J**
TOTBFA	**Total Benzofluoranthenes**	**39**	**230**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	64.2%	2-Fluorobiphenyl	74.4%
d14-p-Terphenyl	89.2%	d4-1,2-Dichlorobenzene	65.4%
d5-Phenol	75.7%	2-Fluorophenol	62.9%
2,4,6-Tribromophenol	77.7%	d4-2-Chlorophenol	73.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: CR23-S-3.0**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AON0B
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized:
Reported: 11/03/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/21/15
Date Analyzed: 10/28/15 18:22
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.73 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 17.5%

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	19	< 19 U
111-44-4	Bis-(2-Chloroethyl) Ether	19	< 19 U
95-57-8	2-Chlorophenol	19	< 19 U
541-73-1	1,3-Dichlorobenzene	19	< 19 U
106-46-7	1,4-Dichlorobenzene	19	< 19 U
100-51-6	Benzyl Alcohol	19	< 19 U
95-50-1	1,2-Dichlorobenzene	19	< 19 U
95-48-7	2-Methylphenol	19	< 19 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	19	< 19 U
106-44-5	4-Methylphenol	19	< 19 U
621-64-7	N-Nitroso-Di-N-Propylamine	19	< 19 U
67-72-1	Hexachloroethane	19	< 19 U
98-95-3	Nitrobenzene	19	< 19 U
78-59-1	Isophorone	19	< 19 U
88-75-5	2-Nitrophenol	19	< 19 U
105-67-9	2,4-Dimethylphenol	93	< 93 U
65-85-0	Benzoic Acid	190	< 190 U
111-91-1	bis(2-Chloroethoxy) Methane	19	< 19 U
120-83-2	2,4-Dichlorophenol	93	< 93 U
120-82-1	1,2,4-Trichlorobenzene	19	< 19 U
91-20-3	Naphthalene	19	< 19 U
106-47-8	4-Chloroaniline	93	< 93 U
87-68-3	Hexachlorobutadiene	19	< 19 U
59-50-7	4-Chloro-3-methylphenol	93	< 93 U
91-57-6	2-Methylnaphthalene	19	< 19 U
77-47-4	Hexachlorocyclopentadiene	93	< 93 U
88-06-2	2,4,6-Trichlorophenol	93	< 93 U
95-95-4	2,4,5-Trichlorophenol	93	< 93 U
91-58-7	2-Chloronaphthalene	19	< 19 U
88-74-4	2-Nitroaniline	93	< 93 U
131-11-3	Dimethylphthalate	19	< 19 U
208-96-8	Acenaphthylene	19	< 19 U
99-09-2	3-Nitroaniline	93	< 93 U
83-32-9	Acenaphthene	19	< 19 U
51-28-5	2,4-Dinitrophenol	190	< 190 U
100-02-7	4-Nitrophenol	93	< 93 U
132-64-9	Dibenzofuran	19	< 19 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: CR23-S-3.0**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AON0B
LIMS ID: 15-19093
Matrix: Soil
Date Analyzed: 10/28/15 18:22

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result
606-20-2	2,6-Dinitrotoluene	93	< 93 U
121-14-2	2,4-Dinitrotoluene	93	< 93 U
84-66-2	Diethylphthalate	19	< 19 U
7005-72-3	4-Chlorophenyl-phenylether	19	< 19 U
86-73-7	Fluorene	19	< 19 U
100-01-6	4-Nitroaniline	93	< 93 U
534-52-1	4,6-Dinitro-2-Methylphenol	190	< 190 U
86-30-6	N-Nitrosodiphenylamine	19	< 19 U
101-55-3	4-Bromophenyl-phenylether	19	< 19 U
118-74-1	Hexachlorobenzene	19	< 19 U
87-86-5	Pentachlorophenol	93	< 93 U
85-01-8	**Phenanthrene**	**19**	**11 J**
86-74-8	Carbazole	19	< 19 U
120-12-7	Anthracene	19	< 19 U
84-74-2	Di-n-Butylphthalate	19	< 19 U
206-44-0	**Fluoranthene**	**19**	**11 J**
129-00-0	**Pyrene**	**19**	**11 J**
85-68-7	Butylbenzylphthalate	19	< 19 U
91-94-1	3,3'-Dichlorobenzidine	93	< 93 U
56-55-3	Benzo(a)anthracene	19	< 19 U
117-81-7	bis(2-Ethylhexyl)phthalate	47	< 47 U
218-01-9	Chrysene	19	< 19 U
117-84-0	Di-n-Octyl phthalate	19	< 19 U
50-32-8	Benzo(a)pyrene	19	< 19 U
193-39-5	Indeno(1,2,3-cd)pyrene	19	< 19 U
53-70-3	Dibenz(a,h)anthracene	19	< 19 U
191-24-2	Benzo(g,h,i)perylene	19	< 19 U
90-12-0	1-Methylnaphthalene	19	< 19 U
TOTBFA	Total Benzofluoranthenes	37	< 37 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	72.0%	2-Fluorobiphenyl	71.0%
d14-p-Terphenyl	98.4%	d4-1,2-Dichlorobenzene	66.2%
d5-Phenol	73.6%	2-Fluorophenol	68.1%
2,4,6-Tribromophenol	79.5%	d4-2-Chlorophenol	70.9%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: CR22-S-3.0**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AON0C
LIMS ID: 15-19094
Matrix: Soil
Data Release Authorized:
Reported: 11/03/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/21/15
Date Analyzed: 10/28/15 18:58
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.61 g-dry-wt
Final Extract Volume: 2.0 mL
Dilution Factor: 1.00
Percent Moisture: 11.9%

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	38	< 38 U
111-44-4	Bis-(2-Chloroethyl) Ether	38	< 38 U
95-57-8	2-Chlorophenol	38	< 38 U
541-73-1	1,3-Dichlorobenzene	38	< 38 U
106-46-7	1,4-Dichlorobenzene	38	< 38 U
100-51-6	Benzyl Alcohol	38	< 38 U
95-50-1	1,2-Dichlorobenzene	38	< 38 U
95-48-7	2-Methylphenol	38	< 38 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	38	< 38 U
106-44-5	4-Methylphenol	38	< 38 U
621-64-7	N-Nitroso-Di-N-Propylamine	38	< 38 U
67-72-1	Hexachloroethane	38	< 38 U
98-95-3	Nitrobenzene	38	< 38 U
78-59-1	Isophorone	38	< 38 U
88-75-5	2-Nitrophenol	38	< 38 U
105-67-9	2,4-Dimethylphenol	190	< 190 U
65-85-0	Benzoic Acid	380	< 380 U
111-91-1	bis(2-Chloroethoxy) Methane	38	< 38 U
120-83-2	2,4-Dichlorophenol	190	< 190 U
120-82-1	1,2,4-Trichlorobenzene	38	< 38 U
91-20-3	**Naphthalene**	**38**	**270**
106-47-8	4-Chloroaniline	190	< 190 U
87-68-3	Hexachlorobutadiene	38	< 38 U
59-50-7	4-Chloro-3-methylphenol	190	< 190 U
91-57-6	**2-Methylnaphthalene**	**38**	**26 J**
77-47-4	Hexachlorocyclopentadiene	190	< 190 U
88-06-2	2,4,6-Trichlorophenol	190	< 190 U
95-95-4	2,4,5-Trichlorophenol	190	< 190 U
91-58-7	2-Chloronaphthalene	38	< 38 U
88-74-4	2-Nitroaniline	190	< 190 U
131-11-3	Dimethylphthalate	38	< 38 U
208-96-8	Acenaphthylene	38	< 38 U
99-09-2	3-Nitroaniline	190	< 190 U
83-32-9	Acenaphthene	38	< 38 U
51-28-5	2,4-Dinitrophenol	380	< 380 U
100-02-7	4-Nitrophenol	190	< 190 U
132-64-9	Dibenzofuran	38	< 38 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: CR22-S-3.0**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AON0C
LIMS ID: 15-19094
Matrix: Soil
Date Analyzed: 10/28/15 18:58

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result
606-20-2	2,6-Dinitrotoluene	190	< 190 U
121-14-2	2,4-Dinitrotoluene	190	< 190 U
84-66-2	Diethylphthalate	38	< 38 U
7005-72-3	4-Chlorophenyl-phenylether	38	< 38 U
86-73-7	Fluorene	38	< 38 U
100-01-6	4-Nitroaniline	190	< 190 U
534-52-1	4,6-Dinitro-2-Methylphenol	380	< 380 U
86-30-6	N-Nitrosodiphenylamine	38	< 38 U
101-55-3	4-Bromophenyl-phenylether	38	< 38 U
118-74-1	Hexachlorobenzene	38	< 38 U
87-86-5	Pentachlorophenol	190	< 190 U
85-01-8	**Phenanthrene**	**38**	**23 J**
86-74-8	Carbazole	38	< 38 U
120-12-7	Anthracene	38	< 38 U
84-74-2	Di-n-Butylphthalate	38	< 38 U
206-44-0	**Fluoranthene**	**38**	**28 J**
129-00-0	**Pyrene**	**38**	**30 J**
85-68-7	Butylbenzylphthalate	38	< 38 U
91-94-1	3,3'-Dichlorobenzidine	190	< 190 U
56-55-3	**Benzo(a)anthracene**	**38**	**21 J**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**94**	**3,100**
218-01-9	**Chrysene**	**38**	**75**
117-84-0	Di-n-Octyl phthalate	38	< 38 U
50-32-8	**Benzo(a)pyrene**	**38**	**28 J**
193-39-5	Indeno(1,2,3-cd)pyrene	38	< 38 U
53-70-3	Dibenz(a,h)anthracene	38	< 38 U
191-24-2	**Benzo(g,h,i)perylene**	**38**	**32 J**
90-12-0	1-Methylnaphthalene	38	< 38 U
TOTBFA	**Total Benzofluoranthenes**	**75**	**62 J**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	71.6%	2-Fluorobiphenyl	78.4%
d14-p-Terphenyl	92.0%	d4-1,2-Dichlorobenzene	64.0%
d5-Phenol	72.0%	2-Fluorophenol	71.2%
2,4,6-Tribromophenol	87.5%	d4-2-Chlorophenol	74.7%

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT OUT
MB-102015	81.8%	80.6%	113%	81.6%	86.9%	76.7%	74.9%	87.1%	0
LCS-102015	80.6%	81.6%	112%	71.6%	83.7%	76.5%	84.7%	76.7%	0
CR-07-SSD-COMP	64.2%	74.4%	89.2%	65.4%	75.7%	62.9%	77.7%	73.7%	0
CR23-S-3.0	72.0%	71.0%	98.4%	66.2%	73.6%	68.1%	79.5%	70.9%	0
CR22-S-3.0	71.6%	78.4%	92.0%	64.0%	72.0%	71.2%	87.5%	74.7%	0

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(30-120)	(30-120)
(FBP) = 2-Fluorobiphenyl	(35-120)	(35-120)
(TPH) = d14-p-Terphenyl	(37-120)	(37-120)
(DCB) = d4-1,2-Dichlorobenzene	(32-120)	(32-120)
(PHL) = d5-Phenol	(29-120)	(29-120)
(2FP) = 2-Fluorophenol	(27-120)	(27-120)
(TBP) = 2,4,6-Tribromophenol	(24-134)	(24-134)
(2CP) = d4-2-Chlorophenol	(31-120)	(31-120)

Prep Method: SW3546
Log Number Range: 15-19092 to 15-19094

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: LCS-102015**
Page 1 of 2 **LAB CONTROL**

Lab Sample ID: LCS-102015 QC Report No: AON0-Maul Foster & Alongi
LIMS ID: 15-19092 Project: Seaport Landing
Matrix: Soil 1044.02.01-02
Data Release Authorized: Date Sampled: 10/13/15
Reported: 11/03/15 Date Received: 10/14/15

Date Extracted: 10/20/15 Sample Amount: 10.00 g
Date Analyzed: 10/28/15 17:10 Final Extract Volume: 1.0 mL
Instrument/Analyst: NT10/YZ Dilution Factor: 1.00
GPC Cleanup: Yes Percent Moisture: NA

Analyte	Lab Control		Spike Added	Recovery
Phenol	459	Q	500	91.8%
Bis-(2-Chloroethyl) Ether	433		500	86.6%
2-Chlorophenol	432		500	86.4%
1,3-Dichlorobenzene	382		500	76.4%
1,4-Dichlorobenzene	373		500	74.6%
Benzyl Alcohol	239		500	47.8%
1,2-Dichlorobenzene	419		500	83.8%
2-Methylphenol	443		500	88.6%
2,2'-Oxybis(1-Chloropropane)	369		500	73.8%
4-Methylphenol	451		500	90.2%
N-Nitroso-Di-N-Propylamine	444		500	88.8%
Hexachloroethane	400		500	80.0%
Nitrobenzene	475		500	95.0%
Isophorone	489		500	97.8%
2-Nitrophenol	420		500	84.0%
2,4-Dimethylphenol	1140		1500	76.0%
Benzoic Acid	2400		2750	87.3%
bis(2-Chloroethoxy) Methane	381		500	76.2%
2,4-Dichlorophenol	1300		1500	86.7%
1,2,4-Trichlorobenzene	475		500	95.0%
Naphthalene	417		500	83.4%
4-Chloroaniline	57.0	J	1500	3.8%
Hexachlorobutadiene	382		500	76.4%
4-Chloro-3-methylphenol	1320		1500	88.0%
2-Methylnaphthalene	423		500	84.6%
Hexachlorocyclopentadiene	1310		1500	87.3%
2,4,6-Trichlorophenol	1350		1500	90.0%
2,4,5-Trichlorophenol	1360		1500	90.7%
2-Chloronaphthalene	435		500	87.0%
2-Nitroaniline	1490		1500	99.3%
Dimethylphthalate	435		500	87.0%
Acenaphthylene	402		500	80.4%
3-Nitroaniline	86.0	J	1500	5.7%
Acenaphthene	470		500	94.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: LCS-102015**
 LAB CONTROL

Lab Sample ID: LCS-102015 QC Report No: AON0-Maul Foster & Alongi
LIMS ID: 15-19092 Project: Seaport Landing
Matrix: Soil 1044.02.01-02
Date Analyzed: 10/28/15 17:10

Analyte	Lab Control		Spike Added	Recovery
2,4-Dinitrophenol	2620		2750	95.3%
4-Nitrophenol	1290		1500	86.0%
Dibenzofuran	439		500	87.8%
2,6-Dinitrotoluene	1380		1500	92.0%
2,4-Dinitrotoluene	1400		1500	93.3%
Diethylphthalate	461		500	92.2%
4-Chlorophenyl-phenylether	405		500	81.0%
Fluorene	424		500	84.8%
4-Nitroaniline	382		1500	25.5%
4,6-Dinitro-2-Methylphenol	2410		2750	87.6%
N-Nitrosodiphenylamine	315		500	63.0%
4-Bromophenyl-phenylether	427		500	85.4%
Hexachlorobenzene	417		500	83.4%
Pentachlorophenol	1310		1500	87.3%
Phenanthrene	462		500	92.4%
Carbazole	271	Q	500	54.2%
Anthracene	426		500	85.2%
Di-n-Butylphthalate	510		500	102%
Fluoranthene	474		500	94.8%
Pyrene	442		500	88.4%
Butylbenzylphthalate	501		500	100%
3,3'-Dichlorobenzidine	< 100	U	1500	NA
Benzo(a)anthracene	460		500	92.0%
bis(2-Ethylhexyl)phthalate	479		500	95.8%
Chrysene	456		500	91.2%
Di-n-Octyl phthalate	420		500	84.0%
Benzo(a)pyrene	412		500	82.4%
Indeno(1,2,3-cd)pyrene	471		500	94.2%
Dibenz(a,h)anthracene	475		500	95.0%
Benzo(g,h,i)perylene	436		500	87.2%
1-Methylnaphthalene	393		500	78.6%
Total Benzofluoranthenes	949		1000	94.9%

Semivolatile Surrogate Recovery	
d5-Nitrobenzene	80.6%
2-Fluorobiphenyl	81.6%
d14-p-Terphenyl	112%
d4-1,2-Dichlorobenzene	71.6%
d5-Phenol	83.7%
2-Fluorophenol	76.5%
2,4,6-Tribromophenol	84.7%
d4-2-Chlorophenol	76.7%

Reported in µg/kg (ppb)

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i
Lab File ID: cc1028.d
Analysis Type:
Lab Sample ID: CC1028
Method: /chem1/nt10.i/20151028.b/ABN.m

Injection Date: 28-OCT-2015 15:57
Init. Cal. Date(s): 19-OCT-2015 19-OCT-2015
Init. Cal. Times: 11:52 16:03
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RPS	CCAL RRFS	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
$ 1 2-Fluorophenol	1.12958	1.27870	1.27870	0.010	13.20109	20.00000	Averaged	
$ 2 Phenol-d5	1.36520	1.56929	1.56929	0.010	14.94981	20.00000	Averaged	
3 Phenol	1.33180	1.68335	1.68335	0.100	26.39683	20.00000	Averaged	<-
$ 5 2-Chlorophenol-d4	1.33265	1.34155	1.34155	0.010	0.66828	20.00000	Averaged	
4 Bis(2-Chloroethyl)ether	1.01930	1.06981	1.06981	0.700	4.95562	20.00000	Averaged	
6 2-Chlorophenol	1.30689	1.33222	1.33222	0.800	1.93817	20.00000	Averaged	
7 1,3-Dichlorobenzene	1.60078	1.48948	1.48948	0.010	-6.95261	20.00000	Averaged	
9 1,4-Dichlorobenzene	1.54535	1.31524	1.31524	0.010	-14.89051	20.00000	Averaged	
$ 10 1,2-Dichlorobenzene-d4	0.99122	0.92936	0.92936	0.010	-6.24135	20.00000	Averaged	
12 1,2-Dichlorobenzene	1.44684	1.31524	1.31524	0.010	-9.09524	20.00000	Averaged	
11 Benzyl alcohol	0.63765	0.64258	0.64258	0.010	0.77311	20.00000	Averaged	
14 2,2'-oxybis(1-Chloropropane	0.45840	0.44097	0.44097	0.010	-3.80344	20.00000	Averaged	
13 2-Methylphenol	0.99636	1.07412	1.07412	0.700	7.80424	20.00000	Averaged	
17 Hexachloroethane	0.61781	0.57641	0.57641	0.300	-6.70080	20.00000	Averaged	
16 N-Nitroso-di-n-propylamine	0.74117	0.78694	0.78694	0.500	6.17502	20.00000	Averaged	
15 4-Methylphenol	1.00886	1.09715	1.09715	0.600	8.75197	20.00000	Averaged	
$ 18 Nitrobenzene-d5	0.39605	0.39223	0.39223	0.010	-0.96304	20.00000	Averaged	
19 Nitrobenzene	0.36379	0.38182	0.38182	0.200	4.95688	20.00000	Averaged	
20 Isophorone	0.57522	0.65887	0.65887	0.300	14.54160	20.00000	Averaged	
21 2-Nitrophenol	0.21477	0.21350	0.21350	0.100	-0.59170	20.00000	Averaged	
22 2,4-Dimethylphenol	0.39317	0.39413	0.39413	0.200	0.24496	20.00000	Averaged	
23 Bis(2-Chloroethoxy)methane	0.32972	0.35047	0.35047	0.050	6.29211	20.00000	Averaged	
24 Benzoic acid	20.46106	20.00000	0.24161	0.010	2.30529	20.00000	Quadratic	
25 2,4-Dichlorophenol	0.32107	0.31633	0.31633	0.100	-1.47494	20.00000	Averaged	
26 1,2,4-Trichlorobenzene	0.37492	0.33392	0.33392	0.010	-10.93523	20.00000	Averaged	
28 Naphthalene	1.03606	0.96624	0.96624	0.100	-6.73888	20.00000	Averaged	
29 4-Chloroaniline	0.41428	0.40850	0.40850	0.010	-1.39542	20.00000	Averaged	
30 Hexachlorobutadiene	0.24781	0.20426	0.20426	0.010	-17.57357	20.00000	Averaged	
31 4-Chloro-3-methylphenol	0.33608	0.34255	0.34255	0.200	1.92293	20.00000	Averaged	
32 2-Methylnaphthalene	0.74547	0.68917	0.68917	0.300	-7.55265	20.00000	Averaged	
33 Hexachlorocyclopentadiene	0.41843	0.42982	0.42982	0.001	2.72023	20.00000	Averaged	
34 2,4,6-Trichlorophenol	0.37961	0.40517	0.40517	0.200	6.73248	20.00000	Averaged	
35 2,4,5-Trichlorophenol	0.39251	0.39177	0.39177	0.200	-0.18957	20.00000	Averaged	
$ 36 2-Fluorobiphenyl	1.40765	1.32822	1.32822	0.010	-5.64269	20.00000	Averaged	
37 2-Chloronaphthalene	1.14337	1.09230	1.09230	0.700	-4.46642	20.00000	Averaged	

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i
Lab File ID: cc1028.d
Analysis Type:
Lab Sample ID: CC1028
Method: /chem1/nt10.i/20151028.b/ABN.m

Injection Date: 28-OCT-2015 15:57
Init. Cal. Date(s): 19-OCT-2015 19-OCT-2015
Init. Cal. Times: 11:52 16:03
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RF5	CCAL RRF5	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
38 2-Nitroaniline	0.31622	0.35430	0.35430	0.010	12.04243	20.00000	Averaged	
39 Dimethylphthalate	1.36783	1.27023	1.27023	0.010	-7.13516	20.00000	Averaged	
40 Acenaphthylene	1.73670	1.72188	1.72188	0.900	-0.85330	20.00000	Averaged	
41 2,6-Dinitrotoluene	0.28981	0.28860	0.28860	0.100	-0.41939	20.00000	Averaged	
43 3-Nitroaniline	0.28271	0.23718	0.23718	0.010	-16.10442	20.00000	Averaged	
44 Acenaphthene	1.04524	1.02323	1.02323	0.100	-2.10575	20.00000	Averaged	
45 2,4-Dinitrophenol	21.27453	20.00000	0.18063	0.030	6.37267	20.00000	Quadratic	
46 Dibenzofuran	1.57152	1.48797	1.48797	0.800	-5.31621	20.00000	Averaged	
47 4-Nitrophenol	8.42031	10.00000	0.22054	0.010	-15.79689	20.00000	Quadratic	
48 2,4-Dinitrotoluene	0.39543	0.38806	0.38806	0.200	-1.86288	20.00000	Averaged	
50 Diethylphthalate	1.32554	1.24690	1.24690	0.010	-5.93214	20.00000	Averaged	
49 Fluorene	1.34379	1.18146	1.18146	0.100	-12.08057	20.00000	Averaged	
51 4-Chlorophenyl-phenylether	0.68765	0.62587	0.62587	0.100	-8.98460	20.00000	Averaged	
52 4-Nitroaniline	0.30110	0.24827	0.24827	0.010	-17.54542	20.00000	Averaged	
53 4,6-Dinitro-2-methylphenol	20.35501	20.00000	0.14907	0.001	1.77506	20.00000	Quadratic	
54 N-Nitrosodiphenylamine	0.54831	0.52705	0.52705	0.010	-3.87684	20.00000	Averaged	
$ 55 2,4,6-Tribromophenol	0.34466	0.33742	0.33742	0.010	-2.09949	20.00000	Averaged	
56 4-Bromophenyl-phenylether	0.27932	0.27403	0.27403	0.100	-1.89485	20.00000	Averaged	
57 Hexachlorobenzene	0.36460	0.32863	0.32863	0.100	-9.86642	20.00000	Averaged	
58 Pentachlorophenol	9.15421	10.00000	0.18752	0.010	-8.45787	20.00000	Quadratic	
60 Phenanthrene	1.02053	0.95419	0.95419	0.700	-6.50015	20.00000	Averaged	
61 Anthracene	1.04166	1.02891	1.02891	0.700	-1.22345	20.00000	Averaged	
62 Carbazole	0.87135	0.55581	0.55581	0.010	-36.21289	20.00000	Averaged	<-
63 Di-n-butylphthalate	1.31288	1.37353	1.37353	0.010	4.62033	20.00000	Averaged	
64 Fluoranthene	1.11470	1.02211	1.02211	0.600	-8.30652	20.00000	Averaged	
65 Pyrene	1.18016	1.08700	1.08700	0.600	-7.89403	20.00000	Averaged	
$ 66 Terphenyl-d14	0.74289	0.67781	0.67781	0.010	-8.76130	20.00000	Averaged	
67 Butylbenzylphthalate	0.50597	0.53028	0.53028	0.010	4.80640	20.00000	Averaged	
68 Benzo(a)anthracene	1.12072	1.05682	1.05682	0.700	-5.70173	20.00000	Averaged	
70 3,3'-Dichlorobenzidine	0.75137	0.38446	0.38446	0.010	-48.83290	20.00000	Averaged	<-
71 Chrysene	0.97701	0.91512	0.91512	0.700	-6.33423	20.00000	Averaged	
72 bis(2-Ethylhexyl)phthalate	0.52679	0.49117	0.49117	0.010	-6.76242	20.00000	Averaged	
73 Di-n-octylphthalate	1.07536	0.90096	0.90096	0.010	-16.21796	20.00000	Averaged	
74 Benzo(b)fluoranthene	1.08810	1.04642	1.04642	0.700	-3.83032	20.00000	Averaged	
75 Benzo(k)fluoranthene	1.08482	1.02927	1.02927	0.700	-5.12063	20.00000	Averaged	

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i
Lab File ID: cc1028.d
Analysis Type:
Lab Sample ID: CC1028
Method: /chem1/nt10.i/20151028.b/ABN.m

Injection Date: 28-OCT-2015 15:57
Init. Cal. Date(s): 19-OCT-2015 19-OCT-2015
Init. Cal. Times: 11:52 16:03
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RF5	CCAL RRF5	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
76 Benzo(a)pyrene	1.03138	0.96345	0.96345	0.700	-6.58620	20.00000	Averaged	
78 Indeno(1,2,3-cd)pyrene	1.37485	1.32873	1.32873	0.500	-3.35477	20.00000	Averaged	
79 Dibenzo(a,h)anthracene	1.13622	1.06501	1.06501	0.400	-6.26771	20.00000	Averaged	
80 Benzo(g,h,i)perylene	1.23143	1.11783	1.11783	0.500	-9.22455	20.00000	Averaged	
90 N-Nitrosodimethylamine	0.53343	0.72845	0.72845	0.010	36.55981	20.00000	Averaged	<-
91 Aniline	1.56324	1.70839	1.70839	0.010	9.28518	20.00000	Averaged	
93 Benzidine	0.38521	0.19632	0.19632	0.010	-49.03409	20.00000	Averaged	<-
103 Pyridine	0.85366	1.19979	1.19979	0.010	40.54664	20.00000	Averaged	<-
105 1-methylnaphthalene	0.76506	0.71103	0.71103	0.010	-7.06220	20.00000	Averaged	
111 Azobenzene (1,2-DP-Hydrazin	1.22084	1.07876	1.07876	0.010	-11.63732	20.00000	Averaged	
187 Total Benzofluoranthenes	1.04123	0.97996	0.97996	0.010	-5.88442	20.00000	Averaged	
99 Perylene	0.99701	0.93856	0.93856	0.010	-5.86286	20.00000	Averaged	
98 Retene	++++	++++	++++	0.010	++++	20.00000	Averaged	<-
120 2,3,4,6-Tetrachlorophenol	0.35337	0.32555	0.32555	0.010	-7.87320	20.00000	Averaged	

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: MB-102015**
Extraction Method: SW3546 **METHOD BLANK**

Lab Sample ID: MB-102015
LIMS ID: 15-19092
Matrix: Soil
Data Release Authorized: MW
Reported: 11/03/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/20/15
Date Analyzed: 10/28/15 16:33
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	20	< 20 U
111-44-4	Bis-(2-Chloroethyl) Ether	20	< 20 U
95-57-8	2-Chlorophenol	20	< 20 U
541-73-1	1,3-Dichlorobenzene	20	< 20 U
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	20	< 20 U
106-44-5	4-Methylphenol	20	< 20 U
621-64-7	N-Nitroso-Di-N-Propylamine	20	< 20 U
67-72-1	Hexachloroethane	20	< 20 U
98-95-3	Nitrobenzene	20	< 20 U
78-59-1	Isophorone	20	< 20 U
88-75-5	2-Nitrophenol	20	< 20 U
105-67-9	2,4-Dimethylphenol	100	< 100 U
65-85-0	Benzoic Acid	200	< 200 U
111-91-1	bis(2-Chloroethoxy) Methane	20	< 20 U
120-83-2	2,4-Dichlorophenol	100	< 100 U
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	Naphthalene	20	< 20 U
106-47-8	4-Chloroaniline	100	< 100 U
87-68-3	Hexachlorobutadiene	20	< 20 U
59-50-7	4-Chloro-3-methylphenol	100	< 100 U
91-57-6	2-Methylnaphthalene	20	< 20 U
77-47-4	Hexachlorocyclopentadiene	100	< 100 U
88-06-2	2,4,6-Trichlorophenol	100	< 100 U
95-95-4	2,4,5-Trichlorophenol	100	< 100 U
91-58-7	2-Chloronaphthalene	20	< 20 U
88-74-4	2-Nitroaniline	100	< 100 U
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	Acenaphthylene	20	< 20 U
99-09-2	3-Nitroaniline	100	< 100 U
83-32-9	Acenaphthene	20	< 20 U
51-28-5	2,4-Dinitrophenol	200	< 200 U
100-02-7	4-Nitrophenol	100	< 100 U
132-64-9	Dibenzofuran	20	< 20 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: MB-102015**
Extraction Method: SW3546 **METHOD BLANK**

Lab Sample ID: MB-102015 QC Report No: AON0-Maul Foster & Alongi
LIMS ID: 15-19092 Project: Seaport Landing
Matrix: Soil 1044.02.01-02
Date Analyzed: 10/28/15 16:33

CAS Number	Analyte	LOQ	Result
606-20-2	2,6-Dinitrotoluene	100	< 100 U
121-14-2	2,4-Dinitrotoluene	100	< 100 U
84-66-2	Diethylphthalate	20	< 20 U
7005-72-3	4-Chlorophenyl-phenylether	20	< 20 U
86-73-7	Fluorene	20	< 20 U
100-01-6	4-Nitroaniline	100	< 100 U
534-52-1	4,6-Dinitro-2-Methylphenol	200	< 200 U
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
101-55-3	4-Bromophenyl-phenylether	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	100	< 100 U
85-01-8	Phenanthrene	20	< 20 U
86-74-8	Carbazole	20	< 20 U
120-12-7	Anthracene	20	< 20 U
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	Fluoranthene	20	< 20 U
129-00-0	Pyrene	20	< 20 U
85-68-7	Butylbenzylphthalate	20	< 20 U
91-94-1	3,3'-Dichlorobenzidine	100	< 100 U
56-55-3	Benzo(a)anthracene	20	< 20 U
117-81-7	bis(2-Ethylhexyl)phthalate	50	< 50 U
218-01-9	Chrysene	20	< 20 U
117-84-0	Di-n-Octyl phthalate	20	< 20 U
50-32-8	Benzo(a)pyrene	20	< 20 U
193-39-5	Indeno(1,2,3-cd)pyrene	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	20	< 20 U
90-12-0	1-Methylnaphthalene	20	< 20 U
TOTBFA	Total Benzofluoranthenes	40	< 40 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	81.8%	2-Fluorobiphenyl	80.6%
d14-p-Terphenyl	113%	d4-1,2-Dichlorobenzene	81.6%
d5-Phenol	86.9%	2-Fluorophenol	76.7%
2,4,6-Tribromophenol	74.9%	d4-2-Chlorophenol	87.1%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
Page 1 of 2

Sample ID: CR23-GW-6.0
SAMPLE

Lab Sample ID: AON0D
LIMS ID: 15-19095
Matrix: Ground Water
Data Release Authorized:
Reported: 10/26/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/19/15
Date Analyzed: 10/23/15 19:19
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
108-95-2	Phenol	1.0	< 1.0 U
111-44-4	Bis-(2-Chloroethyl) Ether	1.0	< 1.0 U
95-57-8	2-Chlorophenol	1.0	< 1.0 U
541-73-1	1,3-Dichlorobenzene	1.0	< 1.0 U
106-46-7	1,4-Dichlorobenzene	1.0	< 1.0 U
100-51-6	Benzyl Alcohol	2.0	< 2.0 U
95-50-1	1,2-Dichlorobenzene	1.0	< 1.0 U
95-48-7	2-Methylphenol	1.0	< 1.0 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	1.0	< 1.0 U
106-44-5	**4-Methylphenol**	**2.0**	**1.4 J**
621-64-7	N-Nitroso-Di-N-Propylamine	1.0	< 1.0 U
67-72-1	Hexachloroethane	2.0	< 2.0 U
98-95-3	Nitrobenzene	1.0	< 1.0 U
78-59-1	Isophorone	1.0	< 1.0 U
88-75-5	2-Nitrophenol	3.0	< 3.0 U
105-67-9	2,4-Dimethylphenol	3.0	< 3.0 U
65-85-0	**Benzoic Acid**	**20**	**14 JQ**
111-91-1	bis(2-Chloroethoxy) Methane	1.0	< 1.0 U
120-83-2	2,4-Dichlorophenol	3.0	< 3.0 U
120-82-1	1,2,4-Trichlorobenzene	1.0	< 1.0 U
91-20-3	**Naphthalene**	**1.0**	**5.5**
106-47-8	4-Chloroaniline	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	3.0	< 3.0 U
59-50-7	4-Chloro-3-methylphenol	3.0	< 3.0 U
91-57-6	**2-Methylnaphthalene**	**1.0**	**2.0**
77-47-4	Hexachlorocyclopentadiene	5.0	< 5.0 U
88-06-2	2,4,6-Trichlorophenol	3.0	< 3.0 U
95-95-4	2,4,5-Trichlorophenol	5.0	< 5.0 U
91-58-7	2-Chloronaphthalene	1.0	< 1.0 U
88-74-4	2-Nitroaniline	3.0	< 3.0 U
131-11-3	Dimethylphthalate	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
99-09-2	3-Nitroaniline	3.0	< 3.0 U
83-32-9	**Acenaphthene**	**1.0**	**0.8 J**
51-28-5	2,4-Dinitrophenol	20	< 20 U
100-02-7	4-Nitrophenol	10	< 10 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
606-20-2	2,6-Dinitrotoluene	3.0	< 3.0 U
121-14-2	2,4-Dinitrotoluene	3.0	< 3.0 U

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C

Sample ID: CR23-GW-6.0
SAMPLE

Lab Sample ID: AON0D
LIMS ID: 15-19095
Matrix: Ground Water
Date Analyzed: 10/23/15 19:19

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	RL	Result
84-66-2	Diethylphthalate	1.0	< 1.0 U
7005-72-3	4-Chlorophenyl-phenylether	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
100-01-6	4-Nitroaniline	3.0	< 3.0 U
534-52-1	4,6-Dinitro-2-Methylphenol	10	< 10 U
86-30-6	N-Nitrosodiphenylamine	1.0	< 1.0 U
101-55-3	4-Bromophenyl-phenylether	1.0	< 1.0 U
118-74-1	Hexachlorobenzene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	**Phenanthrene**	**1.0**	**0.6 J**
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
84-74-2	Di-n-Butylphthalate	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
85-68-7	Butylbenzylphthalate	1.0	< 1.0 U
91-94-1	3,3'-Dichlorobenzidine	5.0	< 5.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
117-81-7	bis(2-Ethylhexyl)phthalate	3.0	< 3.0 U
218-01-9	Chrysene	1.0	< 1.0 U
117-84-0	Di-n-Octyl phthalate	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	**1-Methylnaphthalene**	**1.0**	**2.0**
TOTBFA	Total Benzofluoranthenes	2.0	< 2.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	67.2%	2-Fluorobiphenyl	40.8%
d14-p-Terphenyl	24.9%	d4-1,2-Dichlorobenzene	58.4%
d5-Phenol	72.3%	2-Fluorophenol	69.3%
2,4,6-Tribromophenol	58.7%	d4-2-Chlorophenol	75.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
Page 1 of 2

Sample ID: CR22-GW-9.0
SAMPLE

Lab Sample ID: AON0E
LIMS ID: 15-19096
Matrix: Ground Water
Data Release Authorized:
Reported: 10/26/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/19/15
Date Analyzed: 10/23/15 19:52
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
108-95-2	Phenol	1.0	< 1.0 U
111-44-4	Bis-(2-Chloroethyl) Ether	1.0	< 1.0 U
95-57-8	2-Chlorophenol	1.0	< 1.0 U
541-73-1	1,3-Dichlorobenzene	1.0	< 1.0 U
106-46-7	1,4-Dichlorobenzene	1.0	< 1.0 U
100-51-6	Benzyl Alcohol	2.0	< 2.0 U
95-50-1	1,2-Dichlorobenzene	1.0	< 1.0 U
95-48-7	2-Methylphenol	1.0	< 1.0 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	1.0	< 1.0 U
106-44-5	4-Methylphenol	2.0	< 2.0 U
621-64-7	N-Nitroso-Di-N-Propylamine	1.0	< 1.0 U
67-72-1	Hexachloroethane	2.0	< 2.0 U
98-95-3	Nitrobenzene	1.0	< 1.0 U
78-59-1	Isophorone	1.0	< 1.0 U
88-75-5	2-Nitrophenol	3.0	< 3.0 U
105-67-9	2,4-Dimethylphenol	3.0	< 3.0 U
65-85-0	Benzoic Acid	20	< 20 U
111-91-1	bis(2-Chloroethoxy) Methane	1.0	< 1.0 U
120-83-2	2,4-Dichlorophenol	3.0	< 3.0 U
120-82-1	1,2,4-Trichlorobenzene	1.0	< 1.0 U
91-20-3	**Naphthalene**	**1.0**	**13**
106-47-8	4-Chloroaniline	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	3.0	< 3.0 U
59-50-7	4-Chloro-3-methylphenol	3.0	< 3.0 U
91-57-6	**2-Methylnaphthalene**	**1.0**	**1.7**
77-47-4	Hexachlorocyclopentadiene	5.0	< 5.0 U
88-06-2	2,4,6-Trichlorophenol	3.0	< 3.0 U
95-95-4	2,4,5-Trichlorophenol	5.0	< 5.0 U
91-58-7	2-Chloronaphthalene	1.0	< 1.0 U
88-74-4	2-Nitroaniline	3.0	< 3.0 U
131-11-3	Dimethylphthalate	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
99-09-2	3-Nitroaniline	3.0	< 3.0 U
83-32-9	**Acenaphthene**	**1.0**	**4.1**
51-28-5	2,4-Dinitrophenol	20	< 20 U
100-02-7	4-Nitrophenol	10	< 10 U
132-64-9	**Dibenzofuran**	**1.0**	**1.4**
606-20-2	2,6-Dinitrotoluene	3.0	< 3.0 U
121-14-2	2,4-Dinitrotoluene	3.0	< 3.0 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS **Sample ID: CR22-GW-9.0**
Extraction Method: SW3520C **SAMPLE**

Lab Sample ID: AON0E
LIMS ID: 15-19096
Matrix: Ground Water
Date Analyzed: 10/23/15 19:52

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	RL	Result
84-66-2	Diethylphthalate	1.0	< 1.0 U
7005-72-3	4-Chlorophenyl-phenylether	1.0	< 1.0 U
86-73-7	**Fluorene**	**1.0**	**2.0**
100-01-6	4-Nitroaniline	3.0	< 3.0 U
534-52-1	4,6-Dinitro-2-Methylphenol	10	< 10 U
86-30-6	N-Nitrosodiphenylamine	1.0	< 1.0 U
101-55-3	4-Bromophenyl-phenylether	1.0	< 1.0 U
118-74-1	Hexachlorobenzene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	**Phenanthrene**	**1.0**	**1.7**
86-74-8	**Carbazole**	**1.0**	**0.7 J**
120-12-7	Anthracene	1.0	< 1.0 U
84-74-2	Di-n-Butylphthalate	1.0	< 1.0 U
206-44-0	**Fluoranthene**	**1.0**	**0.7 J**
129-00-0	**Pyrene**	**1.0**	**0.5 J**
85-68-7	Butylbenzylphthalate	1.0	< 1.0 U
91-94-1	3,3'-Dichlorobenzidine	5.0	< 5.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
117-81-7	bis(2-Ethylhexyl)phthalate	3.0	< 3.0 U
218-01-9	Chrysene	1.0	< 1.0 U
117-84-0	Di-n-Octyl phthalate	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	**1-Methylnaphthalene**	**1.0**	**1.7**
TOTBFA	Total Benzofluoranthenes	2.0	< 2.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	55.6%	2-Fluorobiphenyl	54.4%
d14-p-Terphenyl	48.0%	d4-1,2-Dichlorobenzene	49.2%
d5-Phenol	56.8%	2-Fluorophenol	54.9%
2,4,6-Tribromophenol	66.7%	d4-2-Chlorophenol	61.6%

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES WATER SURROGATE RECOVERY SUMMARY

Matrix: Ground Water

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT OUT
MB-101915	74.0%	74.0%	107%	56.0%	81.9%	77.3%	74.4%	85.3%	0
LCS-101915	64.8%	68.8%	86.4%	56.0%	72.8%	65.3%	78.1%	74.7%	0
LCSD-101915	47.2%	50.4%	87.6%	40.4%	49.6%	46.9%	73.1%	52.8%	0
CR23-GW-6.0	67.2%	40.8%	24.9%*	58.4%	72.3%	69.3%	58.7%	75.5%	1
CR22-GW-9.0	55.6%	54.4%	48.0%	49.2%	56.8%	54.9%	66.7%	61.6%	0

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(27-120)	(27-120)
(FBP) = 2-Fluorobiphenyl	(33-120)	(33-120)
(TPH) = d14-p-Terphenyl	(28-130)	(28-130)
(DCB) = d4-1,2-Dichlorobenzene	(20-120)	(20-120)
(PHL) = d5-Phenol	(38-120)	(38-120)
(2FP) = 2-Fluorophenol	(33-120)	(33-120)
(TBP) = 2,4,6-Tribromophenol	(52-131)	(52-131)
(2CP) = d4-2-Chlorophenol	(41-120)	(41-120)

Prep Method: SW3520C
Log Number Range: 15-19095 to 15-19096

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Page 1 of 2

Sample ID: LCS-101915
LCS/LCSD

Lab Sample ID: LCS-101915
LIMS ID: 15-19095
Matrix: Ground Water
Data Release Authorized:
Reported: 10/26/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted LCS/LCSD: 10/19/15

Date Analyzed LCS: 10/23/15 14:22
LCSD: 10/23/15 14:55
Instrument/Analyst LCS: NT6/JZ
LCSD: NT6/JZ

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 0.50 mL
LCSD: 0.50 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

GPC Cleanup: NO

Analyte	LCS		Spike Added-LCS	LCS Recovery	LCSD		Spike Added-LCSD	LCSD Recovery	RPD
Phenol	18.3		25.0	73.2%	13.4		25.0	53.6%	30.9%
Bis-(2-Chloroethyl) Ether	20.6		25.0	82.4%	15.0		25.0	60.0%	31.5%
2-Chlorophenol	18.3		25.0	73.2%	13.4		25.0	53.6%	30.9%
1,3-Dichlorobenzene	13.1		25.0	52.4%	10.0		25.0	40.0%	26.8%
1,4-Dichlorobenzene	13.5		25.0	54.0%	10.2		25.0	40.8%	27.8%
Benzyl Alcohol	17.9		25.0	71.6%	14.9		25.0	59.6%	18.3%
1,2-Dichlorobenzene	14.2		25.0	56.8%	10.9		25.0	43.6%	26.3%
2-Methylphenol	18.0		25.0	72.0%	13.6		25.0	54.4%	27.8%
2,2'-Oxybis(1-Chloropropane)	14.6		25.0	58.4%	11.1		25.0	44.4%	27.2%
4-Methylphenol	18.8		25.0	75.2%	15.1		25.0	60.4%	21.8%
N-Nitroso-Di-N-Propylamine	18.2		25.0	72.8%	16.1		25.0	64.4%	12.2%
Hexachloroethane	13.1		25.0	52.4%	10.4		25.0	41.6%	23.0%
Nitrobenzene	16.4		25.0	65.6%	12.3		25.0	49.2%	28.6%
Isophorone	16.8		25.0	67.2%	17.2		25.0	68.8%	2.4%
2-Nitrophenol	18.0		25.0	72.0%	13.7		25.0	54.8%	27.1%
2,4-Dimethylphenol	51.0		75.0	68.0%	44.5		75.0	59.3%	13.6%
Benzoic Acid	87.9	Q	138	63.7%	90.3	Q	138	65.4%	2.7%
bis(2-Chloroethoxy) Methane	16.9		25.0	67.6%	13.3		25.0	53.2%	23.8%
2,4-Dichlorophenol	56.8		75.0	75.7%	43.1		75.0	57.5%	27.4%
1,2,4-Trichlorobenzene	13.4		25.0	53.6%	10.4		25.0	41.6%	25.2%
Naphthalene	15.9		25.0	63.6%	11.8		25.0	47.2%	29.6%
4-Chloroaniline	46.2		75.0	61.6%	46.0		75.0	61.3%	0.4%
Hexachlorobutadiene	10.4		25.0	41.6%	8.1		25.0	32.4%	24.9%
4-Chloro-3-methylphenol	72.1		75.0	96.1%	65.3		75.0	87.1%	9.9%
2-Methylnaphthalene	13.4		25.0	53.6%	10.0		25.0	40.0%	29.1%
Hexachlorocyclopentadiene	26.8	Q	75.0	35.7%	20.2	Q	75.0	26.9%	28.1%
2,4,6-Trichlorophenol	71.9		75.0	95.9%	57.6		75.0	76.8%	22.1%
2,4,5-Trichlorophenol	71.6		75.0	95.5%	60.3		75.0	80.4%	17.1%
2-Chloronaphthalene	15.2		25.0	60.8%	11.8		25.0	47.2%	25.2%
2-Nitroaniline	60.1		75.0	80.1%	57.8		75.0	77.1%	3.9%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: LCS-101915
LCS/LCSD

Lab Sample ID: LCS-101915
LIMS ID: 15-19095
Matrix: Ground Water
Date Analyzed LCS: 10/23/15 14:22
LCSD: 10/23/15 14:55

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Analyte	LCS		Spike Added-LCS	LCS Recovery	LCSD		Spike Added-LCSD	LCSD Recovery	RPD
Dimethylphthalate	22.5		25.0	90.0%	23.4		25.0	93.6%	3.9%
Acenaphthylene	19.4		25.0	77.6%	15.8		25.0	63.2%	20.5%
3-Nitroaniline	66.9		75.0	89.2%	68.0		75.0	90.7%	1.6%
Acenaphthene	19.4		25.0	77.6%	15.6		25.0	62.4%	21.7%
2,4-Dinitrophenol	105	Q	138	76.1%	109	Q	138	79.0%	3.7%
4-Nitrophenol	60.9	Q	75.0	81.2%	64.1	Q	75.0	85.5%	5.1%
Dibenzofuran	16.2		25.0	64.8%	13.8		25.0	55.2%	16.0%
2,6-Dinitrotoluene	69.2		75.0	92.3%	65.7		75.0	87.6%	5.2%
2,4-Dinitrotoluene	75.1		75.0	100%	73.8		75.0	98.4%	1.7%
Diethylphthalate	22.4		25.0	89.6%	23.2		25.0	92.8%	3.5%
4-Chlorophenyl-phenylether	17.1		25.0	68.4%	15.5		25.0	62.0%	9.8%
Fluorene	19.4		25.0	77.6%	17.1		25.0	68.4%	12.6%
4-Nitroaniline	62.7		75.0	83.6%	66.6		75.0	88.8%	6.0%
4,6-Dinitro-2-Methylphenol	126		138	91.3%	127		138	92.0%	0.8%
N-Nitrosodiphenylamine	17.3		25.0	69.2%	17.3		25.0	69.2%	0.0%
4-Bromophenyl-phenylether	17.9		25.0	71.6%	16.7		25.0	66.8%	6.9%
Hexachlorobenzene	17.0		25.0	68.0%	15.4		25.0	61.6%	9.9%
Pentachlorophenol	60.6	Q	75.0	80.8%	61.9	Q	75.0	82.5%	2.1%
Phenanthrene	20.1		25.0	80.4%	19.6		25.0	78.4%	2.5%
Carbazole	25.3		25.0	101%	26.6		25.0	106%	5.0%
Anthracene	19.7		25.0	78.8%	19.5		25.0	78.0%	1.0%
Di-n-Butylphthalate	21.0		25.0	84.0%	22.7		25.0	90.8%	7.8%
Fluoranthene	21.1		25.0	84.4%	22.3		25.0	89.2%	5.5%
Pyrene	23.4		25.0	93.6%	24.2		25.0	96.8%	3.4%
Butylbenzylphthalate	23.4		25.0	93.6%	24.7		25.0	98.8%	5.4%
3,3'-Dichlorobenzidine	51.8		75.0	69.1%	55.8		75.0	74.4%	7.4%
Benzo(a)anthracene	20.9		25.0	83.6%	22.9		25.0	91.6%	9.1%
bis(2-Ethylhexyl)phthalate	22.0		25.0	88.0%	23.2		25.0	92.8%	5.3%
Chrysene	24.4		25.0	97.6%	26.1		25.0	104%	6.7%
Di-n-Octyl phthalate	22.7		25.0	90.8%	23.8		25.0	95.2%	4.7%
Benzo(a)pyrene	23.0		25.0	92.0%	25.3		25.0	101%	9.5%
Indeno(1,2,3-cd)pyrene	21.7		25.0	86.8%	23.6		25.0	94.4%	8.4%
Dibenz(a,h)anthracene	22.3		25.0	89.2%	23.8		25.0	95.2%	6.5%
Benzo(g,h,i)perylene	23.1		25.0	92.4%	25.0		25.0	100%	7.9%
1-Methylnaphthalene	16.2		25.0	64.8%	12.4		25.0	49.6%	26.6%
Total Benzofluoranthenes	46.2		50.0	92.4%	50.2		50.0	100%	8.3%

Semivolatile Surrogate Recovery

	LCS	LCSD
d5-Nitrobenzene	64.8%	47.2%
2-Fluorobiphenyl	68.8%	50.4%
d14-p-Terphenyl	86.4%	87.6%
d4-1,2-Dichlorobenzene	56.0%	40.4%
d5-Phenol	72.8%	49.6%
2-Fluorophenol	65.3%	46.9%
2,4,6-Tribromophenol	78.1%	73.1%
d4-2-Chlorophenol	74.7%	52.8%

Results reported in µg/L
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS **Sample ID: MB-101915**
Extraction Method: SW3520C **METHOD BLANK**

Lab Sample ID: MB-101915
LIMS ID: 15-19095
Matrix: Ground Water
Data Release Authorized:
Reported: 10/26/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/19/15
Date Analyzed: 10/23/15 13:49
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
108-95-2	Phenol	1.0	< 1.0 U
111-44-4	Bis-(2-Chloroethyl) Ether	1.0	< 1.0 U
95-57-8	2-Chlorophenol	1.0	< 1.0 U
541-73-1	1,3-Dichlorobenzene	1.0	< 1.0 U
106-46-7	1,4-Dichlorobenzene	1.0	< 1.0 U
100-51-6	Benzyl Alcohol	2.0	< 2.0 U
95-50-1	1,2-Dichlorobenzene	1.0	< 1.0 U
95-48-7	2-Methylphenol	1.0	< 1.0 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	1.0	< 1.0 U
106-44-5	4-Methylphenol	2.0	< 2.0 U
621-64-7	N-Nitroso-Di-N-Propylamine	1.0	< 1.0 U
67-72-1	Hexachloroethane	2.0	< 2.0 U
98-95-3	Nitrobenzene	1.0	< 1.0 U
78-59-1	Isophorone	1.0	< 1.0 U
88-75-5	2-Nitrophenol	3.0	< 3.0 U
105-67-9	2,4-Dimethylphenol	3.0	< 3.0 U
65-85-0	Benzoic Acid	20	< 20 U
111-91-1	bis(2-Chloroethoxy) Methane	1.0	< 1.0 U
120-83-2	2,4-Dichlorophenol	3.0	< 3.0 U
120-82-1	1,2,4-Trichlorobenzene	1.0	< 1.0 U
91-20-3	Naphthalene	1.0	< 1.0 U
106-47-8	4-Chloroaniline	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	3.0	< 3.0 U
59-50-7	4-Chloro-3-methylphenol	3.0	< 3.0 U
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
77-47-4	Hexachlorocyclopentadiene	5.0	< 5.0 U
88-06-2	2,4,6-Trichlorophenol	3.0	< 3.0 U
95-95-4	2,4,5-Trichlorophenol	5.0	< 5.0 U
91-58-7	2-Chloronaphthalene	1.0	< 1.0 U
88-74-4	2-Nitroaniline	3.0	< 3.0 U
131-11-3	Dimethylphthalate	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
99-09-2	3-Nitroaniline	3.0	< 3.0 U
83-32-9	Acenaphthene	1.0	< 1.0 U
51-28-5	2,4-Dinitrophenol	20	< 20 U
100-02-7	4-Nitrophenol	10	< 10 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
606-20-2	2,6-Dinitrotoluene	3.0	< 3.0 U
121-14-2	2,4-Dinitrotoluene	3.0	< 3.0 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS **Sample ID: MB-101915**
Extraction Method: SW3520C **METHOD BLANK**

Lab Sample ID: MB-101915 QC Report No: AON0-Maul Foster & Alongi
LIMS ID: 15-19095 Project: Seaport Landing
Matrix: Ground Water 1044.02.01-02
Date Analyzed: 10/23/15 13:49

CAS Number	Analyte	RL	Result
84-66-2	Diethylphthalate	1.0	< 1.0 U
7005-72-3	4-Chlorophenyl-phenylether	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
100-01-6	4-Nitroaniline	3.0	< 3.0 U
534-52-1	4,6-Dinitro-2-Methylphenol	10	< 10 U
86-30-6	N-Nitrosodiphenylamine	1.0	< 1.0 U
101-55-3	4-Bromophenyl-phenylether	1.0	< 1.0 U
118-74-1	Hexachlorobenzene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
84-74-2	Di-n-Butylphthalate	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
85-68-7	Butylbenzylphthalate	1.0	< 1.0 U
91-94-1	3,3'-Dichlorobenzidine	5.0	< 5.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
117-81-7	bis(2-Ethylhexyl)phthalate	3.0	< 3.0 U
218-01-9	Chrysene	1.0	< 1.0 U
117-84-0	Di-n-Octyl phthalate	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	2.0	< 2.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	74.0%	2-Fluorobiphenyl	74.0%
d14-p-Terphenyl	107%	d4-1,2-Dichlorobenzene	56.0%
d5-Phenol	81.9%	2-Fluorophenol	77.3%
2,4,6-Tribromophenol	74.4%	d4-2-Chlorophenol	85.3%

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt6.i Injection Date: 23-OCT-2015 11:35
Lab File ID: 15102301.d Init. Cal. Date(s): 19-AUG-2015 19-AUG-2015
Analysis Type: Init. Cal. Times: 12:04 15:56
Lab Sample ID: ICV151023 Quant Type: ISTD
Method: /chem2/nt6.i/20151023.b/SW846150819.m

AZ 10/23/15

COMPOUND	RRF / AMOUNT	RF25	CCAL RRF25	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
$ 1 2-Fluorophenol	1.06369	0.93822	0.93822	0.010	-11.79594	20.00000	Averaged	
$ 2 Phenol-d5	1.29902	1.24465	1.24465	0.010	-4.18573	20.00000	Averaged	
3 Phenol	1.41269	1.45715	1.45715	0.800	3.14715	20.00000	Averaged	
$ 5 2-Chlorophenol-d4	1.13628	1.11242	1.11242	0.010	-2.09978	20.00000	Averaged	
4 Bis(2-Chloroethyl)ether	1.09628	1.21444	1.21444	0.700	10.77755	20.00000	Averaged	
6 2-Chlorophenol	1.13828	1.13464	1.13464	0.800	-0.32020	20.00000	Averaged	
7 1,3-Dichlorobenzene	1.47334	1.44660	1.44660	0.010	-1.81460	20.00000	Averaged	
9 1,4-Dichlorobenzene	1.48724	1.46064	1.46064	0.010	-1.78855	20.00000	Averaged	
$ 10 1,2-Dichlorobenzene-d4	0.96174	0.86107	0.86107	0.010	-10.46731	20.00000	Averaged	
12 1,2-Dichlorobenzene	1.43283	1.49191	1.49191	0.010	4.12369	20.00000	Averaged	
11 Benzyl alcohol	25.24468	25.00000	0.85420	0.010	0.97873	20.00000	Quadratic	
14 2,2'-oxybis(1-Chloropropane	1.18478	1.02060	1.02060	0.010	-13.85756	20.00000	Averaged	
13 2-Methylphenol	1.01540	1.00105	1.00105	0.700	-1.41323	20.00000	Averaged	
17 Hexachloroethane	0.59889	0.63902	0.63902	0.300	6.70085	20.00000	Averaged	
16 N-Nitroso-di-n-propylamine	0.88800	0.86911	0.86911	0.500	-2.12782	20.00000	Averaged	
15 4-Methylphenol	1.03538	1.05372	1.05372	0.600	1.77052	20.00000	Averaged	
$ 18 Nitrobenzene-d5	0.42722	0.37109	0.37109	0.010	-13.13916	20.00000	Averaged	
19 Nitrobenzene	0.45886	0.43157	0.43157	0.200	-5.94711	20.00000	Averaged	
20 Isophorone	0.75393	0.69259	0.69259	0.400	-8.13640	20.00000	Averaged	
21 2-Nitrophenol	0.18802	0.18975	0.18975	0.100	0.92017	20.00000	Averaged	
22 2,4-Dimethylphenol	0.36807	0.37973	0.37973	0.200	3.16839	20.00000	Averaged	
23 Bis(2-Chloroethoxy)methane	0.43430	0.40499	0.40499	0.300	-6.74766	20.00000	Averaged	
24 Benzoic acid	45.33927	75.00000	0.16974	0.010	-39.54764	20.00000	Linear	<-
25 2,4-Dichlorophenol	23.08565	25.00000	0.37371	0.200	-7.65739	20.00000	Linear	
26 1,2,4-Trichlorobenzene	0.46055	0.45615	0.45615	0.010	-0.95574	20.00000	Averaged	
28 Naphthalene	1.05561	0.99969	0.99969	0.700	-5.29653	20.00000	Averaged	
29 4-Chloroaniline	0.40000	0.41408	0.41408	0.010	3.51887	20.00000	Averaged	
30 Hexachlorobutadiene	0.35675	0.33993	0.33993	0.010	-4.71575	20.00000	Averaged	
31 4-Chloro-3-methylphenol	0.28808	0.30536	0.30536	0.200	5.99739	20.00000	Averaged	
32 2-Methylnaphthalene	0.75179	0.70861	0.70861	0.400	-5.74361	20.00000	Averaged	
33 Hexachlorocyclopentadiene	0.50233	0.39809	0.39809	0.050	-20.75125	20.00000	Averaged	<-
34 2,4,6-Trichlorophenol	0.44316	0.43200	0.43200	0.200	-2.51843	20.00000	Averaged	
35 2,4,5-Trichlorophenol	0.46319	0.45793	0.45793	0.200	-1.13664	20.00000	Averaged	
$ 36 2-Fluorobiphenyl	1.48502	1.22278	1.22278	0.010	-17.65895	20.00000	Averaged	
37 2-Chloronaphthalene	1.33848	1.23389	1.23389	0.800	-7.81403	20.00000	Averaged	

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt6.i Injection Date: 23-OCT-2015 11:35
Lab File ID: 15102301.d Init. Cal. Date(s): 19-AUG-2015 19-AUG-2015
Analysis Type: Init. Cal. Times: 12:04 15:56
Lab Sample ID: ICV151023 Quant Type: ISTD
Method: /chem2/nt6.i/20151023.b/SW846150819.m

COMPOUND	RRF / AMOUNT	RF25	CCAL RRF25	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
38 2-Nitroaniline	0.35614	0.32308	0.32308	0.010	-9.28477	20.00000	Averaged	
39 Dimethylphthalate	1.41959	1.31094	1.31094	0.010	-7.65350	20.00000	Averaged	
40 Acenaphthylene	1.81718	1.65435	1.65435	0.900	-8.96049	20.00000	Averaged	
41 2,6-Dinitrotoluene	0.30810	0.27475	0.27475	0.200	-10.82420	20.00000	Averaged	
43 3-Nitroaniline	0.26821	0.25303	0.25303	0.010	-5.66099	20.00000	Averaged	
44 Acenaphthene	1.17069	1.02661	1.02661	0.900	-12.30670	20.00000	Averaged	
45 2,4-Dinitrophenol	51.37786	75.00000	0.14943	0.010	-31.49618	20.00000	Quadratic	<-
46 Dibenzofuran	1.95777	1.68054	1.68054	0.800	-14.16011	20.00000	Averaged	
47 4-Nitrophenol	17.56141	25.00000	0.18856	0.010	-29.75437	20.00000	Linear	<-
48 2,4-Dinitrotoluene	0.38644	0.39081	0.39081	0.200	1.13126	20.00000	Averaged	
50 Diethylphthalate	1.44722	1.45024	1.45024	0.010	0.20893	20.00000	Averaged	
49 Fluorene	1.49800	1.38693	1.38693	0.900	-7.41488	20.00000	Averaged	
51 4-Chlorophenyl-phenylether	0.90840	0.76283	0.76283	0.400	-16.02448	20.00000	Averaged	
52 4-Nitroaniline	0.23478	0.20537	0.20537	0.010	-12.52437	20.00000	Averaged	
53 4,6-Dinitro-2-methylphenol	63.68979	75.00000	0.12347	0.010	-15.08028	20.00000	Quadratic	
54 N-Nitrosodiphenylamine	0.51731	0.44855	0.44855	0.010	-13.29200	20.00000	Averaged	
$ 55 2,4,6-Tribromophenol	0.24193	0.21894	0.21894	0.010	-9.50564	20.00000	Averaged	
56 4-Bromophenyl-phenylether	0.28490	0.23690	0.23690	0.100	-16.84999	20.00000	Averaged	
57 Hexachlorobenzene	0.30157	0.25888	0.25888	0.100	-14.15634	20.00000	Averaged	
58 Pentachlorophenol	37.34306	50.00000	0.12371	0.050	-25.31389	20.00000	Quadratic	<-
60 Phenanthrene	1.07466	0.92753	0.92753	0.700	-13.69048	20.00000	Averaged	
61 Anthracene	1.04181	0.92973	0.92973	0.700	-10.75794	20.00000	Averaged	
62 Carbazole	26.27237	25.00000	0.59952	0.010	5.08948	20.00000	Quadratic	
63 Di-n-butylphthalate	1.18086	1.06979	1.06979	0.010	-9.40630	20.00000	Averaged	
64 Fluoranthene	1.29303	1.14984	1.14984	0.600	-11.07456	20.00000	Averaged	
65 Pyrene	1.03713	1.04760	1.04760	0.600	1.00960	20.00000	Averaged	
$ 66 Terphenyl-d14	0.72589	0.65139	0.65139	0.010	-10.26424	20.00000	Averaged	
67 Butylbenzylphthalate	0.39332	0.39482	0.39482	0.010	0.38174	20.00000	Averaged	
68 Benzo(a)anthracene	1.10504	1.00325	1.00325	0.800	-9.21074	20.00000	Averaged	
70 3,3'-Dichlorobenzidine	0.39160	0.39563	0.39563	0.010	1.03009	20.00000	Averaged	
71 Chrysene	0.96045	0.98059	0.98059	0.700	2.09658	20.00000	Averaged	
72 bis(2-Ethylhexyl)phthalate	0.53805	0.52718	0.52718	0.010	-2.02013	20.00000	Averaged	
73 Di-n-octylphthalate	0.95879	0.95442	0.95442	0.010	-0.45595	20.00000	Averaged	
74 Benzo(b)fluoranthene	1.19888	1.12115	1.12115	0.700	-6.48381	20.00000	Averaged	
75 Benzo(k)fluoranthene	1.23129	1.27463	1.27463	0.700	3.51968	20.00000	Averaged	

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt6.i Injection Date: 23-OCT-2015 11:35
Lab File ID: 15102301.d Init. Cal. Date(s): 19-AUG-2015 19-AUG-2015
Analysis Type: Init. Cal. Times: 12:04 15:56
Lab Sample ID: ICV151023 Quant Type: ISTD
Method: /chem2/nt6.i/20151023.b/SW846150819.m

COMPOUND	RRF / AMOUNT	RF25	CCAL RRF25	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
187 Total Benzofluoranthenes	1.14658	1.12283	1.12283	0.010	-2.07065	20.00000	Averaged	
76 Benzo(a)pyrene	1.01548	0.96476	0.96476	0.700	-4.99432	20.00000	Averaged	
78 Indeno(1,2,3-cd)pyrene	1.37047	1.28624	1.28624	0.500	-6.14655	20.00000	Averaged	
79 Dibenzo(a,h)anthracene	1.14336	1.08073	1.08073	0.400	-5.47742	20.00000	Averaged	
80 Benzo(g,h,i)perylene	1.09150	1.05346	1.05346	0.500	-3.48477	20.00000	Averaged	
90 N-Nitrosodimethylamine	0.68182	0.55320	0.55320	0.010	-18.86402	20.00000	Averaged	
103 Pyridine	1.08944	0.99169	0.99169	0.010	-8.97235	20.00000	Averaged	
91 Aniline	1.90244	1.60542	1.60542	0.010	-15.61269	20.00000	Averaged	
105 1-methylnaphthalene	0.60299	0.54762	0.54762	0.010	-9.18301	20.00000	Averaged	
93 Benzidine	53.67197	50.00000	0.15351	0.010	7.34393	20.00000	Quadratic	
111 Azobenzene (1,2-DP-Hydrazin	0.73989	0.71308	0.71308	0.010	-3.62351	20.00000	Averaged	
143 1,4-Dioxane	0.47305	0.37780	0.37780	0.010	-20.13493	20.00000	Averaged	<-
$ 137 d8-1,4-Dioxane	0.35609	0.31362	0.31362	0.010	-11.92650	20.00000	Averaged	
144 alpha-Terpineol	0.25325	0.21599	0.21599	0.010	-14.71432	20.00000	Averaged	
123 Acetophenone	1.44897	1.44599	1.44599	0.010	-0.20558	20.00000	Averaged	
168 Pentachlorobenzene	0.63382	0.54988	0.54988	0.010	-13.24306	20.00000	Averaged	
120 2,3,4,6-Tetrachlorophenol	0.36099	0.29036	0.29036	0.010	-19.56756	20.00000	Averaged	
151 1,2,4,5-Tetrachlorobenzene	0.71800	0.63123	0.63123	0.010	-12.08433	20.00000	Averaged	

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: CR23-S-3.0

Lab Sample ID: AON0B
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 17:35
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Silica-Florisil Cleanup: Yes
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.56	0.65-0.89		0.996	0.0538	JEMPC
2,3,7,8-TCDD	0.69	0.65-0.89		0.996	1.68	
1,2,3,7,8-PeCDF		1.32-1.78	0.0558	0.996	< 0.0558	U
2,3,4,7,8-PeCDF		1.32-1.78	0.0598	0.996	< 0.0598	U
1,2,3,7,8-PeCDD	1.42	1.32-1.78		0.996	1.31	
1,2,3,4,7,8-HxCDF	1.29	1.05-1.43		0.996	0.114	J
1,2,3,6,7,8-HxCDF	0.99	1.05-1.43		0.996	0.153	JEMPC
2,3,4,6,7,8-HxCDF	1.11	1.05-1.43		0.996	0.133	BJ
1,2,3,7,8,9-HxCDF	1.44	1.05-1.43		0.996	0.155	BJEMPC
1,2,3,4,7,8-HxCDD	0.97	1.05-1.43		0.996	0.193	JEMPC
1,2,3,6,7,8-HxCDD	1.16	1.05-1.43		0.996	1.54	
1,2,3,7,8,9-HxCDD	1.21	1.05-1.43		0.996	2.35	
1,2,3,4,6,7,8-HpCDF	0.92	0.88-1.20		0.996	2.97	
1,2,3,4,7,8,9-HpCDF	0.78	0.88-1.20		0.996	0.221	BJEMPC
1,2,3,4,6,7,8-HpCDD	1.00	0.88-1.20		0.996	26.0	
OCDF	0.79	0.76-1.02		1.99	4.82	
OCDD	0.88	0.76-1.02		9.96	298	

Homologue Group	EDL	RL	Result	
Total TCDF		0.996	0.103	EMPC
Total TCDD		0.996	11.4	EMPC
Total PeCDF	0.0598	1.99	0.846	
Total PeCDD		0.996	13.3	
Total HxCDF		1.99	5.78	EMPC
Total HxCDD		1.99	27.3	EMPC
Total HpCDF		1.99	10.2	EMPC
Total HpCDD		1.99	52.5	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 3.84

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 3.85

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B

Sample ID: CR23-S-3.0

Lab Sample ID: AON0B
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 17:35
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.77	0.65-0.89	92.6	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	87.5	25-164	
13C-1,2,3,7,8-PeCDF	1.58	1.32-1.78	99.4	24-185	
13C-2,3,4,7,8-PeCDF	1.54	1.32-1.78	91.6	21-178	
13C-1,2,3,7,8-PeCDD	1.58	1.32-1.78	94.1	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	91.7	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	88.5	26-123	
13C-2,3,4,6,7,8-HxCDF	0.51	0.43-0.59	92.4	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	88.3	29-147	
13C-1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	94.6	32-141	
13C-1,2,3,6,7,8-HxCDD	1.28	1.05-1.43	90.3	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	82.1	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	83.6	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	91.0	23-140	
13C-OCDD	0.92	0.76-1.02	75.6	17-157	
37Cl4-2,3,7,8-TCDD			94.9	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR22-S-3.0**

Lab Sample ID: AON0C
LIMS ID: 15-19094
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 18:28
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 1.81 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Silica-Florisil Cleanup: Yes
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.73	0.65-0.89		5.52	0.552	J
2,3,7,8-TCDD	0.36	0.65-0.89		5.52	1.41	JEMPC
1,2,3,7,8-PeCDF	1.32	1.32-1.78		5.52	1.08	J
2,3,4,7,8-PeCDF	1.78	1.32-1.78		5.52	0.807	J
1,2,3,7,8-PeCDD	1.47	1.32-1.78		5.52	3.14	J
1,2,3,4,7,8-HxCDF	1.13	1.05-1.43		5.52	4.09	J
1,2,3,6,7,8-HxCDF	1.28	1.05-1.43		5.52	4.20	J
2,3,4,6,7,8-HxCDF	1.06	1.05-1.43		5.52	7.81	
1,2,3,7,8,9-HxCDF	1.38	1.05-1.43		5.52	1.82	BJ
1,2,3,4,7,8-HxCDD	1.15	1.05-1.43		5.52	8.65	
1,2,3,6,7,8-HxCDD	1.20	1.05-1.43		5.52	38.2	
1,2,3,7,8,9-HxCDD	1.24	1.05-1.43		5.52	12.1	
1,2,3,4,6,7,8-HpCDF	0.93	0.88-1.20		5.52	188	
1,2,3,4,7,8,9-HpCDF	0.89	0.88-1.20		5.52	12.5	EMPC
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20		5.52	1,260	
OCDF	0.83	0.76-1.02		11.0	412	
OCDD	0.88	0.76-1.02		55.2	30,800	E

Homologue Group	EDL	RL	Result	
Total TCDF		5.52	5.25	EMPC
Total TCDD		5.52	13.6	EMPC
Total PeCDF		11.0	48.6	EMPC
Total PeCDD		5.52	18.2	
Total HxCDF		11.0	243	
Total HxCDD		11.0	205	
Total HpCDF		11.0	695	EMPC
Total HpCDD		11.0	2,900	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 36.5

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 36.5

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: CR22-S-3.0

Lab Sample ID: AON0C
LIMS ID: 15-19094
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 18:28
Instrument/Analyst: AS1/PK

Sample Amount: 1.81 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	94.6	24-169	
13C-2,3,7,8-TCDD	0.79	0.65-0.89	90.7	25-164	
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	99.4	24-185	
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	98.5	21-178	
13C-1,2,3,7,8-PeCDD	1.56	1.32-1.78	101	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	88.5	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	84.7	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	90.1	28-136	
13C-1,2,3,7,8,9-HxCDF	0.51	0.43-0.59	87.1	29-147	
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	93.3	32-141	
13C-1,2,3,6,7,8-HxCDD	1.26	1.05-1.43	88.3	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	80.5	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	80.1	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	86.8	23-140	
13C-OCDD	0.89	0.76-1.02	74.5	17-157	
37Cl4-2,3,7,8-TCDD			98.6	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: OPR-102315**

Lab Sample ID: OPR-102315
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 14:55
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	RL	Result
2,3,7,8-TCDF	0.67	0.65-0.89	1.00	20.1
2,3,7,8-TCDD	0.76	0.65-0.89	1.00	21.8
1,2,3,7,8-PeCDF	1.45	1.32-1.78	1.00	103
2,3,4,7,8-PeCDF	1.41	1.32-1.78	1.00	102
1,2,3,7,8-PeCDD	1.54	1.32-1.78	1.00	104
1,2,3,4,7,8-HxCDF	1.15	1.05-1.43	1.00	106
1,2,3,6,7,8-HxCDF	1.16	1.05-1.43	1.00	103
2,3,4,6,7,8-HxCDF	1.16	1.05-1.43	1.00	107
1,2,3,7,8,9-HxCDF	1.14	1.05-1.43	1.00	105
1,2,3,4,7,8-HxCDD	1.23	1.05-1.43	1.00	104
1,2,3,6,7,8-HxCDD	1.22	1.05-1.43	1.00	104
1,2,3,7,8,9-HxCDD	1.24	1.05-1.43	1.00	105
1,2,3,4,6,7,8-HpCDF	0.98	0.88-1.20	1.00	109
1,2,3,4,7,8,9-HpCDF	0.98	0.88-1.20	1.00	106
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20	1.00	104
OCDF	0.83	0.76-1.02	2.00	202
OCDD	0.90	0.76-1.02	10.0	218

Homologue Group	EDL	RL	Result	
Total TCDF		1.00	20.9	EMPC
Total TCDD		1.00	22.3	
Total PeCDF		2.00	211	EMPC
Total PeCDD		1.00	105	EMPC
Total HxCDF		2.00	422	EMPC
Total HxCDD		2.00	314	EMPC
Total HpCDF		2.00	216	EMPC
Total HpCDD		2.00	108	EMPC

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-102315

Lab Sample ID: OPR-102315
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 14:55
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.77	0.65-0.89	100	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	96.4	25-164	
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	105	24-185	
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	102	21-178	
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	104	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	97.3	26-152	
13C-1,2,3,6,7,8-HxCDF	0.50	0.43-0.59	97.0	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	96.3	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	93.6	29-147	
13C-1,2,3,4,7,8-HxCDD	1.28	1.05-1.43	102	32-141	
13C-1,2,3,6,7,8-HxCDD	1.25	1.05-1.43	99.8	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	90.6	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	91.8	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20	97.8	23-140	
13C-OCDD	0.89	0.76-1.02	83.1	17-157	
37Cl4-2,3,7,8-TCDD			106	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B

Sample ID: OPR-102315

Lab Sample ID: OPR-102315
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 14:55
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	OPR	Spiked	Recovery	Limits
2,3,7,8-TCDF	20.1	20.0	100	75-158
2,3,7,8-TCDD	21.8	20.0	109	67-158
1,2,3,7,8-PeCDF	103	100	103	80-134
2,3,4,7,8-PeCDF	102	100	102	68-160
1,2,3,7,8-PeCDD	104	100	104	70-142
1,2,3,4,7,8-HxCDF	106	100	106	72-134
1,2,3,6,7,8-HxCDF	103	100	103	84-130
2,3,4,6,7,8-HxCDF	107	100	107	70-156
1,2,3,7,8,9-HxCDF	105	100	105	78-130
1,2,3,4,7,8-HxCDD	104	100	104	70-164
1,2,3,6,7,8-HxCDD	104	100	104	76-134
1,2,3,7,8,9-HxCDD	105	100	105	64-162
1,2,3,4,6,7,8-HpCDF	109	100	109	82-132
1,2,3,4,7,8,9-HpCDF	106	100	106	78-138
1,2,3,4,6,7,8-HpCDD	104	100	104	70-140
OCDF	202	200	101	63-170
OCDD	218	200	109	78-144

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: MB-102315

Lab Sample ID: MB-102315
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 14:04
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF		0.65-0.89	0.0360	1.00	< 0.0360	U
2,3,7,8-TCDD		0.65-0.89	0.0520	1.00	< 0.0520	U
1,2,3,7,8-PeCDF		1.32-1.78	0.0380	1.00	< 0.0380	U
2,3,4,7,8-PeCDF		1.32-1.78	0.0400	1.00	< 0.0400	U
1,2,3,7,8-PeCDD		1.32-1.78	0.0640	1.00	< 0.0640	U
1,2,3,4,7,8-HxCDF		1.05-1.43	0.0440	1.00	< 0.0440	U
1,2,3,6,7,8-HxCDF		1.05-1.43	0.0400	1.00	< 0.0400	U
2,3,4,6,7,8-HxCDF	1.37	1.05-1.43		1.00	0.0400	J
1,2,3,7,8,9-HxCDF	1.13	1.05-1.43		1.00	0.0360	J
1,2,3,4,7,8-HxCDD		1.05-1.43	0.0520	1.00	< 0.0520	U
1,2,3,6,7,8-HxCDD	1.75	1.05-1.43		1.00	0.0480	JEMPC
1,2,3,7,8,9-HxCDD	0.96	1.05-1.43		1.00	0.106	JEMPC
1,2,3,4,6,7,8-HpCDF	0.58	0.88-1.20		1.00	0.118	JEMPC
1,2,3,4,7,8,9-HpCDF	0.90	0.88-1.20		1.00	0.0480	J
1,2,3,4,6,7,8-HpCDD	1.00	0.88-1.20		1.00	0.962	J
OCDF	0.68	0.76-1.02		2.00	0.378	JEMPC
OCDD	0.86	0.76-1.02		10.0	6.81	

Homologue Group	EDL	RL	Result	
Total TCDF	0.0360	1.00	< 0.0360	U
Total TCDD	0.0520	1.00	< 0.0520	U
Total PeCDF	0.0400	2.00	< 0.0400	U
Total PeCDD	0.0640	1.00	< 0.0640	U
Total HxCDF		2.00	0.116	EMPC
Total HxCDD		2.00	0.760	EMPC
Total HpCDF		2.00	0.341	EMPC
Total HpCDD		2.00	2.29	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 0.04

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 0.11

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: MB-102315**

Lab Sample ID: MB-102315
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 14:04
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.77	0.65-0.89	104	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	99.2	25-164	
13C-1,2,3,7,8-PeCDF	1.56	1.32-1.78	108	24-185	
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	104	21-178	
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	104	25-181	
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	102	26-152	
13C-1,2,3,6,7,8-HxCDF	0.51	0.43-0.59	102	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	101	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	98.6	29-147	
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	108	32-141	
13C-1,2,3,6,7,8-HxCDD	1.23	1.05-1.43	103	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	97.4	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	98.8	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.07	0.88-1.20	106	23-140	
13C-OCDD	0.90	0.76-1.02	92.3	17-157	
37Cl4-2,3,7,8-TCDD			108	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR-07-SSD-COMP
SAMPLE

Lab Sample ID: AON0A
LIMS ID: 15-19092
Matrix: Soil
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/20/15
Date Analyzed: 10/24/15 00:00
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.17 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 35.6%

CAS Number	Analyte	LOQ	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
11100-14-4	Aroclor 1268	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	79.8%
Tetrachlorometaxylene	74.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR23-S-3.0
SAMPLE

Lab Sample ID: AON0B
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/20/15
Date Analyzed: 10/24/15 00:21
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.80 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 17.5%

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	17	< 17 U
53469-21-9	Aroclor 1242	17	< 17 U
12672-29-6	Aroclor 1248	17	< 17 U
11097-69-1	Aroclor 1254	17	< 17 U
11096-82-5	Aroclor 1260	17	< 17 U
11104-28-2	Aroclor 1221	17	< 17 U
11141-16-5	Aroclor 1232	17	< 17 U
11100-14-4	Aroclor 1268	17	< 17 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	79.5%
Tetrachlorometaxylene	69.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3546

Sample ID: CR22-S-3.0
SAMPLE

Lab Sample ID: AON0C
LIMS ID: 15-19094
Matrix: Soil
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/20/15
Date Analyzed: 10/24/15 00:42
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.30 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 11.9%

CAS Number	Analyte	LOQ	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
11100-14-4	Aroclor 1268	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	87.5%
Tetrachlorometaxylene	80.8%

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB SOIL/SOLID/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-102015	96.2%	59-115	74.8%	58-112	0
LCS-102015	96.0%	59-115	73.2%	58-112	0
CR-07-SSD-COMP	79.8%	47-120	74.0%	53-116	0
CR23-S-3.0	79.5%	47-120	69.8%	53-116	0
CR22-S-3.0	87.5%	47-120	80.8%	53-116	0

Microwave (MARS) Control Limits PCBSMI
Prep Method: SW3546
Log Number Range: 15-19092 to 15-19094

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Page 1 of 1

Sample ID: LCS-102015
LAB CONTROL

Lab Sample ID: LCS-102015
LIMS ID: 15-19092
Matrix: Soil
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/20/15
Date Analyzed: 10/23/15 23:39
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Aroclor 1016	407	500	81.4%
Aroclor 1260	516	500	103%

PCB Surrogate Recovery

Decachlorobiphenyl	96.0%
Tetrachlorometaxylene	73.2%

Results reported in µg/kg (ppb)

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3546

Sample ID: MB-102015
METHOD BLANK

Lab Sample ID: MB-102015
LIMS ID: 15-19092
Matrix: Soil
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/20/15
Date Analyzed: 10/23/15 23:17
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

CAS Number	Analyte	LOQ	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
11100-14-4	Aroclor 1268	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	96.2%
Tetrachlorometaxylene	74.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3510C
Page 1 of 1

Sample ID: CR23-GW-6.0
SAMPLE

Lab Sample ID: AON0D
LIMS ID: 15-19095
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/19/15
Date Analyzed: 10/23/15 00:03
Instrument/Analyst: ECD7/JGR
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	LOQ	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
11100-14-4	Aroclor 1268	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	39.8%
Tetrachlorometaxylene	37.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3510C
Page 1 of 1

Sample ID: CR22-GW-9.0
SAMPLE

Lab Sample ID: AON0E
LIMS ID: 15-19096
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/19/15
Date Analyzed: 10/23/15 00:24
Instrument/Analyst: ECD7/JGR
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	LOQ	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
11100-14-4	Aroclor 1268	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	68.0%
Tetrachlorometaxylene	64.8%

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB WATER SURROGATE RECOVERY SUMMARY

Matrix: Ground Water

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-101915	117%	38-120	56.0%	29-120	0
LCS-101915	85.2%	38-120	65.8%	29-120	0
CR23-GW-6.0	39.8%	38-120	37.2%	29-120	0
CR22-GW-9.0	68.0%	38-120	64.8%	29-120	0

Prep Method: SW3510C
Log Number Range: 15-19095 to 15-19096

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Page 1 of 1

Sample ID: LCS-101915
LAB CONTROL

Lab Sample ID: LCS-101915
LIMS ID: 15-19095
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/19/15
Date Analyzed: 10/22/15 22:59
Instrument/Analyst: ECD7/JGR
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

Analyte	Lab Control	Spike Added	Recovery
Aroclor 1016	3.84	5.00	76.8%
Aroclor 1260	4.86	5.00	97.2%

PCB Surrogate Recovery

Decachlorobiphenyl	85.2%
Tetrachlorometaxylene	65.8%

Results reported in µg/L

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3510C
Page 1 of 1

Sample ID: MB-101915
METHOD BLANK

Lab Sample ID: MB-101915
LIMS ID: 15-19095
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/19/15
Date Analyzed: 10/22/15 22:38
Instrument/Analyst: ECD7/JGR
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	LOQ	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
11100-14-4	Aroclor 1268	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	117%
Tetrachlorometaxylene	56.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Extraction Method: SW3546
Page 1 of 1

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Matrix: Soil

Date Received: 10/14/15

Data Release Authorized:
Reported: 10/23/15

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range/Surrogate	LOQ	Result
MB-101915	Method Blank	10/19/15	10/20/15	1.00	Diesel Range	5.0	< 5.0 U
15-19092	HC ID: ---		FID3B	1.0	Motor Oil Range	10	< 10 U
					o-Terphenyl		78.7%
AON0A	CR-07-SSD-COMP	10/19/15	10/20/15	1.00	**Diesel Range**	**78**	**180**
15-19092	HC ID: **DIESEL/MOTOR OIL**		FID3B	10	**Motor Oil Range**	**160**	**520**
					o-Terphenyl		76.7%
AON0B	CR23-S-3.0	10/19/15	10/20/15	1.00	**Diesel Range**	**6.0**	**21**
15-19093	HC ID: **DIESEL/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**12**	**51**
					o-Terphenyl		71.5%
AON0C	CR22-S-3.0	10/19/15	10/20/15	1.00	**Diesel Range**	**57**	**120**
15-19094	HC ID: **DIESEL/MOTOR OIL**		FID3B	10	**Motor Oil Range**	**110**	**980**
					o-Terphenyl		73.3%

Reported in mg/kg (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
LOQ-Limit of Quantitation

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

ANALYTICAL RESOURCES INCORPORATED

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	OTER	TOT OUT
101915MB	78.7%	0
101915LCS	74.5%	0
CR-07-SSD-COMP	76.7%	0
CR23-S-3.0	71.5%	0
CR22-S-3.0	73.3%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3546
Log Number Range: 15-19092 to 15-19094

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: LCS-101915
LAB CONTROL

Lab Sample ID: LCS-101915
LIMS ID: 15-19092
Matrix: Soil
Data Release Authorized:
Reported: 10/23/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/19/15
Date Analyzed: 10/20/15 17:30
Instrument/Analyst: FID3B/ML

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
Diesel	107	150	71.3%

TPHD Surrogate Recovery

o-Terphenyl	74.5%

Results reported in mg/kg

FORM III

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Soil
Date Received: 10/14/15

ARI Job: AON0
Project: Seaport Landing
1044.02.01-02

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep Date
15-19092-101915MB1	Method Blank	10.0 g	1.00 mL	-	10/19/15
15-19092-101915LCS1	Lab Control	10.0 g	1.00 mL	-	10/19/15
15-19092-AON0A	CR-07-SSD-COMP	6.45 g	1.00 mL	D	10/19/15
15-19093-AON0B	CR23-S-3.0	8.26 g	1.00 mL	D	10/19/15
15-19094-AON0C	CR22-S-3.0	8.83 g	1.00 mL	D	10/19/15

Basis: D=Dry Weight W=As Received

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Extraction Method: SW3510C
Page 1 of 1

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Matrix: Ground Water

Date Received: 10/14/15

Data Release Authorized: BB
Reported: 10/23/15

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DF	Range/Surrogate	RL	Result
MB-101915	Method Blank	10/19/15	10/20/15	1.00	Diesel Range	0.10	< 0.10 U
15-19095	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		74.1%
AON0D	CR23-GW-6.0	10/19/15	10/20/15	1.00	**Diesel Range**	**0.10**	**3.4**
15-19095	HC ID: **DRO/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**0.20**	**3.2**
					o-Terphenyl		47.6%
AON0E	CR22-GW-9.0	10/19/15	10/20/15	1.00	**Diesel Range**	**0.10**	**0.45**
15-19096	HC ID: **DIESEL/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**0.20**	**0.96**
					o-Terphenyl		57.3%

Reported in mg/L (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
RL-Reporting limit.

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

ANALYTICAL RESOURCES INCORPORATED

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Ground Water

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	OTER	TOT OUT
MB-101915	74.1%	0
LCS-101915	65.4%	0
CR23-GW-6.0	47.6%*	1
CR22-GW-9.0	57.3%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3510C
Log Number Range: 15-19095 to 15-19096

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: LCS-101915
LAB CONTROL

Lab Sample ID: LCS-101915
LIMS ID: 15-19095
Matrix: Ground Water
Data Release Authorized:
Reported: 10/23/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/19/15
Date Analyzed: 10/20/15 14:17
Instrument/Analyst: FID3B/ML

Sample Amount: 500 mL
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
Diesel	2.18	3.00	72.7%

TPHD Surrogate Recovery

o-Terphenyl	65.4%

Results reported in mg/L

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job: AON0
Matrix: Ground Water
Project: Seaport Landing
Date Received: 10/14/15
1044.02.01-02

ARI ID	Client ID	Samp Amt	Final Vol	Prep Date
15-19095-101915MB1	Method Blank	500 mL	1.00 mL	10/19/15
15-19095-101915LCS1	Lab Control	500 mL	1.00 mL	10/19/15
15-19095-AON0D	CR23-GW-6.0	500 mL	1.00 mL	10/19/15
15-19096-AON0E	CR22-GW-9.0	500 mL	1.00 mL	10/19/15

Data File: \\target\share\chem2\fid3b.i\20151020.b\15102019.D

Date : 20-OCT-2015 17:09

Client ID: AONOMBS1

Sample Info: AONOMBS1

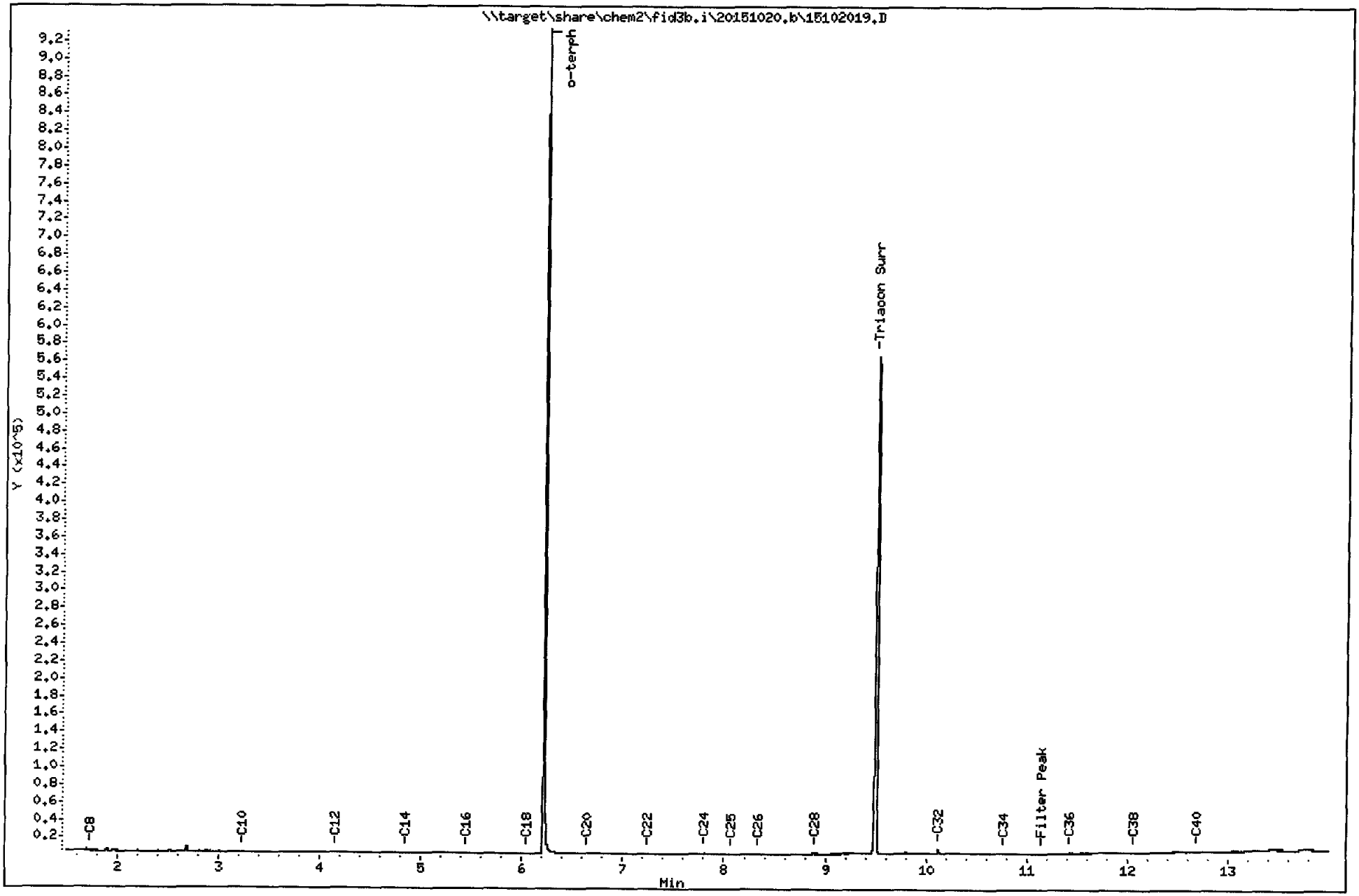
Column phase: RTX-1

Instrument: fid3b.i

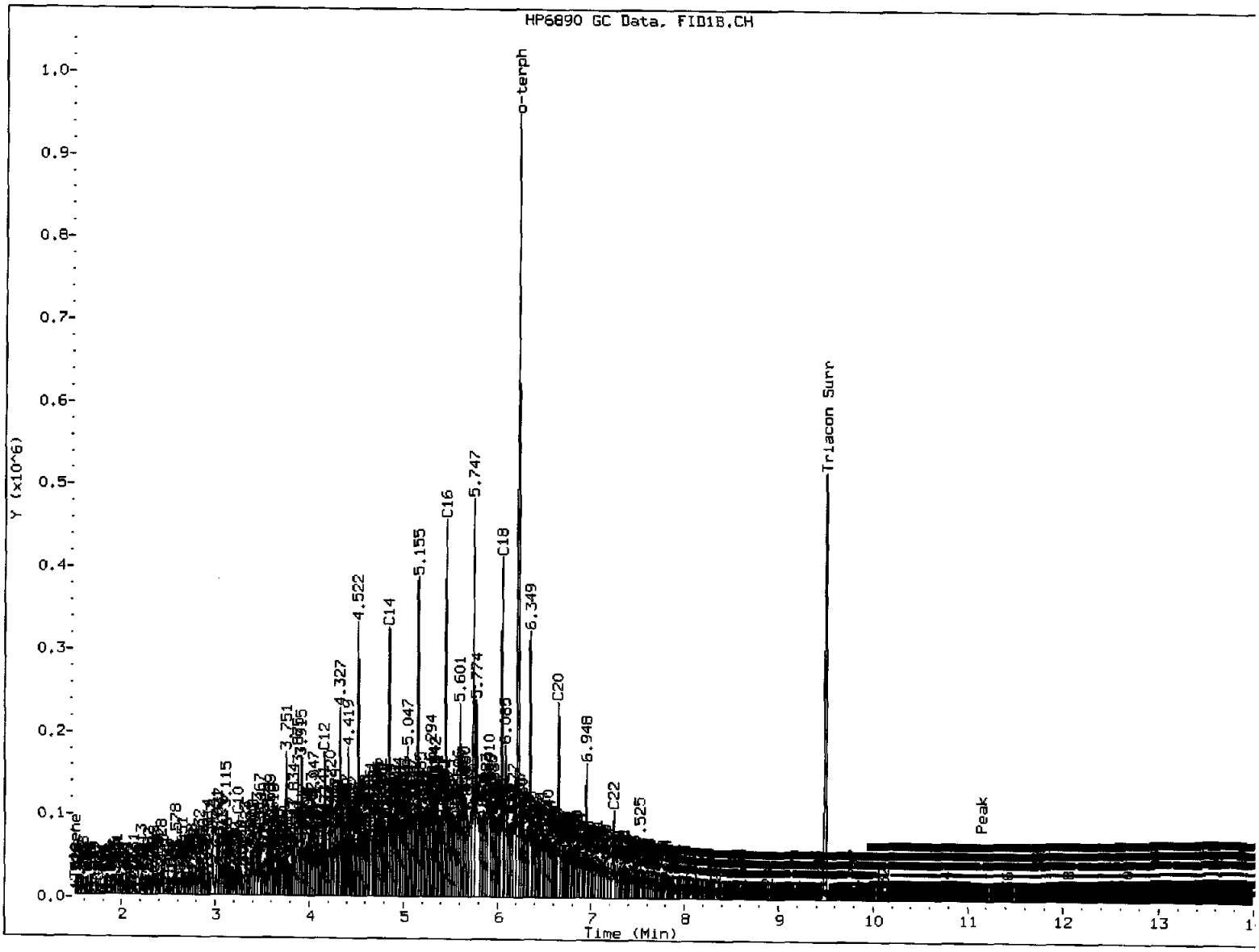
Operator: ML

Column diameter: 0.25

AON0:00064



FID:3B-2C/RTX-1 AON0LCSS1 FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5) Skimmed surrogate

Analyst: ML Date: 10/21/15

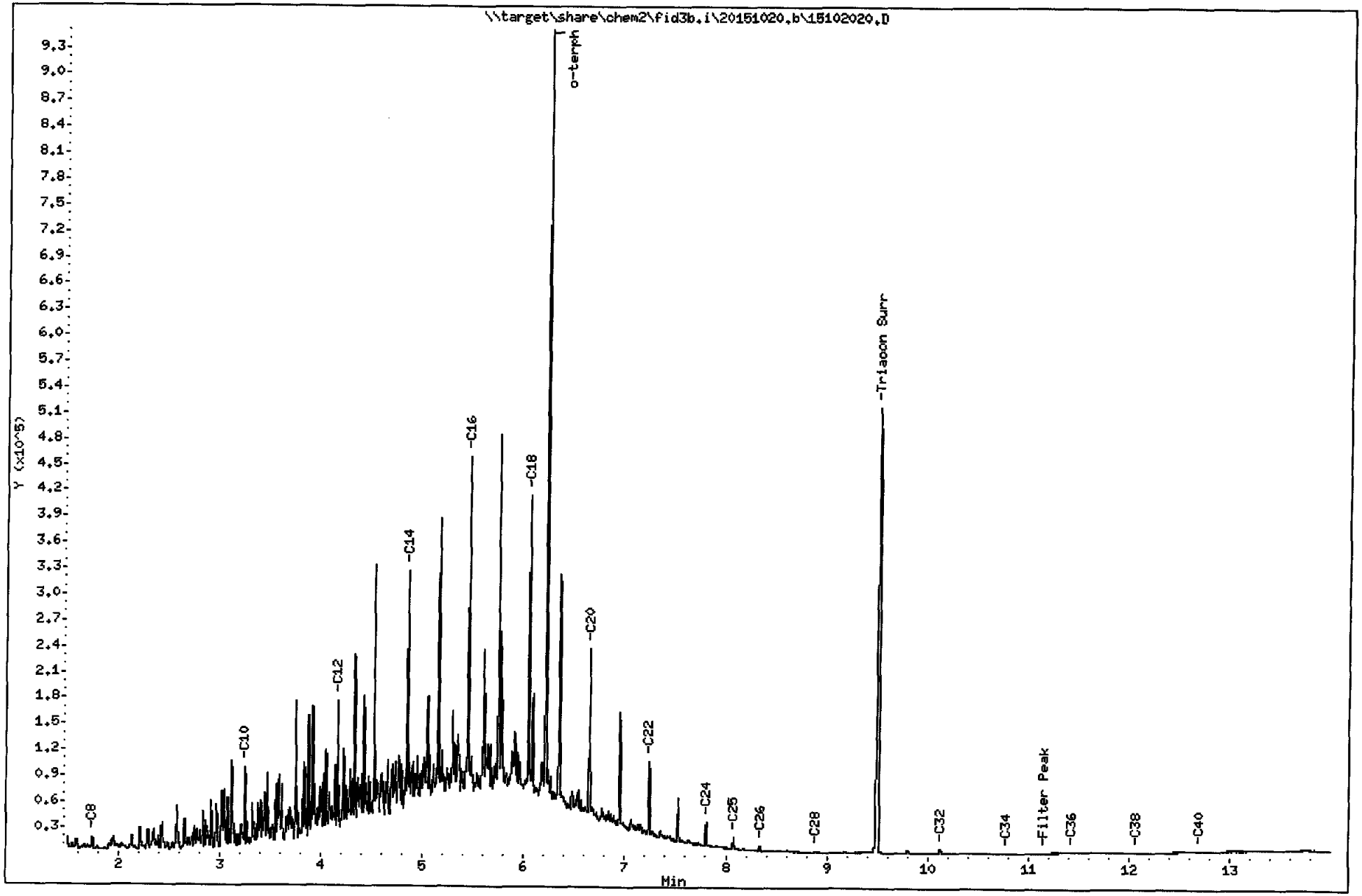
Data File: \\target\share\chem2\fid3b.i\20151020.b\15102020.D
Date : 20-OCT-2015 17:30
Client ID: AON0LCSS1
Sample Info: AON0LCSS1

Instrument: fid3b.i

Operator: ML
Column diameter: 0.25

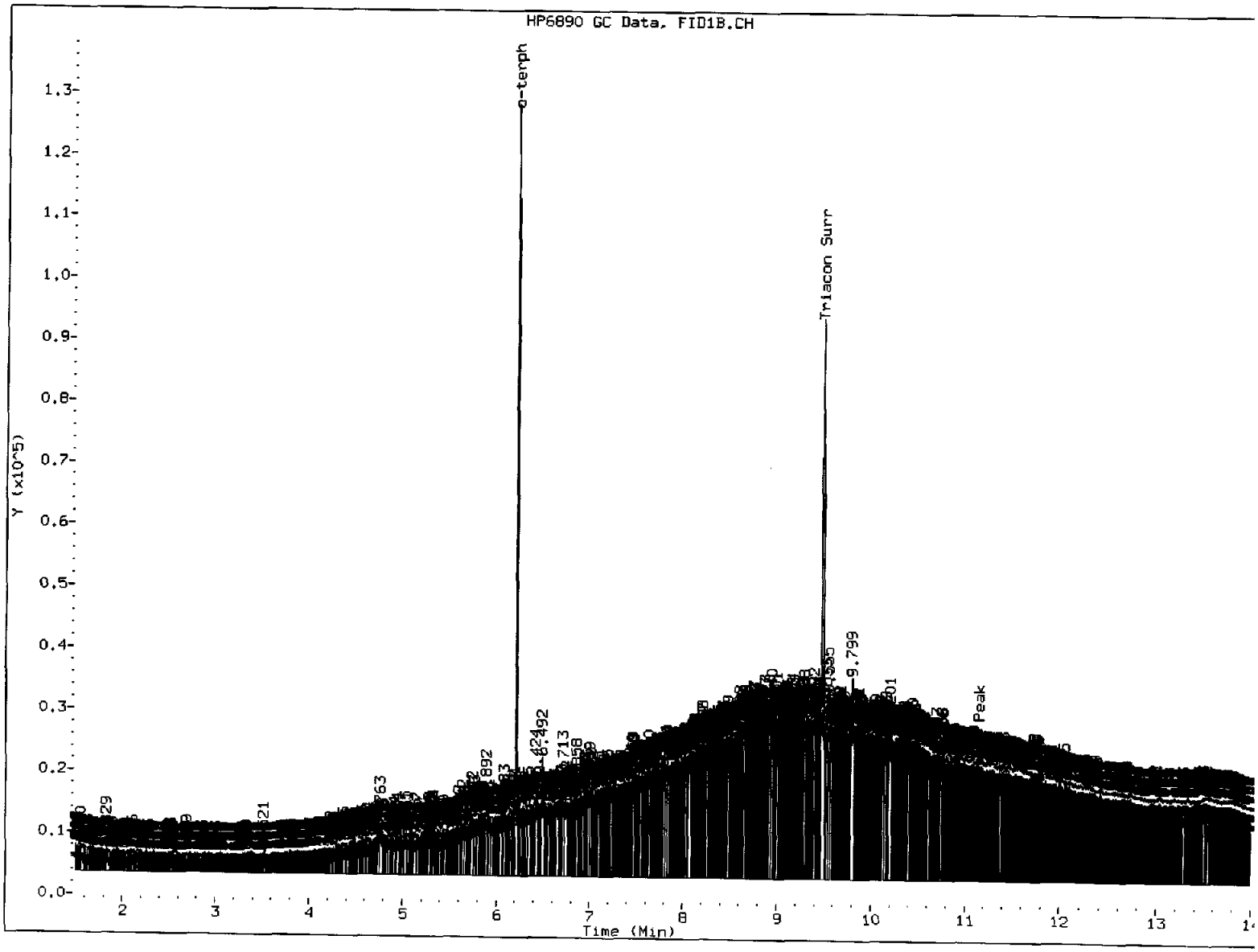
Column phase: RTX-1

AON0 : 00066



FID:3B-2C/RTX-1 AON0A

FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5) Skimmed surrogate

Analyst: ML Date: 10/21/15

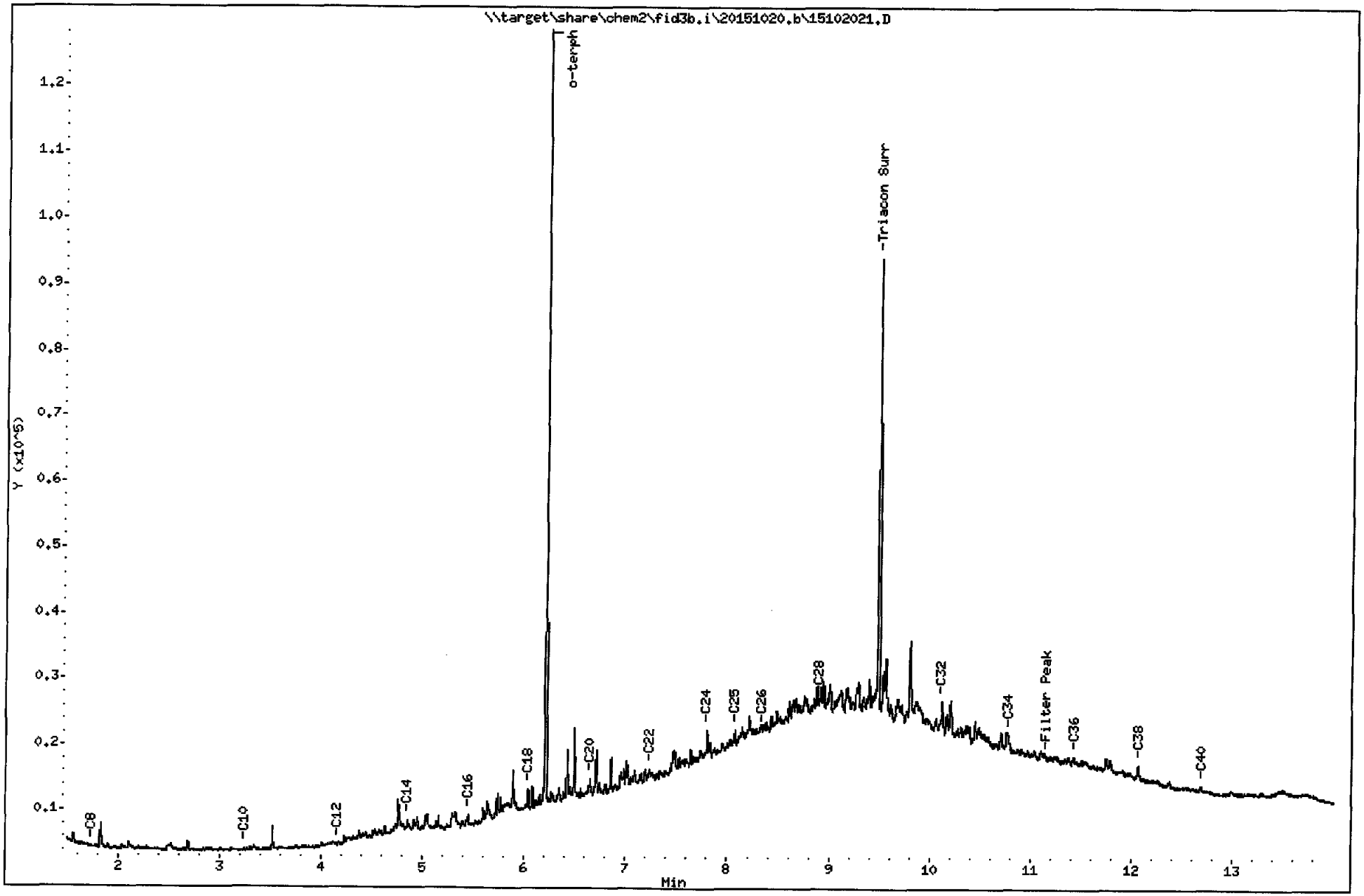
Data File: \\target\share\chem2\fid3b.i\20151020.b\15102021.D
Date : 20-OCT-2015 17:52
Client ID: CR-07-SSD-COMP
Sample Info: AON0A,10

Instrument: fid3b.i

Operator: ML
Column diameter: 0.25

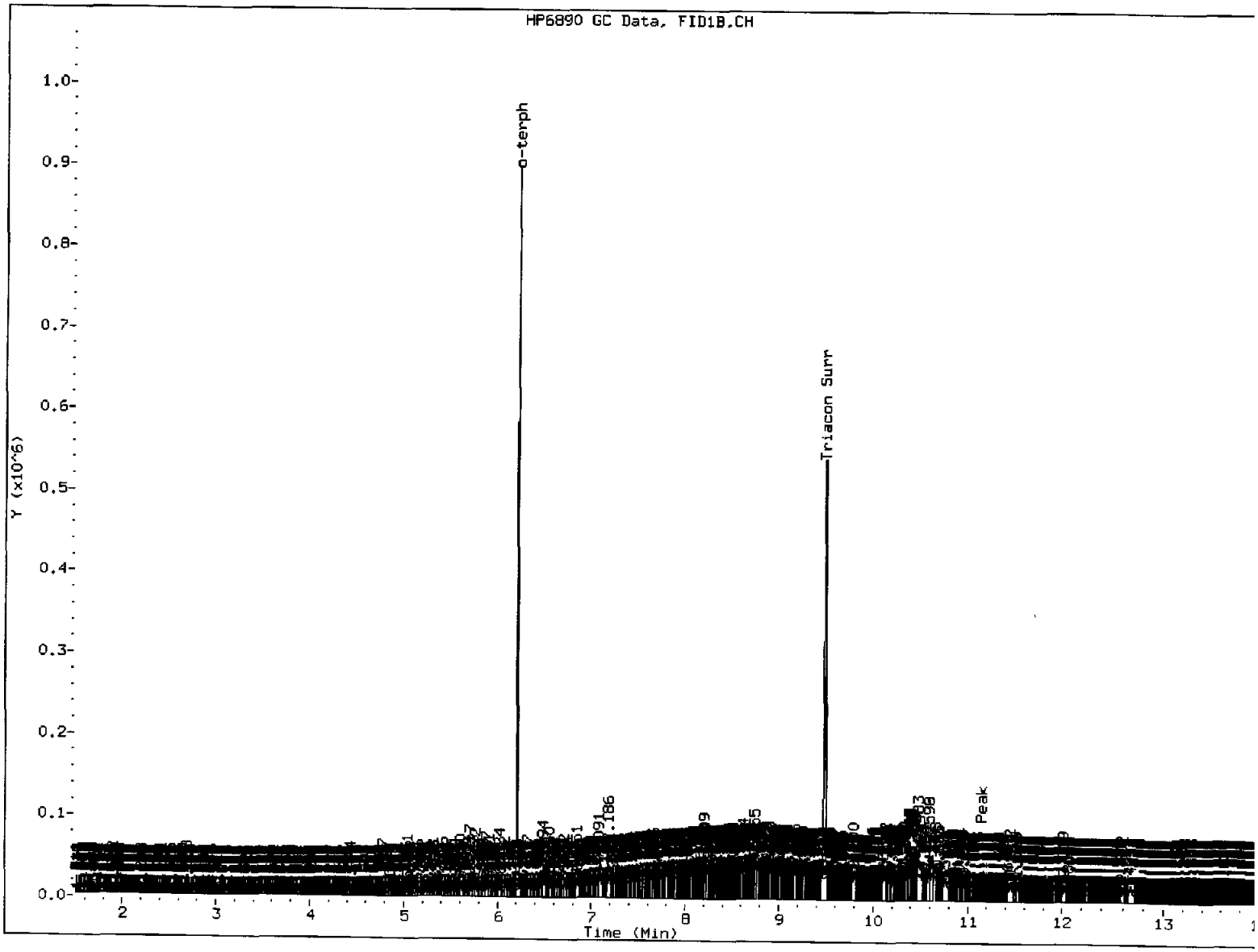
Column phase: RTX-1

AON0 : 00068



FID:3B-2C/RTX-1 AON0B

FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5) Skimmed surrogate

Analyst: M

Date: 10/21/15

Data File: \\target\share\chem2\fid3b.i\20151020.b\15102022.D

Page 1

Date : 20-OCT-2015 18:13

Client ID: CR23-S-3.0

Instrument: fid3b.i

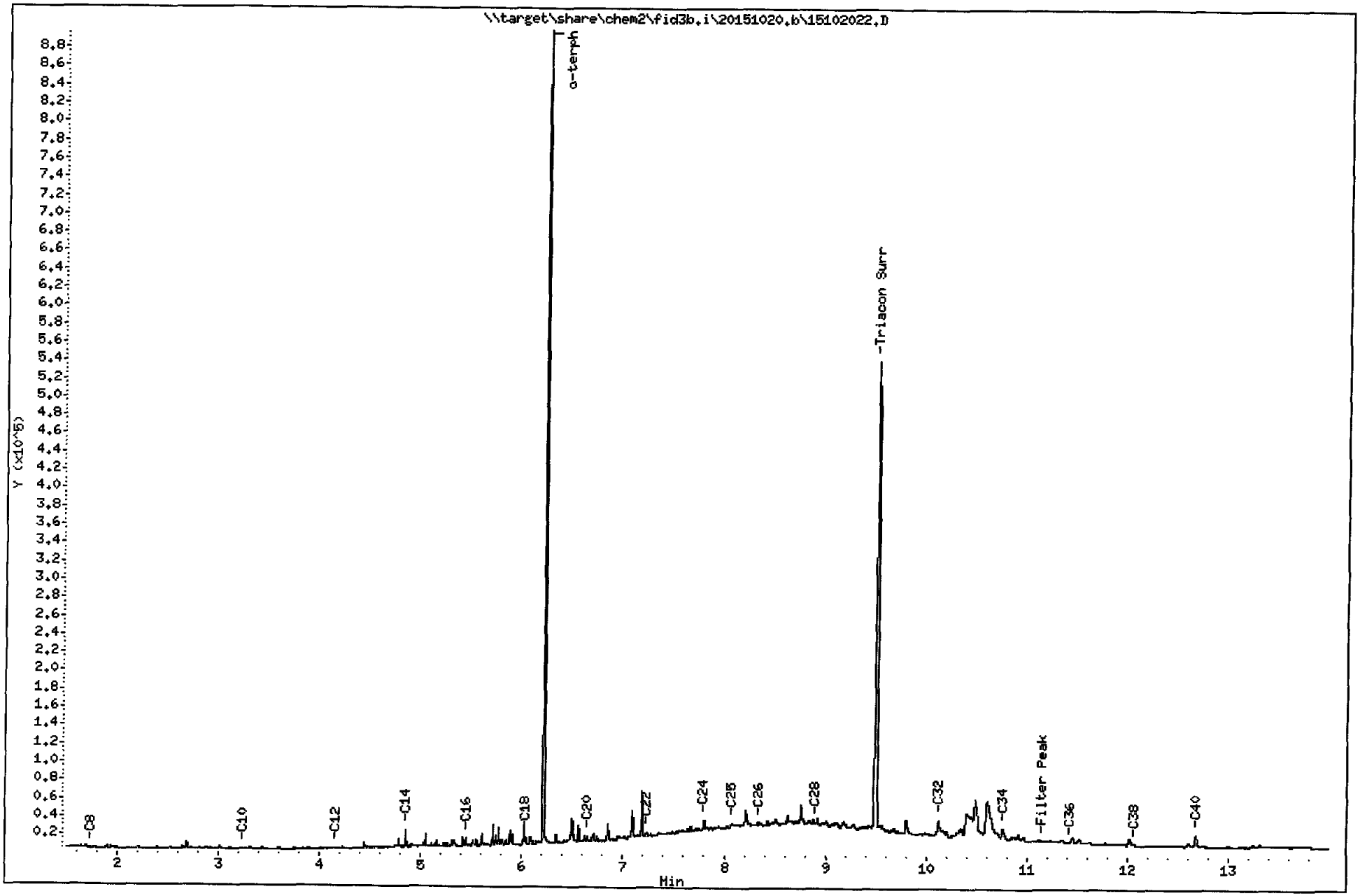
Sample Info: AON0B

Operator: ML

Column phase: RTX-1

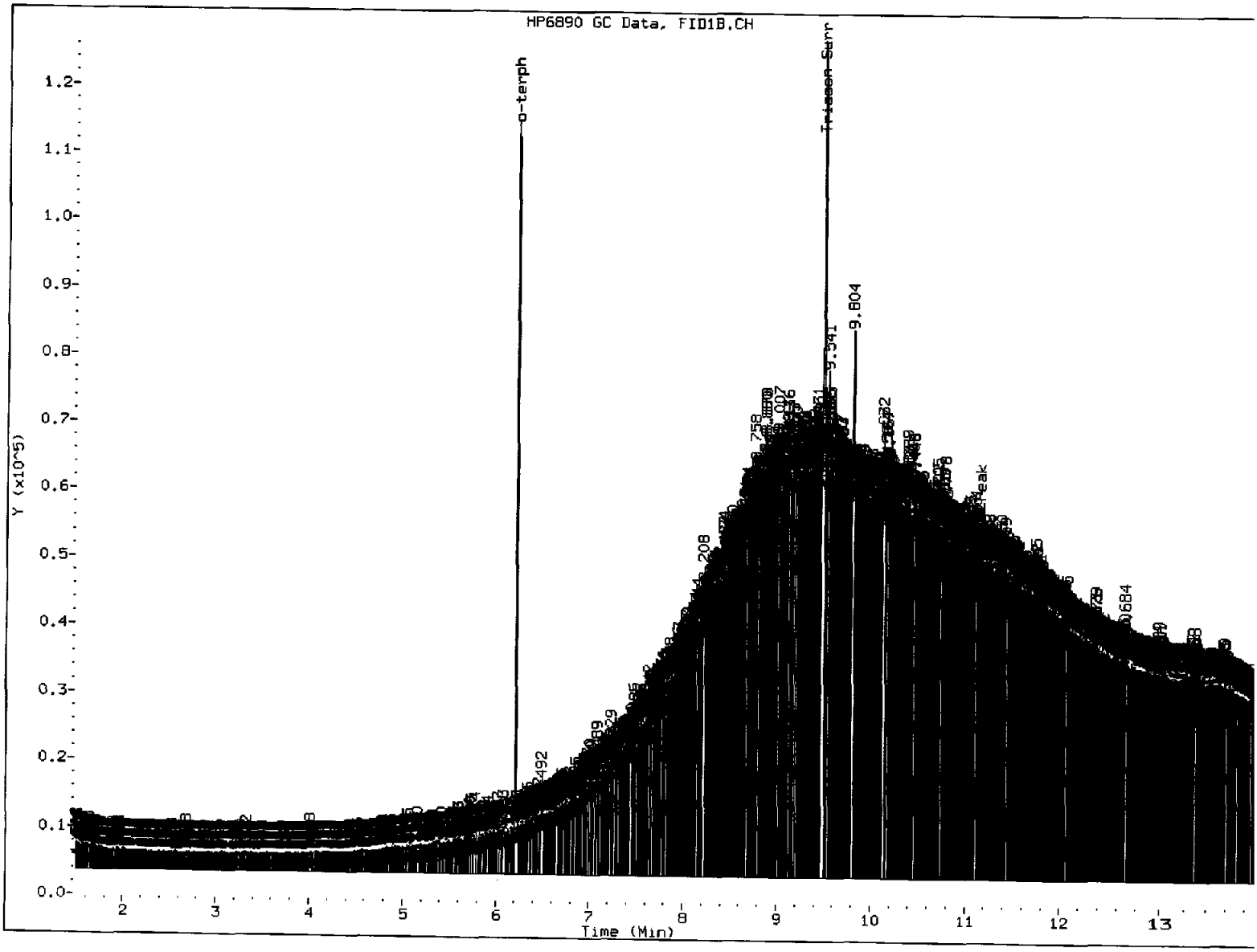
Column diameter: 0.25

AON0 : 000170



FID:3B-2C/RTX-1 AON0C

FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5) Skimmed surrogate

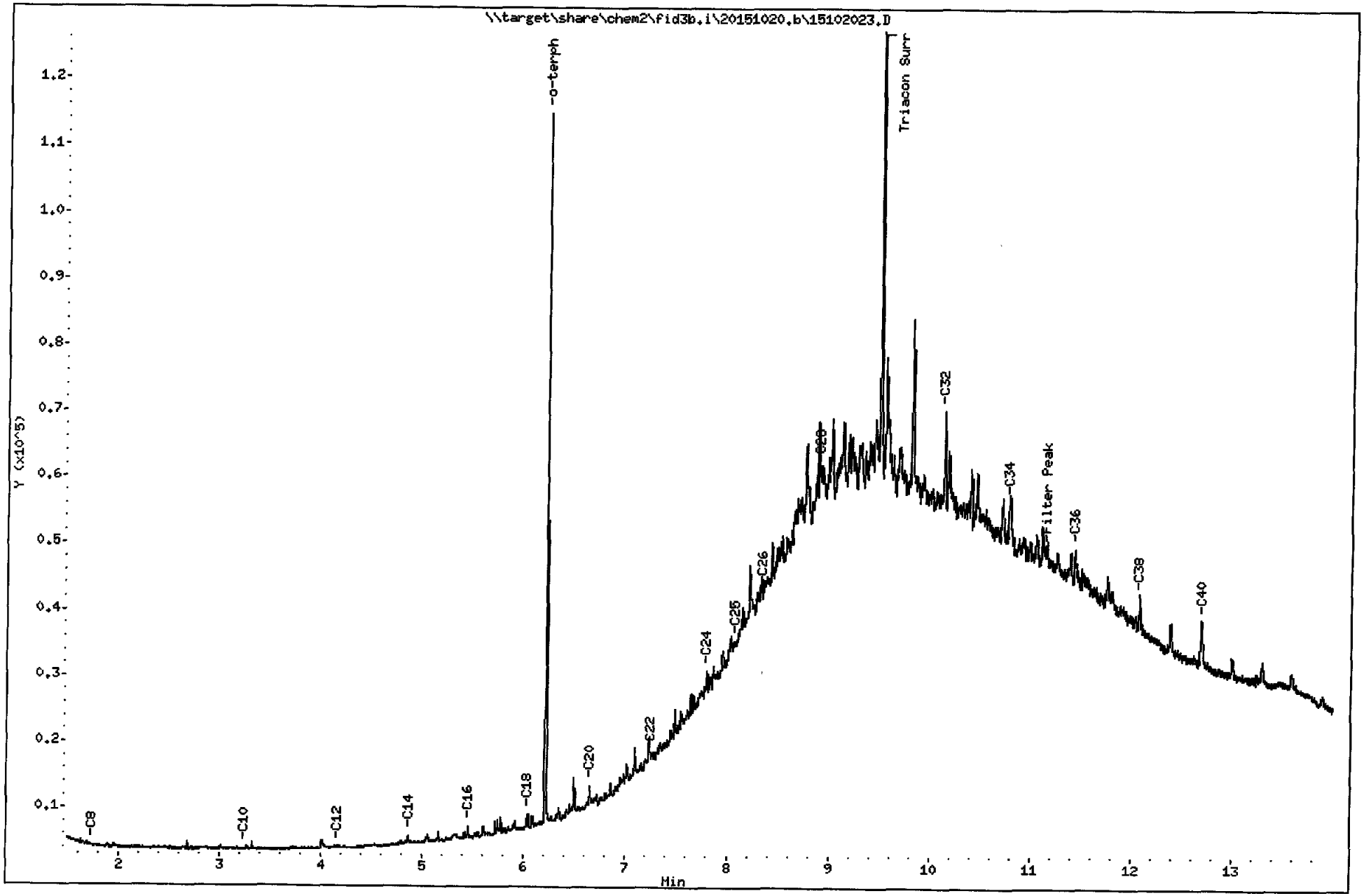
Analyst: ML Date: 6/21/15

Data File: \\target\share\chem2\fid3b.i\20151020.b\15102023.D
Date : 20-OCT-2015 18:35
Client ID: CR22-S-3.0
Sample Info: AON0C,10

Instrument: fid3b.i
Operator: ML
Column diameter: 0.25

Column phase: RTX-1

AON0 : 000072



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Date : 20-OCT-2015 13:55

Client ID: AONOMBW1

Sample Info: AONOMBW1

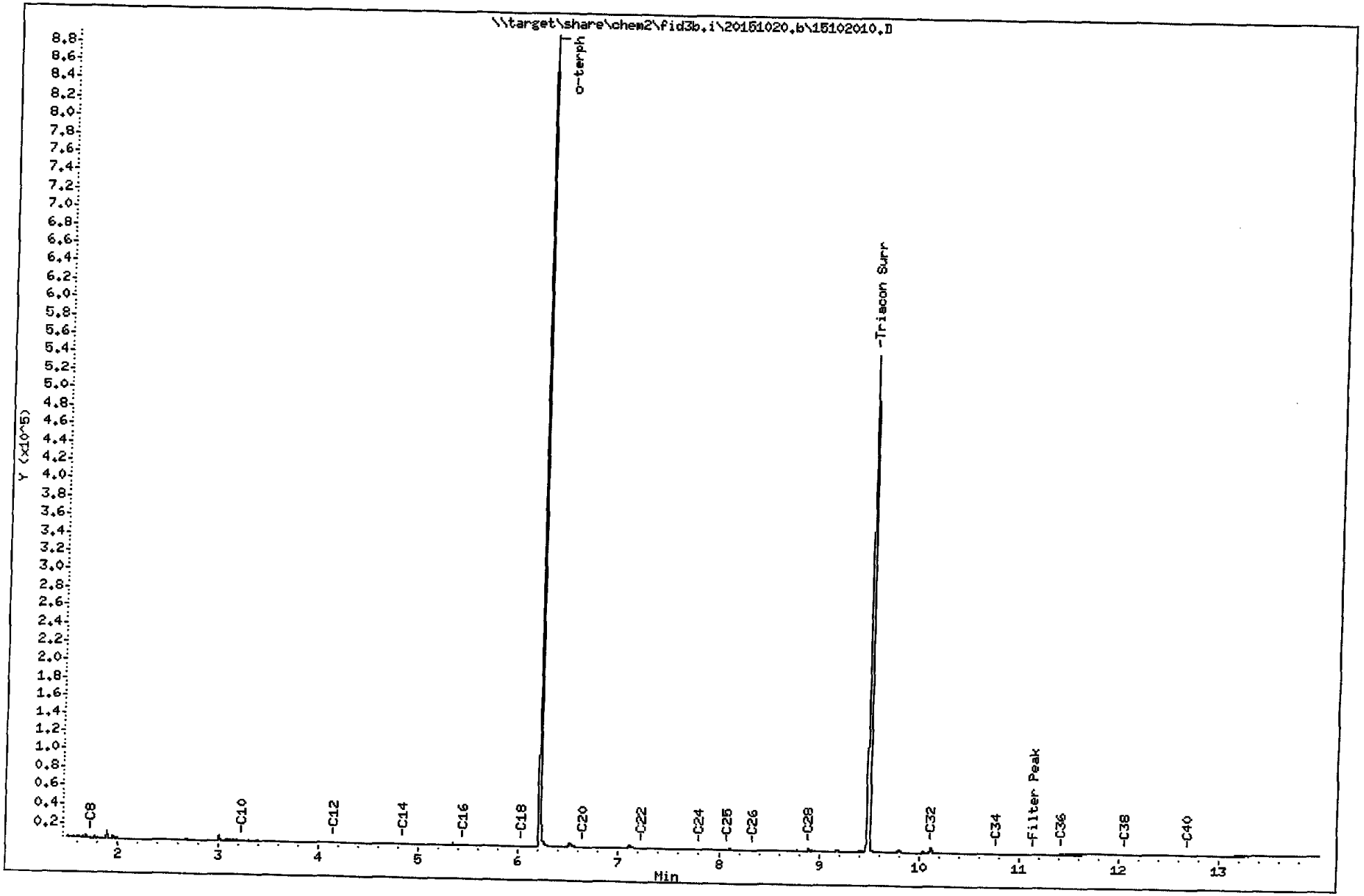
Instrument: fid3b.i

Operator: ML

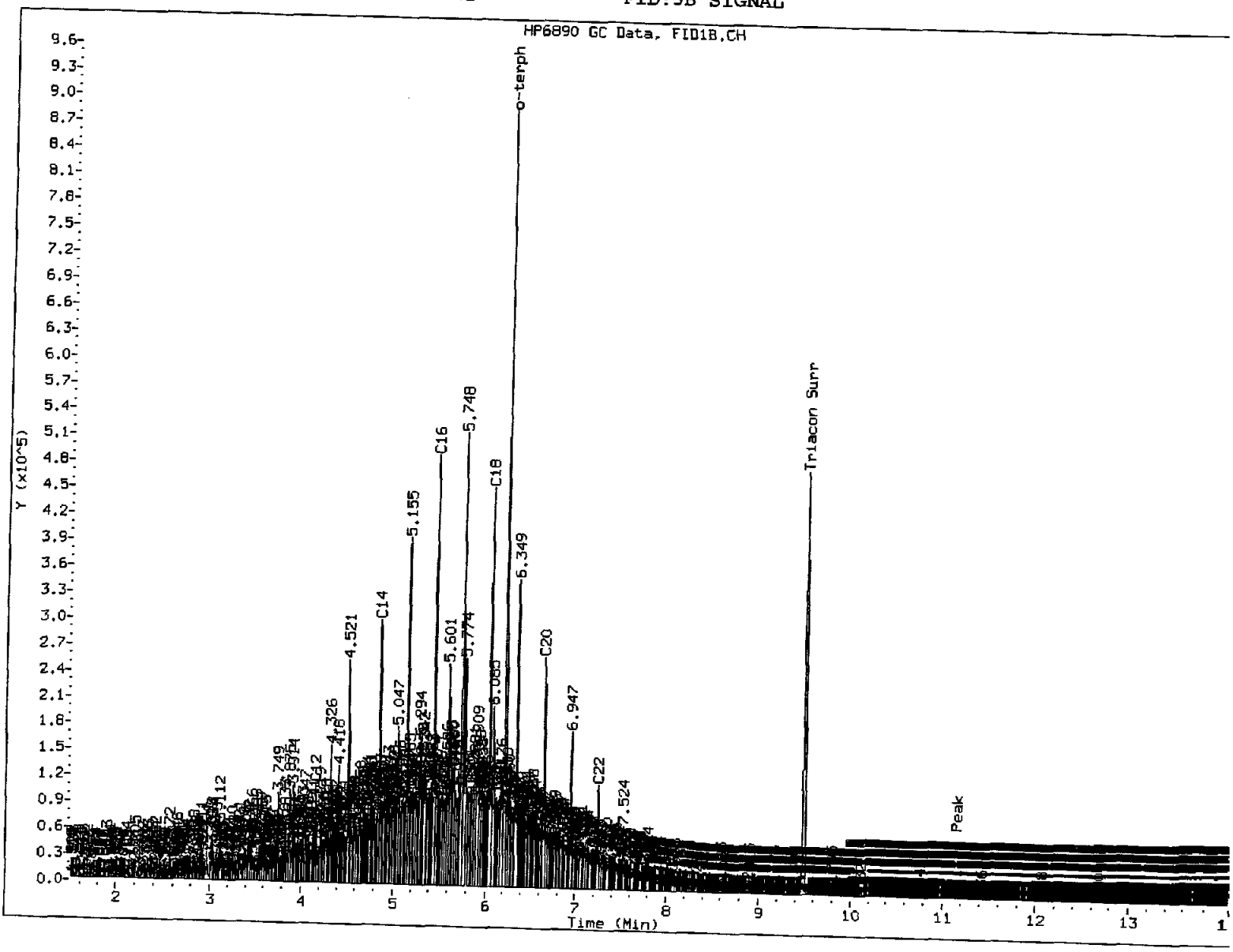
Column phase: RTX-1

Column diameter: 0.25

AON0:00073



FID:3B-2C/RTX-1 AON0LCSW1 FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: UL Date: 10/21/15

Data File: \\target\share\chem2\fid3b.i\20151020.b\15102011.D

Date : 20-OCT-2015 14:17

Client ID: AONOLCSW1

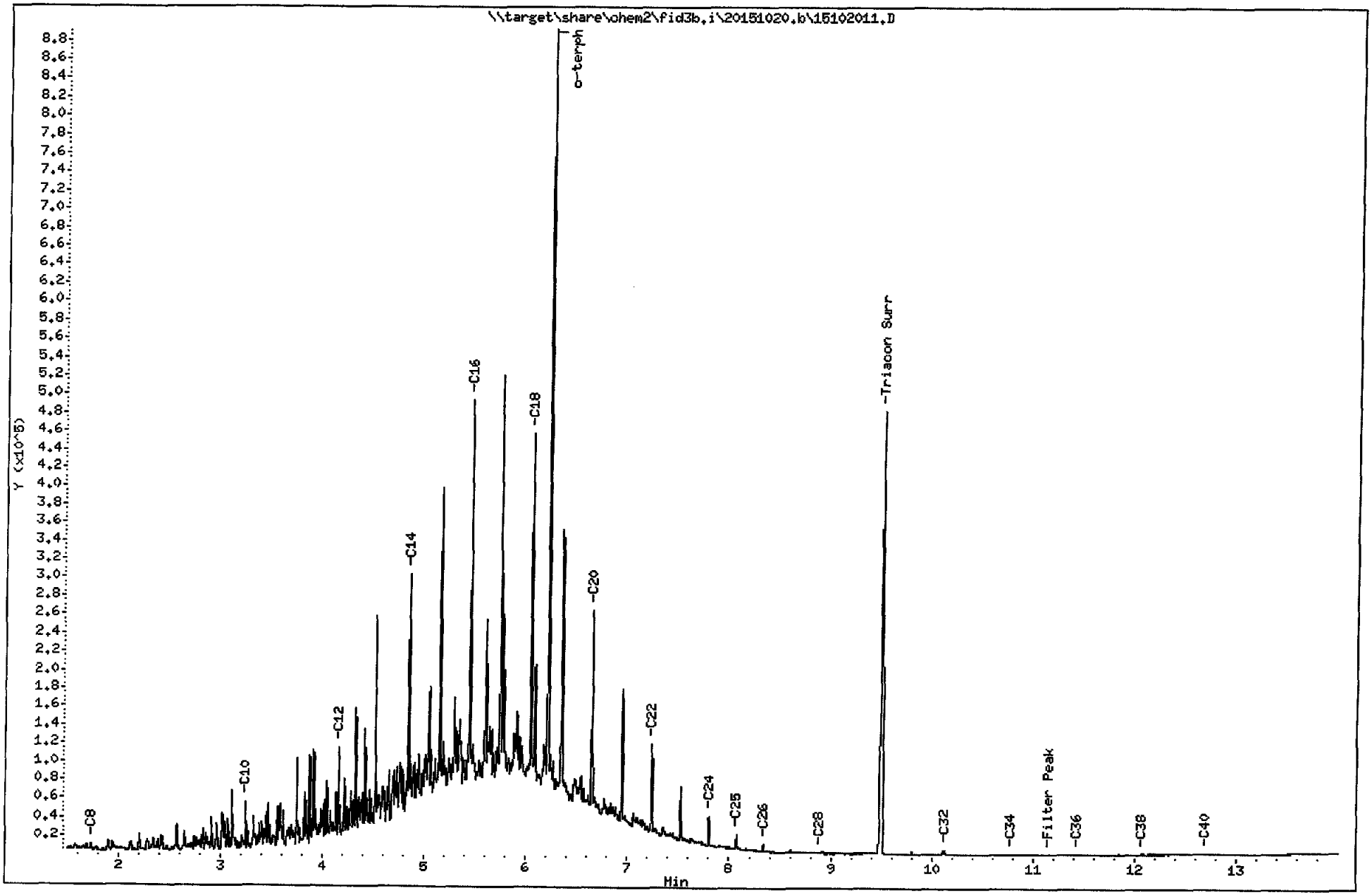
Sample Info: AONOLCSW1

Column phase: RTX-1

Instrument: fid3b.i

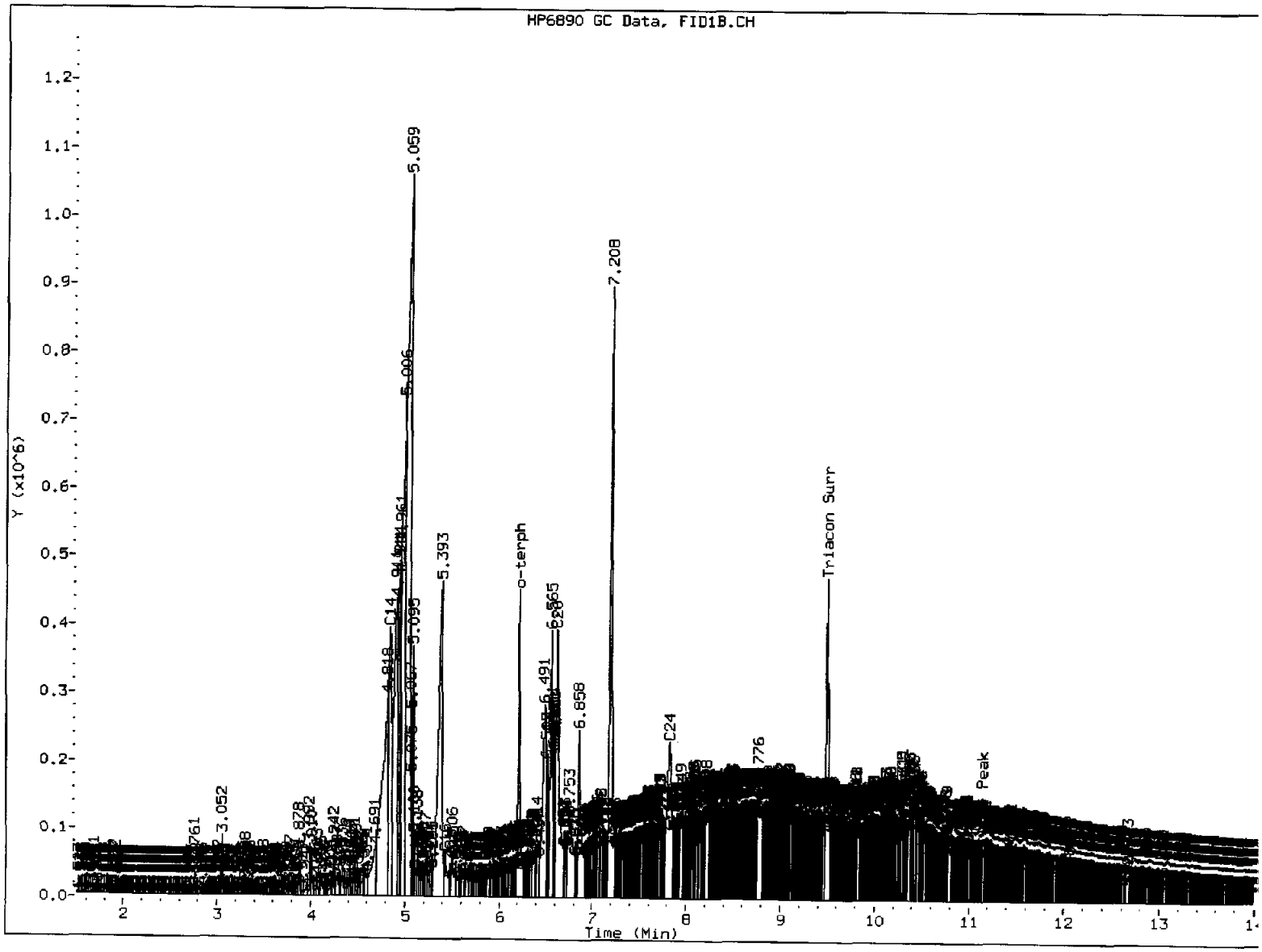
Operator: ML

Column diameter: 0.25



FID:3B-2C/RTX-1 AON0D

FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5). Skimmed surrogate

Analyst: M Date: 10/21/15

Data File: \\target\share\chem2\fid3b.i\20151020.b\15102012.D

Date : 20-OCT-2015 14:38

Client ID: CR23-GW-6.0

Sample Info: AONOD

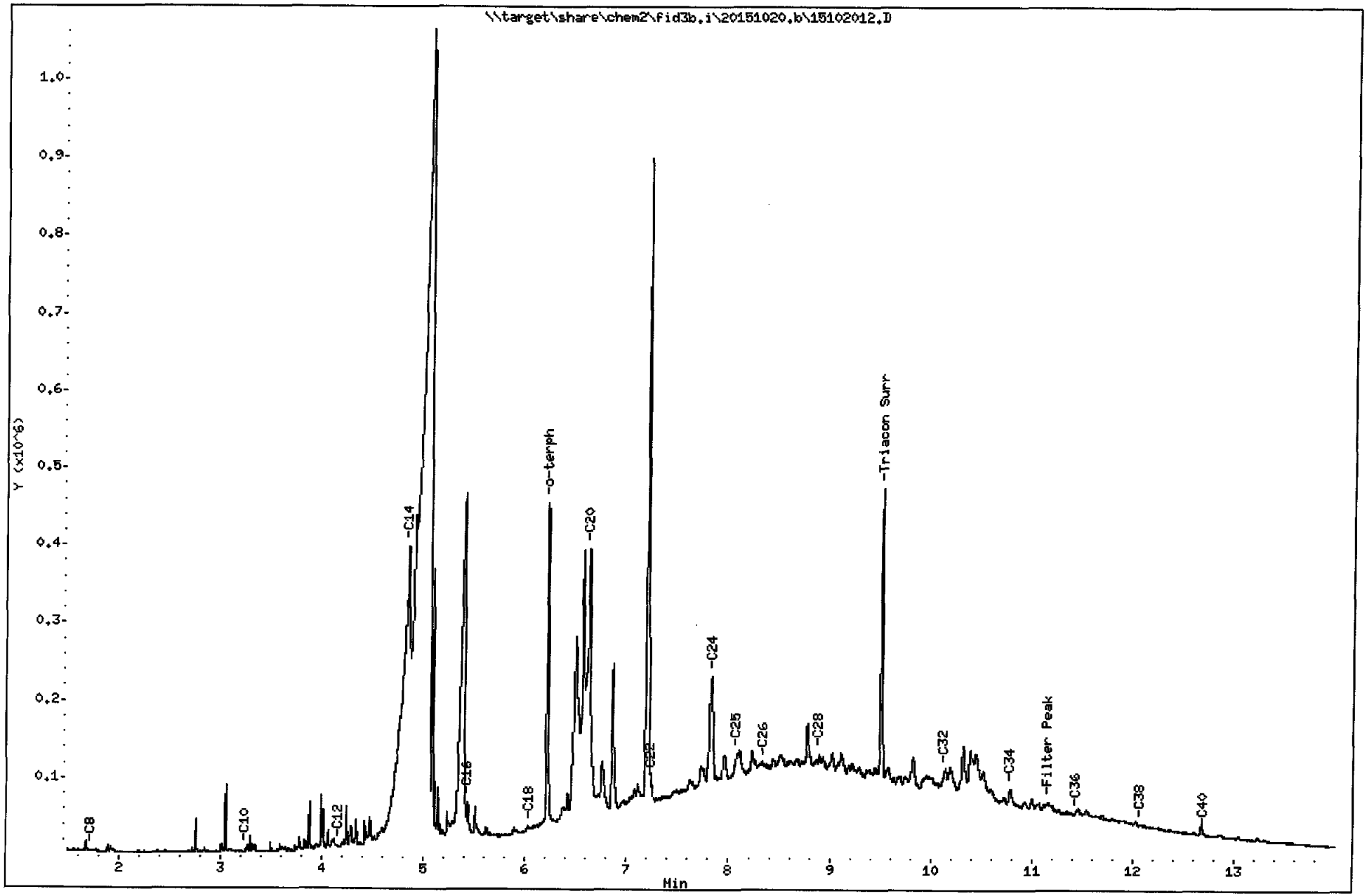
Column phase: RTX-1

Instrument: fid3b.i

Operator: ML

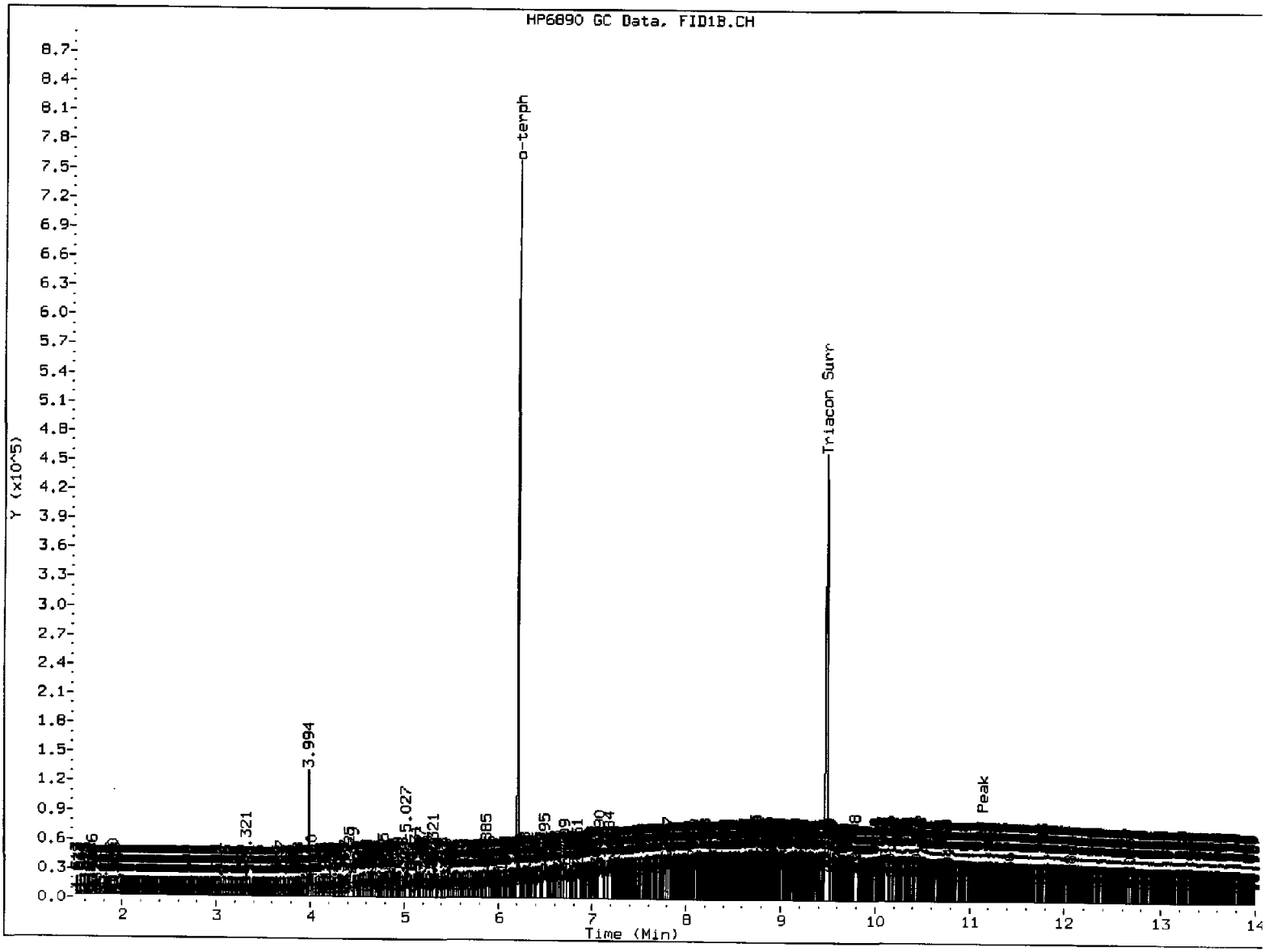
Column diameter: 0.25

AON0:00077



FID:3B-2C/RTX-1 AON0E

FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5) Skimmed surrogate

Analyst: ML Date: 10/21/15

Data File: \\target\share\chem2\fid3b.i\20151020.b\15102013.D

Date : 20-OCT-2015 15:00

Client ID: CR22-GW-9.0

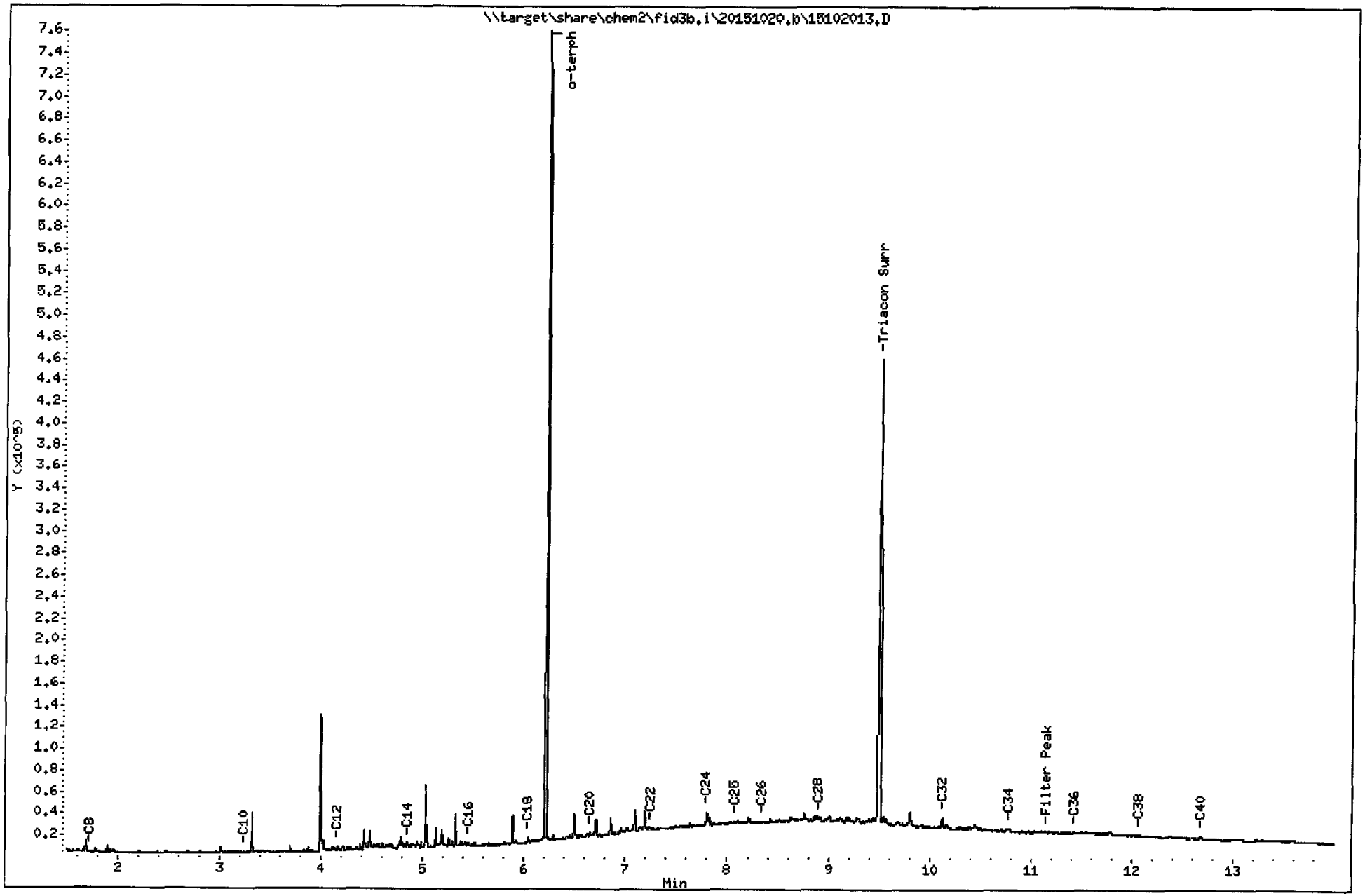
Sample Info: AONOE

Column phase: RTX-1

Instrument: fid3b.i

Operator: ML

Column diameter: 0.25



ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR-07-SSD-COMP
SAMPLE

Lab Sample ID: AON0A
LIMS ID: 15-19092
Matrix: Soil
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Percent Total Solids: 64.2%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	10/22/15	6010C	10/27/15	7440-38-2	Arsenic	20	20	U
3050B	10/22/15	6010C	10/27/15	7440-43-9	Cadmium	0.8	0.8	U
3050B	10/22/15	6010C	10/27/15	**7440-47-3**	**Chromium**	2	**43**	
3050B	10/22/15	6010C	10/27/15	**7439-92-1**	**Lead**	8	**11**	
CLP	10/26/15	7471A	10/27/15	**7439-97-6**	**Mercury**	0.03	**0.04**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR23-S-3.0
SAMPLE

Lab Sample ID: AON0B
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Percent Total Solids: 82.3%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	10/22/15	6010C	10/26/15	7440-38-2	Arsenic	6	6	U
3050B	10/22/15	6010C	10/26/15	7440-43-9	Cadmium	0.2	0.2	U
3050B	10/22/15	6010C	10/26/15	**7440-47-3**	**Chromium**	0.6	**35.5**	
3050B	10/22/15	6010C	10/26/15	**7439-92-1**	**Lead**	2	**3**	
CLP	10/26/15	7471A	10/27/15	7439-97-6	Mercury	0.02	0.02	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR22-S-3.0
SAMPLE

Lab Sample ID: AON0C
LIMS ID: 15-19094
Matrix: Soil
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Percent Total Solids: 84.3%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	10/22/15	6010C	10/27/15	7440-38-2	Arsenic	10	10	U
3050B	10/22/15	6010C	10/27/15	7440-43-9	Cadmium	0.6	0.6	U
3050B	10/22/15	6010C	10/27/15	**7440-47-3**	**Chromium**	1	**37**	
3050B	10/22/15	6010C	10/27/15	7439-92-1	Lead	6	6	U
CLP	10/26/15	7471A	10/27/15	**7439-97-6**	**Mercury**	0.02	**0.09**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR23-GW-6.0
SAMPLE

Lab Sample ID: AON0D
LIMS ID: 15-19095
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
3010A	10/20/15	6010C	10/26/15	7440-38-2	Arsenic	0.05	0.05	U
3010A	10/20/15	6010C	10/26/15	7440-43-9	Cadmium	0.002	0.002	U
3010A	10/20/15	6010C	10/26/15	**7440-47-3**	**Chromium**	0.005	**0.011**	
3010A	10/20/15	6010C	10/26/15	7439-92-1	Lead	0.02	0.02	U
7470A	10/21/15	7470A	10/21/15	7439-97-6	Mercury	0.0001	0.0001	U

U-Analyte undetected at given LOQ
LOQ-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR22-GW-9.0
SAMPLE

Lab Sample ID: AON0E
LIMS ID: 15-19096
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
3010A	10/20/15	6010C	10/26/15	7440-38-2	Arsenic	0.05	0.05	U
3010A	10/20/15	6010C	10/26/15	7440-43-9	Cadmium	0.002	0.002	U
3010A	10/20/15	6010C	10/26/15	**7440-47-3**	**Chromium**	0.005	**0.013**	
3010A	10/20/15	6010C	10/26/15	7439-92-1	Lead	0.02	0.02	U
7470A	10/21/15	7470A	10/21/15	**7439-97-6**	**Mercury**	0.0001	**0.0001**	

U-Analyte undetected at given LOQ
LOQ-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: CR23-GW-6.0
SAMPLE

Lab Sample ID: AON0F
LIMS ID: 15-19097
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
6010C	10/21/15	6010C	10/26/15	7440-38-2	Arsenic	0.05	0.05	U
6010C	10/21/15	6010C	10/26/15	7440-43-9	Cadmium	0.002	0.002	U
6010C	10/21/15	6010C	10/26/15	7440-47-3	Chromium	0.005	0.005	U
6010C	10/21/15	6010C	10/26/15	7439-92-1	Lead	0.02	0.02	U
7470A	10/21/15	7470A	10/21/15	7439-97-6	Mercury	0.0001	0.0001	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: CR22-GW-9.0
SAMPLE

Lab Sample ID: AON0G
LIMS ID: 15-19098
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
6010C	10/21/15	6010C	10/26/15	7440-38-2	Arsenic	0.05	0.05	U
6010C	10/21/15	6010C	10/26/15	7440-43-9	Cadmium	0.002	0.002	U
6010C	10/21/15	6010C	10/26/15	7440-47-3	Chromium	0.005	0.005	U
6010C	10/21/15	6010C	10/26/15	7439-92-1	Lead	0.02	0.02	U
7470A	10/21/15	7470A	10/21/15	7439-97-6	Mercury	0.0001	0.0001	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: Seep-01
DUPLICATE

Lab Sample ID: AON3H
LIMS ID: 15-19363
Matrix: Groundwater
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Mercury	7470A	0.0001 U	0.0001 U	0.0%	+/- 0.0001	L

Reported in mg/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: Seep-01
MATRIX SPIKE

Lab Sample ID: AON3H
LIMS ID: 15-19363
Matrix: Groundwater
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Mercury	7470A	0.0001 U	0.0010	0.001	100%	

Reported in mg/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: METHOD BLANK**

Lab Sample ID: AON3MB
LIMS ID: 15-19216
Matrix: Soil
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	10/22/15	6010C	10/26/15	7440-38-2	Arsenic	5	5	U
3050B	10/22/15	6010C	10/26/15	7440-43-9	Cadmium	0.2	0.2	U
3050B	10/22/15	6010C	10/26/15	7440-47-3	Chromium	0.5	0.5	U
3050B	10/22/15	6010C	10/26/15	7439-92-1	Lead	2	2	U
CLP	10/26/15	7471A	10/27/15	7439-97-6	Mercury	0.02	0.02	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: AON3LCS
LIMS ID: 15-19216
Matrix: Soil
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	6010C	213	200	106%	
Cadmium	6010C	51.7	50.0	103%	
Chromium	6010C	52.6	50.0	105%	
Lead	6010C	208	200	104%	
Mercury	7471A	0.52	0.50	104%	

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: AON3MB
LIMS ID: 15-19218
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
3010A	10/20/15	6010C	10/26/15	7440-38-2	Arsenic	0.05	0.05	U
3010A	10/20/15	6010C	10/26/15	7440-43-9	Cadmium	0.002	0.002	U
3010A	10/20/15	6010C	10/26/15	7440-47-3	Chromium	0.005	0.005	U
3010A	10/20/15	6010C	10/26/15	7439-92-1	Lead	0.02	0.02	U
7470A	10/21/15	7470A	10/21/15	7439-97-6	Mercury	0.0001	0.0001	U

U-Analyte undetected at given LOQ
LOQ-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: LAB CONTROL

Lab Sample ID: AON3LCS
LIMS ID: 15-19218
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	6010C	2.09	2.00	104%	
Cadmium	6010C	0.496	0.500	99.2%	
Chromium	6010C	0.531	0.500	106%	
Lead	6010C	2.04	2.00	102%	
Mercury	7470A	0.0020	0.0020	100%	

Reported in mg/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: AON3MB
LIMS ID: 15-19220
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
6010C	10/21/15	6010C	10/26/15	7440-38-2	Arsenic	0.05	0.05	U
6010C	10/21/15	6010C	10/26/15	7440-43-9	Cadmium	0.002	0.002	U
6010C	10/21/15	6010C	10/26/15	7440-47-3	Chromium	0.005	0.005	U
6010C	10/21/15	6010C	10/26/15	7439-92-1	Lead	0.02	0.02	U
7470A	10/21/15	7470A	10/21/15	7439-97-6	Mercury	0.0001	0.0001	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: LAB CONTROL

Lab Sample ID: AON3LCS
LIMS ID: 15-19220
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	6010C	2.15	2.00	108%	
Cadmium	6010C	0.531	0.500	106%	
Chromium	6010C	0.522	0.500	104%	
Lead	6010C	2.09	2.00	104%	
Mercury	7470A	0.0020	0.0020	100%	

Reported in mg/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: METHOD BLANK

Lab Sample ID: AON3MB
LIMS ID: 15-19363
Matrix: Groundwater
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
7470A	10/21/15	7470A	10/21/15	7439-97-6	Mercury	0.0001	0.0001	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: AON3LCS
LIMS ID: 15-19363
Matrix: Groundwater
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Mercury	7470A	0.0020	0.0020	100%	

Reported in mg/L

N-Control limit not met
Control Limits: 80-120%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

20 November 2015

Madi Novak
Maul, Foster and Alongi, Inc
2001 NW 19th Avenue
Suite 200
Portland, OR 97209

RE: Project: Seaport Landing
ARI Job No.: AON1

Dear Madi:

Please find enclosed the original chain of custody records and the final results for the samples from the project referenced above. Twenty sediment samples were received on October 14, 2015. Fourteen samples were placed on hold as specified. The remaining samples were analyzed for SVOCs, dioxins/furans, PCBs, NWTPH-Dx, TOC and total and TCLP metals as requested.

A matrix spike (MS) and a matrix spike duplicate (MSD) were extracted and analyzed for SVOCs in conjunction with sample CR12-SBSD-15. The percent recoveries for 4-methylphenol and N-nitrosodiphenylamine and the RPD for N-nitrosodiphenylamine were not within control limits following the analyses of the MS/MSD. Since the percent recoveries for all compounds were within established QC limits for the corresponding LCS, it was concluded that the sample matrix was the cause of the MS/MSD failures. No corrective actions were taken.

An MS/MSD were extracted and analyzed for SIM-SVOCs in conjunction with sample CR12-SBSD-15. The percent recovery for N-nitrosodiphenylamine was not within control limits following the analysis of the MSD. The percent RPD for N-nitrosodiphenylamine was not within control limits following the analyses of the MS/MSD. Since the percent recovery for N-nitrosodiphenylamine was within established QC limits for the corresponding LCS, it was concluded that the sample matrix was the cause of the MS/MSD failures. No corrective actions were taken.

The percent differences (%Ds) for pentachlorophenol and the surrogate, d14-p-terphenyl, were not within control limits for the CCAL that bracketed the 11/5/15 SIM-SVOC analyses of these samples. All positive results for these compounds have been flagged with a "Q" qualifier to denote the high %Ds.

An MS was prepared and analyzed for total metals in conjunction with sample CR-24-SSD-COMP. The percent recovery for zinc was not within control limits following the analysis of the MS. Since the percent recovery for zinc was within acceptable QC limits for the corresponding LCS, it was concluded that the sample matrix was the cause of the MS failure. No corrective actions were taken.

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Novak, Maul, Foster and Alongi, Inc.
Seaport Landing
Sediment
AON1

20 November 2015

A matrix duplicate (MD) was prepared and analyzed for total metals in conjunction with the analysis of sample CR-24-SSD-COMP. The RPD for lead was high following the analysis of the MD. Since the percent recovery for lead was within acceptable QC limits for the corresponding LCS, it was concluded that a lack of sample homogeneity was the cause of the high RPD. No corrective actions were taken

All samples were initially prepared and analyzed for total mercury on 10/23/15. The percent recovery for mercury was not within control limits following the analysis of the LCS associated with these samples. All samples were re-prepared and re-analyzed on 10/27/15. The re-analyses proceeded without incident of note. The results for the re-analyses only have been submitted for total mercury.

The remaining analyses proceeded without incident of note.

An electronic copy of this package will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

cc: file AON1

Enclosures

MDH/mdh

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: AON 1	Turn-around Requested: Standard	Page: 1 of 5	
ARI Client Company: MFA	Phone: 5035015212	Date:	Ice Present?
Client Contact: Madi Novak		No. of Coolers:	Cooler Temps:
Client Project Name: Seapo-t Landing			
Client Project #: 1044.02.01-02	Samplers: JJP/MRM/RD		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: TCLP Pb and Hg	Cstd TPH	metals	PAH	PCB	SVOCs	TOC	ARCHIVE	Notes/Comments: Mercury
CR11-14-SBSD-COMP	10/13/15	1030	sed	2	X							X	
LS05	10/13/15	0839	sed	1								X	
LS08	10/13/15	0905	sed	1								X	
LS06	10/13/15	0855	sed	1								X	
LS07	10/13/15	0915	sed	1								X	
CR-24-SD-COMP	10/13/15	0918	sed	3 4		X	X	X	X	X	X	X	X
LS01	10/13/15	0928	sed	1								X	
LS02	10/13/15	0938	sed	1								X	
LS03	10/13/15	0945	sed	1								X	
LS04	10/13/15	0955	sed	1								X	

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Roxanne Degens	Printed Name: Archie Gross	Printed Name:	Printed Name: Emily Litwin
	Company: MFA	Company: M.C. Dec	Company:	Company: ARI
	Date & Time: 10/14/15 1020	Date & Time: 10/14/15 10:20 (A)	Date & Time:	Date & Time: 10/14/15 1235

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: A0N1	Turn-around Requested: Standard	Page: 2 of 5	
ARI Client Company: MFA	Phone:	Date: 10/13	Ice Present?
Client Contact: Madi Novak		No. of Coolers:	Cooler Temps:
Client Project Name: Seapt Landing			
Client Project #: 1044.02.01-02	Samplers: JJP-MRM-RD		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	SVOAs	PCBs	Mercury	metals	PAHs	TOC	Archive	TPH-Dx	Notes/Comments: Dioxin/Furan	Notes/Comments: TCLP lead + Hg
BA07-0-10cm	10/13	1122	Sed	1							X			
BA07-10cm-1	10/13	1118	Sed	1							X			
BA07-1-2	10/13	1120	Sed	1							X			
BA08-0-10cm	10/13	~~1150~~ 1125	Sed	1							X			
BA08-10cm-1	10/13	1130	Sed	1							X			
BA08-1-2	10/13	1135	Sed	1							X			
CR11-SBSD-23	10/13	1015	Sed	3	X	X	X	X	X	X	X	X	X	
CR12-SBSD-15	10/13	900	Sed	3	X	X	X	X	X	X	X			
CR13-SBSD-11	10/13	950	Sed	3	X	X	X	X	X	X	X			
CR14-SBSD-12	10/13	745	Sed	5	X	X	X	X	X	X	X			

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Roxanne Degen	Printed Name: Archie Dizon	Printed Name:	Printed Name: Emily Litwin
	Company: MFA	Company: M.C. DEC	Company:	Company: ARI
	Date & Time: 10/14/15 1020	Date & Time: 10/14/15 10:20	Date & Time:	Date & Time: 10/14/15 1235

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Maul Foster

COC No(s): _____ (NA)

Assigned ARI Job No: AON1

Project Name: _____

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry): 5.2 4.3 6.8 5.0 4.1

Time: _____

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D002565

Cooler Accepted by: ul Date: 10/14/15 Time: 1235

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ... Bubble Wrap (Wet Ice) Gel Packs (Baggies) (Foam Block) Paper Other: _____			
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		YES	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	(NA)	YES	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	(NA)		

Was Sample Split by ARI : (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

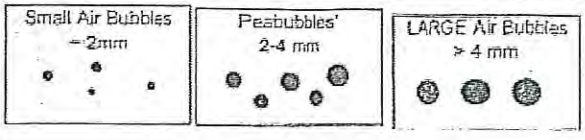
Samples Logged by: ul Date: 10/15/15 Time: 1055

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:



Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: AON1
Client: Maul Foster & Alongi
Project Event: 1044.02.01-02
Project Name: Seaport Landing

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	CR11-14-SBSD-COMP	AON1A	15-19052	Sediment	10/13/15 10:30	10/14/15 12:35
2.	LSO5	AON1B	15-19053	Sediment	10/13/15 08:39	10/14/15 12:35
3.	LSO8	AON1C	15-19054	Sediment	10/13/15 09:05	10/14/15 12:35
4.	LSO6	AON1D	15-19055	Sediment	10/13/15 08:55	10/14/15 12:35
5.	LSO7	AON1E	15-19056	Sediment	10/13/15 09:15	10/14/15 12:35
6.	CR-24-SSD-COMP	AON1F	15-19057	Sediment	10/13/15 09:18	10/14/15 12:35
7.	LSO1	AON1G	15-19058	Sediment	10/13/15 09:28	10/14/15 12:35
8.	LSO2	AON1H	15-19059	Sediment	10/13/15 09:38	10/14/15 12:35
9.	LSO3	AON1I	15-19060	Sediment	10/13/15 09:45	10/14/15 12:35
10.	LSO4	AON1J	15-19061	Sediment	10/13/15 09:55	10/14/15 12:35
11.	BAO7-0-10CM	AON1K	15-19062	Sediment	10/13/15 11:22	10/14/15 12:35
12.	BAO7-10CM-1	AON1L	15-19063	Sediment	10/13/15 11:18	10/14/15 12:35
13.	BAO7-1-2	AON1M	15-19064	Sediment	10/13/15 11:20	10/14/15 12:35
14.	BAO8-0-10CM	AON1N	15-19065	Sediment	10/13/15 11:25	10/14/15 12:35
15.	BAO8-10CM-1	AON1O	15-19066	Sediment	10/13/15 11:30	10/14/15 12:35
16.	BAO8-1-2	AON1P	15-19067	Sediment	10/13/15 11:35	10/14/15 12:35
17.	CR11-SBSD-23	AON1Q	15-19068	Sediment	10/13/15 10:15	10/14/15 12:35
18.	CR12-SBSD-15	AON1R	15-19069	Sediment	10/13/15 09:00	10/14/15 12:35
19.	CR13-SBSD-11	AON1S	15-19070	Sediment	10/13/15 09:50	10/14/15 12:35
20.	CR14-SBSD-12	AON1T	15-19071	Sediment	10/13/15 07:45	10/14/15 12:35

AON1 : 00006

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

AON1 : 00007

Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for
NR	Spiked compound recovery is not reported due to chromatographic interference
NS	The flagged analyte was not spiked into the sample
M	Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
Y	The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
EMPC	Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**
C	The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
P	The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference
X	Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**
Z	Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

AON1 : 00008

Geotechnical Data

A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F Samples were frozen prior to particle size determination

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighting

AON1 : 00009

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: MB-102315
METHOD BLANK

Lab Sample ID: MB-102315
LIMS ID: 15-19069
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/10/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 11/05/15 14:41
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	20	< 20 U
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	4-Methylphenol	20	< 20 U
105-67-9	2,4-Dimethylphenol	100	< 100 U
65-85-0	Benzoic Acid	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	Naphthalene	20	< 20 U
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	< 20 U
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	Acenaphthylene	20	< 20 U
83-32-9	Acenaphthene	20	< 20 U
132-64-9	Dibenzofuran	20	< 20 U
84-66-2	Diethylphthalate	20	< 20 U
86-73-7	Fluorene	20	< 20 U
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	100	< 100 U
85-01-8	Phenanthrene	20	< 20 U
120-12-7	Anthracene	20	< 20 U
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	Fluoranthene	20	< 20 U
129-00-0	Pyrene	20	< 20 U
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	Benzo(a)anthracene	20	< 20 U
117-81-7	bis(2-Ethylhexyl)phthalate	50	< 50 U
218-01-9	Chrysene	20	< 20 U
117-84-0	Di-n-Octyl phthalate	20	< 20 U
50-32-8	Benzo(a)pyrene	20	< 20 U
193-39-5	Indeno(1,2,3-cd)pyrene	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	20	< 20 U
90-12-0	1-Methylnaphthalene	20	< 20 U
TOTBFA	Total Benzofluoranthenes	40	< 40 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: MB-102315
METHOD BLANK

Lab Sample ID: MB-102315
LIMS ID: 15-19069
Matrix: Sediment
Date Analyzed: 11/05/15 14:41

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	75.8%	2-Fluorobiphenyl	75.8%
d14-p-Terphenyl	104%	d4-1,2-Dichlorobenzene	77.4%
d5-Phenol	72.9%	2-Fluorophenol	68.9%
2,4,6-Tribromophenol	74.7%	d4-2-Chlorophenol	76.5%

AON1 : 00011

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR-24-SSD-COMP
SAMPLE

Lab Sample ID: AON1F
LIMS ID: 15-19057
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/10/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/05/15 15:53
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.48 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 47.6%

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	19	100
106-46-7	1,4-Dichlorobenzene	19	< 19 U
100-51-6	Benzyl Alcohol	19	< 19 U
95-50-1	1,2-Dichlorobenzene	19	< 19 U
95-48-7	2-Methylphenol	19	< 19 U
106-44-5	4-Methylphenol	19	120
105-67-9	2,4-Dimethylphenol	95	< 95 U
65-85-0	Benzoic Acid	190	680
120-82-1	1,2,4-Trichlorobenzene	19	< 19 U
91-20-3	Naphthalene	19	120
87-68-3	Hexachlorobutadiene	19	< 19 U
91-57-6	2-Methylnaphthalene	19	< 19 U
131-11-3	Dimethylphthalate	19	25
208-96-8	Acenaphthylene	19	19
83-32-9	Acenaphthene	19	25
132-64-9	Dibenzofuran	19	47
84-66-2	Diethylphthalate	19	< 19 U
86-73-7	Fluorene	19	29
86-30-6	N-Nitrosodiphenylamine	19	< 19 U
118-74-1	Hexachlorobenzene	19	< 19 U
87-86-5	Pentachlorophenol	95	69 J
85-01-8	Phenanthrene	19	160
120-12-7	Anthracene	19	65
84-74-2	Di-n-Butylphthalate	19	130
206-44-0	Fluoranthene	19	380
129-00-0	Pyrene	19	300
85-68-7	Butylbenzylphthalate	19	< 19 U
56-55-3	Benzo(a)anthracene	19	120
117-81-7	bis(2-Ethylhexyl)phthalate	48	66
218-01-9	Chrysene	19	160
117-84-0	Di-n-Octyl phthalate	19	< 19 U
50-32-8	Benzo(a)pyrene	19	84
193-39-5	Indeno(1,2,3-cd)pyrene	19	54
53-70-3	Dibenz(a,h)anthracene	19	19
191-24-2	Benzo(g,h,i)perylene	19	56
90-12-0	1-Methylnaphthalene	19	16 J
TOTBFA	Total Benzofluoranthenes	38	230

AON1 : 00012

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR-24-SSD-COMP SAMPLE

Lab Sample ID: AON1F
LIMS ID: 15-19057
Matrix: Sediment
Date Analyzed: 11/05/15 15:53

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing 1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	59.6%	2-Fluorobiphenyl	66.2%
d14-p-Terphenyl	80.0%	d4-1,2-Dichlorobenzene	53.4%
d5-Phenol	58.7%	2-Fluorophenol	52.5%
2,4,6-Tribromophenol	82.9%	d4-2-Chlorophenol	61.7%

AON1:00013

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR11-SBSD-23
SAMPLE

Lab Sample ID: AON1Q
LIMS ID: 15-19068
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/10/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/05/15 16:29
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.69 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 28.8%

CAS Number	Analyte	LOQ	Result
108-95-2	**Phenol**	**19**	**8.4 J**
106-46-7	1,4-Dichlorobenzene	19	< 19 U
100-51-6	Benzyl Alcohol	19	< 19 U
95-50-1	1,2-Dichlorobenzene	19	< 19 U
95-48-7	2-Methylphenol	19	< 19 U
106-44-5	4-Methylphenol	19	< 19 U
105-67-9	2,4-Dimethylphenol	94	< 94 U
65-85-0	Benzoic Acid	190	< 190 U
120-82-1	1,2,4-Trichlorobenzene	19	< 19 U
91-20-3	Naphthalene	19	< 19 U
87-68-3	Hexachlorobutadiene	19	< 19 U
91-57-6	2-Methylnaphthalene	19	< 19 U
131-11-3	Dimethylphthalate	19	< 19 U
208-96-8	Acenaphthylene	19	< 19 U
83-32-9	Acenaphthene	19	< 19 U
132-64-9	Dibenzofuran	19	< 19 U
84-66-2	Diethylphthalate	19	< 19 U
86-73-7	Fluorene	19	< 19 U
86-30-6	N-Nitrosodiphenylamine	19	< 19 U
118-74-1	Hexachlorobenzene	19	< 19 U
87-86-5	Pentachlorophenol	94	< 94 U
85-01-8	**Phenanthrene**	**19**	**19**
120-12-7	Anthracene	19	< 19 U
84-74-2	Di-n-Butylphthalate	19	< 19 U
206-44-0	**Fluoranthene**	**19**	**24**
129-00-0	**Pyrene**	**19**	**23**
85-68-7	Butylbenzylphthalate	19	< 19 U
56-55-3	**Benzo(a)anthracene**	**19**	**11 J**
117-81-7	bis(2-Ethylhexyl)phthalate	47	< 47 U
218-01-9	**Chrysene**	**19**	**12 J**
117-84-0	Di-n-Octyl phthalate	19	< 19 U
50-32-8	Benzo(a)pyrene	19	< 19 U
193-39-5	Indeno(1,2,3-cd)pyrene	19	< 19 U
53-70-3	Dibenz(a,h)anthracene	19	< 19 U
191-24-2	Benzo(g,h,i)perylene	19	< 19 U
90-12-0	1-Methylnaphthalene	19	< 19 U
TOTBFA	**Total Benzofluoranthenes**	**37**	**16 J**

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR11-SBSD-23
SAMPLE

Lab Sample ID: AON1Q
LIMS ID: 15-19068
Matrix: Sediment
Date Analyzed: 11/05/15 16:29

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	55.0%	2-Fluorobiphenyl	59.4%
d14-p-Terphenyl	78.4%	d4-1,2-Dichlorobenzene	56.4%
d5-Phenol	61.1%	2-Fluorophenol	59.1%
2,4,6-Tribromophenol	76.8%	d4-2-Chlorophenol	64.5%

AON1 : 00015

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR12-SBSD-15
SAMPLE

Lab Sample ID: AON1R
LIMS ID: 15-19069
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/10/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/05/15 17:05
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.20 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 43.4%

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	20	64
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	26
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	4-Methylphenol	20	870
105-67-9	2,4-Dimethylphenol	98	< 98 U
65-85-0	Benzoic Acid	200	440
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	Naphthalene	20	370
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	41
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	Acenaphthylene	20	110
83-32-9	Acenaphthene	20	41
132-64-9	Dibenzofuran	20	40
84-66-2	Diethylphthalate	20	< 20 U
86-73-7	Fluorene	20	47
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	98	< 98 U
85-01-8	Phenanthrene	20	210
120-12-7	Anthracene	20	41
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	Fluoranthene	20	150
129-00-0	Pyrene	20	150
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	Benzo(a)anthracene	20	30
117-81-7	bis(2-Ethylhexyl)phthalate	49	< 49 U
218-01-9	Chrysene	20	43
117-84-0	Di-n-Octyl phthalate	20	< 20 U
50-32-8	Benzo(a)pyrene	20	< 20 U
193-39-5	Indeno(1,2,3-cd)pyrene	20	24
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	20	30
90-12-0	1-Methylnaphthalene	20	24
TOTBFA	Total Benzofluoranthenes	39	61

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR12-SBSD-15
SAMPLE

Lab Sample ID: AON1R
LIMS ID: 15-19069
Matrix: Sediment
Date Analyzed: 11/05/15 17:05

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	58.2%	2-Fluorobiphenyl	61.6%
d14-p-Terphenyl	76.8%	d4-1,2-Dichlorobenzene	53.0%
d5-Phenol	55.1%	2-Fluorophenol	51.2%
2,4,6-Tribromophenol	76.5%	d4-2-Chlorophenol	55.2%

AON1 : 00017

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 2

Sample ID: CR12-SBSD-15
MATRIX SPIKE

Lab Sample ID: AON1R
LIMS ID: 15-19069
Matrix: Sediment
Data Release Authorized:
Reported: 11/10/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/05/15 18:17
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.22 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 43.4%

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	20	---
106-46-7	1,4-Dichlorobenzene	20	---
100-51-6	Benzyl Alcohol	20	---
95-50-1	1,2-Dichlorobenzene	20	---
95-48-7	2-Methylphenol	20	---
106-44-5	4-Methylphenol	20	---
105-67-9	2,4-Dimethylphenol	98	---
65-85-0	Benzoic Acid	200	---
120-82-1	1,2,4-Trichlorobenzene	20	---
91-20-3	Naphthalene	20	---
87-68-3	Hexachlorobutadiene	20	---
91-57-6	2-Methylnaphthalene	20	---
131-11-3	Dimethylphthalate	20	---
208-96-8	Acenaphthylene	20	---
83-32-9	Acenaphthene	20	---
132-64-9	Dibenzofuran	20	---
84-66-2	Diethylphthalate	20	---
86-73-7	Fluorene	20	---
86-30-6	N-Nitrosodiphenylamine	20	---
118-74-1	Hexachlorobenzene	20	---
87-86-5	Pentachlorophenol	98	---
85-01-8	Phenanthrene	20	---
120-12-7	Anthracene	20	---
84-74-2	Di-n-Butylphthalate	20	---
206-44-0	Fluoranthene	20	---
129-00-0	Pyrene	20	---
85-68-7	Butylbenzylphthalate	20	---
56-55-3	Benzo(a)anthracene	20	---
117-81-7	bis(2-Ethylhexyl)phthalate	49	---
218-01-9	Chrysene	20	---
117-84-0	Di-n-Octyl phthalate	20	---
50-32-8	Benzo(a)pyrene	20	---
193-39-5	Indeno(1,2,3-cd)pyrene	20	---
53-70-3	Dibenz(a,h)anthracene	20	---
191-24-2	Benzo(g,h,i)perylene	20	---
90-12-0	1-Methylnaphthalene	20	---
TOTBFA	Total Benzofluoranthenes	39	---

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR12-SBSD-15
MATRIX SPIKE

Lab Sample ID: AON1R
LIMS ID: 15-19069
Matrix: Sediment
Date Analyzed: 11/05/15 18:17

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	64.4%	2-Fluorobiphenyl	63.2%
d14-p-Terphenyl	78.6%	d4-1,2-Dichlorobenzene	60.6%
d5-Phenol	64.4%	2-Fluorophenol	61.7%
2,4,6-Tribromophenol	76.3%	d4-2-Chlorophenol	64.5%

AON1 : 00019

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR12-SBSD-15
MATRIX SPIKE DUPLICATE

Lab Sample ID: AON1R
LIMS ID: 15-19069
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/10/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/05/15 17:41
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.20 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 43.4%

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	20	---
106-46-7	1,4-Dichlorobenzene	20	---
100-51-6	Benzyl Alcohol	20	---
95-50-1	1,2-Dichlorobenzene	20	---
95-48-7	2-Methylphenol	20	---
106-44-5	4-Methylphenol	20	---
105-67-9	2,4-Dimethylphenol	98	---
65-85-0	Benzoic Acid	200	---
120-82-1	1,2,4-Trichlorobenzene	20	---
91-20-3	Naphthalene	20	---
87-68-3	Hexachlorobutadiene	20	---
91-57-6	2-Methylnaphthalene	20	---
131-11-3	Dimethylphthalate	20	---
208-96-8	Acenaphthylene	20	---
83-32-9	Acenaphthene	20	---
132-64-9	Dibenzofuran	20	---
84-66-2	Diethylphthalate	20	---
86-73-7	Fluorene	20	---
86-30-6	N-Nitrosodiphenylamine	20	---
118-74-1	Hexachlorobenzene	20	---
87-86-5	Pentachlorophenol	98	---
85-01-8	Phenanthrene	20	---
120-12-7	Anthracene	20	---
84-74-2	Di-n-Butylphthalate	20	---
206-44-0	Fluoranthene	20	---
129-00-0	Pyrene	20	---
85-68-7	Butylbenzylphthalate	20	---
56-55-3	Benzo(a)anthracene	20	---
117-81-7	bis(2-Ethylhexyl)phthalate	49	---
218-01-9	Chrysene	20	---
117-84-0	Di-n-Octyl phthalate	20	---
50-32-8	Benzo(a)pyrene	20	---
193-39-5	Indeno(1,2,3-cd)pyrene	20	---
53-70-3	Dibenz(a,h)anthracene	20	---
191-24-2	Benzo(g,h,i)perylene	20	---
90-12-0	1-Methylnaphthalene	20	---
TOTBFA	Total Benzofluoranthenes	39	---

AON1 : 00020

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR12-SBSD-15
MATRIX SPIKE DUPLICATE

Lab Sample ID: AON1R
LIMS ID: 15-19069
Matrix: Sediment
Date Analyzed: 11/05/15 17:41

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	67.4%	2-Fluorobiphenyl	67.2%
d14-p-Terphenyl	82.0%	d4-1,2-Dichlorobenzene	64.8%
d5-Phenol	70.8%	2-Fluorophenol	63.9%
2,4,6-Tribromophenol	82.9%	d4-2-Chlorophenol	70.8%

AON1 : 00021

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR13-SBSD-11
SAMPLE

Lab Sample ID: AON1S
LIMS ID: 15-19070
Matrix: Sediment
Data Release Authorized:
Reported: 11/10/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/05/15 18:53
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.25 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 43.2%

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	20	44
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	43
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	4-Methylphenol	20	150
105-67-9	2,4-Dimethylphenol	98	< 98 U
65-85-0	Benzoic Acid	200	260
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	Naphthalene	20	300
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	< 20 U
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	Acenaphthylene	20	110
83-32-9	Acenaphthene	20	31
132-64-9	Dibenzofuran	20	< 20 U
84-66-2	Diethylphthalate	20	< 20 U
86-73-7	Fluorene	20	35
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	98	< 98 U
85-01-8	Phenanthrene	20	150
120-12-7	Anthracene	20	28
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	Fluoranthene	20	100
129-00-0	Pyrene	20	110
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	Benzo(a)anthracene	20	20
117-81-7	bis(2-Ethylhexyl)phthalate	49	< 49 U
218-01-9	Chrysene	20	29
117-84-0	Di-n-Octyl phthalate	20	< 20 U
50-32-8	Benzo(a)pyrene	20	< 20 U
193-39-5	Indeno(1,2,3-cd)pyrene	20	18 J
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	20	30
90-12-0	1-Methylnaphthalene	20	22
TOTBFA	Total Benzofluoranthenes	39	40

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR13-SBSD-11
SAMPLE

Lab Sample ID: AON1S
LIMS ID: 15-19070
Matrix: Sediment
Date Analyzed: 11/05/15 18:53

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	54.2%	2-Fluorobiphenyl	59.4%
d14-p-Terphenyl	77.2%	d4-1,2-Dichlorobenzene	55.4%
d5-Phenol	56.0%	2-Fluorophenol	49.3%
2,4,6-Tribromophenol	74.9%	d4-2-Chlorophenol	59.7%

AON1 : 00023

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR14-SBSD-12
SAMPLE

Lab Sample ID: AON1T
LIMS ID: 15-19071
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/10/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/05/15 19:29
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.26 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 43.0%

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	20	50
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	39
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	4-Methylphenol	20	130
105-67-9	2,4-Dimethylphenol	98	< 98 U
65-85-0	Benzoic Acid	200	200
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	Naphthalene	20	190
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	21
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	Acenaphthylene	20	61
83-32-9	Acenaphthene	20	20
132-64-9	Dibenzofuran	20	20
84-66-2	Diethylphthalate	20	< 20 U
86-73-7	Fluorene	20	23
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	98	< 98 U
85-01-8	Phenanthrene	20	120
120-12-7	Anthracene	20	18 J
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	Fluoranthene	20	88
129-00-0	Pyrene	20	87
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	Benzo(a)anthracene	20	17 J
117-81-7	bis(2-Ethylhexyl)phthalate	49	< 49 U
218-01-9	Chrysene	20	25
117-84-0	Di-n-Octyl phthalate	20	< 20 U
50-32-8	Benzo(a)pyrene	20	< 20 U
193-39-5	Indeno(1,2,3-cd)pyrene	20	15 J
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	20	20
90-12-0	1-Methylnaphthalene	20	16 J
TOTBFA	Total Benzofluoranthenes	39	39

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR14-SBSD-12
SAMPLE

Lab Sample ID: AON1T
LIMS ID: 15-19071
Matrix: Sediment
Date Analyzed: 11/05/15 19:29

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	44.4%	2-Fluorobiphenyl	47.6%
d14-p-Terphenyl	58.6%	d4-1,2-Dichlorobenzene	41.8%
d5-Phenol	45.2%	2-Fluorophenol	40.1%
2,4,6-Tribromophenol	58.7%	d4-2-Chlorophenol	46.3%

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT OUT
CR-24-SSD-COMP	59.6%	66.2%	80.0%	53.4%	58.7%	52.5%	82.9%	61.7%	0
CR11-SBSD-23	55.0%	59.4%	78.4%	56.4%	61.1%	59.1%	76.8%	64.5%	0
MB-102315	75.8%	75.8%	104%	77.4%	72.9%	68.9%	74.7%	76.5%	0
LCS-102315	65.2%	64.6%	79.4%	53.8%	66.7%	59.7%	68.0%	62.9%	0
CR12-SBSD-15	58.2%	61.6%	76.8%	53.0%	55.1%	51.2%	76.5%	55.2%	0
CR12-SBSD-15 MS	64.4%	63.2%	78.6%	60.6%	64.4%	61.7%	76.3%	64.5%	0
CR12-SBSD-15 MSD	67.4%	67.2%	82.0%	64.8%	70.8%	63.9%	82.9%	70.8%	0
CR13-SBSD-11	54.2%	59.4%	77.2%	55.4%	56.0%	49.3%	74.9%	59.7%	0
CR14-SBSD-12	44.4%	47.6%	58.6%	41.8%	45.2%	40.1%	58.7%	46.3%	0

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(30-120)	(30-120)
(FBP) = 2-Fluorobiphenyl	(35-120)	(35-120)
(TPH) = d14-p-Terphenyl	(37-120)	(37-120)
(DCB) = d4-1,2-Dichlorobenzene	(32-120)	(32-120)
(PHL) = d5-Phenol	(29-120)	(29-120)
(2FP) = 2-Fluorophenol	(27-120)	(27-120)
(TBP) = 2,4,6-Tribromophenol	(24-134)	(24-134)
(2CP) = d4-2-Chlorophenol	(31-120)	(31-120)

Prep Method: SW3546
Log Number Range: 15-19057 to 15-19071

FORM-II SW8270

AON1 : 00026

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270 GC/MS

Sample ID: CR12-SBSD-15
MS/MSD

Lab Sample ID: AON1R
LIMS ID: 15-19069
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/10/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted MS/MSD: 10/23/15

Date Analyzed MS: 11/05/15 18:17
MSD: 11/05/15 17:41
Instrument/Analyst MS: NT10/YZ
MSD: NT10/YZ
GPC Cleanup: Yes

Sample Amount MS: 10.22 g-dry-wt
MSD: 10.20 g-dry-wt
Final Extract Volume MS: 1.0 mL
MSD: 1.0 mL
Dilution Factor MS: 1.00
MSD: 1.00
Percent Moisture: 43.4 %

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Phenol	64	388	489	66.3%	417	490	72.0%	7.2%
1,4-Dichlorobenzene	< 20 U	307	489	62.8%	339	490	69.2%	9.9%
Benzyl Alcohol	26	391	489	74.6%	425	490	81.4%	8.3%
1,2-Dichlorobenzene	< 20 U	325	489	66.5%	341	490	69.6%	4.8%
2-Methylphenol	< 20 U	341	489	69.7%	376	490	76.7%	9.8%
4-Methylphenol	870	1660	489	162%	1550	490	139%	6.9%
2,4-Dimethylphenol	< 98 U	1080	1470	73.5%	1150	1470	78.2%	6.3%
Benzoic Acid	440	2510	2690	77.0%	2700	2700	83.7%	7.3%
1,2,4-Trichlorobenzene	< 20 U	323	489	66.1%	339	490	69.2%	4.8%
Naphthalene	370	712	489	69.9%	775	490	82.7%	8.5%
Hexachlorobutadiene	< 20 U	347	489	71.0%	365	490	74.5%	5.1%
2-Methylnaphthalene	41	395	489	72.4%	413	490	75.9%	4.5%
Dimethylphthalate	< 20 U	341	489	69.7%	357	490	72.9%	4.6%
Acenaphthylene	110	451	489	69.7%	485	490	76.5%	7.3%
Acenaphthene	41	401	489	73.6%	415	490	76.3%	3.4%
Dibenzofuran	40	381	489	69.7%	403	490	74.1%	5.6%
Diethylphthalate	< 20 U	356	489	72.8%	379	490	77.3%	6.3%
Fluorene	47	370	489	66.1%	389	490	69.8%	5.0%
N-Nitrosodiphenylamine	< 20 U	120	489	24.5%	59.8	490	12.2%	67.0%
Hexachlorobenzene	< 20 U	308	489	63.0%	309	490	63.1%	0.3%
Pentachlorophenol	< 98 U	977	1470	66.5%	1040	1470	70.7%	6.2%
Phenanthrene	210	546	489	68.7%	552	490	69.8%	1.1%
Anthracene	41	370	489	67.3%	385	490	70.2%	4.0%
Di-n-Butylphthalate	< 20 U	363	489	74.2%	369	490	75.3%	1.6%
Fluoranthene	150	441	489	59.5%	467	490	64.7%	5.7%
Pyrene	150	427	489	56.6%	441	490	59.4%	3.2%
Butylbenzylphthalate	< 20 U	343	489	70.1%	366	490	74.7%	6.5%
Benzo(a)anthracene	30	345	489	64.4%	356	490	66.5%	3.1%
bis(2-Ethylhexyl)phthalate	< 49 U	376	489	76.9%	356	490	72.7%	5.5%
Chrysene	43	350	489	62.8%	363	490	65.3%	3.6%
Di-n-Octyl phthalate	< 20 U	315	489	64.4%	318	490	64.9%	0.9%
Benzo(a)pyrene	< 20 U	316	489	64.6%	344	490	70.2%	8.5%
Indeno(1,2,3-cd)pyrene	24	313	489	59.1%	331	490	62.7%	5.6%
Dibenz(a,h)anthracene	< 20 U	306	489	62.6%	325	490	66.3%	6.0%
Benzo(g,h,i)perylene	30	283	489	51.7%	300	490	55.1%	5.8%
1-Methylnaphthalene	24	350	489	66.7%	360	490	68.6%	2.8%
Total Benzofluoranthenes	61	681	978	63.4%	725	980	67.8%	6.3%

Reported in µg/kg (ppb)
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270 GC/MS

Sample ID: LCS-102315
LAB CONTROL

Lab Sample ID: LCS-102315
LIMS ID: 15-19069
Matrix: Sediment
Data Release Authorized:
Reported: 11/10/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/05/15 15:17
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Phenol	309	500	61.8%
1,4-Dichlorobenzene	273	500	54.6%
Benzyl Alcohol	302	500	60.4%
1,2-Dichlorobenzene	286	500	57.2%
2-Methylphenol	300	500	60.0%
4-Methylphenol	334	500	66.8%
2,4-Dimethylphenol	875	1500	58.3%
Benzoic Acid	1860	2750	67.6%
1,2,4-Trichlorobenzene	285	500	57.0%
Naphthalene	291	500	58.2%
Hexachlorobutadiene	298	500	59.6%
2-Methylnaphthalene	305	500	61.0%
Dimethylphthalate	324	500	64.8%
Acenaphthylene	306	500	61.2%
Acenaphthene	321	500	64.2%
Dibenzofuran	310	500	62.0%
Diethylphthalate	344	500	68.8%
Fluorene	309	500	61.8%
N-Nitrosodiphenylamine	298	500	59.6%
Hexachlorobenzene	282	500	56.4%
Pentachlorophenol	805	1500	53.7%
Phenanthrene	307	500	61.4%
Anthracene	308	500	61.6%
Di-n-Butylphthalate	331	500	66.2%
Fluoranthene	292	500	58.4%
Pyrene	293	500	58.6%
Butylbenzylphthalate	329	500	65.8%
Benzo(a)anthracene	323	500	64.6%
bis(2-Ethylhexyl)phthalate	312	500	62.4%
Chrysene	310	500	62.0%
Di-n-Octyl phthalate	278	500	55.6%
Benzo(a)pyrene	310	500	62.0%
Indeno(1,2,3-cd)pyrene	341	500	68.2%
Dibenz(a,h)anthracene	347	500	69.4%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270 GC/MS

Sample ID: LCS-102315
LAB CONTROL

Lab Sample ID: LCS-102315
LIMS ID: 15-19069
Matrix: Sediment
Date Analyzed: 11/05/15 15:17

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Analyte	Lab Control	Spike Added	Recovery
Benzo(g,h,i)perylene	281	500	56.2%
1-Methylnaphthalene	277	500	55.4%
Total Benzofluoranthenes	686	1000	68.6%

Semivolatile Surrogate Recovery	
d5-Nitrobenzene	65.2%
2-Fluorobiphenyl	64.6%
d14-p-Terphenyl	79.4%
d4-1,2-Dichlorobenzene	53.8%
d5-Phenol	66.7%
2-Fluorophenol	59.7%
2,4,6-Tribromophenol	68.0%
d4-2-Chlorophenol	62.9%

Reported in µg/kg (ppb)

AON1 : 00029

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: MB-102315**
Extraction Method: SW3546 **METHOD BLANK**

Lab Sample ID: MB-102315
LIMS ID: 15-19069
Matrix: Sediment
Data Release Authorized:
Reported: 11/12/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 11/05/15 14:41
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	Dibenz(a,h)anthracene	5.0	< 5.0 U
106-46-7	1,4-Dichlorobenzene	5.0	< 5.0 U
120-82-1	1,2,4-Trichlorobenzene	5.0	< 5.0 U
118-74-1	Hexachlorobenzene	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	5.0	< 5.0 U
131-11-3	Dimethylphthalate	5.0	< 5.0 U
85-68-7	Butylbenzylphthalate	5.0	< 5.0 U
95-48-7	2-Methylphenol	5.0	< 5.0 U
105-67-9	2,4-Dimethylphenol	25	< 25 U
86-30-6	N-Nitrosodiphenylamine	5.0	< 5.0 U
100-51-6	Benzyl Alcohol	20	< 20 U
87-86-5	Pentachlorophenol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	5.0	< 5.0 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	64.3%
d14-p-Terphenyl	83.6% Q

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR-24-SSD-COMP**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AON1F
LIMS ID: 15-19057
Matrix: Sediment
Data Release Authorized:
Reported: 11/12/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/05/15 15:53
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.48 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 47.6%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**4.8**	**19**
106-46-7	1,4-Dichlorobenzene	4.8	< 4.8 U
120-82-1	1,2,4-Trichlorobenzene	4.8	< 4.8 U
118-74-1	Hexachlorobenzene	4.8	< 4.8 U
87-68-3	Hexachlorobutadiene	4.8	< 4.8 U
131-11-3	Dimethylphthalate	4.8	< 4.8 U
85-68-7	Butylbenzylphthalate	4.8	< 4.8 U
95-48-7	**2-Methylphenol**	**4.8**	**8.4**
105-67-9	2,4-Dimethylphenol	24	< 24 U
86-30-6	N-Nitrosodiphenylamine	4.8	< 4.8 U
100-51-6	Benzyl Alcohol	19	< 19 U
87-86-5	**Pentachlorophenol**	**19**	**86 Q**
95-50-1	1,2-Dichlorobenzene	4.8	< 4.8 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	49.9%
d14-p-Terphenyl	64.8% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR11-SBSD-23**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AON1Q
LIMS ID: 15-19068
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/12/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/05/15 16:29
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.69 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 28.8%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	Dibenz(a,h)anthracene	4.7	< 4.7 U
106-46-7	1,4-Dichlorobenzene	4.7	< 4.7 U
120-82-1	1,2,4-Trichlorobenzene	4.7	< 4.7 U
118-74-1	Hexachlorobenzene	4.7	< 4.7 U
87-68-3	Hexachlorobutadiene	4.7	< 4.7 U
131-11-3	Dimethylphthalate	4.7	< 4.7 U
85-68-7	Butylbenzylphthalate	4.7	< 4.7 U
95-48-7	2-Methylphenol	4.7	< 4.7 U
105-67-9	2,4-Dimethylphenol	23	< 23 U
86-30-6	N-Nitrosodiphenylamine	4.7	< 4.7 U
100-51-6	Benzyl Alcohol	19	< 19 U
87-86-5	Pentachlorophenol	19	< 19 U
95-50-1	1,2-Dichlorobenzene	4.7	< 4.7 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	52.9%
d14-p-Terphenyl	64.2% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR12-SBSD-15**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AON1R
LIMS ID: 15-19069
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/12/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/05/15 17:05
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.20 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 43.4%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**4.9**	**6.3**
106-46-7	1,4-Dichlorobenzene	4.9	< 4.9 U
120-82-1	1,2,4-Trichlorobenzene	4.9	< 4.9 U
118-74-1	Hexachlorobenzene	4.9	< 4.9 U
87-68-3	Hexachlorobutadiene	4.9	< 4.9 U
131-11-3	Dimethylphthalate	4.9	< 4.9 U
85-68-7	Butylbenzylphthalate	4.9	< 4.9 U
95-48-7	2-Methylphenol	4.9	< 4.9 U
105-67-9	2,4-Dimethylphenol	24	< 24 U
86-30-6	N-Nitrosodiphenylamine	4.9	< 4.9 U
100-51-6	**Benzyl Alcohol**	**20**	**23**
87-86-5	Pentachlorophenol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	4.9	< 4.9 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	48.9%
d14-p-Terphenyl	61.6% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR12-SBSD-15**
Extraction Method: SW3546 **MATRIX SPIKE**

Lab Sample ID: AON1R
LIMS ID: 15-19069
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/12/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/05/15 18:17
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.22 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 43.4%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	Dibenz(a,h)anthracene	4.9	---
106-46-7	1,4-Dichlorobenzene	4.9	---
120-82-1	1,2,4-Trichlorobenzene	4.9	---
118-74-1	Hexachlorobenzene	4.9	---
87-68-3	Hexachlorobutadiene	4.9	---
131-11-3	Dimethylphthalate	4.9	---
85-68-7	Butylbenzylphthalate	4.9	---
95-48-7	2-Methylphenol	4.9	---
105-67-9	2,4-Dimethylphenol	24	---
86-30-6	N-Nitrosodiphenylamine	4.9	---
100-51-6	Benzyl Alcohol	20	---
87-86-5	Pentachlorophenol	20	---
95-50-1	1,2-Dichlorobenzene	4.9	---

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	58.5%
d14-p-Terphenyl	63.6% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR12-SBSD-15**
Extraction Method: SW3546 **MATRIX SPIKE DUPLICATE**

Lab Sample ID: AON1R
LIMS ID: 15-19069
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/12/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/05/15 17:41
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.20 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 43.4%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	Dibenz(a,h)anthracene	4.9	---
106-46-7	1,4-Dichlorobenzene	4.9	---
120-82-1	1,2,4-Trichlorobenzene	4.9	---
118-74-1	Hexachlorobenzene	4.9	---
87-68-3	Hexachlorobutadiene	4.9	---
131-11-3	Dimethylphthalate	4.9	---
85-68-7	Butylbenzylphthalate	4.9	---
95-48-7	2-Methylphenol	4.9	---
105-67-9	2,4-Dimethylphenol	24	---
86-30-6	N-Nitrosodiphenylamine	4.9	---
100-51-6	Benzyl Alcohol	20	---
87-86-5	Pentachlorophenol	20	---
95-50-1	1,2-Dichlorobenzene	4.9	---

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	59.5%
d14-p-Terphenyl	63.0% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR13-SBSD-11**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AON1S
LIMS ID: 15-19070
Matrix: Sediment
Data Release Authorized:
Reported: 11/12/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/05/15 18:53
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.25 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 43.2%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**4.9**	**4.3 J**
106-46-7	1,4-Dichlorobenzene	4.9	< 4.9 U
120-82-1	1,2,4-Trichlorobenzene	4.9	< 4.9 U
118-74-1	Hexachlorobenzene	4.9	< 4.9 U
87-68-3	Hexachlorobutadiene	4.9	< 4.9 U
131-11-3	Dimethylphthalate	4.9	< 4.9 U
85-68-7	**Butylbenzylphthalate**	**4.9**	**7.3**
95-48-7	**2-Methylphenol**	**4.9**	**7.2**
105-67-9	2,4-Dimethylphenol	24	< 24 U
86-30-6	N-Nitrosodiphenylamine	4.9	< 4.9 U
100-51-6	**Benzyl Alcohol**	**20**	**46**
87-86-5	Pentachlorophenol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	4.9	< 4.9 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	48.4%
d14-p-Terphenyl	59.2% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR14-SBSD-12**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AON1T
LIMS ID: 15-19071
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/12/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/05/15 19:29
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.26 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 43.0%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**4.9**	**3.2 J**
106-46-7	1,4-Dichlorobenzene	4.9	< 4.9 U
120-82-1	1,2,4-Trichlorobenzene	4.9	< 4.9 U
118-74-1	Hexachlorobenzene	4.9	< 4.9 U
87-68-3	Hexachlorobutadiene	4.9	< 4.9 U
131-11-3	Dimethylphthalate	4.9	< 4.9 U
85-68-7	**Butylbenzylphthalate**	**4.9**	**4.7 J**
95-48-7	2-Methylphenol	4.9	< 4.9 U
105-67-9	2,4-Dimethylphenol	24	< 24 U
86-30-6	N-Nitrosodiphenylamine	4.9	< 4.9 U
100-51-6	**Benzyl Alcohol**	**20**	**20**
87-86-5	Pentachlorophenol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	4.9	< 4.9 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery	
2-Fluorophenol	39.7%
d14-p-Terphenyl	47.2% Q

ANALYTICAL RESOURCES INCORPORATED

SIM SW8270 SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	FPH	TER	TOT OUT
CR-24-SSD-COMP	49.9%	64.8% Q	0
CR11-SBSD-23	52.9%	64.2% Q	0
MB-102315	64.3%	83.6% Q	0
LCS-102315	58.1%	65.6% Q	0
CR12-SBSD-15	48.9%	61.6% Q	0
CR12-SBSD-15 MS	58.5%	63.6% Q	0
CR12-SBSD-15 MSD	59.5%	63.0% Q	0
CR13-SBSD-11	48.4%	59.2% Q	0
CR14-SBSD-12	39.7%	47.2% Q	0

	QC LIMITS	
(FPH) = 2-Fluorophenol	(27-120)	(27-120)
(TER) = d14-p-Terphenyl	(37-120)	(37-120)

Prep Method: SW3546
Log Number Range: 15-19057 to 15-19071

FORM-II SIM SW8270

AON1 : 00038

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: LCS-102315**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-102315
LIMS ID: 15-19069
Matrix: Sediment
Data Release Authorized:
Reported: 11/12/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed LCS: 11/05/15 15:17
Instrument/Analyst LCS: NT10/YZ

Sample Amount LCS: 10.00 g-dry-wt
Final Extract Volume LCS: 1.0 mL
Dilution Factor LCS: 1.00

Analyte	LCS	Spike Added	Recovery
Dibenz(a,h)anthracene	305	500	61.0%
1,4-Dichlorobenzene	262	500	52.4%
1,2,4-Trichlorobenzene	270	500	54.0%
Hexachlorobenzene	273	500	54.6%
Hexachlorobutadiene	292	500	58.4%
Dimethylphthalate	308	500	61.6%
Butylbenzylphthalate	344	500	68.8%
2-Methylphenol	276	500	55.2%
2,4-Dimethylphenol	814	1500	54.3%
N-Nitrosodiphenylamine	291	500	58.2%
Benzyl Alcohol	346	500	69.2%
Pentachlorophenol	1000 EQ	1500	66.7%
1,2-Dichlorobenzene	274	500	54.8%

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	58.1%
d14-p-Terphenyl	65.6% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR12-SBSD-15**
Page 1 of 1 **MATRIX SPIKE**

Lab Sample ID: AON1R
LIMS ID: 15-19069
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/12/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted MS/MSD: 10/23/15

Sample Amount MS: 10.22 g-dry-wt
MSD: 10.20 g-dry-wt

Date Analyzed MS: 11/05/15 18:17
MSD: 11/05/15 17:41

Final Extract Volume MS: 1.0 mL
MSD: 1.0 mL

Instrument/Analyst MS: NT10/YZ
MSD: NT10/YZ

Dilution Factor MS: 1.00
MSD: 1.00

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Dibenz(a,h)anthracene	6.3	268	489	53.5%	283	490	56.5%	5.4%
1,4-Dichlorobenzene	< 4.9 U	292	489	59.7%	298	490	60.8%	2.0%
1,2,4-Trichlorobenzene	< 4.9 U	294	489	60.1%	299	490	61.0%	1.7%
Hexachlorobenzene	< 4.9 U	300	489	61.3%	295	490	60.2%	1.7%
Hexachlorobutadiene	< 4.9 U	333	489	68.1%	340	490	69.4%	2.1%
Dimethylphthalate	< 4.9 U	332	489	67.9%	344	490	70.2%	3.6%
Butylbenzylphthalate	< 4.9 U	369	489	75.5%	369	490	75.3%	0.0%
2-Methylphenol	< 4.9 U	313	489	64.0%	323	490	65.9%	3.1%
2,4-Dimethylphenol	< 24 U	962	1470	65.4%	985	1470	67.0%	2.4%
N-Nitrosodiphenylamine	< 4.9 U	139	489	28.4%	71.1	490	14.5%	64.6%
Benzyl Alcohol	23	435	489	84.3%	455	490	88.2%	4.5%
Pentachlorophenol	< 20 U	1280 EQ	1470	87.1%	1300 EQ	1470	88.4%	1.6%
1,2-Dichlorobenzene	< 4.9 U	301	489	61.6%	305	490	62.2%	1.3%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

ARI Labs, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i
Lab File ID: CC1105A.D
Analysis Type:
Lab Sample ID: CC1105A
Method: \\target\share\chem3\nt10.i\20151105.b\SIM.b\SIMABN2.m

Injection Date: 05-NOV-2015 14:04
Init. Cal. Date(s): 19-OCT-2015 19-OCT-2015
Init. Cal. Times: 11:52 16:39
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RF1	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
$ 1 2-Fluorophenol	1.04543	0.98207	0.010	-6.06090	20.00000	Averaged	
3 Phenol	1.55661	1.46467	0.010	-5.90683	20.00000	Averaged	
7 1,3-Dichlorobenzene	1.76229	1.78433	0.010	1.25101	20.00000	Averaged	
9 1,4-Dichlorobenzene	1.73930	1.78433	0.010	2.58940	20.00000	Averaged	
11 Benzyl alcohol	0.81726	0.79485	0.010	-2.74242	20.00000	Averaged	
12 1,2-Dichlorobenzene	1.62946	1.72457	0.010	5.83701	20.00000	Averaged	
13 2-Methylphenol	0.93390	0.81370	0.010	-12.87015	20.00000	Averaged	
15 4-Methylphenol	0.91605	0.81780	0.010	-10.72571	20.00000	Averaged	
16 N-Nitroso-di-n-propylamine	0.61594	0.57662	0.050	-6.38240	20.00000	Averaged	
22 2,4-Dimethylphenol	0.39393	0.33255	0.010	-15.58052	20.00000	Averaged	
26 1,2,4-Trichlorobenzene	0.39456	0.41910	0.010	6.21998	20.00000	Averaged	
30 Hexachlorobutadiene	0.30361	0.33208	0.010	9.37722	20.00000	Averaged	
39 Dimethylphthalate	1.14558	1.01470	0.010	-11.42453	20.00000	Averaged	
50 Diethylphthalate	1.23806	1.13213	0.010	-8.55608	20.00000	Averaged	
54 N-Nitrosodiphenylamine	0.61955	0.57444	0.010	-7.27995	20.00000	Averaged	
57 Hexachlorobenzene	0.41451	0.46057	0.010	11.11164	20.00000	Averaged	
58 Pentachlorophenol	0.21311	0.15371	0.005	-27.87342	20.00000	Averaged	<-
$ 66 Terphenyl-d14	0.36942	0.25581	0.010	-30.75549	20.00000	Averaged	<-
67 Butylbenzylphthalate	0.41305	0.39038	0.010	-5.48875	20.00000	Averaged	
79 Dibenzo(a,h)anthracene	1.15706	1.04200	0.010	-9.94423	20.00000	Averaged	
90 N-Nitrosodimethylamine	0.44352	0.46419	0.010	4.66003	20.00000	Averaged	

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: CR11-SBSD-23

Lab Sample ID: AON1Q
LIMS ID: 15-19068
Matrix: Sediment
Data Release Authorized:
Reported: 11/06/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 19:21
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Silica-Florisil Cleanup: Yes
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF		0.65-0.89	0.0339	0.996	< 0.0339	U
2,3,7,8-TCDD	0.68	0.65-0.89		0.996	0.936	J
1,2,3,7,8-PeCDF		1.32-1.78	0.0398	0.996	< 0.0398	U
2,3,4,7,8-PeCDF		1.32-1.78	0.0418	0.996	< 0.0418	U
1,2,3,7,8-PeCDD	1.54	1.32-1.78		0.996	1.02	
1,2,3,4,7,8-HxCDF	1.24	1.05-1.43		0.996	0.0319	J
1,2,3,6,7,8-HxCDF	0.52	1.05-1.43		0.996	0.0339	JEMPC
2,3,4,6,7,8-HxCDF		1.05-1.43	0.0438	0.996	< 0.0438	U
1,2,3,7,8,9-HxCDF	1.68	1.05-1.43		0.996	0.112	BJEMPC
1,2,3,4,7,8-HxCDD	1.02	1.05-1.43		0.996	0.255	JEMPC
1,2,3,6,7,8-HxCDD	1.01	1.05-1.43		0.996	0.631	JEMPC
1,2,3,7,8,9-HxCDD	1.22	1.05-1.43		0.996	2.76	
1,2,3,4,6,7,8-HpCDF	0.87	0.88-1.20		0.996	0.317	BJEMPC
1,2,3,4,7,8,9-HpCDF		0.88-1.20	0.0458	0.996	< 0.0458	U
1,2,3,4,6,7,8-HpCDD	0.99	0.88-1.20		0.996	6.64	B
OCDF	0.89	0.76-1.02		1.99	1.08	BJ
OCDD	0.87	0.76-1.02		9.96	33.1	

Homologue Group	EDL	RL	Result	
Total TCDF	0.0339	0.996	0.303	EMPC
Total TCDD		0.996	7.61	EMPC
Total PeCDF	0.0418	1.99	0.111	EMPC
Total PeCDD		0.996	7.59	
Total HxCDF		1.99	0.599	EMPC
Total HxCDD		1.99	18.1	EMPC
Total HpCDF		1.99	1.28	EMPC
Total HpCDD		1.99	15.5	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 2.42

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 2.43

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: CR11-SBSD-23

Lab Sample ID: AON1Q
LIMS ID: 15-19068
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 19:21
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	90.3	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	84.4	25-164	
13C-1,2,3,7,8-PeCDF	1.56	1.32-1.78	99.6	24-185	
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	91.2	21-178	
13C-1,2,3,7,8-PeCDD	1.58	1.32-1.78	91.8	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	88.3	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	84.5	26-123	
13C-2,3,4,6,7,8-HxCDF	0.51	0.43-0.59	88.3	28-136	
13C-1,2,3,7,8,9-HxCDF	0.50	0.43-0.59	85.5	29-147	
13C-1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	91.8	32-141	
13C-1,2,3,6,7,8-HxCDD	1.26	1.05-1.43	87.2	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	81.0	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	80.1	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	86.7	23-140	
13C-OCDD	0.90	0.76-1.02	72.2	17-157	
37Cl4-2,3,7,8-TCDD			94.3	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: MB-102315

Lab Sample ID: MB-102315
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 14:04
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF		0.65-0.89	0.0360	1.00	< 0.0360	U
2,3,7,8-TCDD		0.65-0.89	0.0520	1.00	< 0.0520	U
1,2,3,7,8-PeCDF		1.32-1.78	0.0380	1.00	< 0.0380	U
2,3,4,7,8-PeCDF		1.32-1.78	0.0400	1.00	< 0.0400	U
1,2,3,7,8-PeCDD		1.32-1.78	0.0640	1.00	< 0.0640	U
1,2,3,4,7,8-HxCDF		1.05-1.43	0.0440	1.00	< 0.0440	U
1,2,3,6,7,8-HxCDF		1.05-1.43	0.0400	1.00	< 0.0400	U
2,3,4,6,7,8-HxCDF	1.37	1.05-1.43		1.00	0.0400	J
1,2,3,7,8,9-HxCDF	1.13	1.05-1.43		1.00	0.0360	J
1,2,3,4,7,8-HxCDD		1.05-1.43	0.0520	1.00	< 0.0520	U
1,2,3,6,7,8-HxCDD	1.75	1.05-1.43		1.00	0.0480	JEMPC
1,2,3,7,8,9-HxCDD	0.96	1.05-1.43		1.00	0.106	JEMPC
1,2,3,4,6,7,8-HpCDF	0.58	0.88-1.20		1.00	0.118	JEMPC
1,2,3,4,7,8,9-HpCDF	0.90	0.88-1.20		1.00	0.0480	J
1,2,3,4,6,7,8-HpCDD	1.00	0.88-1.20		1.00	0.962	J
OCDF	0.68	0.76-1.02		2.00	0.378	JEMPC
OCDD	0.86	0.76-1.02		10.0	6.81	

Homologue Group	EDL	RL	Result	
Total TCDF	0.0360	1.00	< 0.0360	U
Total TCDD	0.0520	1.00	< 0.0520	U
Total PeCDF	0.0400	2.00	< 0.0400	U
Total PeCDD	0.0640	1.00	< 0.0640	U
Total HxCDF		2.00	0.116	EMPC
Total HxCDD		2.00	0.760	EMPC
Total HpCDF		2.00	0.341	EMPC
Total HpCDD		2.00	2.29	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 0.04

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 0.11

Reported in pg/g

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B

ANALYTICAL RESOURCES INCORPORATED

Sample ID: MB-102315

Lab Sample ID: MB-102315
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 14:04
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.77	0.65-0.89	104	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	99.2	25-164	
13C-1,2,3,7,8-PeCDF	1.56	1.32-1.78	108	24-185	
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	104	21-178	
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	104	25-181	
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	102	26-152	
13C-1,2,3,6,7,8-HxCDF	0.51	0.43-0.59	102	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	101	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	98.6	29-147	
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	108	32-141	
13C-1,2,3,6,7,8-HxCDD	1.23	1.05-1.43	103	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	97.4	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	98.8	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.07	0.88-1.20	106	23-140	
13C-OCDD	0.90	0.76-1.02	92.3	17-157	
37Cl4-2,3,7,8-TCDD			108	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-102315

Lab Sample ID: OPR-102315
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 14:55
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	RL	Result
2,3,7,8-TCDF	0.67	0.65-0.89	1.00	20.1
2,3,7,8-TCDD	0.76	0.65-0.89	1.00	21.8
1,2,3,7,8-PeCDF	1.45	1.32-1.78	1.00	103
2,3,4,7,8-PeCDF	1.41	1.32-1.78	1.00	102
1,2,3,7,8-PeCDD	1.54	1.32-1.78	1.00	104
1,2,3,4,7,8-HxCDF	1.15	1.05-1.43	1.00	106
1,2,3,6,7,8-HxCDF	1.16	1.05-1.43	1.00	103
2,3,4,6,7,8-HxCDF	1.16	1.05-1.43	1.00	107
1,2,3,7,8,9-HxCDF	1.14	1.05-1.43	1.00	105
1,2,3,4,7,8-HxCDD	1.23	1.05-1.43	1.00	104
1,2,3,6,7,8-HxCDD	1.22	1.05-1.43	1.00	104
1,2,3,7,8,9-HxCDD	1.24	1.05-1.43	1.00	105
1,2,3,4,6,7,8-HpCDF	0.98	0.88-1.20	1.00	109
1,2,3,4,7,8,9-HpCDF	0.98	0.88-1.20	1.00	106
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20	1.00	104
OCDF	0.83	0.76-1.02	2.00	202
OCDD	0.90	0.76-1.02	10.0	218

Homologue Group	EDL	RL	Result	
Total TCDF		1.00	20.9	EMPC
Total TCDD		1.00	22.3	
Total PeCDF		2.00	211	EMPC
Total PeCDD		1.00	105	EMPC
Total HxCDF		2.00	422	EMPC
Total HxCDD		2.00	314	EMPC
Total HpCDF		2.00	216	EMPC
Total HpCDD		2.00	108	EMPC

Reported in pg/g

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B

ANALYTICAL RESOURCES INCORPORATED

Sample ID: OPR-102315

Lab Sample ID: OPR-102315
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 14:55
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.77	0.65-0.89	100	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	96.4	25-164	
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	105	24-185	
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	102	21-178	
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	104	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	97.3	26-152	
13C-1,2,3,6,7,8-HxCDF	0.50	0.43-0.59	97.0	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	96.3	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	93.6	29-147	
13C-1,2,3,4,7,8-HxCDD	1.28	1.05-1.43	102	32-141	
13C-1,2,3,6,7,8-HxCDD	1.25	1.05-1.43	99.8	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	90.6	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	91.8	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20	97.8	23-140	
13C-OCDD	0.89	0.76-1.02	83.1	17-157	
37Cl4-2,3,7,8-TCDD			106	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B

Sample ID: OPR-102315

Lab Sample ID: OPR-102315
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 14:55
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	OPR	Spiked	Recovery	Limits
2,3,7,8-TCDF	20.1	20.0	100	75-158
2,3,7,8-TCDD	21.8	20.0	109	67-158
1,2,3,7,8-PeCDF	103	100	103	80-134
2,3,4,7,8-PeCDF	102	100	102	68-160
1,2,3,7,8-PeCDD	104	100	104	70-142
1,2,3,4,7,8-HxCDF	106	100	106	72-134
1,2,3,6,7,8-HxCDF	103	100	103	84-130
2,3,4,6,7,8-HxCDF	107	100	107	70-156
1,2,3,7,8,9-HxCDF	105	100	105	78-130
1,2,3,4,7,8-HxCDD	104	100	104	70-164
1,2,3,6,7,8-HxCDD	104	100	104	76-134
1,2,3,7,8,9-HxCDD	105	100	105	64-162
1,2,3,4,6,7,8-HpCDF	109	100	109	82-132
1,2,3,4,7,8,9-HpCDF	106	100	106	78-138
1,2,3,4,6,7,8-HpCDD	104	100	104	70-140
OCDF	202	200	101	63-170
OCDD	218	200	109	78-144

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR-24-SSD-COMP
SAMPLE

Lab Sample ID: AON1F
LIMS ID: 15-19057
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/20/15
Date Analyzed: 10/24/15 01:04
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.26 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 47.6%

CAS Number	Analyte	LOQ	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**	**30**
11096-82-5	**Aroclor 1260**	**19**	**24**
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U
11100-14-4	Aroclor 1268	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	78.2%
Tetrachlorometaxylene	91.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR11-SBSD-23
SAMPLE

Lab Sample ID: AON1Q
LIMS ID: 15-19068
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/20/15
Date Analyzed: 10/24/15 01:25
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.75 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 28.8%

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	17	< 17 U
53469-21-9	Aroclor 1242	17	< 17 U
12672-29-6	Aroclor 1248	17	< 17 U
11097-69-1	Aroclor 1254	17	< 17 U
11096-82-5	Aroclor 1260	17	< 17 U
11104-28-2	Aroclor 1221	17	< 17 U
11141-16-5	Aroclor 1232	17	< 17 U
11100-14-4	Aroclor 1268	17	< 17 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	77.8%
Tetrachlorometaxylene	70.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR12-SBSD-15
SAMPLE

Lab Sample ID: AON1R
LIMS ID: 15-19069
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/20/15
Date Analyzed: 10/24/15 01:46
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.10 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 43.4%

CAS Number	Analyte	LOQ	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
11100-14-4	Aroclor 1268	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	72.5%
Tetrachlorometaxylene	70.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR13-SBSD-11
SAMPLE

Lab Sample ID: AON1S
LIMS ID: 15-19070
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/20/15
Date Analyzed: 10/24/15 02:07
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.12 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 43.2%

CAS Number	Analyte	LOQ	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
11100-14-4	Aroclor 1268	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	77.2%
Tetrachlorometaxylene	74.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR14-SBSD-12
SAMPLE

Lab Sample ID: AON1T
LIMS ID: 15-19071
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/20/15
Date Analyzed: 10/24/15 03:54
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.14 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 43.0%

CAS Number	Analyte	LOQ	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
11100-14-4	Aroclor 1268	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	79.0%
Tetrachlorometaxylene	77.5%

AON1 : 00053

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Page 1 of 1

Sample ID: CR13-SBSD-11
MS/MSD

Lab Sample ID: AON1S
LIMS ID: 15-19070
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted MS/MSD: 10/20/15

Date Analyzed MS: 10/24/15 02:29
MSD: 10/24/15 02:50
Instrument/Analyst MS: ECD7/JGR
MSD: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount MS: 5.15 g-dry-wt
MSD: 5.13 g-dry-wt
Final Extract Volume MS: 5.0 mL
MSD: 5.0 mL
Dilution Factor MS: 1.00
MSD: 1.00
Silica Gel: Yes

Percent Moisture: 43.2%

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Aroclor 1016	< 20 U	372	485	76.7%	388	487	79.7%	4.2%
Aroclor 1260	< 20 U	429	485	88.5%	433	487	88.9%	0.9%

Results reported in µg/kg (ppb)
RPD calculated using sample concentrations per SW846.

AON1 : 00054

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR13-SBSD-11
MATRIX SPIKE

Lab Sample ID: AON1S
LIMS ID: 15-19070
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/20/15
Date Analyzed: 10/24/15 02:29
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.15 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 43.2%

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	19	---
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	---
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U
11100-14-4	Aroclor 1268	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	75.5%
Tetrachlorometaxylene	72.2%

AON1 : 00055

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR13-SBSD-11
MATRIX SPIKE DUP

Lab Sample ID: AON1S
LIMS ID: 15-19070
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/20/15
Date Analyzed: 10/24/15 02:50
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.13 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 43.2%

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	20	---
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	---
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U
11100-14-4	Aroclor 1268	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	76.5%
Tetrachlorometaxylene	78.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3546
Page 1 of 1

Sample ID: MB-102015
METHOD BLANK

Lab Sample ID: MB-102015
LIMS ID: 15-19070
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/20/15
Date Analyzed: 10/23/15 23:17
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

CAS Number	Analyte	LOQ	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
11100-14-4	Aroclor 1268	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	96.2%
Tetrachlorometaxylene	74.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A

Sample ID: LCS-102015
LAB CONTROL

Lab Sample ID: LCS-102015
LIMS ID: 15-19070
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/20/15
Date Analyzed: 10/23/15 23:39
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Aroclor 1016	407	500	81.4%
Aroclor 1260	516	500	103%

PCB Surrogate Recovery

Decachlorobiphenyl	96.0%
Tetrachlorometaxylene	73.2%

Results reported in µg/kg (ppb)

AON1 : 00058

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB SOIL/SOLID/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
CR-24-SSD-COMP	78.2%	47-120	91.5%	53-116	0
CR11-SBSD-23	77.8%	47-120	70.0%	53-116	0
CR12-SBSD-15	72.5%	47-120	70.5%	53-116	0
MB-102015	96.2%	59-115	74.8%	58-112	0
LCS-102015	96.0%	59-115	73.2%	58-112	0
CR13-SBSD-11	77.2%	47-120	74.0%	53-116	0
CR13-SBSD-11 MS	75.5%	47-120	72.2%	53-116	0
CR13-SBSD-11 MSD	76.5%	47-120	78.0%	53-116	0
CR14-SBSD-12	79.0%	47-120	77.5%	53-116	0

Microwave (MARS) Control Limits PCBSMI
Prep Method: SW3546
Log Number Range: 15-19057 to 15-19071

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Extraction Method: SW3546
Page 1 of 1

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Matrix: Sediment

Date Received: 10/14/15

Data Release Authorized:
Reported: 10/23/15

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range/Surrogate	LOQ	Result
AON1F	CR-24-SSD-COMP	10/19/15	10/20/15	1.00	**Diesel Range**	**95**	**370**
15-19057	HC ID: **DIESEL/MOTOR OIL**		FID3B	10	**Motor Oil Range**	**190**	**850**
					o-Terphenyl		74.0%
MB-101915	Method Blank	10/19/15	10/20/15	1.00	Diesel Range	5.0	< 5.0 U
15-19068	HC ID: ---		FID3B	1.0	Motor Oil Range	10	< 10 U
					o-Terphenyl		78.7%
AON1Q	CR11-SBSD-23	10/19/15	10/20/15	1.00	Diesel Range	7.0	< 7.0 U
15-19068	HC ID: **MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**14**	**19**
					o-Terphenyl		74.2%

Reported in mg/kg (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
LOQ-Limit of Quantitation

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

AON1 : 00060

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID

Sample ID: CR11-SBSD-23
MS/MSD

Lab Sample ID: AON1Q
LIMS ID: 15-19068
Matrix: Sediment
Data Release Authorized:
Reported: 10/23/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted MS/MSD: 10/19/15

Date Analyzed MS: 10/20/15 19:39
MSD: 10/20/15 20:00
Instrument/Analyst MS: FID3B/ML
MSD: FID3B/ML

Sample Amount MS: 7.15 g-dry-wt
MSD: 7.15 g-dry-wt
Final Extract Volume MS: 1.0 mL
MSD: 1.0 mL
Dilution Factor MS: 1.00
MSD: 1.00
Percent Moisture: 28.8%

Range	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Diesel	< 7.0 U	162	210	77.1%	153	210	72.9%	5.7%

TPHD Surrogate Recovery

	MS	MSD
o-Terphenyl	75.3%	71.1%

Results reported in mg/kg
RPD calculated using sample concentrations per SW846.

AON1:00061

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: LCS-101915
LAB CONTROL

Lab Sample ID: LCS-101915
LIMS ID: 15-19068
Matrix: Sediment
Data Release Authorized:
Reported: 10/23/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/19/15
Date Analyzed: 10/20/15 17:30
Instrument/Analyst: FID3B/ML

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
Diesel	107	150	71.3%

TPHD Surrogate Recovery

o-Terphenyl	74.5%

Results reported in mg/kg

AON1 : 00062

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Sediment
Date Received: 10/14/15

ARI Job: AON1
Project: Seaport Landing
1044.02.01-02

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep Date
15-19057-AON1F	CR-24-SSD-COMP	5.25 g	1.00 mL	D	10/19/15
15-19068-101915MB1	Method Blank	10.0 g	1.00 mL	-	10/19/15
15-19068-101915LCS1	Lab Control	10.0 g	1.00 mL	-	10/19/15
15-19068-AON1Q	CR11-SBSD-23	7.13 g	1.00 mL	D	10/19/15
15-19068-AON1QMS	CR11-SBSD-23	7.15 g	1.00 mL	D	10/19/15
15-19068-AON1QMSD	CR11-SBSD-23	7.15 g	1.00 mL	D	10/19/15

Basis: D=Dry Weight W=As Received

ANALYTICAL RESOURCES INCORPORATED

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	OTER	TOT OUT
CR-24-SSD-COMP	74.0%	0
101915MB	78.7%	0
101915LCS	74.5%	0
CR11-SBSD-23	74.2%	0
CR11-SBSD-23 MS	75.3%	0
CR11-SBSD-23 MSD	71.1%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

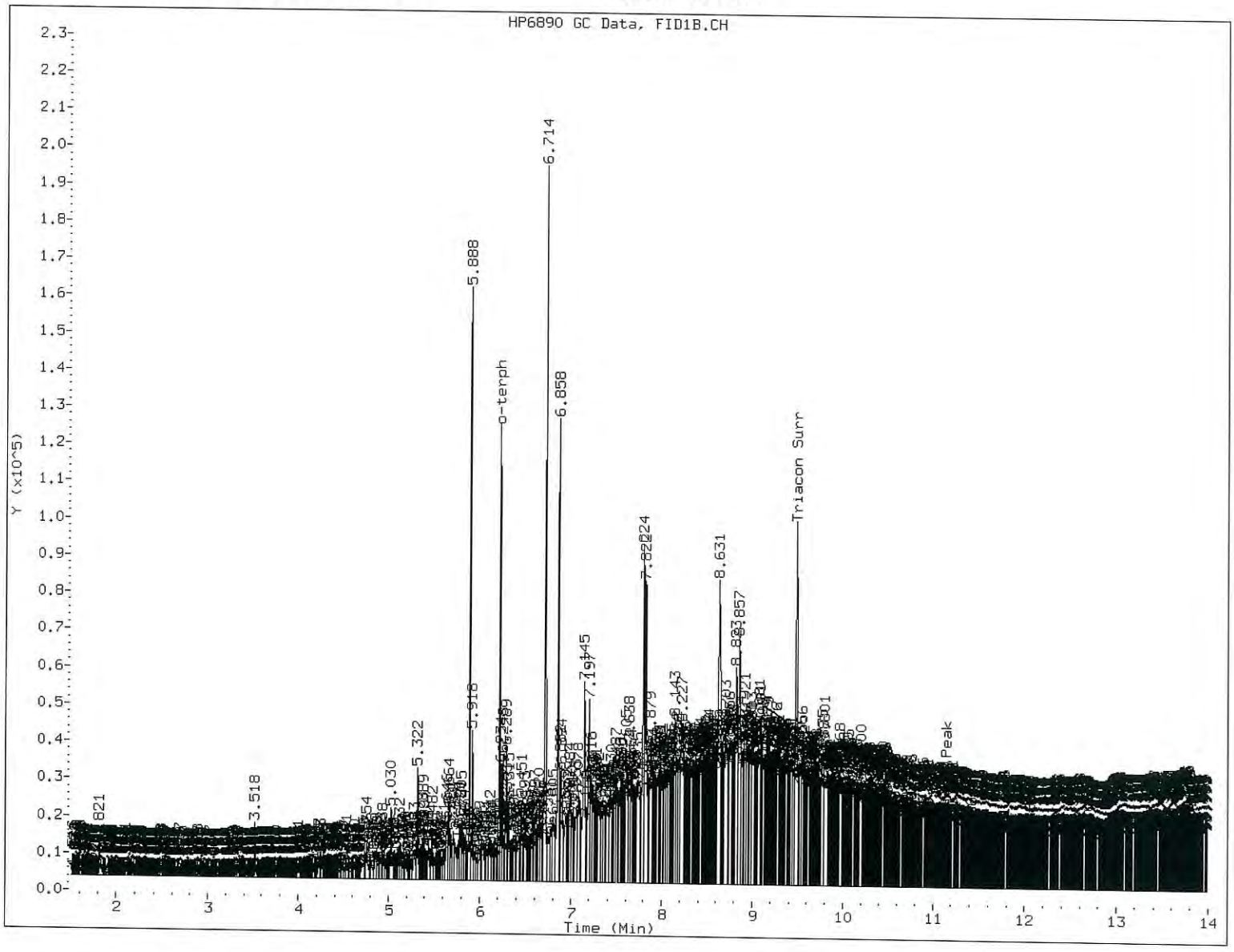
Prep Method: SW3546
Log Number Range: 15-19057 to 15-19068

FORM-II TPHD

AON1 : 00064

FID:3B-2C/RTX-1 AON1F

FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: ML Date: 12/21/15

Data File: \\target\share\chem2\fid3b.i\20151020.b\15102024.D

Date : 20-OCT-2015 18:56

Client ID: CR-24-SSD-COMP

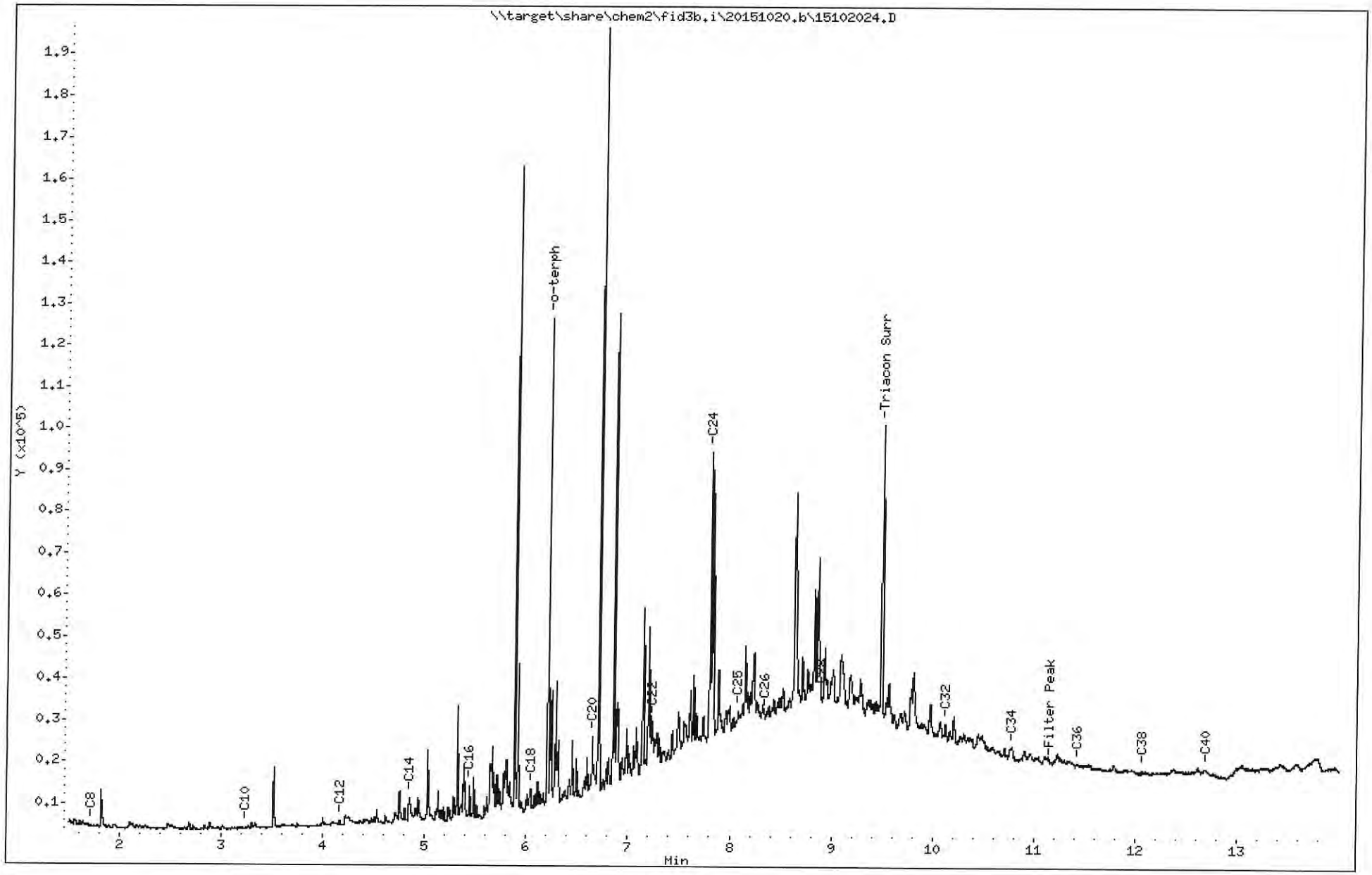
Sample Info: AON1F,10

Column phase: RTX-1

Instrument: fid3b.i

Operator: ML

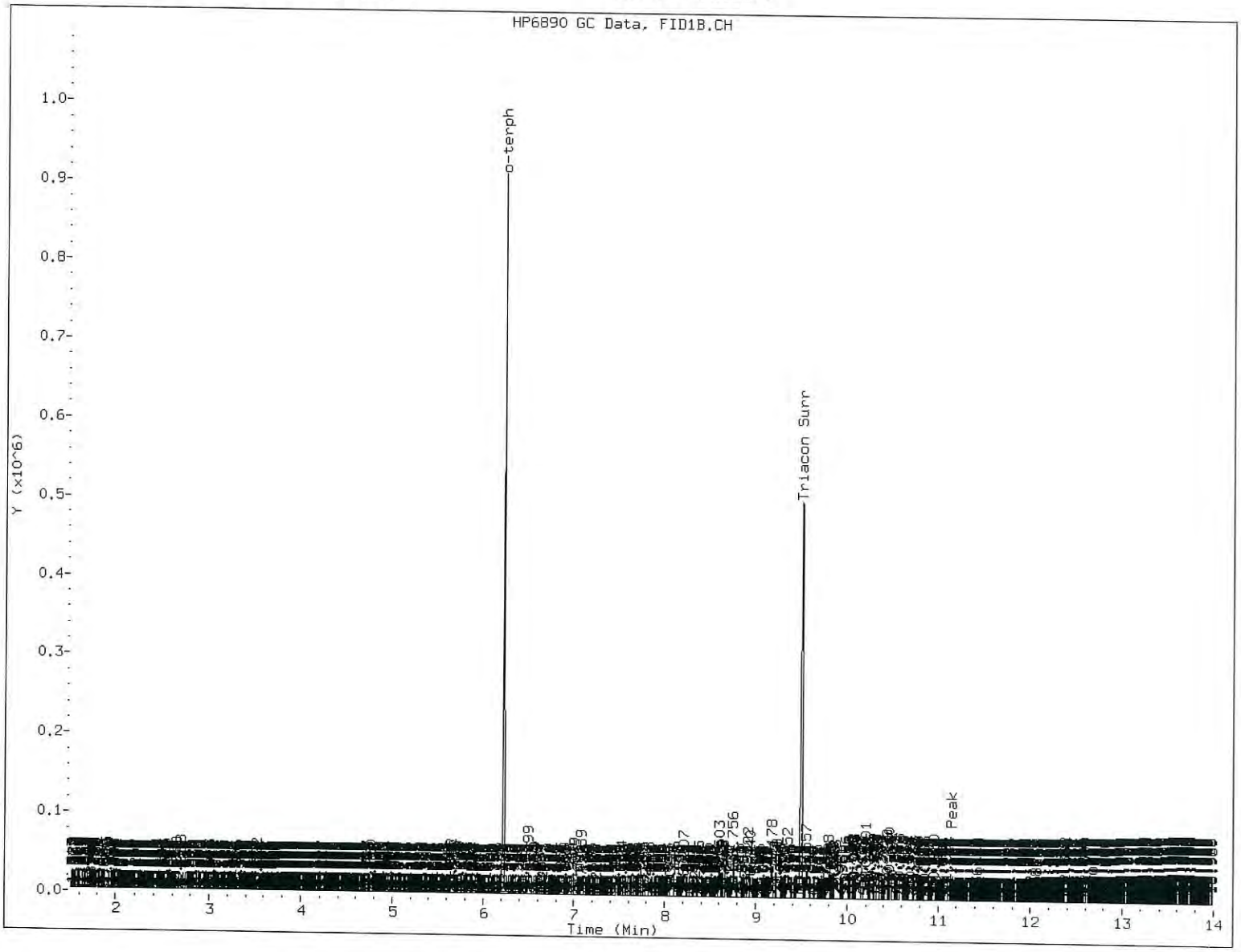
Column diameter: 0.25



AON1:00065

FID:3B-2C/RTX-1 AON1Q

FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: MC Date: 12/21/15

Data File: \\target\share\chem2\fid3b.i\20151020.b\15102025.D

Date : 20-OCT-2015 19:17

Client ID: CR11-SBSD-23

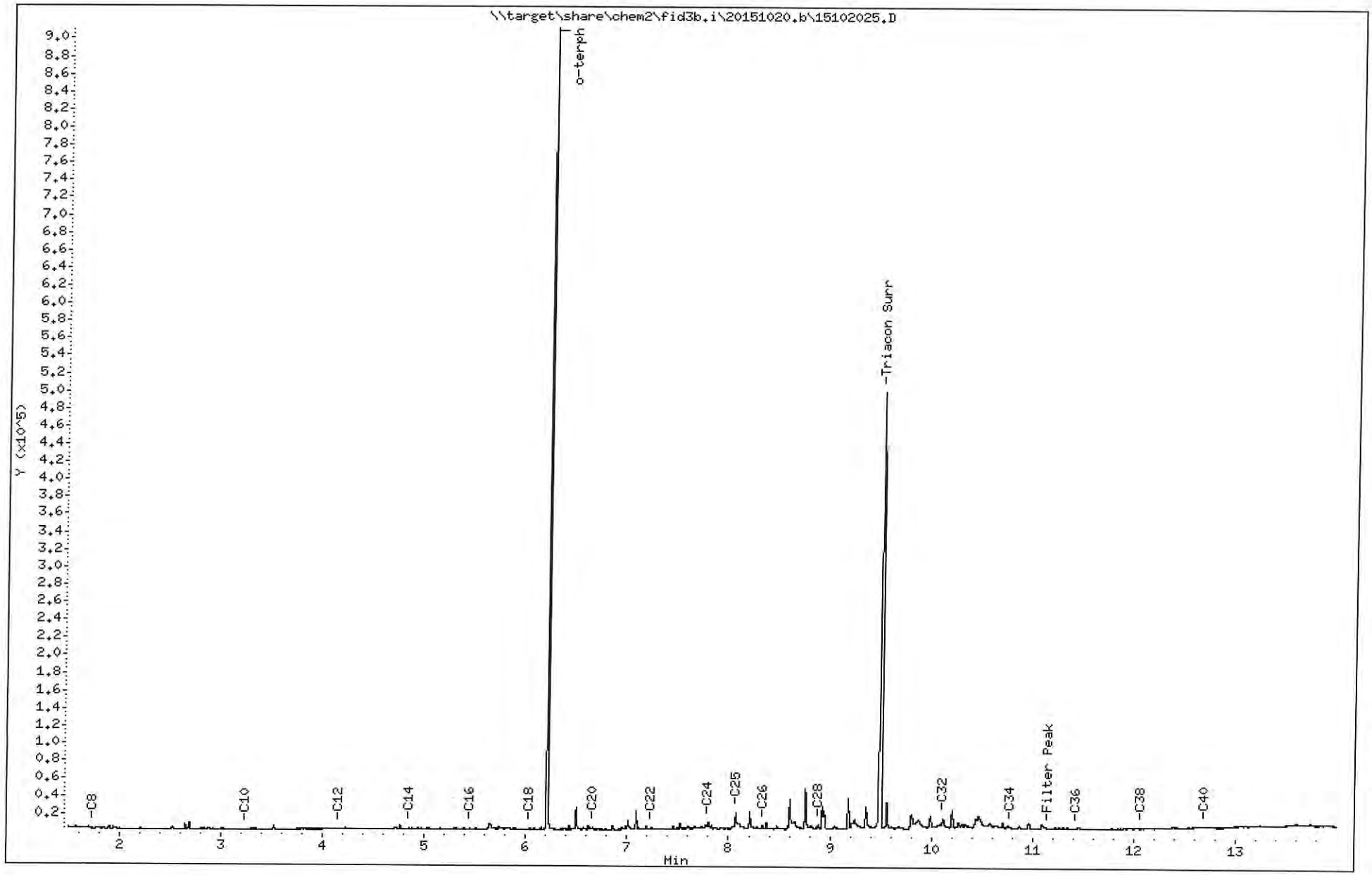
Sample Info: AON1Q

Column phase: RTX-1

Instrument: fid3b.i

Operator: ML

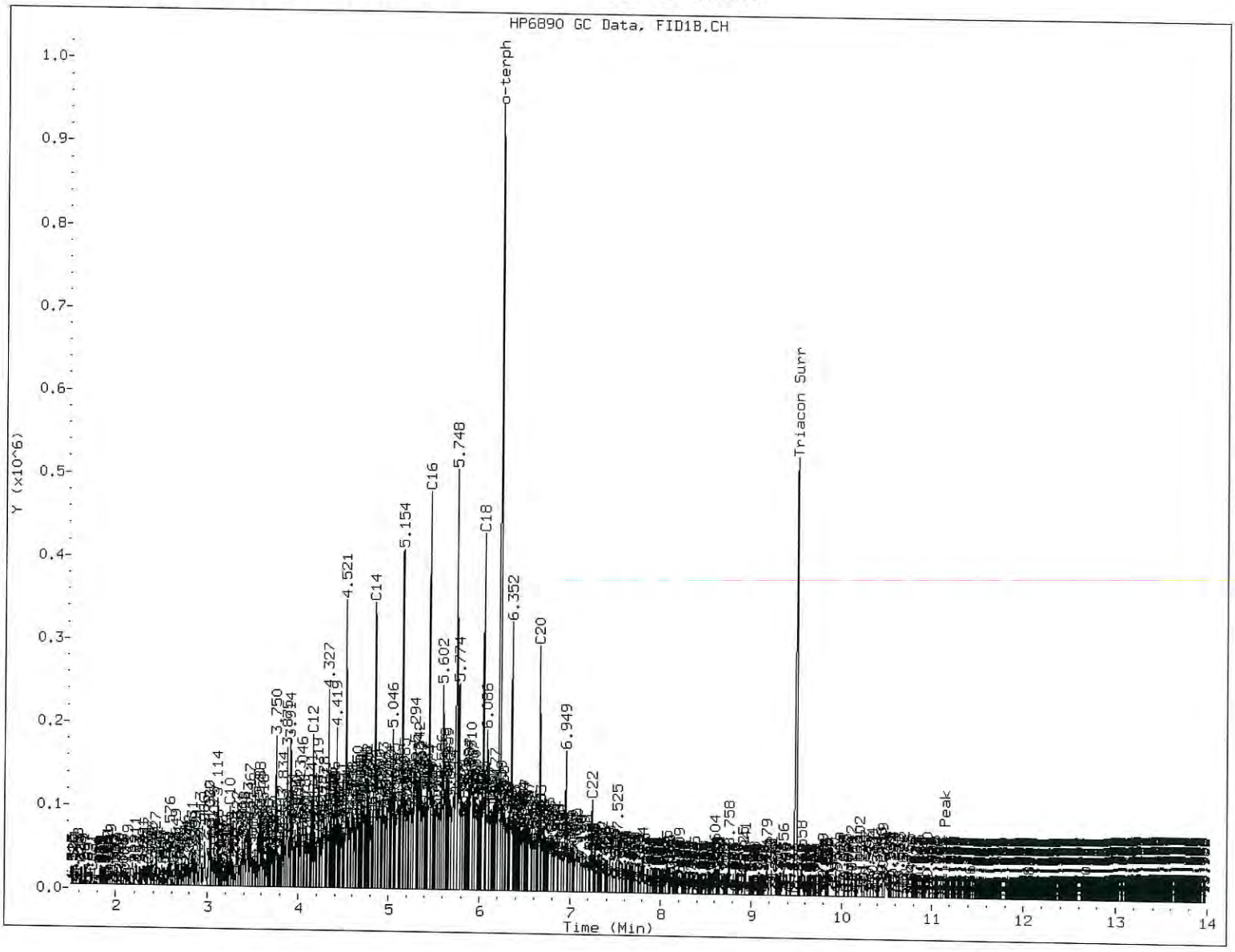
Column diameter: 0.25



AON1 - 00068

FID:3B-2C/RTX-1 AON1QMS

FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5). Skimmed surrogate

Analyst: ML Date: 10/21/15

Data File: \\target\share\chem2\fid3b.i\20151020.b\15102026.D

Date : 20-OCT-2015 19:39

Client ID: CR11-SBSD-23 MS

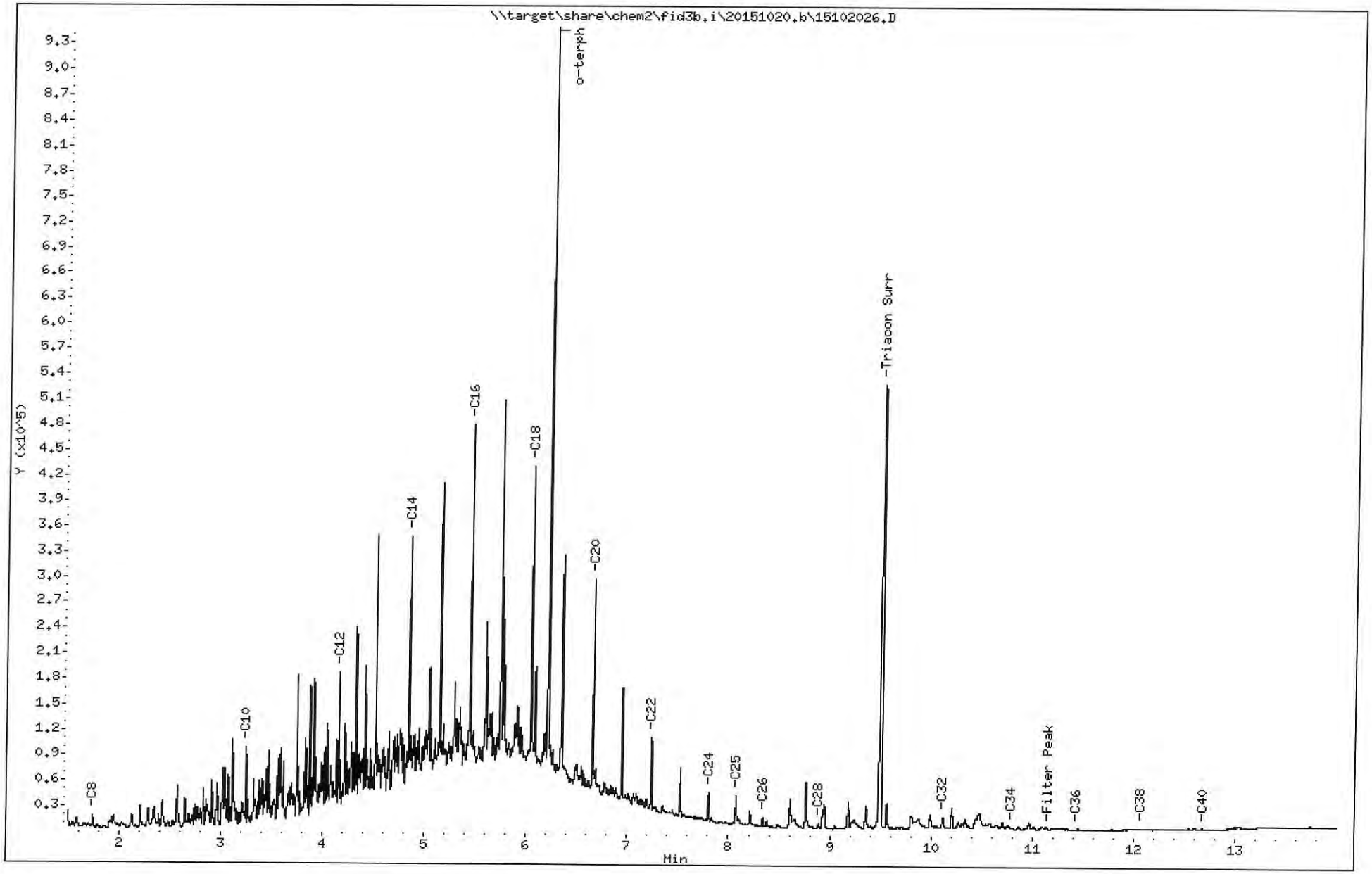
Sample Info: AON1QMS

Column phase: RTX-1

Instrument: fid3b.i

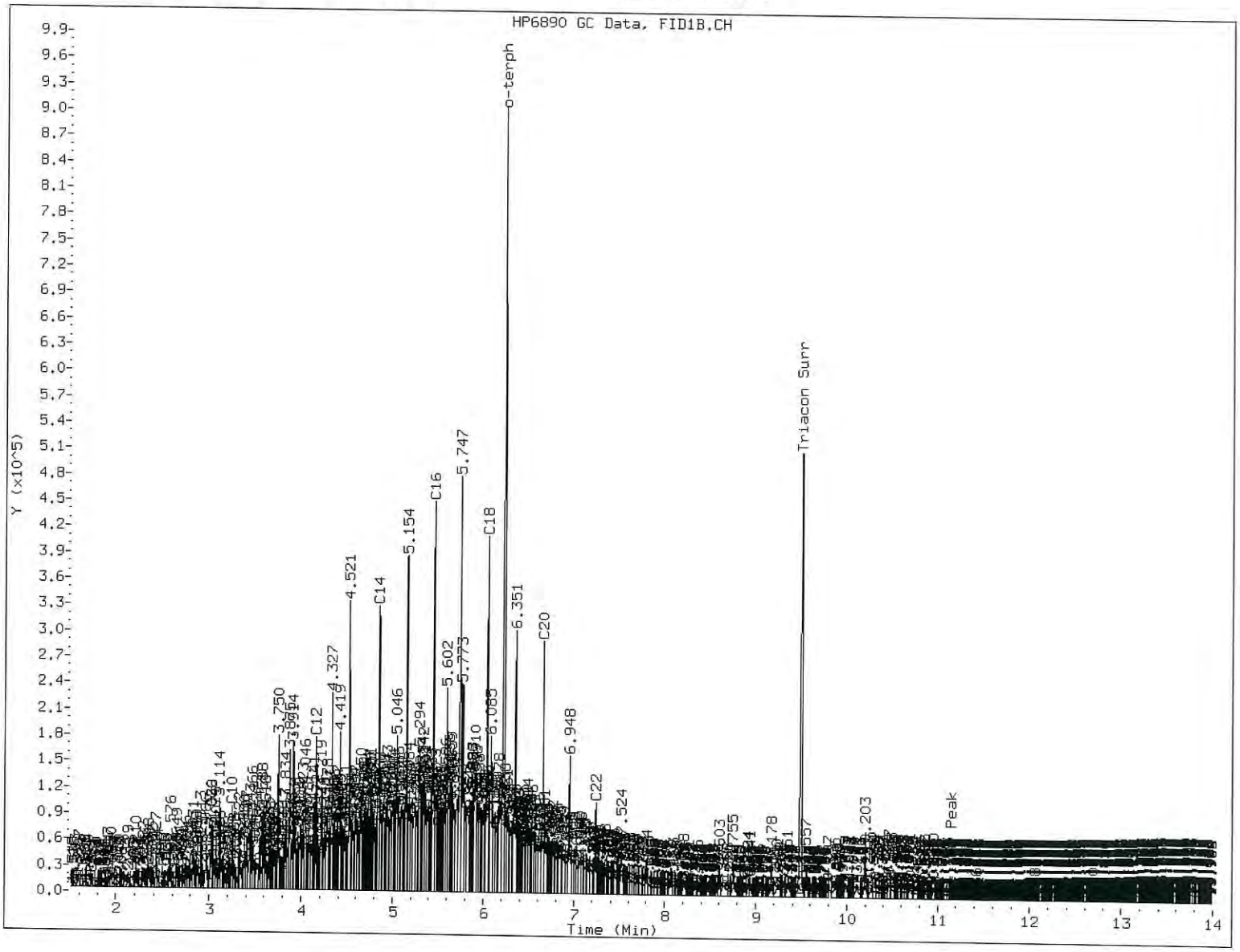
Operator: ML

Column diameter: 0.25



AON1 : 00070

FID:3B-2C/RTX-1 AON1QMSD FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

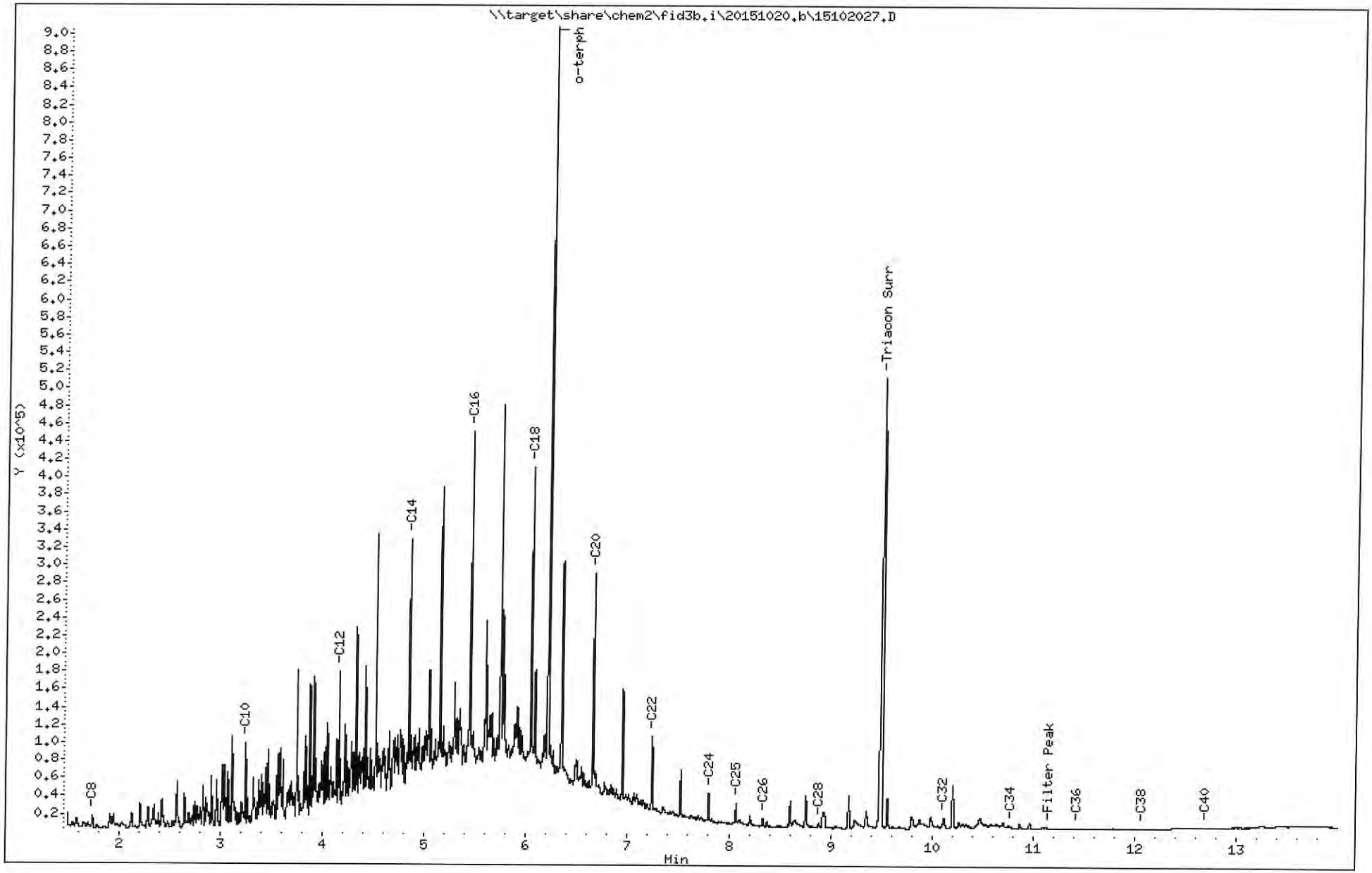
Analyst: M Date: 12/21/15

Data File: \\target\share\chem2\fid3b.i\20151020.b\15102027.D
Date : 20-OCT-2015 20:00
Client ID: CR11-SBSD-23 MSD
Sample Info: AON1QMSD

Column phase: RTX-1

Instrument: fid3b.i

Operator: ML
Column diameter: 0.25



AON1:00072

SAMPLE RESULTS-CONVENTIONALS
AON1-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 11/12/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Client ID: CR-24-SSD-COMP
ARI ID: 15-19057 AON1F

Analyte	Date	Method	Units	RL	Sample
Total Solids	10/19/15 101915#1	SM2540G	Percent	0.01	54.35
Total Organic Carbon	11/11/15 111115#1	Plumb,1981	Percent	0.020	1.56

RL Analytical reporting limit
U Undetected at reported detection limit

AON1 : 00073

SAMPLE RESULTS-CONVENTIONALS
AON1-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 11/12/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Client ID: CR11-SBSD-23
ARI ID: 15-19068 AON1Q

Analyte	Date	Method	Units	RL	Sample
Total Solids	10/19/15 101915#1	SM2540G	Percent	0.01	72.59
Total Organic Carbon	11/11/15 111115#1	Plumb,1981	Percent	0.020	0.415

RL Analytical reporting limit
U Undetected at reported detection limit

AON1 : 00074

SAMPLE RESULTS-CONVENTIONALS
AON1-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: J
Reported: 11/12/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Client ID: CR12-SBSD-15
ARI ID: 15-19069 AON1R

Analyte	Date	Method	Units	RL	Sample
Total Solids	10/19/15 101915#1	SM2540G	Percent	0.01	56.65
Total Organic Carbon	11/11/15 111115#1	Plumb,1981	Percent	0.020	3.33

RL Analytical reporting limit
U Undetected at reported detection limit

AON1 : 00075

SAMPLE RESULTS-CONVENTIONALS
AON1-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 11/12/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Client ID: CR13-SBSD-11
ARI ID: 15-19070 AON1S

Analyte	Date	Method	Units	RL	Sample
Total Solids	10/19/15 101915#1	SM2540G	Percent	0.01	57.95
Total Organic Carbon	11/11/15 111115#1	Plumb,1981	Percent	0.020	2.50

RL Analytical reporting limit
U Undetected at reported detection limit

AON1:00076

SAMPLE RESULTS-CONVENTIONALS
AON1-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 11/12/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Client ID: CR14-SBSD-12
ARI ID: 15-19071 AON1T

Analyte	Date	Method	Units	RL	Sample
Total Solids	10/19/15 101915#1	SM2540G	Percent	0.01	57.04
Total Organic Carbon	11/11/15 111115#1	Plumb,1981	Percent	0.020	3.22

RL Analytical reporting limit
U Undetected at reported detection limit

AON1 : 00077

METHOD BLANK RESULTS-CONVENTIONALS
AON1-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 11/12/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Analyte	Date	Units	Blank	QC ID
Total Solids	10/19/15	Percent	< 0.01 U	ICB
Total Organic Carbon	11/11/15	Percent	< 0.020 U	ICB

AON1 : 00078

LAB CONTROL RESULTS-CONVENTIONALS
AON1-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: LJ
Reported: 11/12/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Total Organic Carbon Plumb,1981	ICVL	11/11/15	Percent	0.096	0.100	96.0%

AON1 : 00079

STANDARD REFERENCE RESULTS-CONVENTIONALS
AON1-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 11/12/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Date	Units	SRM	True Value	Recovery
Total Organic Carbon NIST 1941B	11/11/15	Percent	3.05	2.99	102.0%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: CR-24-SSD-COMP
SAMPLE

Lab Sample ID: AON1F
LIMS ID: 15-19057
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Percent Total Solids: 53.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	10/22/15	6010C	10/28/15	7440-38-2	Arsenic	20	20	U
3050B	10/22/15	6010C	10/28/15	7440-43-9	Cadmium	0.9	0.9	U
3050B	10/22/15	6010C	10/28/15	**7440-47-3**	**Chromium**	2	**49**	
3050B	10/22/15	6010C	10/28/15	**7440-50-8**	**Copper**	0.9	**81.5**	
3050B	10/22/15	6010C	10/28/15	**7439-92-1**	**Lead**	9	**21**	
CLP	10/27/15	7471A	10/27/15	**7439-97-6**	**Mercury**	0.03	**0.16**	
3050B	10/22/15	6010C	10/28/15	7440-22-4	Silver	1	1	U
3050B	10/22/15	6010C	10/28/15	**7440-66-6**	**Zinc**	5	**107**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: CR-24-SSD-COMP DUPLICATE

Lab Sample ID: AON1F
LIMS ID: 15-19057
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	6010C	20 U	20 U	0.0%	+/- 20	L
Cadmium	6010C	0.9 U	0.9 U	0.0%	+/- 0.9	L
Chromium	6010C	49	49	0.0%	+/- 20%	
Copper	6010C	81.5	73.9	9.8%	+/- 20%	
Lead	6010C	21	45	72.7%	+/- 9	L*
Mercury	7471A	0.16	0.16	0.0%	+/- 0.03	L
Silver	6010C	1 U	1 U	0.0%	+/- 1	L
Zinc	6010C	107	118	9.8%	+/- 20%	

Reported in mg/kg-dry

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

AON1 : 00082

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: CR-24-SSD-COMP
MATRIX SPIKE

Lab Sample ID: AON1F
LIMS ID: 15-19057
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	6010C	20 U	360	362	99.4%	
Cadmium	6010C	0.9 U	93.7	90.6	103%	
Chromium	6010C	49	145	90.6	106%	
Copper	6010C	81.5	173	90.6	101%	
Lead	6010C	21	390	362	102%	
Mercury	7471A	0.16	0.52	0.345	104%	
Silver	6010C	1 U	95	90.6	105%	
Zinc	6010C	107	293	90.6	205%	N

Reported in mg/kg-dry

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

AON1 : 00083

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR11-SBSD-23
SAMPLE

Lab Sample ID: AON1Q
LIMS ID: 15-19068
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Percent Total Solids: 72.4%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	10/22/15	6010C	10/28/15	7440-38-2	Arsenic	20	20	U
3050B	10/22/15	6010C	10/28/15	7440-43-9	Cadmium	0.6	0.6	U
3050B	10/22/15	6010C	10/28/15	**7440-47-3**	**Chromium**	2	**37**	
3050B	10/22/15	6010C	10/28/15	**7440-50-8**	**Copper**	0.6	**47.0**	
3050B	10/22/15	6010C	10/28/15	7439-92-1	Lead	6	6	U
CLP	10/27/15	7471A	10/27/15	7439-97-6	Mercury	0.03	0.03	U
3050B	10/22/15	6010C	10/28/15	7440-22-4	Silver	1	1	U
3050B	10/22/15	6010C	10/28/15	**7440-66-6**	**Zinc**	3	**78**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

AON1 : 00084

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: CR12-SBSD-15
SAMPLE

Lab Sample ID: AON1R
LIMS ID: 15-19069
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Percent Total Solids: 56.3%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	10/22/15	6010C	10/28/15	7440-38-2	Arsenic	20	20	U
3050B	10/22/15	6010C	10/28/15	7440-43-9	Cadmium	0.8	0.8	U
3050B	10/22/15	6010C	10/28/15	**7440-47-3**	**Chromium**	2	**48**	
3050B	10/22/15	6010C	10/28/15	**7440-50-8**	**Copper**	0.8	**62.2**	
3050B	10/22/15	6010C	10/28/15	**7439-92-1**	**Lead**	8	**11**	
CLP	10/27/15	7471A	10/27/15	**7439-97-6**	**Mercury**	0.03	**0.09**	
3050B	10/22/15	6010C	10/28/15	7440-22-4	Silver	1	1	U
3050B	10/22/15	6010C	10/28/15	**7440-66-6**	**Zinc**	4	**86**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: CR13-SBSD-11
SAMPLE

Lab Sample ID: AON1S
LIMS ID: 15-19070
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Percent Total Solids: 57.2%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	10/22/15	6010C	10/28/15	7440-38-2	Arsenic	9	9	U
3050B	10/22/15	6010C	10/28/15	**7440-43-9**	**Cadmium**	0.3	**0.4**	
3050B	10/22/15	6010C	10/28/15	**7440-47-3**	**Chromium**	0.9	**41.3**	
3050B	10/22/15	6010C	10/28/15	**7440-50-8**	**Copper**	0.3	**55.1**	
3050B	10/22/15	6010C	10/28/15	**7439-92-1**	**Lead**	3	**9**	
CLP	10/27/15	7471A	10/27/15	**7439-97-6**	**Mercury**	0.03	**0.07**	
3050B	10/22/15	6010C	10/28/15	7440-22-4	Silver	0.5	0.5	U
3050B	10/22/15	6010C	10/28/15	**7440-66-6**	**Zinc**	2	**76**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

AON1 : 00086

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: CR14-SBSD-12
SAMPLE

Lab Sample ID: AON1T
LIMS ID: 15-19071
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Percent Total Solids: 56.1%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	10/22/15	6010C	10/28/15	7440-38-2	Arsenic	20	20	U
3050B	10/22/15	6010C	10/28/15	7440-43-9	Cadmium	0.8	0.8	U
3050B	10/22/15	6010C	10/28/15	**7440-47-3**	**Chromium**	2	**49**	
3050B	10/22/15	6010C	10/28/15	**7440-50-8**	**Copper**	0.8	**63.0**	
3050B	10/22/15	6010C	10/28/15	**7439-92-1**	**Lead**	8	**12**	
CLP	10/27/15	7471A	10/27/15	**7439-97-6**	**Mercury**	0.03	**0.09**	
3050B	10/22/15	6010C	10/28/15	7440-22-4	Silver	1	1	U
3050B	10/22/15	6010C	10/28/15	**7440-66-6**	**Zinc**	4	**90**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

AON1 : 00087

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TCLP METALS

Sample ID: CR11-14-SBSD-COMP
SAMPLE

Lab Sample ID: AON1A
LIMS ID: 15-19052
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
1311	10/21/15	6010C	10/28/15	7439-92-1	Lead	0.1	0.1	U
1311	10/21/15	7470A	10/21/15	7439-97-6	Mercury	0.0001	0.0001	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

AON1 : 00088

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TCLP METALS

Sample ID: CR11-14-SBSD-COMP DUPLICATE

Lab Sample ID: AON1A
LIMS ID: 15-19052
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing 1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Lead	6010C	0.1 U	0.1 U	0.0%	+/- 0.1	L
Mercury	7470A	0.0001 U	0.0001 U	0.0%	+/- 0.0001	L

Reported in mg/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

AON1 : 00089

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TCLP METALS

Sample ID: CR11-14-SBSD-COMP
MATRIX SPIKE

Lab Sample ID: AON1A
LIMS ID: 15-19052
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Lead	6010C	0.1 U	4.0	4.0	100%	
Mercury	7470A	0.0001 U	0.0011	0.0010	110%	

Reported in mg/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked or diluted near or below detection limit

Percent Recovery Limits: 75-125%

AON1 : 00090

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TCLP METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: AON1MB
LIMS ID: 15-19052
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
1311	10/21/15	6010C	10/28/15	7439-92-1	Lead	0.1	0.1	U
1311	10/21/15	7470A	10/21/15	7439-97-6	Mercury	0.0001	0.0001	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

AON1 : 00091

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: METHOD BLANK**

Lab Sample ID: AON1MB
LIMS ID: 15-19071
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	10/22/15	6010C	10/28/15	7440-38-2	Arsenic	5	5	U
3050B	10/22/15	6010C	10/28/15	7440-43-9	Cadmium	0.2	0.2	U
3050B	10/22/15	6010C	10/28/15	7440-47-3	Chromium	0.5	0.5	U
3050B	10/22/15	6010C	10/28/15	7440-50-8	Copper	0.2	0.2	U
3050B	10/22/15	6010C	10/28/15	7439-92-1	Lead	2	2	U
CLP	10/27/15	7471A	10/27/15	7439-97-6	Mercury	0.02	0.02	U
3050B	10/22/15	6010C	10/28/15	7440-22-4	Silver	0.3	0.3	U
3050B	10/22/15	6010C	10/28/15	7440-66-6	Zinc	1	1	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: LAB CONTROL

Lab Sample ID: AON1LCS
LIMS ID: 15-19071
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	6010C	207	200	104%	
Cadmium	6010C	51.2	50.0	102%	
Chromium	6010C	53.9	50.0	108%	
Copper	6010C	51.2	50.0	102%	
Lead	6010C	203	200	102%	
Mercury	7471A	0.52	0.50	104%	
Silver	6010C	53.7	50.0	107%	
Zinc	6010C	51	50	102%	

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%

AON1 : 00093

Analytical Resources, Incorporated
Analytical Chemists and Consultants

20 November 2015

Madi Novak
Maul, Foster and Alongi, Inc
2001 NW 19th Avenue
Suite 200
Portland, OR 97209

RE: Project: Seaport Landing
ARI Job No.: AON2

Dear Madi:

Please find enclosed the original chain of custody records and the final results for the samples from the project referenced above. Twenty sediment samples were received on October 14, 2015. Eighteen samples were placed on hold as specified. The remaining samples were analyzed for SVOCs, dioxins/furans, PCBs, TOC and total metals as requested.

The percent differences (%Ds) for pentachlorophenol and the surrogate, d14-p-terphenyl, were not within control limits for the CCAL that bracketed the 11/5/15 SIM-SVOC analyses of these samples. All positive results for these compounds have been flagged with a "Q" qualifier to denote the high %Ds.

The remaining analyses proceeded without incident of note.

An electronic copy of this package will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

cc: file AON2

Enclosures

MDH/mdh

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: AON 2	Turn-around Requested: Standard	Page: 3 of 5	
ARI Client Company: MFA	Phone: 503 501 5212	Date: 10/14	Ice Present?
Client Contact: Madi Novak		No. of Coolers:	Cooler Temps:
Client Project Name: Seaport Landing			
Client Project #: 1044.02.01-02	Samplers: JJP/MRM-RD		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	SVOAs	PCBs	Mercury	Metals	PAHs	TOC	Archive	Dioxin/Furans	Notes/Comments
CR09a-SSD-COMP	10/13/15	1140	Sed	4	X	X	X	X	X	X	X	X	
CR096-SSD-COMP	10/13/15	1145	Sed	4	X	X	X	X	X	X	X	X	
BA01-0-10cm		1109	Sed	1							X		
BA01-10cm-1		1100	Sed	1							X		
BA01-1-2		1050	Sed	1							X		
BA02-0-10cm		1105	Sed	1							X		
BA02-10cm-1		1107	Sed	1							X		
BA02-1-2		1110	Sed	1							X		
BA03-0-10cm		1113	Sed	1							X		
BA03-10cm-1		1115	Sed	1							X		

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Roxanne Degens	Printed Name: Archie Trapps	Printed Name:	Printed Name: Emily Litwin
	Company: MFA	Company: M-C-R	Company:	Company: ARI
	Date & Time: 10/14/15 1020	Date & Time: 10/14/15 10:20(A)	Date & Time:	Date & Time: 10/14/15 1235

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Chain of Custody Record & Laboratory Analysis Request

AON2 : 00003

ARI Assigned Number: AON2	Turn-around Requested: Standard	Page: 4 of 5	
ARI Client Company: MFA	Phone: (503) 501 5212	Date: 10/13	Ice Present? yes
Client Contact: S Madi Novak		No. of Coolers:	Cooler Temps:
Client Project Name: Seapoint Landing			
Client Project #: 1044.02.01-02	Samplers: JTP/MRM/RD		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: Archive	Notes/Comments
BA03-1-2	10/13	1117	Sed	1	X	
BA04-0-10cm	10/13	1120	Sed	1	X	
BA04-10cm-1	10/13	1125	Sed	1	X	
BA04-1-2	10/13	1127	Sed	1	X	
BA05-0-10cm	10/13	1130	Sed	1	X	
BA05 10cm-1	10/13	1132	Sed	1	X	
BA05-1-2	10/13	1135	Sed	1	X	
BA06-0-10cm	10/13	1140	Sed	1	X	
BA06-10cm-1	10/13	1142	Sed	1	X	
BA06-1-2	10/13	1145	Sed	1	X	

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Archive all samples.				
	Printed Name: Roxanne Degens	Printed Name: Archie Triest	Printed Name:	Printed Name: Emily Litwin
	Company: MFA	Company: M.C. Dec	Company:	Company: ARI
	Date & Time: 10/14/15 1020	Date & Time: 10/14/15 10:20	Date & Time:	Date & Time: 10/14/15 1235

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Maul Foster

COC No(s): _____ (NA)

Assigned ARI Job No: AON2

Project Name: _____

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES (NO)

Were custody papers included with the cooler? (YES) NO

Were custody papers properly filled out (ink, signed, etc.) (YES) NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 5.2 4.3 5.8 5.0 4.1

Time: _____

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D002565

Cooler Accepted by: UL Date: 10/14/16 Time: 1235

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES (NO)

What kind of packing material was used? ... Bubble Wrap (Wet Ice) Gel Packs (Baggies) (Foam Block) Paper Other: _____

Was sufficient ice used (if appropriate)? NA (YES) NO

Were all bottles sealed in individual plastic bags? YES (NO)

Did all bottles arrive in good condition (unbroken)? (YES) NO

Were all bottle labels complete and legible? (YES) NO

Did the number of containers listed on COC match with the number of containers received? (YES) NO

Did all bottle labels and tags agree with custody papers? (YES) NO

Were all bottles used correct for the requested analyses? (YES) NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... (NA) YES NO

Were all VOC vials free of air bubbles? (NA) YES NO

Was sufficient amount of sample sent in each bottle? (YES) NO

Date VOC Trip Blank was made at ARI..... NA _____

Was Sample Split by ARI : (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: UL Date: 10/16/16 Time: 1213

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm
• • •	• • •	● ● ●

Small → "sm" (< 2 mm)

Peabubbles → "pb" (2 to < 4 mm)

Large → "lg" (4 to < 6 mm)

Headspace → "hs" (> 6 mm)

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: AON2
Client: Maul Foster & Alongi
Project Event: 1044.02.01-02
Project Name: Seaport Landing

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	CR09a-SSD-COMP	AON2A	15-19072	Sediment	10/13/15 11:40	10/14/15 10:20
2.	CR09b-SSD-COMP	AON2B	15-19073	Sediment	10/13/15 11:45	10/14/15 10:20
3.	BA01-0-10CM	AON2C	15-19074	Sediment	10/13/15 11:03	10/14/15 10:20
4.	BA01-10CM-1	AON2D	15-19075	Sediment	10/13/15 11:00	10/14/15 10:20
5.	BA01-1-2	AON2E	15-19076	Sediment	10/13/15 10:50	10/14/15 10:20
6.	BA02-0-10CM	AON2F	15-19077	Sediment	10/13/15 11:05	10/14/15 10:20
7.	BA02-10CM-1	AON2G	15-19078	Sediment	10/13/15 11:07	10/14/15 10:20
8.	BA02-1-2	AON2H	15-19079	Sediment	10/13/15 11:10	10/14/15 10:20
9.	BA03-0-10CM	AON2I	15-19080	Sediment	10/13/15 11:13	10/14/15 10:20
10.	BA03-10CM-1	AON2J	15-19081	Sediment	10/13/15 11:15	10/14/15 10:20
11.	BA03-1-2	AON2K	15-19082	Sediment	10/13/15 11:17	10/14/15 10:20
12.	BA04-0-10CM	AON2L	15-19083	Sediment	10/13/15 11:20	10/14/15 10:20
13.	BA04-10CM-1	AON2M	15-19084	Sediment	10/13/15 11:25	10/14/15 10:20
14.	BA04-1-2	AON2N	15-19085	Sediment	10/13/15 11:27	10/14/15 10:20
15.	BA05-0-10CM	AON2O	15-19086	Sediment	10/13/15 11:30	10/14/15 10:20
16.	BA05-10CM-1	AON2P	15-19087	Sediment	10/13/15 11:32	10/14/15 10:20
17.	BA05-1-2	AON2Q	15-19088	Sediment	10/13/15 11:35	10/14/15 10:20
18.	BA06-0-10CM	AON2R	15-19089	Sediment	10/13/15 11:40	10/14/15 10:20
19.	BA06-10CM-1	AON2S	15-19090	Sediment	10/13/15 11:42	10/14/15 10:20
20.	BA06-1-2	AON2T	15-19091	Sediment	10/13/15 11:45	10/14/15 10:20

AON2:00005 RC

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Duplicate RPD is not within established control limits

B — Reported value is less than the CRDL but ≥ the Reporting Limit

N — Matrix Spike recovery not within established control limits

NA — Not Applicable, analyte not spiked

H — The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible

L — Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Flagged value is not within established control limits

B — Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.

J — Estimated concentration when the value is less than ARI's established reporting limits

D — The spiked compound was not detected due to sample extract dilution

E — Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

AON2 : 00006

Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).

S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte

NA The flagged analyte was not analyzed for

NR Spiked compound recovery is not reported due to chromatographic interference

NS The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

EMPC Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

X Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**

Z Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

AON2 : 00007

Geotechnical Data

A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F Samples were frozen prior to particle size determination

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighting

AON2 : 00008

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 2

Sample ID: MB-102315
METHOD BLANK

Lab Sample ID: MB-102315
LIMS ID: 15-19072
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/10/15

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 11/05/15 14:41
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	20	< 20 U
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	4-Methylphenol	20	< 20 U
105-67-9	2,4-Dimethylphenol	100	< 100 U
65-85-0	Benzoic Acid	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	Naphthalene	20	< 20 U
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	< 20 U
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	Acenaphthylene	20	< 20 U
83-32-9	Acenaphthene	20	< 20 U
132-64-9	Dibenzofuran	20	< 20 U
84-66-2	Diethylphthalate	20	< 20 U
86-73-7	Fluorene	20	< 20 U
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	100	< 100 U
85-01-8	Phenanthrene	20	< 20 U
120-12-7	Anthracene	20	< 20 U
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	Fluoranthene	20	< 20 U
129-00-0	Pyrene	20	< 20 U
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	Benzo(a)anthracene	20	< 20 U
117-81-7	bis(2-Ethylhexyl)phthalate	50	< 50 U
218-01-9	Chrysene	20	< 20 U
117-84-0	Di-n-Octyl phthalate	20	< 20 U
50-32-8	Benzo(a)pyrene	20	< 20 U
193-39-5	Indeno(1,2,3-cd)pyrene	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	20	< 20 U
90-12-0	1-Methylnaphthalene	20	< 20 U
TOTBFA	Total Benzofluoranthenes	40	< 40 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: MB-102315
METHOD BLANK

Lab Sample ID: MB-102315
LIMS ID: 15-19072
Matrix: Sediment
Date Analyzed: 11/05/15 14:41

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	75.8%	2-Fluorobiphenyl	75.8%
d14-p-Terphenyl	104%	d4-1,2-Dichlorobenzene	77.4%
d5-Phenol	72.9%	2-Fluorophenol	68.9%
2,4,6-Tribromophenol	74.7%	d4-2-Chlorophenol	76.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR09a-SSD-COMP SAMPLE

Lab Sample ID: AON2A
LIMS ID: 15-19072
Matrix: Sediment
Data Release Authorized:
Reported: 12/04/15

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing 1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/05/15 20:05
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.54 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 38.0%

CAS Number	Analyte	LOQ	Result
108-95-2	**Phenol**	**19**	**130**
106-46-7	1,4-Dichlorobenzene	19	< 19 U
100-51-6	Benzyl Alcohol	19	< 19 U
95-50-1	1,2-Dichlorobenzene	19	< 19 U
95-48-7	2-Methylphenol	19	< 19 U
106-44-5	**4-Methylphenol**	**19**	**26**
105-67-9	2,4-Dimethylphenol	95	< 95 U
65-85-0	**Benzoic Acid**	**190**	**230**
120-82-1	1,2,4-Trichlorobenzene	19	< 19 U
91-20-3	**Naphthalene**	**19**	**45**
87-68-3	Hexachlorobutadiene	19	< 19 U
91-57-6	2-Methylnaphthalene	19	< 19 U
131-11-3	Dimethylphthalate	19	< 19 U
208-96-8	Acenaphthylene	19	< 19 U
83-32-9	Acenaphthene	19	< 19 U
132-64-9	Dibenzofuran	19	< 19 U
84-66-2	Diethylphthalate	19	< 19 U
86-73-7	Fluorene	19	< 19 U
86-30-6	N-Nitrosodiphenylamine	19	< 19 U
118-74-1	Hexachlorobenzene	19	< 19 U
87-86-5	Pentachlorophenol	95	< 95 U
85-01-8	**Phenanthrene**	**19**	**26**
120-12-7	Anthracene	19	< 19 U
84-74-2	Di-n-Butylphthalate	19	< 19 U
206-44-0	**Fluoranthene**	**19**	**22**
129-00-0	**Pyrene**	**19**	**17 J**
85-68-7	Butylbenzylphthalate	19	< 19 U
56-55-3	Benzo(a)anthracene	19	< 19 U
117-81-7	**bis(2-Ethylhexyl)phthalate**	**47**	**43 J**
218-01-9	**Chrysene**	**19**	**10 J**
117-84-0	Di-n-Octyl phthalate	19	< 19 U
50-32-8	Benzo(a)pyrene	19	< 19 U
193-39-5	Indeno(1,2,3-cd)pyrene	19	< 19 U
53-70-3	Dibenz(a,h)anthracene	19	< 19 U
191-24-2	Benzo(g,h,i)perylene	19	< 19 U
90-12-0	**1-Methylnaphthalene**	**19**	**9.5 J**
TOTBFA	**Total Benzofluoranthenes**	**38**	**12 J**

AON2: 00011 RE

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR09a-SSD-COMP SAMPLE

Lab Sample ID: AON2A
LIMS ID: 15-19072
Matrix: Sediment
Date Analyzed: 11/05/15 20:05

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	51.0%	2-Fluorobiphenyl	53.4%
d14-p-Terphenyl	70.6%	d4-1,2-Dichlorobenzene	49.0%
d5-Phenol	52.4%	2-Fluorophenol	49.7%
2,4,6-Tribromophenol	66.7%	d4-2-Chlorophenol	53.1%

AON2: 00012 RE

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 2

Sample ID: CR09b-SSD-COMP SAMPLE

Lab Sample ID: AON2B
LIMS ID: 15-19073
Matrix: Sediment
Data Release Authorized:
Reported: 12/04/15

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing 1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/05/15 20:41
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.34 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 48.3%

CAS Number	Analyte	LOQ	Result
108-95-2	**Phenol**	**19**	**200**
106-46-7	1,4-Dichlorobenzene	19	< 19 U
100-51-6	**Benzyl Alcohol**	**19**	**41**
95-50-1	1,2-Dichlorobenzene	19	< 19 U
95-48-7	2-Methylphenol	19	< 19 U
106-44-5	4-Methylphenol	19	< 19 U
105-67-9	2,4-Dimethylphenol	97	< 97 U
65-85-0	**Benzoic Acid**	**190**	**380**
120-82-1	1,2,4-Trichlorobenzene	19	< 19 U
91-20-3	Naphthalene	19	< 19 U
87-68-3	Hexachlorobutadiene	19	< 19 U
91-57-6	2-Methylnaphthalene	19	< 19 U
131-11-3	Dimethylphthalate	19	< 19 U
208-96-8	Acenaphthylene	19	< 19 U
83-32-9	Acenaphthene	19	< 19 U
132-64-9	Dibenzofuran	19	< 19 U
84-66-2	Diethylphthalate	19	< 19 U
86-73-7	**Fluorene**	**19**	**14 J**
86-30-6	N-Nitrosodiphenylamine	19	< 19 U
118-74-1	Hexachlorobenzene	19	< 19 U
87-86-5	Pentachlorophenol	97	< 97 U
85-01-8	**Phenanthrene**	**19**	**52**
120-12-7	**Anthracene**	**19**	**11 J**
84-74-2	Di-n-Butylphthalate	19	< 19 U
206-44-0	**Fluoranthene**	**19**	**52**
129-00-0	**Pyrene**	**19**	**40**
85-68-7	Butylbenzylphthalate	19	< 19 U
56-55-3	**Benzo(a)anthracene**	**19**	**14 J**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**48**	**39 J**
218-01-9	**Chrysene**	**19**	**24**
117-84-0	Di-n-Octyl phthalate	19	< 19 U
50-32-8	**Benzo(a)pyrene**	**19**	**12 J**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**19**	**13 J**
53-70-3	Dibenz(a,h)anthracene	19	< 19 U
191-24-2	**Benzo(g,h,i)perylene**	**19**	**14 J**
90-12-0	1-Methylnaphthalene	19	< 19 U
TOTBFA	**Total Benzofluoranthenes**	**39**	**34 J**

AON2: 00013 RE

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR09b-SSD-COMP SAMPLE

Lab Sample ID: AON2B
LIMS ID: 15-19073
Matrix: Sediment
Date Analyzed: 11/05/15 20:41

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	64.0%	2-Fluorobiphenyl	69.2%
d14-p-Terphenyl	90.6%	d4-1,2-Dichlorobenzene	64.4%
d5-Phenol	68.4%	2-Fluorophenol	58.9%
2,4,6-Tribromophenol	82.8%	d4-2-Chlorophenol	69.2%

AON2: DDD 14 RL

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270 GC/MS

Sample ID: LCS-102315
LAB CONTROL

Lab Sample ID: LCS-102315
LIMS ID: 15-19072
Matrix: Sediment
Data Release Authorized:
Reported: 11/10/15

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/05/15 15:17
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Phenol	309	500	61.8%
1,4-Dichlorobenzene	273	500	54.6%
Benzyl Alcohol	302	500	60.4%
1,2-Dichlorobenzene	286	500	57.2%
2-Methylphenol	300	500	60.0%
4-Methylphenol	334	500	66.8%
2,4-Dimethylphenol	875	1500	58.3%
Benzoic Acid	1860	2750	67.6%
1,2,4-Trichlorobenzene	285	500	57.0%
Naphthalene	291	500	58.2%
Hexachlorobutadiene	298	500	59.6%
2-Methylnaphthalene	305	500	61.0%
Dimethylphthalate	324	500	64.8%
Acenaphthylene	306	500	61.2%
Acenaphthene	321	500	64.2%
Dibenzofuran	310	500	62.0%
Diethylphthalate	344	500	68.8%
Fluorene	309	500	61.8%
N-Nitrosodiphenylamine	298	500	59.6%
Hexachlorobenzene	282	500	56.4%
Pentachlorophenol	805	1500	53.7%
Phenanthrene	307	500	61.4%
Anthracene	308	500	61.6%
Di-n-Butylphthalate	331	500	66.2%
Fluoranthene	292	500	58.4%
Pyrene	293	500	58.6%
Butylbenzylphthalate	329	500	65.8%
Benzo(a)anthracene	323	500	64.6%
bis(2-Ethylhexyl)phthalate	312	500	62.4%
Chrysene	310	500	62.0%
Di-n-Octyl phthalate	278	500	55.6%
Benzo(a)pyrene	310	500	62.0%
Indeno(1,2,3-cd)pyrene	341	500	68.2%
Dibenz(a,h)anthracene	347	500	69.4%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270 GC/MS

Sample ID: LCS-102315
LAB CONTROL

Lab Sample ID: LCS-102315
LIMS ID: 15-19072
Matrix: Sediment
Date Analyzed: 11/05/15 15:17

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Analyte	Lab Control	Spike Added	Recovery
Benzo(g,h,i)perylene	281	500	56.2%
1-Methylnaphthalene	277	500	55.4%
Total Benzofluoranthenes	686	1000	68.6%

Semivolatile Surrogate Recovery

d5-Nitrobenzene	65.2%
2-Fluorobiphenyl	64.6%
d14-p-Terphenyl	79.4%
d4-1,2-Dichlorobenzene	53.8%
d5-Phenol	66.7%
2-Fluorophenol	59.7%
2,4,6-Tribromophenol	68.0%
d4-2-Chlorophenol	62.9%

Reported in µg/kg (ppb)

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT OUT
MB-102315	75.8%	75.8%	104%	77.4%	72.9%	68.9%	74.7%	76.5%	0
LCS-102315	65.2%	64.6%	79.4%	53.8%	66.7%	59.7%	68.0%	62.9%	0
CRO9a-SSD-COMP	51.0%	53.4%	70.6%	49.0%	52.4%	49.7%	66.7%	53.1%	0
CRO96-SSD-COMP	64.0%	69.2%	90.6%	64.4%	68.4%	58.9%	82.8%	69.2%	0

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(30-120)	(30-120)
(FBP) = 2-Fluorobiphenyl	(35-120)	(35-120)
(TPH) = d14-p-Terphenyl	(37-120)	(37-120)
(DCB) = d4-1,2-Dichlorobenzene	(32-120)	(32-120)
(PHL) = d5-Phenol	(29-120)	(29-120)
(2FP) = 2-Fluorophenol	(27-120)	(27-120)
(TBP) = 2,4,6-Tribromophenol	(24-134)	(24-134)
(2CP) = d4-2-Chlorophenol	(31-120)	(31-120)

Prep Method: SW3546
Log Number Range: 15-19072 to 15-19073

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: MB-102315**
Extraction Method: SW3546 **METHOD BLANK**

Lab Sample ID: MB-102315
LIMS ID: 15-19072
Matrix: Sediment
Data Release Authorized:
Reported: 11/12/15

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 11/05/15 14:41
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	Dibenz(a,h)anthracene	5.0	< 5.0 U
106-46-7	1,4-Dichlorobenzene	5.0	< 5.0 U
120-82-1	1,2,4-Trichlorobenzene	5.0	< 5.0 U
118-74-1	Hexachlorobenzene	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	5.0	< 5.0 U
131-11-3	Dimethylphthalate	5.0	< 5.0 U
85-68-7	Butylbenzylphthalate	5.0	< 5.0 U
95-48-7	2-Methylphenol	5.0	< 5.0 U
105-67-9	2,4-Dimethylphenol	25	< 25 U
86-30-6	N-Nitrosodiphenylamine	5.0	< 5.0 U
100-51-6	Benzyl Alcohol	20	< 20 U
87-86-5	Pentachlorophenol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	5.0	< 5.0 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	64.3%
d14-p-Terphenyl	83.6% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR09a-SSD-COMP**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AON2A
LIMS ID: 15-19072
Matrix: Sediment
Data Release Authorized:
Reported: 12/04/15

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/05/15 20:05
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.54 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 38.0%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	Dibenz(a,h)anthracene	4.7	< 4.7 U
106-46-7	**1,4-Dichlorobenzene**	**4.7**	**4.2 J**
120-82-1	1,2,4-Trichlorobenzene	4.7	< 4.7 U
118-74-1	Hexachlorobenzene	4.7	< 4.7 U
87-68-3	Hexachlorobutadiene	4.7	< 4.7 U
131-11-3	Dimethylphthalate	4.7	< 4.7 U
85-68-7	**Butylbenzylphthalate**	**4.7**	**5.1**
95-48-7	**2-Methylphenol**	**4.7**	**4.0 J**
105-67-9	2,4-Dimethylphenol	24	< 24 U
86-30-6	N-Nitrosodiphenylamine	4.7	< 4.7 U
100-51-6	Benzyl Alcohol	19	< 19 U
87-86-5	Pentachlorophenol	19	< 19 U
95-50-1	1,2-Dichlorobenzene	4.7	< 4.7 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery	
2-Fluorophenol	45.7%
d14-p-Terphenyl	55.6% Q

AON2-00019RE

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR09b-SSD-COMP**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AON2B
LIMS ID: 15-19073
Matrix: Sediment
Data Release Authorized:
Reported: 12/04/15

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/05/15 20:41
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.37 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 48.3%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**4.8**	**3.9 J**
106-46-7	1,4-Dichlorobenzene	4.8	< 4.8 U
120-82-1	1,2,4-Trichlorobenzene	4.8	< 4.8 U
118-74-1	Hexachlorobenzene	4.8	< 4.8 U
87-68-3	Hexachlorobutadiene	4.8	< 4.8 U
131-11-3	Dimethylphthalate	4.8	< 4.8 U
85-68-7	Butylbenzylphthalate	4.8	< 4.8 U
95-48-7	**2-Methylphenol**	**4.8**	**7.3**
105-67-9	2,4-Dimethylphenol	24	< 24 U
86-30-6	N-Nitrosodiphenylamine	4.8	< 4.8 U
100-51-6	**Benzyl Alcohol**	**19**	**58**
87-86-5	Pentachlorophenol	19	< 19 U
95-50-1	1,2-Dichlorobenzene	4.8	< 4.8 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	57.1%
d14-p-Terphenyl	68.8% Q

AON2-00020RE

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: LCS-102315**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-102315
LIMS ID: 15-19072
Matrix: Sediment
Data Release Authorized:
Reported: 11/12/15

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed LCS: 11/05/15 15:17
Instrument/Analyst LCS: NT10/YZ

Sample Amount LCS: 10.00 g-dry-wt
Final Extract Volume LCS: 1.0 mL
Dilution Factor LCS: 1.00

Analyte	LCS	Spike Added	Recovery
Dibenz(a,h)anthracene	305	500	61.0%
1,4-Dichlorobenzene	262	500	52.4%
1,2,4-Trichlorobenzene	270	500	54.0%
Hexachlorobenzene	273	500	54.6%
Hexachlorobutadiene	292	500	58.4%
Dimethylphthalate	308	500	61.6%
Butylbenzylphthalate	344	500	68.8%
2-Methylphenol	276	500	55.2%
2,4-Dimethylphenol	814	1500	54.3%
N-Nitrosodiphenylamine	291	500	58.2%
Benzyl Alcohol	346	500	69.2%
Pentachlorophenol	1000 EQ	1500	66.7%
1,2-Dichlorobenzene	274	500	54.8%

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	58.1%
d14-p-Terphenyl	65.6% Q

ANALYTICAL RESOURCES INCORPORATED

SIM SW8270 SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	FPH	TER	TOT OUT
MB-102315	64.3%	83.6% Q	0
LCS-102315	58.1%	65.6% Q	0
CRO9a-SSD-COMP	45.7%	55.6% Q	0
CRO96-SSD-COMP	57.1%	68.8% Q	0

	QC LIMITS	
(FPH) = 2-Fluorophenol	(27-120)	(27-120)
(TER) = d14-p-Terphenyl	(37-120)	(37-120)

Prep Method: SW3546
Log Number Range: 15-19072 to 15-19073

ARI Labs, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i
Lab File ID: CC1105A.D
Analysis Type:
Lab Sample ID: CC1105A
Method: \\target\share\chem3\nt10.i\20151105.b\SIM.b\SIMABN2.m

Injection Date: 05-NOV-2015 14:04
Init. Cal. Date(s): 19-OCT-2015 19-OCT-2015
Init. Cal. Times: 11:52 16:39
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RF1	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
$ 1 2-Fluorophenol	1.04543	0.98207	0.010	-6.06090	20.00000	Averaged	
3 Phenol	1.55661	1.46467	0.010	-5.90683	20.00000	Averaged	
7 1,3-Dichlorobenzene	1.76229	1.78433	0.010	1.25101	20.00000	Averaged	
9 1,4-Dichlorobenzene	1.73930	1.78433	0.010	2.58940	20.00000	Averaged	
11 Benzyl alcohol	0.81726	0.79485	0.010	-2.74242	20.00000	Averaged	
12 1,2-Dichlorobenzene	1.62946	1.72457	0.010	5.83701	20.00000	Averaged	
13 2-Methylphenol	0.93390	0.81370	0.010	-12.87015	20.00000	Averaged	
15 4-Methylphenol	0.91605	0.81780	0.010	-10.72571	20.00000	Averaged	
16 N-Nitroso-di-n-propylamine	0.61594	0.57662	0.050	-6.38240	20.00000	Averaged	
22 2,4-Dimethylphenol	0.39393	0.33255	0.010	-15.58052	20.00000	Averaged	
26 1,2,4-Trichlorobenzene	0.39456	0.41910	0.010	6.21998	20.00000	Averaged	
30 Hexachlorobutadiene	0.30361	0.33208	0.010	9.37722	20.00000	Averaged	
39 Dimethylphthalate	1.14558	1.01470	0.010	-11.42453	20.00000	Averaged	
50 Diethylphthalate	1.23806	1.13213	0.010	-8.55608	20.00000	Averaged	
54 N-Nitrosodiphenylamine	0.61955	0.57444	0.010	-7.27995	20.00000	Averaged	
57 Hexachlorobenzene	0.41451	0.46057	0.010	11.11164	20.00000	Averaged	
58 Pentachlorophenol	0.21311	0.15371	0.005	-27.87342	20.00000	Averaged	<-
$ 66 Terphenyl-d14	0.36942	0.25581	0.010	-30.75549	20.00000	Averaged	<-
67 Butylbenzylphthalate	0.41305	0.39038	0.010	-5.48875	20.00000	Averaged	
79 Dibenzo(a,h)anthracene	1.15706	1.04200	0.010	-9.94423	20.00000	Averaged	
90 N-Nitrosodimethylamine	0.44352	0.46419	0.010	4.66003	20.00000	Averaged	

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: CR09a-SSD-COMP

Lab Sample ID: AON2A
LIMS ID: 15-19072
Matrix: Sediment
Data Release Authorized:
Reported: 12/04/15

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 20:14
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.1 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Silica-Florisil Cleanup: Yes
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.69	0.65-0.89		0.987	0.831	J
2,3,7,8-TCDD	0.81	0.65-0.89		0.987	1.18	
1,2,3,7,8-PeCDF	1.30	1.32-1.78		0.987	0.383	JXEMPC
2,3,4,7,8-PeCDF	1.30	1.32-1.78		0.987	0.379	JEMPC
1,2,3,7,8-PeCDD	1.46	1.32-1.78		0.987	1.99	
1,2,3,4,7,8-HxCDF	1.02	1.05-1.43		0.987	0.991	EMPC
1,2,3,6,7,8-HxCDF	1.27	1.05-1.43		0.987	0.626	J
2,3,4,6,7,8-HxCDF	1.10	1.05-1.43		0.987	0.991	
1,2,3,7,8,9-HxCDF	1.07	1.05-1.43		0.987	0.395	J
1,2,3,4,7,8-HxCDD	1.20	1.05-1.43		0.987	1.32	
1,2,3,6,7,8-HxCDD	1.22	1.05-1.43		0.987	5.25	
1,2,3,7,8,9-HxCDD	1.20	1.05-1.43		0.987	5.49	
1,2,3,4,6,7,8-HpCDF	0.93	0.88-1.20		0.987	14.6	
1,2,3,4,7,8,9-HpCDF	1.04	0.88-1.20		0.987	0.908	J
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20		0.987	95.4	
OCDF	0.83	0.76-1.02		1.97	23.8	
OCDD	0.88	0.76-1.02		9.87	700	

Homologue Group	EDL	RL	Result	
Total TCDF		0.987	6.42	EMPC
Total TCDD		0.987	8.55	EMPC
Total PeCDF		1.97	10.6	EMPC
Total PeCDD		0.987	12.4	EMPC
Total HxCDF		1.97	22.2	EMPC
Total HxCDD		1.97	48.3	EMPC
Total HpCDF		1.97	37.3	
Total HpCDD		1.97	225	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 6.21

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 6.21

Reported in pg/g

AON2-00024RL

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: CR09a-SSD-COMP

Lab Sample ID: AON2A
LIMS ID: 15-19072
Matrix: Sediment
Data Release Authorized:
Reported: 12/04/15

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 20:14
Instrument/Analyst: AS1/PK

Sample Amount: 10.1 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.77	0.65-0.89	92.4	24-169	
13C-2,3,7,8-TCDD	0.76	0.65-0.89	89.9	25-164	
13C-1,2,3,7,8-PeCDF	1.56	1.32-1.78	96.6	24-185	
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	95.5	21-178	
13C-1,2,3,7,8-PeCDD	1.58	1.32-1.78	95.8	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	90.1	26-152	
13C-1,2,3,6,7,8-HxCDF	0.51	0.43-0.59	85.8	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	92.9	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	89.4	29-147	
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	95.9	32-141	
13C-1,2,3,6,7,8-HxCDD	1.25	1.05-1.43	89.5	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	84.3	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	85.5	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20	90.4	23-140	
13C-OCDD	0.89	0.76-1.02	82.3	17-157	
37Cl4-2,3,7,8-TCDD			97.7	35-197	

Reported in Percent Recovery

AON2: 00025 RL

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: CR09b-SSD-COMP

Lab Sample ID: AON2B
LIMS ID: 15-19073
Matrix: Sediment
Data Release Authorized:
Reported: 12/04/15

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 21:08
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Silica-Florisil Cleanup: Yes
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.67	0.65-0.89		0.996	1.63	
2,3,7,8-TCDD	0.63	0.65-0.89		0.996	2.06	EMPC
1,2,3,7,8-PeCDF	1.39	1.32-1.78		0.996	0.394	J
2,3,4,7,8-PeCDF	1.25	1.32-1.78		0.996	0.528	JEMPC
1,2,3,7,8-PeCDD	1.44	1.32-1.78		0.996	3.16	
1,2,3,4,7,8-HxCDF	1.04	1.05-1.43		0.996	1.16	EMPC
1,2,3,6,7,8-HxCDF	1.27	1.05-1.43		0.996	0.924	J
2,3,4,6,7,8-HxCDF	1.30	1.05-1.43		0.996	1.36	
1,2,3,7,8,9-HxCDF	1.14	1.05-1.43		0.996	0.420	J
1,2,3,4,7,8-HxCDD	1.15	1.05-1.43		0.996	1.57	
1,2,3,6,7,8-HxCDD	1.21	1.05-1.43		0.996	6.27	
1,2,3,7,8,9-HxCDD	1.15	1.05-1.43		0.996	7.96	
1,2,3,4,6,7,8-HpCDF	0.91	0.88-1.20		0.996	23.9	
1,2,3,4,7,8,9-HpCDF	1.15	0.88-1.20		0.996	1.15	
1,2,3,4,6,7,8-HpCDD	1.02	0.88-1.20		0.996	107	
OCDF	0.79	0.76-1.02		1.99	33.8	
OCDD	0.87	0.76-1.02		9.96	788	

Homologue Group	EDL	RL	Result	
Total TCDF		0.996	12.5	EMPC
Total TCDD		0.996	15.4	EMPC
Total PeCDF		1.99	16.5	EMPC
Total PeCDD		0.996	21.0	EMPC
Total HxCDF		1.99	30.8	EMPC
Total HxCDD		1.99	72.3	EMPC
Total HpCDF		1.99	58.9	EMPC
Total HpCDD		1.99	273	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 9.09

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 9.09

Reported in pg/g

AON2: 00026 RE

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: CR09b-SSD-COMP

Lab Sample ID: AON2B
LIMS ID: 15-19073
Matrix: Sediment
Data Release Authorized:
Reported: 12/04/15

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 21:08
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	88.1	24-169	
13C-2,3,7,8-TCDD	0.79	0.65-0.89	83.4	25-164	
13C-1,2,3,7,8-PeCDF	1.55	1.32-1.78	89.5	24-185	
13C-2,3,4,7,8-PeCDF	1.55	1.32-1.78	85.6	21-178	
13C-1,2,3,7,8-PeCDD	1.58	1.32-1.78	85.6	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	88.4	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	84.7	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	87.3	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	83.1	29-147	
13C-1,2,3,4,7,8-HxCDD	1.30	1.05-1.43	92.0	32-141	
13C-1,2,3,6,7,8-HxCDD	1.25	1.05-1.43	86.1	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	77.5	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	77.6	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	83.3	23-140	
13C-OCDD	0.88	0.76-1.02	78.8	17-157	
37Cl4-2,3,7,8-TCDD			94.9	35-197	

Reported in Percent Recovery

AON2: 00027 RE

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: MB-102315

Lab Sample ID: MB-102315
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 14:04
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF		0.65-0.89	0.0360	1.00	< 0.0360	U
2,3,7,8-TCDD		0.65-0.89	0.0520	1.00	< 0.0520	U
1,2,3,7,8-PeCDF		1.32-1.78	0.0380	1.00	< 0.0380	U
2,3,4,7,8-PeCDF		1.32-1.78	0.0400	1.00	< 0.0400	U
1,2,3,7,8-PeCDD		1.32-1.78	0.0640	1.00	< 0.0640	U
1,2,3,4,7,8-HxCDF		1.05-1.43	0.0440	1.00	< 0.0440	U
1,2,3,6,7,8-HxCDF		1.05-1.43	0.0400	1.00	< 0.0400	U
2,3,4,6,7,8-HxCDF	1.37	1.05-1.43		1.00	0.0400	J
1,2,3,7,8,9-HxCDF	1.13	1.05-1.43		1.00	0.0360	J
1,2,3,4,7,8-HxCDD		1.05-1.43	0.0520	1.00	< 0.0520	U
1,2,3,6,7,8-HxCDD	1.75	1.05-1.43		1.00	0.0480	JEMPC
1,2,3,7,8,9-HxCDD	0.96	1.05-1.43		1.00	0.106	JEMPC
1,2,3,4,6,7,8-HpCDF	0.58	0.88-1.20		1.00	0.118	JEMPC
1,2,3,4,7,8,9-HpCDF	0.90	0.88-1.20		1.00	0.0480	J
1,2,3,4,6,7,8-HpCDD	1.00	0.88-1.20		1.00	0.962	J
OCDF	0.68	0.76-1.02		2.00	0.378	JEMPC
OCDD	0.86	0.76-1.02		10.0	6.81	

Homologue Group	EDL	RL	Result	
Total TCDF	0.0360	1.00	< 0.0360	U
Total TCDD	0.0520	1.00	< 0.0520	U
Total PeCDF	0.0400	2.00	< 0.0400	U
Total PeCDD	0.0640	1.00	< 0.0640	U
Total HxCDF		2.00	0.116	EMPC
Total HxCDD		2.00	0.760	EMPC
Total HpCDF		2.00	0.341	EMPC
Total HpCDD		2.00	2.29	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 0.04

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 0.11

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: MB-102315

Lab Sample ID: MB-102315
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 14:04
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.77	0.65-0.89	104	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	99.2	25-164	
13C-1,2,3,7,8-PeCDF	1.56	1.32-1.78	108	24-185	
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	104	21-178	
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	104	25-181	
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	102	26-152	
13C-1,2,3,6,7,8-HxCDF	0.51	0.43-0.59	102	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	101	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	98.6	29-147	
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	108	32-141	
13C-1,2,3,6,7,8-HxCDD	1.23	1.05-1.43	103	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	97.4	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	98.8	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.07	0.88-1.20	106	23-140	
13C-OCDD	0.90	0.76-1.02	92.3	17-157	
37Cl4-2,3,7,8-TCDD			108	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-102315

Lab Sample ID: OPR-102315
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 14:55
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	RL	Result
2,3,7,8-TCDF	0.67	0.65-0.89	1.00	20.1
2,3,7,8-TCDD	0.76	0.65-0.89	1.00	21.8
1,2,3,7,8-PeCDF	1.45	1.32-1.78	1.00	103
2,3,4,7,8-PeCDF	1.41	1.32-1.78	1.00	102
1,2,3,7,8-PeCDD	1.54	1.32-1.78	1.00	104
1,2,3,4,7,8-HxCDF	1.15	1.05-1.43	1.00	106
1,2,3,6,7,8-HxCDF	1.16	1.05-1.43	1.00	103
2,3,4,6,7,8-HxCDF	1.16	1.05-1.43	1.00	107
1,2,3,7,8,9-HxCDF	1.14	1.05-1.43	1.00	105
1,2,3,4,7,8-HxCDD	1.23	1.05-1.43	1.00	104
1,2,3,6,7,8-HxCDD	1.22	1.05-1.43	1.00	104
1,2,3,7,8,9-HxCDD	1.24	1.05-1.43	1.00	105
1,2,3,4,6,7,8-HpCDF	0.98	0.88-1.20	1.00	109
1,2,3,4,7,8,9-HpCDF	0.98	0.88-1.20	1.00	106
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20	1.00	104
OCDF	0.83	0.76-1.02	2.00	202
OCDD	0.90	0.76-1.02	10.0	218

Homologue Group	EDL	RL	Result	
Total TCDF		1.00	20.9	EMPC
Total TCDD		1.00	22.3	
Total PeCDF		2.00	211	EMPC
Total PeCDD		1.00	105	EMPC
Total HxCDF		2.00	422	EMPC
Total HxCDD		2.00	314	EMPC
Total HpCDF		2.00	216	EMPC
Total HpCDD		2.00	108	EMPC

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-102315

Lab Sample ID: OPR-102315
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 14:55
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.77	0.65-0.89	100	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	96.4	25-164	
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	105	24-185	
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	102	21-178	
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	104	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	97.3	26-152	
13C-1,2,3,6,7,8-HxCDF	0.50	0.43-0.59	97.0	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	96.3	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	93.6	29-147	
13C-1,2,3,4,7,8-HxCDD	1.28	1.05-1.43	102	32-141	
13C-1,2,3,6,7,8-HxCDD	1.25	1.05-1.43	99.8	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	90.6	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	91.8	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20	97.8	23-140	
13C-OCDD	0.89	0.76-1.02	83.1	17-157	
37Cl4-2,3,7,8-TCDD			106	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-102315

Lab Sample ID: OPR-102315
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 14:55
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	OPR	Spiked	Recovery	Limits
2,3,7,8-TCDF	20.1	20.0	100	75-158
2,3,7,8-TCDD	21.8	20.0	109	67-158
1,2,3,7,8-PeCDF	103	100	103	80-134
2,3,4,7,8-PeCDF	102	100	102	68-160
1,2,3,7,8-PeCDD	104	100	104	70-142
1,2,3,4,7,8-HxCDF	106	100	106	72-134
1,2,3,6,7,8-HxCDF	103	100	103	84-130
2,3,4,6,7,8-HxCDF	107	100	107	70-156
1,2,3,7,8,9-HxCDF	105	100	105	78-130
1,2,3,4,7,8-HxCDD	104	100	104	70-164
1,2,3,6,7,8-HxCDD	104	100	104	76-134
1,2,3,7,8,9-HxCDD	105	100	105	64-162
1,2,3,4,6,7,8-HpCDF	109	100	109	82-132
1,2,3,4,7,8,9-HpCDF	106	100	106	78-138
1,2,3,4,6,7,8-HpCDD	104	100	104	70-140
OCDF	202	200	101	63-170
OCDD	218	200	109	78-144

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546

Sample ID: CR09a-SSD-COMP
SAMPLE

Lab Sample ID: AON2A
LIMS ID: 15-19072
Matrix: Sediment
Data Release Authorized:
Reported: 12/04/15

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/20/15
Date Analyzed: 10/24/15 04:15
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.59 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 38.0%

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	18	< 18 U
53469-21-9	Aroclor 1242	18	< 18 U
12672-29-6	Aroclor 1248	18	< 18 U
11097-69-1	Aroclor 1254	18	< 18 U
11096-82-5	Aroclor 1260	18	< 18 U
11104-28-2	Aroclor 1221	18	< 18 U
11141-16-5	Aroclor 1232	18	< 18 U
11100-14-4	Aroclor 1268	18	< 18 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	78.2%
Tetrachlorometaxylene	75.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546

Sample ID: CR09b-SSD-COMP
SAMPLE

Lab Sample ID: AON2B
LIMS ID: 15-19073
Matrix: Sediment
Data Release Authorized: B
Reported: 12/04/15

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Date Extracted: 10/20/15
Date Analyzed: 10/24/15 04:36
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.21 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 48.3%

CAS Number	Analyte	LOQ	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
11100-14-4	Aroclor 1268	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	74.5%
Tetrachlorometaxylene	74.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3546
Page 1 of 1

Sample ID: MB-102015
METHOD BLANK

Lab Sample ID: MB-102015
LIMS ID: 15-19072
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/20/15
Date Analyzed: 10/23/15 23:17
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

CAS Number	Analyte	LOQ	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
11100-14-4	Aroclor 1268	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	96.2%
Tetrachlorometaxylene	74.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Page 1 of 1

Sample ID: LCS-102015
LAB CONTROL

Lab Sample ID: LCS-102015
LIMS ID: 15-19072
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/20/15
Date Analyzed: 10/23/15 23:39
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Aroclor 1016	407	500	81.4%
Aroclor 1260	516	500	103%

PCB Surrogate Recovery

Decachlorobiphenyl	96.0%
Tetrachlorometaxylene	73.2%

Results reported in µg/kg (ppb)

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB SOIL/SOLID/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-102015	96.2%	59-115	74.8%	58-112	0
LCS-102015	96.0%	59-115	73.2%	58-112	0
CR09a-SSD-COMP	78.2%	47-120	75.5%	53-116	0
CR096-SSD-COMP	74.5%	47-120	74.0%	53-116	0

Microwave (MARS) Control Limits PCBSMI
Prep Method: SW3546
Log Number Range: 15-19072 to 15-19073

SAMPLE RESULTS-CONVENTIONALS
AON2-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 12/04/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Client ID: CR09a-SSD-COMP
ARI ID: 15-19072 AON2A

Analyte	Date	Method	Units	RL	Sample
Total Solids	10/19/15 101915#1	SM2540G	Percent	0.01	55.60
Total Organic Carbon	10/29/15 102915#1	Plumb,1981	Percent	0.020	4.39

RL Analytical reporting limit
U Undetected at reported detection limit

AON2 : 00038 RE

SAMPLE RESULTS-CONVENTIONALS
AON2-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 12/04/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Client ID: CR09b-SSD-COMP
ARI ID: 15-19073 AON2B

Analyte	Date	Method	Units	RL	Sample
Total Solids	10/19/15 101915#1	SM2540G	Percent	0.01	59.33
Total Organic Carbon	10/29/15 102915#1	Plumb,1981	Percent	0.020	2.99

RL Analytical reporting limit
U Undetected at reported detection limit

METHOD BLANK RESULTS-CONVENTIONALS
AON2-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: ✓
Reported: 10/29/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Analyte	Date	Units	Blank	QC ID
Total Solids	10/19/15	Percent	< 0.01 U	ICB
Total Organic Carbon	10/29/15	Percent	< 0.020 U	ICB

LAB CONTROL RESULTS-CONVENTIONALS
AON2-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: LJ
Reported: 10/29/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Total Organic Carbon Plumb,1981	ICVL	10/29/15	Percent	0.095	0.100	95.0%

STANDARD REFERENCE RESULTS-CONVENTIONALS
AON2-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: W
Reported: 10/29/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Date	Units	SRM	True Value	Recovery
Total Organic Carbon NIST 1941B	10/29/15	Percent	2.98	2.99	99.7%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR09a-SSD-COMP
SAMPLE

Lab Sample ID: AON2A
LIMS ID: 15-19072
Matrix: Sediment
Data Release Authorized:
Reported: 12/04/15

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Percent Total Solids: 51.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	10/22/15	6010C	10/28/15	7440-38-2	Arsenic	9	9	U
3050B	10/22/15	6010C	10/28/15	7440-43-9	Cadmium	0.4	0.4	U
3050B	10/22/15	6010C	10/28/15	**7440-47-3**	**Chromium**	0.9	**31.0**	
3050B	10/22/15	6010C	10/28/15	**7440-50-8**	**Copper**	0.4	**40.8**	
3050B	10/22/15	6010C	10/28/15	**7439-92-1**	**Lead**	4	**8**	
CLP	10/27/15	7471A	10/27/15	**7439-97-6**	**Mercury**	0.03	**0.04**	
3050B	10/22/15	6010C	10/28/15	7440-22-4	Silver	0.5	0.5	U
3050B	10/22/15	6010C	10/28/15	**7440-66-6**	**Zinc**	2	**68**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR09b-SSD-COMP
SAMPLE

Lab Sample ID: AON2B
LIMS ID: 15-19073
Matrix: Sediment
Data Release Authorized:
Reported: 12/04/15

QC Report No: AON2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/13/15
Date Received: 10/14/15

Percent Total Solids: 51.5%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	10/22/15	6010C	10/28/15	7440-38-2	Arsenic	9	9	U
3050B	10/22/15	6010C	10/28/15	**7440-43-9**	**Cadmium**	0.4	**0.4**	
3050B	10/22/15	6010C	10/28/15	**7440-47-3**	**Chromium**	0.9	**39.9**	
3050B	10/22/15	6010C	10/28/15	**7440-50-8**	**Copper**	0.4	**49.2**	
3050B	10/22/15	6010C	10/28/15	**7439-92-1**	**Lead**	4	**10**	
CLP	10/27/15	7471A	10/27/15	**7439-97-6**	**Mercury**	0.04	**0.06**	
3050B	10/22/15	6010C	10/28/15	7440-22-4	Silver	0.5	0.5	U
3050B	10/22/15	6010C	10/28/15	**7440-66-6**	**Zinc**	2	**80**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

AON2: 00044 RE

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: METHOD BLANK**

Lab Sample ID: AON1MB
LIMS ID: 15-19071
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	10/22/15	6010C	10/28/15	7440-38-2	Arsenic	5	5	U
3050B	10/22/15	6010C	10/28/15	7440-43-9	Cadmium	0.2	0.2	U
3050B	10/22/15	6010C	10/28/15	7440-47-3	Chromium	0.5	0.5	U
3050B	10/22/15	6010C	10/28/15	7440-50-8	Copper	0.2	0.2	U
3050B	10/22/15	6010C	10/28/15	7439-92-1	Lead	2	2	U
CLP	10/27/15	7471A	10/27/15	7439-97-6	Mercury	0.02	0.02	U
3050B	10/22/15	6010C	10/28/15	7440-22-4	Silver	0.3	0.3	U
3050B	10/22/15	6010C	10/28/15	7440-66-6	Zinc	1	1	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: LAB CONTROL**

Lab Sample ID: AON1LCS
LIMS ID: 15-19071
Matrix: Sediment
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	6010C	207	200	104%	
Cadmium	6010C	51.2	50.0	102%	
Chromium	6010C	53.9	50.0	108%	
Copper	6010C	51.2	50.0	102%	
Lead	6010C	203	200	102%	
Mercury	7471A	0.52	0.50	104%	
Silver	6010C	53.7	50.0	107%	
Zinc	6010C	51	50	102%	

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

9 November 2015

Madi Novak
Maul, Foster and Alongi, Inc
2001 NW 19th Avenue
Suite 200
Portland, OR 97209

RE: Project: Seaport Landing
ARI Job No.: AON3

Dear Madi:

Please find enclosed the original chain of custody records and the final data package for the samples from the project referenced above. Two soil samples and three water samples were received on October 14, 2015. The samples were analyzed for SVOCs, dioxins/furans, PCBs, NWTPH-Dx and total and dissolved metals as requested.

Problems associated with these analyses are discussed in the case narrative.

An electronic copy of this package will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

cc: file AON3

Enclosures

MDH/mdh

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • 206-695-6200 • 206-695-6201 fax

AONJ : 00002

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: AONJ	Turn-around Requested:	Page: 1 of 1	
ARI Client Company: Maul Foster & Alongi, Inc.	Phone: (503)501-5212	Date: 10/12/15	Ice Present? Y/N
Client Contact: Madi Novak		No. of Coolers:	Cooler Temps:
Client Project Name: Seaport Landing			
Client Project #: 1044.02-01-02	Samplers: R. Degens + M. Murray		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: Total Metals (As, Cd, Cr, Hg, Pb)	Dissolved Metals (As, Cd, Cr, Hg, Pb)	TPH	PAH	Phenol	PCB	Dioxin/Furan	SVOA	Notes/Comments
CR20-S-5.0	10/12/15	1625	S	5	X		X	X	X	X	X	X	
CR21-S-5.0	10/12/15	1520	S	5	X		X	X	X	X	X	X	
CR21-GW-10	10/12/15	1515	GW	8	X	X	X			X		X	
CR20-GW-5.0	10/12/15	1630	GW	8	X	X	X			X		X	

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Roxanne Degens	Printed Name: Archie Tribbs	Printed Name:	Printed Name: Emily Litwin
	Company: MFA	Company: M.C. 122 L	Company:	Company: ARI
	Date & Time: 10/14/15 1020	Date & Time: 10/14/15 10:20	Date & Time:	Date & Time: 10/14/15 1230

AONJ : 00003

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Maul Foster

COC No(s): _____ (NA)

Assigned ARI Job No: AON3

Project Name: _____

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 5.2 4.3 5.8 5.0 4.1

Time: _____

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D00256S

Cooler Accepted by: UL Date: 10/14/15 Time: 1235

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ... Bubble Wrap (Wet Ice) Gel Packs (Baggies) (Foam Block) Paper Other: _____			
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		YES	(NO)
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	(YES)	(NO)
Were all VOC vials free of air bubbles?	NA	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO
Date VOC Trip Blank was made at ARI...	NA	9/17/15	

Was Sample Split by ARI : (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: UL Date: 10/16/15 Time: 1126

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions: ~~Trip blanks not listed on COC~~

~~for~~ 7 500-ml amber glass bottles labeled "seep" in cooler, not on COCs

By: UL Date: 10/16/15



Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

AON3 : 00004

PRESERVATION VERIFICATION 10/19/15
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **AON3**

Inquiry Number: NONE
Analysis Requested: 10/14/15
Contact: Novak, Madi
Client: Maul Foster & Alongi
Logged by: EL
Sample Set Used: Yes-482
Validatable Package: No
Deliverables:

PC: Mark
VTSR: 10/14/15

Project #: 1044.02.01-02
Project: Seaport Landing
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	TPHD <2	Fe2+ <2	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
15-19217 AON3C	CR21-GW-10						TOT pass									N						
15-19218 AON3D	CR20-GW-5.0						TOT pass									N						
15-19219 AON3E	CR21-GW-10						DIS pass									Y						
15-19220 AON3F	CR20-GW-5.0						DIS pass									Y						
15-19221 AON3G	Seep-01						TOT fail									N		pH	<2	D2431	4mL	10/16/15 MB
15-19363 AON3H	Seep-01						DIS fail									N		↓	↓	↓	↓	10/19/15 MB

preserved G in Lab
10/16/15 MB

filtered + preserved H in Lab
10/19/15 MB

Checked By [signature] Date 10/16/15

AON3 : 00005

Subject: RE: Aberdeen sediment, soil, and groundwater login
From: Mary Benzinger <mbenzinger@maulfoster.com>
Date: 10/16/2015 11:32 AM
To: Mark Harris <markh@arilabs.com>
CC: Mike Murray <mmurray@maulfoster.com>, Roxanne Degens <rdegens@maulfoster.com>

Hi Mark,
Based on the workplan, please analyze the seep for the following:

-NWTPH-Dx
-8270D full list
-Mercury (EPA 7470 – please use the same method used for the groundwater analysis)
-PCB Aroclors (standard list plus Aroclor 1268)

Mike and Roxanne, if you see anything here that doesn't match up, please let us know.

Thanks,

Mary Benzinger | MAUL FOSTER & ALONGI, INC.

d. 503 501 5247 | p. 971 544 2139 | c. 503 319 7132
2001 NW 19th Avenue, Suite 200, Portland, OR 97209
www.maulfoster.com

From: Mark Harris [mailto:markh@arilabs.com]
Sent: Friday, October 16, 2015 11:30 AM
To: Mary Benzinger
Cc: Mike Murray; Roxanne Degens
Subject: Re: Aberdeen sediment, soil, and groundwater login

All:

We received a large plastic bag containing 7-500mL AG bottles of water. The bag is labeled 'Seep' as are the bottles. These aren't on any of the COCs. Should we log and analyze them for anything?

Mark H.

On 10/16/2015 9:27 AM, Mary Benzinger wrote:

> Hi Mark,
> Just to confirm my earlier phone call today:
>
> When we request PCBs for any of the Aberdeen sediment, soil, and groundwater samples, please report the SCUM II Marine Benthic PCB list and also include Aroclor 1268. (Aroclor 1016, 1221, 1232, 1242, 1248, 1254 and 1260, plus 1268).

When we request "SVOCs" or "PAHs and Phenols" for soil and groundwater samples, please report the full list of analytes for 8270D.

1- and 2- methylnaphthalene will need to be reported whenever PAHs are requested.

Thanks, and please let me know if you have any questions.

Mary Benzinger | MAUL FOSTER & ALONGI, INC.

d. 503 501 5247 | p. 971 544 2139 | c. 503 319 7132
2001 NW 19th Avenue, Suite 200, Portland, OR 97209
www.maulfoster.com

-----Original Message-----
From: Mark Harris [mailto:markh@arilabs.com]
Sent: Friday, October 16, 2015 7:42 AM
To: Mike Murray; Amanda Volgardsen; Mary Benzinger
Subject: Re: Conventional analysis

Mike:

For sediment:

Sulfides: 2oz, no headspace, one pipetteful of zinc acetate over the sample before capping.
TOC/TVS/TS/NH3: 4oz.

Phenol (in sediment): 8oz glass.

If this question is in regards to soil or water, let me know.

Mark H.

On 10/16/2015 7:35 AM, Mike Murray wrote:
> Can anyone remind me of the bottle set needed for conventional analysis? I have the zinc acetate:
>
> TOC
> TVS
> Total solids
> Ammonia
> Total sulfides
>
> Also, what bottle do you need for phenol?
>
> Thanks! !
>
>
> Sent from my Verizon Wireless 4G LTE smartphone

AON3 : 00007 10/16/2015 11:40

AON3 : 00006

--
Mark Harris
Project Manager
Analytical Resources, Inc.
206/695-6210
markh@arilabs.com

How was your customer experience?
Please take our 5 minute online customer survey <https://www.surveymonkey.com/s/WPDBVJK>.

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If you have received this correspondence in error, please notify sender immediately. Thank you.

--
Mark Harris
Project Manager
Analytical Resources, Inc.
206/695-6210
markh@arilabs.com

How was your customer experience?
Please take our 5 minute online customer survey <https://www.surveymonkey.com/s/WPDBVJK>.

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prohibited.

If you have received this correspondence in error, please
notify sender immediately. Thank you.

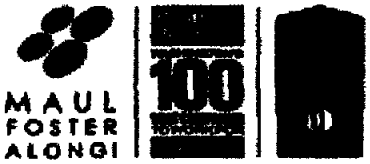
Subject: RE: Aberdeen sediment, soil, and groundwater login
From: Mary Benzinger <mbenzinger@maulfoster.com>
Date: 10/19/2015 8:48 AM
To: Mark Harris <markh@arilabs.com>
CC: Roxanne Degens <rdegens@maulfoster.com>, Mike Murray <mmurray@maulfoster.com>

Hi Mark,
Just talked to the project team, and the Seep sample should be analyzed for both total and dissolved mercury. Let us know if you have any other questions.

Thanks!

Mary Benzinger | MAUL FOSTER & ALONGI, INC.

d. 503 501 5247 | p. 971 544 2139 | c. 503 319 7132
2001 NW 19th Avenue, Suite 200, Portland, OR 97209
www.maulfoster.com



From: Mark Harris [mailto:markh@arilabs.com]
Sent: Monday, October 19, 2015 7:59 AM
To: Mary Benzinger
Subject: Re: Aberdeen sediment, soil, and groundwater login

Total and dissolved.

On 10/19/2015 7:42 AM, Mary Benzinger wrote:

> Hi Mark,
> I'm pretty sure it's just total mercury, but I'd like to double check with some other folks on the project team.
>
> Were the groundwater samples submitted for total and dissolved metals, as well as total mercury? (or just total metals and mercury)
>
> Thanks,
>
> **Mary Benzinger** | MAUL FOSTER & ALONGI, INC.
>
> d. 503 501 5247 | p. 971 544 2139 | c. 503 319 7132
> 2001 NW 19th Avenue, Suite 200, Portland, OR 97209
> www.maulfoster.com



From: Mark Harris [mailto:markh@arilabs.com]
Sent: Monday, October 19, 2015 6:39 AM
To: Mike Murray; Mary Benzinger
Cc: Roxanne Degens

AON3 : 00009

AON3 : 00008

Subject: Re: Aberdeen sediment, soil, and groundwater login

Mike:

This matches Mary's list. One clarification:

Do you want total mercury only? Or total and dissolved?

Mark H.

On 10/17/2015 1:08 PM, Mike Murray wrote:

> Details...
>
> Sorry about that, the seep samples should be analyzed for: TPH, SVOA, Hg, PCB
>
> For any more detail, I'll have to defer to Mary.
> Thanks!
>
> **MICHAEL R. MURRAY** RG, LHG | MAUL FOSTER & ALONGI, INC.
>
> d. 503 501 5226 | p. 971 544 2139 | c. 503 310 0435 | f. 971 544 2140 | www.maulfoster.com
> 2001 NW 19th Avenue, Suite 200, Portland, OR 97209
>
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>
> ---
>
> **From:** Mark Harris [mailto:markh@ardlabs.com]
> **Sent:** Friday, October 16, 2015 11:30 AM
> **To:** Mary Benzinger
> **Cc:** Mike Murray; Roxanne Degens
> **Subject:** Re: Aberdeen sediment, soil, and groundwater login
>
> All:
>
> We received a large plastic bag containing 7-500mL AG bottles of water. The bag is labeled 'Seep' as are the bottles. These aren't on any of the COCs. Should we log and analyze them for anything?
>
> Mark H.
>
> On 10/16/2015 9:27 AM, Mary Benzinger wrote:
>
> > Hi Mark,
> > Just to confirm my earlier phone call today:
> >
> > When we request PCBs for any of the Aberdeen sediment, soil, and groundwater samples, please report the SCUM II Marine Benthic PCB list and also include Aroclor 1268. (Aroclor 1016, 1221, 1232, 1242, 1248, 1254 and 1260, plus 1268).
> >
> > When we request "SVOCs" or "PAHs and Phenols" for soil and groundwater samples, please report the full list of analytes for 8270D.
> >
> > 1- and 2- methylnaphthalene will need to be reported whenever PAHs are requested.

Thanks, and please let me know if you have any questions.

Mary Benzinger | MAUL FOSTER & ALONGI, INC.

d. 503 501 5247 | p. 971 544 2139| c. 503 319 7132
2001 NW 19th Avenue, Suite 200, Portland, OR 97209
www.maulfoster.com

-----Original Message-----
From: Mark Harris [mailto:markh@arilabs.com]
Sent: Friday, October 16, 2015 7:42 AM
To: Mike Murray; Amanda Volgardsen; Mary Benzinger
Subject: Re: Conventional analysis

Mike:

For sediment:

Sulfides: 2oz, no headspace, one pipetteful of zinc acetate over the sample before capping.
TOC/TVS/TS/NH3: 4oz.

Phenol (in sediment): 8oz glass.

If this question is in regards to soil or water, let me know.

Mark H.

On 10/16/2015 7:35 AM, Mike Murray wrote:
> Can anyone remind me of the bottle set needed for conventional analysis? I have the zinc acetate:
>
> TOC
> TVS
> Total solids
> Ammonia
> Total sulfides
>
> Also, what bottle do you need for phenol?
>
> Thanks! !
>
>
> Sent from my Verizon Wireless 4G LTE smartphone

--
Mark Harris
Project Manager
Analytical Resources, Inc.
206/695-6210
markh@arilabs.com

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--
Mark Harris
Project Manager
Analytical Resources, Inc.
206/695-6210
markh@arilabs.com

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--
Mark Harris
Project Manager
Analytical Resources, Inc.
206/695-6210
markh@arilabs.com

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Mark Harris
Project Manager
Analytical Resources, Inc.
206/695-6210
markh@arilabs.com

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AON3 : 00012

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Case Narrative

Client: Maul, Foster, Alongi, Inc.
Project: Seaport Landing
ARI Job Number: AON3
Matrix: Soil/Water

Date: November 9, 2015

SVOA Analysis

The percent differences (%Ds) for several compounds were not within control limits for the CCALs that bracketed the analyses of these samples. All positive results for these compounds have been flagged with a "Q" qualifier to denote the high %Ds.

The percent recoveries for 4-chloroaniline and 3-nitroaniline were low and 3,3'-dichlorobenzidine was not recovered following the analysis of the LCS associated with the soil samples. Since all of these compounds are known ton be reactive and recover poorly, no corrective actions were taken.

The RPDs for three compounds were high following the analyses of the LCS/LCSD associated with the analyses of the water samples. Since the individual percent recoveries were within established QC limits for these compounds, no corrective actions were taken.

Dioxins/Furans Analysis

These analyses proceeded without incident of note.

PCBs Analysis

The percent recovery for the surrogate, DCBP, was not within control limits following the analysis of sample CR20-S-5.0. This was due to co-elution of target Aroclors present in this sample. Since the percent recovery for the secondary surrogate, TCMX, was within established QC limits for this sample, no corrective actions were taken.

The %D for Aroclor 1242 was high for one column for one CCAL that bracketed the analyses of some of these samples. The %D for Aroclor 1242 was within acceptable QC limits for the secondary column. The secondary column only was used for quantitation.

NWTPH-Dx Analysis

These analyses proceeded without incident of note.

AON3-00014 R2

Novak, Maul, Foster, Alongi, Inc.
Seaport Landing
AON3
Soil/Water

9 November 2015

Metals Analysis

A matrix spike (MS) was prepared and analyzed in conjunction with sample CR20-S-5.0. The percent recovery for mercury was not within control limits following the analysis of the MS. The samples were re-prepared and re-analyzed. The percent recovery for mercury was within established QC limits for the re-analysis. The results for the re-analysis only have been submitted.

A matrix duplicate (MD) was prepared and analyzed in conjunction with the re-analysis of sample CR20-S-5.0. The RPDs for chromium and mercury were high following the analysis of the MD. Since the percent recoveries for all elements were within acceptable QC limits for the corresponding MS and LCS, it was concluded that a lack of sample homogeneity was the cause of the high RPDs. No corrective actions were taken.

The percent recovery for chromium was not within control limits following the ICP analysis of the MS. Since the percent recovery for chromium was within acceptable QC limits for the corresponding LCS, it was concluded that the sample matrix was the cause of the poor MS recovery. No corrective actions were taken.

AON3:00015 RE

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: AON3
Client: Maul Foster & Alongi
Project Event: 1044.02.01-02
Project Name: Seaport Landing

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	CR20-S-5.0	AON3A	15-19215	Soil	10/12/15 16:25	10/14/15 12:35
2.	CR21-S-5.0	AON3B	15-19216	Soil	10/12/15 15:20	10/14/15 12:35
3.	CR21-GW-10	AON3C	15-19217	Ground Wate	10/12/15 15:15	10/14/15 12:35
4.	CR20-GW-5.0	AON3D	15-19218	Ground Wate	10/12/15 16:30	10/14/15 12:35
5.	CR21-GW-10	AON3E	15-19219	Ground Wate	10/12/15 15:15	10/14/15 12:35
6.	CR20-GW-5.0	AON3F	15-19220	Ground Wate	10/12/15 16:30	10/14/15 12:35
7.	Seep-01	AON3G	15-19221	Ground Wate	10/12/15	10/14/15 12:35
8.	Seep-01	AON3H	15-19363	Groundwater	10/12/15	10/14/15 12:35

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 2/14/2011

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).

S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte

NA The flagged analyte was not analyzed for

NR Spiked compound recovery is not reported due to chromatographic interference

NS The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

EMPC Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

X Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**

Z Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

Geotechnical Data

A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F Samples were frozen prior to particle size determination

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighting

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: CR20-S-5.0**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AON3A
LIMS ID: 15-19215
Matrix: Soil
Data Release Authorized: MW
Reported: 11/03/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

Date Extracted: 10/21/15
Date Analyzed: 10/28/15 19:34
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.55 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 3.00
Percent Moisture: 24.8%

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	280	< 280 U
111-44-4	Bis-(2-Chloroethyl) Ether	280	< 280 U
95-57-8	2-Chlorophenol	280	< 280 U
541-73-1	1,3-Dichlorobenzene	280	< 280 U
106-46-7	1,4-Dichlorobenzene	280	< 280 U
100-51-6	Benzyl Alcohol	280	< 280 U
95-50-1	1,2-Dichlorobenzene	280	< 280 U
95-48-7	2-Methylphenol	280	< 280 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	280	< 280 U
106-44-5	4-Methylphenol	280	< 280 U
621-64-7	N-Nitroso-Di-N-Propylamine	280	< 280 U
67-72-1	Hexachloroethane	280	< 280 U
98-95-3	Nitrobenzene	280	< 280 U
78-59-1	Isophorone	280	< 280 U
88-75-5	2-Nitrophenol	280	< 280 U
105-67-9	2,4-Dimethylphenol	1,400	< 1,400 U
65-85-0	Benzoic Acid	2,800	< 2,800 U
111-91-1	bis(2-Chloroethoxy) Methane	280	< 280 U
120-83-2	2,4-Dichlorophenol	1,400	< 1,400 U
120-82-1	1,2,4-Trichlorobenzene	280	< 280 U
91-20-3	Naphthalene	280	< 280 U
106-47-8	4-Chloroaniline	1,400	< 1,400 U
87-68-3	Hexachlorobutadiene	280	< 280 U
59-50-7	4-Chloro-3-methylphenol	1,400	< 1,400 U
91-57-6	2-Methylnaphthalene	280	< 280 U
77-47-4	Hexachlorocyclopentadiene	1,400	< 1,400 U
88-06-2	2,4,6-Trichlorophenol	1,400	< 1,400 U
95-95-4	2,4,5-Trichlorophenol	1,400	< 1,400 U
91-58-7	2-Chloronaphthalene	280	< 280 U
88-74-4	2-Nitroaniline	1,400	< 1,400 U
131-11-3	Dimethylphthalate	280	< 280 U
208-96-8	Acenaphthylene	280	< 280 U
99-09-2	3-Nitroaniline	1,400	< 1,400 U
83-32-9	**Acenaphthene**	**280**	**140 J**
51-28-5	2,4-Dinitrophenol	2,800	< 2,800 U
100-02-7	4-Nitrophenol	1,400	< 1,400 U
132-64-9	Dibenzofuran	280	< 280 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: CR20-S-5.0**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AON3A
LIMS ID: 15-19215
Matrix: Soil
Date Analyzed: 10/28/15 19:34

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result
606-20-2	2,6-Dinitrotoluene	1,400	< 1,400 U
121-14-2	2,4-Dinitrotoluene	1,400	< 1,400 U
84-66-2	Diethylphthalate	280	< 280 U
7005-72-3	4-Chlorophenyl-phenylether	280	< 280 U
86-73-7	**Fluorene**	**280**	**160 J**
100-01-6	4-Nitroaniline	1,400	< 1,400 U
534-52-1	4,6-Dinitro-2-Methylphenol	2,800	< 2,800 U
86-30-6	N-Nitrosodiphenylamine	280	< 280 U
101-55-3	4-Bromophenyl-phenylether	280	< 280 U
118-74-1	Hexachlorobenzene	280	< 280 U
87-86-5	Pentachlorophenol	1,400	< 1,400 U
85-01-8	**Phenanthrene**	**280**	**510**
86-74-8	Carbazole	280	< 280 U
120-12-7	Anthracene	280	< 280 U
84-74-2	Di-n-Butylphthalate	280	< 280 U
206-44-0	**Fluoranthene**	**280**	**600**
129-00-0	**Pyrene**	**280**	**530**
85-68-7	Butylbenzylphthalate	280	< 280 U
91-94-1	3,3'-Dichlorobenzidine	1,400	< 1,400 U
56-55-3	**Benzo(a)anthracene**	**280**	**140 J**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**710**	**570 J**
218-01-9	**Chrysene**	**280**	**470**
117-84-0	Di-n-Octyl phthalate	280	< 280 U
50-32-8	**Benzo(a)pyrene**	**280**	**160 J**
193-39-5	Indeno(1,2,3-cd)pyrene	280	< 280 U
53-70-3	Dibenz(a,h)anthracene	280	< 280 U
191-24-2	Benzo(g,h,i)perylene	280	< 280 U
90-12-0	1-Methylnaphthalene	280	< 280 U
TOTBFA	**Total Benzofluoranthenes**	**570**	**300 J**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	87.0%	2-Fluorobiphenyl	75.0%
d14-p-Terphenyl	99.0%	d4-1,2-Dichlorobenzene	63.0%
d5-Phenol	86.0%	2-Fluorophenol	68.0%
2,4,6-Tribromophenol	72.0%	d4-2-Chlorophenol	80.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: CR21-S-5.0**
Extraction Method: SW3546 **SAMPLE**
Page 1 of 2

Lab Sample ID: AON3B
LIMS ID: 15-19216
Matrix: Soil
Data Release Authorized:
Reported: 11/03/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

Date Extracted: 10/21/15
Date Analyzed: 10/28/15 20:10
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.81 g-dry-wt
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Percent Moisture: 16.9%

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	92	< 92 U
111-44-4	Bis-(2-Chloroethyl) Ether	92	< 92 U
95-57-8	2-Chlorophenol	92	< 92 U
541-73-1	1,3-Dichlorobenzene	92	< 92 U
106-46-7	1,4-Dichlorobenzene	92	< 92 U
100-51-6	Benzyl Alcohol	92	< 92 U
95-50-1	1,2-Dichlorobenzene	92	< 92 U
95-48-7	2-Methylphenol	92	< 92 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	92	< 92 U
106-44-5	**4-Methylphenol**	**92**	**92**
621-64-7	N-Nitroso-Di-N-Propylamine	92	< 92 U
67-72-1	Hexachloroethane	92	< 92 U
98-95-3	Nitrobenzene	92	< 92 U
78-59-1	Isophorone	92	< 92 U
88-75-5	2-Nitrophenol	92	< 92 U
105-67-9	2,4-Dimethylphenol	460	< 460 U
65-85-0	Benzoic Acid	920	< 920 U
111-91-1	bis(2-Chloroethoxy) Methane	92	< 92 U
120-83-2	2,4-Dichlorophenol	460	< 460 U
120-82-1	1,2,4-Trichlorobenzene	92	< 92 U
91-20-3	**Naphthalene**	**92**	**65 J**
106-47-8	4-Chloroaniline	460	< 460 U
87-68-3	Hexachlorobutadiene	92	< 92 U
59-50-7	4-Chloro-3-methylphenol	460	< 460 U
91-57-6	**2-Methylnaphthalene**	**92**	**46 J**
77-47-4	Hexachlorocyclopentadiene	460	< 460 U
88-06-2	2,4,6-Trichlorophenol	460	< 460 U
95-95-4	2,4,5-Trichlorophenol	460	< 460 U
91-58-7	2-Chloronaphthalene	92	< 92 U
88-74-4	2-Nitroaniline	460	< 460 U
131-11-3	Dimethylphthalate	92	< 92 U
208-96-8	Acenaphthylene	92	< 92 U
99-09-2	3-Nitroaniline	460	< 460 U
83-32-9	**Acenaphthene**	**92**	**420**
51-28-5	2,4-Dinitrophenol	920	< 920 U
100-02-7	4-Nitrophenol	460	< 460 U
132-64-9	**Dibenzofuran**	**92**	**100**

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: CR21-S-5.0**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AON3B
LIMS ID: 15-19216
Matrix: Soil
Date Analyzed: 10/28/15 20:10

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result
606-20-2	2,6-Dinitrotoluene	460	< 460 U
121-14-2	2,4-Dinitrotoluene	460	< 460 U
84-66-2	Diethylphthalate	92	< 92 U
7005-72-3	4-Chlorophenyl-phenylether	92	< 92 U
86-73-7	**Fluorene**	**92**	**300**
100-01-6	4-Nitroaniline	460	< 460 U
534-52-1	4,6-Dinitro-2-Methylphenol	920	< 920 U
86-30-6	N-Nitrosodiphenylamine	92	< 92 U
101-55-3	4-Bromophenyl-phenylether	92	< 92 U
118-74-1	Hexachlorobenzene	92	< 92 U
87-86-5	Pentachlorophenol	460	< 460 U
85-01-8	**Phenanthrene**	**92**	**920**
86-74-8	Carbazole	92	< 92 U
120-12-7	**Anthracene**	**92**	**150**
84-74-2	Di-n-Butylphthalate	92	< 92 U
206-44-0	**Fluoranthene**	**92**	**640**
129-00-0	**Pyrene**	**92**	**610**
85-68-7	Butylbenzylphthalate	92	< 92 U
91-94-1	3,3'-Dichlorobenzidine	460	< 460 U
56-55-3	**Benzo(a)anthracene**	**92**	**210**
117-81-7	bis(2-Ethylhexyl)phthalate	230	< 230 U
218-01-9	**Chrysene**	**92**	**480**
117-84-0	Di-n-Octyl phthalate	92	< 92 U
50-32-8	**Benzo(a)pyrene**	**92**	**180**
193-39-5	Indeno(1,2,3-cd)pyrene	92	< 92 U
53-70-3	Dibenz(a,h)anthracene	92	< 92 U
191-24-2	Benzo(g,h,i)perylene	92	< 92 U
90-12-0	1-Methylnaphthalene	92	< 92 U
TOTBFA	**Total Benzofluoranthenes**	**160**	**320**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	74.0%	2-Fluorobiphenyl	74.0%
d14-p-Terphenyl	97.0%	d4-1,2-Dichlorobenzene	75.0%
d5-Phenol	74.0%	2-Fluorophenol	70.7%
2,4,6-Tribromophenol	71.3%	d4-2-Chlorophenol	70.7%

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT OUT
MB-102015	81.8%	80.6%	113%	81.6%	86.9%	76.7%	74.9%	87.1%	0
LCS-102015	80.6%	81.6%	112%	71.6%	83.7%	76.5%	84.7%	76.7%	0
CR20-S-5.0	87.0%	75.0%	99.0%	63.0%	86.0%	68.0%	72.0%	80.0%	0
CR21-S-5.0	74.0%	74.0%	97.0%	75.0%	74.0%	70.7%	71.3%	70.7%	0

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(30-120)	(30-120)
(FBP) = 2-Fluorobiphenyl	(35-120)	(35-120)
(TPH) = d14-p-Terphenyl	(37-120)	(37-120)
(DCB) = d4-1,2-Dichlorobenzene	(32-120)	(32-120)
(PHL) = d5-Phenol	(29-120)	(29-120)
(2FP) = 2-Fluorophenol	(27-120)	(27-120)
(TBP) = 2,4,6-Tribromophenol	(24-134)	(24-134)
(2CP) = d4-2-Chlorophenol	(31-120)	(31-120)

Prep Method: SW3546
Log Number Range: 15-19215 to 15-19216

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: LCS-102015**
Page 1 of 2 **LAB CONTROL**

Lab Sample ID: LCS-102015 QC Report No: AON3-Maul Foster & Alongi
LIMS ID: 15-19215 Project: Seaport Landing
Matrix: Soil 1044.02.01-02
Data Release Authorized: Date Sampled: 10/12/15
Reported: 11/03/15 Date Received: 10/14/15

Date Extracted: 10/20/15 Sample Amount: 10.00 g
Date Analyzed: 10/28/15 17:10 Final Extract Volume: 1.0 mL
Instrument/Analyst: NT10/YZ Dilution Factor: 1.00
GPC Cleanup: Yes Percent Moisture: NA

Analyte	Lab Control		Spike Added	Recovery
Phenol	459	Q	500	91.8%
Bis-(2-Chloroethyl) Ether	433		500	86.6%
2-Chlorophenol	432		500	86.4%
1,3-Dichlorobenzene	382		500	76.4%
1,4-Dichlorobenzene	373		500	74.6%
Benzyl Alcohol	239		500	47.8%
1,2-Dichlorobenzene	419		500	83.8%
2-Methylphenol	443		500	88.6%
2,2'-Oxybis(1-Chloropropane)	369		500	73.8%
4-Methylphenol	451		500	90.2%
N-Nitroso-Di-N-Propylamine	444		500	88.8%
Hexachloroethane	400		500	80.0%
Nitrobenzene	475		500	95.0%
Isophorone	489		500	97.8%
2-Nitrophenol	420		500	84.0%
2,4-Dimethylphenol	1140		1500	76.0%
Benzoic Acid	2400		2750	87.3%
bis(2-Chloroethoxy) Methane	381		500	76.2%
2,4-Dichlorophenol	1300		1500	86.7%
1,2,4-Trichlorobenzene	475		500	95.0%
Naphthalene	417		500	83.4%
4-Chloroaniline	57.0	J	1500	3.8%
Hexachlorobutadiene	382		500	76.4%
4-Chloro-3-methylphenol	1320		1500	88.0%
2-Methylnaphthalene	423		500	84.6%
Hexachlorocyclopentadiene	1310		1500	87.3%
2,4,6-Trichlorophenol	1350		1500	90.0%
2,4,5-Trichlorophenol	1360		1500	90.7%
2-Chloronaphthalene	435		500	87.0%
2-Nitroaniline	1490		1500	99.3%
Dimethylphthalate	435		500	87.0%
Acenaphthylene	402		500	80.4%
3-Nitroaniline	86.0	J	1500	5.7%
Acenaphthene	470		500	94.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: LCS-102015**
Page 2 of 2 **LAB CONTROL**

Lab Sample ID: LCS-102015 QC Report No: AON3-Maul Foster & Alongi
LIMS ID: 15-19215 Project: Seaport Landing
Matrix: Soil 1044.02.01-02
Date Analyzed: 10/28/15 17:10

Analyte	Lab Control	Spike Added	Recovery
2,4-Dinitrophenol	2620	2750	95.3%
4-Nitrophenol	1290	1500	86.0%
Dibenzofuran	439	500	87.8%
2,6-Dinitrotoluene	1380	1500	92.0%
2,4-Dinitrotoluene	1400	1500	93.3%
Diethylphthalate	461	500	92.2%
4-Chlorophenyl-phenylether	405	500	81.0%
Fluorene	424	500	84.8%
4-Nitroaniline	382	1500	25.5%
4,6-Dinitro-2-Methylphenol	2410	2750	87.6%
N-Nitrosodiphenylamine	315	500	63.0%
4-Bromophenyl-phenylether	427	500	85.4%
Hexachlorobenzene	417	500	83.4%
Pentachlorophenol	1310	1500	87.3%
Phenanthrene	462	500	92.4%
Carbazole	271 Q	500	54.2%
Anthracene	426	500	85.2%
Di-n-Butylphthalate	510	500	102%
Fluoranthene	474	500	94.8%
Pyrene	442	500	88.4%
Butylbenzylphthalate	501	500	100%
3,3'-Dichlorobenzidine	< 100 U	1500	NA
Benzo(a)anthracene	460	500	92.0%
bis(2-Ethylhexyl)phthalate	479	500	95.8%
Chrysene	456	500	91.2%
Di-n-Octyl phthalate	420	500	84.0%
Benzo(a)pyrene	412	500	82.4%
Indeno(1,2,3-cd)pyrene	471	500	94.2%
Dibenz(a,h)anthracene	475	500	95.0%
Benzo(g,h,i)perylene	436	500	87.2%
1-Methylnaphthalene	393	500	78.6%
Total Benzofluoranthenes	949	1000	94.9%

Semivolatile Surrogate Recovery	
d5-Nitrobenzene	80.6%
2-Fluorobiphenyl	81.6%
d14-p-Terphenyl	112%
d4-1,2-Dichlorobenzene	71.6%
d5-Phenol	83.7%
2-Fluorophenol	76.5%
2,4,6-Tribromophenol	84.7%
d4-2-Chlorophenol	76.7%

Reported in µg/kg (ppb)

4B

SEMIVOLATILE METHOD BLANK SUMMARY

BLANK NO.

AON0MBS1

Lab Name: ANALYTICAL RESOURCES INC

Client: MAUL FOSTER & ALONGI

ARI Job No: AON4

Project: SEAPORT LANDING

Lab File ID: AON0MB

Date Extracted: 10/20/15

Instrument ID: NT10

Date Analyzed: 10/28/15

Matrix: SOLID

Time Analyzed: 1633

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	AON0LCSS1	AON0LCSS1	AON0SB	10/28/15
02	B01-S-4.5 MS	AON4AMS	AON4AMS	10/28/15
03	B01-S-4.5 MSD	AON4AMSD	AON4AMSD	10/28/15
04				
05				
06				
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ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: MB-102015**
Extraction Method: SW3546 **METHOD BLANK**
Page 1 of 2

Lab Sample ID: MB-102015
LIMS ID: 15-19215
Matrix: Soil
Data Release Authorized:
Reported: 11/03/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/20/15
Date Analyzed: 10/28/15 16:33
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	20	< 20 U
111-44-4	Bis-(2-Chloroethyl) Ether	20	< 20 U
95-57-8	2-Chlorophenol	20	< 20 U
541-73-1	1,3-Dichlorobenzene	20	< 20 U
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	20	< 20 U
106-44-5	4-Methylphenol	20	< 20 U
621-64-7	N-Nitroso-Di-N-Propylamine	20	< 20 U
67-72-1	Hexachloroethane	20	< 20 U
98-95-3	Nitrobenzene	20	< 20 U
78-59-1	Isophorone	20	< 20 U
88-75-5	2-Nitrophenol	20	< 20 U
105-67-9	2,4-Dimethylphenol	100	< 100 U
65-85-0	Benzoic Acid	200	< 200 U
111-91-1	bis(2-Chloroethoxy) Methane	20	< 20 U
120-83-2	2,4-Dichlorophenol	100	< 100 U
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	Naphthalene	20	< 20 U
106-47-8	4-Chloroaniline	100	< 100 U
87-68-3	Hexachlorobutadiene	20	< 20 U
59-50-7	4-Chloro-3-methylphenol	100	< 100 U
91-57-6	2-Methylnaphthalene	20	< 20 U
77-47-4	Hexachlorocyclopentadiene	100	< 100 U
88-06-2	2,4,6-Trichlorophenol	100	< 100 U
95-95-4	2,4,5-Trichlorophenol	100	< 100 U
91-58-7	2-Chloronaphthalene	20	< 20 U
88-74-4	2-Nitroaniline	100	< 100 U
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	Acenaphthylene	20	< 20 U
99-09-2	3-Nitroaniline	100	< 100 U
83-32-9	Acenaphthene	20	< 20 U
51-28-5	2,4-Dinitrophenol	200	< 200 U
100-02-7	4-Nitrophenol	100	< 100 U
132-64-9	Dibenzofuran	20	< 20 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: MB-102015**
Extraction Method: SW3546 **METHOD BLANK**

Lab Sample ID: MB-102015 QC Report No: AON3-Maul Foster & Alongi
LIMS ID: 15-19215 Project: Seaport Landing
Matrix: Soil 1044.02.01-02
Date Analyzed: 10/28/15 16:33

CAS Number	Analyte	LOQ	Result
606-20-2	2,6-Dinitrotoluene	100	< 100 U
121-14-2	2,4-Dinitrotoluene	100	< 100 U
84-66-2	Diethylphthalate	20	< 20 U
7005-72-3	4-Chlorophenyl-phenylether	20	< 20 U
86-73-7	Fluorene	20	< 20 U
100-01-6	4-Nitroaniline	100	< 100 U
534-52-1	4,6-Dinitro-2-Methylphenol	200	< 200 U
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
101-55-3	4-Bromophenyl-phenylether	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	100	< 100 U
85-01-8	Phenanthrene	20	< 20 U
86-74-8	Carbazole	20	< 20 U
120-12-7	Anthracene	20	< 20 U
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	Fluoranthene	20	< 20 U
129-00-0	Pyrene	20	< 20 U
85-68-7	Butylbenzylphthalate	20	< 20 U
91-94-1	3,3'-Dichlorobenzidine	100	< 100 U
56-55-3	Benzo(a)anthracene	20	< 20 U
117-81-7	bis(2-Ethylhexyl)phthalate	50	< 50 U
218-01-9	Chrysene	20	< 20 U
117-84-0	Di-n-Octyl phthalate	20	< 20 U
50-32-8	Benzo(a)pyrene	20	< 20 U
193-39-5	Indeno(1,2,3-cd)pyrene	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	20	< 20 U
90-12-0	1-Methylnaphthalene	20	< 20 U
TOTBFA	Total Benzofluoranthenes	40	< 40 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	81.8%	2-Fluorobiphenyl	80.6%
d14-p-Terphenyl	113%	d4-1,2-Dichlorobenzene	81.6%
d5-Phenol	86.9%	2-Fluorophenol	76.7%
2,4,6-Tribromophenol	74.9%	d4-2-Chlorophenol	87.1%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
Page 1 of 2

Sample ID: CR21-GW-10
SAMPLE

Lab Sample ID: AON3C
LIMS ID: 15-19217
Matrix: Ground Water
Data Release Authorized:
Reported: 10/26/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

Date Extracted: 10/19/15
Date Analyzed: 10/23/15 20:25
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
108-95-2	Phenol	1.0	< 1.0 U
111-44-4	Bis-(2-Chloroethyl) Ether	1.0	< 1.0 U
95-57-8	2-Chlorophenol	1.0	< 1.0 U
541-73-1	1,3-Dichlorobenzene	1.0	< 1.0 U
106-46-7	1,4-Dichlorobenzene	1.0	< 1.0 U
100-51-6	Benzyl Alcohol	2.0	< 2.0 U
95-50-1	1,2-Dichlorobenzene	1.0	< 1.0 U
95-48-7	2-Methylphenol	1.0	< 1.0 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	1.0	< 1.0 U
106-44-5	4-Methylphenol	2.0	< 2.0 U
621-64-7	N-Nitroso-Di-N-Propylamine	1.0	< 1.0 U
67-72-1	Hexachloroethane	2.0	< 2.0 U
98-95-3	Nitrobenzene	1.0	< 1.0 U
78-59-1	Isophorone	1.0	< 1.0 U
88-75-5	2-Nitrophenol	3.0	< 3.0 U
105-67-9	2,4-Dimethylphenol	3.0	< 3.0 U
65-85-0	Benzoic Acid	20	< 20 U
111-91-1	bis(2-Chloroethoxy) Methane	1.0	< 1.0 U
120-83-2	2,4-Dichlorophenol	3.0	< 3.0 U
120-82-1	1,2,4-Trichlorobenzene	1.0	< 1.0 U
91-20-3	Naphthalene	1.0	< 1.0 U
106-47-8	4-Chloroaniline	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	3.0	< 3.0 U
59-50-7	4-Chloro-3-methylphenol	3.0	< 3.0 U
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
77-47-4	Hexachlorocyclopentadiene	5.0	< 5.0 U
88-06-2	2,4,6-Trichlorophenol	3.0	< 3.0 U
95-95-4	2,4,5-Trichlorophenol	5.0	< 5.0 U
91-58-7	2-Chloronaphthalene	1.0	< 1.0 U
88-74-4	2-Nitroaniline	3.0	< 3.0 U
131-11-3	Dimethylphthalate	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
99-09-2	3-Nitroaniline	3.0	< 3.0 U
83-32-9	Acenaphthene	1.0	< 1.0 U
51-28-5	2,4-Dinitrophenol	20	< 20 U
100-02-7	4-Nitrophenol	10	< 10 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
606-20-2	2,6-Dinitrotoluene	3.0	< 3.0 U
121-14-2	2,4-Dinitrotoluene	3.0	< 3.0 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS **Sample ID: CR21-GW-10**
Extraction Method: SW3520C **SAMPLE**

Lab Sample ID: AON3C
LIMS ID: 15-19217
Matrix: Ground Water
Date Analyzed: 10/23/15 20:25

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	RL	Result
84-66-2	Diethylphthalate	1.0	< 1.0 U
7005-72-3	4-Chlorophenyl-phenylether	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
100-01-6	4-Nitroaniline	3.0	< 3.0 U
534-52-1	4,6-Dinitro-2-Methylphenol	10	< 10 U
86-30-6	N-Nitrosodiphenylamine	1.0	< 1.0 U
101-55-3	4-Bromophenyl-phenylether	1.0	< 1.0 U
118-74-1	Hexachlorobenzene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
84-74-2	Di-n-Butylphthalate	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
85-68-7	Butylbenzylphthalate	1.0	< 1.0 U
91-94-1	3,3'-Dichlorobenzidine	5.0	< 5.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
117-81-7	bis(2-Ethylhexyl)phthalate	3.0	< 3.0 U
218-01-9	Chrysene	1.0	< 1.0 U
117-84-0	Di-n-Octyl phthalate	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	2.0	< 2.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	54.8%	2-Fluorobiphenyl	55.2%
d14-p-Terphenyl	47.6%	d4-1,2-Dichlorobenzene	49.6%
d5-Phenol	53.3%	2-Fluorophenol	51.7%
2,4,6-Tribromophenol	68.8%	d4-2-Chlorophenol	60.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
Page 1 of 2

Sample ID: CR20-GW-5.0
SAMPLE

Lab Sample ID: AON3D
LIMS ID: 15-19218
Matrix: Ground Water
Data Release Authorized:
Reported: 10/26/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

Date Extracted: 10/19/15
Date Analyzed: 10/23/15 20:57
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
108-95-2	Phenol	1.0	< 1.0 U
111-44-4	Bis-(2-Chloroethyl) Ether	1.0	< 1.0 U
95-57-8	2-Chlorophenol	1.0	< 1.0 U
541-73-1	1,3-Dichlorobenzene	1.0	< 1.0 U
106-46-7	1,4-Dichlorobenzene	1.0	< 1.0 U
100-51-6	Benzyl Alcohol	2.0	< 2.0 U
95-50-1	1,2-Dichlorobenzene	1.0	< 1.0 U
95-48-7	2-Methylphenol	1.0	< 1.0 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	1.0	< 1.0 U
106-44-5	4-Methylphenol	2.0	< 2.0 U
621-64-7	N-Nitroso-Di-N-Propylamine	1.0	< 1.0 U
67-72-1	Hexachloroethane	2.0	< 2.0 U
98-95-3	Nitrobenzene	1.0	< 1.0 U
78-59-1	Isophorone	1.0	< 1.0 U
88-75-5	2-Nitrophenol	3.0	< 3.0 U
105-67-9	2,4-Dimethylphenol	3.0	< 3.0 U
65-85-0	Benzoic Acid	20	< 20 U
111-91-1	bis(2-Chloroethoxy) Methane	1.0	< 1.0 U
120-83-2	2,4-Dichlorophenol	3.0	< 3.0 U
120-82-1	1,2,4-Trichlorobenzene	1.0	< 1.0 U
91-20-3	Naphthalene	1.0	< 1.0 U
106-47-8	4-Chloroaniline	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	3.0	< 3.0 U
59-50-7	4-Chloro-3-methylphenol	3.0	< 3.0 U
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
77-47-4	Hexachlorocyclopentadiene	5.0	< 5.0 U
88-06-2	2,4,6-Trichlorophenol	3.0	< 3.0 U
95-95-4	2,4,5-Trichlorophenol	5.0	< 5.0 U
91-58-7	2-Chloronaphthalene	1.0	< 1.0 U
88-74-4	2-Nitroaniline	3.0	< 3.0 U
131-11-3	Dimethylphthalate	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
99-09-2	3-Nitroaniline	3.0	< 3.0 U
83-32-9	Acenaphthene	1.0	< 1.0 U
51-28-5	2,4-Dinitrophenol	20	< 20 U
100-02-7	4-Nitrophenol	10	< 10 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
606-20-2	2,6-Dinitrotoluene	3.0	< 3.0 U
121-14-2	2,4-Dinitrotoluene	3.0	< 3.0 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS **Sample ID: CR20-GW-5.0**
Extraction Method: SW3520C **SAMPLE**

Lab Sample ID: AON3D
LIMS ID: 15-19218
Matrix: Ground Water
Date Analyzed: 10/23/15 20:57

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	RL	Result
84-66-2	Diethylphthalate	1.0	< 1.0 U
7005-72-3	4-Chlorophenyl-phenylether	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
100-01-6	4-Nitroaniline	3.0	< 3.0 U
534-52-1	4,6-Dinitro-2-Methylphenol	10	< 10 U
86-30-6	N-Nitrosodiphenylamine	1.0	< 1.0 U
101-55-3	4-Bromophenyl-phenylether	1.0	< 1.0 U
118-74-1	Hexachlorobenzene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
84-74-2	Di-n-Butylphthalate	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
85-68-7	Butylbenzylphthalate	1.0	< 1.0 U
91-94-1	3,3'-Dichlorobenzidine	5.0	< 5.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
117-81-7	bis(2-Ethylhexyl)phthalate	3.0	< 3.0 U
218-01-9	Chrysene	1.0	< 1.0 U
117-84-0	Di-n-Octyl phthalate	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	2.0	< 2.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	62.4%	2-Fluorobiphenyl	64.0%
d14-p-Terphenyl	50.0%	d4-1,2-Dichlorobenzene	56.4%
d5-Phenol	67.2%	2-Fluorophenol	66.9%
2,4,6-Tribromophenol	74.1%	d4-2-Chlorophenol	70.4%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
Page 1 of 2

Sample ID: Seep-01
SAMPLE

Lab Sample ID: AON3G
LIMS ID: 15-19221
Matrix: Ground Water
Data Release Authorized:
Reported: 10/26/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

Date Extracted: 10/19/15
Date Analyzed: 10/23/15 21:30
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
108-95-2	Phenol	1.0	< 1.0 U
111-44-4	Bis-(2-Chloroethyl) Ether	1.0	< 1.0 U
95-57-8	2-Chlorophenol	1.0	< 1.0 U
541-73-1	1,3-Dichlorobenzene	1.0	< 1.0 U
106-46-7	1,4-Dichlorobenzene	1.0	< 1.0 U
100-51-6	Benzyl Alcohol	2.0	< 2.0 U
95-50-1	1,2-Dichlorobenzene	1.0	< 1.0 U
95-48-7	2-Methylphenol	1.0	< 1.0 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	1.0	< 1.0 U
106-44-5	4-Methylphenol	2.0	< 2.0 U
621-64-7	N-Nitroso-Di-N-Propylamine	1.0	< 1.0 U
67-72-1	Hexachloroethane	2.0	< 2.0 U
98-95-3	Nitrobenzene	1.0	< 1.0 U
78-59-1	Isophorone	1.0	< 1.0 U
88-75-5	2-Nitrophenol	3.0	< 3.0 U
105-67-9	2,4-Dimethylphenol	3.0	< 3.0 U
65-85-0	Benzoic Acid	20	< 20 U
111-91-1	bis(2-Chloroethoxy) Methane	1.0	< 1.0 U
120-83-2	2,4-Dichlorophenol	3.0	< 3.0 U
120-82-1	1,2,4-Trichlorobenzene	1.0	< 1.0 U
91-20-3	Naphthalene	1.0	< 1.0 U
106-47-8	4-Chloroaniline	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	3.0	< 3.0 U
59-50-7	4-Chloro-3-methylphenol	3.0	< 3.0 U
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
77-47-4	Hexachlorocyclopentadiene	5.0	< 5.0 U
88-06-2	2,4,6-Trichlorophenol	3.0	< 3.0 U
95-95-4	2,4,5-Trichlorophenol	5.0	< 5.0 U
91-58-7	2-Chloronaphthalene	1.0	< 1.0 U
88-74-4	2-Nitroaniline	3.0	< 3.0 U
131-11-3	Dimethylphthalate	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
99-09-2	3-Nitroaniline	3.0	< 3.0 U
83-32-9	Acenaphthene	1.0	< 1.0 U
51-28-5	2,4-Dinitrophenol	20	< 20 U
100-02-7	4-Nitrophenol	10	< 10 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
606-20-2	2,6-Dinitrotoluene	3.0	< 3.0 U
121-14-2	2,4-Dinitrotoluene	3.0	< 3.0 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
Page 2 of 2

Sample ID: Seep-01
SAMPLE

Lab Sample ID: AON3G
LIMS ID: 15-19221
Matrix: Ground Water
Date Analyzed: 10/23/15 21:30

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	RL	Result
84-66-2	Diethylphthalate	1.0	< 1.0 U
7005-72-3	4-Chlorophenyl-phenylether	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
100-01-6	4-Nitroaniline	3.0	< 3.0 U
534-52-1	4,6-Dinitro-2-Methylphenol	10	< 10 U
86-30-6	N-Nitrosodiphenylamine	1.0	< 1.0 U
101-55-3	4-Bromophenyl-phenylether	1.0	< 1.0 U
118-74-1	Hexachlorobenzene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
84-74-2	Di-n-Butylphthalate	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
85-68-7	Butylbenzylphthalate	1.0	< 1.0 U
91-94-1	3,3'-Dichlorobenzidine	5.0	< 5.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
117-81-7	bis(2-Ethylhexyl)phthalate	3.0	< 3.0 U
218-01-9	Chrysene	1.0	< 1.0 U
117-84-0	Di-n-Octyl phthalate	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	2.0	< 2.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	72.0%	2-Fluorobiphenyl	76.0%
d14-p-Terphenyl	94.8%	d4-1,2-Dichlorobenzene	68.0%
d5-Phenol	75.2%	2-Fluorophenol	75.7%
2,4,6-Tribromophenol	88.0%	d4-2-Chlorophenol	81.9%

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES WATER SURROGATE RECOVERY SUMMARY

Matrix: Ground Water

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT OUT
MB-101915	74.0%	74.0%	107%	56.0%	81.9%	77.3%	74.4%	85.3%	0
LCS-101915	64.8%	68.8%	86.4%	56.0%	72.8%	65.3%	78.1%	74.7%	0
LCSD-101915	47.2%	50.4%	87.6%	40.4%	49.6%	46.9%	73.1%	52.8%	0
CR21-GW-10	54.8%	55.2%	47.6%	49.6%	53.3%	51.7%	68.8%	60.3%	0
CR20-GW-5.0	62.4%	64.0%	50.0%	56.4%	67.2%	66.9%	74.1%	70.4%	0
Seep-01	72.0%	76.0%	94.8%	68.0%	75.2%	75.7%	88.0%	81.9%	0

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(27-120)	(27-120)
(FBP) = 2-Fluorobiphenyl	(33-120)	(33-120)
(TPH) = d14-p-Terphenyl	(28-130)	(28-130)
(DCB) = d4-1,2-Dichlorobenzene	(20-120)	(20-120)
(PHL) = d5-Phenol	(38-120)	(38-120)
(2FP) = 2-Fluorophenol	(33-120)	(33-120)
(TBP) = 2,4,6-Tribromophenol	(52-131)	(52-131)
(2CP) = d4-2-Chlorophenol	(41-120)	(41-120)

Prep Method: SW3520C
Log Number Range: 15-19217 to 15-19221

FORM-II SW8270

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Page 1 of 2

Sample ID: LCS-101915
LCS/LCSD

Lab Sample ID: LCS-101915
LIMS ID: 15-19217
Matrix: Ground Water
Data Release Authorized:
Reported: 10/26/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

Date Extracted LCS/LCSD: 10/19/15

Date Analyzed LCS: 10/23/15 14:22
LCSD: 10/23/15 14:55
Instrument/Analyst LCS: NT6/JZ
LCSD: NT6/JZ
GPC Cleanup: NO

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 0.50 mL
LCSD: 0.50 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

Analyte	LCS		Spike Added-LCS	LCS Recovery	LCSD		Spike Added-LCSD	LCSD Recovery	RPD
Phenol	18.3		25.0	73.2%	13.4		25.0	53.6%	30.9%
Bis-(2-Chloroethyl) Ether	20.6		25.0	82.4%	15.0		25.0	60.0%	31.5%
2-Chlorophenol	18.3		25.0	73.2%	13.4		25.0	53.6%	30.9%
1,3-Dichlorobenzene	13.1		25.0	52.4%	10.0		25.0	40.0%	26.8%
1,4-Dichlorobenzene	13.5		25.0	54.0%	10.2		25.0	40.8%	27.8%
Benzyl Alcohol	17.9		25.0	71.6%	14.9		25.0	59.6%	18.3%
1,2-Dichlorobenzene	14.2		25.0	56.8%	10.9		25.0	43.6%	26.3%
2-Methylphenol	18.0		25.0	72.0%	13.6		25.0	54.4%	27.8%
2,2'-Oxybis(1-Chloropropane)	14.6		25.0	58.4%	11.1		25.0	44.4%	27.2%
4-Methylphenol	18.8		25.0	75.2%	15.1		25.0	60.4%	21.8%
N-Nitroso-Di-N-Propylamine	18.2		25.0	72.8%	16.1		25.0	64.4%	12.2%
Hexachloroethane	13.1		25.0	52.4%	10.4		25.0	41.6%	23.0%
Nitrobenzene	16.4		25.0	65.6%	12.3		25.0	49.2%	28.6%
Isophorone	16.8		25.0	67.2%	17.2		25.0	68.8%	2.4%
2-Nitrophenol	18.0		25.0	72.0%	13.7		25.0	54.8%	27.1%
2,4-Dimethylphenol	51.0		75.0	68.0%	44.5		75.0	59.3%	13.6%
Benzoic Acid	87.9	Q	138	63.7%	90.3	Q	138	65.4%	2.7%
bis(2-Chloroethoxy) Methane	16.9		25.0	67.6%	13.3		25.0	53.2%	23.8%
2,4-Dichlorophenol	56.8		75.0	75.7%	43.1		75.0	57.5%	27.4%
1,2,4-Trichlorobenzene	13.4		25.0	53.6%	10.4		25.0	41.6%	25.2%
Naphthalene	15.9		25.0	63.6%	11.8		25.0	47.2%	29.6%
4-Chloroaniline	46.2		75.0	61.6%	46.0		75.0	61.3%	0.4%
Hexachlorobutadiene	10.4		25.0	41.6%	8.1		25.0	32.4%	24.9%
4-Chloro-3-methylphenol	72.1		75.0	96.1%	65.3		75.0	87.1%	9.9%
2-Methylnaphthalene	13.4		25.0	53.6%	10.0		25.0	40.0%	29.1%
Hexachlorocyclopentadiene	26.8	Q	75.0	35.7%	20.2	Q	75.0	26.9%	28.1%
2,4,6-Trichlorophenol	71.9		75.0	95.9%	57.6		75.0	76.8%	22.1%
2,4,5-Trichlorophenol	71.6		75.0	95.5%	60.3		75.0	80.4%	17.1%
2-Chloronaphthalene	15.2		25.0	60.8%	11.8		25.0	47.2%	25.2%
2-Nitroaniline	60.1		75.0	80.1%	57.8		75.0	77.1%	3.9%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Page 2 of 2

Sample ID: LCS-101915
LCS/LCSD

Lab Sample ID: LCS-101915
LIMS ID: 15-19217
Matrix: Ground Water
Date Analyzed LCS: 10/23/15 14:22
LCSD: 10/23/15 14:55

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Dimethylphthalate	22.5	25.0	90.0%	23.4	25.0	93.6%	3.9%
Acenaphthylene	19.4	25.0	77.6%	15.8	25.0	63.2%	20.5%
3-Nitroaniline	66.9	75.0	89.2%	68.0	75.0	90.7%	1.6%
Acenaphthene	19.4	25.0	77.6%	15.6	25.0	62.4%	21.7%
2,4-Dinitrophenol	105 Q	138	76.1%	109 Q	138	79.0%	3.7%
4-Nitrophenol	60.9 Q	75.0	81.2%	64.1 Q	75.0	85.5%	5.1%
Dibenzofuran	16.2	25.0	64.8%	13.8	25.0	55.2%	16.0%
2,6-Dinitrotoluene	69.2	75.0	92.3%	65.7	75.0	87.6%	5.2%
2,4-Dinitrotoluene	75.1	75.0	100%	73.8	75.0	98.4%	1.7%
Diethylphthalate	22.4	25.0	89.6%	23.2	25.0	92.8%	3.5%
4-Chlorophenyl-phenylether	17.1	25.0	68.4%	15.5	25.0	62.0%	9.8%
Fluorene	19.4	25.0	77.6%	17.1	25.0	68.4%	12.6%
4-Nitroaniline	62.7	75.0	83.6%	66.6	75.0	88.8%	6.0%
4,6-Dinitro-2-Methylphenol	126	138	91.3%	127	138	92.0%	0.8%
N-Nitrosodiphenylamine	17.3	25.0	69.2%	17.3	25.0	69.2%	0.0%
4-Bromophenyl-phenylether	17.9	25.0	71.6%	16.7	25.0	66.8%	6.9%
Hexachlorobenzene	17.0	25.0	68.0%	15.4	25.0	61.6%	9.9%
Pentachlorophenol	60.6 Q	75.0	80.8%	61.9 Q	75.0	82.5%	2.1%
Phenanthrene	20.1	25.0	80.4%	19.6	25.0	78.4%	2.5%
Carbazole	25.3	25.0	101%	26.6	25.0	106%	5.0%
Anthracene	19.7	25.0	78.8%	19.5	25.0	78.0%	1.0%
Di-n-Butylphthalate	21.0	25.0	84.0%	22.7	25.0	90.8%	7.8%
Fluoranthene	21.1	25.0	84.4%	22.3	25.0	89.2%	5.5%
Pyrene	23.4	25.0	93.6%	24.2	25.0	96.8%	3.4%
Butylbenzylphthalate	23.4	25.0	93.6%	24.7	25.0	98.8%	5.4%
3,3'-Dichlorobenzidine	51.8	75.0	69.1%	55.8	75.0	74.4%	7.4%
Benzo(a)anthracene	20.9	25.0	83.6%	22.9	25.0	91.6%	9.1%
bis(2-Ethylhexyl)phthalate	22.0	25.0	88.0%	23.2	25.0	92.8%	5.3%
Chrysene	24.4	25.0	97.6%	26.1	25.0	104%	6.7%
Di-n-Octyl phthalate	22.7	25.0	90.8%	23.8	25.0	95.2%	4.7%
Benzo(a)pyrene	23.0	25.0	92.0%	25.3	25.0	101%	9.5%
Indeno(1,2,3-cd)pyrene	21.7	25.0	86.8%	23.6	25.0	94.4%	8.4%
Dibenz(a,h)anthracene	22.3	25.0	89.2%	23.8	25.0	95.2%	6.5%
Benzo(g,h,i)perylene	23.1	25.0	92.4%	25.0	25.0	100%	7.9%
1-Methylnaphthalene	16.2	25.0	64.8%	12.4	25.0	49.6%	26.6%
Total Benzofluoranthenes	46.2	50.0	92.4%	50.2	50.0	100%	8.3%

Semivolatile Surrogate Recovery

	LCS	LCSD
d5-Nitrobenzene	64.8%	47.2%
2-Fluorobiphenyl	68.8%	50.4%
d14-p-Terphenyl	86.4%	87.6%
d4-1,2-Dichlorobenzene	56.0%	40.4%
d5-Phenol	72.8%	49.6%
2-Fluorophenol	65.3%	46.9%
2,4,6-Tribromophenol	78.1%	73.1%
d4-2-Chlorophenol	74.7%	52.8%

Results reported in µg/L
RPD calculated using sample concentrations per SW846.

4B

BLANK NO.

SEMIVOLATILE METHOD BLANK SUMMARY

AON3MBW1

Lab Name: ANALYTICAL RESOURCES INC
ARI Job No: AON3

Client: Paul Foster & Alongi
Project: Seaport landing

Lab File ID: 15102304

Date Extracted: 10/19/15

Instrument ID: NT6

Date Analyzed: 10/23/15

Matrix: LIQUID

Time Analyzed: 1349

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	AOP0LCSW1	AOP0LCSW1	15102305	10/23/15
02	AOP0LCSDW1	AOP0LCSDW1	15102306	10/23/15
03	CR21-GW-10	AON3C	15102316	10/23/15
04	CR20-GW-5.0	AON3D	15102317	10/23/15
05	SEEP-01	AON3G	15102318	10/23/15
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ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
Page 1 of 2

Sample ID: MB-101915
METHOD BLANK

Lab Sample ID: MB-101915
LIMS ID: 15-19217
Matrix: Ground Water
Data Release Authorized:
Reported: 10/26/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/19/15
Date Analyzed: 10/23/15 13:49
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
108-95-2	Phenol	1.0	< 1.0 U
111-44-4	Bis-(2-Chloroethyl) Ether	1.0	< 1.0 U
95-57-8	2-Chlorophenol	1.0	< 1.0 U
541-73-1	1,3-Dichlorobenzene	1.0	< 1.0 U
106-46-7	1,4-Dichlorobenzene	1.0	< 1.0 U
100-51-6	Benzyl Alcohol	2.0	< 2.0 U
95-50-1	1,2-Dichlorobenzene	1.0	< 1.0 U
95-48-7	2-Methylphenol	1.0	< 1.0 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	1.0	< 1.0 U
106-44-5	4-Methylphenol	2.0	< 2.0 U
621-64-7	N-Nitroso-Di-N-Propylamine	1.0	< 1.0 U
67-72-1	Hexachloroethane	2.0	< 2.0 U
98-95-3	Nitrobenzene	1.0	< 1.0 U
78-59-1	Isophorone	1.0	< 1.0 U
88-75-5	2-Nitrophenol	3.0	< 3.0 U
105-67-9	2,4-Dimethylphenol	3.0	< 3.0 U
65-85-0	Benzoic Acid	20	< 20 U
111-91-1	bis(2-Chloroethoxy) Methane	1.0	< 1.0 U
120-83-2	2,4-Dichlorophenol	3.0	< 3.0 U
120-82-1	1,2,4-Trichlorobenzene	1.0	< 1.0 U
91-20-3	Naphthalene	1.0	< 1.0 U
106-47-8	4-Chloroaniline	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	3.0	< 3.0 U
59-50-7	4-Chloro-3-methylphenol	3.0	< 3.0 U
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
77-47-4	Hexachlorocyclopentadiene	5.0	< 5.0 U
88-06-2	2,4,6-Trichlorophenol	3.0	< 3.0 U
95-95-4	2,4,5-Trichlorophenol	5.0	< 5.0 U
91-58-7	2-Chloronaphthalene	1.0	< 1.0 U
88-74-4	2-Nitroaniline	3.0	< 3.0 U
131-11-3	Dimethylphthalate	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
99-09-2	3-Nitroaniline	3.0	< 3.0 U
83-32-9	Acenaphthene	1.0	< 1.0 U
51-28-5	2,4-Dinitrophenol	20	< 20 U
100-02-7	4-Nitrophenol	10	< 10 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
606-20-2	2,6-Dinitrotoluene	3.0	< 3.0 U
121-14-2	2,4-Dinitrotoluene	3.0	< 3.0 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS **Sample ID: MB-101915**
Extraction Method: SW3520C **METHOD BLANK**

Lab Sample ID: MB-101915 QC Report No: AON3-Maul Foster & Alongi
LIMS ID: 15-19217 Project: Seaport Landing
Matrix: Ground Water 1044.02.01-02
Date Analyzed: 10/23/15 13:49

CAS Number	Analyte	RL	Result
84-66-2	Diethylphthalate	1.0	< 1.0 U
7005-72-3	4-Chlorophenyl-phenylether	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
100-01-6	4-Nitroaniline	3.0	< 3.0 U
534-52-1	4,6-Dinitro-2-Methylphenol	10	< 10 U
86-30-6	N-Nitrosodiphenylamine	1.0	< 1.0 U
101-55-3	4-Bromophenyl-phenylether	1.0	< 1.0 U
118-74-1	Hexachlorobenzene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
84-74-2	Di-n-Butylphthalate	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
85-68-7	Butylbenzylphthalate	1.0	< 1.0 U
91-94-1	3,3'-Dichlorobenzidine	5.0	< 5.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
117-81-7	bis(2-Ethylhexyl)phthalate	3.0	< 3.0 U
218-01-9	Chrysene	1.0	< 1.0 U
117-84-0	Di-n-Octyl phthalate	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	2.0	< 2.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	74.0%	2-Fluorobiphenyl	74.0%
d14-p-Terphenyl	107%	d4-1,2-Dichlorobenzene	56.0%
d5-Phenol	81.9%	2-Fluorophenol	77.3%
2,4,6-Tribromophenol	74.4%	d4-2-Chlorophenol	85.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR20-S-5.0**
Page 1 of 1

Lab Sample ID: AON3A
LIMS ID: 15-19215
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 22:01
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.1 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Silica-Florisil Cleanup: Yes
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.69	0.65-0.89		0.992	5.07	
2,3,7,8-TCDD	0.74	0.65-0.89		0.992	6.42	
1,2,3,7,8-PeCDF	1.31	1.32-1.78		0.992	4.85	EMPC
2,3,4,7,8-PeCDF	1.43	1.32-1.78		0.992	5.51	
1,2,3,7,8-PeCDD	1.53	1.32-1.78		0.992	10.8	
1,2,3,4,7,8-HxCDF	1.09	1.05-1.43		0.992	17.0	
1,2,3,6,7,8-HxCDF	1.17	1.05-1.43		0.992	9.97	
2,3,4,6,7,8-HxCDF	1.15	1.05-1.43		0.992	40.0	
1,2,3,7,8,9-HxCDF	1.15	1.05-1.43		0.992	8.52	
1,2,3,4,7,8-HxCDD	1.30	1.05-1.43		0.992	36.1	
1,2,3,6,7,8-HxCDD	1.21	1.05-1.43		0.992	184	
1,2,3,7,8,9-HxCDD	1.30	1.05-1.43		0.992	16.7	
1,2,3,4,6,7,8-HpCDF	0.95	0.88-1.20		0.992	653	
1,2,3,4,7,8,9-HpCDF	0.95	0.88-1.20		0.992	32.0	
1,2,3,4,6,7,8-HpCDD	1.02	0.88-1.20		9.92	2,650	#
OCDF	0.82	0.76-1.02		1.98	1,490	
OCDD	0.88	0.76-1.02		99.2	18,400	#

Homologue Group	EDL	RL	Result	
Total TCDF		0.992	50.9	EMPC
Total TCDD		0.992	79.6	EMPC
Total PeCDF		1.98	316	EMPC
Total PeCDD		0.992	140	
Total HxCDF		1.98	1,340	EMPC
Total HxCDD		1.98	843	EMPC
Total HpCDF		1.98	3,080	EMPC
Total HpCDD		1.98	4,760	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 90.1

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 90.1

#-Result from diluted secondary analysis.

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR20-S-5.0**
Page 1 of 1

Lab Sample ID: AON3A
LIMS ID: 15-19215
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 22:01
Instrument/Analyst: AS1/PK

Sample Amount: 10.1 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.77	0.65-0.89	75.3	24-169	
13C-2,3,7,8-TCDD	0.76	0.65-0.89	71.9	25-164	
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	69.6	24-185	
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	68.4	21-178	
13C-1,2,3,7,8-PeCDD	1.58	1.32-1.78	69.3	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	77.2	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	72.1	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	70.0	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	65.5	29-147	
13C-1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	78.3	32-141	
13C-1,2,3,6,7,8-HxCDD	1.23	1.05-1.43	72.4	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	54.1	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.43	0.37-0.51	48.1	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	55.0	23-140	
13C-OCDD	0.90	0.76-1.02	35.1	17-157	
37Cl4-2,3,7,8-TCDD			94.5	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: CR20-S-5.0
DILUTION

Lab Sample ID: AON3A
LIMS ID: 15-19215
Matrix: Soil
Data Release Authorized:
Reported: 11/06/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/04/15 14:38
Instrument/Analyst: AS1/PK

Sample Amount: 10.1 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 10.0

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-1,2,3,4,6,7,8-HpCDD	1.06	0.88-1.20	77.2	23-140	
13C-OCDD	0.93	0.76-1.02	58.5	17-157	
37Cl4-2,3,7,8-TCDD			109	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: CR21-S-5.0

Lab Sample ID: AON3B
LIMS ID: 15-19216
Matrix: Soil
Data Release Authorized:
Reported: 11/06/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/04/15 15:29
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.1 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Silica-Florisil Cleanup: Yes
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.64	0.65-0.89		0.990	0.657	JEMPC
2,3,7,8-TCDD	0.62	0.65-0.89		0.990	0.467	JEMPC
1,2,3,7,8-PeCDF	1.65	1.32-1.78		0.990	0.859	J
2,3,4,7,8-PeCDF	1.02	1.32-1.78		0.990	0.727	JEMPC
1,2,3,7,8-PeCDD	1.66	1.32-1.78		0.990	1.97	
1,2,3,4,7,8-HxCDF	1.16	1.05-1.43		0.990	2.11	
1,2,3,6,7,8-HxCDF	1.25	1.05-1.43		0.990	1.55	
2,3,4,6,7,8-HxCDF	1.10	1.05-1.43		0.990	1.58	
1,2,3,7,8,9-HxCDF	1.17	1.05-1.43		0.990	1.30	
1,2,3,4,7,8-HxCDD	1.22	1.05-1.43		0.990	3.49	
1,2,3,6,7,8-HxCDD	1.25	1.05-1.43		0.990	23.6	
1,2,3,7,8,9-HxCDD	1.25	1.05-1.43		0.990	8.09	
1,2,3,4,6,7,8-HpCDF	1.02	0.88-1.20		0.990	37.9	
1,2,3,4,7,8,9-HpCDF	1.03	0.88-1.20		0.990	1.48	
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20		0.990	373	
OCDF	0.81	0.76-1.02		1.98	42.8	
OCDD	0.89	0.76-1.02		9.90	2,480	

Homologue Group	EDL	RL	Result	
Total TCDF		0.990	7.08	EMPC
Total TCDD		0.990	4.89	EMPC
Total PeCDF		1.98	36.3	EMPC
Total PeCDD		0.990	14.9	EMPC
Total HxCDF		1.98	95.5	EMPC
Total HxCDD		1.98	117	
Total HpCDF		1.98	114	
Total HpCDD		1.98	708	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 11.8

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 11.8

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: CR21-S-5.0

Lab Sample ID: AON3B
LIMS ID: 15-19216
Matrix: Soil
Data Release Authorized:
Reported: 11/06/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

Date Extracted: 10/23/15
Date Analyzed: 11/04/15 15:29
Instrument/Analyst: AS1/PK

Sample Amount: 10.1 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.77	0.65-0.89	77.0	24-169	
13C-2,3,7,8-TCDD	0.77	0.65-0.89	73.5	25-164	
13C-1,2,3,7,8-PeCDF	1.58	1.32-1.78	64.3	24-185	
13C-2,3,4,7,8-PeCDF	1.58	1.32-1.78	62.5	21-178	
13C-1,2,3,7,8-PeCDD	1.58	1.32-1.78	61.9	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	89.9	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	77.9	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	79.6	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	75.1	29-147	
13C-1,2,3,4,7,8-HxCDD	1.29	1.05-1.43	84.6	32-141	
13C-1,2,3,6,7,8-HxCDD	1.22	1.05-1.43	75.1	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	56.5	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	55.9	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	58.0	23-140	
13C-OCDD	0.89	0.76-1.02	38.0	17-157	
37Cl4-2,3,7,8-TCDD			90.1	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-102315

Lab Sample ID: OPR-102315
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 14:55
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	RL	Result
2,3,7,8-TCDF	0.67	0.65-0.89	1.00	20.1
2,3,7,8-TCDD	0.76	0.65-0.89	1.00	21.8
1,2,3,7,8-PeCDF	1.45	1.32-1.78	1.00	103
2,3,4,7,8-PeCDF	1.41	1.32-1.78	1.00	102
1,2,3,7,8-PeCDD	1.54	1.32-1.78	1.00	104
1,2,3,4,7,8-HxCDF	1.15	1.05-1.43	1.00	106
1,2,3,6,7,8-HxCDF	1.16	1.05-1.43	1.00	103
2,3,4,6,7,8-HxCDF	1.16	1.05-1.43	1.00	107
1,2,3,7,8,9-HxCDF	1.14	1.05-1.43	1.00	105
1,2,3,4,7,8-HxCDD	1.23	1.05-1.43	1.00	104
1,2,3,6,7,8-HxCDD	1.22	1.05-1.43	1.00	104
1,2,3,7,8,9-HxCDD	1.24	1.05-1.43	1.00	105
1,2,3,4,6,7,8-HpCDF	0.98	0.88-1.20	1.00	109
1,2,3,4,7,8,9-HpCDF	0.98	0.88-1.20	1.00	106
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20	1.00	104
OCDF	0.83	0.76-1.02	2.00	202
OCDD	0.90	0.76-1.02	10.0	218

Homologue Group	EDL	RL	Result	
Total TCDF		1.00	20.9	EMPC
Total TCDD		1.00	22.3	
Total PeCDF		2.00	211	EMPC
Total PeCDD		1.00	105	EMPC
Total HxCDF		2.00	422	EMPC
Total HxCDD		2.00	314	EMPC
Total HpCDF		2.00	216	EMPC
Total HpCDD		2.00	108	EMPC

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-102315

Lab Sample ID: OPR-102315
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 14:55
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.77	0.65-0.89	100	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	96.4	25-164	
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	105	24-185	
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	102	21-178	
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	104	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	97.3	26-152	
13C-1,2,3,6,7,8-HxCDF	0.50	0.43-0.59	97.0	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	96.3	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	93.6	29-147	
13C-1,2,3,4,7,8-HxCDD	1.28	1.05-1.43	102	32-141	
13C-1,2,3,6,7,8-HxCDD	1.25	1.05-1.43	99.8	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	90.6	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	91.8	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20	97.8	23-140	
13C-OCDD	0.89	0.76-1.02	83.1	17-157	
37Cl4-2,3,7,8-TCDD			106	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-102315

Lab Sample ID: OPR-102315
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 14:55
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	OPR	Spiked	Recovery	Limits
2,3,7,8-TCDF	20.1	20.0	100	75-158
2,3,7,8-TCDD	21.8	20.0	109	67-158
1,2,3,7,8-PeCDF	103	100	103	80-134
2,3,4,7,8-PeCDF	102	100	102	68-160
1,2,3,7,8-PeCDD	104	100	104	70-142
1,2,3,4,7,8-HxCDF	106	100	106	72-134
1,2,3,6,7,8-HxCDF	103	100	103	84-130
2,3,4,6,7,8-HxCDF	107	100	107	70-156
1,2,3,7,8,9-HxCDF	105	100	105	78-130
1,2,3,4,7,8-HxCDD	104	100	104	70-164
1,2,3,6,7,8-HxCDD	104	100	104	76-134
1,2,3,7,8,9-HxCDD	105	100	105	64-162
1,2,3,4,6,7,8-HpCDF	109	100	109	82-132
1,2,3,4,7,8,9-HpCDF	106	100	106	78-138
1,2,3,4,6,7,8-HpCDD	104	100	104	70-140
OCDF	202	200	101	63-170
OCDD	218	200	109	78-144

Reported in pg/g

4DF - FORM IV-HR CDD
CDD/CDF METHOD BLANK SUMMARY
HIGH RESOLUTION

Blank No.: AON0MB

Lab Name: ANALYTICAL RESOURCES, INC. Contract: MAUL FOSTER

Lab Code: AON0 Project: SEAPORT LANDING

Matrix: (Soil/Water/Ash/Tissue/Oil) SOIL Lab Sample ID: AON0MBS

Sample wt/vol: 10 (g/ml) g Lab File ID: 15110304

Water Sample Prep: (sep/spe) Date Received: 14-OCT-15

GC Column: RTX-DIOXIN2 ID: 0.25 mm Date Extracted: 23-OCT-15

Instrument ID: AUTOSPEC1 Date Analyzed: 03-NOV-15

Client Sample No.	Lab Sample ID	Lab File ID	Date Analyzed
AON0OPR	AON0OPR	15110305	11/03/15
CR23-S-3.0	AON0B	15110308	11/03/15
CR22-S-3.0	AON0C	15110309	11/03/15
CR11-SBSD-23	AON1Q	15110310	11/03/15
CR09A-SSD-COMP	AON2A	15110311	11/03/15
CR096-SSD-COMP	AON2B	15110312	11/03/15
CR20-S-5.0	AON3A	15110313	11/03/15
CR20-S-5.0	AON3A 10X	15110404	11/04/15
CR21-S-5.0	AON3B	15110405	11/04/15

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: MB-102315

Lab Sample ID: MB-102315
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 14:04
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF		0.65-0.89	0.0360	1.00	< 0.0360	U
2,3,7,8-TCDD		0.65-0.89	0.0520	1.00	< 0.0520	U
1,2,3,7,8-PeCDF		1.32-1.78	0.0380	1.00	< 0.0380	U
2,3,4,7,8-PeCDF		1.32-1.78	0.0400	1.00	< 0.0400	U
1,2,3,7,8-PeCDD		1.32-1.78	0.0640	1.00	< 0.0640	U
1,2,3,4,7,8-HxCDF		1.05-1.43	0.0440	1.00	< 0.0440	U
1,2,3,6,7,8-HxCDF		1.05-1.43	0.0400	1.00	< 0.0400	U
2,3,4,6,7,8-HxCDF	1.37	1.05-1.43		1.00	0.0400	J
1,2,3,7,8,9-HxCDF	1.13	1.05-1.43		1.00	0.0360	J
1,2,3,4,7,8-HxCDD		1.05-1.43	0.0520	1.00	< 0.0520	U
1,2,3,6,7,8-HxCDD	1.75	1.05-1.43		1.00	0.0480	JEMPC
1,2,3,7,8,9-HxCDD	0.96	1.05-1.43		1.00	0.106	JEMPC
1,2,3,4,6,7,8-HpCDF	0.58	0.88-1.20		1.00	0.118	JEMPC
1,2,3,4,7,8,9-HpCDF	0.90	0.88-1.20		1.00	0.0480	J
1,2,3,4,6,7,8-HpCDD	1.00	0.88-1.20		1.00	0.962	J
OCDF	0.68	0.76-1.02		2.00	0.378	JEMPC
OCDD	0.86	0.76-1.02		10.0	6.81	

Homologue Group	EDL	RL	Result	
Total TCDF	0.0360	1.00	< 0.0360	U
Total TCDD	0.0520	1.00	< 0.0520	U
Total PeCDF	0.0400	2.00	< 0.0400	U
Total PeCDD	0.0640	1.00	< 0.0640	U
Total HxCDF		2.00	0.116	EMPC
Total HxCDD		2.00	0.760	EMPC
Total HpCDF		2.00	0.341	EMPC
Total HpCDD		2.00	2.29	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 0.04

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 0.11

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: MB-102315

Lab Sample ID: MB-102315
LIMS ID: 15-19093
Matrix: Soil
Data Release Authorized: MW
Reported: 11/06/15

QC Report No: AON0-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 11/03/15 14:04
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.77	0.65-0.89	104	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	99.2	25-164	
13C-1,2,3,7,8-PeCDF	1.56	1.32-1.78	108	24-185	
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	104	21-178	
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	104	25-181	
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	102	26-152	
13C-1,2,3,6,7,8-HxCDF	0.51	0.43-0.59	102	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	101	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	98.6	29-147	
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	108	32-141	
13C-1,2,3,6,7,8-HxCDD	1.23	1.05-1.43	103	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	97.4	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	98.8	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.07	0.88-1.20	106	23-140	
13C-OCDD	0.90	0.76-1.02	92.3	17-157	
37Cl4-2,3,7,8-TCDD			108	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR20-S-5.0
SAMPLE

Lab Sample ID: AON3A
LIMS ID: 15-19215
Matrix: Soil
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

Date Extracted: 10/20/15
Date Analyzed: 10/24/15 04:57
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.32 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 24.8%

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	19	< 19 U
53469-21-9	Aroclor 1242	19	< 19 U
12672-29-6	**Aroclor 1248**	**19**	**530**
11097-69-1	**Aroclor 1254**	**19**	**710 P**
11096-82-5	**Aroclor 1260**	**19**	**930**
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U
11100-14-4	Aroclor 1268	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	126%
Tetrachlorometaxylene	73.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR21-S-5.0
SAMPLE

Lab Sample ID: AON3B
LIMS ID: 15-19216
Matrix: Soil
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

Date Extracted: 10/20/15
Date Analyzed: 10/24/15 05:19
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.85 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 16.9%

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	17	< 17 U
53469-21-9	Aroclor 1242	17	< 17 U
12672-29-6	Aroclor 1248	34	< 34 Y
11097-69-1	**Aroclor 1254**	**17**	**73 P**
11096-82-5	**Aroclor 1260**	**17**	**56**
11104-28-2	Aroclor 1221	17	< 17 U
11141-16-5	Aroclor 1232	17	< 17 U
11100-14-4	Aroclor 1268	17	< 17 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	101%
Tetrachlorometaxylene	67.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB SOIL/SOLID/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-102015	96.2%	59-115	74.8%	58-112	0
LCS-102015	96.0%	59-115	73.2%	58-112	0
CR20-S-5.0	126%*	47-120	73.0%	53-116	1
CR21-S-5.0	101%	47-120	67.8%	53-116	0

Microwave (MARS) Control Limits PCBSMI
Prep Method: SW3546
Log Number Range: 15-19215 to 15-19216

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Page 1 of 1

Sample ID: LCS-102015
LAB CONTROL

Lab Sample ID: LCS-102015
LIMS ID: 15-19215
Matrix: Soil
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/20/15
Date Analyzed: 10/23/15 23:39
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Aroclor 1016	407	500	81.4%
Aroclor 1260	516	500	103%

PCB Surrogate Recovery

Decachlorobiphenyl	96.0%
Tetrachlorometaxylene	73.2%

Results reported in µg/kg (ppb)

FORM III

BLANK NO.

PCB METHOD BLANK SUMMARY

AON0MBS1

Lab Name: ANALYTICAL RESOURCES INC — Client: MAUL FOSTER & ALONGI

ARI Job No.: AON0 — Project: SEAPORT LANDING

Lab Sample ID: AON0MBS1 — Lab File ID: 10231518

Date Extracted: 10/20/15 — Matrix: SOLID

Date Analyzed: 10/23/15 — Instrument ID: ECD7

Time Analyzed: 2317 — GC Columns: ZB5/ZB35

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED
01	CR-07-SSD-COMP	AON0A	10/23/15
02	AON0LCSS1	AON0LCSS1	10/23/15
03	CR23-S-3.0	AON0B	10/24/15
04	CR22-S-3.0	AON0C	10/24/15
05	CR-24-SSD-COMP	AON1F	10/24/15
06	CR11-SBSD-23	AON1Q	10/24/15
07	CR12-SBSD-15	AON1R	10/24/15
08	CR13-SBSD-11	AON1S	10/24/15
09	CR13-SBSD-11 MS	AON1SMS	10/24/15
10	CR13-SBSD-11 MSD	AON1SMSD	10/24/15
11	CR14-SBSD-12	AON1T	10/24/15
12	CR09A-SSD-COMP	AON2A	10/24/15
13	CR096-SSD-COMP	AON2B	10/24/15
14	CR20-S-5.0	AON3A	10/24/15
15	CR21-S-5.0	AON3B	10/24/15

ALL RUNS ARE DUAL COLUMN

FORM IV PCB

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3546
Page 1 of 1

Sample ID: MB-102015
METHOD BLANK

Lab Sample ID: MB-102015
LIMS ID: 15-19215
Matrix: Soil
Data Release Authorized:
Reported: 10/29/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/20/15
Date Analyzed: 10/23/15 23:17
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

CAS Number	Analyte	LOQ	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
11100-14-4	Aroclor 1268	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	96.2%
Tetrachlorometaxylene	74.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3510C
Page 1 of 1

Sample ID: CR21-GW-10
SAMPLE

Lab Sample ID: AON3C
LIMS ID: 15-19217
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

Date Extracted: 10/19/15
Date Analyzed: 10/23/15 00:45
Instrument/Analyst: ECD7/JGR
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	LOQ	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
11100-14-4	Aroclor 1268	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	50.5%
Tetrachlorometaxylene	58.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3510C
Page 1 of 1

Sample ID: CR20-GW-5.0
SAMPLE

Lab Sample ID: AON3D
LIMS ID: 15-19218
Matrix: Ground Water
Data Release Authorized: 
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

Date Extracted: 10/19/15
Date Analyzed: 10/23/15 01:07
Instrument/Analyst: ECD7/JGR
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	LOQ	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
11100-14-4	Aroclor 1268	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	68.0%
Tetrachlorometaxylene	68.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3510C
Page 1 of 1

Sample ID: Seep-01
SAMPLE

Lab Sample ID: AON3G
LIMS ID: 15-19221
Matrix: Ground Water
Data Release Authorized: B
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

Date Extracted: 10/19/15
Date Analyzed: 10/23/15 01:28
Instrument/Analyst: ECD7/JGR
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	LOQ	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
11100-14-4	Aroclor 1268	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	82.0%
Tetrachlorometaxylene	57.5%

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB WATER SURROGATE RECOVERY SUMMARY

Matrix: Ground Water

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-101915	117%	38-120	56.0%	29-120	0
LCS-101915	85.2%	38-120	65.8%	29-120	0
CR21-GW-10	50.5%	38-120	58.2%	29-120	0
CR20-GW-5.0	68.0%	38-120	68.2%	29-120	0
Seep-01	82.0%	38-120	57.5%	29-120	0

Prep Method: SW3510C
Log Number Range: 15-19217 to 15-19221

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Page 1 of 1

Sample ID: LCS-101915
LAB CONTROL

Lab Sample ID: LCS-101915
LIMS ID: 15-19217
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/19/15
Date Analyzed: 10/22/15 22:59
Instrument/Analyst: ECD7/JGR
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

Analyte	Lab Control	Spike Added	Recovery
Aroclor 1016	3.84	5.00	76.8%
Aroclor 1260	4.86	5.00	97.2%

PCB Surrogate Recovery

Decachlorobiphenyl	85.2%
Tetrachlorometaxylene	65.8%

Results reported in µg/L

FORM III

BLANK NO.

PCB METHOD BLANK SUMMARY

AON0MBW1

Lab Name: ANALYTICAL RESOURCES INC — Client: MAUL FOSTER & ALONGI

ARI Job No.: AON0 — Project: SEAPORT LANDING

Lab Sample ID: AON0MBW1 — Lab File ID: 10221546

Date Extracted: 10/19/15 — Matrix: LIQUID

Date Analyzed: 10/22/15 — Instrument ID: ECD7

Time Analyzed: 2238 — GC Columns: ZB5/ZB35

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED
01	AON0LCSW1	AON0LCSW1	10/22/15
02	CR23-GW-6.0	AON0D	10/23/15
03	CR22-GW-9.0	AON0E	10/23/15
04	CR21-GW-10	AON3C	10/23/15
05	CR20-GW-5.0	AON3D	10/23/15
06	SEEP-01	AON3G	10/23/15

ALL RUNS ARE DUAL COLUMN

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3510C
Page 1 of 1

Sample ID: MB-101915
METHOD BLANK

Lab Sample ID: MB-101915
LIMS ID: 15-19217
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/19/15
Date Analyzed: 10/22/15 22:38
Instrument/Analyst: ECD7/JGR
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	LOQ	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
11100-14-4	Aroclor 1268	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	117%
Tetrachlorometaxylene	56.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Extraction Method: SW3546
Page 1 of 1

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Matrix: Soil

Date Received: 10/14/15

Data Release Authorized:
Reported: 10/23/15

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range/Surrogate	LOQ	Result
MB-101915	Method Blank	10/19/15	10/20/15	1.00	Diesel Range	5.0	< 5.0 U
15-19215	HC ID: ---		FID3B	1.0	Motor Oil Range	10	< 10 U
					o-Terphenyl		78.7%
AON3A	CR20-S-5.0	10/19/15	10/20/15	1.00	**Diesel Range**	**66**	**480**
15-19215	HC ID: **DIESEL/MOTOR OIL**		FID3B	10	**Motor Oil Range**	**130**	**2,600**
					o-Terphenyl		74.9%
AON3B	CR21-S-5.0	10/19/15	10/20/15	1.00	**Diesel Range**	**60**	**620**
15-19216	HC ID: **DIESEL/MOTOR OIL**		FID3B	10	**Motor Oil Range**	**120**	**3,600**
					o-Terphenyl		69.3%

Reported in mg/kg (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
LOQ-Limit of Quantitation

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

ANALYTICAL RESOURCES INCORPORATED

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	OTER	TOT OUT
101915MB	78.7%	0
101915LCS	74.5%	0
CR20-S-5.0	74.9%	0
CR21-S-5.0	69.3%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3546
Log Number Range: 15-19215 to 15-19216

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: LCS-101915
LAB CONTROL

Lab Sample ID: LCS-101915
LIMS ID: 15-19215
Matrix: Soil
Data Release Authorized:
Reported: 10/23/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/19/15
Date Analyzed: 10/20/15 17:30
Instrument/Analyst: FID3B/ML

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
Diesel	107	150	71.3%

TPHD Surrogate Recovery

o-Terphenyl	74.5%

Results reported in mg/kg

FORM III

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Soil
Date Received: 10/14/15

ARI Job: AON3
Project: Seaport Landing
1044.02.01-02

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep Date
15-19215-101915MB1	Method Blank	10.0 g	1.00 mL	-	10/19/15
15-19215-101915LCS1	Lab Control	10.0 g	1.00 mL	-	10/19/15
15-19215-AON3A	CR20-S-5.0	7.52 g	1.00 mL	D	10/19/15
15-19216-AON3B	CR21-S-5.0	8.32 g	1.00 mL	D	10/19/15

Basis: D=Dry Weight W=As Received

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Extraction Method: SW3510C
Page 1 of 1

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Matrix: Ground Water

Date Received: 10/14/15

Data Release Authorized:
Reported: 10/23/15

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DF	Range/Surrogate	RL	Result
MB-101915	Method Blank	10/19/15	10/20/15	1.00	Diesel Range	0.10	< 0.10 U
15-19217	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		74.1%
AON3C	CR21-GW-10	10/19/15	10/20/15	1.00	**Diesel Range**	**0.10**	**0.72**
15-19217	HC ID: **DIESEL/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**0.20**	**3.1**
					o-Terphenyl		54.8%
AON3D	CR20-GW-5.0	10/19/15	10/20/15	1.00	**Diesel Range**	**0.10**	**1.0**
15-19218	HC ID: **DIESEL/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**0.20**	**1.6**
					o-Terphenyl		74.0%
AON3G	Seep-01	10/19/15	10/20/15	1.00	**Diesel Range**	**0.10**	**0.22**
15-19221	HC ID: **DIESEL/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**0.20**	**0.33**
					o-Terphenyl		74.9%

Reported in mg/L (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
RL-Reporting limit.

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

ANALYTICAL RESOURCES INCORPORATED

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Ground Water

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	OTER	TOT OUT
MB-101915	74.1%	0
LCS-101915	65.4%	0
CR21-GW-10	54.8%	0
CR20-GW-5.0	74.0%	0
Seep-01	74.9%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3510C
Log Number Range: 15-19217 to 15-19221

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: LCS-101915
LAB CONTROL

Lab Sample ID: LCS-101915
LIMS ID: 15-19217
Matrix: Ground Water
Data Release Authorized:
Reported: 10/23/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/19/15
Date Analyzed: 10/20/15 14:17
Instrument/Analyst: FID3B/ML

Sample Amount: 500 mL
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
Diesel	2.18	3.00	72.7%

TPHD Surrogate Recovery

o-Terphenyl	65.4%

Results reported in mg/L

FORM III

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Ground Water
Date Received: 10/14/15

ARI Job: AON3
Project: Seaport Landing
1044.02.01-02

ARI ID	Client ID	Samp Amt	Final Vol	Prep Date
15-19217-101915MB1	Method Blank	500 mL	1.00 mL	10/19/15
15-19217-101915LCS1	Lab Control	500 mL	1.00 mL	10/19/15
15-19217-AON3C	CR21-GW-10	500 mL	1.00 mL	10/19/15
15-19218-AON3D	CR20-GW-5.0	500 mL	1.00 mL	10/19/15
15-19221-AON3G	Seep-01	500 mL	1.00 mL	10/19/15

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR20-S-5.0
SAMPLE

Lab Sample ID: AON3A
LIMS ID: 15-19215
Matrix: Soil
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

Percent Total Solids: 83.3%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	10/22/15	6010C	10/27/15	7440-38-2	Arsenic	10	10	U
3050B	10/22/15	6010C	10/27/15	7440-43-9	Cadmium	0.6	0.6	U
3050B	10/22/15	6010C	10/27/15	**7440-47-3**	**Chromium**	1	**71**	
3050B	10/22/15	6010C	10/27/15	7439-92-1	Lead	6	6	U
CLP	10/26/15	7471A	10/27/15	7439-97-6	Mercury	0.03	0.03	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR20-S-5.0
DUPLICATE

Lab Sample ID: AON3A
LIMS ID: 15-19215
Matrix: Soil
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	6010C	10 U	10 U	0.0%	+/- 10	L
Cadmium	6010C	0.6 U	0.6 U	0.0%	+/- 0.6	L
Chromium	6010C	71	18	119%	+/- 20%	*
Lead	6010C	6 U	6 U	0.0%	+/- 6	L
Mercury	7471A	0.03 U	0.06	66.7%	+/- 0.03	L

Reported in mg/kg-dry

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR20-S-5.0
MATRIX SPIKE

Lab Sample ID: AON3A
LIMS ID: 15-19215
Matrix: Soil
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	6010C	10 U	200	221	90.5%	
Cadmium	6010C	0.6 U	52.8	55.3	95.5%	
Chromium	6010C	71	68	55.3	-5.4%	N
Lead	6010C	6 U	206	221	93.2%	
Mercury	7471A	0.03 U	0.30	0.277	108%	

Reported in mg/kg-dry

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR21-S-5.0
SAMPLE

Lab Sample ID: AON3B
LIMS ID: 15-19216
Matrix: Soil
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

Percent Total Solids: 91.4%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	10/22/15	6010C	10/27/15	7440-38-2	Arsenic	10	10	U
3050B	10/22/15	6010C	10/27/15	7440-43-9	Cadmium	0.5	0.5	U
3050B	10/22/15	6010C	10/27/15	**7440-47-3**	**Chromium**	1	**32**	
3050B	10/22/15	6010C	10/27/15	7439-92-1	Lead	5	5	U
CLP	10/26/15	7471A	10/27/15	**7439-97-6**	**Mercury**	0.02	**0.02**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR21-GW-10
SAMPLE

Lab Sample ID: AON3C
LIMS ID: 15-19217
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
3010A	10/20/15	6010C	10/26/15	7440-38-2	Arsenic	0.05	0.05	U
3010A	10/20/15	6010C	10/26/15	7440-43-9	Cadmium	0.002	0.002	U
3010A	10/20/15	6010C	10/26/15	**7440-47-3**	**Chromium**	0.005	**0.066**	
3010A	10/20/15	6010C	10/26/15	7439-92-1	Lead	0.02	0.02	U
7470A	10/21/15	7470A	10/21/15	**7439-97-6**	**Mercury**	0.0001	**0.0001**	

U-Analyte undetected at given LOQ
LOQ-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR21-GW-10
DUPLICATE

Lab Sample ID: AON3C
LIMS ID: 15-19217
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	6010C	0.05 U	0.05 U	0.0%	+/- 0.05	L
Cadmium	6010C	0.002 U	0.002 U	0.0%	+/- 0.002	L
Chromium	6010C	0.066	0.063	4.7%	+/- 20%	
Lead	6010C	0.02 U	0.02 U	0.0%	+/- 0.02	L
Mercury	7470A	0.0001	0.0001	0.0%	+/- 0.0001	L

Reported in mg/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR21-GW-10
MATRIX SPIKE

Lab Sample ID: AON3C
LIMS ID: 15-19217
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	6010C	0.05 U	2.23	2.00	112%	
Cadmium	6010C	0.002 U	0.519	0.500	104%	
Chromium	6010C	0.066	0.571	0.500	101%	
Lead	6010C	0.02 U	1.97	2.00	98.5%	
Mercury	7470A	0.0001	0.0011	0.0010	100%	

Reported in mg/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked or
LOQ > Spike Concentration

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR20-GW-5.0
SAMPLE

Lab Sample ID: AON3D
LIMS ID: 15-19218
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
3010A	10/20/15	6010C	10/26/15	7440-38-2	Arsenic	0.05	0.05	U
3010A	10/20/15	6010C	10/26/15	7440-43-9	Cadmium	0.002	0.002	U
3010A	10/20/15	6010C	10/26/15	7440-47-3	Chromium	0.005	0.005	U
3010A	10/20/15	6010C	10/26/15	7439-92-1	Lead	0.02	0.02	U
7470A	10/21/15	7470A	10/21/15	7439-97-6	Mercury	0.0001	0.0001	U

U-Analyte undetected at given LOQ
LOQ-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: CR21-GW-10
SAMPLE

Lab Sample ID: AON3E
LIMS ID: 15-19219
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
6010C	10/21/15	6010C	10/26/15	7440-38-2	Arsenic	0.05	0.05	U
6010C	10/21/15	6010C	10/26/15	7440-43-9	Cadmium	0.002	0.002	U
6010C	10/21/15	6010C	10/26/15	7440-47-3	Chromium	0.005	0.005	U
6010C	10/21/15	6010C	10/26/15	7439-92-1	Lead	0.02	0.02	U
7470A	10/21/15	7470A	10/21/15	7439-97-6	Mercury	0.0001	0.0001	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

FORM-I

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: CR21-GW-10
DUPLICATE

Lab Sample ID: AON3E
LIMS ID: 15-19219
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	6010C	0.05 U	0.05 U	0.0%	+/- 0.05	L
Cadmium	6010C	0.002 U	0.002 U	0.0%	+/- 0.002	L
Chromium	6010C	0.005 U	0.005 U	0.0%	+/- 0.005	L
Lead	6010C	0.02 U	0.02 U	0.0%	+/- 0.02	L
Mercury	7470A	0.0001 U	0.0001 U	0.0%	+/- 0.0001	L

Reported in mg/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: CR21-GW-10
MATRIX SPIKE

Lab Sample ID: AON3E
LIMS ID: 15-19219
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	6010C	0.05 U	2.27	2.00	114%	
Cadmium	6010C	0.002 U	0.534	0.500	107%	
Chromium	6010C	0.005 U	0.503	0.500	101%	
Lead	6010C	0.02 U	1.99	2.00	99.5%	
Mercury	7470A	0.0001 U	0.0010	0.001	100%	

Reported in mg/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: CR20-GW-5.0
SAMPLE

Lab Sample ID: AON3F
LIMS ID: 15-19220
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
6010C	10/21/15	6010C	10/26/15	7440-38-2	Arsenic	0.05	0.05	U
6010C	10/21/15	6010C	10/26/15	7440-43-9	Cadmium	0.002	0.002	U
6010C	10/21/15	6010C	10/26/15	7440-47-3	Chromium	0.005	0.005	U
6010C	10/21/15	6010C	10/26/15	7439-92-1	Lead	0.02	0.02	U
7470A	10/21/15	7470A	10/21/15	7439-97-6	Mercury	0.0001	0.0001	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

FORM-I

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: Seep-01
SAMPLE

Lab Sample ID: AON3G
LIMS ID: 15-19221
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
7470A	10/21/15	7470A	10/21/15	7439-97-6	Mercury	0.0001	0.0001	U

U-Analyte undetected at given LOQ
LOQ-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: Seep-01
SAMPLE

Lab Sample ID: AON3H
LIMS ID: 15-19363
Matrix: Groundwater
Data Release Authorized:
Reported: 10/26/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
7470A	10/21/15	7470A	10/21/15	7439-97-6	Mercury	0.0001	0.0001	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: Seep-01
DUPLICATE

Lab Sample ID: AON3H
LIMS ID: 15-19363
Matrix: Groundwater
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Mercury	7470A	0.0001 U	0.0001 U	0.0%	+/- 0.0001	L

Reported in mg/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: Seep-01
MATRIX SPIKE

Lab Sample ID: AON3H
LIMS ID: 15-19363
Matrix: Groundwater
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/12/15
Date Received: 10/14/15

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Mercury	7470A	0.0001 U	0.0010	0.001	100%	

Reported in mg/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: AON3MB
LIMS ID: 15-19216
Matrix: Soil
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	10/22/15	6010C	10/26/15	7440-38-2	Arsenic	5	5	U
3050B	10/22/15	6010C	10/26/15	7440-43-9	Cadmium	0.2	0.2	U
3050B	10/22/15	6010C	10/26/15	7440-47-3	Chromium	0.5	0.5	U
3050B	10/22/15	6010C	10/26/15	7439-92-1	Lead	2	2	U
CLP	10/26/15	7471A	10/27/15	7439-97-6	Mercury	0.02	0.02	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: AON3LCS
LIMS ID: 15-19216
Matrix: Soil
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	6010C	213	200	106%	
Cadmium	6010C	51.7	50.0	103%	
Chromium	6010C	52.6	50.0	105%	
Lead	6010C	208	200	104%	
Mercury	7471A	0.52	0.50	104%	

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: AON3MB
LIMS ID: 15-19218
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
3010A	10/20/15	6010C	10/26/15	7440-38-2	Arsenic	0.05	0.05	U
3010A	10/20/15	6010C	10/26/15	7440-43-9	Cadmium	0.002	0.002	U
3010A	10/20/15	6010C	10/26/15	7440-47-3	Chromium	0.005	0.005	U
3010A	10/20/15	6010C	10/26/15	7439-92-1	Lead	0.02	0.02	U
7470A	10/21/15	7470A	10/21/15	7439-97-6	Mercury	0.0001	0.0001	U

U-Analyte undetected at given LOQ
LOQ-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: AON3LCS
LIMS ID: 15-19218
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	6010C	2.09	2.00	104%	
Cadmium	6010C	0.496	0.500	99.2%	
Chromium	6010C	0.531	0.500	106%	
Lead	6010C	2.04	2.00	102%	
Mercury	7470A	0.0020	0.0020	100%	

Reported in mg/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: AON3MB
LIMS ID: 15-19220
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
6010C	10/21/15	6010C	10/26/15	7440-38-2	Arsenic	0.05	0.05	U
6010C	10/21/15	6010C	10/26/15	7440-43-9	Cadmium	0.002	0.002	U
6010C	10/21/15	6010C	10/26/15	7440-47-3	Chromium	0.005	0.005	U
6010C	10/21/15	6010C	10/26/15	7439-92-1	Lead	0.02	0.02	U
7470A	10/21/15	7470A	10/21/15	7439-97-6	Mercury	0.0001	0.0001	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: AON3LCS
LIMS ID: 15-19220
Matrix: Ground Water
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	6010C	2.15	2.00	108%	
Cadmium	6010C	0.531	0.500	106%	
Chromium	6010C	0.522	0.500	104%	
Lead	6010C	2.09	2.00	104%	
Mercury	7470A	0.0020	0.0020	100%	

Reported in mg/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: AON3MB
LIMS ID: 15-19363
Matrix: Groundwater
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
7470A	10/21/15	7470A	10/21/15	7439-97-6	Mercury	0.0001	0.0001	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: AON3LCS
LIMS ID: 15-19363
Matrix: Groundwater
Data Release Authorized:
Reported: 10/28/15

QC Report No: AON3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Mercury	7470A	0.0020	0.0020	100%	

Reported in mg/L

N-Control limit not met
Control Limits: 80-120%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

24 November 2015

Madi Novak
Maul, Foster and Alongi, Inc
2001 NW 19th Avenue
Suite 200
Portland, OR 97209

RE: Project: Seaport Landing
ARI Job No.: AOT3

Dear Madi:

Please find enclosed the original chain of custody records and the final results for the sample from the project referenced above. One sediment sample was received on October 16, 2015. The sample was analyzed for phenol, grain size and conventional parameters as requested. The analysis for grain size was sub-contracted to MTC in Tukwila, WA.

These analyses proceeded without incident of note.

An electronic copy of these reports will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

cc: file AOT3

Enclosures

MDH/mdh

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: AOT3	Turn-around Requested: standard	Page: 1 of 1	
ARI Client Company: Anchor Foster & Alongi	Phone: (503) 501 5212	Date: 10/16/15	Ice Present? yes
Client Contact: Madi Novak		No. of Coolers:	Cooler Temps:
Client Project Name: Seaport Landing			
Client Project #: 1044.02.01-02	Samplers: DD + MRM		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: TOC	TVS	Total solids	Ammonia	total sulfides	Grain size	Phenol (dry weight)		Notes/Comments
CR19D-SSD-CMW	10/16/15	1110	Sed	4	X	X	X	X	X	X	X		

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Roxanne Degay	Printed Name: Emily Litwin	Printed Name:	Printed Name:
	Company: MPA	Company: ARI	Company:	Company:
	Date & Time: 10/16 1520	Date & Time: 10/16/15 1520	Date & Time:	Date & Time:

AOT3 : 00002

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Mall foster

Project Name: _____

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: _____

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	NO
Were custody papers included with the cooler?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 2.6

Time: _____

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D00256S

Cooler Accepted by: WL Date: 10/16/15 Time: 1520

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	NO
What kind of packing material was used? ... Bubble Wrap Wet ice Gel Packs Baggies Foam Block Paper Other:			
Was sufficient ice used (if appropriate)?	NA	YES	NO
Were all bottles sealed in individual plastic bags?		YES	NO
Did all bottles arrive in good condition (unbroken)?		YES	NO
Were all bottle labels complete and legible?		YES	NO
Did the number of containers listed on COC match with the number of containers received?		YES	NO
Did all bottle labels and tags agree with custody papers?		YES	NO
Were all bottles used correct for the requested analyses?		YES	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	YES	NO
Were all VOC vials free of air bubbles?	NA	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO
Date VOC Trip Blank was made at ARI	NA		

Was Sample Split by ARI : NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: WL Date: 10/20/15 Time: _____

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Small Air Bubbles < 2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm
• • •	• • •	● ● ●

Small → "sm" (< 2 mm)

Peabubbles → "pb" (2 to < 4 mm)

Large → "lg" (4 to < 6 mm)

Headspace → "hs" (> 6 mm)

SUBCONTRACTOR ANALYSIS REQUEST
CUSTODY TRANSFER 10/19/15

ANALYTICAL RESOURCES INCORPORATED

17.4°C

ARI Project: AOT3

Laboratory: Materials Testing & Consulting, In
Lab Contact: Harold Benny
Lab Address: 4611 S. 134th Pl
Tukwila, WA 98168
Phone: 360-255-9802
Fax:

ARI Client: Maul Foster & Alongi
Project ID: Seaport Landing
ARI PM: Mark Harris
Phone: 206-695-6210
Fax: 206-695-6201
Email: subdata@arilabs.com

Analytical Protocol: PSDDA
Special Instructions:

Requested Turn Around: **10/30/15**
Email Results (Y/N): **Yes**

Limits of Liability. *Subcontractor is expected to perform all requested services in accordance with appropriate methodology following Standard Operating Procedures that meet standards for the industry. The total liability of ARI, its officers, agents, employees, or sucessors, arising out of or in connection with the requested services, shall not exceed the negotiated amount for said services. The agreement by the Subcontractor to perform services requested by ARI releases ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Subcontractor.*

ARI ID	Client ID/ Add'l ID	Sampled	Matrix	Bottles	Analyses
15-19369-AOT3A	CR19D-SSD-CONV	10/16/15 11:10	Sediment	1	PSEP, 1986 Sub GSPSEP

Special Instructions: None

Carrier	Airbill	Date

Relinquished by	Company ARI	Date 10/19/15	Time 1343
Received by	Company MTC	Date 10/19/15	Time 1350

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: AOT3
Client: Maul Foster & Alongi
Project Event: 1044.02.01-02
Project Name: Seaport Landing

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	CR19D-SSD-CONV	AOT3A	15-19369	Sediment	10/16/15 11:10	10/16/15 15:20

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Duplicate RPD is not within established control limits

B — Reported value is less than the CRDL but ≥ the Reporting Limit

N — Matrix Spike recovery not within established control limits

NA — Not Applicable, analyte not spiked

H — The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible

L — Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Flagged value is not within established control limits

B — Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.

J — Estimated concentration when the value is less than ARI's established reporting limits

D — The spiked compound was not detected due to sample extract dilution

E — Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

AOT3 : 00006

Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).

S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte

NA The flagged analyte was not analyzed for

NR Spiked compound recovery is not reported due to chromatographic interference

NS The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

EMPC Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

X Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**

Z Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

AOT3 : 00007

Geotechnical Data

A	The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
F	Samples were frozen prior to particle size determination
SM	Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
SS	Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
W	Weight of sample in some pipette aliquots was below the level required for accurate weighting

AOT3 : 00008

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: CR19D-SSD-CONV**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AOT3A
LIMS ID: 15-19369
Matrix: Sediment
Data Release Authorized:
Reported: 11/11/15

QC Report No: AOT3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Date Extracted: 10/28/15
Date Analyzed: 11/02/15 19:28
Instrument/Analyst: NT10/YZ
GPC Cleanup: No

Sample Amount: 10.07 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 59.8%

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	20	93 B

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Phenol	77.1%
2-Fluorophenol	66.3%
2,4,6-Tribromophenol	94.0%
d4-2-Chlorophenol	74.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: MB-102815**
Extraction Method: SW3546 **METHOD BLANK**

Lab Sample ID: MB-102815
LIMS ID: 15-19369
Matrix: Sediment
Data Release Authorized:
Reported: 11/11/15

QC Report No: AOT3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/28/15
Date Analyzed: 11/02/15 18:16
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	20	17 J

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Phenol	72.5%
2-Fluorophenol	67.1%
2,4,6-Tribromophenol	62.8%
d4-2-Chlorophenol	71.1%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: LCS-102815**
Page 1 of 1 **LAB CONTROL**

Lab Sample ID: LCS-102815
LIMS ID: 15-19369
Matrix: Sediment
Data Release Authorized:
Reported: 11/11/15

QC Report No: AOT3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Date Extracted: 10/28/15
Date Analyzed: 11/02/15 18:52
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Phenol	467 B	500	93.4%

Semivolatile Surrogate Recovery

d5-Phenol	81.7%
2-Fluorophenol	80.0%
2,4,6-Tribromophenol	85.9%
d4-2-Chlorophenol	82.3%

Reported in µg/kg (ppb)

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AOT3-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	PHL	2FP	TBP	2CP	TOT OUT
MB-102815	72.5%	67.1%	62.8%	71.1%	0
LCS-102815	81.7%	80.0%	85.9%	82.3%	0
CR19D-SSD-CONV	77.1%	66.3%	94.0%	74.7%	0

	LCS/MB LIMITS	QC LIMITS
(PHL) = d5-Phenol	(29-120)	(29-120)
(2FP) = 2-Fluorophenol	(27-120)	(27-120)
(TBP) = 2,4,6-Tribromophenol	(24-134)	(24-134)
(2CP) = d4-2-Chlorophenol	(31-120)	(31-120)

Prep Method: SW3546
Log Number Range: 15-19369 to 15-19369

SAMPLE RESULTS-CONVENTIONALS
AOT3-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: ✓
Reported: 10/23/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Client ID: CR19D-SSD-CONV
ARI ID: 15-19369 AOT3A

Analyte	Date	Method	Units	RL	Sample
Total Solids	10/19/15 101915#1	SM2540G	Percent	0.01	39.38
Preserved Total Solids	10/19/15 101915#1	SM2540G	Percent	0.01	44.80
Total Volatile Solids	10/19/15 101915#1	SM2540G	Percent	0.01	8.58
N-Ammonia	10/21/15 102115#1	EPA 350.1M	mg-N/kg	0.22	18.6
Sulfide	10/19/15 101915#1	SM4500-S2D	mg/kg	39.1	605
Total Organic Carbon	10/22/15 102215#1	Plumb,1981	Percent	0.020	3.99

RL Analytical reporting limit
U Undetected at reported detection limit

Ammonia determined on 2N KCl extracts.

METHOD BLANK RESULTS-CONVENTIONALS
AOT3-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: W
Reported: 10/23/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Analyte	Date	Units	Blank	QC ID
Total Solids	10/19/15	Percent	< 0.01 U	ICB
Preserved Total Solids	10/19/15	Percent	< 0.01 U	ICB
Total Volatile Solids	10/19/15	Percent	< 0.01 U	ICB
N-Ammonia	10/21/15	mg-N/kg	< 0.10 U	PREP
Sulfide	10/19/15	mg/kg	< 0.05 U	PREP
Total Organic Carbon	10/22/15	Percent	< 0.020 U	ICB

LAB CONTROL RESULTS-CONVENTIONALS
AOT3-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: LJ
Reported: 10/23/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Sulfide SM4500-S2D	PREP	10/19/15	mg/kg	6.13	6.42	95.5%
Total Organic Carbon Plumb,1981	ICVL	10/22/15	Percent	0.099	0.100	99.0%

STANDARD REFERENCE RESULTS-CONVENTIONALS
AOT3-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: CJ
Reported: 10/23/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Date	Units	SRM	True Value	Recovery
N-Ammonia ERA #360114	10/21/15	mg-N/kg	97.1	100	97.1%
Total Organic Carbon NIST 1941B	10/22/15	Percent	3.01	2.99	100.7%

REPLICATE RESULTS-CONVENTIONALS
AOT3-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: U
Reported: 10/23/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Analyte	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: AOT3A Client ID: CR19D-SSD-CONV					
N-Ammonia	10/21/15	mg-N/kg	18.6	18.9 18.9	0.9%

MS/MSD RESULTS-CONVENTIONALS
AOT3-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: W
Reported: 10/23/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Analyte	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: AOT3A Client ID: CR19D-SSD-CONV						
N-Ammonia	10/21/15	mg-N/kg	18.6	653	694	91.4%

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project:	Seaport Landing	**Date Received:**	October 19, 2015
Project #:	AOT3	**Sampled By:**	Others
Client :	Analytical Resources, Inc.	**Date Tested:**	November 20, 2015
Source:	CR19D-SSD-CONV	**Tested By:**	A. Urban, B. Goble, C. Laramie
MTC Sample#:	T15-2434		

CASE NARRATIVE

1. One sample was submitted for grain size analysis according to Puget Sound Estuary Protocol (PSEP) methodology.
2. The sample was run in a single batch and one sample from another job was chosen for triplicate analysis. The triplicate data is reported on the QA summary.
3. The data is provided in summary tables and plots.
4. There were no other noted anomalies in this project.

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by: EGoble

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project: Seaport Landing
Project #: AOT3
Date Received: October 19, 2015
Date Tested: November 20, 2015

Client: Analytical Resources, Inc.
Sampled by: Others
Tested by: A. Urban, B. Goble, C. Laramie

Apparent Grain Size Distribution Summary

Percent Finer Than Indicated Size

Sample No.	Gravel			Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt				Clay	
Phi Size	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
Sieve Size (microns)	3/8"	#4 (4750)	#10 (2000)	#18 (1000)	#35 (500)	#60 (250)	#120 (125)	#230 (63)	31.0	15.6	7.8	3.9	2.0	1.0
T15-2412	100.0	99.2	96.6	90.9	85.7	74.2	47.4	25.6	25.0	21.9	17.5	13.1	9.3	6.7
	100.0	99.1	95.0	89.3	82.7	71.2	45.2	23.7	23.2	20.4	16.5	11.9	8.9	6.1
	100.0	100.0	96.2	90.8	85.6	74.1	47.8	26.2	24.4	21.4	17.5	13.0	10.0	6.5
CR19D-SSD-CONV	100.0	100.0	99.0	95.2	93.4	91.3	86.8	77.8	61.9	41.7	27.1	19.8	13.9	10.5

Notes to the Testing: Organic matter was not removed prior to testing, thus the reported values are the "apparent" grain size distribution. See narrative for discussion of the testing.

Reviewed by: _____

AOT3 : 00020

AOT3:00021

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project: Seaport Landing
Project #: AOT3
Date Received: October 19, 2015
Date Tested: November 20, 2015

Client: Analytical Resources, Inc.
Sampled by: Others
Tested by: A. Urban, B. Goble, C. Laramie

Apparent Grain Size Distribution Summary

Percent Retained in Each Size Fraction

Sample No.	Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Coarse Silt	Medium Silt	Fine Silt	Very Fine Silt	Clay			Total Fines
Phi Size	< -1	-1 to 0	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	> 10	> 4
Sieve Size (microns)	> #10 (2000)	10-18 (2000-1000)	18-35 (1000-500)	35-60 (500-250)	60-120 (250-125)	120-230 (125-62)	62.5-31.0	31.0-15.6	15.6-7.8	7.8-3.9	3.9-2.0	2.0-1.0	<1.0	<230 (<62)
T15-2412	3.4	5.7	5.2	11.5	26.8	21.8	0.6	3.1	4.4	4.4	3.9	2.5	6.7	25.6
	5.0	5.7	6.6	11.5	26.0	21.5	0.4	2.8	3.9	4.7	2.9	2.9	6.1	23.7
	3.8	5.3	5.2	11.5	26.3	21.6	1.8	3.0	3.9	4.4	3.0	3.5	6.5	26.2
CR19D-SSD-CONV	1.0	3.8	1.8	2.0	4.6	8.9	16.0	20.1	14.6	7.3	5.9	3.4	10.5	77.8

Notes to the Testing: Organic matter was not removed prior to testing, thus the reported values are the "apparent" grain size distribution. See narrative for discussion of the testing.

Reviewed by: E Gabe Goble

AOT3 : 00022

Corporate ~ 777 Chrysler Drive • **Burlington, WA 98233** • **Phone (360) 755-1990** • **Fax (360) 755-1980**
Regional Offices: Olympia ~ 360.534.9777 Bellingham ~ 360.647.6111 Silverdale ~ 360.698.6787 Tukwila ~ 206.241.1974
Visit our website: www.mtc-inc.net

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project: Seaport Landing
Project #: AOT3
Date Received: October 19, 2015
Date Tested: November 20, 2015

Client: Analytical Resources, Inc.
Sampled by: Others
Tested by: A. Urban, B. Goble, C. Laramie

Relative Standard Deviation, By Phi Size

Sample ID	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
T15-2412	100.0	99.2	96.6	90.9	85.7	74.2	47.4	25.6	25.0	21.9	17.5	13.1	9.3	6.7
	100.0	99.1	95.0	89.3	82.7	71.2	45.2	23.7	23.2	20.4	16.5	11.9	8.9	6.1
	100.0	100.0	96.2	90.8	85.6	74.1	47.8	26.2	24.4	21.4	17.5	13.0	10.0	6.5
AVE	100.0	99.4	95.9	90.4	84.6	73.2	46.8	25.2	24.2	21.2	17.2	12.7	9.4	6.4
STDEV	0.0	0.4	0.7	0.7	1.4	1.4	1.2	1.1	0.7	0.6	0.4	0.6	0.4	0.3
%RSD	0.0	0.4	0.7	0.8	1.6	1.9	2.5	4.3	3.0	2.8	2.6	4.5	4.7	4.3

The Triplicate Applies To The Following Samples

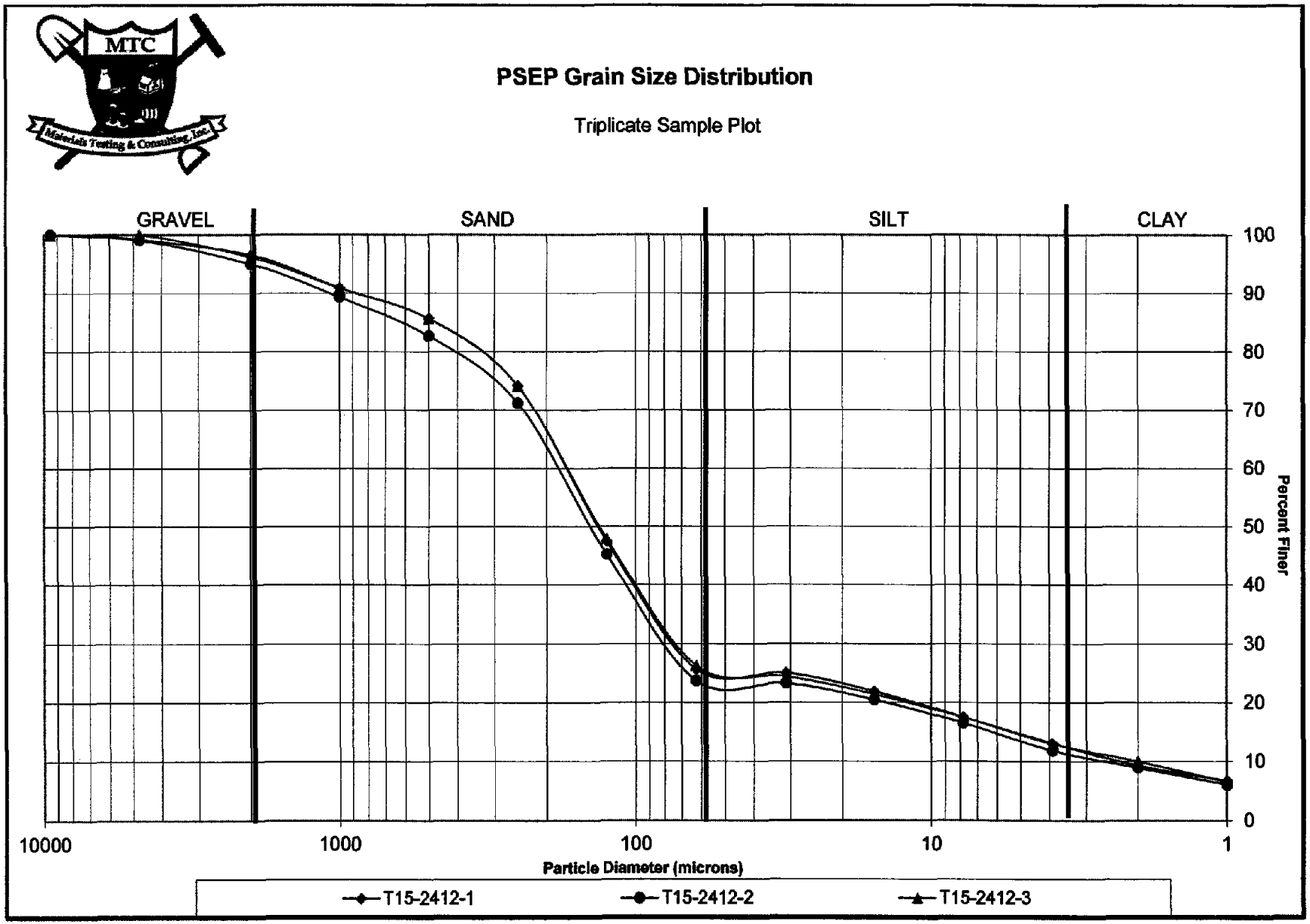
Client ID	Date Sampled	Date Extracted	Date Complete	QA Ratio (95-105)	Data Qualifiers	Pipette Portion (5.0-25.0g)
T15-2412	10/15/2015	11/5/2015	11/11/2015	97.7		5.5
	10/15/2015	11/5/2015	11/11/2015	95.9		5.4
	10/15/2015	11/5/2015	11/11/2015	97.9		5.9
CR19D-SSD-CONV	10/16/2015	11/5/2015	11/9/2015	98.1		11.9

* MTC Internal QA limits = 95-105%

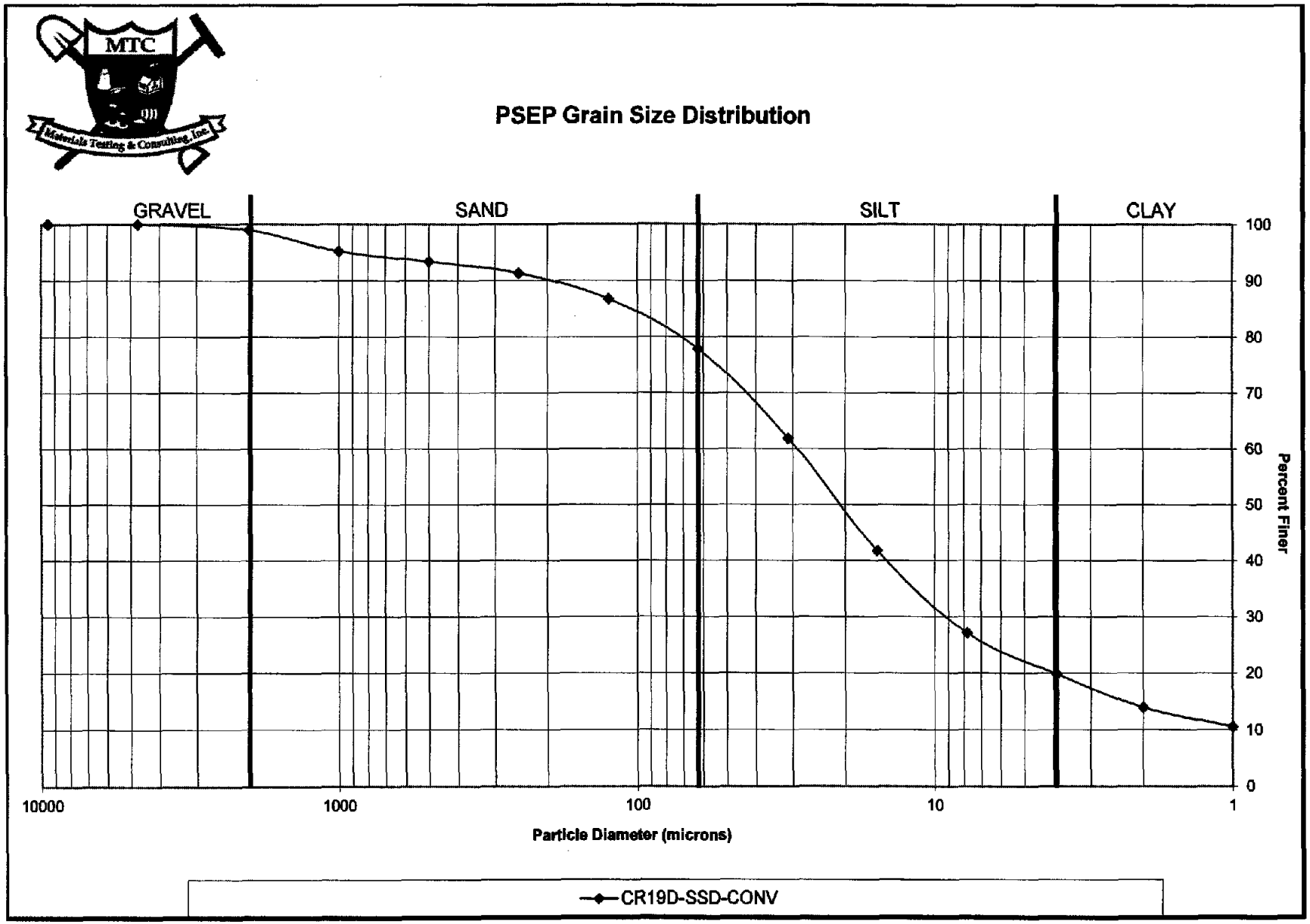
Notes to the Testing: Organic matter was not removed prior to testing, thus the reported values are the "apparent" grain size distribution. See narrative for discussion of the testing.

Reviewed by: _____

AOT3:00023


MTC
Materials Testing & Consulting, Inc.
PSEP Grain Size Distribution
Triplicate Sample Plot
GRAVEL
SAND
SILT
CLAY
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
10000
1000
100
10
1
Particle Diameter (microns)
T15-2412-1
T15-2412-2
T15-2412-3

AOT3 : 00021


MTC
Materials Testing & Consulting, Inc
PSEP Grain Size Distribution
GRAVEL
SAND
SILT
CLAY
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
10000
1000
100
10
1
Particle Diameter (microns)
CR19D-SSD-CONV

AOT3:00025

Analytical Resources, Incorporated
Analytical Chemists and Consultants

23 November 2015

Madi Novak
Maul, Foster and Alongi, Inc
2001 NW 19th Avenue
Suite 200
Portland, OR 97209

RE: Project: Seaport Landing
ARI Job No.: AOV8

Dear Madi:

Please find enclosed the original chain of custody records and the final results for the samples from the project referenced above. Twenty sediment samples were received on October 16, 2015. Fifteen samples were placed on hold as specified. The remaining samples were analyzed for SVOCs, dioxins/furans, PCBs, NWTPH-Dx, asbestos, TOC and total metals as requested. The analysis for asbestos was sub-contracted to NVL Laboratories in Seattle, WA.

The percent differences (%Ds) for 4-methylphenol and benzoic acid were not within control limits for the CCAL that bracketed the 10/30/15 SVOC analyses of these samples. All positive results for these compounds have been flagged with a "Q" qualifier to denote the high %Ds.

The %D for the surrogate, d14-p-terphenyl, was not within control limits for the CCAL that bracketed the 10/30/15 SIM-SVOC analyses of these samples. All positive results for this surrogate have been flagged with a "Q" qualifier to denote the high %Ds.

The %D for Aroclor 1260 was not within control limits for one column for the CCAL that bracketed the 10/29/15 PCB analyses of these samples. The %D for Aroclor 1260 was within acceptable QC limits for the secondary column. The secondary column only was used for the quantitation of Aroclor 1260.

The remaining analyses proceeded without incident of note.

An electronic copy of this package will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

cc: file AOV8
Enclosures
MDH/mdh

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: AOV8	Turn-around Requested: standard	Page: 1 of 3	
ARI Client Company: Maul Foster & Alongi	Phone: (503)5015212	Date: 10/15/15	Ice Present? yes
Client Contact: Madi Novak		No. of Coolers:	Cooler Temps:
Client Project Name: Seaport Landing			
Client Project #: 1044.02.01-02	Samplers: RD & MRM		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: Archive	TPH	Dioxin/Furan	PAH	TPC	Phenol	PCB	Metals	Notes/Comments: Asbestos	Archive
CR17C-0-10cm	10/15/15	9:40	Sed	1	X									
CR17C-9.5		9:35	sed	1	X									
CR17-D-SSD		10:10	sed	5	X	X	X	X	X	X	X	X		X
CR17-D-SBSD		10:15	sed	2	X			X	X	X	X	X		X
CR19B-0-10cm		1115	Sed	1	X									
CR19B-10.0		1117	Sed	1	X									
CR19D-0-10cm		1215	Sed	1	X									
CR19D-9.0		1220	sed	1	X									
CR18A-9.0		1325	Sed	1	X									
CR03A-SBSD	↓	1420	Sed	5	X	X	X	X	X	X	X	X	~~Archive~~ Only asbestos if enough sample volume	

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Archive all remaining volume.		Archie Jones		
	Printed Name: Roxanne Defelice	Printed Name: ARCHIE TRIEST	Printed Name:	Printed Name: Chris Atwell
	Company: MFA	Company: U.C. Del	Company:	Company: ARI
	Date & Time: 10/15/15	Date & Time: 10/16/15 8:35	Date & Time:	Date & Time: 10/16/15 1116

AOV8:00002

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: A0V8	Turn-around Requested: Standard	Page: 2 of 3	
ARI Client Company: Maul Foster & Alongi	Phone: 503 8015212	Date: 10/15/15	Ice Present? yes
Client Contact: Madi Novak		No. of Coolers:	Cooler Temps:
Client Project Name: Seaport Landing			
Client Project #: 1044.0201-02	Samplers: RD+MRM		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: TOC	PAH	PCB	Phenol	metals	Archive	Dioxin/Furans	TPH-DX	Notes/Comments: TCLP lead/mercury	Asbestos	Archive
CR10-SSD Comp	10/14/15	10:00	S	3	X	X	X	X	X	X					X
SM-01	10/14/15	9:45	S	1						X					
SM-02	10/14/15	9:40	S	1						X					
SM-03	10/14/15	9:35	S	1						X					
SM-04	10/14/15	9:30	S	1						X					
FB-01	10/14/15	09:35	S	1						X					
FB-02	10/14/15	09:40	S	1						X					
FB-03	10/14/15	09:47	S	1						X					
FB-04	10/14/15	09:54	S	1						X					
CR02a-SSD-Comp	10/14/15	1000	S	6	X	X	X	X	X	X	X			X	X

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Archive all remaining volume.	Printed Name: Roxanne Rogers	Printed Name: Archie Tirsbr	Printed Name: Chris Atwell	Printed Name: Chris Atwell
	Company: MFA	Company: M.C. Rec	Company: ARI	Company: ARI
	Date & Time: 10/16	Date & Time: 10/16/15	Date & Time: 10/16/15 1116	Date & Time: 10/16/15 1116

A0V8

C0000903

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Maul Foster & Alongi

Project Name: _____

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: AOV8

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	NO
Were custody papers included with the cooler?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 5.1 4.9

Time: _____

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D00265

Cooler Accepted by: CA Date: 10/16/15 Time: 1116

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	NO
What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____			
Was sufficient ice used (if appropriate)?	NA	YES	NO
Were all bottles sealed in individual plastic bags?		YES	NO
Did all bottles arrive in good condition (unbroken)?		YES	NO
Were all bottle labels complete and legible?		YES	NO
Did the number of containers listed on COC match with the number of containers received?		YES	NO
Did all bottle labels and tags agree with custody papers?		YES	NO
Were all bottles used correct for the requested analyses?		YES	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	YES	NO
Were all VOC vials free of air bubbles?	NA	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO
Date VOC Trip Blank was made at ARI	NA		

Was Sample Split by ARI : NA YES Date/Time: _____ Equipment: _____ Split by: _____

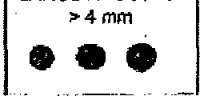
Samples Logged by: _____ Date: 10/20/15 Time: 1056

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm
		

Small → "sm" (< 2 mm)	
Peabubbles → "pb" (2 to < 4 mm)	
Large → "lg" (4 to < 6 mm)	
Headspace → "hs" (> 6 mm)	

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: AOV8
Client: Maul Foster & Alongi
Project Event: 1044.02.01-02
Project Name: Seaport Landing

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	CR17C-0-10CM	AOV8A	15-19491	Sediment	10/15/15 09:40	10/16/15 11:16
2.	CR17C-9.5	AOV8B	15-19492	Sediment	10/15/15 09:35	10/16/15 11:16
3.	CR17-D-SSD	AOV8C	15-19493	Sediment	10/15/15 10:10	10/16/15 11:16
4.	CR17-D-SBSD	AOV8D	15-19494	Sediment	10/15/15 10:15	10/16/15 11:16
5.	CR19B-0-10CM	AOV8E	15-19495	Sediment	10/15/15 11:15	10/16/15 11:16
6.	CR19B-10.0	AOV8F	15-19496	Sediment	10/15/15 11:17	10/16/15 11:16
7.	CR19D-0-10CM	AOV8G	15-19497	Sediment	10/15/15 12:15	10/16/15 11:16
8.	CR19D-9.0	AOV8H	15-19498	Sediment	10/15/15 12:20	10/16/15 11:16
9.	CR18A-9.0	AOV8I	15-19499	Sediment	10/15/15 13:25	10/16/15 11:16
10.	CR08A-SBSD	AOV8J	15-19500	Sediment	10/15/15 14:20	10/16/15 11:16
11.	CR10-SSD-COMP	AOV8K	15-19501	Sediment	10/14/15 10:00	10/16/15 11:16
12.	SM-01	AOV8L	15-19502	Sediment	10/14/15 09:45	10/16/15 11:16
13.	SM-02	AOV8M	15-19503	Sediment	10/14/15 09:40	10/16/15 11:16
14.	SM-03	AOV8N	15-19504	Sediment	10/14/15 09:35	10/16/15 11:16
15.	SM-04	AOV8O	15-19505	Sediment	10/14/15 09:30	10/16/15 11:16
16.	FB-01	AOV8P	15-19506	Sediment	10/14/15 09:35	10/16/15 11:16
17.	FB-02	AOV8Q	15-19507	Sediment	10/14/15 09:40	10/16/15 11:16
18.	FB-03	AOV8R	15-19508	Sediment	10/14/15 09:47	10/16/15 11:16
19.	FB-04	AOV8S	15-19509	Sediment	10/14/15 09:54	10/16/15 11:16
20.	CR08a-SSD-COMP	AOV8T	15-19510	Sediment	10/14/15 10:00	10/16/15 11:16

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 2/14/2011

Inorganic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Duplicate RPD is not within established control limits

B — Reported value is less than the CRDL but ≥ the Reporting Limit

N — Matrix Spike recovery not within established control limits

NA — Not Applicable, analyte not spiked

H — The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible

L — Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Flagged value is not within established control limits

B — Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.

J — Estimated concentration when the value is less than ARI's established reporting limits

D — The spiked compound was not detected due to sample extract dilution

E — Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

Q — Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).

AOV8 : 00006

S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte

NA The flagged analyte was not analyzed for

NR Spiked compound recovery is not reported due to chromatographic interference

NS The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

EMPC Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

X Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**

Z Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

Geotechnical Data

A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F Samples were frozen prior to particle size determination

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighting

AOV8 : 00008

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR17-D-SSD
SAMPLE

Lab Sample ID: AOV8C
LIMS ID: 15-19493
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/24/15
Date Analyzed: 10/30/15 17:17
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.42 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 42.2%

CAS Number	Analyte	LOQ	Result
108-95-2	**Phenol**	**19**	**16 J**
106-46-7	1,4-Dichlorobenzene	19	< 19 U
100-51-6	Benzyl Alcohol	19	< 19 U
95-50-1	1,2-Dichlorobenzene	19	< 19 U
95-48-7	2-Methylphenol	19	< 19 U
106-44-5	4-Methylphenol	19	< 19 U
105-67-9	2,4-Dimethylphenol	96	< 96 U
65-85-0	**Benzoic Acid**	**190**	**150 JQ**
120-82-1	1,2,4-Trichlorobenzene	19	< 19 U
91-20-3	**Naphthalene**	**19**	**13 J**
87-68-3	Hexachlorobutadiene	19	< 19 U
91-57-6	2-Methylnaphthalene	19	< 19 U
131-11-3	Dimethylphthalate	19	< 19 U
208-96-8	Acenaphthylene	19	< 19 U
83-32-9	Acenaphthene	19	< 19 U
132-64-9	Dibenzofuran	19	< 19 U
84-66-2	Diethylphthalate	19	< 19 U
86-73-7	Fluorene	19	< 19 U
86-30-6	N-Nitrosodiphenylamine	19	< 19 U
118-74-1	Hexachlorobenzene	19	< 19 U
87-86-5	Pentachlorophenol	96	< 96 U
85-01-8	**Phenanthrene**	**19**	**19**
120-12-7	Anthracene	19	< 19 U
84-74-2	Di-n-Butylphthalate	19	< 19 U
206-44-0	**Fluoranthene**	**19**	**25**
129-00-0	**Pyrene**	**19**	**20**
85-68-7	Butylbenzylphthalate	19	< 19 U
56-55-3	Benzo(a)anthracene	19	< 19 U
117-81-7	bis(2-Ethylhexyl)phthalate	48	< 48 U
218-01-9	**Chrysene**	**19**	**8.6 J**
117-84-0	Di-n-Octyl phthalate	19	< 19 U
50-32-8	Benzo(a)pyrene	19	< 19 U
193-39-5	Indeno(1,2,3-cd)pyrene	19	< 19 U
53-70-3	Dibenz(a,h)anthracene	19	< 19 U
191-24-2	Benzo(g,h,i)perylene	19	< 19 U
90-12-0	1-Methylnaphthalene	19	< 19 U
TOTBFA	**Total Benzofluoranthenes**	**38**	**13 J**

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR17-D-SSD
SAMPLE

Lab Sample ID: AOV8C
LIMS ID: 15-19493
Matrix: Sediment
Date Analyzed: 10/30/15 17:17

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	70.6%	2-Fluorobiphenyl	68.2%
d14-p-Terphenyl	100%	d4-1,2-Dichlorobenzene	61.8%
d5-Phenol	65.9% Q	2-Fluorophenol	59.1%
2,4,6-Tribromophenol	78.1%	d4-2-Chlorophenol	64.4%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR17-D-SBSD
SAMPLE

Lab Sample ID: AOV8D
LIMS ID: 15-19494
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/24/15
Date Analyzed: 10/30/15 17:53
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.29 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 48.8%

CAS Number	Analyte	LOQ	Result	
108-95-2	**Phenol**	**19**	**39**	
106-46-7	1,4-Dichlorobenzene	19	< 19	U
100-51-6	**Benzyl Alcohol**	**19**	**44**	
95-50-1	1,2-Dichlorobenzene	19	< 19	U
95-48-7	2-Methylphenol	19	< 19	U
106-44-5	**4-Methylphenol**	**19**	**120**	**Q**
105-67-9	2,4-Dimethylphenol	97	< 97	U
65-85-0	**Benzoic Acid**	**190**	**230**	**Q**
120-82-1	1,2,4-Trichlorobenzene	19	< 19	U
91-20-3	**Naphthalene**	**19**	**110**	
87-68-3	Hexachlorobutadiene	19	< 19	U
91-57-6	**2-Methylnaphthalene**	**19**	**31**	
131-11-3	Dimethylphthalate	19	< 19	U
208-96-8	**Acenaphthylene**	**19**	**20**	
83-32-9	**Acenaphthene**	**19**	**420**	
132-64-9	**Dibenzofuran**	**19**	**84**	
84-66-2	Diethylphthalate	19	< 19	U
86-73-7	**Fluorene**	**19**	**140**	
86-30-6	N-Nitrosodiphenylamine	19	< 19	U
118-74-1	Hexachlorobenzene	19	< 19	U
87-86-5	Pentachlorophenol	97	< 97	U
85-01-8	**Phenanthrene**	**19**	**360**	
120-12-7	**Anthracene**	**19**	**110**	
84-74-2	Di-n-Butylphthalate	19	< 19	U
206-44-0	**Fluoranthene**	**19**	**600**	
129-00-0	**Pyrene**	**19**	**470**	
85-68-7	Butylbenzylphthalate	19	< 19	U
56-55-3	**Benzo(a)anthracene**	**19**	**160**	
117-81-7	**bis(2-Ethylhexyl)phthalate**	**49**	**38**	**J**
218-01-9	**Chrysene**	**19**	**210**	
117-84-0	Di-n-Octyl phthalate	19	< 19	U
50-32-8	**Benzo(a)pyrene**	**19**	**81**	
193-39-5	**Indeno(1,2,3-cd)pyrene**	**19**	**41**	
53-70-3	**Dibenz(a,h)anthracene**	**19**	**16**	**J**
191-24-2	**Benzo(g,h,i)perylene**	**19**	**36**	
90-12-0	**1-Methylnaphthalene**	**19**	**23**	
TOTBFA	**Total Benzofluoranthenes**	**39**	**240**	

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR17-D-SBSD
SAMPLE

Lab Sample ID: AOV8D
LIMS ID: 15-19494
Matrix: Sediment
Date Analyzed: 10/30/15 17:53

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	73.0%	2-Fluorobiphenyl	77.8%
d14-p-Terphenyl	101%	d4-1,2-Dichlorobenzene	66.8%
d5-Phenol	76.9% Q	2-Fluorophenol	70.3%
2,4,6-Tribromophenol	93.3%	d4-2-Chlorophenol	73.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS **Sample ID: CR08A-SBSD**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AOV8J
LIMS ID: 15-19500
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/24/15
Date Analyzed: 10/30/15 18:29
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.11 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 32.7%

CAS Number	Analyte	LOQ	Result
108-95-2	**Phenol**	**20**	**22**
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	**4-Methylphenol**	**20**	**190 Q**
105-67-9	2,4-Dimethylphenol	99	< 99 U
65-85-0	**Benzoic Acid**	**200**	**110 JQ**
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	**Naphthalene**	**20**	**180**
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	< 20 U
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	**Acenaphthylene**	**20**	**56**
83-32-9	**Acenaphthene**	**20**	**18 J**
132-64-9	**Dibenzofuran**	**20**	**14 J**
84-66-2	Diethylphthalate	20	< 20 U
86-73-7	**Fluorene**	**20**	**15 J**
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	99	< 99 U
85-01-8	**Phenanthrene**	**20**	**60**
120-12-7	**Anthracene**	**20**	**15 J**
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	**Fluoranthene**	**20**	**44**
129-00-0	**Pyrene**	**20**	**41**
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	Benzo(a)anthracene	20	< 20 U
117-81-7	bis(2-Ethylhexyl)phthalate	50	< 50 U
218-01-9	Chrysene	20	< 20 U
117-84-0	Di-n-Octyl phthalate	20	< 20 U
50-32-8	Benzo(a)pyrene	20	< 20 U
193-39-5	Indeno(1,2,3-cd)pyrene	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	20	< 20 U
90-12-0	**1-Methylnaphthalene**	**20**	**13 J**
TOTBFA	Total Benzofluoranthenes	40	< 40 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR08A-SBSD
SAMPLE

Lab Sample ID: AOV8J
LIMS ID: 15-19500
Matrix: Sediment
Date Analyzed: 10/30/15 18:29

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	58.4%	2-Fluorobiphenyl	60.6%
d14-p-Terphenyl	80.6%	d4-1,2-Dichlorobenzene	50.2%
d5-Phenol	55.7% Q	2-Fluorophenol	56.7%
2,4,6-Tribromophenol	72.1%	d4-2-Chlorophenol	56.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR10-SSD-COMP
SAMPLE

Lab Sample ID: AOV8K
LIMS ID: 15-19501
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted: 10/24/15
Date Analyzed: 10/30/15 20:17
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.11 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 51.9%

CAS Number	Analyte	LOQ	Result
108-95-2	**Phenol**	**20**	**51**
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	**Benzyl Alcohol**	**20**	**22**
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	**2-Methylphenol**	**20**	**11 J**
106-44-5	**4-Methylphenol**	**20**	**160 Q**
105-67-9	2,4-Dimethylphenol	99	< 99 U
65-85-0	**Benzoic Acid**	**200**	**210 Q**
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	**Naphthalene**	**20**	**200**
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	**2-Methylnaphthalene**	**20**	**26**
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	**Acenaphthylene**	**20**	**59**
83-32-9	**Acenaphthene**	**20**	**24**
132-64-9	**Dibenzofuran**	**20**	**28**
84-66-2	Diethylphthalate	20	< 20 U
86-73-7	**Fluorene**	**20**	**29**
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	99	< 99 U
85-01-8	**Phenanthrene**	**20**	**110**
120-12-7	**Anthracene**	**20**	**26**
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	**Fluoranthene**	**20**	**180**
129-00-0	**Pyrene**	**20**	**150**
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	**Benzo(a)anthracene**	**20**	**46**
117-81-7	bis(2-Ethylhexyl)phthalate	50	< 50 U
218-01-9	**Chrysene**	**20**	**56**
117-84-0	Di-n-Octyl phthalate	20	< 20 U
50-32-8	**Benzo(a)pyrene**	**20**	**32**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**20**	**19 J**
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	**Benzo(g,h,i)perylene**	**20**	**29**
90-12-0	**1-Methylnaphthalene**	**20**	**15 J**
TOTBFA	**Total Benzofluoranthenes**	**40**	**110**

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR10-SSD-COMP
SAMPLE

Lab Sample ID: AOV8K
LIMS ID: 15-19501
Matrix: Sediment
Date Analyzed: 10/30/15 20:17

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	71.4%	2-Fluorobiphenyl	71.8%
d14-p-Terphenyl	91.6%	d4-1,2-Dichlorobenzene	62.6%
d5-Phenol	66.0% Q	2-Fluorophenol	61.7%
2,4,6-Tribromophenol	81.3%	d4-2-Chlorophenol	67.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 2

Sample ID: CR08a-SSD-COMP
SAMPLE

Lab Sample ID: AOV8T
LIMS ID: 15-19510
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted: 10/24/15
Date Analyzed: 10/30/15 20:53
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.31 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 48.5%

CAS Number	Analyte	LOQ	Result
108-95-2	**Phenol**	**19**	**35**
106-46-7	1,4-Dichlorobenzene	19	< 19 U
100-51-6	**Benzyl Alcohol**	**19**	**28**
95-50-1	1,2-Dichlorobenzene	19	< 19 U
95-48-7	2-Methylphenol	19	< 19 U
106-44-5	**4-Methylphenol**	**19**	**28 Q**
105-67-9	2,4-Dimethylphenol	97	< 97 U
65-85-0	**Benzoic Acid**	**190**	**180 JQ**
120-82-1	1,2,4-Trichlorobenzene	19	< 19 U
91-20-3	**Naphthalene**	**19**	**110**
87-68-3	Hexachlorobutadiene	19	< 19 U
91-57-6	**2-Methylnaphthalene**	**19**	**23**
131-11-3	Dimethylphthalate	19	< 19 U
208-96-8	**Acenaphthylene**	**19**	**14 J**
83-32-9	**Acenaphthene**	**19**	**16 J**
132-64-9	**Dibenzofuran**	**19**	**25**
84-66-2	**Diethylphthalate**	**19**	**19**
86-73-7	Fluorene	19	< 19 U
86-30-6	N-Nitrosodiphenylamine	19	< 19 U
118-74-1	Hexachlorobenzene	19	< 19 U
87-86-5	Pentachlorophenol	97	< 97 U
85-01-8	**Phenanthrene**	**19**	**92**
120-12-7	**Anthracene**	**19**	**27**
84-74-2	Di-n-Butylphthalate	19	< 19 U
206-44-0	**Fluoranthene**	**19**	**110**
129-00-0	**Pyrene**	**19**	**84**
85-68-7	Butylbenzylphthalate	19	< 19 U
56-55-3	**Benzo(a)anthracene**	**19**	**43**
117-81-7	bis(2-Ethylhexyl)phthalate	48	< 48 U
218-01-9	**Chrysene**	**19**	**74**
117-84-0	**Di-n-Octyl phthalate**	**19**	**710**
50-32-8	**Benzo(a)pyrene**	**19**	**37**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**19**	**26**
53-70-3	Dibenz(a,h)anthracene	19	< 19 U
191-24-2	**Benzo(g,h,i)perylene**	**19**	**28**
90-12-0	**1-Methylnaphthalene**	**19**	**16 J**
TOTBFA	**Total Benzofluoranthenes**	**39**	**100**

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR08a-SSD-COMP SAMPLE

Lab Sample ID: AOV8T
LIMS ID: 15-19510
Matrix: Sediment
Date Analyzed: 10/30/15 20:53

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	61.4%	2-Fluorobiphenyl	69.0%
d14-p-Terphenyl	87.0%	d4-1,2-Dichlorobenzene	57.2%
d5-Phenol	64.8% Q	2-Fluorophenol	59.7%
2,4,6-Tribromophenol	77.3%	d4-2-Chlorophenol	66.0%

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT OUT
CR17-D-SSD	70.6%	68.2%	100%	61.8%	65.9%Q	59.1%	78.1%	64.4%	0
CR17-D-SBSD	73.0%	77.8%	101%	66.8%	76.9%Q	70.3%	93.3%	73.3%	0
MB-102415	72.0%	73.6%	103%	71.4%	69.7%Q	64.4%	69.7%	70.1%	0
LCS-102415	82.0%	80.8%	118%	73.8%	85.7%Q	78.7%	91.1%	81.5%	0
CR08A-SBSD	58.4%	60.6%	80.6%	50.2%	55.7%Q	56.7%	72.1%	56.3%	0
CR08A-SBSD MS	70.8%	72.0%	89.6%	66.0%	75.9%Q	74.3%	85.1%	77.6%	0
CR08A-SBSD MSD	68.0%	68.2%	88.4%	62.4%	72.3%Q	68.7%	79.2%	72.7%	0
CR10-SSD-COMP	71.4%	71.8%	91.6%	62.6%	66.0%Q	61.7%	81.3%	67.3%	0
CR08a-SSD-COMP	61.4%	69.0%	87.0%	57.2%	64.8%Q	59.7%	77.3%	66.0%	0

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(30-120)	(30-120)
(FBP) = 2-Fluorobiphenyl	(35-120)	(35-120)
(TPH) = d14-p-Terphenyl	(37-120)	(37-120)
(DCB) = d4-1,2-Dichlorobenzene	(32-120)	(32-120)
(PHL) = d5-Phenol	(29-120)	(29-120)
(2FP) = 2-Fluorophenol	(27-120)	(27-120)
(TBP) = 2,4,6-Tribromophenol	(24-134)	(24-134)
(2CP) = d4-2-Chlorophenol	(31-120)	(31-120)

Prep Method: SW3546
Log Number Range: 15-19493 to 15-19510

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270 GC/MS
Page 1 of 1

Sample ID: CR08A-SBSD
MS/MSD

Lab Sample ID: AOV8J
LIMS ID: 15-19500
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted MS/MSD: 10/24/15

Sample Amount MS: 10.12 g-dry-wt
MSD: 10.12 g-dry-wt

Date Analyzed MS: 10/30/15 19:05
MSD: 10/30/15 19:41

Final Extract Volume MS: 1.0 mL
MSD: 1.0 mL

Instrument/Analyst MS: NT10/YZ
MSD: NT10/YZ

Dilution Factor MS: 1.00
MSD: 1.00

GPC Cleanup: Yes

Percent Moisture: 32.7 %

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Phenol	22	440	494	84.6%	363	494	69.0%	19.2%
1,4-Dichlorobenzene	< 20 U	308	494	62.3%	310	494	62.8%	0.6%
Benzyl Alcohol	< 20 U	403	494	81.6%	403	494	81.6%	0.0%
1,2-Dichlorobenzene	< 20 U	337	494	68.2%	324	494	65.6%	3.9%
2-Methylphenol	< 20 U	374	494	75.7%	383	494	77.5%	2.4%
4-Methylphenol	190 Q	691 Q	494	101%	642 Q	494	91.5%	7.4%
2,4-Dimethylphenol	< 99 U	1120	1480	75.7%	1110	1480	75.0%	0.9%
Benzoic Acid	110 J	1790 Q	2720	61.8%	1920 Q	2720	66.5%	7.0%
1,2,4-Trichlorobenzene	< 20 U	336	494	68.0%	314	494	63.6%	6.8%
Naphthalene	180	485	494	61.7%	468	494	58.3%	3.6%
Hexachlorobutadiene	< 20 U	345	494	69.8%	317	494	64.2%	8.5%
2-Methylnaphthalene	< 20 U	376	494	76.1%	359	494	72.7%	4.6%
Dimethylphthalate	< 20 U	354	494	71.7%	371	494	75.1%	4.7%
Acenaphthylene	56	407	494	71.1%	411	494	71.9%	1.0%
Acenaphthene	18 J	396	494	76.5%	401	494	77.5%	1.3%
Dibenzofuran	14 J	382	494	74.5%	374	494	72.9%	2.1%
Diethylphthalate	< 20 U	376	494	76.1%	393	494	79.6%	4.4%
Fluorene	15 J	354	494	68.6%	367	494	71.3%	3.6%
N-Nitrosodiphenylamine	< 20 U	301	494	60.9%	328	494	66.4%	8.6%
Hexachlorobenzene	< 20 U	374	494	75.7%	328	494	66.4%	13.1%
Pentachlorophenol	< 99 U	1310	1480	88.5%	1180	1480	79.7%	10.4%
Phenanthrene	60	443	494	77.5%	412	494	71.3%	7.3%
Anthracene	15 J	398	494	77.5%	373	494	72.5%	6.5%
Di-n-Butylphthalate	< 20 U	406	494	82.2%	388	494	78.5%	4.5%
Fluoranthene	44	375	494	67.0%	398	494	71.7%	6.0%
Pyrene	41	368	494	66.2%	373	494	67.2%	1.3%
Butylbenzylphthalate	< 20 U	356	494	72.1%	366	494	74.1%	2.8%
Benzo(a)anthracene	< 20 U	350	494	70.9%	367	494	74.3%	4.7%
bis(2-Ethylhexyl)phthalate	< 50 U	345	494	69.8%	357	494	72.3%	3.4%
Chrysene	< 20 U	352	494	71.3%	355	494	71.9%	0.8%
Di-n-Octyl phthalate	< 20 U	324	494	65.6%	319	494	64.6%	1.6%
Benzo(a)pyrene	< 20 U	333	494	67.4%	339	494	68.6%	1.8%
Indeno(1,2,3-cd)pyrene	< 20 U	331	494	67.0%	347	494	70.2%	4.7%
Dibenz(a,h)anthracene	< 20 U	342	494	69.2%	352	494	71.3%	2.9%
Benzo(g,h,i)perylene	< 20 U	317	494	64.2%	339	494	68.6%	6.7%
1-Methylnaphthalene	13 J	329	494	64.0%	351	494	68.4%	6.5%
Total Benzofluoranthenes	< 40 U	718	988	72.7%	724	988	73.3%	0.8%

Reported in µg/kg (ppb)
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR08A-SBSD
MATRIX SPIKE

Lab Sample ID: AOV8J
LIMS ID: 15-19500
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/24/15
Date Analyzed: 10/30/15 19:05
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.12 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 32.7%

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	20	---
106-46-7	1,4-Dichlorobenzene	20	---
100-51-6	Benzyl Alcohol	20	---
95-50-1	1,2-Dichlorobenzene	20	---
95-48-7	2-Methylphenol	20	---
106-44-5	4-Methylphenol	20	---
105-67-9	2,4-Dimethylphenol	99	---
65-85-0	Benzoic Acid	200	---
120-82-1	1,2,4-Trichlorobenzene	20	---
91-20-3	Naphthalene	20	---
87-68-3	Hexachlorobutadiene	20	---
91-57-6	2-Methylnaphthalene	20	---
131-11-3	Dimethylphthalate	20	---
208-96-8	Acenaphthylene	20	---
83-32-9	Acenaphthene	20	---
132-64-9	Dibenzofuran	20	---
84-66-2	Diethylphthalate	20	---
86-73-7	Fluorene	20	---
86-30-6	N-Nitrosodiphenylamine	20	---
118-74-1	Hexachlorobenzene	20	---
87-86-5	Pentachlorophenol	99	---
85-01-8	Phenanthrene	20	---
120-12-7	Anthracene	20	---
84-74-2	Di-n-Butylphthalate	20	---
206-44-0	Fluoranthene	20	---
129-00-0	Pyrene	20	---
85-68-7	Butylbenzylphthalate	20	---
56-55-3	Benzo(a)anthracene	20	---
117-81-7	bis(2-Ethylhexyl)phthalate	49	---
218-01-9	Chrysene	20	---
117-84-0	Di-n-Octyl phthalate	20	---
50-32-8	Benzo(a)pyrene	20	---
193-39-5	Indeno(1,2,3-cd)pyrene	20	---
53-70-3	Dibenz(a,h)anthracene	20	---
191-24-2	Benzo(g,h,i)perylene	20	---
90-12-0	1-Methylnaphthalene	20	---
TOTBFA	Total Benzofluoranthenes	40	---

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR08A-SBSD
MATRIX SPIKE

Lab Sample ID: AOV8J
LIMS ID: 15-19500
Matrix: Sediment
Date Analyzed: 10/30/15 19:05

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	70.8%	2-Fluorobiphenyl	72.0%
d14-p-Terphenyl	89.6%	d4-1,2-Dichlorobenzene	66.0%
d5-Phenol	75.9% Q	2-Fluorophenol	74.3%
2,4,6-Tribromophenol	85.1%	d4-2-Chlorophenol	77.6%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR08A-SBSD
MATRIX SPIKE DUPLICATE

Lab Sample ID: AOV8J
LIMS ID: 15-19500
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/24/15
Date Analyzed: 10/30/15 19:41
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.12 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 32.7%

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	20	---
106-46-7	1,4-Dichlorobenzene	20	---
100-51-6	Benzyl Alcohol	20	---
95-50-1	1,2-Dichlorobenzene	20	---
95-48-7	2-Methylphenol	20	---
106-44-5	4-Methylphenol	20	---
105-67-9	2,4-Dimethylphenol	99	---
65-85-0	Benzoic Acid	200	---
120-82-1	1,2,4-Trichlorobenzene	20	---
91-20-3	Naphthalene	20	---
87-68-3	Hexachlorobutadiene	20	---
91-57-6	2-Methylnaphthalene	20	---
131-11-3	Dimethylphthalate	20	---
208-96-8	Acenaphthylene	20	---
83-32-9	Acenaphthene	20	---
132-64-9	Dibenzofuran	20	---
84-66-2	Diethylphthalate	20	---
86-73-7	Fluorene	20	---
86-30-6	N-Nitrosodiphenylamine	20	---
118-74-1	Hexachlorobenzene	20	---
87-86-5	Pentachlorophenol	99	---
85-01-8	Phenanthrene	20	---
120-12-7	Anthracene	20	---
84-74-2	Di-n-Butylphthalate	20	---
206-44-0	Fluoranthene	20	---
129-00-0	Pyrene	20	---
85-68-7	Butylbenzylphthalate	20	---
56-55-3	Benzo(a)anthracene	20	---
117-81-7	bis(2-Ethylhexyl)phthalate	49	---
218-01-9	Chrysene	20	---
117-84-0	Di-n-Octyl phthalate	20	---
50-32-8	Benzo(a)pyrene	20	---
193-39-5	Indeno(1,2,3-cd)pyrene	20	---
53-70-3	Dibenz(a,h)anthracene	20	---
191-24-2	Benzo(g,h,i)perylene	20	---
90-12-0	1-Methylnaphthalene	20	---
TOTBFA	Total Benzofluoranthenes	40	---

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR08A-SBSD
MATRIX SPIKE DUPLICATE

Lab Sample ID: AOV8J
LIMS ID: 15-19500
Matrix: Sediment
Date Analyzed: 10/30/15 19:41

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	68.0%	2-Fluorobiphenyl	68.2%
d14-p-Terphenyl	88.4%	d4-1,2-Dichlorobenzene	62.4%
d5-Phenol	72.3% Q	2-Fluorophenol	68.7%
2,4,6-Tribromophenol	79.2%	d4-2-Chlorophenol	72.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270 GC/MS
Page 1 of 2

Sample ID: LCS-102415
LAB CONTROL

Lab Sample ID: LCS-102415
LIMS ID: 15-19500
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/24/15
Date Analyzed: 10/30/15 16:42
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

Analyte	Lab Control		Spike Added	Recovery
Phenol	358		500	71.6%
1,4-Dichlorobenzene	315		500	63.0%
Benzyl Alcohol	262		500	52.4%
1,2-Dichlorobenzene	334		500	66.8%
2-Methylphenol	365		500	73.0%
4-Methylphenol	436	Q	500	87.2%
2,4-Dimethylphenol	1060		1500	70.7%
Benzoic Acid	2740	Q	2750	99.6%
1,2,4-Trichlorobenzene	331		500	66.2%
Naphthalene	327		500	65.4%
Hexachlorobutadiene	325		500	65.0%
2-Methylnaphthalene	346		500	69.2%
Dimethylphthalate	369		500	73.8%
Acenaphthylene	349		500	69.8%
Acenaphthene	371		500	74.2%
Dibenzofuran	367		500	73.4%
Diethylphthalate	402		500	80.4%
Fluorene	358		500	71.6%
N-Nitrosodiphenylamine	329		500	65.8%
Hexachlorobenzene	361		500	72.2%
Pentachlorophenol	1440		1500	96.0%
Phenanthrene	384		500	76.8%
Anthracene	380		500	76.0%
Di-n-Butylphthalate	404		500	80.8%
Fluoranthene	399		500	79.8%
Pyrene	385		500	77.0%
Butylbenzylphthalate	410		500	82.0%
Benzo(a)anthracene	382		500	76.4%
bis(2-Ethylhexyl)phthalate	389		500	77.8%
Chrysene	376		500	75.2%
Di-n-Octyl phthalate	359		500	71.8%
Benzo(a)pyrene	358		500	71.6%
Indeno(1,2,3-cd)pyrene	375		500	75.0%
Dibenz(a,h)anthracene	373		500	74.6%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270 GC/MS

Sample ID: LCS-102415
LAB CONTROL

Lab Sample ID: LCS-102415
LIMS ID: 15-19500
Matrix: Sediment
Date Analyzed: 10/30/15 16:42

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Analyte	Lab Control	Spike Added	Recovery
Benzo(g,h,i)perylene	338	500	67.6%
1-Methylnaphthalene	316	500	63.2%
Total Benzofluoranthenes	783	1000	78.3%

Semivolatile Surrogate Recovery	
d5-Nitrobenzene	82.0%
2-Fluorobiphenyl	80.8%
d14-p-Terphenyl	118%
d4-1,2-Dichlorobenzene	73.8%
d5-Phenol	85.7%
2-Fluorophenol	78.7%
2,4,6-Tribromophenol	91.1%
d4-2-Chlorophenol	81.5%

Reported in µg/kg (ppb)

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: MB-102415
METHOD BLANK

Lab Sample ID: MB-102415
LIMS ID: 15-19500
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/24/15
Date Analyzed: 10/30/15 16:05
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	20	< 20 U
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	4-Methylphenol	20	< 20 U
105-67-9	2,4-Dimethylphenol	100	< 100 U
65-85-0	Benzoic Acid	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	Naphthalene	20	< 20 U
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	< 20 U
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	Acenaphthylene	20	< 20 U
83-32-9	Acenaphthene	20	< 20 U
132-64-9	Dibenzofuran	20	< 20 U
84-66-2	Diethylphthalate	20	< 20 U
86-73-7	Fluorene	20	< 20 U
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	100	< 100 U
85-01-8	Phenanthrene	20	< 20 U
120-12-7	Anthracene	20	< 20 U
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	Fluoranthene	20	< 20 U
129-00-0	Pyrene	20	< 20 U
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	Benzo(a)anthracene	20	< 20 U
117-81-7	bis(2-Ethylhexyl)phthalate	50	< 50 U
218-01-9	Chrysene	20	< 20 U
117-84-0	Di-n-Octyl phthalate	20	< 20 U
50-32-8	Benzo(a)pyrene	20	< 20 U
193-39-5	Indeno(1,2,3-cd)pyrene	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	20	< 20 U
90-12-0	1-Methylnaphthalene	20	< 20 U
TOTBFA	Total Benzofluoranthenes	40	< 40 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: MB-102415
METHOD BLANK

Lab Sample ID: MB-102415
LIMS ID: 15-19500
Matrix: Sediment
Date Analyzed: 10/30/15 16:05

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	72.0%	2-Fluorobiphenyl	73.6%
d14-p-Terphenyl	103%	d4-1,2-Dichlorobenzene	71.4%
d5-Phenol	69.7% Q	2-Fluorophenol	64.4%
2,4,6-Tribromophenol	69.7%	d4-2-Chlorophenol	70.1%

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i Injection Date: 30-OCT-2015 12:48
Lab File ID: 15103002.d Init. Cal. Date(s): 19-OCT-2015 19-OCT-2015
Analysis Type: Init. Cal. Times: 11:52 16:03
Lab Sample ID: ABN 5 Quant Type: ISTD
Method: /chem1/nt10.i/20151030.b/ABN.m

COMPOUND	RRF / AMOUNT	RF5	CCAL RRF5	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
$ 1 2-Fluorophenol	1.12958	1.25667	1.25667	0.010	11.25129	20.00000	Averaged	
$ 2 Phenol-d5	1.36520	1.77220	1.77220	0.010	29.81235	20.00000	Averaged	<-
3 Phenol	1.33180	1.39912	1.39912	0.100	5.05461	20.00000	Averaged	
$ 5 2-Chlorophenol-d4	1.33265	1.38844	1.38844	0.010	4.18634	20.00000	Averaged	
4 Bis(2-Chloroethyl)ether	1.01930	0.98740	0.98740	0.700	-3.12944	20.00000	Averaged	
6 2-Chlorophenol	1.30689	1.40643	1.40643	0.800	7.61663	20.00000	Averaged	
7 1,3-Dichlorobenzene	1.60078	1.54935	1.54935	0.010	-3.21253	20.00000	Averaged	
9 1,4-Dichlorobenzene	1.54535	1.51473	1.51473	0.010	-1.98142	20.00000	Averaged	
$ 10 1,2-Dichlorobenzene-d4	0.99122	0.89358	0.89358	0.010	-9.85095	20.00000	Averaged	
12 1,2-Dichlorobenzene	1.44684	1.41150	1.41150	0.010	-2.44239	20.00000	Averaged	
11 Benzyl alcohol	0.63765	0.71838	0.71838	0.010	12.66063	20.00000	Averaged	
14 2,2'-oxybis(1-Chloropropane	0.45840	0.46004	0.46004	0.010	0.35677	20.00000	Averaged	
13 2-Methylphenol	0.99636	1.06374	1.06374	0.700	6.76215	20.00000	Averaged	
17 Hexachloroethane	0.61781	0.59664	0.59664	0.300	-3.42602	20.00000	Averaged	
16 N-Nitroso-di-n-propylamine	0.74117	0.80620	0.80620	0.500	8.77350	20.00000	Averaged	
15 4-Methylphenol	1.00886	1.34036	1.34036	0.600	32.85896	20.00000	Averaged	<-
$ 18 Nitrobenzene-d5	0.39605	0.40683	0.40683	0.010	2.72180	20.00000	Averaged	
19 Nitrobenzene	0.36379	0.36907	0.36907	0.200	1.45212	20.00000	Averaged	
20 Isophorone	0.57522	0.61950	0.61950	0.300	7.69752	20.00000	Averaged	
21 2-Nitrophenol	0.21477	0.23500	0.23500	0.100	9.42189	20.00000	Averaged	
22 2,4-Dimethylphenol	0.39317	0.39472	0.39472	0.200	0.39531	20.00000	Averaged	
23 Bis(2-Chloroethoxy)methane	0.32972	0.31872	0.31872	0.050	-3.33731	20.00000	Averaged	
24 Benzoic acid	24.39186	20.00000	0.29066	0.010	21.95931	20.00000	Quadratic	<-
25 2,4-Dichlorophenol	0.32107	0.32388	0.32388	0.100	0.87503	20.00000	Averaged	
26 1,2,4-Trichlorobenzene	0.37492	0.34970	0.34970	0.010	-6.72587	20.00000	Averaged	
28 Naphthalene	1.03606	0.97223	0.97223	0.100	-6.16116	20.00000	Averaged	
29 4-Chloroaniline	0.41428	0.40344	0.40344	0.010	-2.61718	20.00000	Averaged	
30 Hexachlorobutadiene	0.24781	0.27998	0.27998	0.010	12.98214	20.00000	Averaged	
31 4-Chloro-3-methylphenol	0.33608	0.35003	0.35003	0.200	4.14809	20.00000	Averaged	
32 2-Methylnaphthalene	0.74547	0.71366	0.71366	0.300	-4.26724	20.00000	Averaged	
33 Hexachlorocyclopentadiene	0.41843	0.48193	0.48193	0.001	15.17489	20.00000	Averaged	
34 2,4,6-Trichlorophenol	0.37961	0.39533	0.39533	0.200	4.13879	20.00000	Averaged	
35 2,4,5-Trichlorophenol	0.39251	0.41014	0.41014	0.200	4.49159	20.00000	Averaged	
$ 36 2-Fluorobiphenyl	1.40765	1.31736	1.31736	0.010	-6.41413	20.00000	Averaged	
37 2-Chloronaphthalene	1.14337	1.05852	1.05852	0.700	-7.42109	20.00000	Averaged	

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i
Lab File ID: 15103002.d
Analysis Type:
Lab Sample ID: ABN 5
Method: /chem1/nt10.i/20151030.b/ABN.m

Injection Date: 30-OCT-2015 12:48
Init. Cal. Date(s): 19-OCT-2015 19-OCT-2015
Init. Cal. Times: 11:52 16:03
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RF5	CCAL RRF5	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
38 2-Nitroaniline	0.31622	0.35585	0.35585	0.010	12.53104	20.00000	Averaged	
39 Dimethylphthalate	1.36783	1.32388	1.32388	0.010	-3.21284	20.00000	Averaged	
40 Acenaphthylene	1.73670	1.66151	1.66151	0.900	-4.32942	20.00000	Averaged	
41 2,6-Dinitrotoluene	0.28981	0.29600	0.29600	0.100	2.13428	20.00000	Averaged	
43 3-Nitroaniline	0.28271	0.21623	0.21623	0.010	-23.51299	20.00000	Averaged	<-
44 Acenaphthene	1.04524	1.05083	1.05083	0.100	0.53450	20.00000	Averaged	
45 2,4-Dinitrophenol	24.71689	20.00000	0.21203	0.030	23.58447	20.00000	Quadratic	<-
46 Dibenzofuran	1.57152	1.51619	1.51619	0.800	-3.52039	20.00000	Averaged	
47 4-Nitrophenol	9.37250	10.00000	0.24621	0.010	-6.27500	20.00000	Quadratic	
48 2,4-Dinitrotoluene	0.39543	0.40859	0.40859	0.200	3.32881	20.00000	Averaged	
50 Diethylphthalate	1.32554	1.31047	1.31047	0.010	-1.13655	20.00000	Averaged	
49 Fluorene	1.34379	1.20883	1.20883	0.100	-10.04354	20.00000	Averaged	
51 4-Chlorophenyl-phenylether	0.68765	0.65187	0.65187	0.100	-5.20323	20.00000	Averaged	
52 4-Nitroaniline	0.30110	0.25121	0.25121	0.010	-16.56968	20.00000	Averaged	
53 4,6-Dinitro-2-methylphenol	20.80121	20.00000	0.15246	0.001	4.00604	20.00000	Quadratic	
54 N-Nitrosodiphenylamine	0.54831	0.50988	0.50988	0.010	-7.00857	20.00000	Averaged	
$ 55 2,4,6-Tribromophenol	0.34466	0.36287	0.36287	0.010	5.28225	20.00000	Averaged	
56 4-Bromophenyl-phenylether	0.27932	0.26556	0.26556	0.100	-4.92601	20.00000	Averaged	
57 Hexachlorobenzene	0.36460	0.32067	0.32067	0.100	-12.05077	20.00000	Averaged	
58 Pentachlorophenol	10.21740	10.00000	0.21002	0.010	2.17396	20.00000	Quadratic	
60 Phenanthrene	1.02053	0.94907	0.94907	0.700	-7.00175	20.00000	Averaged	
61 Anthracene	1.04166	1.00682	1.00682	0.700	-3.34414	20.00000	Averaged	
62 Carbazole	0.87135	0.84632	0.84632	0.010	-2.87351	20.00000	Averaged	
63 Di-n-butylphthalate	1.31288	1.36435	1.36435	0.010	3.92112	20.00000	Averaged	
64 Fluoranthene	1.11470	1.03055	1.03055	0.600	-7.54914	20.00000	Averaged	
65 Pyrene	1.18016	1.09600	1.09600	0.600	-7.13137	20.00000	Averaged	
$ 66 Terphenyl-d14	0.74289	0.68480	0.68480	0.010	-7.82036	20.00000	Averaged	
67 Butylbenzylphthalate	0.50597	0.49895	0.49895	0.010	-1.38563	20.00000	Averaged	
68 Benzo(a)anthracene	1.12072	1.04909	1.04909	0.700	-6.39155	20.00000	Averaged	
70 3,3'-Dichlorobenzidine	0.75137	0.60645	0.60645	0.010	-19.28827	20.00000	Averaged	
71 Chrysene	0.97701	0.88490	0.88490	0.700	-9.42727	20.00000	Averaged	
72 bis(2-Ethylhexyl)phthalate	0.52679	0.48145	0.48145	0.010	-8.60659	20.00000	Averaged	
73 Di-n-octylphthalate	1.07536	0.91056	0.91056	0.010	-15.32476	20.00000	Averaged	
74 Benzo(b)fluoranthene	1.08810	1.04396	1.04396	0.700	-4.05689	20.00000	Averaged	
75 Benzo(k)fluoranthene	1.08482	1.12636	1.12636	0.700	3.82913	20.00000	Averaged	

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i Injection Date: 30-OCT-2015 12:48
Lab File ID: 15103002.d Init. Cal. Date(s): 19-OCT-2015 19-OCT-2015
Analysis Type: Init. Cal. Times: 11:52 16:03
Lab Sample ID: ABN 5 Quant Type: ISTD
Method: /chem1/nt10.i/20151030.b/ABN.m

COMPOUND	RRF / AMOUNT	RF5	CCAL RRF5	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
76 Benzo(a)pyrene	1.03138	1.00573	1.00573	0.700	-2.48654	20.00000	Averaged	
78 Indeno(1,2,3-cd)pyrene	1.37485	1.30285	1.30285	0.500	-5.23687	20.00000	Averaged	
79 Dibenzo(a,h)anthracene	1.13622	1.06040	1.06040	0.400	-6.67317	20.00000	Averaged	
80 Benzo(g,h,i)perylene	1.23143	1.07154	1.07154	0.500	-12.98367	20.00000	Averaged	
90 N-Nitrosodimethylamine	0.53343	0.64824	0.64824	0.010	21.52303	20.00000	Averaged	<-
91 Aniline	1.56324	1.67206	1.67206	0.010	6.96121	20.00000	Averaged	
93 Benzidine	0.38521	0.17587	0.17587	0.010	-54.34480	20.00000	Averaged	<-
103 Pyridine	0.85366	1.08870	1.08870	0.010	27.53394	20.00000	Averaged	<-
105 1-methylnaphthalene	0.76506	0.75900	0.75900	0.010	-0.79269	20.00000	Averaged	
111 Azobenzene (1,2-DP-Hydrazin	1.22084	1.11240	1.11240	0.010	-8.88248	20.00000	Averaged	
187 Total Benzofluoranthenes	1.04123	1.04020	1.04020	0.010	-0.09922	20.00000	Averaged	
99 Perylene	0.99701	0.98004	0.98004	0.010	-1.70288	20.00000	Averaged	
98 Retene	++++	++++	++++	0.010	++++	20.00000	Averaged	<-
120 2,3,4,6-Tetrachlorophenol	0.35337	0.36589	0.36589	0.010	3.54308	20.00000	Averaged	

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: MB-102415**
Extraction Method: SW3546 **METHOD BLANK**

Lab Sample ID: MB-102415
LIMS ID: 15-19500
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/23/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/24/15
Date Analyzed: 10/30/15 16:05
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	Dibenz(a,h)anthracene	5.0	< 5.0 U
106-46-7	1,4-Dichlorobenzene	5.0	< 5.0 U
120-82-1	1,2,4-Trichlorobenzene	5.0	< 5.0 U
118-74-1	Hexachlorobenzene	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	5.0	< 5.0 U
131-11-3	Dimethylphthalate	5.0	< 5.0 U
85-68-7	Butylbenzylphthalate	5.0	< 5.0 U
95-48-7	2-Methylphenol	5.0	< 5.0 U
105-67-9	2,4-Dimethylphenol	25	< 25 U
86-30-6	N-Nitrosodiphenylamine	5.0	< 5.0 U
100-51-6	Benzyl Alcohol	20	< 20 U
87-86-5	Pentachlorophenol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	5.0	< 5.0 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	64.9%
d14-p-Terphenyl	88.4% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR17-D-SSD**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AOV8C
LIMS ID: 15-19493
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/23/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/24/15
Date Analyzed: 10/30/15 17:17
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.42 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 42.2%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**4.8**	**2.3 J**
106-46-7	1,4-Dichlorobenzene	4.8	< 4.8 U
120-82-1	1,2,4-Trichlorobenzene	4.8	< 4.8 U
118-74-1	Hexachlorobenzene	4.8	< 4.8 U
87-68-3	Hexachlorobutadiene	4.8	< 4.8 U
131-11-3	Dimethylphthalate	4.8	< 4.8 U
85-68-7	**Butylbenzylphthalate**	**4.8**	**3.4 J**
95-48-7	2-Methylphenol	4.8	< 4.8 U
105-67-9	2,4-Dimethylphenol	24	< 24 U
86-30-6	N-Nitrosodiphenylamine	4.8	< 4.8 U
100-51-6	**Benzyl Alcohol**	**19**	**16 J**
87-86-5	Pentachlorophenol	19	< 19 U
95-50-1	1,2-Dichlorobenzene	4.8	< 4.8 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery	
2-Fluorophenol	59.1%
d14-p-Terphenyl	86.4% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR17-D-SBSD**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AOV8D
LIMS ID: 15-19494
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/23/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/24/15
Date Analyzed: 10/30/15 17:53
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.29 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 48.8%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**4.9**	**15**
106-46-7	1,4-Dichlorobenzene	4.9	< 4.9 U
120-82-1	**1,2,4-Trichlorobenzene**	**4.9**	**4.8 J**
118-74-1	Hexachlorobenzene	4.9	< 4.9 U
87-68-3	Hexachlorobutadiene	4.9	< 4.9 U
131-11-3	Dimethylphthalate	4.9	< 4.9 U
85-68-7	Butylbenzylphthalate	4.9	< 4.9 U
95-48-7	2-Methylphenol	4.9	< 4.9 U
105-67-9	2,4-Dimethylphenol	24	< 24 U
86-30-6	N-Nitrosodiphenylamine	4.9	< 4.9 U
100-51-6	**Benzyl Alcohol**	**19**	**48**
87-86-5	**Pentachlorophenol**	**19**	**21**
95-50-1	**1,2-Dichlorobenzene**	**4.9**	**1.6 J**

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	62.9%
d14-p-Terphenyl	88.2% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR08A-SBSD**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AOV8J
LIMS ID: 15-19500
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/23/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/24/15
Date Analyzed: 10/30/15 18:29
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.11 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 32.7%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	Dibenz(a,h)anthracene	5.0	< 5.0 U
106-46-7	1,4-Dichlorobenzene	5.0	< 5.0 U
120-82-1	1,2,4-Trichlorobenzene	5.0	< 5.0 U
118-74-1	Hexachlorobenzene	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	5.0	< 5.0 U
131-11-3	Dimethylphthalate	5.0	< 5.0 U
85-68-7	Butylbenzylphthalate	5.0	< 5.0 U
95-48-7	2-Methylphenol	5.0	< 5.0 U
105-67-9	2,4-Dimethylphenol	25	< 25 U
86-30-6	N-Nitrosodiphenylamine	5.0	< 5.0 U
100-51-6	**Benzyl Alcohol**	**20**	**17 J**
87-86-5	Pentachlorophenol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	5.0	< 5.0 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	53.9%
dl4-p-Terphenyl	69.8% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR08A-SBSD**
Extraction Method: SW3546 **MATRIX SPIKE**

Lab Sample ID: AOV8J
LIMS ID: 15-19500
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/23/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/24/15
Date Analyzed: 10/30/15 19:05
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.12 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 32.7%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	Dibenz(a,h)anthracene	4.9	---
106-46-7	1,4-Dichlorobenzene	4.9	---
120-82-1	1,2,4-Trichlorobenzene	4.9	---
118-74-1	Hexachlorobenzene	4.9	---
87-68-3	Hexachlorobutadiene	4.9	---
131-11-3	Dimethylphthalate	4.9	---
85-68-7	Butylbenzylphthalate	4.9	---
95-48-7	2-Methylphenol	4.9	---
105-67-9	2,4-Dimethylphenol	25	---
86-30-6	N-Nitrosodiphenylamine	4.9	---
100-51-6	Benzyl Alcohol	20	---
87-86-5	Pentachlorophenol	20	---
95-50-1	1,2-Dichlorobenzene	4.9	---

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	68.1%
d14-p-Terphenyl	79.0% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR08A-SBSD**
Extraction Method: SW3546 **MATRIX SPIKE DUPLICATE**

Lab Sample ID: AOV8J
LIMS ID: 15-19500
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/23/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/24/15
Date Analyzed: 10/30/15 19:41
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.12 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 32.7%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	Dibenz(a,h)anthracene	4.9	---
106-46-7	1,4-Dichlorobenzene	4.9	---
120-82-1	1,2,4-Trichlorobenzene	4.9	---
118-74-1	Hexachlorobenzene	4.9	---
87-68-3	Hexachlorobutadiene	4.9	---
131-11-3	Dimethylphthalate	4.9	---
85-68-7	Butylbenzylphthalate	4.9	---
95-48-7	2-Methylphenol	4.9	---
105-67-9	2,4-Dimethylphenol	25	---
86-30-6	N-Nitrosodiphenylamine	4.9	---
100-51-6	Benzyl Alcohol	20	---
87-86-5	Pentachlorophenol	20	---
95-50-1	1,2-Dichlorobenzene	4.9	---

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	62.0%
d14-p-Terphenyl	74.0% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR10-SSD-COMP**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AOV8K
LIMS ID: 15-19501
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/23/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted: 10/24/15
Date Analyzed: 10/30/15 20:17
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.11 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 51.9%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**5.0**	**8.5**
106-46-7	**1,4-Dichlorobenzene**	**5.0**	**3.7 J**
120-82-1	**1,2,4-Trichlorobenzene**	**5.0**	**3.0 J**
118-74-1	**Hexachlorobenzene**	**5.0**	**3.3 J**
87-68-3	**Hexachlorobutadiene**	**5.0**	**2.8 J**
131-11-3	Dimethylphthalate	5.0	< 5.0 U
85-68-7	Butylbenzylphthalate	5.0	< 5.0 U
95-48-7	**2-Methylphenol**	**5.0**	**7.7**
105-67-9	2,4-Dimethylphenol	25	< 25 U
86-30-6	N-Nitrosodiphenylamine	5.0	< 5.0 U
100-51-6	**Benzyl Alcohol**	**20**	**22**
87-86-5	**Pentachlorophenol**	**20**	**23**
95-50-1	**1,2-Dichlorobenzene**	**5.0**	**3.3 J**

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery	
2-Fluorophenol	61.3%
d14-p-Terphenyl	77.2% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR08a-SSD-COMP**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AOV8T
LIMS ID: 15-19510
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/23/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted: 10/24/15
Date Analyzed: 10/30/15 20:53
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.31 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 48.5%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**4.8**	**9.5**
106-46-7	**1,4-Dichlorobenzene**	**4.8**	**2.4 J**
120-82-1	1,2,4-Trichlorobenzene	4.8	< 4.8 U
118-74-1	Hexachlorobenzene	4.8	< 4.8 U
87-68-3	Hexachlorobutadiene	4.8	< 4.8 U
131-11-3	Dimethylphthalate	4.8	< 4.8 U
85-68-7	Butylbenzylphthalate	4.8	< 4.8 U
95-48-7	2-Methylphenol	4.8	< 4.8 U
105-67-9	2,4-Dimethylphenol	24	< 24 U
86-30-6	N-Nitrosodiphenylamine	4.8	< 4.8 U
100-51-6	**Benzyl Alcohol**	**19**	**27**
87-86-5	**Pentachlorophenol**	**19**	**14 J**
95-50-1	1,2-Dichlorobenzene	4.8	< 4.8 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	57.1%
d14-p-Terphenyl	75.4% Q

ANALYTICAL RESOURCES INCORPORATED

SIM SW8270 SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	FPH	TER	TOT OUT
CR17-D-SSD	59.1%	86.4% Q	0
CR17-D-SBSD	62.9%	88.2% Q	0
MB-102415	64.9%	88.4% Q	0
LCS-102415	73.6%	103% Q	0
CR08A-SBSD	53.9%	69.8% Q	0
CR08A-SBSD MS	68.1%	79.0% Q	0
CR08A-SBSD MSD	62.0%	74.0% Q	0
CR10-SSD-COMP	61.3%	77.2% Q	0
CR08a-SSD-COMP	57.1%	75.4% Q	0

	QC LIMITS	
(FPH) = 2-Fluorophenol	(27-120)	(27-120)
(TER) = d14-p-Terphenyl	(37-120)	(37-120)

Prep Method: SW3546
Log Number Range: 15-19493 to 15-19510

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: LCS-102415**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-102415
LIMS ID: 15-19500
Matrix: Sediment
Data Release Authorized:
Reported: 11/23/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/24/15
Date Analyzed LCS: 10/30/15 16:42
Instrument/Analyst LCS: NT10/YZ

Sample Amount LCS: 10.00 g-dry-wt
Final Extract Volume LCS: 1.0 mL
Dilution Factor LCS: 1.00

Analyte	LCS	Spike Added	Recovery
Dibenz(a,h)anthracene	341	500	68.2%
1,4-Dichlorobenzene	281	500	56.2%
1,2,4-Trichlorobenzene	299	500	59.8%
Hexachlorobenzene	330	500	66.0%
Hexachlorobutadiene	317	500	63.4%
Dimethylphthalate	342	500	68.4%
Butylbenzylphthalate	432	500	86.4%
2-Methylphenol	316	500	63.2%
2,4-Dimethylphenol	932	1500	62.1%
N-Nitrosodiphenylamine	313	500	62.6%
Benzyl Alcohol	304	500	60.8%
Pentachlorophenol	1680 E	1500	112%
1,2-Dichlorobenzene	291	500	58.2%

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	73.6%
d14-p-Terphenyl	103% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR08A-SBSD**
Page 1 of 1 **MATRIX SPIKE**

Lab Sample ID: AOV8J
LIMS ID: 15-19500
Matrix: Sediment
Data Release Authorized:
Reported: 11/23/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted MS/MSD: 10/24/15

Sample Amount MS: 10.12 g-dry-wt
MSD: 10.12 g-dry-wt

Date Analyzed MS: 10/30/15 19:05
MSD: 10/30/15 19:41

Final Extract Volume MS: 1.0 mL
MSD: 1.0 mL

Instrument/Analyst MS: NT10/YZ
MSD: NT10/YZ

Dilution Factor MS: 1.00
MSD: 1.00

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Dibenz(a,h)anthracene	< 5.0 U	298	494	60.3%	310	494	62.8%	3.9%
1,4-Dichlorobenzene	< 5.0 U	293	494	59.3%	279	494	56.5%	4.9%
1,2,4-Trichlorobenzene	< 5.0 U	308	494	62.3%	293	494	59.3%	5.0%
Hexachlorobenzene	< 5.0 U	338	494	68.4%	321	494	65.0%	5.2%
Hexachlorobutadiene	< 5.0 U	329	494	66.6%	319	494	64.6%	3.1%
Dimethylphthalate	< 5.0 U	345	494	69.8%	331	494	67.0%	4.1%
Butylbenzylphthalate	< 5.0 U	399	494	80.8%	395	494	80.0%	1.0%
2-Methylphenol	< 5.0 U	323	494	65.4%	316	494	64.0%	2.2%
2,4-Dimethylphenol	< 25 U	1040 E	1480	70.3%	988	1480	66.8%	5.1%
N-Nitrosodiphenylamine	< 5.0 U	301	494	60.9%	336	494	68.0%	11.0%
Benzyl Alcohol	17 J	412	494	80.0%	398	494	77.1%	3.5%
Pentachlorophenol	< 20 U	1520 E	1480	103%	1420 E	1480	95.9%	6.8%
1,2-Dichlorobenzene	< 5.0 U	305	494	61.7%	294	494	59.5%	3.7%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i Injection Date: 30-OCT-2015 13:24
Lab File ID: 15103003.d Init. Cal. Date(s): 19-OCT-2015 19-OCT-2015
Analysis Type: Init. Cal. Times: 11:52 16:39
Lab Sample ID: ABN 1 Quant Type: ISTD
Method: /chem1/nt10.i/20151030.b/SIM.b/SIMABN2.m

COMPOUND	RRF / AMOUNT	RF1	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
$ 1 2-Fluorophenol	1.04543	0.96142	0.010	-8.03654	20.00000	Averaged	
3 Phenol	1.55661	1.40648	0.010	-9.64464	20.00000	Averaged	
7 1,3-Dichlorobenzene	1.76229	1.81225	0.010	2.83494	20.00000	Averaged	
9 1,4-Dichlorobenzene	1.73930	1.76468	0.010	1.45974	20.00000	Averaged	
11 Benzyl alcohol	0.81726	0.79225	0.010	-3.06060	20.00000	Averaged	
12 1,2-Dichlorobenzene	1.62946	1.70304	0.010	4.51605	20.00000	Averaged	
13 2-Methylphenol	0.93390	0.80168	0.010	-14.15811	20.00000	Averaged	
15 4-Methylphenol	0.91605	0.81806	0.010	-10.69673	20.00000	Averaged	
16 N-Nitroso-di-n-propylamine	0.61594	0.57640	0.050	-6.41927	20.00000	Averaged	
22 2,4-Dimethylphenol	0.39393	0.33783	0.010	-14.23919	20.00000	Averaged	
26 1,2,4-Trichlorobenzene	0.39456	0.42313	0.010	7.24230	20.00000	Averaged	
30 Hexachlorobutadiene	0.30361	0.32506	0.010	7.06797	20.00000	Averaged	
39 Dimethylphthalate	1.14558	0.98245	0.010	-14.23996	20.00000	Averaged	
50 Diethylphthalate	1.23806	1.15862	0.010	-6.41678	20.00000	Averaged	
54 N-Nitrosodiphenylamine	0.61955	0.55635	0.010	-10.20083	20.00000	Averaged	
57 Hexachlorobenzene	0.41451	0.45813	0.010	10.52324	20.00000	Averaged	
58 Pentachlorophenol	0.21311	0.22135	0.005	3.86819	20.00000	Averaged	
$ 66 Terphenyl-d14	0.36942	0.29005	0.010	-21.48474	20.00000	Averaged	<-
67 Butylbenzylphthalate	0.41305	0.39713	0.010	-3.85451	20.00000	Averaged	
79 Dibenzo(a,h)anthracene	1.15706	1.02003	0.010	-11.84321	20.00000	Averaged	
90 N-Nitrosodimethylamine	0.44352	0.45598	0.010	2.81024	20.00000	Averaged	

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR17-D-SSD**

Lab Sample ID: AOV8C
LIMS ID: 15-19493
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/26/18
Date Analyzed: 11/05/15 08:35
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.1 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Silica-Florisil Cleanup: Yes
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.63	0.65-0.89		0.994	0.406	JEMPC
2,3,7,8-TCDD	0.74	0.65-0.89		0.994	1.85	
1,2,3,7,8-PeCDF	1.13	1.32-1.78		0.994	0.213	JEMPC
2,3,4,7,8-PeCDF	2.15	1.32-1.78		0.994	0.239	JEMPC
1,2,3,7,8-PeCDD	1.60	1.32-1.78		0.994	2.49	
1,2,3,4,7,8-HxCDF	1.19	1.05-1.43		0.994	0.596	J
1,2,3,6,7,8-HxCDF	1.42	1.05-1.43		0.994	0.370	J
2,3,4,6,7,8-HxCDF	0.82	1.05-1.43		0.994	0.443	JEMPC
1,2,3,7,8,9-HxCDF	0.80	1.05-1.43		0.994	0.324	BJEMPC
1,2,3,4,7,8-HxCDD	1.04	1.05-1.43		0.994	0.736	JEMPC
1,2,3,6,7,8-HxCDD	1.15	1.05-1.43		0.994	2.94	
1,2,3,7,8,9-HxCDD	1.33	1.05-1.43		0.994	6.33	
1,2,3,4,6,7,8-HpCDF	0.96	0.88-1.20		0.994	8.12	
1,2,3,4,7,8,9-HpCDF	0.83	0.88-1.20		0.994	0.483	JEMPC
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20		0.994	56.2	
OCDF	0.77	0.76-1.02		1.99	14.0	
OCDD	0.88	0.76-1.02		9.94	475	

Homologue Group	EDL	RL	Result	
Total TCDF		0.994	4.27	EMPC
Total TCDD		0.994	12.4	EMPC
Total PeCDF		1.99	4.66	EMPC
Total PeCDD		0.994	16.7	EMPC
Total HxCDF		1.99	10.8	EMPC
Total HxCDD		1.99	45.8	EMPC
Total HpCDF		1.99	21.2	EMPC
Total HpCDD		1.99	150	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 6.43

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 6.43

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B

Sample ID: CR17-D-SSD

Lab Sample ID: AOV8C
LIMS ID: 15-19493
Matrix: Sediment
Data Release Authorized:
Reported: 11/11/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/26/18
Date Analyzed: 11/05/15 08:35
Instrument/Analyst: AS1/PK

Sample Amount: 10.1 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	90.2	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	86.6	25-164	
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	88.9	24-185	
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	87.8	21-178	
13C-1,2,3,7,8-PeCDD	1.56	1.32-1.78	86.6	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	91.0	26-152	
13C-1,2,3,6,7,8-HxCDF	0.51	0.43-0.59	87.7	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	91.4	28-136	
13C-1,2,3,7,8,9-HxCDF	0.51	0.43-0.59	89.9	29-147	
13C-1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	96.1	32-141	
13C-1,2,3,6,7,8-HxCDD	1.23	1.05-1.43	88.4	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	80.0	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	80.6	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	85.8	23-140	
13C-OCDD	0.89	0.76-1.02	72.1	17-157	
37Cl4-2,3,7,8-TCDD			95.3	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR08A-SBSD**
Page 1 of 1

Lab Sample ID: AOV8J
LIMS ID: 15-19500
Matrix: Sediment
Data Release Authorized:
Reported: 11/11/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/26/18
Date Analyzed: 11/05/15 09:35
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.2 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Silica-Florisil Cleanup: Yes
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.69	0.65-0.89		0.978	0.0880	J
2,3,7,8-TCDD	0.70	0.65-0.89		0.978	1.55	
1,2,3,7,8-PeCDF	1.68	1.32-1.78		0.978	0.141	J
2,3,4,7,8-PeCDF	1.57	1.32-1.78		0.978	0.0704	J
1,2,3,7,8-PeCDD	1.49	1.32-1.78		0.978	1.76	
1,2,3,4,7,8-HxCDF	1.26	1.05-1.43		0.978	0.217	J
1,2,3,6,7,8-HxCDF	1.35	1.05-1.43		0.978	0.178	J
2,3,4,6,7,8-HxCDF	1.21	1.05-1.43		0.978	0.188	J
1,2,3,7,8,9-HxCDF	1.05	1.05-1.43		0.978	0.258	BJEMPC
1,2,3,4,7,8-HxCDD	1.76	1.05-1.43		0.978	0.583	JEMPC
1,2,3,6,7,8-HxCDD	1.12	1.05-1.43		0.978	1.30	
1,2,3,7,8,9-HxCDD	1.28	1.05-1.43		0.978	5.31	
1,2,3,4,6,7,8-HpCDF	0.98	0.88-1.20		0.978	1.26	B
1,2,3,4,7,8,9-HpCDF	1.33	0.88-1.20		0.978	0.250	JEMPC
1,2,3,4,6,7,8-HpCDD	1.00	0.88-1.20		0.978	14.5	B
OCDF	0.84	0.76-1.02		1.96	6.41	
OCDD	0.90	0.76-1.02		9.78	130	B

Homologue Group	EDL	RL	Result	
Total TCDF		0.978	0.656	EMPC
Total TCDD		0.978	12.0	EMPC
Total PeCDF		1.96	0.428	EMPC
Total PeCDD		0.978	12.7	EMPC
Total HxCDF		1.96	1.27	EMPC
Total HxCDD		1.96	33.2	EMPC
Total HpCDF		1.96	3.43	EMPC
Total HpCDD		1.96	32.3	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 4.35

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 4.35

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: CR08A-SBSD

Lab Sample ID: AOV8J
LIMS ID: 15-19500
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/26/18
Date Analyzed: 11/05/15 09:35
Instrument/Analyst: AS1/PK

Sample Amount: 10.2 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	85.9	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	82.0	25-164	
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	89.2	24-185	
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	85.3	21-178	
13C-1,2,3,7,8-PeCDD	1.54	1.32-1.78	86.5	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	86.5	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	83.2	26-123	
13C-2,3,4,6,7,8-HxCDF	0.51	0.43-0.59	86.4	28-136	
13C-1,2,3,7,8,9-HxCDF	0.51	0.43-0.59	82.7	29-147	
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	88.1	32-141	
13C-1,2,3,6,7,8-HxCDD	1.25	1.05-1.43	83.7	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	77.0	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.43	0.37-0.51	74.3	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	82.1	23-140	
13C-OCDD	0.90	0.76-1.02	65.1	17-157	
37Cl4-2,3,7,8-TCDD			91.9	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: CR08a-SSD-COMP

Lab Sample ID: AOV8T
LIMS ID: 15-19510
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted: 10/26/18
Date Analyzed: 11/05/15 10:28
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.1 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Silica-Florisil Cleanup: Yes
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.72	0.65-0.89		0.993	1.06	
2,3,7,8-TCDD	0.69	0.65-0.89		0.993	1.71	
1,2,3,7,8-PeCDF	1.79	1.32-1.78		0.993	0.483	JEMPC
2,3,4,7,8-PeCDF	1.47	1.32-1.78		0.993	0.506	J
1,2,3,7,8-PeCDD	1.64	1.32-1.78		0.993	2.87	
1,2,3,4,7,8-HxCDF	1.18	1.05-1.43		0.993	1.42	
1,2,3,6,7,8-HxCDF	1.11	1.05-1.43		0.993	0.798	J
2,3,4,6,7,8-HxCDF	1.16	1.05-1.43		0.993	1.46	
1,2,3,7,8,9-HxCDF		1.05-1.43	0.0933	0.993	< 0.0933	U
1,2,3,4,7,8-HxCDD	1.19	1.05-1.43		0.993	2.33	
1,2,3,6,7,8-HxCDD	1.20	1.05-1.43		0.993	10.7	
1,2,3,7,8,9-HxCDD	1.18	1.05-1.43		0.993	8.01	
1,2,3,4,6,7,8-HpCDF	0.96	0.88-1.20		0.993	33.1	
1,2,3,4,7,8,9-HpCDF	0.82	0.88-1.20		0.993	2.10	EMPC
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20		0.993	583	
OCDF	0.82	0.76-1.02		1.99	73.9	
OCDD	0.89	0.76-1.02		9.93	13,700	E

Homologue Group	EDL	RL	Result	
Total TCDF		0.993	10.9	EMPC
Total TCDD		0.993	23.9	EMPC
Total PeCDF		1.99	12.8	EMPC
Total PeCDD		0.993	25.9	EMPC
Total HxCDF		1.99	44.0	EMPC
Total HxCDD		1.99	147	EMPC
Total HpCDF		1.99	126	EMPC
Total HpCDD		1.99	1,650	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 17.6

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 17.6

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: CR08a-SSD-COMP

Lab Sample ID: AOV8T
LIMS ID: 15-19510
Matrix: Sediment
Data Release Authorized:
Reported: 11/11/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted: 10/26/18
Date Analyzed: 11/05/15 10:28
Instrument/Analyst: AS1/PK

Sample Amount: 10.1 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	96.4	24-169	
13C-2,3,7,8-TCDD	0.79	0.65-0.89	92.5	25-164	
13C-1,2,3,7,8-PeCDF	1.56	1.32-1.78	101	24-185	
13C-2,3,4,7,8-PeCDF	1.55	1.32-1.78	101	21-178	
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	99.3	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	93.0	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	89.8	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	94.7	28-136	
13C-1,2,3,7,8,9-HxCDF	0.51	0.43-0.59	95.0	29-147	
13C-1,2,3,4,7,8-HxCDD	1.28	1.05-1.43	104	32-141	
13C-1,2,3,6,7,8-HxCDD	1.29	1.05-1.43	92.5	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	88.5	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	89.9	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	95.8	23-140	
13C-OCDD	0.90	0.76-1.02	100	17-157	
37Cl4-2,3,7,8-TCDD			103	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-102615

Lab Sample ID: OPR-102615
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 11/05/15 01:26
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	RL	Result
2,3,7,8-TCDF	0.70	0.65-0.89	1.00	20.6
2,3,7,8-TCDD	0.74	0.65-0.89	1.00	21.4
1,2,3,7,8-PeCDF	1.43	1.32-1.78	1.00	103
2,3,4,7,8-PeCDF	1.44	1.32-1.78	1.00	104
1,2,3,7,8-PeCDD	1.56	1.32-1.78	1.00	104
1,2,3,4,7,8-HxCDF	1.14	1.05-1.43	1.00	105
1,2,3,6,7,8-HxCDF	1.14	1.05-1.43	1.00	105
2,3,4,6,7,8-HxCDF	1.15	1.05-1.43	1.00	105
1,2,3,7,8,9-HxCDF	1.15	1.05-1.43	1.00	105
1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	1.00	102
1,2,3,6,7,8-HxCDD	1.19	1.05-1.43	1.00	104
1,2,3,7,8,9-HxCDD	1.23	1.05-1.43	1.00	107
1,2,3,4,6,7,8-HpCDF	0.98	0.88-1.20	1.00	108
1,2,3,4,7,8,9-HpCDF	0.99	0.88-1.20	1.00	109
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20	1.00	104
OCDF	0.82	0.76-1.02	2.00	199
OCDD	0.90	0.76-1.02	10.0	212

Homologue Group	EDL	RL	Result	
Total TCDF		1.00	21.4	EMPC
Total TCDD		1.00	22.0	EMPC
Total PeCDF		2.00	211	EMPC
Total PeCDD		1.00	104	EMPC
Total HxCDF		2.00	421	EMPC
Total HxCDD		2.00	314	EMPC
Total HpCDF		2.00	217	
Total HpCDD		2.00	106	

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-102615

Lab Sample ID: OPR-102615
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 11/05/15 01:26
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.77	0.65-0.89	93.5	24-169	
13C-2,3,7,8-TCDD	0.80	0.65-0.89	89.2	25-164	
13C-1,2,3,7,8-PeCDF	1.55	1.32-1.78	97.5	24-185	
13C-2,3,4,7,8-PeCDF	1.55	1.32-1.78	92.4	21-178	
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	93.9	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	90.4	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	88.6	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	89.2	28-136	
13C-1,2,3,7,8,9-HxCDF	0.51	0.43-0.59	84.5	29-147	
13C-1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	95.2	32-141	
13C-1,2,3,6,7,8-HxCDD	1.26	1.05-1.43	89.2	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	82.3	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.43	0.37-0.51	82.6	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.02	0.88-1.20	88.8	23-140	
13C-OCDD	0.90	0.76-1.02	77.0	17-157	
37Cl4-2,3,7,8-TCDD			99.1	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-102615

Lab Sample ID: OPR-102615
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 11/05/15 01:26
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	OPR	Spiked	Recovery	Limits
2,3,7,8-TCDF	20.6	20.0	103	75-158
2,3,7,8-TCDD	21.4	20.0	107	67-158
1,2,3,7,8-PeCDF	103	100	103	80-134
2,3,4,7,8-PeCDF	104	100	104	68-160
1,2,3,7,8-PeCDD	104	100	104	70-142
1,2,3,4,7,8-HxCDF	105	100	105	72-134
1,2,3,6,7,8-HxCDF	105	100	105	84-130
2,3,4,6,7,8-HxCDF	105	100	105	70-156
1,2,3,7,8,9-HxCDF	105	100	105	78-130
1,2,3,4,7,8-HxCDD	102	100	102	70-164
1,2,3,6,7,8-HxCDD	104	100	104	76-134
1,2,3,7,8,9-HxCDD	107	100	107	64-162
1,2,3,4,6,7,8-HpCDF	108	100	108	82-132
1,2,3,4,7,8,9-HpCDF	109	100	109	78-138
1,2,3,4,6,7,8-HpCDD	104	100	104	70-140
OCDF	199	200	99.5	63-170
OCDD	212	200	106	78-144

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: MB-102615

Lab Sample ID: MB-102615
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized:
Reported: 11/11/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 11/05/15 00:25
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF		0.65-0.89	0.0500	1.00	< 0.0500	U
2,3,7,8-TCDD		0.65-0.89	0.0560	1.00	< 0.0560	U
1,2,3,7,8-PeCDF		1.32-1.78	0.0580	1.00	< 0.0580	U
2,3,4,7,8-PeCDF		1.32-1.78	0.0600	1.00	< 0.0600	U
1,2,3,7,8-PeCDD		1.32-1.78	0.0980	1.00	< 0.0980	U
1,2,3,4,7,8-HxCDF		1.05-1.43	0.0640	1.00	< 0.0640	U
1,2,3,6,7,8-HxCDF		1.05-1.43	0.0580	1.00	< 0.0580	U
2,3,4,6,7,8-HxCDF		1.05-1.43	0.0620	1.00	< 0.0620	U
1,2,3,7,8,9-HxCDF	1.11	1.05-1.43		1.00	0.116	J
1,2,3,4,7,8-HxCDD		1.05-1.43	0.0840	1.00	< 0.0840	U
1,2,3,6,7,8-HxCDD		1.05-1.43	0.0880	1.00	< 0.0880	U
1,2,3,7,8,9-HxCDD		1.05-1.43	0.0880	1.00	< 0.0880	U
1,2,3,4,6,7,8-HpCDF	0.84	0.88-1.20		1.00	0.196	JEMPC
1,2,3,4,7,8,9-HpCDF		0.88-1.20	0.0600	1.00	< 0.0600	U
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20		1.00	1.99	
OCDF	0.72	0.76-1.02		2.00	0.776	JEMPC
OCDD	0.86	0.76-1.02		10.0	16.9	

Homologue Group	EDL	RL	Result	
Total TCDF	0.0500	1.00	< 0.0500	U
Total TCDD	0.0560	1.00	0.0524	EMPC
Total PeCDF	0.0600	2.00	< 0.0600	U
Total PeCDD	0.0980	1.00	0.253	EMPC
Total HxCDF		2.00	0.117	
Total HxCDD	0.0880	2.00	1.31	EMPC
Total HpCDF		2.00	0.426	EMPC
Total HpCDD		2.00	5.27	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 0.04

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 0.15

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: MB-102615

Lab Sample ID: MB-102615
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 11/05/15 00:25
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	99.6	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	95.8	25-164	
13C-1,2,3,7,8-PeCDF	1.59	1.32-1.78	103	24-185	
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	96.9	21-178	
13C-1,2,3,7,8-PeCDD	1.59	1.32-1.78	98.0	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	99.9	26-152	
13C-1,2,3,6,7,8-HxCDF	0.51	0.43-0.59	101	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	99.4	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	92.8	29-147	
13C-1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	103	32-141	
13C-1,2,3,6,7,8-HxCDD	1.26	1.05-1.43	99.0	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	90.7	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	91.9	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.07	0.88-1.20	98.5	23-140	
13C-OCDD	0.91	0.76-1.02	84.7	17-157	
37Cl4-2,3,7,8-TCDD			105	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR17-D-SSD
SAMPLE

Lab Sample ID: AOV8C
LIMS ID: 15-19493
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/26/15
Date Analyzed: 10/29/15 19:35
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.21 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 42.2%

CAS Number	Analyte	LOQ	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
11100-14-4	Aroclor 1268	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	73.2%
Tetrachlorometaxylene	80.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR17-D-SBSD
SAMPLE

Lab Sample ID: AOV8D
LIMS ID: 15-19494
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/26/15
Date Analyzed: 10/29/15 19:56
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.12 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 48.8%

CAS Number	Analyte	LOQ	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**	**18 J**
11096-82-5	Aroclor 1260	20	< 20 U
11104-28-2	Aroclor 1221	20	< 20 U
11141-16-5	Aroclor 1232	20	< 20 U
11100-14-4	Aroclor 1268	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	68.5%
Tetrachlorometaxylene	78.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR08A-SBSD
SAMPLE

Lab Sample ID: AOV8J
LIMS ID: 15-19500
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/26/15
Date Analyzed: 10/29/15 20:17
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.42 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 32.7%

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	18	< 18 U
53469-21-9	Aroclor 1242	18	< 18 U
12672-29-6	Aroclor 1248	18	< 18 U
11097-69-1	Aroclor 1254	18	< 18 U
11096-82-5	Aroclor 1260	18	< 18 U
11104-28-2	Aroclor 1221	18	< 18 U
11141-16-5	Aroclor 1232	18	< 18 U
11100-14-4	Aroclor 1268	18	< 18 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	75.2%
Tetrachlorometaxylene	83.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR10-SSD-COMP
SAMPLE

Lab Sample ID: AOV8K
LIMS ID: 15-19501
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted: 10/26/15
Date Analyzed: 10/29/15 20:38
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.31 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 51.9%

CAS Number	Analyte	LOQ	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
11100-14-4	Aroclor 1268	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	62.8%
Tetrachlorometaxylene	73.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR08a-SSD-COMP
SAMPLE

Lab Sample ID: AOV8T
LIMS ID: 15-19510
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted: 10/26/15
Date Analyzed: 10/29/15 20:59
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.15 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 48.5%

CAS Number	Analyte	LOQ	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
11100-14-4	Aroclor 1268	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	75.0%
Tetrachlorometaxylene	80.8%

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB SOIL/SOLID/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
CR17-D-SSD	73.2%	40-133	80.2%	53-120	0
CR17-D-SBSD	68.5%	40-133	78.5%	53-120	0
CR08A-SBSD	75.2%	40-133	83.2%	53-120	0
CR10-SSD-COMP	62.8%	40-133	73.2%	53-120	0
MB-102615	71.8%	40-133	77.5%	53-120	0
LCS-102615	74.0%	40-133	82.0%	53-120	0
CR08a-SSD-COMP	75.0%	40-133	80.8%	53-120	0
CR08a-SSD-COMP MS	70.0%	40-133	82.8%	53-120	0
CR08a-SSD-COMP MSD	67.2%	40-133	83.5%	53-120	0

Microwave (MARS) Control Limits PCBSMP
Prep Method: SW3546
Log Number Range: 15-19493 to 15-19510

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Page 1 of 1

Sample ID: CR08a-SSD-COMP
MS/MSD

Lab Sample ID: AOV8T
LIMS ID: 15-19510
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted MS/MSD: 10/26/15

Date Analyzed MS: 10/29/15 21:20
MSD: 10/29/15 21:41
Instrument/Analyst MS: ECD7/JGR
MSD: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount MS: 5.15 g-dry-wt
MSD: 5.15 g-dry-wt
Final Extract Volume MS: 5.0 mL
MSD: 5.0 mL
Dilution Factor MS: 1.00
MSD: 1.00
Silica Gel: No

Percent Moisture: 48.5%

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Aroclor 1016	< 19 U	463	485	95.5%	434	485	89.5%	6.5%
Aroclor 1260	< 19 U	408	485	84.1%	399	485	82.3%	2.2%

Results reported in µg/kg (ppb)
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR08a-SSD-COMP
MATRIX SPIKE

Lab Sample ID: AOV8T
LIMS ID: 15-19510
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted: 10/26/15
Date Analyzed: 10/29/15 21:20
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.15 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 48.5%

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	19	---
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	---
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U
11100-14-4	Aroclor 1268	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	70.0%
Tetrachlorometaxylene	82.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR08a-SSD-COMP
MATRIX SPIKE DUP

Lab Sample ID: AOV8T
LIMS ID: 15-19510
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted: 10/26/15
Date Analyzed: 10/29/15 21:41
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.15 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 48.5%

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	19	---
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	---
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	19	< 19 U
11100-14-4	Aroclor 1268	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	67.2%
Tetrachlorometaxylene	83.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Page 1 of 1

Sample ID: LCS-102615
LAB CONTROL

Lab Sample ID: LCS-102615
LIMS ID: 15-19510
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 10/29/15 19:14
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Aroclor 1016	405	500	81.0%
Aroclor 1260	407	500	81.4%

PCB Surrogate Recovery

Decachlorobiphenyl	74.0%
Tetrachlorometaxylene	82.0%

Results reported in µg/kg (ppb)

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: MB-102615
METHOD BLANK

Lab Sample ID: MB-102615
LIMS ID: 15-19510
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 10/29/15 18:54
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: NA

CAS Number	Analyte	LOQ	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
11100-14-4	Aroclor 1268	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	71.8%
Tetrachlorometaxylene	77.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS

NWTPHD by GC/FID
Extraction Method: SW3546
Page 1 of 1

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Matrix: Sediment

Date Received: 10/16/15

Data Release Authorized: MW
Reported: 11/02/15

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range/Surrogate	LOQ	Result
MB-102315	Method Blank	10/23/15	10/28/15	1.00	Diesel Range	5.0	< 5.0 U
15-19493	HC ID: ---		FID3B	1.0	Motor Oil Range	10	< 10 U
					o-Terphenyl		74.0%
AOV8C	CR17-D-SSD	10/23/15	10/28/15	1.00	**Diesel Range**	**8.6**	**24**
15-19493	HC ID: **DIESEL/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**17**	**46**
					o-Terphenyl		62.5%
AOV8J	CR08A-SBSD	10/23/15	10/29/15	1.00	**Diesel Range**	**7.4**	**26**
15-19500	HC ID: **DIESEL/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**15**	**74**
					o-Terphenyl		71.3%

Reported in mg/kg (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
LOQ-Limit of Quantitation

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

ANALYTICAL RESOURCES INCORPORATED

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	OTER	TOT OUT
102315MB	74.0%	0
102315LCS	74.6%	0
CR17-D-SSD	62.5%	0
CR17-D-SSD MS	70.0%	0
CR17-D-SSD MSD	74.8%	0
CR08A-SBSD	71.3%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3546
Log Number Range: 15-19493 to 15-19500

FORM-II TPHD

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: CR17-D-SSD
MS/MSD

Lab Sample ID: AOV8C
LIMS ID: 15-19493
Matrix: Sediment
Data Release Authorized:
Reported: 11/02/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted MS/MSD: 10/23/15

Date Analyzed MS: 10/28/15 23:41
MSD: 10/29/15 00:03
Instrument/Analyst MS: FID3B/ML
MSD: FID3B/ML

Sample Amount MS: 5.80 g-dry-wt
MSD: 5.80 g-dry-wt
Final Extract Volume MS: 1.0 mL
MSD: 1.0 mL
Dilution Factor MS: 1.00
MSD: 1.00
Percent Moisture: 42.2%

Range	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Diesel	24	201	259	68.3%	209	259	71.4%	3.9%

TPHD Surrogate Recovery

	MS	MSD
o-Terphenyl	70.0%	74.8%

Results reported in mg/kg
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: LCS-102315
LAB CONTROL

Lab Sample ID: LCS-102315
LIMS ID: 15-19493
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/02/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 10/28/15 22:59
Instrument/Analyst: FID3B/ML

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
Diesel	109	150	72.7%

TPHD Surrogate Recovery

o-Terphenyl	74.6%

Results reported in mg/kg

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Sediment
Date Received: 10/16/15

ARI Job: AOV8
Project: Seaport Landing
1044.02.01-02

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep Date
15-19493-102315MB1	Method Blank	10.0 g	1.00 mL	-	10/23/15
15-19493-102315LCS1	Lab Control	10.0 g	1.00 mL	-	10/23/15
15-19493-AOV8C	CR17-D-SSD	5.80 g	1.00 mL	D	10/23/15
15-19493-AOV8CMS	CR17-D-SSD	5.80 g	1.00 mL	D	10/23/15
15-19493-AOV8CMSD	CR17-D-SSD	5.80 g	1.00 mL	D	10/23/15
15-19500-AOV8J	CR08A-SBSD	6.76 g	1.00 mL	D	10/23/15

Basis: D=Dry Weight W=As Received

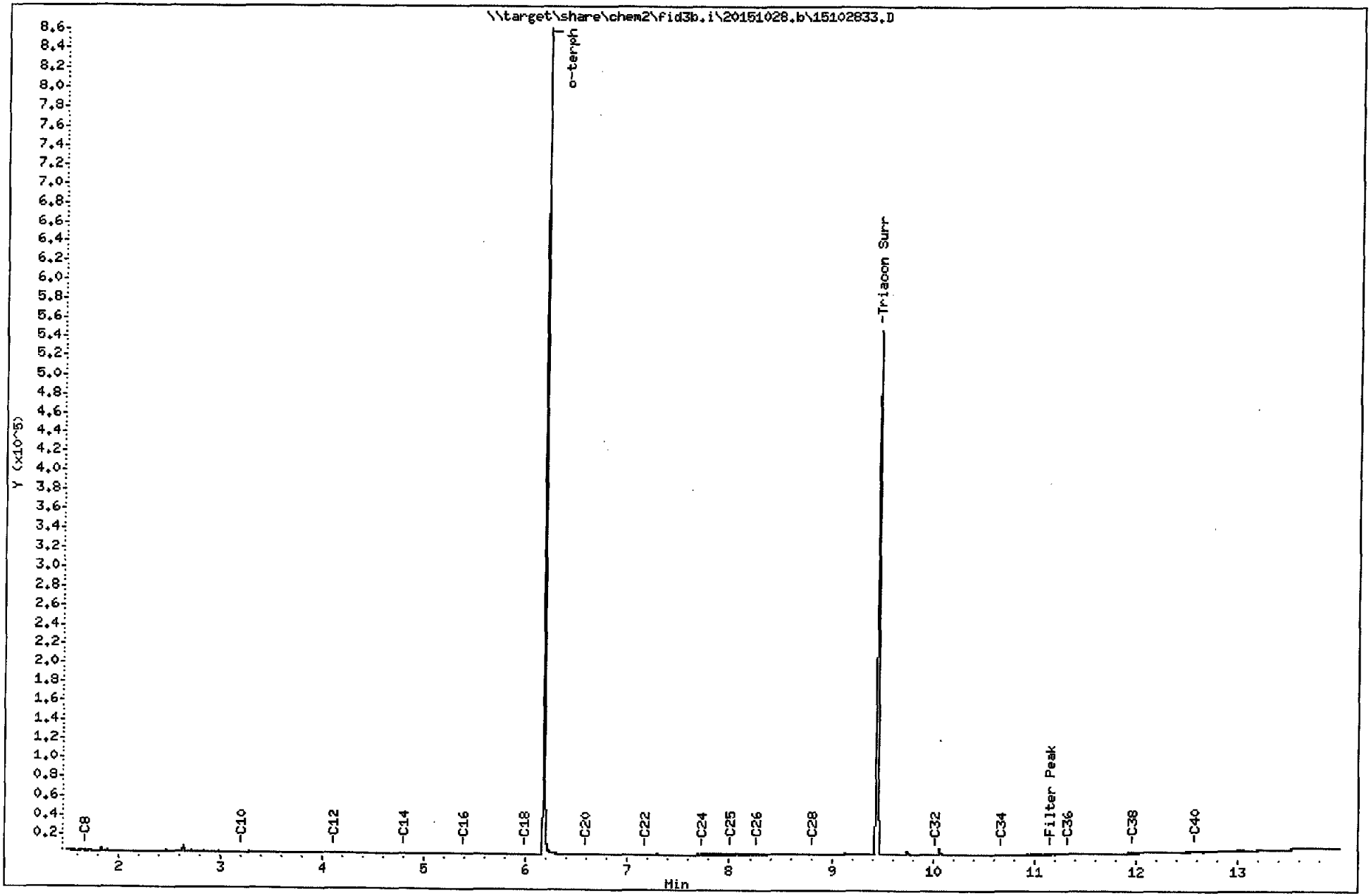
Data File: \\target\share\chem2\fid3b.i\20151028.b\15102833.D
Date : 28-OCT-2015 22:38
Client ID: AOV8MBS1
Sample Info: AOV8MBS1

Instrument: fid3b.i

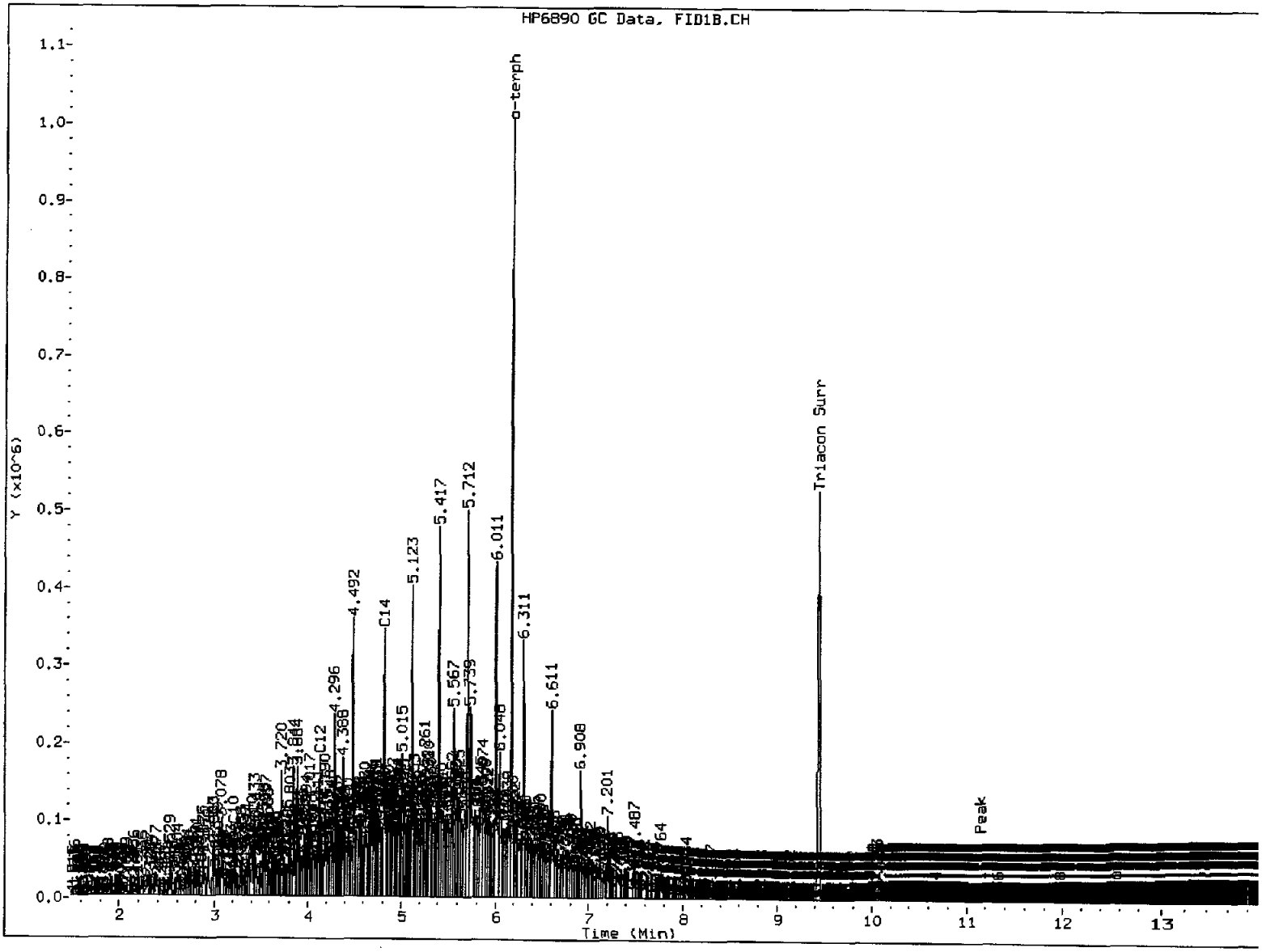
Operator: ML
Column diameter: 0.25

Column phase: RTX-1

AOV8:000071



FID:3B-2C/RTX-1 AOV8LCSS1 FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5) Skimmed surrogate

Analyst: MM Date: 10/29/15

Data File: \\target\share\chem2\fid3b.i\20151028.b\15102834.D

Date : 28-OCT-2015 22:59

Client ID: AOV8LCSS1

Sample Info: AOV8LCSS1

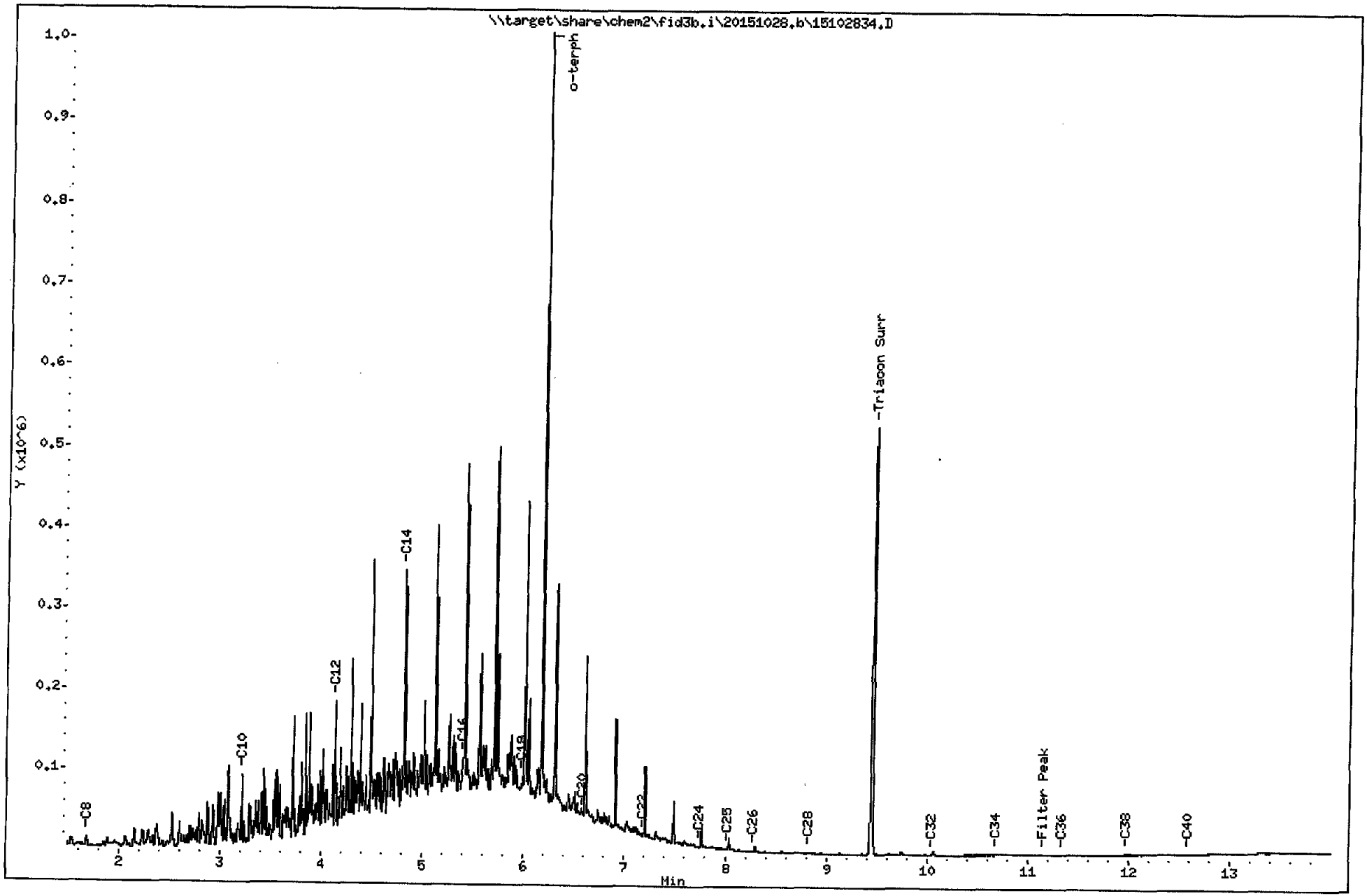
Column phase: RTX-1

Instrument: fid3b.i

Operator: ML

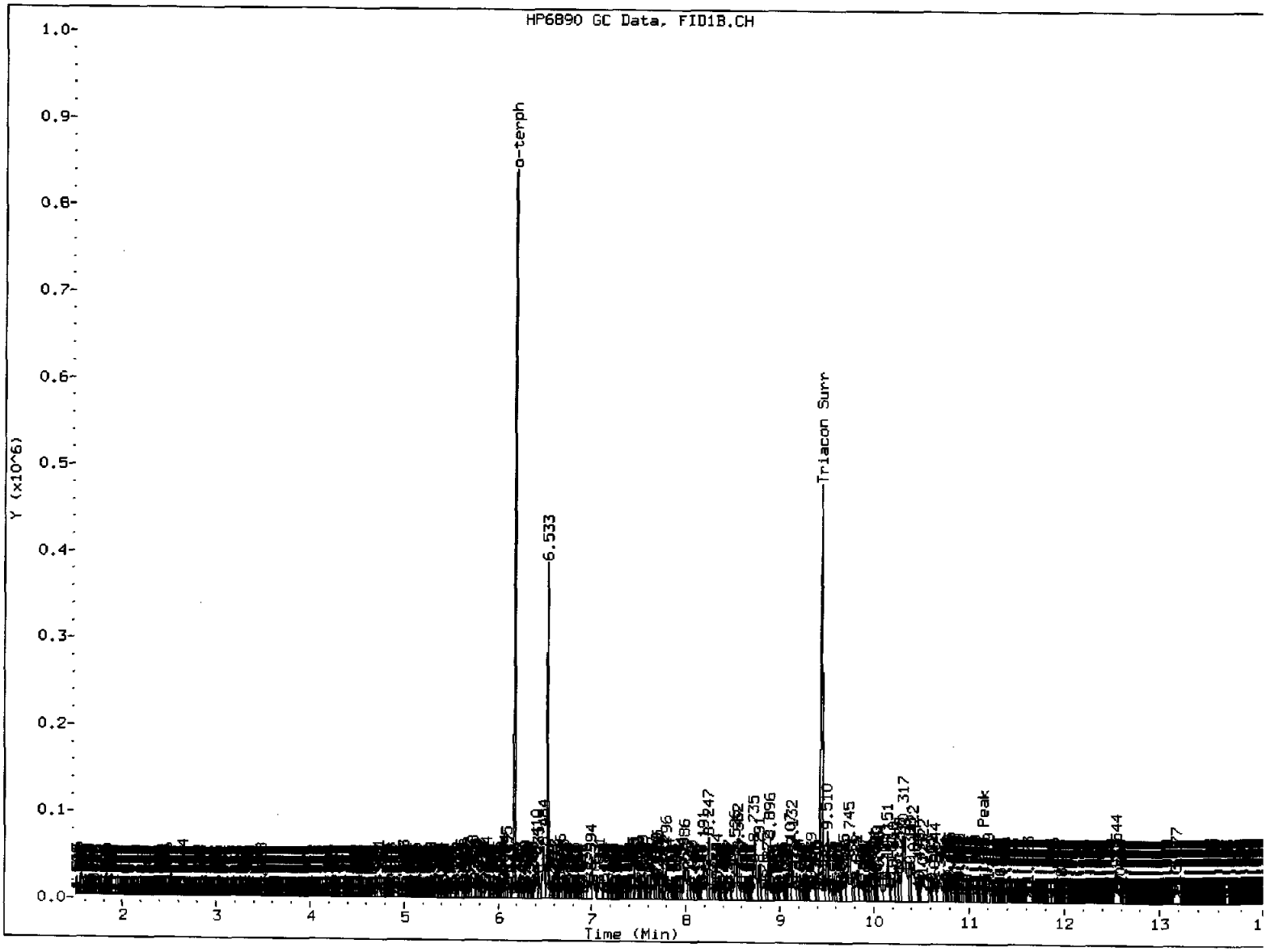
Column diameter: 0.25

AOV8:000073



FID:3B-2C/RTX-1 AOV8C

FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5.) Skimmed surrogate

Analyst: MA Date: 10/29/15

Data File: \\target\share\chem2\fid3b.i\20151028.b\15102835.D

Page 1

Date : 28-OCT-2015 23:20

Client ID: CR17-D-SSD

Instrument: fid3b.i

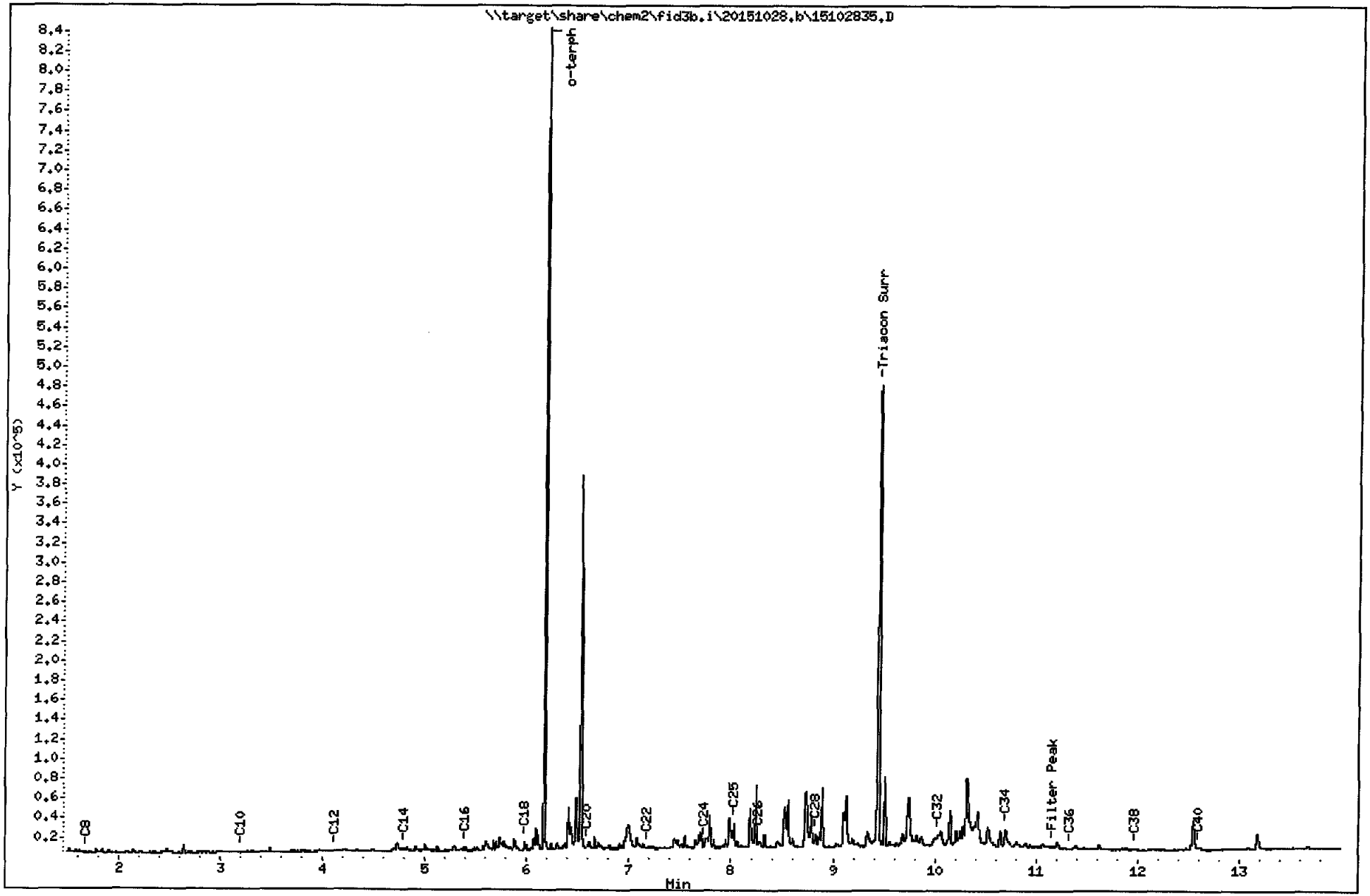
Sample Info: AOV8C

Operator: ML

Column phase: RTX-1

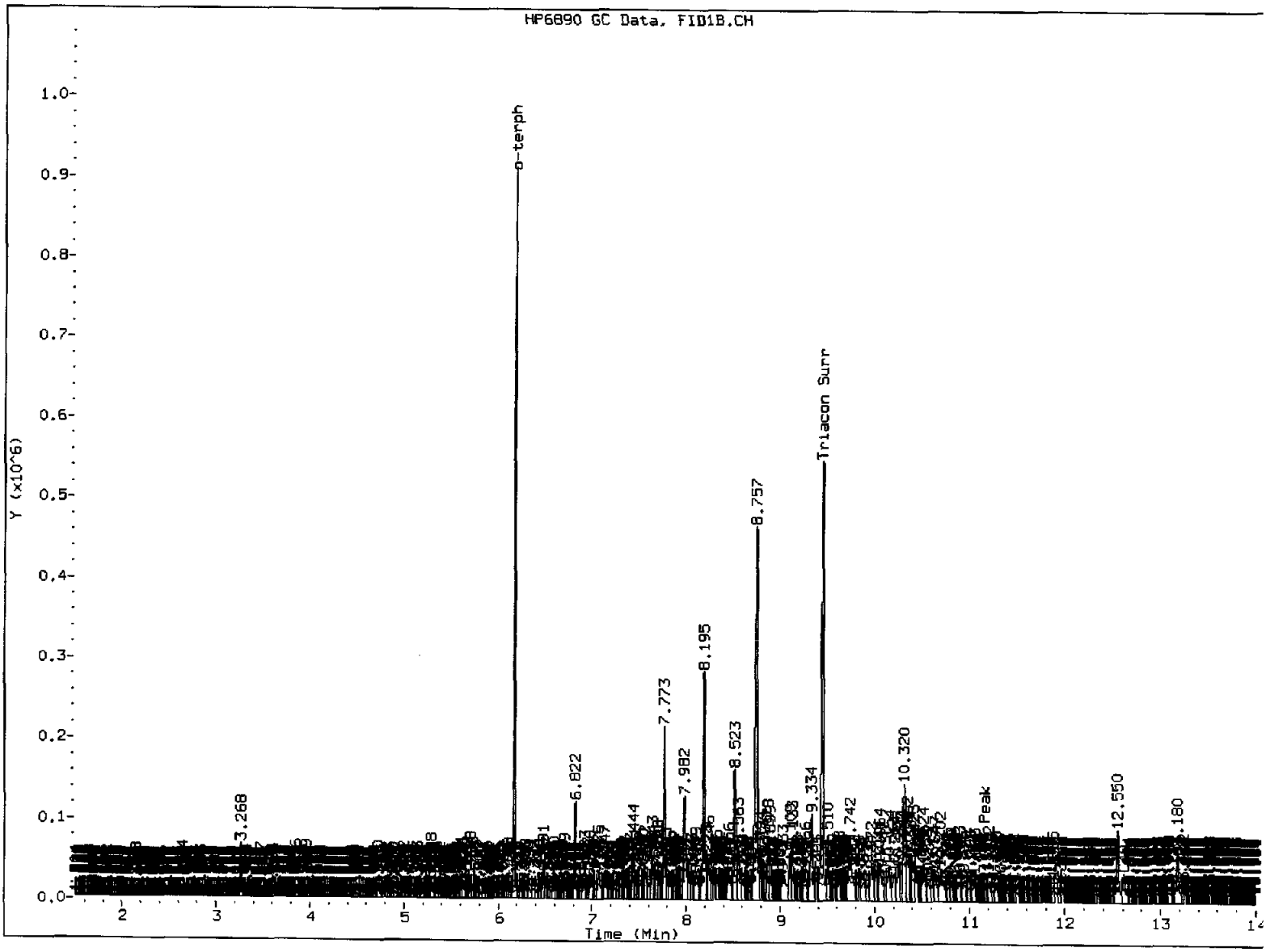
Column diameter: 0.25

AOV8:00075



FID:3B-2C/RTX-1 AOV8J

FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5). Skimmed surrogate

Analyst: m Date: 10/29/15

Data File: \\target\share\chem2\fid3b.i\20151028.b\15102838.D

Page 1

Date : 29-OCT-2015 00:24

Client ID: CR08A-SBSD

Instrument: fid3b.i

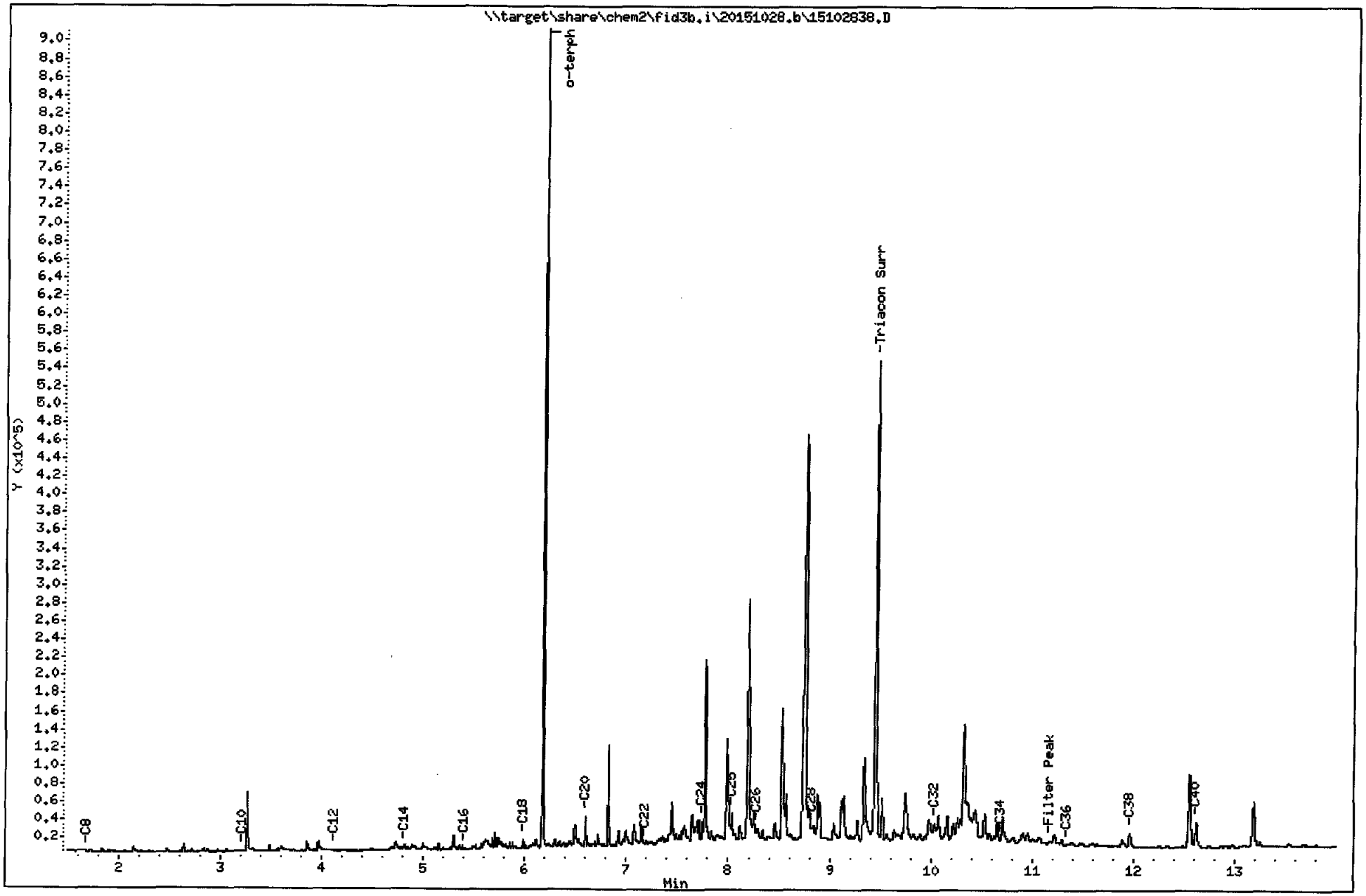
Sample Info: AOV8J

Operator: ML

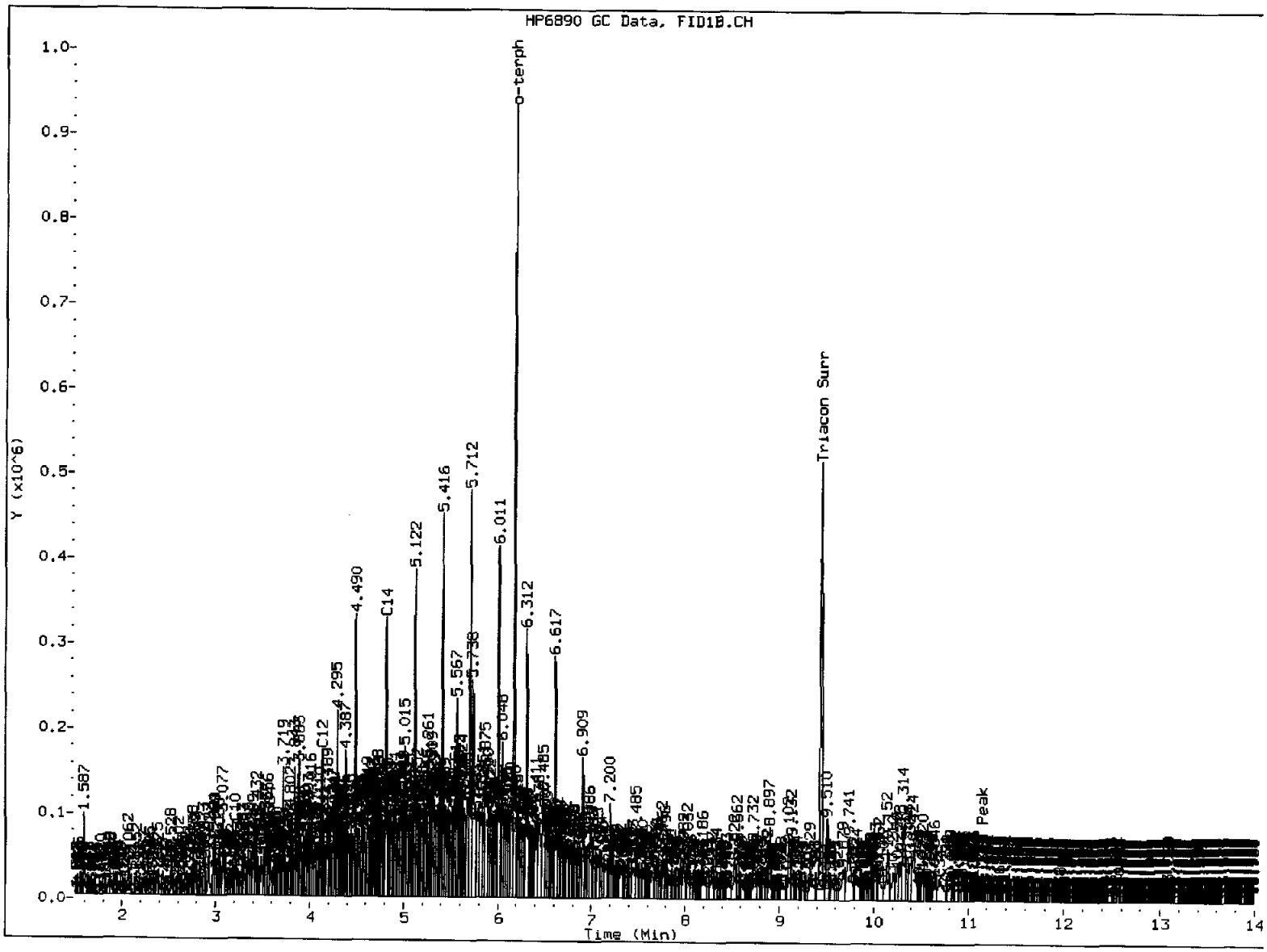
Column phase: RTX-1

Column diameter: 0.25

AOV8 : 000077



FID:3B-2C/RTX-1 AOV8CMS FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5) Skimmed surrogate

Analyst: MU Date: 10/29/15

Data File: \\target\share\chem2\fid3b.i\20151028.b\15102836.D

Date : 28-OCT-2015 23:41

Client ID: CR17-D-SSD MS

Sample Info: AOV8CMS

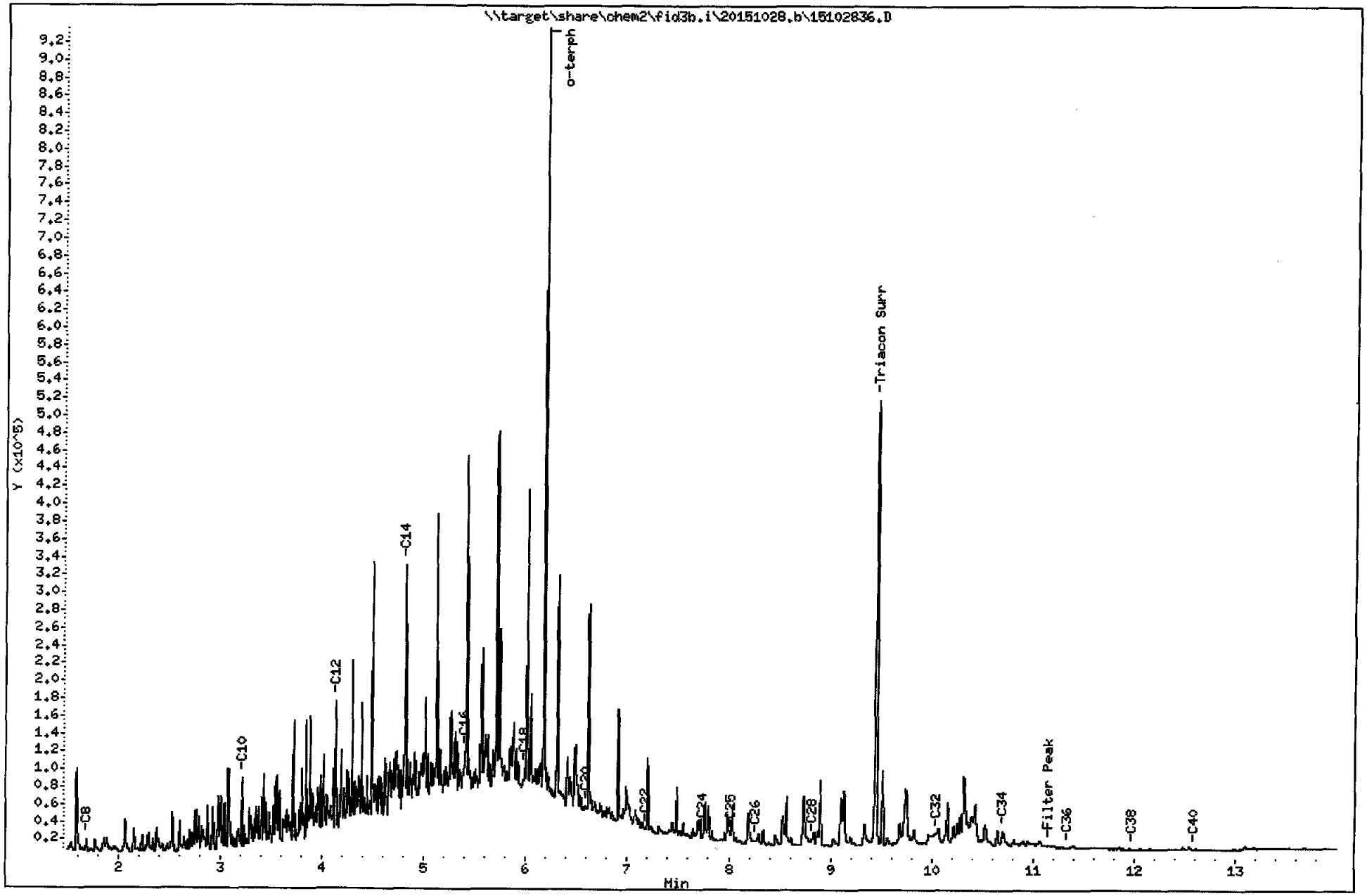
Column phase: RTX-1

Instrument: fid3b.i

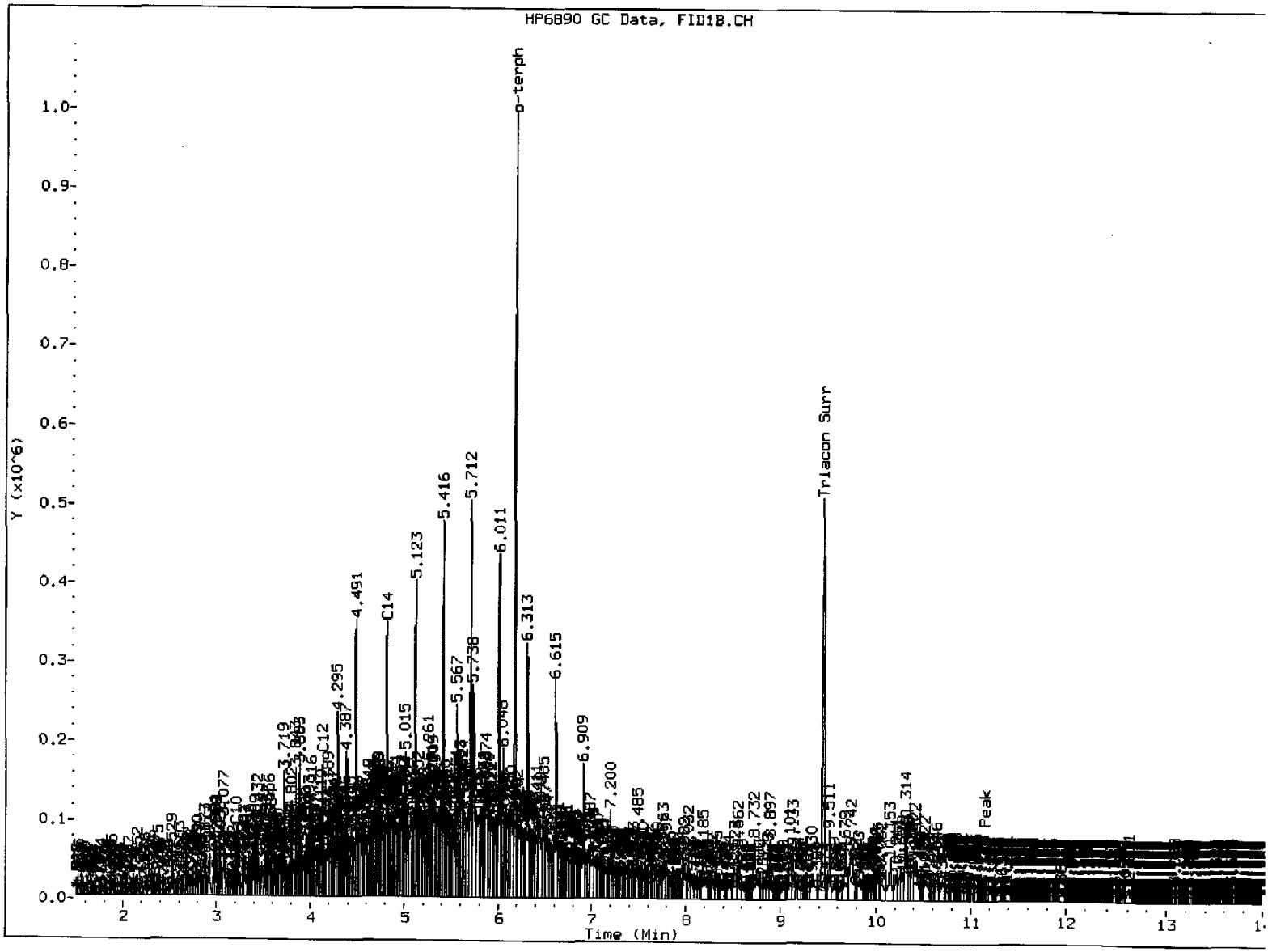
Operator: ML

Column diameter: 0.25

AOV8:00079



FID:3B-2C/RTX-1 AOV8CMSD FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5) Skimmed surrogate

Analyst: MM Date: 10/29/15

Data File: \\target\share\chem2\fid3b.i\20151028.b\15102837.D

Date : 29-OCT-2015 00:03

Client ID: CR17-D-SSD MSD

Sample Info: AOV8CMSD

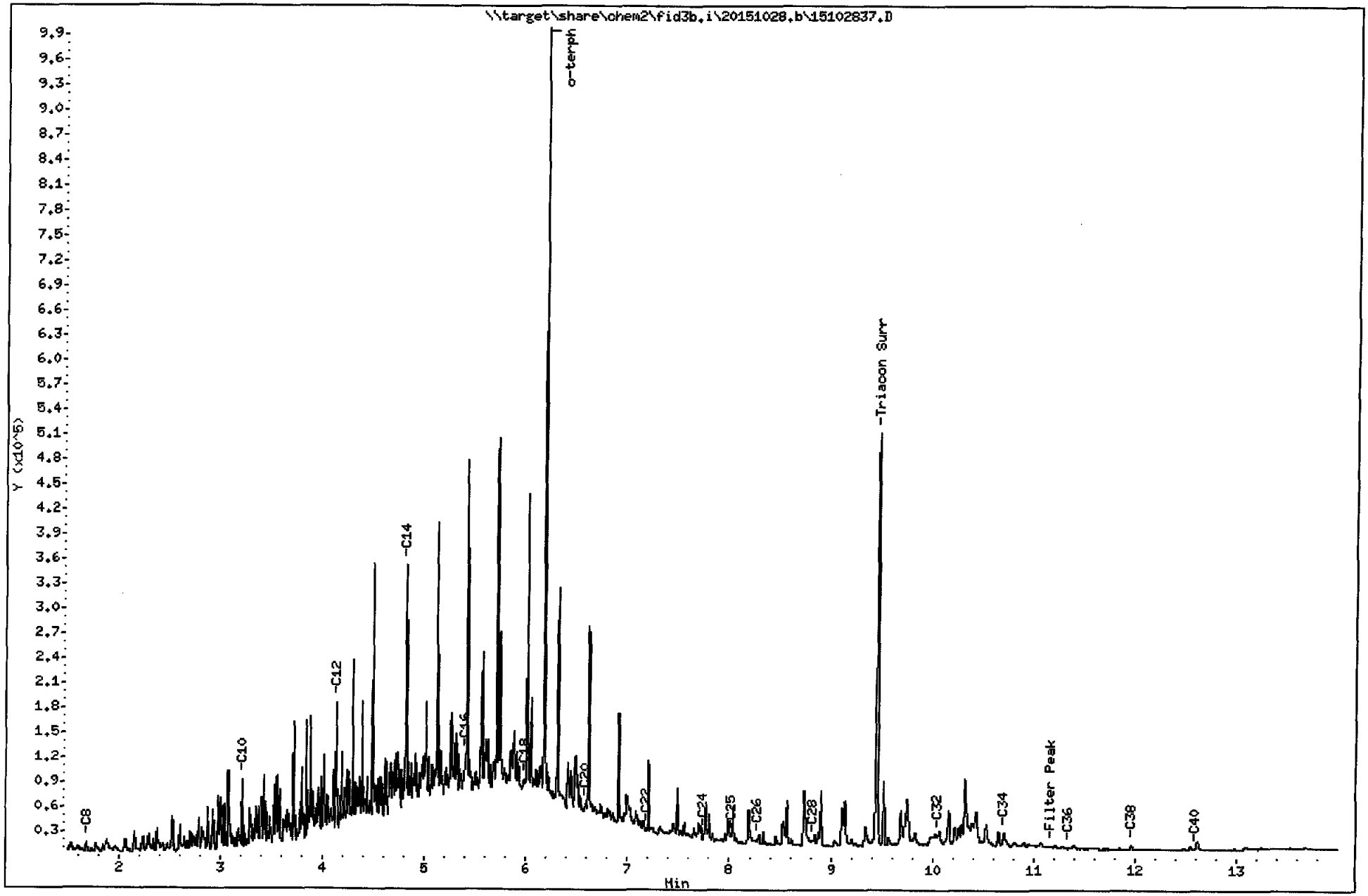
Column phase: RTX-1

Instrument: fid3b.i

Operator: ML

Column diameter: 0.25

AOV8:000831



ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR17-D-SSD
SAMPLE

Lab Sample ID: AOV8C
LIMS ID: 15-19493
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Percent Total Solids: 53.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	11/02/15	6010C	11/03/15	**7440-38-2**	**Arsenic**	9	**21**	
3050B	11/02/15	6010C	11/03/15	7440-43-9	Cadmium	0.4	0.4	U
3050B	11/02/15	6010C	11/03/15	**7440-47-3**	**Chromium**	0.9	**34.4**	
3050B	11/02/15	6010C	11/03/15	**7440-50-8**	**Copper**	0.4	**51.1**	
3050B	11/02/15	6010C	11/03/15	**7439-92-1**	**Lead**	4	**9**	
CLP	11/02/15	7471A	11/06/15	**7439-97-6**	**Mercury**	0.04	**0.04**	
3050B	11/02/15	6010C	11/03/15	7440-22-4	Silver	0.5	0.5	U
3050B	11/02/15	6010C	11/03/15	**7440-66-6**	**Zinc**	2	**70**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR17-D-SBSD
SAMPLE

Lab Sample ID: AOV8D
LIMS ID: 15-19494
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Percent Total Solids: 49.3%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	11/02/15	6010C	11/03/15	**7440-38-2**	**Arsenic**	10	**30**	
3050B	11/02/15	6010C	11/03/15	7440-43-9	Cadmium	0.4	0.4	U
3050B	11/02/15	6010C	11/03/15	**7440-47-3**	**Chromium**	1	**40**	
3050B	11/02/15	6010C	11/03/15	**7440-50-8**	**Copper**	0.4	**58.2**	
3050B	11/02/15	6010C	11/03/15	**7439-92-1**	**Lead**	4	**12**	
CLP	11/02/15	7471A	11/06/15	**7439-97-6**	**Mercury**	0.04	**0.07**	
3050B	11/02/15	6010C	11/03/15	7440-22-4	Silver	0.6	0.6	U
3050B	11/02/15	6010C	11/03/15	**7440-66-6**	**Zinc**	2	**79**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR08A-SBSD
SAMPLE

Lab Sample ID: AOV8J
LIMS ID: 15-19500
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Percent Total Solids: 65.9%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	11/02/15	6010C	11/03/15	**7440-38-2**	**Arsenic**	20	**20**	
3050B	11/02/15	6010C	11/03/15	7440-43-9	Cadmium	0.7	0.7	U
3050B	11/02/15	6010C	11/03/15	**7440-47-3**	**Chromium**	2	**39**	
3050B	11/02/15	6010C	11/03/15	**7440-50-8**	**Copper**	0.7	**57.8**	
3050B	11/02/15	6010C	11/03/15	**7439-92-1**	**Lead**	7	**8**	
CLP	11/02/15	7471A	11/06/15	7439-97-6	Mercury	0.03	0.03	U
3050B	11/02/15	6010C	11/03/15	7440-22-4	Silver	1	1	U
3050B	11/02/15	6010C	11/03/15	**7440-66-6**	**Zinc**	4	**71**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR10-SSD-COMP
SAMPLE

Lab Sample ID: AOV8K
LIMS ID: 15-19501
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Percent Total Solids: 46.7%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	11/02/15	6010C	11/03/15	**7440-38-2**	**Arsenic**	10	**30**	
3050B	11/02/15	6010C	11/03/15	7440-43-9	Cadmium	0.4	0.4	U
3050B	11/02/15	6010C	11/03/15	**7440-47-3**	**Chromium**	1	**42**	
3050B	11/02/15	6010C	11/03/15	**7440-50-8**	**Copper**	0.4	**54.8**	
3050B	11/02/15	6010C	11/03/15	**7439-92-1**	**Lead**	4	**11**	
CLP	11/02/15	7471A	11/06/15	**7439-97-6**	**Mercury**	0.05	**0.07**	
3050B	11/02/15	6010C	11/03/15	7440-22-4	Silver	0.6	0.6	U
3050B	11/02/15	6010C	11/03/15	**7440-66-6**	**Zinc**	2	**83**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR08a-SSD-COMP
SAMPLE

Lab Sample ID: AOV8T
LIMS ID: 15-19510
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOV8-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Percent Total Solids: 47.2%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	11/02/15	6010C	11/03/15	**7440-38-2**	**Arsenic**	10	**30**	
3050B	11/02/15	6010C	11/03/15	7440-43-9	Cadmium	0.4	0.4	U
3050B	11/02/15	6010C	11/03/15	**7440-47-3**	**Chromium**	1	**52**	
3050B	11/02/15	6010C	11/03/15	**7440-50-8**	**Copper**	0.4	**134**	
3050B	11/02/15	6010C	11/03/15	**7439-92-1**	**Lead**	4	**30**	
CLP	11/02/15	7471A	11/06/15	**7439-97-6**	**Mercury**	0.04	**0.06**	
3050B	11/02/15	6010C	11/03/15	7440-22-4	Silver	0.6	0.6	U
3050B	11/02/15	6010C	11/03/15	**7440-66-6**	**Zinc**	2	**134**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: METHOD BLANK**

Lab Sample ID: AOW1MB
LIMS ID: 15-19550
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	11/02/15	6010C	11/03/15	7440-38-2	Arsenic	5	5	U
3050B	11/02/15	6010C	11/03/15	7440-43-9	Cadmium	0.2	0.2	U
3050B	11/02/15	6010C	11/03/15	7440-47-3	Chromium	0.5	0.5	U
3050B	11/02/15	6010C	11/03/15	7440-50-8	Copper	0.2	0.2	U
3050B	11/02/15	6010C	11/03/15	7439-92-1	Lead	2	2	U
CLP	11/02/15	7471A	11/06/15	7439-97-6	Mercury	0.02	0.02	U
3050B	11/02/15	6010C	11/03/15	7440-22-4	Silver	0.3	0.3	U
3050B	11/02/15	6010C	11/03/15	7440-66-6	Zinc	1	1	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: AOW1LCS
LIMS ID: 15-19550
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery
Arsenic	6010C	200	200	100%
Cadmium	6010C	49.7	50.0	99.4%
Chromium	6010C	50.9	50.0	102%
Copper	6010C	47.6	50.0	95.2%
Lead	6010C	197	200	98.5%
Mercury	7471A	0.49	0.50	98.0%
Silver	6010C	51.3	50.0	103%
Zinc	6010C	47	50	94.0%

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%

SAMPLE RESULTS-CONVENTIONALS
AOV8-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: ω
Reported: 11/11/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Client ID: CR17-D-SSD
ARI ID: 15-19493 AOV8C

Analyte	Date	Method	Units	RL	Sample
Total Solids	10/21/15 102115#1	SM2540G	Percent	0.01	52.10
Total Organic Carbon	11/09/15 110915#1	Plumb,1981	Percent	0.020	1.61

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
AOV8-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: U
Reported: 11/11/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Client ID: CR17-D-SBSD
ARI ID: 15-19494 AOV8D

Analyte	Date	Method	Units	RL	Sample
Total Solids	10/21/15 102115#1	SM2540G	Percent	0.01	48.09
Total Organic Carbon	11/09/15 110915#1	Plumb,1981	Percent	0.020	3.05

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
AOV8-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: ✓
Reported: 11/11/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Client ID: CR08A-SBSD
ARI ID: 15-19500 AOV8J

Analyte	Date	Method	Units	RL	Sample
Total Solids	10/21/15 102115#1	SM2540G	Percent	0.01	63.97
Total Organic Carbon	11/09/15 110915#1	Plumb,1981	Percent	0.020	1.29

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
AOV8-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: ✓
Reported: 11/11/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Client ID: CR10-SSD-COMP
ARI ID: 15-19501 AOV8K

Analyte	Date	Method	Units	RL	Sample
Total Solids	10/21/15 102115#1	SM2540G	Percent	0.01	45.44
Total Organic Carbon	11/09/15 110915#1	Plumb,1981	Percent	0.020	2.94

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
AOV8-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: LJ
Reported: 11/11/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Client ID: CR08a-SSD-COMP
ARI ID: 15-19510 AOV8T

Analyte	Date	Method	Units	RL	Sample
Total Solids	10/21/15 102115#1	SM2540G	Percent	0.01	47.46
Total Organic Carbon	11/09/15 110915#1	Plumb,1981	Percent	0.020	1.92

RL Analytical reporting limit
U Undetected at reported detection limit

METHOD BLANK RESULTS-CONVENTIONALS
AOV8-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: W
Reported: 11/11/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Analyte	Date	Units	Blank	QC ID
Total Solids	10/21/15	Percent	< 0.01 U	ICB
Total Organic Carbon	11/09/15	Percent	< 0.020 U	ICB

LAB CONTROL RESULTS-CONVENTIONALS
AOV8-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: JJ
Reported: 11/11/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Total Organic Carbon Plumb,1981	ICVL	11/09/15	Percent	0.096	0.100	96.0%

STANDARD REFERENCE RESULTS-CONVENTIONALS
AOV8-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: ✓
Reported: 11/11/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Date	Units	SRM	True Value	Recovery
Total Organic Carbon NIST 1941B	11/09/15	Percent	3.03	2.99	101.3%

October 29, 2015

NVL LABS
INDUSTRIAL HYGIENE SERVICES
Laboratory | Management | Training

Mark Harris
Analytical Resources, Incorporated
4611 S. 134th Place Suite 100
Tukwila, WA 98168

RE: Bulk Asbestos Fiber Analysis; NVL Batch # 1519449.00

Client Project: ARI Project AOV8 Seaport Landing
Location: N-A

Dear Mr. Harris,

Enclosed please find test results for the 2 sample(s) submitted to our laboratory for analysis on 10/23/2015.

Examination of these samples was conducted for the presence of identifiable asbestos fibers using polarized light microscopy (PLM) with dispersion staining in accordance with both **EPA 600/M4-82-020**, Interim Method for the Determination of Asbestos in Bulk Insulation Samples and **EPA 600/R-93/116** Method for the Determination of Asbestos in Bulk Building Materials.

For samples containing more than one separable layer of materials, the report will include findings for each layer (labeled Layer 1 and Layer 2, etc. for each individual layer). The asbestos concentration in the sample is determined by calibrated visual estimation.

For those samples with asbestos concentrations between 1 and 10 percent based on visual estimation, the EPA recommends a procedure known as point counting (NESHAPS, 40 CFR Part 61). Point counting is a statistically more accurate means of quantification for samples with low concentrations of asbestos.

The detection limit for the calibrated visual estimation is <1%, 400 point counts is 0.25% and 1000 point counts is 0.1%

Samples are archived for two weeks following analysis. Samples that are not retrieved by the client are discarded after two weeks.

Thank you for using our laboratory services. Please do not hesitate to call if there is anything further we can assist you with.

Sincerely,

Nick Ly, Technical Director

Enc.: Sample Results

NVLAP Lab Code: 102063-0

1.888.NVL.LABS
1.888.(685.5227)
www.nvllabs.com

NVL Laboratories, Inc.
4708 Aurora Ave N, Seattle, WA 98103
p 206.547.0100 | f 206.634.1936

AOV8 : 00097

NVL Laboratories, Inc.
4708 Aurora Ave N, Seattle, WA 98103
p 206.547.0100 | f 206.634.1936 | www.nvllabs.com

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: Analytical Resources, Incorporated
Address: 4611 S. 134th Place Suite 100
Tukwila, WA 98168

Attention: Mr. Mark Harris
Project Location: N-A

Batch #: 1519449.00
Client Project #: ARI Project AOV8 Seaport Landing
Date Received: 10/23/2015
Samples Received: 2
Samples Analyzed: 2
Method: EPA/600/R-93/116
& EPA/600/M4-82-020

Lab ID: 15116163 **Client Sample #: 15-19500-AOV8J**
Location: N-A
Comments: Sample was dried prior to analysis. Qualitative analysis was conducted for presence of asbestos
Layer 1 of 1 **Description:** Black wet sludge sample

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Fine particles, Mineral grains, Mica	Cellulose	**None Detected ND**
Paint		

Lab ID: 15116164 **Client Sample #: 15-19510-AOV8T**
Location: N-A
Comments: Sample was dried prior to analysis. Qualitative analysis was conducted for presence of asbestos
Layer 1 of 1 **Description:** Black wet sludge sample

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Fine particles, Mineral grains, Paint	Cellulose	**None Detected ND**
Rusted metal, Glass beads, Gravel	Glass fibers	

Sampled by: Client
Analyzed by: Nadezhda Prysyazhnyuk **Date:** 10/28/2015
Reviewed by: Nick Ly **Date:** 10/29/2015

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

AOV8 : 00098

NVL Laboratories, Inc.
4708 Aurora Ave N, Seattle, WA 98103
p 206.547.0100 | f 206.634.1936 | www.nvllabs.com

ASBESTOS LABORATORY SERVICES

NVL LABS

Company Analytical Resources, Incorporated
Address 4611 S. 134th Place Suite 100
Tukwila, WA 98168
Project Manager Mr. Mark Harris
Phone (206) 695-6200

NVL Batch Number 1519449.00
TAT 5 Days **AH** No
Rush TAT
Due Date 10/30/2015 **Time** 12:15 PM
Email markh@arilabs.com
Fax (206) 695-6202

Project Name/Number: ARI Project AOV8 Seaport Landing **Project Location:** N-A

Subcategory PLM Bulk
Item Code ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

Total Number of Samples 2 **Rush Samples**

	Lab ID	Sample ID	Description	A/R
1	15116163	15-19500-AOV8J		A
2	15116164	15-19510-AOV8T		A

	Print Name	Signature	Company	Date	Time
Sampled by	Client				
Relinquished by	UPS				

Office Use Only	Print Name	Signature	Company	Date	Time
Received by	Maxwell Raymond		NVL	10/23/15	1215
Analyzed by	Nadezhda		NVL	10/28/15	11:39 AM
Results Called by					
☐ **Faxed** ☐ **Emailed**					

Special Instructions:

Date: 10/23/2015
Time: 5:41 PM
Entered By: Justin Shearer

AOV8 : 00099

SUBCONTRACTOR ANALYSIS REQUEST
CUSTODY TRANSFER 10/20/15

ANALYTICAL RESOURCES INCORPORATED

1519449

Laboratory: NVL Laboratories, Inc
Lab Contact: Perry Cheston
Lab Address: 4708 Aurora Ave. N.
Seattle, WA 98103
Phone: 206-547-0100
Fax: 206-344-1878

ARI Client: Maul Foster & Alongi
Project ID: Seaport Landing
ARI PM: Mark Harris
Phone: 206-695-6210
Fax: 206-695-6201
Email: subdata@arilabs.com

Analytical Protocol: PSDDA
Special Instructions:

Requested Turn Around: **10/30/15**
Email Results (Y/N): **Yes**

Limits of Liability. *Subcontractor is expected to perform all requested services in accordance with appropriate methodology following Standard Operating Procedures that meet standards for the industry. The total liability of ARI, its officers, agents, employees, or sucessors, arising out of or in connection with the requested services, shall not exceed the negotiated amount for said services. The agreement by the Subcontractor to perform services requested by ARI releases ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Subcontractor.*

ARI ID	Client ID/ Add'l ID	Sampled	Matrix	Bottles	Analyses
15-19500-AOV8J	CR08A-SBSD	10/15/15 14:20	Sediment	1	Asbestos (Sub)
Special Instructions: None					
15-19510-AOV8T	CR08a-SSD-COMP	10/14/15 10:00	Sediment	1	Asbestos (Sub)
Special Instructions: None					

Carrier UPS	Airbill 1Z 832 695 03 5676 9540		Date 10/22/15
Relinquished by ul	Company ARI	Date 10/22/15	Time 927
Received by Max	Company NVL	Date 10/23/15	Time 1215

Subcontractor Custody Form - **AOV8**
Page 1 of 1

AOV8 : 00100

Analytical Resources, Incorporated
Analytical Chemists and Consultants

20 November 2015

Madi Novak
Maul, Foster and Alongi, Inc
2001 NW 19th Avenue
Suite 200
Portland, OR 97209

RE: Project: Seaport Landing
ARI Job No.: AOV9

Dear Madi:

Please find enclosed the original chain of custody records and the final results for the samples from the project referenced above. Five sediment samples were received on October 16, 2015. Three samples were placed on hold as specified. The remaining samples were analyzed for SVOCs, dioxins/furans, PCBs, NWTPH-Dx, asbestos and total metals as requested. The analysis for asbestos was sub-contracted to NVL Laboratories in Seattle, WA.

The percent differences (%Ds) for 4-methylphenol and benzoic acid were not within control limits for the CCAL that bracketed the 10/30/15 SVOC analyses of these samples. All positive results for these compounds have been flagged with a "Q" qualifier to denote the high %Ds.

The %D for the surrogate, d14-p-terphenyl, was not within control limits for the CCAL that bracketed the 10/30/15 SIM-SVOC analyses of these samples. All positive results for this surrogate have been flagged with a "Q" qualifier to denote the high %Ds.

The %Ds for pentachlorophenol and d14-p-terphenyl were not within control limits for the CCAL that bracketed the 11/5/15 SIM-SVOC analyses of these samples. All positive results for these compounds have been flagged with a "Q" qualifier to denote the high %Ds.

The remaining analyses proceeded without incident of note.

An electronic copy of this package will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

cc: file AOV9
Enclosures
MDH/mdh

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Record & Laboratory Analysis Request

20000.604

ARI Assigned Number: AOV9	Turn-around Requested: Standard	Page: 3 of 3	
ARI Client Company: Mail Foster & Alongi	Phone: (503) 501-5212	Date: 10/15/15	Ice Present? yes
Client Contact: Madi Novak		No. of Coolers:	Cooler Temps:
Client Project Name: Seaport Landing			
Client Project #: 1044.02.01-02	Samplers: RD + MRM		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: Archive	PAH	PCB	Phenol	Metals	Dioxin/Furan	Asbestos	Mercury	Notes/Comments
CR026-SBSD	10/15/15	1507	Sed	6	X	X	X	X	X	X	X	X	
CR25-0-10cm	10/15/15	1553	sed	1	X								
CR25.5.0	10/15/15	1555	sed	1	X								
CR26-SSD	10/15/15	1620	sed	5	X								
CR26-SBSD	10/15/15	1623	sed	3	X	X	X	X	X			X	

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Archive all remaining volume.	Printed Name: Roxanne Rogers	Printed Name: Archie Triggs	Printed Name:	Printed Name: Chris Arndt
	Company: MFA	Company: M.C. DL	Company:	Company: ARI
	Date & Time: 10/15/15	Date & Time: 10/16/15 8:35	Date & Time:	Date & Time: 10/16/15 1114

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Maul Foster & Alongi

COC No(s): _____ NA

Assigned ARI Job No: AOV9

Project Name: _____

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	NO
Were custody papers included with the cooler?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO
Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)	5.1	4.8
Time: _____		

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D00265

Cooler Accepted by: CA Date: 10/22/15 Time: 1116

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	NO
What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____			
Was sufficient ice used (if appropriate)?	NA	YES	NO
Were all bottles sealed in individual plastic bags?		YES	NO
Did all bottles arrive in good condition (unbroken)?		YES	NO
Were all bottle labels complete and legible?		YES	NO
Did the number of containers listed on COC match with the number of containers received?		YES	NO
Did all bottle labels and tags agree with custody papers?		YES	NO
Were all bottles used correct for the requested analyses?		YES	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	YES	NO
Were all VOC vials free of air bubbles?	NA	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO
Date VOC Trip Blank was made at ARI	NA		

Was Sample Split by ARI : NA YES Date/Time: _____ Equipment: _____ Split by: _____

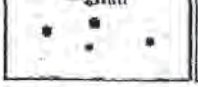
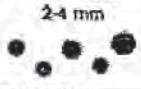
Samples Logged by: VL Date: 10/20/15 Time: 1237

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles >4 mm
		

Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

Subject: RE: AON4-Seaport Landing
From: Roxanne Degens <rdegens@maulfoster.com>
Date: 10/21/2015 12:57 PM
To: Mark Harris <markh@arilabs.com>

Thank you! Also, could you add TPH for CR08b-SBSD? Thanks!

ROXANNE DEGENS | MAUL FOSTER & ALONGI, INC.

d. 206.724.0612 | p. 206 858 7620 | c. 206.450.3396
411 First Avenue South, Suite 610, Seattle, WA 98104
www.maulfoster.com

-----Original Message-----
From: Mark Harris [mailto:markh@arilabs.com]
Sent: Wednesday, October 21, 2015 5:21 AM
To: Roxanne Degens <rdegens@maulfoster.com>
Subject: Re: AON4-Seaport Landing

Roxanne:

Should not be a problem. We'll get these added this morning.

Mark H.

On 10/20/2015 4:03 PM, Roxanne Degens wrote:

> Mark -
> In looking through the COCs earlier, I noticed that I had miswritten/not included an analyte on some of the COCs. The following samples must additionally be analyzed for SVOAs:
>
> CR17D-SSD
> CR17D-SBSD
> CR08A-SBSD
> CR10-SSD-COMP
> CR08A-SSD-COMP
> CR08b-SBSD
> CR26-SBSD
> CR19F-SBSD
> CR19F-SBSD-DUP
> CR19F-SSD
> CR18B-SBSD
> CR18B-SSD

Please let me know if this will cause any issues. SVOAs is part of the SMS suite. Thanks!

ROXANNE DEGENS | MAUL FOSTER & ALONGI, INC.

d. 206.724.0612 | p. 206 858 7620 | c. 206.450.3396
411 First Avenue South, Suite 610, Seattle, WA 98104
www.maulfoster.com

-----Original Message-----
From: Mark Harris [mailto:markh@arilabs.com]
Sent: Tuesday, October 20, 2015 2:27 PM
To: Madi Novak <mnovak@maulfoster.com>; Mike Murray <mmurray@maulfoster.com>; Mary Benzinger <mbenzinger@maulfoster.com>
Cc: Roxanne Degens <rdegens@maulfoster.com>
Subject: Re: AON4-Seaport Landing

Will do.

On 10/20/2015 2:21 PM, Madi Novak wrote:

> Thanks Mark,
> Yes, please run NWTPH-Dx for B02-S-5.0 and B03-S-5.0. Thank you!
>
> MADI NOVAK | MAUL FOSTER & ALONGI, INC.
> direct. 503 501 5212 | main. 971 544 2139 | cell. 971 227 1060 |www.maulfoster.com
> 2001 NW 19th Avenue, Suite 200, Portland, OR 97209
>
> -----Original Message-----
> From: Mark Harris [mailto:markh@arilabs.com]
> Sent: Tuesday, October 20, 2015 2:20 PM
> To: Madi Novak; Mike Murray; Mary Benzinger
> Cc: Roxanne Degens
> Subject: Re: AON4-Seaport Landing

Here are the soil HCID results. Let me know if you'd like and TPH-Dx follow-ups.

Mark H.

On 10/19/2015 1:29 PM, Madi Novak wrote:

> Yes, please go ahead and trigger -Dx analysis for B02-GW-6 and B03-GW-10. Let's do -Gx for B02-GW-6 as well. Thank you.
>
> MADI NOVAK | MAUL FOSTER & ALONGI, INC.
> direct. 503 501 5212 | main. 971 544 2139 | cell. 971 227 1060
> |www.maulfoster.com
> 2001 NW 19th Avenue, Suite 200, Portland, OR 97209
>
> -----Original Message-----
> From: Mark Harris [mailto:markh@arilabs.com]
> Sent: Monday, October 19, 2015 1:28 PM
> To: Madi Novak; Mike Murray; Mary Benzinger
> Subject: AON4-Seaport Landing
>
> All:
>
> One set of HCID analyses are done for some soil samples.
>
> Let me know if you'd like us to trigger any NWTPH-Dx analyses based on these results.
>
> Mark H.
>
> --
> Mark Harris
> Project Manager
> Analytical Resources, Inc.
> 206/695-6210
> markh@arilabs.com
>
> How was your customer experience?

Please take our 5 minute online customer survey<https://www.surveymonkey.com/s/WPDBVJK>.

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If you have received this correspondence in error, please notify sender immediately. Thank you.

--
Mark Harris
Project Manager
Analytical Resources, Inc.
206/695-6210
markh@arilabs.com

How was your customer experience?
Please take our 5 minute online customer survey
<https://www.surveymonkey.com/s/WPDBVJK>.

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If you have received this correspondence in error, please notify sender immediately. Thank you.

--
Mark Harris
Project Manager
Analytical Resources, Inc.
206/695-6210
markh@arilabs.com

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Please take our 5 minute online customer survey

<https://www.surveymonkey.com/s/WPDBVJK>.

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If you have received this correspondence in error, please notify sender immediately. Thank you.

--
Mark Harris
Project Manager
Analytical Resources, Inc.
206/695-6210
markh@arilabs.com

How was your customer experience?
Please take our 5 minute online customer survey <https://www.surveymonkey.com/s/WPDBVJK>.

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If you have received this correspondence in error, please notify sender immediately. Thank you.

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: AOV9
Client: Maul Foster & Alongi
Project Event: 1044.02.01-02
Project Name: Seaport Landing

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	CR08b-SBSD	AOV9A	15-19535	Sediment	10/15/15 15:07	10/16/15 11:16
2.	CR25-0-10CM	AOV9B	15-19536	Sediment	10/15/15 15:53	10/16/15 11:16
3.	CR25-5.0	AOV9C	15-19537	Sediment	10/15/15 15:55	10/16/15 11:16
4.	CR26-SSD	AOV9D	15-19538	Sediment	10/15/15 16:20	10/16/15 11:16
5.	CR26-SBSD	AOV9E	15-19539	Sediment	10/15/15 16:23	10/16/15 11:16

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

AOV9 : 00010

Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for
NR	Spiked compound recovery is not reported due to chromatographic interference
NS	The flagged analyte was not spiked into the sample
M	Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
Y	The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
EMPC	Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**
C	The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
P	The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference
X	Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**
Z	Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

AOV9 : 00011

Geotechnical Data

A	The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
F	Samples were frozen prior to particle size determination
SM	Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
SS	Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
W	Weight of sample in some pipette aliquots was below the level required for accurate weighting

AOV9 : 00012

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 2

Sample ID: CR08b-SBSD
SAMPLE

Lab Sample ID: AOV9A
LIMS ID: 15-19535
Matrix: Sediment
Data Release Authorized:
Reported: 11/12/15

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/24/15
Date Analyzed: 10/30/15 21:29
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.27 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 46.0%

CAS Number	Analyte	LOQ	Result
108-95-2	**Phenol**	**20**	**53**
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	**Benzyl Alcohol**	**20**	**29**
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	**4-Methylphenol**	**20**	**560 Q**
105-67-9	2,4-Dimethylphenol	97	< 97 U
65-85-0	**Benzoic Acid**	**200**	**290 Q**
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	**Naphthalene**	**20**	**800**
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	**2-Methylnaphthalene**	**20**	**79**
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	**Acenaphthylene**	**20**	**300**
83-32-9	**Acenaphthene**	**20**	**75**
132-64-9	**Dibenzofuran**	**20**	**65**
84-66-2	**Diethylphthalate**	**20**	**25**
86-73-7	**Fluorene**	**20**	**66**
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	97	< 97 U
85-01-8	**Phenanthrene**	**20**	**430**
120-12-7	**Anthracene**	**20**	**72**
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	**Fluoranthene**	**20**	**290**
129-00-0	**Pyrene**	**20**	**300**
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	**Benzo(a)anthracene**	**20**	**46**
117-81-7	bis(2-Ethylhexyl)phthalate	49	< 49 U
218-01-9	**Chrysene**	**20**	**73**
117-84-0	Di-n-Octyl phthalate	20	< 20 U
50-32-8	**Benzo(a)pyrene**	**20**	**44**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**20**	**28**
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	**Benzo(g,h,i)perylene**	**20**	**44**
90-12-0	**1-Methylnaphthalene**	**20**	**50**
TOTBFA	**Total Benzofluoranthenes**	**39**	**92**

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR08b-SBSD SAMPLE

Lab Sample ID: AOV9A
LIMS ID: 15-19535
Matrix: Sediment
Date Analyzed: 10/30/15 21:29

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing 1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	60.6%	2-Fluorobiphenyl	68.2%
d14-p-Terphenyl	77.4%	d4-1,2-Dichlorobenzene	59.2%
d5-Phenol	67.5%	2-Fluorophenol	62.0%
2,4,6-Tribromophenol	82.3%	d4-2-Chlorophenol	65.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: MB-102415
METHOD BLANK

Lab Sample ID: MB-102415
LIMS ID: 15-19535
Matrix: Sediment
Data Release Authorized:
Reported: 11/12/15

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/24/15
Date Analyzed: 10/30/15 16:05
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	20	< 20 U
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	4-Methylphenol	20	< 20 U
105-67-9	2,4-Dimethylphenol	100	< 100 U
65-85-0	Benzoic Acid	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	Naphthalene	20	< 20 U
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	< 20 U
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	Acenaphthylene	20	< 20 U
83-32-9	Acenaphthene	20	< 20 U
132-64-9	Dibenzofuran	20	< 20 U
84-66-2	Diethylphthalate	20	< 20 U
86-73-7	Fluorene	20	< 20 U
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	100	< 100 U
85-01-8	Phenanthrene	20	< 20 U
120-12-7	Anthracene	20	< 20 U
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	Fluoranthene	20	< 20 U
129-00-0	Pyrene	20	< 20 U
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	Benzo(a)anthracene	20	< 20 U
117-81-7	bis(2-Ethylhexyl)phthalate	50	< 50 U
218-01-9	Chrysene	20	< 20 U
117-84-0	Di-n-Octyl phthalate	20	< 20 U
50-32-8	Benzo(a)pyrene	20	< 20 U
193-39-5	Indeno(1,2,3-cd)pyrene	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	20	< 20 U
90-12-0	1-Methylnaphthalene	20	< 20 U
TOTBFA	Total Benzofluoranthenes	40	< 40 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: MB-102415
METHOD BLANK

Lab Sample ID: MB-102415
LIMS ID: 15-19535
Matrix: Sediment
Date Analyzed: 10/30/15 16:05

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	72.0%	2-Fluorobiphenyl	73.6%
d14-p-Terphenyl	103%	d4-1,2-Dichlorobenzene	71.4%
d5-Phenol	69.7%	2-Fluorophenol	64.4%
2,4,6-Tribromophenol	69.7%	d4-2-Chlorophenol	70.1%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270 GC/MS

Sample ID: LCS-102415
LAB CONTROL

Lab Sample ID: LCS-102415
LIMS ID: 15-19535
Matrix: Sediment
Data Release Authorized:
Reported: 11/12/15

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/24/15
Date Analyzed: 10/30/15 16:42
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Phenol	358	500	71.6%
1,4-Dichlorobenzene	315	500	63.0%
Benzyl Alcohol	262	500	52.4%
1,2-Dichlorobenzene	334	500	66.8%
2-Methylphenol	365	500	73.0%
4-Methylphenol	436 Q	500	87.2%
2,4-Dimethylphenol	1060	1500	70.7%
Benzoic Acid	2740 Q	2750	99.6%
1,2,4-Trichlorobenzene	331	500	66.2%
Naphthalene	327	500	65.4%
Hexachlorobutadiene	325	500	65.0%
2-Methylnaphthalene	346	500	69.2%
Dimethylphthalate	369	500	73.8%
Acenaphthylene	349	500	69.8%
Acenaphthene	371	500	74.2%
Dibenzofuran	367	500	73.4%
Diethylphthalate	402	500	80.4%
Fluorene	358	500	71.6%
N-Nitrosodiphenylamine	329	500	65.8%
Hexachlorobenzene	361	500	72.2%
Pentachlorophenol	1440	1500	96.0%
Phenanthrene	384	500	76.8%
Anthracene	380	500	76.0%
Di-n-Butylphthalate	404	500	80.8%
Fluoranthene	399	500	79.8%
Pyrene	385	500	77.0%
Butylbenzylphthalate	410	500	82.0%
Benzo(a)anthracene	382	500	76.4%
bis(2-Ethylhexyl)phthalate	389	500	77.8%
Chrysene	376	500	75.2%
Di-n-Octyl phthalate	359	500	71.8%
Benzo(a)pyrene	358	500	71.6%
Indeno(1,2,3-cd)pyrene	375	500	75.0%
Dibenz(a,h)anthracene	373	500	74.6%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270 GC/MS

Sample ID: LCS-102415
LAB CONTROL

Lab Sample ID: LCS-102415
LIMS ID: 15-19535
Matrix: Sediment
Date Analyzed: 10/30/15 16:42

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Analyte	Lab Control	Spike Added	Recovery
Benzo(g,h,i)perylene	338	500	67.6%
1-Methylnaphthalene	316	500	63.2%
Total Benzofluoranthenes	783	1000	78.3%

Semivolatile Surrogate Recovery	
d5-Nitrobenzene	82.0%
2-Fluorobiphenyl	80.8%
d14-p-Terphenyl	118%
d4-1,2-Dichlorobenzene	73.8%
d5-Phenol	85.7%
2-Fluorophenol	78.7%
2,4,6-Tribromophenol	91.1%
d4-2-Chlorophenol	81.5%

Reported in µg/kg (ppb)

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR26-SBSD
SAMPLE

Lab Sample ID: AOV9E
LIMS ID: 15-19539
Matrix: Sediment
Data Release Authorized:
Reported: 11/12/15

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/30/15
Date Analyzed: 11/05/15 22:28
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.27 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 51.1%

CAS Number	Analyte	LOQ	Result
108-95-2	**Phenol**	**20**	**76**
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	**Benzyl Alcohol**	**20**	**54**
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	**2-Methylphenol**	**20**	**12 J**
106-44-5	**4-Methylphenol**	**20**	**45**
105-67-9	2,4-Dimethylphenol	97	< 97 U
65-85-0	**Benzoic Acid**	**200**	**440**
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	**Naphthalene**	**20**	**51**
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	< 20 U
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	**Acenaphthylene**	**20**	**9.7 J**
83-32-9	**Acenaphthene**	**20**	**29**
132-64-9	**Dibenzofuran**	**20**	**25**
84-66-2	**Diethylphthalate**	**20**	**20 B**
86-73-7	**Fluorene**	**20**	**23**
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	97	< 97 U
85-01-8	**Phenanthrene**	**20**	**39**
120-12-7	**Anthracene**	**20**	**14 J**
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	**Fluoranthene**	**20**	**75**
129-00-0	**Pyrene**	**20**	**70**
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	**Benzo(a)anthracene**	**20**	**18 J**
117-81-7	bis(2-Ethylhexyl)phthalate	49	< 49 U
218-01-9	**Chrysene**	**20**	**26**
117-84-0	Di-n-Octyl phthalate	20	< 20 U
50-32-8	Benzo(a)pyrene	20	< 20 U
193-39-5	**Indeno(1,2,3-cd)pyrene**	**20**	**8.8 J**
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	**Benzo(g,h,i)perylene**	**20**	**13 J**
90-12-0	**1-Methylnaphthalene**	**20**	**11 J**
TOTBFA	**Total Benzofluoranthenes**	**39**	**36 J**

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR26-SBSD SAMPLE

Lab Sample ID: AOV9E
LIMS ID: 15-19539
Matrix: Sediment
Date Analyzed: 11/05/15 22:28

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing 1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	53.2%	2-Fluorobiphenyl	58.4%
d14-p-Terphenyl	71.8%	d4-1,2-Dichlorobenzene	48.4%
d5-Phenol	54.5%	2-Fluorophenol	45.7%
2,4,6-Tribromophenol	72.8%	d4-2-Chlorophenol	51.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: MB-103015
METHOD BLANK

Lab Sample ID: MB-103015
LIMS ID: 15-19539
Matrix: Sediment
Data Release Authorized:
Reported: 11/12/15

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/30/15
Date Analyzed: 11/05/15 21:17
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	20	< 20 U
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	4-Methylphenol	20	< 20 U
105-67-9	2,4-Dimethylphenol	100	< 100 U
65-85-0	Benzoic Acid	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	Naphthalene	20	< 20 U
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	< 20 U
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	Acenaphthylene	20	< 20 U
83-32-9	Acenaphthene	20	< 20 U
132-64-9	Dibenzofuran	20	< 20 U
84-66-2	**Diethylphthalate**	**20**	**21**
86-73-7	Fluorene	20	< 20 U
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	100	< 100 U
85-01-8	Phenanthrene	20	< 20 U
120-12-7	Anthracene	20	< 20 U
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	Fluoranthene	20	< 20 U
129-00-0	Pyrene	20	< 20 U
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	Benzo(a)anthracene	20	< 20 U
117-81-7	bis(2-Ethylhexyl)phthalate	50	< 50 U
218-01-9	Chrysene	20	< 20 U
117-84-0	Di-n-Octyl phthalate	20	< 20 U
50-32-8	Benzo(a)pyrene	20	< 20 U
193-39-5	Indeno(1,2,3-cd)pyrene	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	20	< 20 U
90-12-0	1-Methylnaphthalene	20	< 20 U
TOTBFA	Total Benzofluoranthenes	40	< 40 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: MB-103015
METHOD BLANK

Lab Sample ID: MB-103015
LIMS ID: 15-19539
Matrix: Sediment
Date Analyzed: 11/05/15 21:17

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	61.0%	2-Fluorobiphenyl	65.0%
d14-p-Terphenyl	94.2%	d4-1,2-Dichlorobenzene	65.0%
d5-Phenol	65.6%	2-Fluorophenol	61.7%
2,4,6-Tribromophenol	74.3%	d4-2-Chlorophenol	66.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270 GC/MS

Sample ID: LCS-103015
LAB CONTROL

Lab Sample ID: LCS-103015
LIMS ID: 15-19539
Matrix: Sediment
Data Release Authorized:
Reported: 11/12/15

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/30/15
Date Analyzed: 11/05/15 21:52
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Phenol	418	500	83.6%
1,4-Dichlorobenzene	339	500	67.8%
Benzyl Alcohol	401	500	80.2%
1,2-Dichlorobenzene	368	500	73.6%
2-Methylphenol	346	500	69.2%
4-Methylphenol	393	500	78.6%
2,4-Dimethylphenol	822	1500	54.8%
Benzoic Acid	2160	2750	78.5%
1,2,4-Trichlorobenzene	349	500	69.8%
Naphthalene	351	500	70.2%
Hexachlorobutadiene	390	500	78.0%
2-Methylnaphthalene	374	500	74.8%
Dimethylphthalate	372	500	74.4%
Acenaphthylene	356	500	71.2%
Acenaphthene	371	500	74.2%
Dibenzofuran	375	500	75.0%
Diethylphthalate	410 B	500	82.0%
Fluorene	342	500	68.4%
N-Nitrosodiphenylamine	368	500	73.6%
Hexachlorobenzene	350	500	70.0%
Pentachlorophenol	977	1500	65.1%
Phenanthrene	402	500	80.4%
Anthracene	405	500	81.0%
Di-n-Butylphthalate	446	500	89.2%
Fluoranthene	386	500	77.2%
Pyrene	371	500	74.2%
Butylbenzylphthalate	398	500	79.6%
Benzo(a)anthracene	401	500	80.2%
bis(2-Ethylhexyl)phthalate	372	500	74.4%
Chrysene	389	500	77.8%
Di-n-Octyl phthalate	353	500	70.6%
Benzo(a)pyrene	384	500	76.8%
Indeno(1,2,3-cd)pyrene	362	500	72.4%
Dibenz(a,h)anthracene	371	500	74.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270 GC/MS

Sample ID: LCS-103015
LAB CONTROL

Lab Sample ID: LCS-103015
LIMS ID: 15-19539
Matrix: Sediment
Date Analyzed: 11/05/15 21:52

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Analyte	Lab Control	Spike Added	Recovery
Benzo(g,h,i)perylene	304	500	60.8%
1-Methylnaphthalene	350	500	70.0%
Total Benzofluoranthenes	806	1000	80.6%

Semivolatile Surrogate Recovery	
d5-Nitrobenzene	63.8%
2-Fluorobiphenyl	65.2%
d14-p-Terphenyl	88.6%
d4-1,2-Dichlorobenzene	59.4%
d5-Phenol	65.6%
2-Fluorophenol	66.0%
2,4,6-Tribromophenol	70.7%
d4-2-Chlorophenol	66.8%

Reported in µg/kg (ppb)

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT OUT
MB-102415	72.0%	73.6%	103%	71.4%	69.7%	64.4%	69.7%	70.1%	0
LCS-102415	82.0%	80.8%	118%	73.8%	85.7%	78.7%	91.1%	81.5%	0
CR08b-SBSD	60.6%	68.2%	77.4%	59.2%	67.5%	62.0%	82.3%	65.7%	0
MB-103015	61.0%	65.0%	94.2%	65.0%	65.6%	61.7%	74.3%	66.7%	0
LCS-103015	63.8%	65.2%	88.6%	59.4%	65.6%	66.0%	70.7%	66.8%	0
CR26-SBSD	53.2%	58.4%	71.8%	48.4%	54.5%	45.7%	72.8%	51.7%	0

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(30-120)	(30-120)
(FBP) = 2-Fluorobiphenyl	(35-120)	(35-120)
(TPH) = d14-p-Terphenyl	(37-120)	(37-120)
(DCB) = d4-1,2-Dichlorobenzene	(32-120)	(32-120)
(PHL) = d5-Phenol	(29-120)	(29-120)
(2FP) = 2-Fluorophenol	(27-120)	(27-120)
(TBP) = 2,4,6-Tribromophenol	(24-134)	(24-134)
(2CP) = d4-2-Chlorophenol	(31-120)	(31-120)

Prep Method: SW3546
Log Number Range: 15-19535 to 15-19539

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i
Lab File ID: 15103002.d
Analysis Type:
Lab Sample ID: ABN 5
Method: /chem1/nt10.i/20151030.b/ABN.m

Injection Date: 30-OCT-2015 12:48
Init. Cal. Date(s): 19-OCT-2015 19-OCT-2015
Init. Cal. Times: 11:52 16:03
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RF5	CCAL RRF5	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
$ 1 2-Fluorophenol	1.12958	1.25667	1.25667	0.010	11.25129	20.00000	Averaged	
$ 2 Phenol-d5	1.36520	1.77220	1.77220	0.010	29.81235	20.00000	Averaged	<-
3 Phenol	1.33180	1.39912	1.39912	0.100	5.05461	20.00000	Averaged	
$ 5 2-Chlorophenol-d4	1.33265	1.38844	1.38844	0.010	4.18634	20.00000	Averaged	
4 Bis(2-Chloroethyl)ether	1.01930	0.98740	0.98740	0.700	-3.12944	20.00000	Averaged	
6 2-Chlorophenol	1.30689	1.40643	1.40643	0.800	7.61663	20.00000	Averaged	
7 1,3-Dichlorobenzene	1.60078	1.54935	1.54935	0.010	-3.21253	20.00000	Averaged	
9 1,4-Dichlorobenzene	1.54535	1.51473	1.51473	0.010	-1.98142	20.00000	Averaged	
$ 10 1,2-Dichlorobenzene-d4	0.99122	0.89358	0.89358	0.010	-9.85095	20.00000	Averaged	
12 1,2-Dichlorobenzene	1.44684	1.41150	1.41150	0.010	-2.44239	20.00000	Averaged	
11 Benzyl alcohol	0.63765	0.71838	0.71838	0.010	12.66063	20.00000	Averaged	
14 2,2'-oxybis(1-Chloropropane	0.45840	0.46004	0.46004	0.010	0.35677	20.00000	Averaged	
13 2-Methylphenol	0.99636	1.06374	1.06374	0.700	6.76215	20.00000	Averaged	
17 Hexachloroethane	0.61781	0.59664	0.59664	0.300	-3.42602	20.00000	Averaged	
16 N-Nitroso-di-n-propylamine	0.74117	0.80620	0.80620	0.500	8.77350	20.00000	Averaged	
15 4-Methylphenol	1.00886	1.34036	1.34036	0.600	32.85896	20.00000	Averaged	<-
$ 18 Nitrobenzene-d5	0.39605	0.40683	0.40683	0.010	2.72180	20.00000	Averaged	
19 Nitrobenzene	0.36379	0.36907	0.36907	0.200	1.45212	20.00000	Averaged	
20 Isophorone	0.57522	0.61950	0.61950	0.300	7.69752	20.00000	Averaged	
21 2-Nitrophenol	0.21477	0.23500	0.23500	0.100	9.42189	20.00000	Averaged	
22 2,4-Dimethylphenol	0.39317	0.39472	0.39472	0.200	0.39531	20.00000	Averaged	
23 Bis(2-Chloroethoxy)methane	0.32972	0.31872	0.31872	0.050	-3.33731	20.00000	Averaged	
24 Benzoic acid	24.39186	20.00000	0.29066	0.010	21.95931	20.00000	Quadratic	<-
25 2,4-Dichlorophenol	0.32107	0.32388	0.32388	0.100	0.87503	20.00000	Averaged	
26 1,2,4-Trichlorobenzene	0.37492	0.34970	0.34970	0.010	-6.72587	20.00000	Averaged	
28 Naphthalene	1.03606	0.97223	0.97223	0.100	-6.16116	20.00000	Averaged	
29 4-Chloroaniline	0.41428	0.40344	0.40344	0.010	-2.61718	20.00000	Averaged	
30 Hexachlorobutadiene	0.24781	0.27998	0.27998	0.010	12.98214	20.00000	Averaged	
31 4-Chloro-3-methylphenol	0.33608	0.35003	0.35003	0.200	4.14809	20.00000	Averaged	
32 2-Methylnaphthalene	0.74547	0.71366	0.71366	0.300	-4.26724	20.00000	Averaged	
33 Hexachlorocyclopentadiene	0.41843	0.48193	0.48193	0.001	15.17489	20.00000	Averaged	
34 2,4,6-Trichlorophenol	0.37961	0.39533	0.39533	0.200	4.13879	20.00000	Averaged	
35 2,4,5-Trichlorophenol	0.39251	0.41014	0.41014	0.200	4.49159	20.00000	Averaged	
$ 36 2-Fluorobiphenyl	1.40765	1.31736	1.31736	0.010	-6.41413	20.00000	Averaged	
37 2-Chloronaphthalene	1.14337	1.05852	1.05852	0.700	-7.42109	20.00000	Averaged	

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i
Lab File ID: 15103002.d
Analysis Type:
Lab Sample ID: ABN 5
Method: /chem1/nt10.i/20151030.b/ABN.m

Injection Date: 30-OCT-2015 12:48
Init. Cal. Date(s): 19-OCT-2015 19-OCT-2015
Init. Cal. Times: 11:52 16:03
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RFS	CCAL RRFS	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
38 2-Nitroaniline	0.31622	0.35585	0.35585	0.010	12.53104	20.00000	Averaged	
39 Dimethylphthalate	1.36783	1.32388	1.32388	0.010	-3.21284	20.00000	Averaged	
40 Acenaphthylene	1.73670	1.66151	1.66151	0.900	-4.32942	20.00000	Averaged	
41 2,6-Dinitrotoluene	0.28981	0.29600	0.29600	0.100	2.13428	20.00000	Averaged	
43 3-Nitroaniline	0.28271	0.21623	0.21623	0.010	-23.51299	20.00000	Averaged	<-
44 Acenaphthene	1.04524	1.05083	1.05083	0.100	0.53450	20.00000	Averaged	
45 2,4-Dinitrophenol	24.71689	20.00000	0.21203	0.030	23.58447	20.00000	Quadratic	<-
46 Dibenzofuran	1.57152	1.51619	1.51619	0.800	-3.52039	20.00000	Averaged	
47 4-Nitrophenol	9.37250	10.00000	0.24621	0.010	-6.27500	20.00000	Quadratic	
48 2,4-Dinitrotoluene	0.39543	0.40859	0.40859	0.200	3.32881	20.00000	Averaged	
50 Diethylphthalate	1.32554	1.31047	1.31047	0.010	-1.13655	20.00000	Averaged	
49 Fluorene	1.34379	1.20883	1.20883	0.100	-10.04354	20.00000	Averaged	
51 4-Chlorophenyl-phenylether	0.68765	0.65187	0.65187	0.100	-5.20323	20.00000	Averaged	
52 4-Nitroaniline	0.30110	0.25121	0.25121	0.010	-16.56968	20.00000	Averaged	
53 4,6-Dinitro-2-methylphenol	20.80121	20.00000	0.15246	0.001	4.00604	20.00000	Quadratic	
54 N-Nitrosodiphenylamine	0.54831	0.50988	0.50988	0.010	-7.00857	20.00000	Averaged	
$ 55 2,4,6-Tribromophenol	0.34466	0.36287	0.36287	0.010	5.28225	20.00000	Averaged	
56 4-Bromophenyl-phenylether	0.27932	0.26556	0.26556	0.100	-4.92601	20.00000	Averaged	
57 Hexachlorobenzene	0.36460	0.32067	0.32067	0.100	-12.05077	20.00000	Averaged	
58 Pentachlorophenol	10.21740	10.00000	0.21002	0.010	2.17396	20.00000	Quadratic	
60 Phenanthrene	1.02053	0.94907	0.94907	0.700	-7.00175	20.00000	Averaged	
61 Anthracene	1.04166	1.00682	1.00682	0.700	-3.34414	20.00000	Averaged	
62 Carbazole	0.87135	0.84632	0.84632	0.010	-2.87351	20.00000	Averaged	
63 Di-n-butylphthalate	1.31288	1.36435	1.36435	0.010	3.92112	20.00000	Averaged	
64 Fluoranthene	1.11470	1.03055	1.03055	0.600	-7.54914	20.00000	Averaged	
65 Pyrene	1.18016	1.09600	1.09600	0.600	-7.13137	20.00000	Averaged	
$ 66 Terphenyl-d14	0.74289	0.68480	0.68480	0.010	-7.82036	20.00000	Averaged	
67 Butylbenzylphthalate	0.50597	0.49895	0.49895	0.010	-1.38563	20.00000	Averaged	
68 Benzo(a)anthracene	1.12072	1.04909	1.04909	0.700	-6.39155	20.00000	Averaged	
70 3,3'-Dichlorobenzidine	0.75137	0.60645	0.60645	0.010	-19.28827	20.00000	Averaged	
71 Chrysene	0.97701	0.88490	0.88490	0.700	-9.42727	20.00000	Averaged	
72 bis(2-Ethylhexyl)phthalate	0.52679	0.48145	0.48145	0.010	-8.60659	20.00000	Averaged	
73 Di-n-octylphthalate	1.07536	0.91056	0.91056	0.010	-15.32476	20.00000	Averaged	
74 Benzo(b)fluoranthene	1.08810	1.04396	1.04396	0.700	-4.05689	20.00000	Averaged	
75 Benzo(k)fluoranthene	1.08482	1.12636	1.12636	0.700	3.82913	20.00000	Averaged	

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i
Lab File ID: 15103002.d
Analysis Type:
Lab Sample ID: ABN 5
Method: /chem1/nt10.i/20151030.b/ABN.m

Injection Date: 30-OCT-2015 12:48
Init. Cal. Date(s): 19-OCT-2015 19-OCT-2015
Init. Cal. Times: 11:52 16:03
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RFS	CCAL RRFS	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
76 Benzo(a)pyrene	1.03138	1.00573	1.00573	0.700	-2.48654	20.00000	Averaged	
78 Indeno(1,2,3-cd)pyrene	1.37485	1.30285	1.30285	0.500	-5.23687	20.00000	Averaged	
79 Dibenzo(a,h)anthracene	1.13622	1.06040	1.06040	0.400	-6.67317	20.00000	Averaged	
80 Benzo(g,h,i)perylene	1.23143	1.07154	1.07154	0.500	-12.98367	20.00000	Averaged	
90 N-Nitrosodimethylamine	0.53343	0.64824	0.64824	0.010	21.52303	20.00000	Averaged	<-
91 Aniline	1.56324	1.67206	1.67206	0.010	6.96121	20.00000	Averaged	
93 Benzidine	0.38521	0.17587	0.17587	0.010	-54.34480	20.00000	Averaged	<-
103 Pyridine	0.85366	1.08870	1.08870	0.010	27.53394	20.00000	Averaged	<-
105 1-methylnaphthalene	0.76506	0.75900	0.75900	0.010	-0.79269	20.00000	Averaged	
111 Azobenzene (1,2-DP-Hydrazin	1.22084	1.11240	1.11240	0.010	-8.88248	20.00000	Averaged	
187 Total Benzofluoranthenes	1.04123	1.04020	1.04020	0.010	-0.09922	20.00000	Averaged	
99 Perylene	0.99701	0.98004	0.98004	0.010	-1.70288	20.00000	Averaged	
98 Retene	++++	++++	++++	0.010	++++	20.00000	Averaged	<-
120 2,3,4,6-Tetrachlorophenol	0.35337	0.36589	0.36589	0.010	3.54308	20.00000	Averaged	

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: MB-102415**
Extraction Method: SW3546 **METHOD BLANK**

Lab Sample ID: MB-102415
LIMS ID: 15-19535
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/20/15

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/24/15
Date Analyzed: 10/30/15 16:05
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	Dibenz(a,h)anthracene	5.0	< 5.0 U
106-46-7	1,4-Dichlorobenzene	5.0	< 5.0 U
120-82-1	1,2,4-Trichlorobenzene	5.0	< 5.0 U
118-74-1	Hexachlorobenzene	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	5.0	< 5.0 U
131-11-3	Dimethylphthalate	5.0	< 5.0 U
85-68-7	Butylbenzylphthalate	5.0	< 5.0 U
95-48-7	2-Methylphenol	5.0	< 5.0 U
105-67-9	2,4-Dimethylphenol	25	< 25 U
86-30-6	N-Nitrosodiphenylamine	5.0	< 5.0 U
100-51-6	Benzyl Alcohol	20	< 20 U
87-86-5	Pentachlorophenol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	5.0	< 5.0 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery	
2-Fluorophenol	64.9%
d14-p-Terphenyl	88.4% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR08b-SBSD**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AOV9A
LIMS ID: 15-19535
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/20/15

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/24/15
Date Analyzed: 10/30/15 21:29
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.27 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 46.0%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**4.9**	**6.4**
106-46-7	1,4-Dichlorobenzene	4.9	< 4.9 U
120-82-1	1,2,4-Trichlorobenzene	4.9	< 4.9 U
118-74-1	Hexachlorobenzene	4.9	< 4.9 U
87-68-3	Hexachlorobutadiene	4.9	< 4.9 U
131-11-3	Dimethylphthalate	4.9	< 4.9 U
85-68-7	Butylbenzylphthalate	4.9	< 4.9 U
95-48-7	2-Methylphenol	4.9	< 4.9 U
105-67-9	**2,4-Dimethylphenol**	**24**	**17 J**
86-30-6	N-Nitrosodiphenylamine	4.9	< 4.9 U
100-51-6	**Benzyl Alcohol**	**20**	**50**
87-86-5	Pentachlorophenol	20	< 20 U
95-50-1	**1,2-Dichlorobenzene**	**4.9**	**1.8 J**

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	58.0%
d14-p-Terphenyl	66.0% Q

ANALYTICAL RESOURCES INCORPORATED

SIM SW8270 SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	FPH	TER	TOT OUT
MB-102415	64.9%	88.4% Q	0
LCS-102415	73.6%	103% Q	0
CR08b-SBSD	58.0%	66.0% Q	0

	QC LIMITS	
(FPH) = 2-Fluorophenol	(27-120)	(27-120)
(TER) = d14-p-Terphenyl	(37-120)	(37-120)

Prep Method: SW3546
Log Number Range: 15-19535 to 15-19535

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: LCS-102415**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-102415
LIMS ID: 15-19535
Matrix: Sediment
Data Release Authorized:
Reported: 11/20/15

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/24/15
Date Analyzed LCS: 10/30/15 16:42
Instrument/Analyst LCS: NT10/YZ

Sample Amount LCS: 10.00 g-dry-wt
Final Extract Volume LCS: 1.0 mL
Dilution Factor LCS: 1.00

Analyte	LCS	Spike Added	Recovery
Dibenz(a,h)anthracene	341	500	68.2%
1,4-Dichlorobenzene	281	500	56.2%
1,2,4-Trichlorobenzene	299	500	59.8%
Hexachlorobenzene	330	500	66.0%
Hexachlorobutadiene	317	500	63.4%
Dimethylphthalate	342	500	68.4%
Butylbenzylphthalate	432	500	86.4%
2-Methylphenol	316	500	63.2%
2,4-Dimethylphenol	932	1500	62.1%
N-Nitrosodiphenylamine	313	500	62.6%
Benzyl Alcohol	304	500	60.8%
Pentachlorophenol	1680 E	1500	112%
1,2-Dichlorobenzene	291	500	58.2%

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery	
2-Fluorophenol	73.6%
d14-p-Terphenyl	103% Q

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i Injection Date: 30-OCT-2015 13:24
Lab File ID: 15103003.d Init. Cal. Date(s): 19-OCT-2015 19-OCT-2015
Analysis Type: Init. Cal. Times: 11:52 16:39
Lab Sample ID: ABN 1 Quant Type: ISTD
Method: /chem1/nt10.i/20151030.b/SIM.b/SIMABN2.m

COMPOUND	RRF / AMOUNT	RF1	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
$ 1 2-Fluorophenol	1.04543	0.96142	0.010	-8.03654	20.00000	Averaged	
3 Phenol	1.55661	1.40648	0.010	-9.64464	20.00000	Averaged	
7 1,3-Dichlorobenzene	1.76229	1.81225	0.010	2.83494	20.00000	Averaged	
9 1,4-Dichlorobenzene	1.73930	1.76468	0.010	1.45974	20.00000	Averaged	
11 Benzyl alcohol	0.81726	0.79225	0.010	-3.06060	20.00000	Averaged	
12 1,2-Dichlorobenzene	1.62946	1.70304	0.010	4.51605	20.00000	Averaged	
13 2-Methylphenol	0.93390	0.80168	0.010	-14.15811	20.00000	Averaged	
15 4-Methylphenol	0.91605	0.81806	0.010	-10.69673	20.00000	Averaged	
16 N-Nitroso-di-n-propylamine	0.61594	0.57640	0.050	-6.41927	20.00000	Averaged	
22 2,4-Dimethylphenol	0.39393	0.33783	0.010	-14.23919	20.00000	Averaged	
26 1,2,4-Trichlorobenzene	0.39456	0.42313	0.010	7.24230	20.00000	Averaged	
30 Hexachlorobutadiene	0.30361	0.32506	0.010	7.06797	20.00000	Averaged	
39 Dimethylphthalate	1.14558	0.98245	0.010	-14.23996	20.00000	Averaged	
50 Diethylphthalate	1.23806	1.15862	0.010	-6.41678	20.00000	Averaged	
54 N-Nitrosodiphenylamine	0.61955	0.55635	0.010	-10.20083	20.00000	Averaged	
57 Hexachlorobenzene	0.41451	0.45813	0.010	10.52324	20.00000	Averaged	
58 Pentachlorophenol	0.21311	0.22135	0.005	3.86819	20.00000	Averaged	
$ 66 Terphenyl-d14	0.36942	0.29005	0.010	-21.48474	20.00000	Averaged	<-
67 Butylbenzylphthalate	0.41305	0.39713	0.010	-3.85451	20.00000	Averaged	
79 Dibenzo(a,h)anthracene	1.15706	1.02003	0.010	-11.84321	20.00000	Averaged	
90 N-Nitrosodimethylamine	0.44352	0.45598	0.010	2.81024	20.00000	Averaged	

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: MB-103015**
Extraction Method: SW3546 **METHOD BLANK**

Lab Sample ID: MB-103015
LIMS ID: 15-19539
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/20/15

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/30/15
Date Analyzed: 11/05/15 21:17
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	Dibenz(a,h)anthracene	5.0	< 5.0 U
106-46-7	1,4-Dichlorobenzene	5.0	< 5.0 U
120-82-1	1,2,4-Trichlorobenzene	5.0	< 5.0 U
118-74-1	Hexachlorobenzene	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	5.0	< 5.0 U
131-11-3	Dimethylphthalate	5.0	< 5.0 U
85-68-7	Butylbenzylphthalate	5.0	< 5.0 U
95-48-7	2-Methylphenol	5.0	< 5.0 U
105-67-9	2,4-Dimethylphenol	25	< 25 U
86-30-6	N-Nitrosodiphenylamine	5.0	< 5.0 U
100-51-6	Benzyl Alcohol	20	< 20 U
87-86-5	Pentachlorophenol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	5.0	< 5.0 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	57.9%
d14-p-Terphenyl	75.6% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR26-SBSD**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AOV9E
LIMS ID: 15-19539
Matrix: Sediment
Data Release Authorized:
Reported: 11/20/15

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/30/15
Date Analyzed: 11/05/15 22:28
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.27 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 51.1%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**4.9**	**3.1 J**
106-46-7	1,4-Dichlorobenzene	4.9	< 4.9 U
120-82-1	1,2,4-Trichlorobenzene	4.9	< 4.9 U
118-74-1	Hexachlorobenzene	4.9	< 4.9 U
87-68-3	Hexachlorobutadiene	4.9	< 4.9 U
131-11-3	Dimethylphthalate	4.9	< 4.9 U
85-68-7	Butylbenzylphthalate	4.9	< 4.9 U
95-48-7	**2-Methylphenol**	**4.9**	**5.4**
105-67-9	2,4-Dimethylphenol	24	< 24 U
86-30-6	N-Nitrosodiphenylamine	4.9	< 4.9 U
100-51-6	**Benzyl Alcohol**	**20**	**64**
87-86-5	Pentachlorophenol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	4.9	< 4.9 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery	
2-Fluorophenol	45.9%
d14-p-Terphenyl	58.6% Q

ANALYTICAL RESOURCES INCORPORATED

SIM SW8270 SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	FPH	TER	TOT OUT
MB-103015	57.9%	75.6% Q	0
LCS-103015	60.9%	71.2% Q	0
CR26-SBSD	45.9%	58.6% Q	0

	QC LIMITS	
(FPH) = 2-Fluorophenol	(27-120)	(27-120)
(TER) = d14-p-Terphenyl	(37-120)	(37-120)

Prep Method: SW3546
Log Number Range: 15-19539 to 15-19539

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: LCS-103015**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-103015
LIMS ID: 15-19539
Matrix: Sediment
Data Release Authorized:
Reported: 11/20/15

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/30/15
Date Analyzed LCS: 11/05/15 21:52
Instrument/Analyst LCS: NT10/YZ

Sample Amount LCS: 10.00 g-dry-wt
Final Extract Volume LCS: 1.0 mL
Dilution Factor LCS: 1.00

Analyte	LCS		Spike Added	Recovery
Dibenz(a,h)anthracene	334		500	66.8%
1,4-Dichlorobenzene	316		500	63.2%
1,2,4-Trichlorobenzene	324		500	64.8%
Hexachlorobenzene	333		500	66.6%
Hexachlorobutadiene	364		500	72.8%
Dimethylphthalate	378		500	75.6%
Butylbenzylphthalate	416		500	83.2%
2-Methylphenol	317		500	63.4%
2,4-Dimethylphenol	770		1500	51.3%
N-Nitrosodiphenylamine	346		500	69.2%
Benzyl Alcohol	416		500	83.2%
Pentachlorophenol	1210	EQ	1500	80.7%
1,2-Dichlorobenzene	328		500	65.6%

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery	
2-Fluorophenol	60.9%
d14-p-Terphenyl	71.2% Q

ARI Labs, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i
Lab File ID: CC1105A.D
Analysis Type:
Lab Sample ID: CC1105A
Method: \\target\share\chem3\nt10.i\20151105.b\SIM.b\SIMABN2.m

Injection Date: 05-NOV-2015 14:04
Init. Cal. Date(s): 19-OCT-2015 19-OCT-2015
Init. Cal. Times: 11:52 16:39
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RF1	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
$ 1 2-Fluorophenol	1.04543	0.98207	0.010	-6.06090	20.00000	Averaged	
3 Phenol	1.55661	1.46467	0.010	-5.90683	20.00000	Averaged	
7 1,3-Dichlorobenzene	1.76229	1.78433	0.010	1.25101	20.00000	Averaged	
9 1,4-Dichlorobenzene	1.73930	1.78433	0.010	2.58940	20.00000	Averaged	
11 Benzyl alcohol	0.81726	0.79485	0.010	-2.74242	20.00000	Averaged	
12 1,2-Dichlorobenzene	1.62946	1.72457	0.010	5.83701	20.00000	Averaged	
13 2-Methylphenol	0.93390	0.81370	0.010	-12.87015	20.00000	Averaged	
15 4-Methylphenol	0.91605	0.81780	0.010	-10.72571	20.00000	Averaged	
16 N-Nitroso-di-n-propylamine	0.61594	0.57662	0.050	-6.38240	20.00000	Averaged	
22 2,4-Dimethylphenol	0.39393	0.33255	0.010	-15.58052	20.00000	Averaged	
26 1,2,4-Trichlorobenzene	0.39456	0.41910	0.010	6.21998	20.00000	Averaged	
30 Hexachlorobutadiene	0.30361	0.33208	0.010	9.37722	20.00000	Averaged	
39 Dimethylphthalate	1.14558	1.01470	0.010	-11.42453	20.00000	Averaged	
50 Diethylphthalate	1.23806	1.13213	0.010	-8.55608	20.00000	Averaged	
54 N-Nitrosodiphenylamine	0.61955	0.57444	0.010	-7.27995	20.00000	Averaged	
57 Hexachlorobenzene	0.41451	0.46057	0.010	11.11164	20.00000	Averaged	
58 Pentachlorophenol	0.21311	0.15371	0.005	-27.87342	20.00000	Averaged	<-
$ 66 Terphenyl-d14	0.36942	0.25581	0.010	-30.75549	20.00000	Averaged	<-
67 Butylbenzylphthalate	0.41305	0.39038	0.010	-5.48875	20.00000	Averaged	
79 Dibenzo(a,h)anthracene	1.15706	1.04200	0.010	-9.94423	20.00000	Averaged	
90 N-Nitrosodimethylamine	0.44352	0.46419	0.010	4.66003	20.00000	Averaged	

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: CR08b-SBSD

Lab Sample ID: AOV9A
LIMS ID: 15-19535
Matrix: Sediment
Data Release Authorized:
Reported: 11/11/15

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/26/18
Date Analyzed: 11/05/15 03:12
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.4 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Silica-Florisil Cleanup: Yes
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.66	0.65-0.89		0.959	0.529	J
2,3,7,8-TCDD	0.77	0.65-0.89		0.959	2.06	
1,2,3,7,8-PeCDF	1.21	1.32-1.78		0.959	0.288	JEMPC
2,3,4,7,8-PeCDF	1.63	1.32-1.78		0.959	0.201	J
1,2,3,7,8-PeCDD	1.65	1.32-1.78		0.959	2.68	
1,2,3,4,7,8-HxCDF	1.25	1.05-1.43		0.959	0.111	J
1,2,3,6,7,8-HxCDF	1.21	1.05-1.43		0.959	0.140	J
2,3,4,6,7,8-HxCDF	1.41	1.05-1.43		0.959	0.105	J
1,2,3,7,8,9-HxCDF	1.15	1.05-1.43		0.959	0.146	BJ
1,2,3,4,7,8-HxCDD	1.27	1.05-1.43		0.959	0.589	J
1,2,3,6,7,8-HxCDD	1.32	1.05-1.43		0.959	1.71	
1,2,3,7,8,9-HxCDD	1.27	1.05-1.43		0.959	7.04	
1,2,3,4,6,7,8-HpCDF	1.21	0.88-1.20		0.959	0.295	BJEMPC
1,2,3,4,7,8,9-HpCDF	1.04	0.88-1.20		0.959	0.0959	J
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20		0.959	12.5	B
OCDF	0.70	0.76-1.02		1.92	0.802	BJEMPC
OCDD	0.87	0.76-1.02		9.59	45.4	B

Homologue Group	EDL	RL	Result	
Total TCDF		0.959	10.7	EMPC
Total TCDD		0.959	21.4	EMPC
Total PeCDF		1.92	2.08	EMPC
Total PeCDD		0.959	21.9	EMPC
Total HxCDF		1.92	0.888	EMPC
Total HxCDD		1.92	45.4	EMPC
Total HpCDF		1.92	0.643	EMPC
Total HpCDD		1.92	26.3	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 5.99

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 5.99

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: CR08b-SBSD

Lab Sample ID: AOV9A
LIMS ID: 15-19535
Matrix: Sediment
Data Release Authorized:
Reported: 11/11/15

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/26/18
Date Analyzed: 11/05/15 03:12
Instrument/Analyst: AS1/PK

Sample Amount: 10.4 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.77	0.65-0.89	91.1	24-169	
13C-2,3,7,8-TCDD	0.77	0.65-0.89	87.8	25-164	
13C-1,2,3,7,8-PeCDF	1.56	1.32-1.78	94.2	24-185	
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	95.3	21-178	
13C-1,2,3,7,8-PeCDD	1.59	1.32-1.78	97.5	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	85.0	26-152	
13C-1,2,3,6,7,8-HxCDF	0.53	0.43-0.59	82.6	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	88.2	28-136	
13C-1,2,3,7,8,9-HxCDF	0.51	0.43-0.59	86.0	29-147	
13C-1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	90.2	32-141	
13C-1,2,3,6,7,8-HxCDD	1.25	1.05-1.43	85.2	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	78.4	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	82.2	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	85.6	23-140	
13C-OCDD	0.89	0.76-1.02	75.1	17-157	
37Cl4-2,3,7,8-TCDD			98.5	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: MB-102615

Lab Sample ID: MB-102615
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 11/05/15 00:25
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF		0.65-0.89	0.0500	1.00	< 0.0500	U
2,3,7,8-TCDD		0.65-0.89	0.0560	1.00	< 0.0560	U
1,2,3,7,8-PeCDF		1.32-1.78	0.0580	1.00	< 0.0580	U
2,3,4,7,8-PeCDF		1.32-1.78	0.0600	1.00	< 0.0600	U
1,2,3,7,8-PeCDD		1.32-1.78	0.0980	1.00	< 0.0980	U
1,2,3,4,7,8-HxCDF		1.05-1.43	0.0640	1.00	< 0.0640	U
1,2,3,6,7,8-HxCDF		1.05-1.43	0.0580	1.00	< 0.0580	U
2,3,4,6,7,8-HxCDF		1.05-1.43	0.0620	1.00	< 0.0620	U
1,2,3,7,8,9-HxCDF	1.11	1.05-1.43		1.00	0.116	J
1,2,3,4,7,8-HxCDD		1.05-1.43	0.0840	1.00	< 0.0840	U
1,2,3,6,7,8-HxCDD		1.05-1.43	0.0880	1.00	< 0.0880	U
1,2,3,7,8,9-HxCDD		1.05-1.43	0.0880	1.00	< 0.0880	U
1,2,3,4,6,7,8-HpCDF	0.84	0.88-1.20		1.00	0.196	JEMPC
1,2,3,4,7,8,9-HpCDF		0.88-1.20	0.0600	1.00	< 0.0600	U
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20		1.00	1.99	
OCDF	0.72	0.76-1.02		2.00	0.776	JEMPC
OCDD	0.86	0.76-1.02		10.0	16.9	

Homologue Group	EDL	RL	Result	
Total TCDF	0.0500	1.00	< 0.0500	U
Total TCDD	0.0560	1.00	0.0524	EMPC
Total PeCDF	0.0600	2.00	< 0.0600	U
Total PeCDD	0.0980	1.00	0.253	EMPC
Total HxCDF		2.00	0.117	
Total HxCDD	0.0880	2.00	1.31	EMPC
Total HpCDF		2.00	0.426	EMPC
Total HpCDD		2.00	5.27	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 0.04

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 0.15

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: MB-102615

Lab Sample ID: MB-102615
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 11/05/15 00:25
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	99.6	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	95.8	25-164	
13C-1,2,3,7,8-PeCDF	1.59	1.32-1.78	103	24-185	
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	96.9	21-178	
13C-1,2,3,7,8-PeCDD	1.59	1.32-1.78	98.0	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	99.9	26-152	
13C-1,2,3,6,7,8-HxCDF	0.51	0.43-0.59	101	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	99.4	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	92.8	29-147	
13C-1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	103	32-141	
13C-1,2,3,6,7,8-HxCDD	1.26	1.05-1.43	99.0	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	90.7	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	91.9	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.07	0.88-1.20	98.5	23-140	
13C-OCDD	0.91	0.76-1.02	84.7	17-157	
37Cl4-2,3,7,8-TCDD			105	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-102615

Lab Sample ID: OPR-102615
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 11/05/15 01:26
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	RL	Result
2,3,7,8-TCDF	0.70	0.65-0.89	1.00	20.6
2,3,7,8-TCDD	0.74	0.65-0.89	1.00	21.4
1,2,3,7,8-PeCDF	1.43	1.32-1.78	1.00	103
2,3,4,7,8-PeCDF	1.44	1.32-1.78	1.00	104
1,2,3,7,8-PeCDD	1.56	1.32-1.78	1.00	104
1,2,3,4,7,8-HxCDF	1.14	1.05-1.43	1.00	105
1,2,3,6,7,8-HxCDF	1.14	1.05-1.43	1.00	105
2,3,4,6,7,8-HxCDF	1.15	1.05-1.43	1.00	105
1,2,3,7,8,9-HxCDF	1.15	1.05-1.43	1.00	105
1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	1.00	102
1,2,3,6,7,8-HxCDD	1.19	1.05-1.43	1.00	104
1,2,3,7,8,9-HxCDD	1.23	1.05-1.43	1.00	107
1,2,3,4,6,7,8-HpCDF	0.98	0.88-1.20	1.00	108
1,2,3,4,7,8,9-HpCDF	0.99	0.88-1.20	1.00	109
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20	1.00	104
OCDF	0.82	0.76-1.02	2.00	199
OCDD	0.90	0.76-1.02	10.0	212

Homologue Group	EDL	RL	Result	
Total TCDF		1.00	21.4	EMPC
Total TCDD		1.00	22.0	EMPC
Total PeCDF		2.00	211	EMPC
Total PeCDD		1.00	104	EMPC
Total HxCDF		2.00	421	EMPC
Total HxCDD		2.00	314	EMPC
Total HpCDF		2.00	217	
Total HpCDD		2.00	106	

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-102615

Lab Sample ID: OPR-102615
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 11/05/15 01:26
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.77	0.65-0.89	93.5	24-169	
13C-2,3,7,8-TCDD	0.80	0.65-0.89	89.2	25-164	
13C-1,2,3,7,8-PeCDF	1.55	1.32-1.78	97.5	24-185	
13C-2,3,4,7,8-PeCDF	1.55	1.32-1.78	92.4	21-178	
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	93.9	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	90.4	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	88.6	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	89.2	28-136	
13C-1,2,3,7,8,9-HxCDF	0.51	0.43-0.59	84.5	29-147	
13C-1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	95.2	32-141	
13C-1,2,3,6,7,8-HxCDD	1.26	1.05-1.43	89.2	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	82.3	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.43	0.37-0.51	82.6	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.02	0.88-1.20	88.8	23-140	
13C-OCDD	0.90	0.76-1.02	77.0	17-157	
37Cl4-2,3,7,8-TCDD			99.1	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-102615

Lab Sample ID: OPR-102615
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 11/05/15 01:26
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	OPR	Spiked	Recovery	Limits
2,3,7,8-TCDF	20.6	20.0	103	75-158
2,3,7,8-TCDD	21.4	20.0	107	67-158
1,2,3,7,8-PeCDF	103	100	103	80-134
2,3,4,7,8-PeCDF	104	100	104	68-160
1,2,3,7,8-PeCDD	104	100	104	70-142
1,2,3,4,7,8-HxCDF	105	100	105	72-134
1,2,3,6,7,8-HxCDF	105	100	105	84-130
2,3,4,6,7,8-HxCDF	105	100	105	70-156
1,2,3,7,8,9-HxCDF	105	100	105	78-130
1,2,3,4,7,8-HxCDD	102	100	102	70-164
1,2,3,6,7,8-HxCDD	104	100	104	76-134
1,2,3,7,8,9-HxCDD	107	100	107	64-162
1,2,3,4,6,7,8-HpCDF	108	100	108	82-132
1,2,3,4,7,8,9-HpCDF	109	100	109	78-138
1,2,3,4,6,7,8-HpCDD	104	100	104	70-140
OCDF	199	200	99.5	63-170
OCDD	212	200	106	78-144

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR08b-SBSD
SAMPLE

Lab Sample ID: AOV9A
LIMS ID: 15-19535
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/26/15
Date Analyzed: 10/29/15 22:02
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.41 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 46.0%

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	18	< 18 U
53469-21-9	Aroclor 1242	18	< 18 U
12672-29-6	Aroclor 1248	18	< 18 U
11097-69-1	Aroclor 1254	18	< 18 U
11096-82-5	Aroclor 1260	18	< 18 U
11104-28-2	Aroclor 1221	18	< 18 U
11141-16-5	Aroclor 1232	18	< 18 U
11100-14-4	Aroclor 1268	18	< 18 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	67.2%
Tetrachlorometaxylene	75.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR26-SBSD
SAMPLE

Lab Sample ID: AOV9E
LIMS ID: 15-19539
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Date Extracted: 10/26/15
Date Analyzed: 10/29/15 23:05
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.38 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 51.1%

CAS Number	Analyte	LOQ	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
11100-14-4	Aroclor 1268	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	64.2%
Tetrachlorometaxylene	75.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: MB-102615
METHOD BLANK

Lab Sample ID: MB-102615
LIMS ID: 15-19535
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 10/29/15 18:54
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: NA

CAS Number	Analyte	LOQ	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
11100-14-4	Aroclor 1268	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	71.8%
Tetrachlorometaxylene	77.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Page 1 of 1

Sample ID: LCS-102615
LAB CONTROL

Lab Sample ID: LCS-102615
LIMS ID: 15-19535
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 10/29/15 19:14
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Aroclor 1016	405	500	81.0%
Aroclor 1260	407	500	81.4%

PCB Surrogate Recovery

Decachlorobiphenyl	74.0%
Tetrachlorometaxylene	82.0%

Results reported in µg/kg (ppb)

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB SOIL/SOLID/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-102615	71.8%	40-133	77.5%	53-120	0
LCS-102615	74.0%	40-133	82.0%	53-120	0
CR08b-SBSD	67.2%	40-133	75.0%	53-120	0
CR26-SBSD	64.2%	40-133	75.0%	53-120	0

Microwave (MARS) Control Limits PCBSMP
Prep Method: SW3546
Log Number Range: 15-19535 to 15-19539

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Extraction Method: SW3546
Page 1 of 1

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Matrix: Sediment

Date Received: 10/16/15

Data Release Authorized:
Reported: 11/02/15

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range/Surrogate	LOQ	Result
MB-102315	Method Blank	10/23/15	10/28/15	1.00	Diesel Range	5.0	< 5.0 U
15-19535	HC ID: ---		FID3B	1.0	Motor Oil Range	10	< 10 U
					o-Terphenyl		74.0%
AOV9A	CR08b-SBSD	10/23/15	10/29/15	1.00	**Diesel Range**	**9.3**	**170**
15-19535	HC ID: **DIESEL/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**18**	**280**
					o-Terphenyl		72.4%

Reported in mg/kg (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
LOQ-Limit of Quantitation

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

ANALYTICAL RESOURCES INCORPORATED

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	OTER	TOT OUT
102315MB	74.0%	0
102315LCS	74.6%	0
CR08b-SBSD	72.4%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3546
Log Number Range: 15-19535 to 15-19535

FORM-II TPHD

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: LCS-102315
LAB CONTROL

Lab Sample ID: LCS-102315
LIMS ID: 15-19535
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/02/15

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 10/28/15 22:59
Instrument/Analyst: FID3B/ML

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
Diesel	109	150	72.7%

TPHD Surrogate Recovery

o-Terphenyl	74.6%

Results reported in mg/kg

FORM III

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Sediment
Date Received: 10/16/15

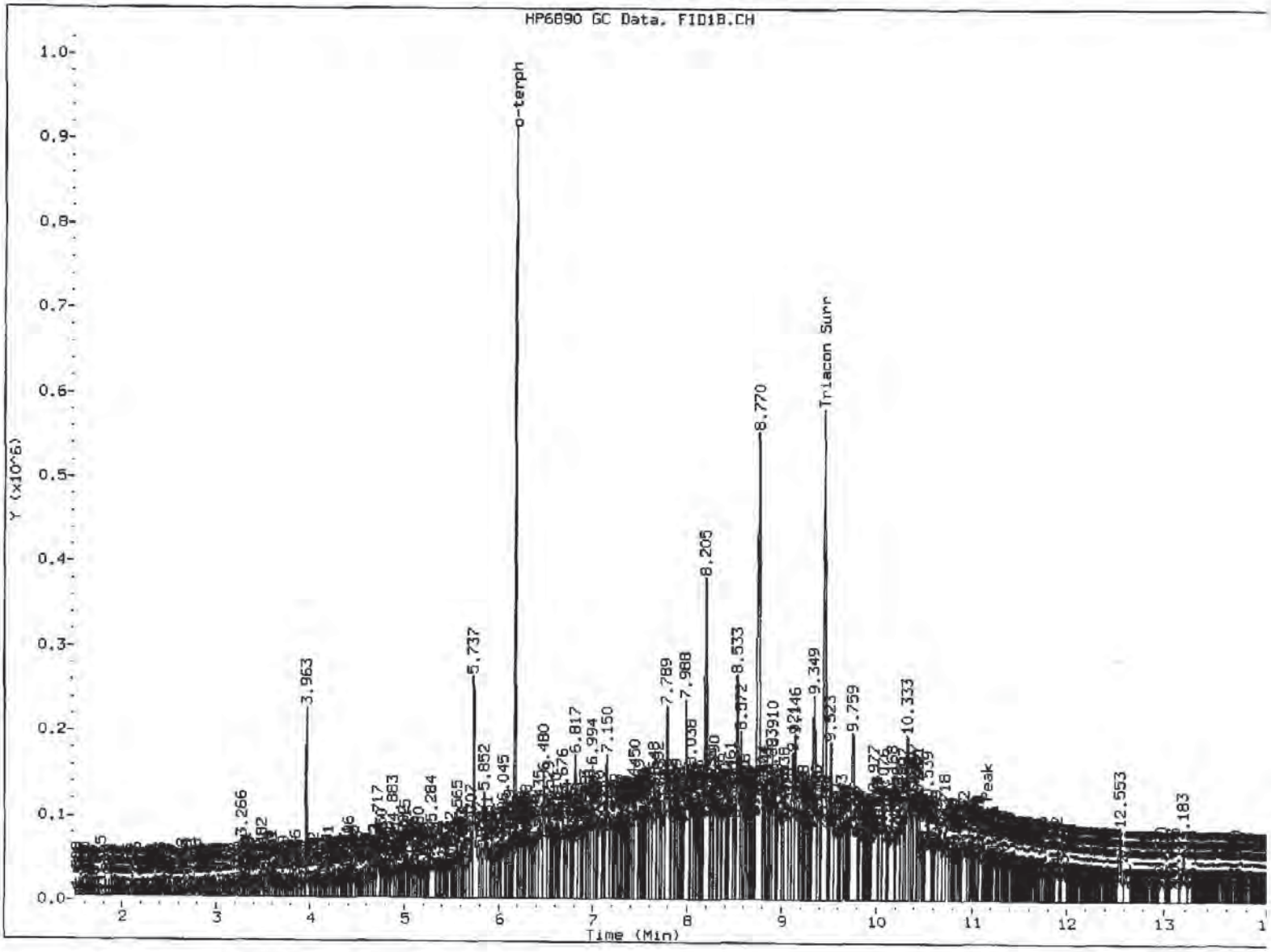
ARI Job: AOV9
Project: Seaport Landing
1044.02.01-02

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep Date
15-19535-102315MB1	Method Blank	10.0 g	1.00 mL	-	10/23/15
15-19535-102315LCS1	Lab Control	10.0 g	1.00 mL	-	10/23/15
15-19535-AOV9A	CR08b-SBSD	5.40 g	1.00 mL	D	10/23/15

Basis: D=Dry Weight W=As Received

FID:3B-2C/RTX-1 AOV9A

FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5) Skimmed surrogate

Analyst: MI Date: 10/29/15

Data File: \\target\share\chem2\fid3b.i\20151028.b\15102839.D

Page 1

Date : 29-OCT-2015 00:45

Client ID: CRO8b-SBSD

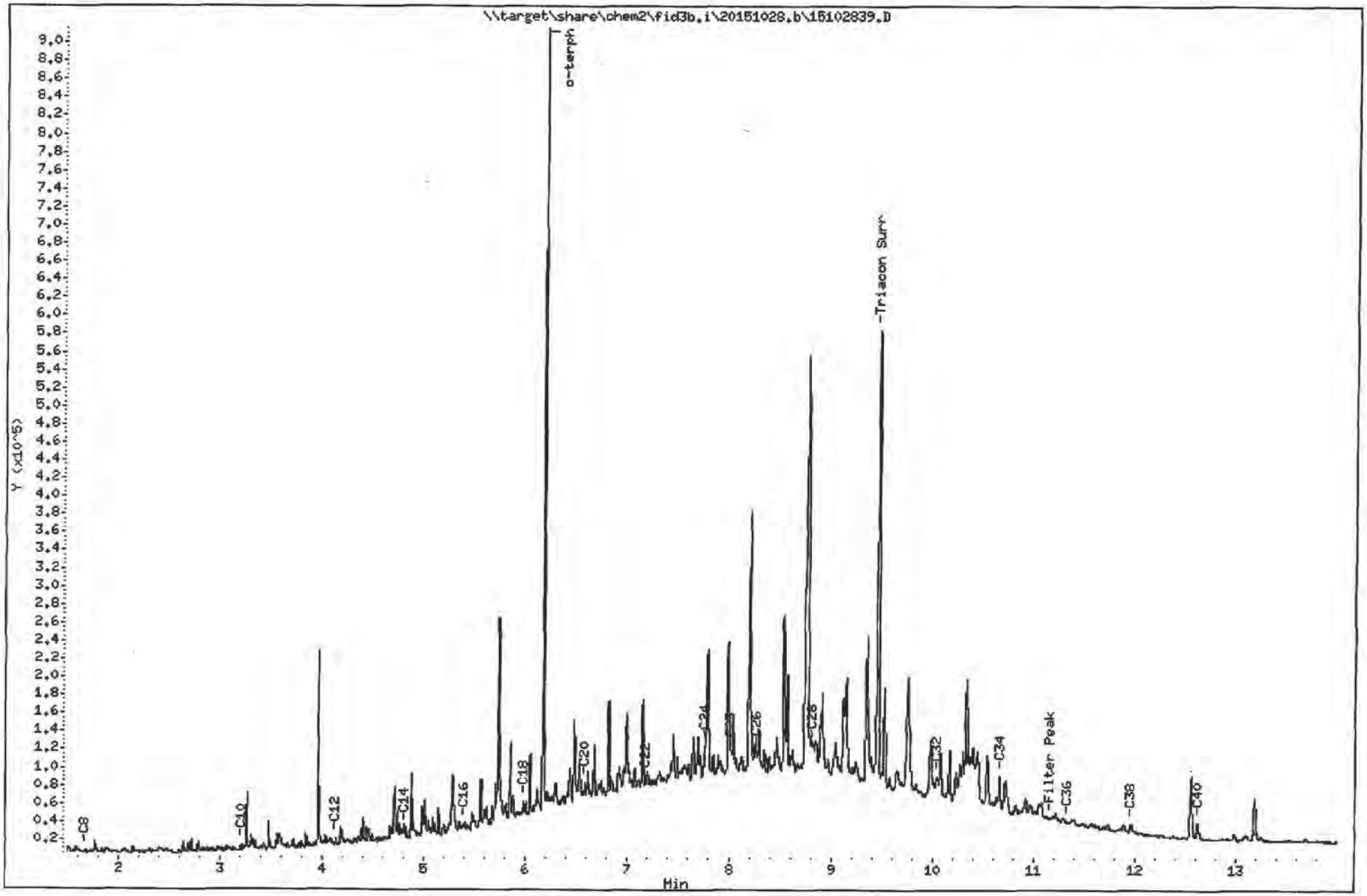
Instrument: fid3b.i

Sample Info: AOV9A

Operator: ML

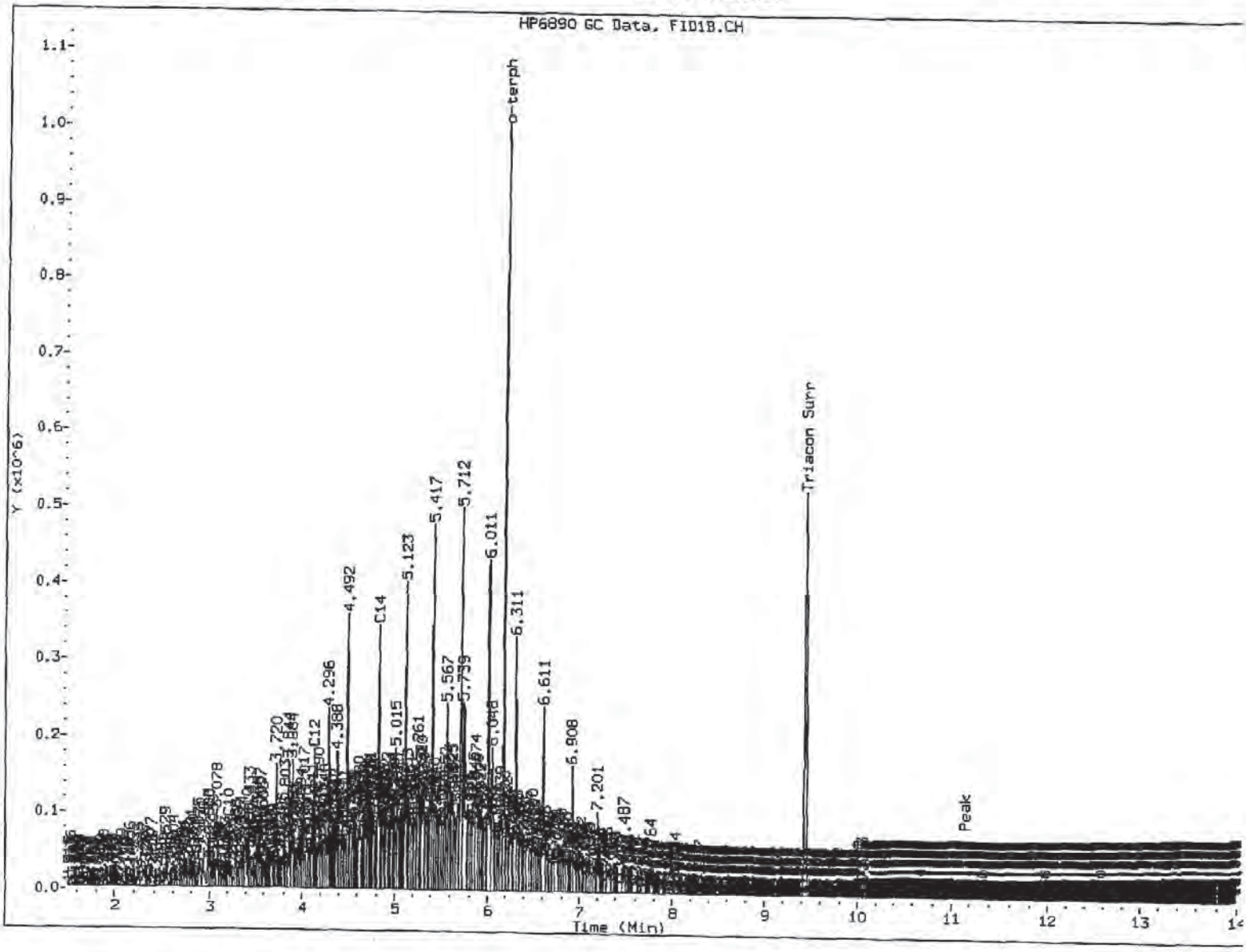
Column phase: RTX-1

Column diameter: 0.25



AOV9:00056

FID:3B-2C/RTX-1 AOV8LCSS1 FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5) Skimmed surrogate

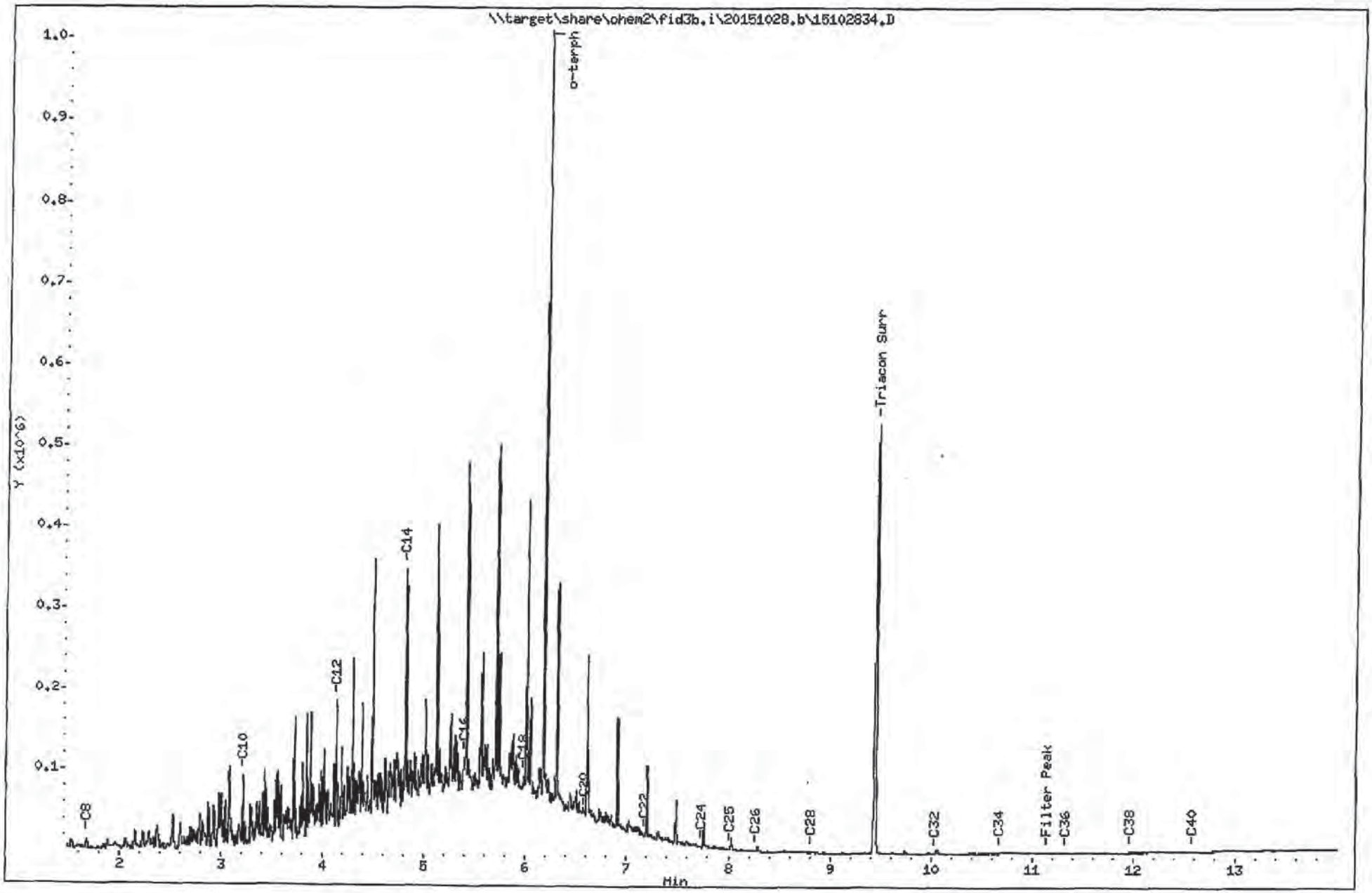
Analyst: MM Date: 10/29/15

Data File: \\target\share\ohem2\fid3b.i\20151028.b\15102834.D
Date : 28-OCT-2015 22:59
Client ID: AOV8LCSS1
Sample Info: AOV8LCSS1

Column phase: RTX-1

Instrument: fid3b.i

Operator: ML
Column diameter: 0.25



AOV9:00058

Data File: \\target\share\chem2\fid3b.i\20151028.b\15102833.D

Date : 28-OCT-2015 22:38

Client ID: AOV8MBS1

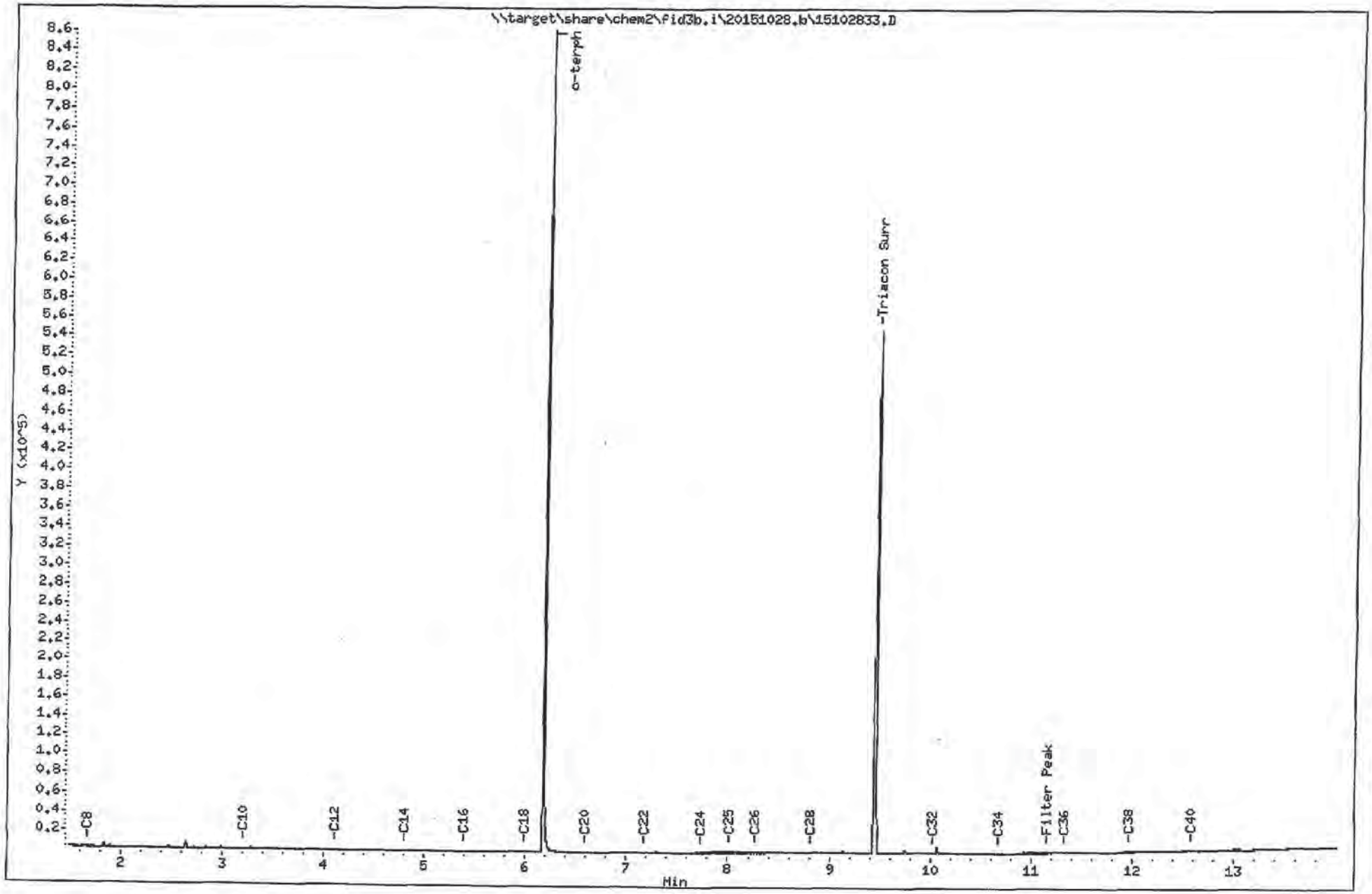
Sample Info: AOV8MBS1

Instrument: fid3b.i

Operator: ML

Column phase: RTX-1

Column diameter: 0.25



AOV9:00059

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR08b-SBSD
SAMPLE

Lab Sample ID: AOV9A
LIMS ID: 15-19535
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Percent Total Solids: 66.3%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	11/02/15	6010C	11/03/15	**7440-38-2**	**Arsenic**	20	**20**	
3050B	11/02/15	6010C	11/03/15	7440-43-9	Cadmium	0.7	0.7	U
3050B	11/02/15	6010C	11/03/15	**7440-47-3**	**Chromium**	2	**40**	
3050B	11/02/15	6010C	11/03/15	**7440-50-8**	**Copper**	0.7	**55.3**	
3050B	11/02/15	6010C	11/03/15	**7439-92-1**	**Lead**	7	**10**	
CLP	11/02/15	7471A	11/06/15	**7439-97-6**	**Mercury**	0.03	**0.07**	
3050B	11/02/15	6010C	11/03/15	7440-22-4	Silver	1	1	U
3050B	11/02/15	6010C	11/03/15	**7440-66-6**	**Zinc**	3	**75**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR26-SBSD
SAMPLE

Lab Sample ID: AOV9E
LIMS ID: 15-19539
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOV9-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Percent Total Solids: 48.7%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	11/02/15	6010C	11/03/15	**7440-38-2**	**Arsenic**	9	**24**	
3050B	11/02/15	6010C	11/03/15	7440-43-9	Cadmium	0.4	0.4	U
3050B	11/02/15	6010C	11/03/15	**7440-47-3**	**Chromium**	0.9	**39.3**	
3050B	11/02/15	6010C	11/03/15	**7440-50-8**	**Copper**	0.4	**55.9**	
3050B	11/02/15	6010C	11/03/15	**7439-92-1**	**Lead**	4	**11**	
CLP	11/02/15	7471A	11/06/15	**7439-97-6**	**Mercury**	0.04	**0.09**	
3050B	11/02/15	6010C	11/03/15	7440-22-4	Silver	0.6	0.6	U
3050B	11/02/15	6010C	11/03/15	**7440-66-6**	**Zinc**	2	**75**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: METHOD BLANK**

Lab Sample ID: AOW1MB
LIMS ID: 15-19550
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	11/02/15	6010C	11/03/15	7440-38-2	Arsenic	5	5	U
3050B	11/02/15	6010C	11/03/15	7440-43-9	Cadmium	0.2	0.2	U
3050B	11/02/15	6010C	11/03/15	7440-47-3	Chromium	0.5	0.5	U
3050B	11/02/15	6010C	11/03/15	7440-50-8	Copper	0.2	0.2	U
3050B	11/02/15	6010C	11/03/15	7439-92-1	Lead	2	2	U
CLP	11/02/15	7471A	11/06/15	7439-97-6	Mercury	0.02	0.02	U
3050B	11/02/15	6010C	11/03/15	7440-22-4	Silver	0.3	0.3	U
3050B	11/02/15	6010C	11/03/15	7440-66-6	Zinc	1	1	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: AOW1LCS
LIMS ID: 15-19550
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	C
Arsenic	6010C	200	200	100%	
Cadmium	6010C	49.7	50.0	99.4%	
Chromium	6010C	50.9	50.0	102%	
Copper	6010C	47.6	50.0	95.2%	
Lead	6010C	197	200	98.5%	
Mercury	7471A	0.49	0.50	98.0%	
Silver	6010C	51.3	50.0	103%	
Zinc	6010C	47	50	94.0%	

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%

October 30, 2015

NVL LABS
INDUSTRIAL HYGIENE SERVICES
Laboratory | Management | Training

Mark Harris
Analytical Resources, Incorporated
4611 S. 134th Place Suite 100
Tukwila, WA 98168

RE: Bulk Asbestos Fiber Analysis; NVL Batch # 1519447.00

Client Project: ARI Project AOV9 Seaport Landing
Location: N-A

Dear Mr. Harris,

Enclosed please find test results for the 1 sample(s) submitted to our laboratory for analysis on 10/23/2015.

Examination of these samples was conducted for the presence of identifiable asbestos fibers using polarized light microscopy (PLM) with dispersion staining in accordance with both **EPA 600/M4-82-020**, Interim Method for the Determination of Asbestos in Bulk Insulation Samples and **EPA 600/R-93/116** Method for the Determination of Asbestos in Bulk Building Materials.

For samples containing more than one separable layer of materials, the report will include findings for each layer (labeled Layer 1 and Layer 2, etc. for each individual layer). The asbestos concentration in the sample is determined by calibrated visual estimation.

For those samples with asbestos concentrations between 1 and 10 percent based on visual estimation, the EPA recommends a procedure known as point counting (NESHAPS, 40 CFR Part 61). Point counting is a statistically more accurate means of quantification for samples with low concentrations of asbestos.

The detection limit for the calibrated visual estimation is <1%, 400 point counts is 0.25% and 1000 point counts is 0.1%

Samples are archived for two weeks following analysis. Samples that are not retrieved by the client are discarded after two weeks.

Thank you for using our laboratory services. Please do not hesitate to call if there is anything further we can assist you with.

Sincerely,

Nick Ly, Technical Director

NVLAP
Lab Code: 102063-0

Enc.: Sample Results

1.888.NVL.LABS
1.888.(685.5227)
www.nvllabs.com

NVL Laboratories, Inc.
4708 Aurora Ave N, Seattle, WA 98103
p 206.547.0100 | f 206.634.1936

AOV9 : 00064

NVL Laboratories, Inc.
4708 Aurora Ave N, Seattle, WA 98103
p 206.547.0100 | f 206.634.1936 | www.nvllabs.com

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: Analytical Resources, Incorporated
Address: 4611 S. 134th Place Suite 100
Tukwila, WA 98168

Attention: Mr. Mark Harris
Project Location: N-A

Batch #: 1519447.00
Client Project #: ARI Project AOV9 Seaport Landing
Date Received: 10/23/2015
Samples Received: 1
Samples Analyzed: 1
Method: EPA/600/R-93/116
& EPA/600/M4-82-020

Lab ID: 15116161 **Client Sample #: 15-19535-AOV9A**
Location: N-A
Comments: Qualitative analysis was conducted for the presence of asbestos fibers in this sample.

Layer 1 of 1 **Description:** Gray brittle material

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Binder/Filler, Mineral grains	Cellulose	**None Detected ND**
	Glass fibers	

Sampled by: Client
Analyzed by: Fiona Chui **Date:** 10/28/2015
Reviewed by: Nick Ly **Date:** 10/30/2015

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

AOV9 : 00065

NVL Laboratories, Inc.
4708 Aurora Ave N, Seattle, WA 98103
p 206.547.0100 | f 206.634.1936 | www.nvllabs.com

ASBESTOS LABORATORY SERVICES

NVL LABS

Company Analytical Resources, Incorporated
Address 4611 S. 134th Place Suite 100
Tukwila, WA 98168
Project Manager Mr. Mark Harris
Phone (206) 695-6200

NVL Batch Number 1519447.00
TAT 5 Days **AH** No
Rush TAT
Due Date 10/30/2015 **Time** 12:15 PM
Email markh@arilabs.com
Fax (206) 695-6202

Project Name/Number: ARI Project AOV9 Seaport Landing **Project Location:** N-A

Subcategory PLM Bulk
Item Code ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

Total Number of Samples 1 Rush Samples

	Lab ID	Sample ID	Description	A/R
1	15116161	15-19535-AOV9A		A

	Print Name	Signature	Company	Date	Time
Sampled by	Client				
Relinquished by	UPS				

Office Use Only	Print Name	Signature	Company	Date	Time
Received by	Maxwell Raymond		NVL	10/23/15	1215
Analyzed by	Fiona Chui		NVL	10/28/15	9:24 AM
Results Called by					
☐ **Faxed** ☐ **Emailed**					

Special Instructions:

Date: 10/23/2015
Time: 5:31 PM
Entered By: Justin Shearer

AOV9 : 00066

SUBCONTRACTOR ANALYSIS REQUEST
CUSTODY TRANSFER 10/20/15

ANALYTICAL RESOURCES INCORPORATED

ARI Project: AOV9

Laboratory: NVL Laboratories, Inc
Lab Contact: Perry Cheston
Lab Address: 4708 Aurora Ave. N.
Seattle, WA 98103
Phone: 206-547-0100
Fax: 206-344-1878

ARI Client: Maul Foster & Alongi
Project ID: Seaport Landing
ARI PM: Mark Harris
Phone: 206-695-6210
Fax: 206-695-6201
Email: subdata@arilabs.com

Analytical Protocol: PSDDA
Special Instructions:

Requested Turn Around: **10/30/15**
Email Results (Y/N): **Yes**

Limits of Liability. *Subcontractor is expected to perform all requested services in accordance with appropriate methodology following Standard Operating Procedures that meet standards for the industry. The total liability of ARI, its officers, agents, employees, or sucessors, arising out of or in connection with the requested services, shall not exceed the negotiated amount for said services. The agreement by the Subcontractor to perform services requested by ARI releases ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Subcontractor.*

ARI ID	Client ID/ Add'l ID	Sampled	Matrix	Bottles	Analyses
15-19535-AOV9A	CR08b-SBSD	10/15/15 15:07	Sediment	1	Asbestos (Sub)

Special Instructions: None

Carrier UPS		Airbill 12 832 695 03 55 76 9640		Date 10/22/15	
Relinquished by	Company ARI	Date 10/22/15	Time 921		
Received by	Company	Date 10/23/15	Time 1215 UPS		

Subcontractor Custody Form - **AOV9**
Page 1 of 1

1519447

AOV9 : 00067

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Organic Extractions Laboratory Analyst Notes

ARI Job No.: AQV9 Client ID: Maui Foster & Alougi

Batch ID:

Parameter: BAN/SIM SVOA Client Project: Seaport Landing

Screens: Soil/Sediment/Solid/Other:	Analyst/Date
☒ No Anomalies (standard soil/wet sediment/sand/gravel)= A, E	RH 10/20/15
☐ Standing Water Decanted (Not shared)=	
☐ Standing Water Homogenized (Shared samples)=	
☐ Clay/Clumps (Difficult to homogenize)=	
☐ Rocks (%+size)?	
☐ Organics (Leaves/sticks/grass)=	
☐ Oily, obvious fuel/sulfur odors=	
☐ Received in 32oz jar(s)=Homogenized in Pyrex dish=	
☐ Other (Details)=	
Aqueous:	
☐ No Anomalies	
☐ Turbid/Color=	
☐ Particulates(%)=(Note: >5%=Notify Supervisor/Lead)	
☐ Emulsions (%)=	
☐ Oily, obvious fuel/sulfur odors=	
☐ Other (Details)=	
☐ Received in 1.0L Bottle(s)=No Bottle Rinse=	
☒ Other Notes/Comments= (Note problems, concerns, corrective actions).	
Sample E lost due to GPC mal function.	
Sample pulled from freezer for re-extract.	SP 10/29/15
☒ Share Samples Y / N	
☐ Multiple Jars Y / N	
☐ Sample Pre-Screens indicate analyte activity=	
☐ Sample weights/volumes reduced based on Pre-Screen= 11/12/15	

Analytical Resources, Incorporated
Analytical Chemists and Consultants

20 November 2015

Madi Novak
Maul, Foster and Alongi, Inc
2001 NW 19th Avenue
Suite 200
Portland, OR 97209

RE: Project: Seaport Landing
ARI Job No.: AOW1

Dear Madi:

Please find enclosed the original chain of custody records and the final results for the samples from the project referenced above. Nine sediment samples were received on October 16, 2015. Four samples were placed on hold as specified. The remaining samples were analyzed for SVOCs, dioxins/furans, PCBs, NWTPH-Dx, TOC and total metals as requested.

The percent differences (%Ds) for benzoic acid and diethylphthalate were not within control limits for the CCAL that bracketed the 11/14/15 SVOC analyses of these samples. All positive results for these compounds have been flagged with a "Q" qualifier to denote the high %Ds.

The %Ds for pentachlorophenol and the surrogate, d14-p-terphenyl, were not within control limits for the CCAL that bracketed the 11/5/15 SIM-SVOC analyses of these samples. All positive results for these compounds have been flagged with a "Q" qualifier to denote the high %Ds.

A matrix duplicate (MD) was prepared and analyzed for total metals in conjunction with sample CR-19F-SBSD. The RPD for mercury was high following the analysis of the MD. Since the percent recovery for mercury was within acceptable QC limits for the corresponding LCS, it was concluded that a lack of sample homogeneity was the cause of the high RPD. No corrective actions were taken.

The remaining analyses proceeded without incident of note.

An electronic copy of this package will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

cc: file AOW1
Enclosures
MDH/mdh

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: FOW01	Turn-around Requested:	Page: 1 of 3	
ARI Client Company: Maul Foster & Alongi, Inc.	Phone: (503) 501 3212	Date: 10/16	Ice Present? Yes
Client Contact: Madi Novak		No. of Coolers:	Cooler Temps:
Client Project Name: Seaport landing			
Client Project #: 1044.02.01-02	Samplers: KD & MRM		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	TOC	Phenol	PAH	PCB	Mercury	metals	TPH	Dioxin/Furan	Notes/Comments: Archive	
CR19F-SBSD	10/16	0940	Sed	2	X	X	X	X	X	X				
CR19F-SBSD-DUP	10/16	0945	Sed	2	X	X	X	X	X	X				
CR19F-SSD	10/16	0950	Sed	5	X	X	X	X	X	X	X	X		
~~CR19D-SSD-CONV~~	~~10/16~~	~~1110~~	~~Sed~~	~~4~~										
CR19G-0-10cm	10/16	0927	Sed	1									X	
CR19G-9.0	10/16	0930	Sed	1									X	
CR19F-5.0	10/16	0950	Sed	1									X	
CR19F-9.0	10/16	0945	Sed	1									X	
CR18B-SBSD	10/16	1200	Sed	2	X	X	X	X	X	X	~~X~~			NO TPH
CR18B-SSD	10/16	1205	Sed	4	X	X	X	X	X	X	X	X		

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Archive remaining volume.	Printed Name: Roxanne Degens	Printed Name: Emily Litwin	Printed Name:	Printed Name:
	Company: MFA	Company: ARI	Company:	Company:
	Date & Time: 10/16 1520	Date & Time: 10/16/16 1520	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Mall foster

Project Name: _____

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: _____

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	NO
Were custody papers included with the cooler?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 2.6 ___ ___ ___ ___

Time: _____

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D00256S

Cooler Accepted by: ul Date: 10/16/15 Time: 1520

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	NO
What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____			
Was sufficient ice used (if appropriate)?	NA	YES	NO
Were all bottles sealed in individual plastic bags?		YES	NO
Did all bottles arrive in good condition (unbroken)?		YES	NO
Were all bottle labels complete and legible?		YES	NO
Did the number of containers listed on COC match with the number of containers received?		YES	NO
Did all bottle labels and tags agree with custody papers?		YES	NO
Were all bottles used correct for the requested analyses?		YES	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	YES	NO
Were all VOC vials free of air bubbles?	NA	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO
Date VOC Trip Blank was made at ARI	NA		

Was Sample Split by ARI : NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: ul Date: 10/20/15 Time: 1420

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Small Air Bubbles < 2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm
• •	• • •	● ● ●

Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: AOW1
Client: Maul Foster & Alongi
Project Event: 1044.02.01-02
Project Name: Seaport Landing

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	CR19F-SBSD	AOW1A	15-19542	Sediment	10/16/15 09:40	10/16/15 15:20
2.	CR19F-SBSD-DUP	AOW1B	15-19543	Sediment	10/16/15 09:45	10/16/15 15:20
3.	CR19F-SSD	AOW1C	15-19544	Sediment	10/16/15 09:50	10/16/15 15:20
4.	CR19G-0-10CM	AOW1D	15-19545	Sediment	10/16/15 09:27	10/16/15 15:20
5.	CR19G-9.0	AOW1E	15-19546	Sediment	10/16/15 09:30	10/16/15 15:20
6.	CR19F-5.0	AOW1F	15-19547	Sediment	10/16/15 09:50	10/16/15 15:20
7.	CR19F-9.0	AOW1G	15-19548	Sediment	10/16/15 09:45	10/16/15 15:20
8.	CR18B-SBSD	AOW1H	15-19549	Sediment	10/16/15 12:00	10/16/15 15:20
9.	CR18B-SSD	AOW1I	15-19550	Sediment	10/16/15 12:05	10/16/15 15:20

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

AOW1 : 00005

Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).

S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte

NA The flagged analyte was not analyzed for

NR Spiked compound recovery is not reported due to chromatographic interference

NS The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

EMPC Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

X Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**

Z Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

AOW1 : 00006

Geotechnical Data

A	The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
F	Samples were frozen prior to particle size determination
SM	Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
SS	Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
W	Weight of sample in some pipette aliquots was below the level required for accurate weighting

AOW1 : 00007

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS **Sample ID: CR19F-SBSD**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AOW1A
LIMS ID: 15-19542
Matrix: Sediment
Data Release Authorized:
Reported: 11/18/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Date Extracted: 10/30/15
Date Analyzed: 11/05/15 23:04
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.01 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 47.3%

CAS Number	Analyte	LOQ	Result
108-95-2	**Phenol**	**20**	**47**
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	**Benzyl Alcohol**	**20**	**17 J**
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	**4-Methylphenol**	**20**	**230**
105-67-9	2,4-Dimethylphenol	100	< 100 U
65-85-0	**Benzoic Acid**	**200**	**240**
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	**Naphthalene**	**20**	**62**
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	**2-Methylnaphthalene**	**20**	**13 J**
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	Acenaphthylene	20	< 20 U
83-32-9	**Acenaphthene**	**20**	**27**
132-64-9	**Dibenzofuran**	**20**	**25**
84-66-2	**Diethylphthalate**	**20**	**24 B**
86-73-7	**Fluorene**	**20**	**29**
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	100	< 100 U
85-01-8	**Phenanthrene**	**20**	**110**
120-12-7	**Anthracene**	**20**	**30**
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	**Fluoranthene**	**20**	**94**
129-00-0	**Pyrene**	**20**	**83**
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	**Benzo(a)anthracene**	**20**	**21**
117-81-7	bis(2-Ethylhexyl)phthalate	50	< 50 U
218-01-9	**Chrysene**	**20**	**30**
117-84-0	Di-n-Octyl phthalate	20	< 20 U
50-32-8	Benzo(a)pyrene	20	< 20 U
193-39-5	Indeno(1,2,3-cd)pyrene	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	20	< 20 U
90-12-0	1-Methylnaphthalene	20	< 20 U
TOTBFA	**Total Benzofluoranthenes**	**40**	**27 J**

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR19F-SBSD
SAMPLE

Lab Sample ID: AOW1A
LIMS ID: 15-19542
Matrix: Sediment
Date Analyzed: 11/05/15 23:04

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	49.0%	2-Fluorobiphenyl	53.6%
d14-p-Terphenyl	68.4%	d4-1,2-Dichlorobenzene	46.0%
d5-Phenol	46.3%	2-Fluorophenol	41.6%
2,4,6-Tribromophenol	64.3%	d4-2-Chlorophenol	48.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR19F-SBSD-DUP SAMPLE

Lab Sample ID: AOW1B
LIMS ID: 15-19543
Matrix: Sediment
Data Release Authorized:
Reported: 11/18/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing 1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Date Extracted: 10/30/15
Date Analyzed: 11/05/15 23:40
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.11 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 49.6%

CAS Number	Analyte	LOQ	Result	
108-95-2	**Phenol**	**20**	**68**	
106-46-7	1,4-Dichlorobenzene	20	< 20	U
100-51-6	**Benzyl Alcohol**	**20**	**26**	
95-50-1	1,2-Dichlorobenzene	20	< 20	U
95-48-7	2-Methylphenol	20	< 20	U
106-44-5	**4-Methylphenol**	**20**	**320**	
105-67-9	2,4-Dimethylphenol	99	< 99	U
65-85-0	**Benzoic Acid**	**200**	**370**	
120-82-1	1,2,4-Trichlorobenzene	20	< 20	U
91-20-3	**Naphthalene**	**20**	**98**	
87-68-3	Hexachlorobutadiene	20	< 20	U
91-57-6	**2-Methylnaphthalene**	**20**	**22**	
131-11-3	Dimethylphthalate	20	< 20	U
208-96-8	**Acenaphthylene**	**20**	**18**	**J**
83-32-9	**Acenaphthene**	**20**	**31**	
132-64-9	**Dibenzofuran**	**20**	**28**	
84-66-2	**Diethylphthalate**	**20**	**38**	**B**
86-73-7	**Fluorene**	**20**	**27**	
86-30-6	N-Nitrosodiphenylamine	20	< 20	U
118-74-1	Hexachlorobenzene	20	< 20	U
87-86-5	Pentachlorophenol	99	< 99	U
85-01-8	**Phenanthrene**	**20**	**140**	
120-12-7	**Anthracene**	**20**	**26**	
84-74-2	Di-n-Butylphthalate	20	< 20	U
206-44-0	**Fluoranthene**	**20**	**150**	
129-00-0	**Pyrene**	**20**	**130**	
85-68-7	Butylbenzylphthalate	20	< 20	U
56-55-3	**Benzo(a)anthracene**	**20**	**37**	
117-81-7	**bis(2-Ethylhexyl)phthalate**	**50**	**32**	**J**
218-01-9	**Chrysene**	**20**	**64**	
117-84-0	Di-n-Octyl phthalate	20	< 20	U
50-32-8	Benzo(a)pyrene	20	< 20	U
193-39-5	**Indeno(1,2,3-cd)pyrene**	**20**	**14**	**J**
53-70-3	Dibenz(a,h)anthracene	20	< 20	U
191-24-2	**Benzo(g,h,i)perylene**	**20**	**15**	**J**
90-12-0	**1-Methylnaphthalene**	**20**	**13**	**J**
TOTBFA	**Total Benzofluoranthenes**	**40**	**60**	

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR19F-SBSD-DUP SAMPLE

Lab Sample ID: AOW1B
LIMS ID: 15-19543
Matrix: Sediment
Date Analyzed: 11/05/15 23:40

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	65.8%	2-Fluorobiphenyl	70.8%
d14-p-Terphenyl	89.6%	d4-1,2-Dichlorobenzene	60.4%
d5-Phenol	58.4%	2-Fluorophenol	58.1%
2,4,6-Tribromophenol	86.4%	d4-2-Chlorophenol	64.1%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 2

Sample ID: CR19F-SSD
SAMPLE

Lab Sample ID: AOW1C
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized:
Reported: 11/18/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Date Extracted: 10/30/15
Date Analyzed: 11/06/15 00:16
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.46 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 50.3%

CAS Number	Analyte	LOQ	Result
108-95-2	**Phenol**	**19**	**89**
106-46-7	1,4-Dichlorobenzene	19	< 19 U
100-51-6	Benzyl Alcohol	19	< 19 U
95-50-1	1,2-Dichlorobenzene	19	< 19 U
95-48-7	2-Methylphenol	19	< 19 U
106-44-5	4-Methylphenol	19	< 19 U
105-67-9	2,4-Dimethylphenol	96	< 96 U
65-85-0	**Benzoic Acid**	**190**	**170 J**
120-82-1	1,2,4-Trichlorobenzene	19	< 19 U
91-20-3	**Naphthalene**	**19**	**56**
87-68-3	Hexachlorobutadiene	19	< 19 U
91-57-6	**2-Methylnaphthalene**	**19**	**10 J**
131-11-3	Dimethylphthalate	19	< 19 U
208-96-8	Acenaphthylene	19	< 19 U
83-32-9	**Acenaphthene**	**19**	**12 J**
132-64-9	**Dibenzofuran**	**19**	**15 J**
84-66-2	**Diethylphthalate**	**19**	**22 B**
86-73-7	**Fluorene**	**19**	**12 J**
86-30-6	N-Nitrosodiphenylamine	19	< 19 U
118-74-1	Hexachlorobenzene	19	< 19 U
87-86-5	Pentachlorophenol	96	< 96 U
85-01-8	**Phenanthrene**	**19**	**36**
120-12-7	**Anthracene**	**19**	**15 J**
84-74-2	Di-n-Butylphthalate	19	< 19 U
206-44-0	**Fluoranthene**	**19**	**41**
129-00-0	**Pyrene**	**19**	**35**
85-68-7	Butylbenzylphthalate	19	< 19 U
56-55-3	**Benzo(a)anthracene**	**19**	**12 J**
117-81-7	bis(2-Ethylhexyl)phthalate	48	< 48 U
218-01-9	**Chrysene**	**19**	**21**
117-84-0	Di-n-Octyl phthalate	19	< 19 U
50-32-8	Benzo(a)pyrene	19	< 19 U
193-39-5	Indeno(1,2,3-cd)pyrene	19	< 19 U
53-70-3	Dibenz(a,h)anthracene	19	< 19 U
191-24-2	Benzo(g,h,i)perylene	19	< 19 U
90-12-0	1-Methylnaphthalene	19	< 19 U
TOTBFA	**Total Benzofluoranthenes**	**38**	**19 J**

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR19F-SSD
SAMPLE

Lab Sample ID: AOW1C
LIMS ID: 15-19544
Matrix: Sediment
Date Analyzed: 11/06/15 00:16

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	58.6%	2-Fluorobiphenyl	66.8%
d14-p-Terphenyl	85.2%	d4-1,2-Dichlorobenzene	57.2%
d5-Phenol	58.3%	2-Fluorophenol	54.9%
2,4,6-Tribromophenol	82.5%	d4-2-Chlorophenol	61.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS **Sample ID: CR18B-SBSD**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AOW1H
LIMS ID: 15-19549
Matrix: Sediment
Data Release Authorized:
Reported: 11/18/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Date Extracted: 10/30/15
Date Analyzed: 11/14/15 22:24
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.07 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 52.1%

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	20	< 20 U
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	4-Methylphenol	20	< 20 U
105-67-9	2,4-Dimethylphenol	99	< 99 U
65-85-0	**Benzoic Acid**	**200**	**210 Q**
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	**Naphthalene**	**20**	**22**
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	< 20 U
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	**Acenaphthylene**	**20**	**17 J**
83-32-9	**Acenaphthene**	**20**	**16 J**
132-64-9	Dibenzofuran	20	< 20 U
84-66-2	**Diethylphthalate**	**20**	**20 QB**
86-73-7	**Fluorene**	**20**	**12 J**
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	99	< 99 U
85-01-8	**Phenanthrene**	**20**	**27**
120-12-7	**Anthracene**	**20**	**24**
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	**Fluoranthene**	**20**	**210**
129-00-0	**Pyrene**	**20**	**220**
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	**Benzo(a)anthracene**	**20**	**99**
117-81-7	bis(2-Ethylhexyl)phthalate	50	< 50 U
218-01-9	**Chrysene**	**20**	**93**
117-84-0	Di-n-Octyl phthalate	20	< 20 U
50-32-8	**Benzo(a)pyrene**	**20**	**68**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**20**	**27**
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	**Benzo(g,h,i)perylene**	**20**	**27**
90-12-0	1-Methylnaphthalene	20	< 20 U
TOTBFA	**Total Benzofluoranthenes**	**40**	**180**

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS **Sample ID: CR18B-SBSD**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AOW1H
LIMS ID: 15-19549
Matrix: Sediment
Date Analyzed: 11/14/15 22:24

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	69.0%	2-Fluorobiphenyl	56.0%
d14-p-Terphenyl	78.0%	d4-1,2-Dichlorobenzene	54.2%
d5-Phenol	42.0%	2-Fluorophenol	41.9%
2,4,6-Tribromophenol	73.5%	d4-2-Chlorophenol	51.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 2

Sample ID: CR18B-SSD
SAMPLE

Lab Sample ID: AOW1I
LIMS ID: 15-19550
Matrix: Sediment
Data Release Authorized:
Reported: 11/18/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Date Extracted: 10/30/15
Date Analyzed: 11/14/15 22:59
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.07 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 52.1%

CAS Number	Analyte	LOQ	Result
108-95-2	**Phenol**	**20**	**81**
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	**4-Methylphenol**	**20**	**42**
105-67-9	2,4-Dimethylphenol	99	< 99 U
65-85-0	**Benzoic Acid**	**200**	**160 JQ**
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	**Naphthalene**	**20**	**29**
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	< 20 U
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	Acenaphthylene	20	< 20 U
83-32-9	Acenaphthene	20	< 20 U
132-64-9	Dibenzofuran	20	< 20 U
84-66-2	**Diethylphthalate**	**20**	**40 QB**
86-73-7	**Fluorene**	**20**	**11 J**
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	99	< 99 U
85-01-8	**Phenanthrene**	**20**	**26**
120-12-7	Anthracene	20	< 20 U
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	**Fluoranthene**	**20**	**82**
129-00-0	**Pyrene**	**20**	**62**
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	**Benzo(a)anthracene**	**20**	**29**
117-81-7	bis(2-Ethylhexyl)phthalate	50	< 50 U
218-01-9	**Chrysene**	**20**	**66**
117-84-0	Di-n-Octyl phthalate	20	< 20 U
50-32-8	**Benzo(a)pyrene**	**20**	**12 J**
193-39-5	Indeno(1,2,3-cd)pyrene	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	20	< 20 U
90-12-0	1-Methylnaphthalene	20	< 20 U
TOTBFA	**Total Benzofluoranthenes**	**40**	**39 J**

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS **Sample ID: CR18B-SSD**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AOW1I
LIMS ID: 15-19550
Matrix: Sediment
Date Analyzed: 11/14/15 22:59

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	63.8%	2-Fluorobiphenyl	62.2%
d14-p-Terphenyl	73.2%	d4-1,2-Dichlorobenzene	59.0%
d5-Phenol	48.8%	2-Fluorophenol	47.5%
2,4,6-Tribromophenol	75.7%	d4-2-Chlorophenol	56.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: MB-103015
METHOD BLANK

Lab Sample ID: MB-103015
LIMS ID: 15-19542
Matrix: Sediment
Data Release Authorized:
Reported: 11/18/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/30/15
Date Analyzed: 11/05/15 21:17
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	20	< 20 U
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	4-Methylphenol	20	< 20 U
105-67-9	2,4-Dimethylphenol	100	< 100 U
65-85-0	Benzoic Acid	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	Naphthalene	20	< 20 U
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	< 20 U
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	Acenaphthylene	20	< 20 U
83-32-9	Acenaphthene	20	< 20 U
132-64-9	Dibenzofuran	20	< 20 U
84-66-2	**Diethylphthalate**	**20**	**21**
86-73-7	Fluorene	20	< 20 U
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	100	< 100 U
85-01-8	Phenanthrene	20	< 20 U
120-12-7	Anthracene	20	< 20 U
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	Fluoranthene	20	< 20 U
129-00-0	Pyrene	20	< 20 U
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	Benzo(a)anthracene	20	< 20 U
117-81-7	bis(2-Ethylhexyl)phthalate	50	< 50 U
218-01-9	Chrysene	20	< 20 U
117-84-0	Di-n-Octyl phthalate	20	< 20 U
50-32-8	Benzo(a)pyrene	20	< 20 U
193-39-5	Indeno(1,2,3-cd)pyrene	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	20	< 20 U
90-12-0	1-Methylnaphthalene	20	< 20 U
TOTBFA	Total Benzofluoranthenes	40	< 40 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: MB-103015
METHOD BLANK

Lab Sample ID: MB-103015
LIMS ID: 15-19542
Matrix: Sediment
Date Analyzed: 11/05/15 21:17

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	61.0%	2-Fluorobiphenyl	65.0%
d14-p-Terphenyl	94.2%	d4-1,2-Dichlorobenzene	65.0%
d5-Phenol	65.6%	2-Fluorophenol	61.7%
2,4,6-Tribromophenol	74.3%	d4-2-Chlorophenol	66.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270 GC/MS
Page 1 of 2

Sample ID: LCS-103015
LAB CONTROL

Lab Sample ID: LCS-103015
LIMS ID: 15-19542
Matrix: Sediment
Data Release Authorized:
Reported: 11/20/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Date Extracted: 10/30/15
Date Analyzed: 11/05/15 21:52
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Phenol	418	500	83.6%
1,4-Dichlorobenzene	339	500	67.8%
Benzyl Alcohol	401	500	80.2%
1,2-Dichlorobenzene	368	500	73.6%
2-Methylphenol	346	500	69.2%
4-Methylphenol	393	500	78.6%
2,4-Dimethylphenol	822	1500	54.8%
Benzoic Acid	2160	2750	78.5%
1,2,4-Trichlorobenzene	349	500	69.8%
Naphthalene	351	500	70.2%
Hexachlorobutadiene	390	500	78.0%
2-Methylnaphthalene	374	500	74.8%
Dimethylphthalate	372	500	74.4%
Acenaphthylene	356	500	71.2%
Acenaphthene	371	500	74.2%
Dibenzofuran	375	500	75.0%
Diethylphthalate	410 B	500	82.0%
Fluorene	342	500	68.4%
N-Nitrosodiphenylamine	368	500	73.6%
Hexachlorobenzene	350	500	70.0%
Pentachlorophenol	977	1500	65.1%
Phenanthrene	402	500	80.4%
Anthracene	405	500	81.0%
Di-n-Butylphthalate	446	500	89.2%
Fluoranthene	386	500	77.2%
Pyrene	371	500	74.2%
Butylbenzylphthalate	398	500	79.6%
Benzo(a)anthracene	401	500	80.2%
bis(2-Ethylhexyl)phthalate	372	500	74.4%
Chrysene	389	500	77.8%
Di-n-Octyl phthalate	353	500	70.6%
Benzo(a)pyrene	384	500	76.8%
Indeno(1,2,3-cd)pyrene	362	500	72.4%
Dibenz(a,h)anthracene	371	500	74.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270 GC/MS

Sample ID: LCS-103015
LAB CONTROL

Lab Sample ID: LCS-103015
LIMS ID: 15-19542
Matrix: Sediment
Date Analyzed: 11/05/15 21:52

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Analyte	Lab Control	Spike Added	Recovery
Benzo(g,h,i)perylene	304	500	60.8%
1-Methylnaphthalene	350	500	70.0%
Total Benzofluoranthenes	806	1000	80.6%

Semivolatile Surrogate Recovery	
d5-Nitrobenzene	63.8%
2-Fluorobiphenyl	65.2%
d14-p-Terphenyl	88.6%
d4-1,2-Dichlorobenzene	59.4%
d5-Phenol	65.6%
2-Fluorophenol	66.0%
2,4,6-Tribromophenol	70.7%
d4-2-Chlorophenol	66.8%

Reported in µg/kg (ppb)

ARI Labs, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i
Lab File ID: 15111403.D
Analysis Type:
Lab Sample ID: ICV 5
Method: \\target\share\chem3\nt10.i\20151114.b\ABN.m

Injection Date: 14-NOV-2015 12:09
Init. Cal. Date(s): 19-OCT-2015 19-OCT-2015
Init. Cal. Times: 11:52 16:03
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RF5	CCAL RRF5	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
$ 1 2-Fluorophenol	1.12958	0.98032	0.98032	0.010	-13.21370	20.00000	Averaged	
$ 2 Phenol-d5	1.36520	1.13439	1.13439	0.010	-16.90661	20.00000	Averaged	
3 Phenol	1.33180	1.10533	1.10533	0.100	-17.00502	20.00000	Averaged	
$ 5 2-Chlorophenol-d4	1.33265	1.26674	1.26674	0.010	-4.94562	20.00000	Averaged	
4 Bis(2-Chloroethyl)ether	1.01930	0.79941	0.79941	0.700	-21.57225	20.00000	Averaged	<-
6 2-Chlorophenol	1.30689	1.28200	1.28200	0.800	-1.90460	20.00000	Averaged	
7 1,3-Dichlorobenzene	1.60078	1.54397	1.54397	0.010	-3.54909	20.00000	Averaged	
9 1,4-Dichlorobenzene	1.54535	1.45107	1.45107	0.010	-6.10132	20.00000	Averaged	
$ 10 1,2-Dichlorobenzene-d4	0.99122	0.96956	0.96956	0.010	-2.18580	20.00000	Averaged	
12 1,2-Dichlorobenzene	1.44684	1.42493	1.42493	0.010	-1.51401	20.00000	Averaged	
11 Benzyl alcohol	0.63765	0.61868	0.61868	0.010	-2.97423	20.00000	Averaged	
14 2,2'-oxybis(1-Chloropropane	0.45840	0.43519	0.43519	0.010	-5.06371	20.00000	Averaged	
13 2-Methylphenol	0.99636	0.87219	0.87219	0.700	-12.46244	20.00000	Averaged	
17 Hexachloroethane	0.61781	0.68425	0.68425	0.300	10.75475	20.00000	Averaged	
16 N-Nitroso-di-n-propylamine	0.74117	0.73679	0.73679	0.500	-0.59170	20.00000	Averaged	
15 4-Methylphenol	1.00886	0.95885	0.95885	0.600	-4.95718	20.00000	Averaged	
$ 18 Nitrobenzene-d5	0.39605	0.41261	0.41261	0.010	4.18241	20.00000	Averaged	
19 Nitrobenzene	0.36379	0.38536	0.38536	0.200	5.92827	20.00000	Averaged	
20 Isophorone	0.57522	0.57445	0.57445	0.300	-0.13479	20.00000	Averaged	
21 2-Nitrophenol	0.21477	0.20907	0.20907	0.100	-2.65471	20.00000	Averaged	
22 2,4-Dimethylphenol	0.39317	0.42421	0.42421	0.200	7.89512	20.00000	Averaged	
23 Bis(2-Chloroethoxy)methane	0.32972	0.28007	0.28007	0.050	-15.05717	20.00000	Averaged	
24 Benzoic acid	20.00000	15.43857	0.18026	0.010	-22.80714	20.00000	Quadratic	<-
25 2,4-Dichlorophenol	0.32107	0.33912	0.33912	0.100	5.62338	20.00000	Averaged	
26 1,2,4-Trichlorobenzene	0.37492	0.36985	0.36985	0.010	-1.35257	20.00000	Averaged	
28 Naphthalene	1.03606	0.92566	0.92566	0.100	-10.65624	20.00000	Averaged	
29 4-Chloroaniline	0.41428	0.37549	0.37549	0.010	-9.36314	20.00000	Averaged	
30 Hexachlorobutadiene	0.24781	0.27807	0.27807	0.010	12.21075	20.00000	Averaged	
31 4-Chloro-3-methylphenol	0.33608	0.34643	0.34643	0.200	3.07743	20.00000	Averaged	
32 2-Methylnaphthalene	0.74547	0.73816	0.73816	0.300	-0.98109	20.00000	Averaged	
33 Hexachlorocyclopentadiene	0.41843	0.48613	0.48613	0.001	16.17855	20.00000	Averaged	
34 2,4,6-Trichlorophenol	0.37961	0.42039	0.42039	0.200	10.74070	20.00000	Averaged	
35 2,4,5-Trichlorophenol	0.39251	0.45345	0.45345	0.200	15.52692	20.00000	Averaged	
$ 36 2-Fluorobiphenyl	1.40765	1.33204	1.33204	0.010	-5.37119	20.00000	Averaged	
37 2-Chloronaphthalene	1.14337	1.14997	1.14997	0.700	0.57749	20.00000	Averaged	
38 2-Nitroaniline	0.31622	0.40203	0.40203	0.010	27.13477	20.00000	Averaged	<-
39 Dimethylphthalate	1.36783	1.52406	1.52406	0.010	11.42196	20.00000	Averaged	
40 Acenaphthylene	1.73670	1.75215	1.75215	0.900	0.88965	20.00000	Averaged	
41 2,6-Dinitrotoluene	0.28981	0.32357	0.32357	0.100	11.64737	20.00000	Averaged	
43 3-Nitroaniline	0.28271	0.24382	0.24382	0.010	-13.75648	20.00000	Averaged	
44 Acenaphthene	1.04524	1.02061	1.02061	0.100	-2.35672	20.00000	Averaged	
45 2,4-Dinitrophenol	20.00000	19.95149	0.16875	0.030	-0.24255	20.00000	Quadratic	

ARI Labs, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i
Lab File ID: 15111403.D
Analysis Type:
Lab Sample ID: ICV 5
Method: \\target\share\chem3\nt10.i\20151114.b\ABN.m

Injection Date: 14-NOV-2015 12:09
Init. Cal. Date(s): 19-OCT-2015 19-OCT-2015
Init. Cal. Times: 11:52 16:03
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RF5	CCAL RRF5	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
46 Dibenzofuran	1.57152	1.56593	1.56593	0.800	-0.35557	20.00000	Averaged	
47 4-Nitrophenol	10.00000	13.43358	0.35747	0.010	34.33584	20.00000	Quadratic	<-
48 2,4-Dinitrotoluene	0.39543	0.44242	0.44242	0.200	11.88253	20.00000	Averaged	
50 Diethylphthalate	1.32554	1.82004	1.82004	0.010	37.30561	20.00000	Averaged	<-
49 Fluorene	1.34379	1.20933	1.20933	0.100	-10.00593	20.00000	Averaged	
51 4-Chlorophenyl-phenylether	0.68765	0.71361	0.71361	0.100	3.77493	20.00000	Averaged	
52 4-Nitroaniline	0.30110	0.27918	0.27918	0.010	-7.27836	20.00000	Averaged	
53 4,6-Dinitro-2-methylphenol	20.00000	18.45121	0.13467	0.001	-7.74397	20.00000	Quadratic	
54 N-Nitrosodiphenylamine	0.54831	0.50803	0.50803	0.010	-7.34588	20.00000	Averaged	
$ 55 2,4,6-Tribromophenol	0.34466	0.40646	0.40646	0.010	17.93047	20.00000	Averaged	
56 4-Bromophenyl-phenylether	0.27932	0.29241	0.29241	0.100	4.68494	20.00000	Averaged	
57 Hexachlorobenzene	0.36460	0.33543	0.33543	0.100	-8.00104	20.00000	Averaged	
58 Pentachlorophenol	10.00000	7.95604	0.16235	0.010	-20.43960	20.00000	Quadratic	<-
60 Phenanthrene	1.02053	0.95681	0.95681	0.700	-6.24361	20.00000	Averaged	
61 Anthracene	1.04166	1.02305	1.02305	0.700	-1.78690	20.00000	Averaged	
62 Carbazole	0.87135	0.79066	0.79066	0.010	-9.26048	20.00000	Averaged	
63 Di-n-butylphthalate	1.31288	1.40257	1.40257	0.010	6.83226	20.00000	Averaged	
64 Fluoranthene	1.11470	1.02121	1.02121	0.600	-8.38756	20.00000	Averaged	
65 Pyrene	1.18016	1.00630	1.00630	0.600	-14.73179	20.00000	Averaged	
$ 66 Terphenyl-d14	0.74289	0.66949	0.66949	0.010	-9.88103	20.00000	Averaged	
67 Butylbenzylphthalate	0.50597	0.53414	0.53414	0.010	5.56781	20.00000	Averaged	
68 Benzo(a)anthracene	1.12072	1.07562	1.07562	0.700	-4.02433	20.00000	Averaged	
70 3,3'-Dichlorobenzidine	0.75137	0.72269	0.72269	0.010	-3.81794	20.00000	Averaged	
71 Chrysene	0.97701	0.91661	0.91661	0.700	-6.18140	20.00000	Averaged	
72 bis(2-Ethylhexyl)phthalate	0.52679	0.48036	0.48036	0.010	-8.81366	20.00000	Averaged	
73 Di-n-octylphthalate	1.07536	0.91915	0.91915	0.010	-14.52593	20.00000	Averaged	
74 Benzo(b)fluoranthene	1.08810	1.03403	1.03403	0.700	-4.96944	20.00000	Averaged	
75 Benzo(k)fluoranthene	1.08482	0.99545	0.99545	0.700	-8.23784	20.00000	Averaged	
76 Benzo(a)pyrene	1.03138	0.99224	0.99224	0.700	-3.79407	20.00000	Averaged	
78 Indeno(1,2,3-cd)pyrene	1.37485	1.40557	1.40557	0.500	2.23424	20.00000	Averaged	
79 Dibenzo(a,h)anthracene	1.13622	1.09199	1.09199	0.400	-3.89259	20.00000	Averaged	
80 Benzo(g,h,i)perylene	1.23143	1.18040	1.18040	0.500	-4.14398	20.00000	Averaged	
90 N-Nitrosodimethylamine	0.53343	0.47585	0.47585	0.010	-10.79437	20.00000	Averaged	
91 Aniline	1.56324	1.29410	1.29410	0.010	-17.21667	20.00000	Averaged	
93 Benzidine	0.38521	0.16659	0.16659	0.010	-56.75226	20.00000	Averaged	<-
103 Pyridine	0.85366	0.79840	0.79840	0.010	-6.47352	20.00000	Averaged	
105 1-methylnaphthalene	0.76506	0.70658	0.70658	0.010	-7.64354	20.00000	Averaged	
111 Azobenzene (1,2-DP-Hydrazin	1.22084	1.62369	1.62369	0.010	32.99768	20.00000	Averaged	<-
187 Total Benzofluoranthenes	1.04123	0.97581	0.97581	0.010	-6.28350	20.00000	Averaged	
99 Perylene	0.99701	0.95088	0.95088	0.010	-4.62702	20.00000	Averaged	
98 Retene	++++	0.00066	0.00066	0.010	++++	20.00000	Averaged	<-
120 2,3,4,6-Tetrachlorophenol	0.35337	0.33535	0.33535	0.010	-5.09982	20.00000	Averaged	

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT OUT
MB-103015	61.0%	65.0%	94.2%	65.0%	65.6%	61.7%	74.3%	66.7%	0
LCS-103015	63.8%	65.2%	88.6%	59.4%	65.6%	66.0%	70.7%	66.8%	0
CR19F-SBSD	49.0%	53.6%	68.4%	46.0%	46.3%	41.6%	64.3%	48.0%	0
CR19F-SBSD-DUP	65.8%	70.8%	89.6%	60.4%	58.4%	58.1%	86.4%	64.1%	0
CR19F-SSD	58.6%	66.8%	85.2%	57.2%	58.3%	54.9%	82.5%	61.2%	0
CR18B-SBSD	69.0%	56.0%	78.0%	54.2%	42.0%	41.9%	73.5%	51.2%	0
CR18B-SSD	63.8%	62.2%	73.2%	59.0%	48.8%	47.5%	75.7%	56.3%	0

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(30-120)	(30-120)
(FBP) = 2-Fluorobiphenyl	(35-120)	(35-120)
(TPH) = d14-p-Terphenyl	(37-120)	(37-120)
(DCB) = d4-1,2-Dichlorobenzene	(32-120)	(32-120)
(PHL) = d5-Phenol	(29-120)	(29-120)
(2FP) = 2-Fluorophenol	(27-120)	(27-120)
(TBP) = 2,4,6-Tribromophenol	(24-134)	(24-134)
(2CP) = d4-2-Chlorophenol	(31-120)	(31-120)

Prep Method: SW3546
Log Number Range: 15-19542 to 15-19550

FORM-II SW8270

AOW1 : 00024

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: MB-103015**
Extraction Method: SW3546 **METHOD BLANK**

Lab Sample ID: MB-103015
LIMS ID: 15-19542
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/19/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/30/15
Date Analyzed: 11/05/15 21:17
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	Dibenz(a,h)anthracene	5.0	< 5.0 U
106-46-7	1,4-Dichlorobenzene	5.0	< 5.0 U
120-82-1	1,2,4-Trichlorobenzene	5.0	< 5.0 U
118-74-1	Hexachlorobenzene	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	5.0	< 5.0 U
131-11-3	Dimethylphthalate	5.0	< 5.0 U
85-68-7	Butylbenzylphthalate	5.0	< 5.0 U
95-48-7	2-Methylphenol	5.0	< 5.0 U
105-67-9	2,4-Dimethylphenol	25	< 25 U
86-30-6	N-Nitrosodiphenylamine	5.0	< 5.0 U
100-51-6	Benzyl Alcohol	20	< 20 U
87-86-5	Pentachlorophenol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	5.0	< 5.0 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	57.9%
d14-p-Terphenyl	75.6% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR19F-SBSD**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AOW1A
LIMS ID: 15-19542
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/19/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Date Extracted: 10/30/15
Date Analyzed: 11/05/15 23:04
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.01 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 47.3%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	Dibenz(a,h)anthracene	5.0	< 5.0 U
106-46-7	1,4-Dichlorobenzene	5.0	< 5.0 U
120-82-1	1,2,4-Trichlorobenzene	5.0	< 5.0 U
118-74-1	Hexachlorobenzene	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	5.0	< 5.0 U
131-11-3	Dimethylphthalate	5.0	< 5.0 U
85-68-7	**Butylbenzylphthalate**	**5.0**	**9.3**
95-48-7	2-Methylphenol	5.0	< 5.0 U
105-67-9	2,4-Dimethylphenol	25	< 25 U
86-30-6	N-Nitrosodiphenylamine	5.0	< 5.0 U
100-51-6	**Benzyl Alcohol**	**20**	**27**
87-86-5	Pentachlorophenol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	5.0	< 5.0 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	40.8%
dl4-p-Terphenyl	55.0% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR19F-SBSD-DUP**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AOW1B
LIMS ID: 15-19543
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/19/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Date Extracted: 10/30/15
Date Analyzed: 11/05/15 23:40
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.11 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 49.6%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**5.0**	**3.1 J**
106-46-7	1,4-Dichlorobenzene	5.0	< 5.0 U
120-82-1	1,2,4-Trichlorobenzene	5.0	< 5.0 U
118-74-1	Hexachlorobenzene	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	5.0	< 5.0 U
131-11-3	Dimethylphthalate	5.0	< 5.0 U
85-68-7	**Butylbenzylphthalate**	**5.0**	**7.4**
95-48-7	2-Methylphenol	5.0	< 5.0 U
105-67-9	2,4-Dimethylphenol	25	< 25 U
86-30-6	N-Nitrosodiphenylamine	5.0	< 5.0 U
100-51-6	**Benzyl Alcohol**	**20**	**28**
87-86-5	Pentachlorophenol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	5.0	< 5.0 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	58.1%
d14-p-Terphenyl	70.4% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR19F-SSD**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AOW1C
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/19/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Date Extracted: 10/30/15
Date Analyzed: 11/06/15 00:16
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.46 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 50.3%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	Dibenz(a,h)anthracene	4.8	< 4.8 U
106-46-7	1,4-Dichlorobenzene	4.8	< 4.8 U
120-82-1	1,2,4-Trichlorobenzene	4.8	< 4.8 U
118-74-1	Hexachlorobenzene	4.8	< 4.8 U
87-68-3	Hexachlorobutadiene	4.8	< 4.8 U
131-11-3	Dimethylphthalate	4.8	< 4.8 U
85-68-7	**Butylbenzylphthalate**	**4.8**	**8.1**
95-48-7	2-Methylphenol	4.8	< 4.8 U
105-67-9	2,4-Dimethylphenol	24	< 24 U
86-30-6	N-Nitrosodiphenylamine	4.8	< 4.8 U
100-51-6	Benzyl Alcohol	19	< 19 U
87-86-5	Pentachlorophenol	19	< 19 U
95-50-1	1,2-Dichlorobenzene	4.8	< 4.8 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	52.8%
d14-p-Terphenyl	67.6% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR18B-SBSD**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AOW1H
LIMS ID: 15-19549
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/19/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Date Extracted: 10/30/15
Date Analyzed: 11/14/15 22:24
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.07 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 52.1%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**5.0**	**8.0**
106-46-7	1,4-Dichlorobenzene	5.0	< 5.0 U
120-82-1	1,2,4-Trichlorobenzene	5.0	< 5.0 U
118-74-1	Hexachlorobenzene	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	5.0	< 5.0 U
131-11-3	Dimethylphthalate	5.0	< 5.0 U
85-68-7	**Butylbenzylphthalate**	**5.0**	**2.8 J**
95-48-7	2-Methylphenol	5.0	< 5.0 U
105-67-9	2,4-Dimethylphenol	25	< 25 U
86-30-6	N-Nitrosodiphenylamine	5.0	< 5.0 U
100-51-6	Benzyl Alcohol	20	< 20 U
87-86-5	Pentachlorophenol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	5.0	< 5.0 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	45.1%
d14-p-Terphenyl	70.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR18B-SSD**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AOW1I
LIMS ID: 15-19550
Matrix: Sediment
Data Release Authorized: TMW
Reported: 11/19/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Date Extracted: 10/30/15
Date Analyzed: 11/14/15 22:59
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.07 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 52.1%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	Dibenz(a,h)anthracene	5.0	< 5.0 U
106-46-7	1,4-Dichlorobenzene	5.0	< 5.0 U
120-82-1	1,2,4-Trichlorobenzene	5.0	< 5.0 U
118-74-1	Hexachlorobenzene	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	5.0	< 5.0 U
131-11-3	Dimethylphthalate	5.0	< 5.0 U
85-68-7	**Butylbenzylphthalate**	**5.0**	**7.2**
95-48-7	2-Methylphenol	5.0	< 5.0 U
105-67-9	2,4-Dimethylphenol	25	< 25 U
86-30-6	N-Nitrosodiphenylamine	5.0	< 5.0 U
100-51-6	Benzyl Alcohol	20	< 20 U
87-86-5	Pentachlorophenol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	5.0	< 5.0 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery	
2-Fluorophenol	45.7%
d14-p-Terphenyl	69.2%

ANALYTICAL RESOURCES INCORPORATED

SIM SW8270 SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	FPH	TER	TOT OUT
MB-103015	57.9%	75.6% Q	0
LCS-103015	60.9%	71.2% Q	0
CR19F-SBSD	40.8%	55.0% Q	0
CR19F-SBSD-DUP	58.1%	70.4% Q	0
CR19F-SSD	52.8%	67.6% Q	0
CR18B-SBSD	45.1%	70.0%	0
CR18B-SSD	45.7%	69.2%	0

	QC LIMITS	
(FPH) = 2-Fluorophenol	(27-120)	(27-120)
(TER) = d14-p-Terphenyl	(37-120)	(37-120)

Prep Method: SW3546
Log Number Range: 15-19542 to 15-19550

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: LCS-103015**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-103015
LIMS ID: 15-19542
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/19/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/30/15
Date Analyzed LCS: 11/05/15 21:52
Instrument/Analyst LCS: NT10/YZ

Sample Amount LCS: 10.00 g-dry-wt
Final Extract Volume LCS: 1.0 mL
Dilution Factor LCS: 1.00

Analyte	LCS		Spike Added	Recovery
Dibenz(a,h)anthracene	334		500	66.8%
1,4-Dichlorobenzene	316		500	63.2%
1,2,4-Trichlorobenzene	324		500	64.8%
Hexachlorobenzene	333		500	66.6%
Hexachlorobutadiene	364		500	72.8%
Dimethylphthalate	378		500	75.6%
Butylbenzylphthalate	416		500	83.2%
2-Methylphenol	317		500	63.4%
2,4-Dimethylphenol	770		1500	51.3%
N-Nitrosodiphenylamine	346		500	69.2%
Benzyl Alcohol	416		500	83.2%
Pentachlorophenol	1210	EQ	1500	80.7%
1,2-Dichlorobenzene	328		500	65.6%

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	60.9%
d14-p-Terphenyl	71.2% Q

ARI Labs, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i
Lab File ID: CC1105A.D
Analysis Type:
Lab Sample ID: CC1105A
Method: \\target\share\chem3\nt10.i\20151105.b\SIM.b\SIMABN2.m

Injection Date: 05-NOV-2015 14:04
Init. Cal. Date(s): 19-OCT-2015 19-OCT-2015
Init. Cal. Times: 11:52 16:39
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RF1	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
$ 1 2-Fluorophenol	1.04543	0.98207	0.010	-6.06090	20.00000	Averaged	
3 Phenol	1.55661	1.46467	0.010	-5.90683	20.00000	Averaged	
7 1,3-Dichlorobenzene	1.76229	1.78433	0.010	1.25101	20.00000	Averaged	
9 1,4-Dichlorobenzene	1.73930	1.78433	0.010	2.58940	20.00000	Averaged	
11 Benzyl alcohol	0.81726	0.79485	0.010	-2.74242	20.00000	Averaged	
12 1,2-Dichlorobenzene	1.62946	1.72457	0.010	5.83701	20.00000	Averaged	
13 2-Methylphenol	0.93390	0.81370	0.010	-12.87015	20.00000	Averaged	
15 4-Methylphenol	0.91605	0.81780	0.010	-10.72571	20.00000	Averaged	
16 N-Nitroso-di-n-propylamine	0.61594	0.57662	0.050	-6.38240	20.00000	Averaged	
22 2,4-Dimethylphenol	0.39393	0.33255	0.010	-15.58052	20.00000	Averaged	
26 1,2,4-Trichlorobenzene	0.39456	0.41910	0.010	6.21998	20.00000	Averaged	
30 Hexachlorobutadiene	0.30361	0.33208	0.010	9.37722	20.00000	Averaged	
39 Dimethylphthalate	1.14558	1.01470	0.010	-11.42453	20.00000	Averaged	
50 Diethylphthalate	1.23806	1.13213	0.010	-8.55608	20.00000	Averaged	
54 N-Nitrosodiphenylamine	0.61955	0.57444	0.010	-7.27995	20.00000	Averaged	
57 Hexachlorobenzene	0.41451	0.46057	0.010	11.11164	20.00000	Averaged	
58 Pentachlorophenol	0.21311	0.15371	0.005	-27.87342	20.00000	Averaged	<-
$ 66 Terphenyl-d14	0.36942	0.25581	0.010	-30.75549	20.00000	Averaged	<-
67 Butylbenzylphthalate	0.41305	0.39038	0.010	-5.48875	20.00000	Averaged	
79 Dibenzo(a,h)anthracene	1.15706	1.04200	0.010	-9.94423	20.00000	Averaged	
90 N-Nitrosodimethylamine	0.44352	0.46419	0.010	4.66003	20.00000	Averaged	

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: CR19F-SSD

Lab Sample ID: AOW1C
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized:
Reported: 11/11/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Date Extracted: 10/26/18
Date Analyzed: 11/05/15 04:05
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Silica-Florisil Cleanup: Yes
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.68	0.65-0.89		0.998	7.75	
2,3,7,8-TCDD	0.68	0.65-0.89		0.998	2.16	
1,2,3,7,8-PeCDF	1.28	1.32-1.78		0.998	0.613	JXEMPC
2,3,4,7,8-PeCDF	1.38	1.32-1.78		0.998	0.557	J
1,2,3,7,8-PeCDD	1.55	1.32-1.78		0.998	3.01	
1,2,3,4,7,8-HxCDF	1.11	1.05-1.43		0.998	1.37	
1,2,3,6,7,8-HxCDF	1.19	1.05-1.43		0.998	1.07	
2,3,4,6,7,8-HxCDF	1.17	1.05-1.43		0.998	1.73	
1,2,3,7,8,9-HxCDF	1.00	1.05-1.43		0.998	0.571	BJEMPC
1,2,3,4,7,8-HxCDD	1.18	1.05-1.43		0.998	1.35	
1,2,3,6,7,8-HxCDD	1.21	1.05-1.43		0.998	9.89	
1,2,3,7,8,9-HxCDD	1.22	1.05-1.43		0.998	8.91	
1,2,3,4,6,7,8-HpCDF	0.97	0.88-1.20		0.998	24.3	
1,2,3,4,7,8,9-HpCDF	0.91	0.88-1.20		0.998	1.04	
1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20		0.998	141	
OCDF	0.83	0.76-1.02		2.00	36.8	
OCDD	0.88	0.76-1.02		9.98	1,010	

Homologue Group	EDL	RL	Result	
Total TCDF		0.998	25.6	EMPC
Total TCDD		0.998	20.6	EMPC
Total PeCDF		2.00	23.6	EMPC
Total PeCDD		0.998	26.4	EMPC
Total HxCDF		2.00	40.2	EMPC
Total HxCDD		2.00	93.0	EMPC
Total HpCDF		2.00	62.7	EMPC
Total HpCDD		2.00	340	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 10.6

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 10.6

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: CR19F-SSD

Lab Sample ID: AOW1C
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Date Extracted: 10/26/18
Date Analyzed: 11/05/15 04:05
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	97.0	24-169	
13C-2,3,7,8-TCDD	0.79	0.65-0.89	87.7	25-164	
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	93.6	24-185	
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	94.0	21-178	
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	93.8	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	91.0	26-152	
13C-1,2,3,6,7,8-HxCDF	0.51	0.43-0.59	87.0	26-123	
13C-2,3,4,6,7,8-HxCDF	0.51	0.43-0.59	94.9	28-136	
13C-1,2,3,7,8,9-HxCDF	0.51	0.43-0.59	92.7	29-147	
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	98.7	32-141	
13C-1,2,3,6,7,8-HxCDD	1.24	1.05-1.43	89.7	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	84.3	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	85.8	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	90.9	23-140	
13C-OCDD	0.90	0.76-1.02	82.0	17-157	
37Cl4-2,3,7,8-TCDD			94.1	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR18B-SSD**

Lab Sample ID: AOW1I
LIMS ID: 15-19550
Matrix: Sediment
Data Release Authorized:
Reported: 11/11/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Date Extracted: 10/26/18
Date Analyzed: 11/05/15 04:58
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.2 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Silica-Florisil Cleanup: Yes
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.65	0.65-0.89		0.981	0.381	JEMPC
2,3,7,8-TCDD	0.72	0.65-0.89		0.981	2.36	
1,2,3,7,8-PeCDF	1.98	1.32-1.78		0.981	0.157	JEMPC
2,3,4,7,8-PeCDF	1.15	1.32-1.78		0.981	0.183	JEMPC
1,2,3,7,8-PeCDD	1.69	1.32-1.78		0.981	3.28	
1,2,3,4,7,8-HxCDF	0.90	1.05-1.43		0.981	0.424	JEMPC
1,2,3,6,7,8-HxCDF	1.64	1.05-1.43		0.981	0.294	JEMPC
2,3,4,6,7,8-HxCDF	1.09	1.05-1.43		0.981	0.469	J
1,2,3,7,8,9-HxCDF	1.07	1.05-1.43		0.981	0.226	BJ
1,2,3,4,7,8-HxCDD	1.19	1.05-1.43		0.981	0.758	J
1,2,3,6,7,8-HxCDD	1.23	1.05-1.43		0.981	2.46	
1,2,3,7,8,9-HxCDD	1.25	1.05-1.43		0.981	8.00	
1,2,3,4,6,7,8-HpCDF	0.97	0.88-1.20		0.981	7.34	
1,2,3,4,7,8,9-HpCDF	1.15	0.88-1.20		0.981	0.332	J
1,2,3,4,6,7,8-HpCDD	1.02	0.88-1.20		0.981	30.9	
OCDF	0.80	0.76-1.02		1.96	10.9	
OCDD	0.90	0.76-1.02		9.81	189	

Homologue Group	EDL	RL	Result	
Total TCDF		0.981	4.57	EMPC
Total TCDD		0.981	15.9	EMPC
Total PeCDF		1.96	4.65	EMPC
Total PeCDD		0.981	20.5	EMPC
Total HxCDF		1.96	8.92	EMPC
Total HxCDD		1.96	46.9	EMPC
Total HpCDF		1.96	17.4	
Total HpCDD		1.96	73.7	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 7.45

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 7.45

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: CR18B-SSD

Lab Sample ID: AOW1I
LIMS ID: 15-19550
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Date Extracted: 10/26/18
Date Analyzed: 11/05/15 04:58
Instrument/Analyst: AS1/PK

Sample Amount: 10.2 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	92.7	24-169	
13C-2,3,7,8-TCDD	0.80	0.65-0.89	83.3	25-164	
13C-1,2,3,7,8-PeCDF	1.56	1.32-1.78	89.4	24-185	
13C-2,3,4,7,8-PeCDF	1.55	1.32-1.78	90.0	21-178	
13C-1,2,3,7,8-PeCDD	1.59	1.32-1.78	87.4	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	86.2	26-152	
13C-1,2,3,6,7,8-HxCDF	0.51	0.43-0.59	82.9	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	89.8	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	85.4	29-147	
13C-1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	94.1	32-141	
13C-1,2,3,6,7,8-HxCDD	1.25	1.05-1.43	84.5	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	81.8	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	82.4	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	87.7	23-140	
13C-OCDD	0.90	0.76-1.02	78.9	17-157	
37Cl4-2,3,7,8-TCDD			91.3	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: MB-102615**

Lab Sample ID: MB-102615
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 11/05/15 00:25
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF		0.65-0.89	0.0500	1.00	< 0.0500	U
2,3,7,8-TCDD		0.65-0.89	0.0560	1.00	< 0.0560	U
1,2,3,7,8-PeCDF		1.32-1.78	0.0580	1.00	< 0.0580	U
2,3,4,7,8-PeCDF		1.32-1.78	0.0600	1.00	< 0.0600	U
1,2,3,7,8-PeCDD		1.32-1.78	0.0980	1.00	< 0.0980	U
1,2,3,4,7,8-HxCDF		1.05-1.43	0.0640	1.00	< 0.0640	U
1,2,3,6,7,8-HxCDF		1.05-1.43	0.0580	1.00	< 0.0580	U
2,3,4,6,7,8-HxCDF		1.05-1.43	0.0620	1.00	< 0.0620	U
1,2,3,7,8,9-HxCDF	1.11	1.05-1.43		1.00	0.116	J
1,2,3,4,7,8-HxCDD		1.05-1.43	0.0840	1.00	< 0.0840	U
1,2,3,6,7,8-HxCDD		1.05-1.43	0.0880	1.00	< 0.0880	U
1,2,3,7,8,9-HxCDD		1.05-1.43	0.0880	1.00	< 0.0880	U
1,2,3,4,6,7,8-HpCDF	0.84	0.88-1.20		1.00	0.196	JEMPC
1,2,3,4,7,8,9-HpCDF		0.88-1.20	0.0600	1.00	< 0.0600	U
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20		1.00	1.99	
OCDF	0.72	0.76-1.02		2.00	0.776	JEMPC
OCDD	0.86	0.76-1.02		10.0	16.9	

Homologue Group	EDL	RL	Result	
Total TCDF	0.0500	1.00	< 0.0500	U
Total TCDD	0.0560	1.00	0.0524	EMPC
Total PeCDF	0.0600	2.00	< 0.0600	U
Total PeCDD	0.0980	1.00	0.253	EMPC
Total HxCDF		2.00	0.117	
Total HxCDD	0.0880	2.00	1.31	EMPC
Total HpCDF		2.00	0.426	EMPC
Total HpCDD		2.00	5.27	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 0.04

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 0.15

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: MB-102615

Lab Sample ID: MB-102615
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 11/05/15 00:25
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	99.6	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	95.8	25-164	
13C-1,2,3,7,8-PeCDF	1.59	1.32-1.78	103	24-185	
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	96.9	21-178	
13C-1,2,3,7,8-PeCDD	1.59	1.32-1.78	98.0	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	99.9	26-152	
13C-1,2,3,6,7,8-HxCDF	0.51	0.43-0.59	101	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	99.4	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	92.8	29-147	
13C-1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	103	32-141	
13C-1,2,3,6,7,8-HxCDD	1.26	1.05-1.43	99.0	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	90.7	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	91.9	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.07	0.88-1.20	98.5	23-140	
13C-OCDD	0.91	0.76-1.02	84.7	17-157	
37Cl4-2,3,7,8-TCDD			105	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: OPR-102615**

Lab Sample ID: OPR-102615
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 11/05/15 01:26
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	RL	Result
2,3,7,8-TCDF	0.70	0.65-0.89	1.00	20.6
2,3,7,8-TCDD	0.74	0.65-0.89	1.00	21.4
1,2,3,7,8-PeCDF	1.43	1.32-1.78	1.00	103
2,3,4,7,8-PeCDF	1.44	1.32-1.78	1.00	104
1,2,3,7,8-PeCDD	1.56	1.32-1.78	1.00	104
1,2,3,4,7,8-HxCDF	1.14	1.05-1.43	1.00	105
1,2,3,6,7,8-HxCDF	1.14	1.05-1.43	1.00	105
2,3,4,6,7,8-HxCDF	1.15	1.05-1.43	1.00	105
1,2,3,7,8,9-HxCDF	1.15	1.05-1.43	1.00	105
1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	1.00	102
1,2,3,6,7,8-HxCDD	1.19	1.05-1.43	1.00	104
1,2,3,7,8,9-HxCDD	1.23	1.05-1.43	1.00	107
1,2,3,4,6,7,8-HpCDF	0.98	0.88-1.20	1.00	108
1,2,3,4,7,8,9-HpCDF	0.99	0.88-1.20	1.00	109
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20	1.00	104
OCDF	0.82	0.76-1.02	2.00	199
OCDD	0.90	0.76-1.02	10.0	212

Homologue Group	EDL	RL	Result	
Total TCDF		1.00	21.4	EMPC
Total TCDD		1.00	22.0	EMPC
Total PeCDF		2.00	211	EMPC
Total PeCDD		1.00	104	EMPC
Total HxCDF		2.00	421	EMPC
Total HxCDD		2.00	314	EMPC
Total HpCDF		2.00	217	
Total HpCDD		2.00	106	

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-102615

Lab Sample ID: OPR-102615
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 11/05/15 01:26
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.77	0.65-0.89	93.5	24-169	
13C-2,3,7,8-TCDD	0.80	0.65-0.89	89.2	25-164	
13C-1,2,3,7,8-PeCDF	1.55	1.32-1.78	97.5	24-185	
13C-2,3,4,7,8-PeCDF	1.55	1.32-1.78	92.4	21-178	
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	93.9	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	90.4	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	88.6	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	89.2	28-136	
13C-1,2,3,7,8,9-HxCDF	0.51	0.43-0.59	84.5	29-147	
13C-1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	95.2	32-141	
13C-1,2,3,6,7,8-HxCDD	1.26	1.05-1.43	89.2	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	82.3	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.43	0.37-0.51	82.6	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.02	0.88-1.20	88.8	23-140	
13C-OCDD	0.90	0.76-1.02	77.0	17-157	
37Cl4-2,3,7,8-TCDD			99.1	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-102615

Lab Sample ID: OPR-102615
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 11/05/15 01:26
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	OPR	Spiked	Recovery	Limits
2,3,7,8-TCDF	20.6	20.0	103	75-158
2,3,7,8-TCDD	21.4	20.0	107	67-158
1,2,3,7,8-PeCDF	103	100	103	80-134
2,3,4,7,8-PeCDF	104	100	104	68-160
1,2,3,7,8-PeCDD	104	100	104	70-142
1,2,3,4,7,8-HxCDF	105	100	105	72-134
1,2,3,6,7,8-HxCDF	105	100	105	84-130
2,3,4,6,7,8-HxCDF	105	100	105	70-156
1,2,3,7,8,9-HxCDF	105	100	105	78-130
1,2,3,4,7,8-HxCDD	102	100	102	70-164
1,2,3,6,7,8-HxCDD	104	100	104	76-134
1,2,3,7,8,9-HxCDD	107	100	107	64-162
1,2,3,4,6,7,8-HpCDF	108	100	108	82-132
1,2,3,4,7,8,9-HpCDF	109	100	109	78-138
1,2,3,4,6,7,8-HpCDD	104	100	104	70-140
OCDF	199	200	99.5	63-170
OCDD	212	200	106	78-144

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR19F-SBSD
SAMPLE

Lab Sample ID: AOW1A
LIMS ID: 15-19542
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Date Extracted: 10/26/15
Date Analyzed: 10/29/15 23:26
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.29 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 47.3%

CAS Number	Analyte	LOQ	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
11100-14-4	Aroclor 1268	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobipheny1	72.8%
Tetrachlorometaxylene	80.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR19F-SBSD-DUP
SAMPLE

Lab Sample ID: AOW1B
LIMS ID: 15-19543
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Date Extracted: 10/26/15
Date Analyzed: 10/29/15 23:47
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.06 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 49.6%

CAS Number	Analyte	LOQ	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
11100-14-4	Aroclor 1268	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	66.2%
Tetrachlorometaxylene	76.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR19F-SSD
SAMPLE

Lab Sample ID: AOW1C
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Date Extracted: 10/26/15
Date Analyzed: 10/30/15 00:08
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.49 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 50.3%

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	18	< 18 U
53469-21-9	Aroclor 1242	18	< 18 U
12672-29-6	Aroclor 1248	18	< 18 U
11097-69-1	Aroclor 1254	18	< 18 U
11096-82-5	Aroclor 1260	18	< 18 U
11104-28-2	Aroclor 1221	18	< 18 U
11141-16-5	Aroclor 1232	18	< 18 U
11100-14-4	Aroclor 1268	18	< 18 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	65.0%
Tetrachlorometaxylene	73.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546

Sample ID: MB-102615
METHOD BLANK

Lab Sample ID: MB-102615
LIMS ID: 15-19542
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 10/29/15 18:54
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: NA

CAS Number	Analyte	LOQ	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
11100-14-4	Aroclor 1268	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	71.8%
Tetrachlorometaxylene	77.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Page 1 of 1

Sample ID: LCS-102615
LAB CONTROL

Lab Sample ID: LCS-102615
LIMS ID: 15-19542
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 10/29/15 19:14
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Aroclor 1016	405	500	81.0%
Aroclor 1260	407	500	81.4%

PCB Surrogate Recovery

Decachlorobiphenyl	74.0%
Tetrachlorometaxylene	82.0%

Results reported in µg/kg (ppb)

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB SOIL/SOLID/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-102615	71.8%	40-133	77.5%	53-120	0
LCS-102615	74.0%	40-133	82.0%	53-120	0
CR19F-SBSD	72.8%	40-133	80.5%	53-120	0
CR19F-SBSD-DUP	66.2%	40-133	76.5%	53-120	0
CR19F-SSD	65.0%	40-133	73.8%	53-120	0

Microwave (MARS) Control Limits PCBSMP
Prep Method: SW3546
Log Number Range: 15-19542 to 15-19544

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Extraction Method: SW3546
Page 1 of 1

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Matrix: Sediment

Date Received: 10/16/15

Data Release Authorized:
Reported: 11/02/15

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range/Surrogate	LOQ	Result
MB-102315	Method Blank	10/23/15	10/28/15	1.00	Diesel Range	5.0	< 5.0 U
15-19544	HC ID: ---		FID3B	1.0	Motor Oil Range	10	< 10 U
					o-Terphenyl		74.0%
AOW1C	CR19F-SSD	10/23/15	10/29/15	1.00	**Diesel Range**	**10**	**93**
15-19544	HC ID: **DIESEL/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**20**	**240**
					o-Terphenyl		72.0%
AOW1I	CR18B-SSD	10/23/15	10/29/15	1.00	**Diesel Range**	**10**	**44**
15-19550	HC ID: **DIESEL/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**21**	**92**
					o-Terphenyl		70.8%

Reported in mg/kg (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
LOQ-Limit of Quantitation

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

ANALYTICAL RESOURCES INCORPORATED

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	OTER	TOT OUT
102315MB	74.0%	0
102315LCS	74.6%	0
CR19F-SSD	72.0%	0
CR18B-SSD	70.8%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3546
Log Number Range: 15-19544 to 15-19550

FORM-II TPHD

AOW1 : 00050

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: LCS-102315
LAB CONTROL

Lab Sample ID: LCS-102315
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized:
Reported: 11/02/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 10/28/15 22:59
Instrument/Analyst: FID3B/ML

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
Diesel	109	150	72.7%

TPHD Surrogate Recovery

o-Terphenyl	74.6%

Results reported in mg/kg

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

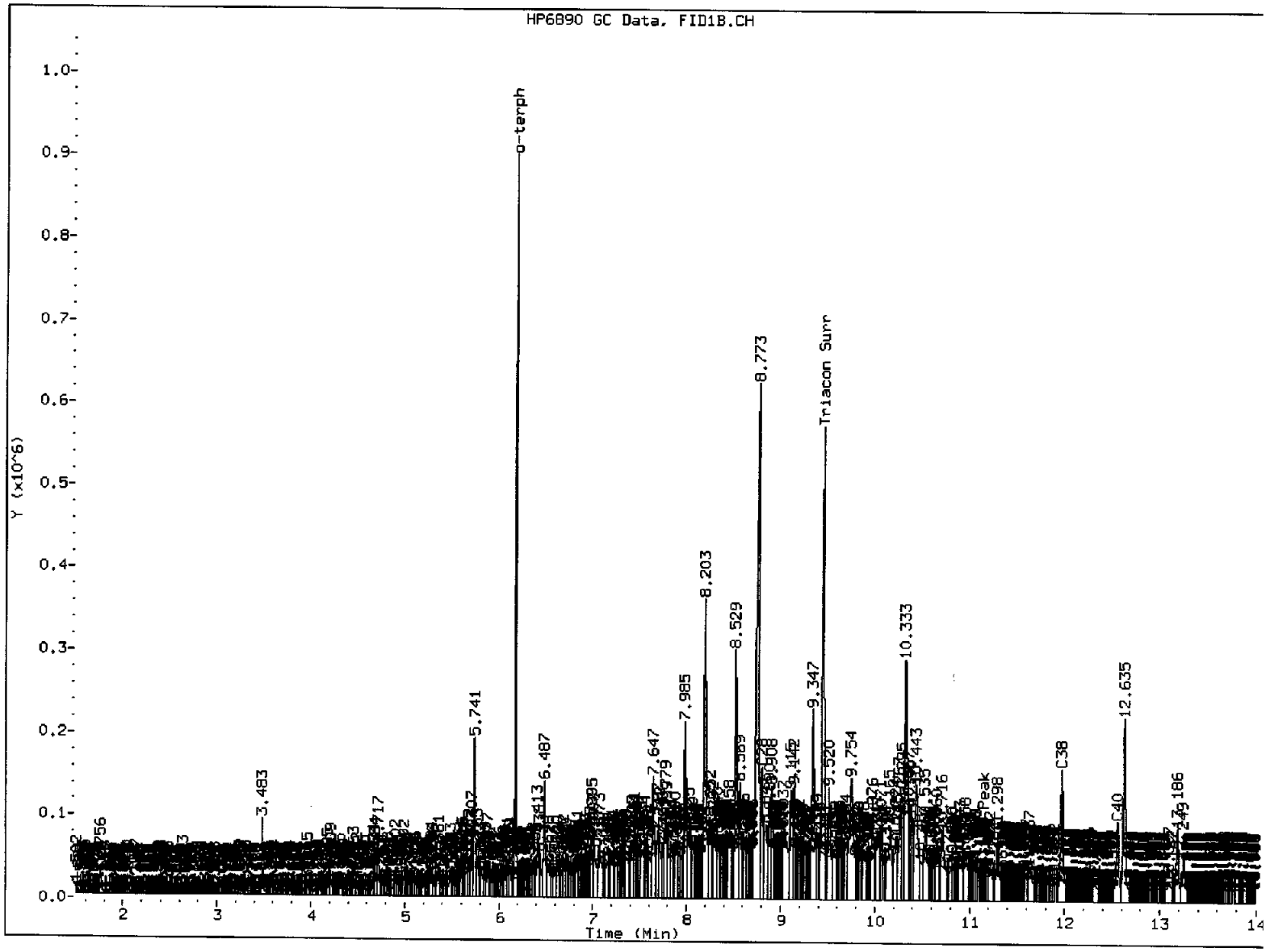
ARI Job: AOW1
Matrix: Sediment Project: Seaport Landing
Date Received: 10/16/15 1044.02.01-02

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep Date
15-19544-102315MB1	Method Blank	10.0 g	1.00 mL	-	10/23/15
15-19544-102315LCS1	Lab Control	10.0 g	1.00 mL	-	10/23/15
15-19544-AOW1C	CR19F-SSD	4.97 g	1.00 mL	D	10/23/15
15-19550-AOW1I	CR18B-SSD	4.80 g	1.00 mL	D	10/23/15

Basis: D=Dry Weight W=As Received

FID:3B-2C/RTX-1 AOW1C

FID:3B SIGNAL



MANUAL INTEGRATION

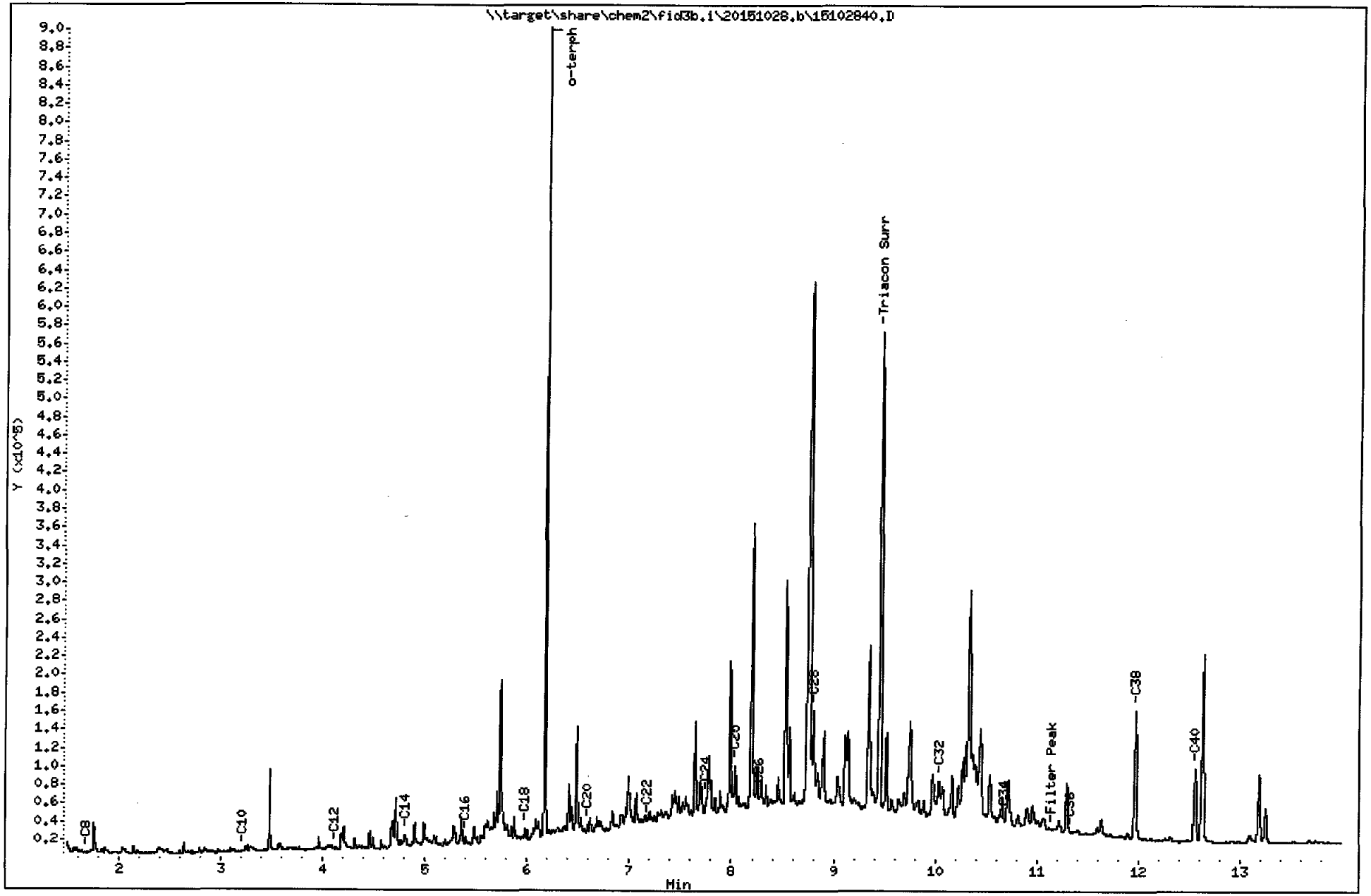
1. Baseline correction
3. Peak not found
(5) Skimmed surrogate

Analyst: MW Date: 10/29/15

Data File: \\target\share\chem2\fid3b.i\20151028.b\15102840.D
Date : 29-OCT-2015 01:07
Client ID: CR19F-SSD
Sample Info: AOW1C

Instrument: fid3b.i
Operator: ML
Column diameter: 0.25

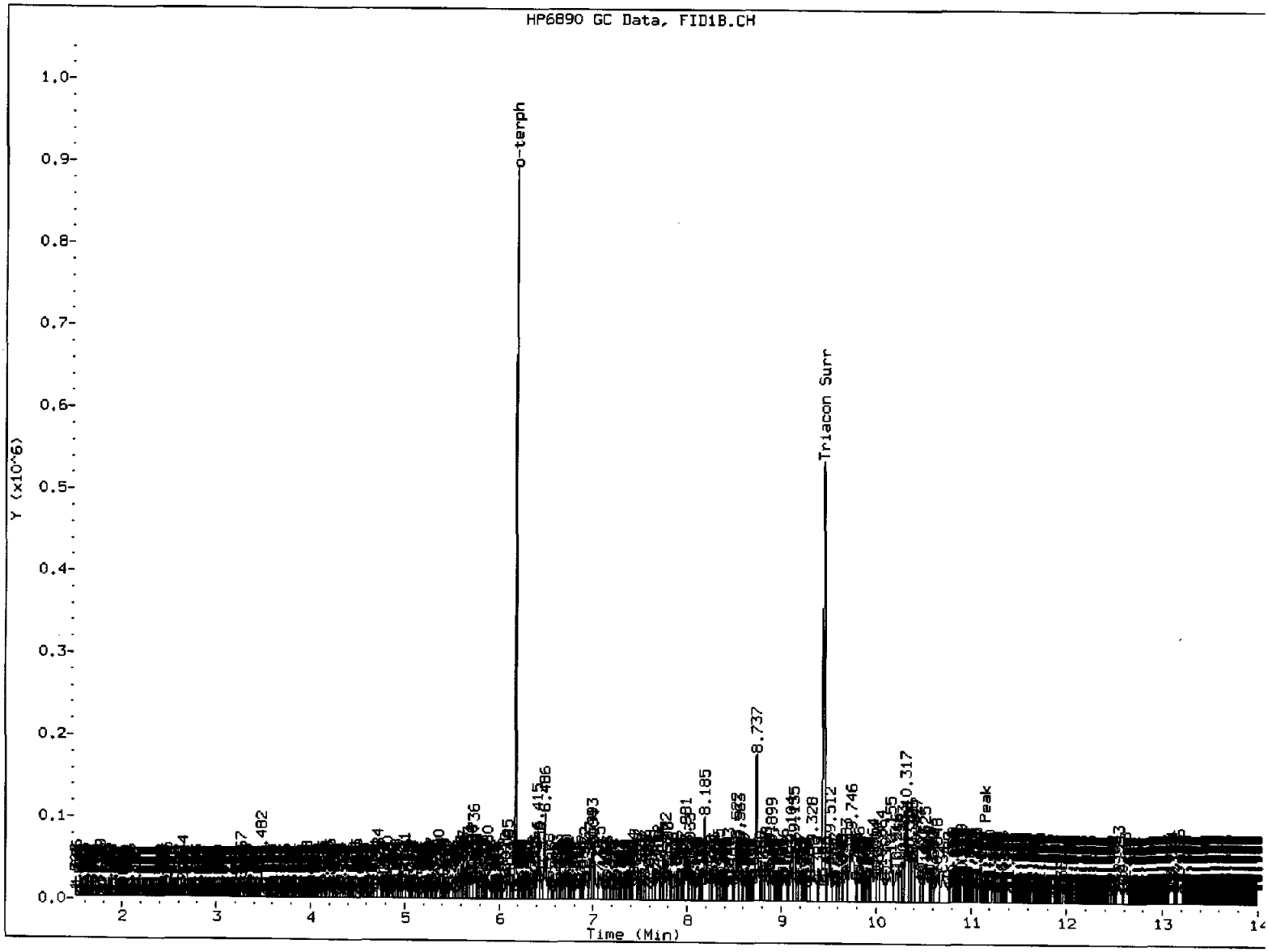
Column phase: RTX-1



AOW1 : 00054

FID:3B-2C/RTX-1 AOW1I

FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5) Skimmed surrogate

Analyst: MM Date: 10/29/15

Data File: \\target\share\chem2\fid3b.i\20151028.b\15102841.D

Date : 29-OCT-2015 01:28

Client ID: CR18B-SSD

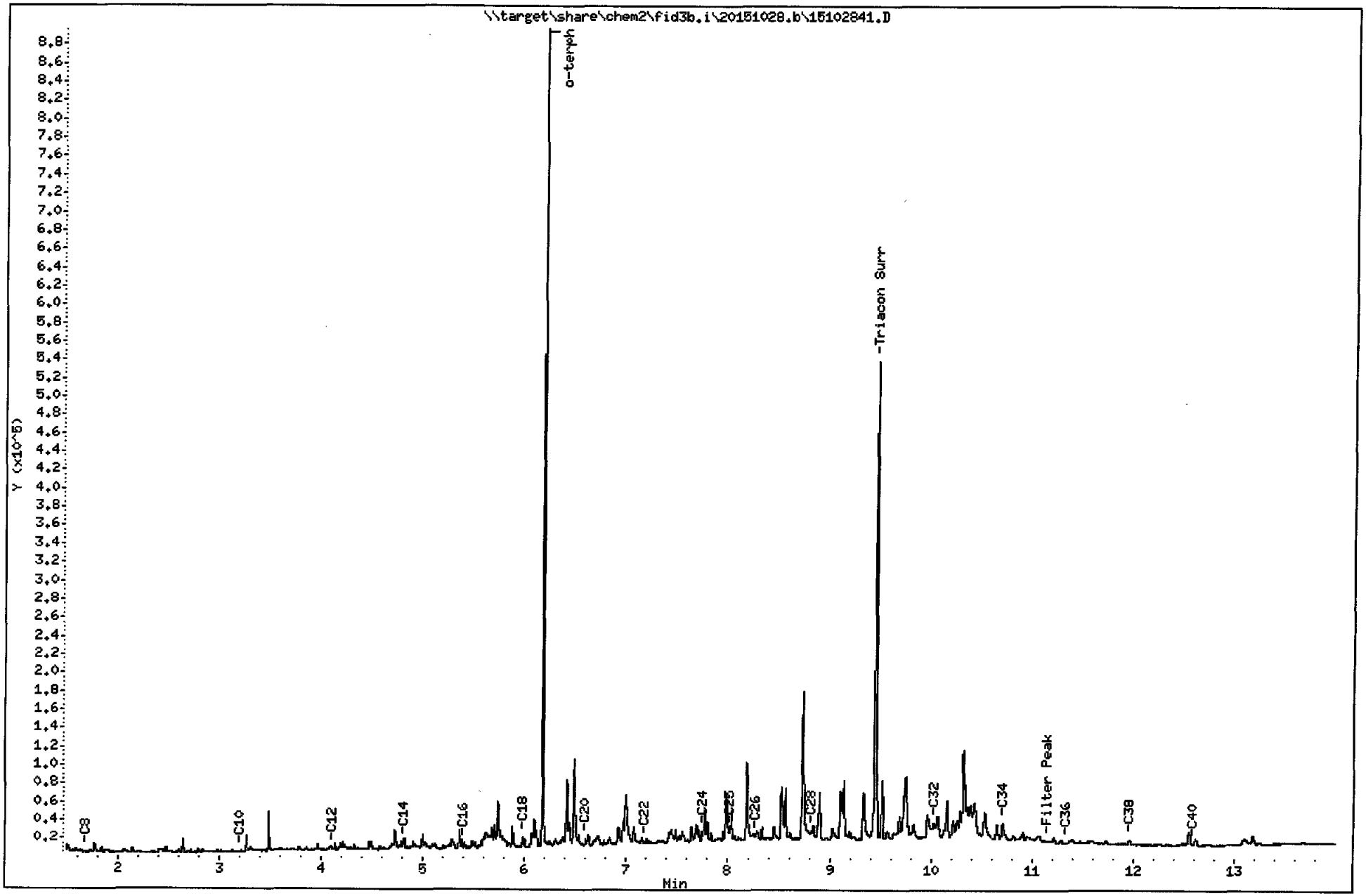
Sample Info: AOW1I

Column phase: RTX-1

Instrument: fid3b.i

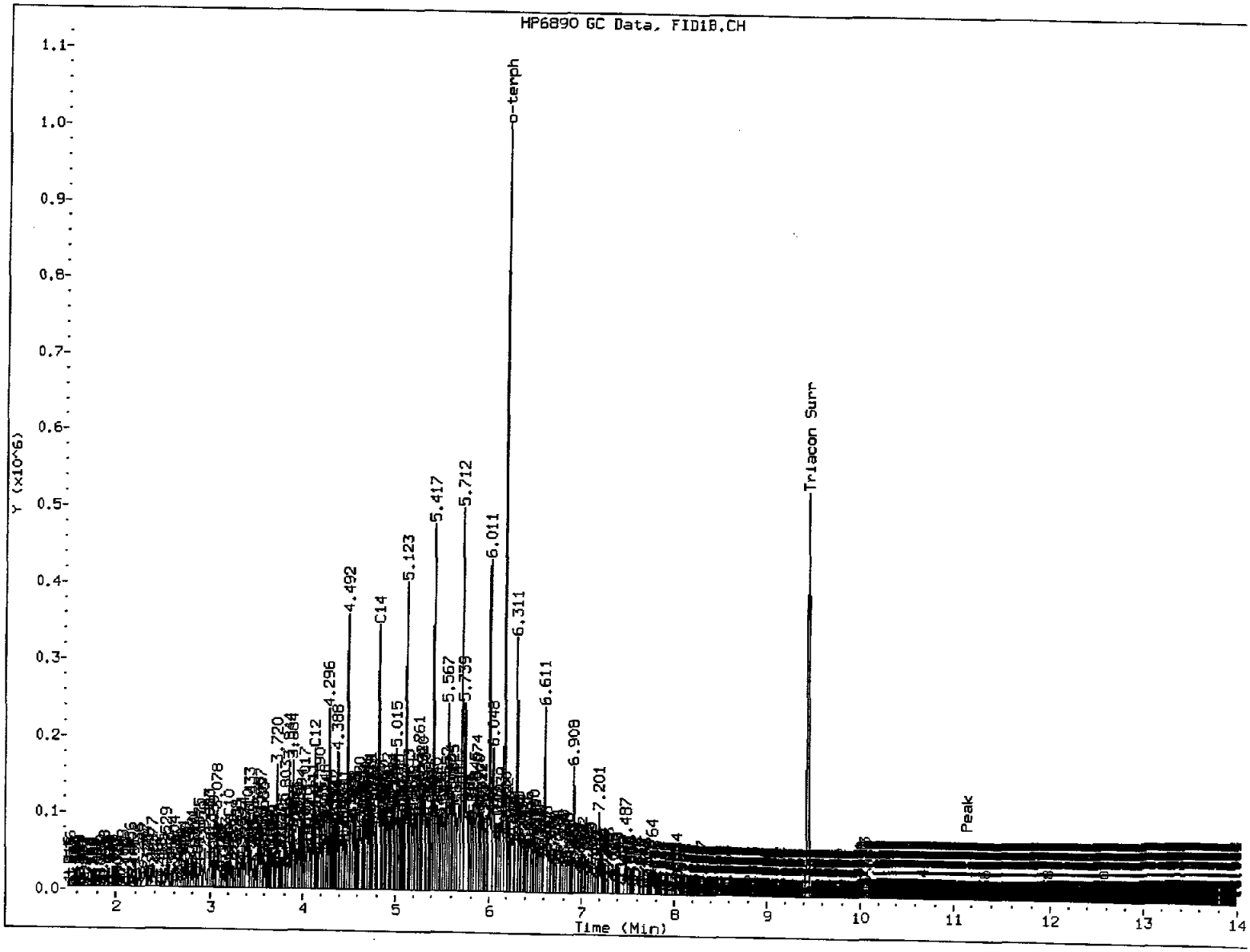
Operator: ML

Column diameter: 0.25



AOW1:00056

FID:3B-2C/RTX-1 AOV8LCSS1 FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5) Skimmed surrogate

Analyst: MM Date: 10/29/15

Data File: \\target\share\chem2\fid3b.i\20151028.b\15102834.D

Date : 28-OCT-2015 22:59

Client ID: AOV8LCSS1

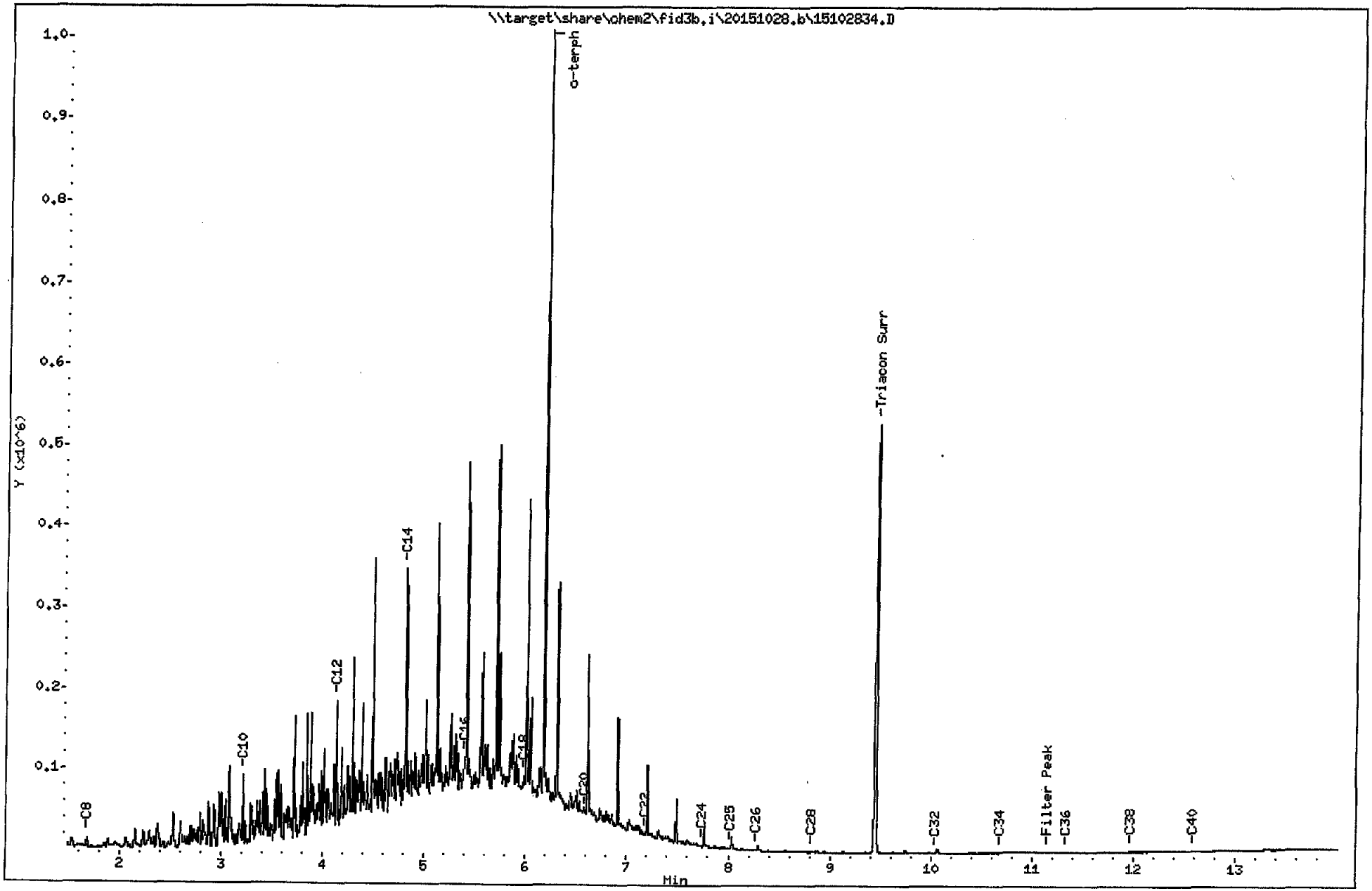
Sample Info: AOV8LCSS1

Column phase: RTX-1

Instrument: fid3b.i

Operator: ML

Column diameter: 0.25



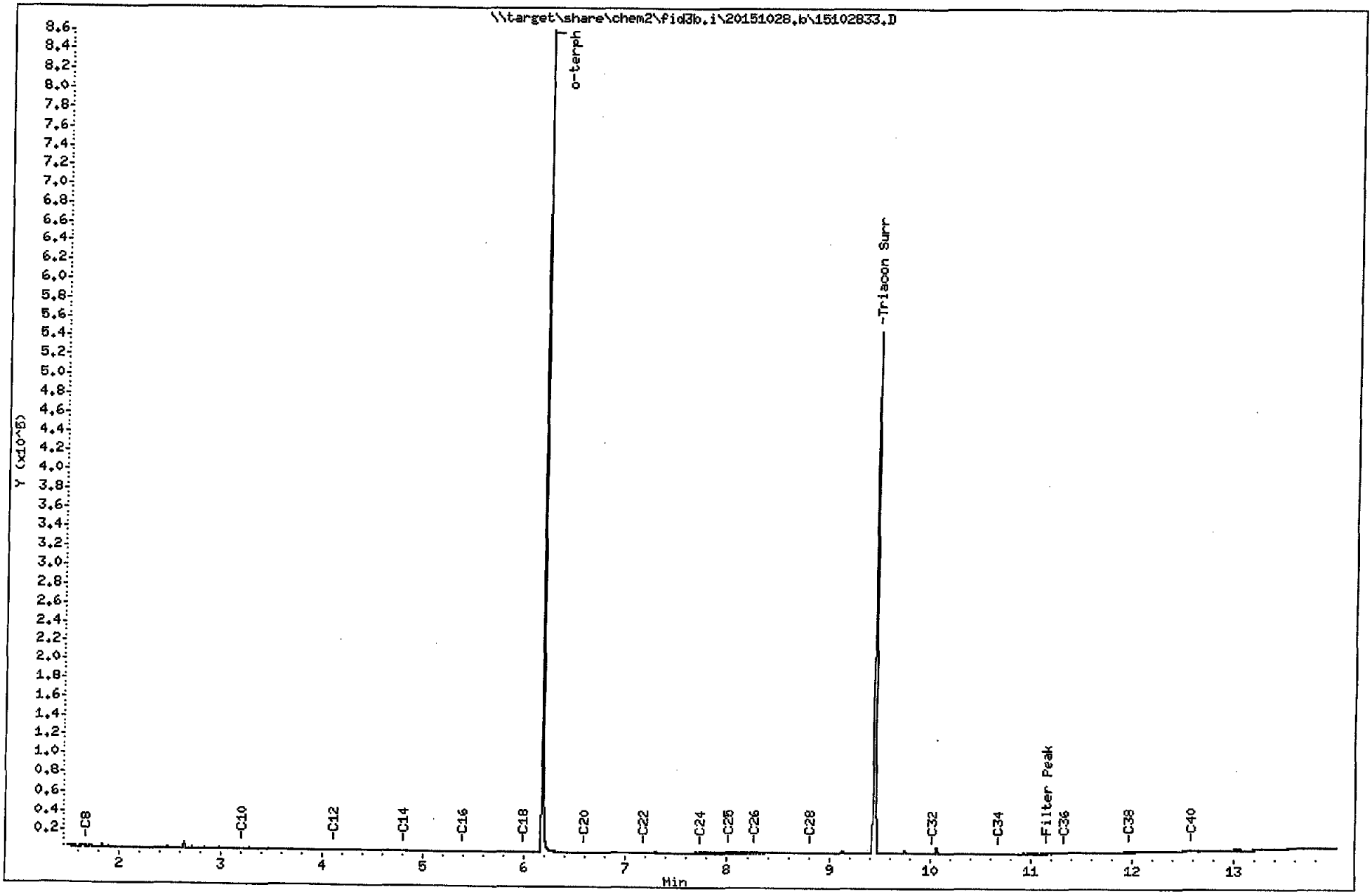
AOW1:00058

Data File: \\target\share\chem2\fid3b.i\20151028.b\15102833.D
Date : 28-OCT-2015 22:38
Client ID: AOV8MBS1
Sample Info: AOV8MBS1

Instrument: fid3b.i

Operator: ML
Column diameter: 0.25

Column phase: RTX-1



AOW1:00059

SAMPLE RESULTS-CONVENTIONALS
AOW1-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: ✓
Reported: 11/12/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Client ID: CR19F-SBSD
ARI ID: 15-19542 AOW1A

Analyte	Date	Method	Units	RL	Sample
Total Solids	10/21/15 102115#1	SM2540G	Percent	0.01	50.30
Total Organic Carbon	11/11/15 111115#1	Plumb,1981	Percent	0.020	2.76

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
AOW1-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: W
Reported: 11/12/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Client ID: CR19F-SBSD-DUP
ARI ID: 15-19543 AOW1B

Analyte	Date	Method	Units	RL	Sample
Total Solids	10/21/15 102115#1	SM2540G	Percent	0.01	51.43
Total Organic Carbon	11/11/15 111115#1	Plumb,1981	Percent	0.020	2.59

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
AOW1-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: W
Reported: 11/12/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Client ID: CR19F-SSD
ARI ID: 15-19544 AOW1C

Analyte	Date	Method	Units	RL	Sample
Total Solids	10/21/15 102115#1	SM2540G	Percent	0.01	49.31
Total Organic Carbon	11/11/15 111115#1	Plumb,1981	Percent	0.020	2.77

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
AOW1-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: ✓
Reported: 11/12/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Client ID: CR18B-SBSD
ARI ID: 15-19549 AOW1H

Analyte	Date	Method	Units	RL	Sample
Total Solids	10/21/15 102115#1	SM2540G	Percent	0.01	47.88
Total Organic Carbon	11/11/15 111115#1	Plumb,1981	Percent	0.020	2.45

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
AOW1-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: J
Reported: 11/12/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Client ID: CR18B-SSD
ARI ID: 15-19550 AOW1I

Analyte	Date	Method	Units	RL	Sample
Total Solids	10/21/15 102115#1	SM2540G	Percent	0.01	46.44
Total Organic Carbon	11/11/15 111115#1	Plumb,1981	Percent	0.020	1.95

RL Analytical reporting limit
U Undetected at reported detection limit

METHOD BLANK RESULTS-CONVENTIONALS
AOW1-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: J
Reported: 11/12/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Analyte	Date	Units	Blank	QC ID
Total Solids	10/21/15	Percent	< 0.01 U	ICB
Total Organic Carbon	11/11/15	Percent	< 0.020 U	ICB

LAB CONTROL RESULTS-CONVENTIONALS
AOW1-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: V
Reported: 11/12/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Total Organic Carbon Plumb,1981	ICVL	11/11/15	Percent	0.096	0.100	96.0%

STANDARD REFERENCE RESULTS-CONVENTIONALS
AOW1-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: U
Reported: 11/12/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Date	Units	SRM	True Value	Recovery
Total Organic Carbon NIST 1941B	11/11/15	Percent	3.05	2.99	102.0%

REPLICATE RESULTS-CONVENTIONALS
AOW1-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: W
Reported: 11/12/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Analyte	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: AOW1I Client ID: CR18B-SSD					
Total Solids	10/21/15	Percent	46.44	45.68 45.72	0.9%
Total Organic Carbon	11/11/15	Percent	1.95	2.04 1.73	8.4%

MS/MSD RESULTS-CONVENTIONALS
AOW1-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: ✓
Reported: 11/12/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Analyte	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: AOW1I Client ID: CR18B-SSD						
Total Organic Carbon	11/11/15	Percent	1.95	4.57	3.34	78.4%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR19F-SBSD
SAMPLE

Lab Sample ID: AOW1A
LIMS ID: 15-19542
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Percent Total Solids: 52.1%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	11/02/15	6010C	11/03/15	**7440-38-2**	**Arsenic**	9	**22**	
3050B	11/02/15	6010C	11/03/15	7440-43-9	Cadmium	0.4	0.4	U
3050B	11/02/15	6010C	11/03/15	**7440-47-3**	**Chromium**	0.9	**50.5**	
3050B	11/02/15	6010C	11/03/15	**7440-50-8**	**Copper**	0.4	**60.0**	
3050B	11/02/15	6010C	11/03/15	**7439-92-1**	**Lead**	4	**13**	
CLP	11/02/15	7471A	11/06/15	**7439-97-6**	**Mercury**	0.04	**0.05**	
3050B	11/02/15	6010C	11/03/15	7440-22-4	Silver	0.6	0.6	U
3050B	11/02/15	6010C	11/03/15	**7440-66-6**	**Zinc**	2	**80**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR19F-SBSD
DUPLICATE

Lab Sample ID: AOW1A
LIMS ID: 15-19542
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	6010C	22	21	4.7%	+/- 9	L
Cadmium	6010C	0.4 U	0.4 U	0.0%	+/- 0.4	L
Chromium	6010C	50.5	49.7	1.6%	+/- 20%	
Copper	6010C	60.0	57.4	4.4%	+/- 20%	
Lead	6010C	13	12	8.0%	+/- 4	L
Mercury	7471A	0.05	0.07	33.3%	+/- 0.04	L
Silver	6010C	0.6 U	0.6 U	0.0%	+/- 0.6	L
Zinc	6010C	80	79	1.3%	+/- 20%	

Reported in mg/kg-dry

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR19F-SBSD
MATRIX SPIKE

Lab Sample ID: AOW1A
LIMS ID: 15-19542
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	6010C	22	353	370	89.5%	
Cadmium	6010C	0.4 U	88.2	92.4	95.5%	
Chromium	6010C	50.5	135	92.4	91.5%	
Copper	6010C	60.0	142	92.4	88.7%	
Lead	6010C	13	349	370	90.8%	
Mercury	7471A	0.05	0.51	0.446	103%	
Silver	6010C	0.6 U	85.4	92.4	92.4%	
Zinc	6010C	80	159	92.4	85.5%	

Reported in mg/kg-dry

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR19F-SBSD-DUP
SAMPLE

Lab Sample ID: AOW1B
LIMS ID: 15-19543
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Percent Total Solids: 53.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	11/02/15	6010C	11/03/15	**7440-38-2**	**Arsenic**	9	**23**	
3050B	11/02/15	6010C	11/03/15	7440-43-9	Cadmium	0.3	0.3	U
3050B	11/02/15	6010C	11/03/15	**7440-47-3**	**Chromium**	0.9	**51.3**	
3050B	11/02/15	6010C	11/03/15	**7440-50-8**	**Copper**	0.3	**53.3**	
3050B	11/02/15	6010C	11/03/15	**7439-92-1**	**Lead**	3	**14**	
CLP	11/02/15	7471A	11/06/15	**7439-97-6**	**Mercury**	0.05	**0.07**	
3050B	11/02/15	6010C	11/03/15	7440-22-4	Silver	0.5	0.5	U
3050B	11/02/15	6010C	11/03/15	**7440-66-6**	**Zinc**	2	**79**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR19F-SSD
SAMPLE

Lab Sample ID: AOW1C
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Percent Total Solids: 49.5%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	11/02/15	6010C	11/03/15	**7440-38-2**	**Arsenic**	10	**20**	
3050B	11/02/15	6010C	11/03/15	7440-43-9	Cadmium	0.4	0.4	U
3050B	11/02/15	6010C	11/03/15	**7440-47-3**	**Chromium**	1	**41**	
3050B	11/02/15	6010C	11/03/15	**7440-50-8**	**Copper**	0.4	**53.1**	
3050B	11/02/15	6010C	11/03/15	**7439-92-1**	**Lead**	4	**11**	
CLP	11/02/15	7471A	11/06/15	**7439-97-6**	**Mercury**	0.04	**0.05**	
3050B	11/02/15	6010C	11/03/15	7440-22-4	Silver	0.6	0.6	U
3050B	11/02/15	6010C	11/03/15	**7440-66-6**	**Zinc**	2	**74**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR18B-SBSD
SAMPLE

Lab Sample ID: AOW1H
LIMS ID: 15-19549
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Percent Total Solids: 48.6%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	11/02/15	6010C	11/03/15	**7440-38-2**	**Arsenic**	10	**20**	
3050B	11/02/15	6010C	11/03/15	7440-43-9	Cadmium	0.4	0.4	U
3050B	11/02/15	6010C	11/03/15	**7440-47-3**	**Chromium**	1	**36**	
3050B	11/02/15	6010C	11/03/15	**7440-50-8**	**Copper**	0.4	**53.4**	
3050B	11/02/15	6010C	11/03/15	**7439-92-1**	**Lead**	4	**10**	
CLP	11/02/15	7471A	11/06/15	**7439-97-6**	**Mercury**	0.05	**0.07**	
3050B	11/02/15	6010C	11/03/15	7440-22-4	Silver	0.6	0.6	U
3050B	11/02/15	6010C	11/03/15	**7440-66-6**	**Zinc**	2	**73**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR18B-SSD
SAMPLE

Lab Sample ID: AOW1I
LIMS ID: 15-19550
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Percent Total Solids: 45.3%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	11/02/15	6010C	11/03/15	**7440-38-2**	**Arsenic**	10	**30**	
3050B	11/02/15	6010C	11/03/15	7440-43-9	Cadmium	0.4	0.4	U
3050B	11/02/15	6010C	11/03/15	**7440-47-3**	**Chromium**	1	**41**	
3050B	11/02/15	6010C	11/03/15	**7440-50-8**	**Copper**	0.4	**62.7**	
3050B	11/02/15	6010C	11/03/15	**7439-92-1**	**Lead**	4	**10**	
CLP	11/02/15	7471A	11/06/15	7439-97-6	Mercury	0.05	0.05	U
3050B	11/02/15	6010C	11/03/15	7440-22-4	Silver	0.6	0.6	U
3050B	11/02/15	6010C	11/03/15	**7440-66-6**	**Zinc**	2	**76**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: METHOD BLANK**

Lab Sample ID: AOW1MB
LIMS ID: 15-19550
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	11/02/15	6010C	11/03/15	7440-38-2	Arsenic	5	5	U
3050B	11/02/15	6010C	11/03/15	7440-43-9	Cadmium	0.2	0.2	U
3050B	11/02/15	6010C	11/03/15	7440-47-3	Chromium	0.5	0.5	U
3050B	11/02/15	6010C	11/03/15	7440-50-8	Copper	0.2	0.2	U
3050B	11/02/15	6010C	11/03/15	7439-92-1	Lead	2	2	U
CLP	11/02/15	7471A	11/06/15	7439-97-6	Mercury	0.02	0.02	U
3050B	11/02/15	6010C	11/03/15	7440-22-4	Silver	0.3	0.3	U
3050B	11/02/15	6010C	11/03/15	7440-66-6	Zinc	1	1	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: LAB CONTROL**

Lab Sample ID: AOW1LCS
LIMS ID: 15-19550
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery
Arsenic	6010C	200	200	100%
Cadmium	6010C	49.7	50.0	99.4%
Chromium	6010C	50.9	50.0	102%
Copper	6010C	47.6	50.0	95.2%
Lead	6010C	197	200	98.5%
Mercury	7471A	0.49	0.50	98.0%
Silver	6010C	51.3	50.0	103%
Zinc	6010C	47	50	94.0%

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

20 November 2015

Madi Novak
Maul, Foster and Alongi, Inc
2001 NW 19th Avenue
Suite 200
Portland, OR 97209

RE: Project: Seaport Landing
ARI Job No.: AOW2

Dear Madi:

Please find enclosed the original chain of custody records and the final results for the samples from the project referenced above. Twenty sediment samples were received on October 16, 2015. Seventeen samples were placed on hold as specified. The remaining samples were analyzed for SVOCs, dioxins/furans, PCBs, NWTPH-Dx, TOC, asbestos and total metals as requested. The analysis for asbestos was sub-contracted to NVL Laboratories in Seattle, WA.

The %Ds for pentachlorophenol and the surrogate, d14-p-terphenyl, were not within control limits for the CCAL that bracketed the 11/5/15 SIM-SVOC analyses of these samples. All positive results for these compounds have been flagged with a "Q" qualifier to denote the high %Ds.

The percent differences (%Ds) for benzoic acid and diethylphthalate were not within control limits for the CCAL that bracketed the 11/14/15 SVOC analyses of these samples. All positive results for these compounds have been flagged with a "Q" qualifier to denote the high %Ds.

The remaining analyses proceeded without incident of note.

An electronic copy of this package will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

cc: file AOW2

Enclosures

MDH/mdh

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

AOW2 : 00002

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: AOW2	Turn-around Requested: Standard	Page:	of
ARI Client Company: Mault Foster Alongi, Inc.	Phone: (503)501.5212	Date:	Ice Present?
Client Contact: Madi Novak		No. of Coolers:	Cooler Temps:
Client Project Name: Scapa Landing			
Client Project #: 1044.02.01-02	Samplers: RD, JJP, MRM		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: ARCHIVE	TOC	DAH	SVOA PAH only	PCB	Mercury	Metals	TPH	Notes/Comments: Dioxin/Furan
CR16A-5.0	~~10/15~~ 10/14	1415	Sed	1	X								
CR16A-14	10/14	1417	Sed	1	X								
CR16B-0-10cm	10/14	1440	Sed	1	X								
CR16B-10.0	10/14	1443	Sed	1	X								
CR16B-13.0	10/14	1445	Sed	1	X								
CR15C-SSD	10/14	1620	Sed	5	X	X	X	X	X	X	X	X	X
CR15C-5.0	10/14	1634	Sed	1	X								
CR15D-0-10cm	10/14	1641	Sed	1	X								
CR15C-SBSD	10/14	1640	Sed	3	X	X	X	X	X	X	X		
~~CR16C-SSD~~	~~10/14~~	~~16~~											

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Roxanne Degens	Printed Name:	Printed Name:	Printed Name:
	Company: MFA	Company:	Company:	Company:
	Date & Time:	Date & Time:	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

AOM2 : 00003

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: AOM2	Turn-around Requested: Standard	Page:	of
ARI Client Company: Maul Foster & Alongi, Inc.	Phone: (503) 501-5212	Date:	Ice Present?
Client Contact: Madi Norak		No. of Coolers:	Cooler Temps:
Client Project Name: Seaport Landing			
Client Project #: 1044.02.01-02	Samplers: RD MRM JJP		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: ARCHIVE	Asbestos	Dioxin/Furan	TPH	SVOA	TOC	Mercury	Metals	Notes/Comments: PAH	PCBs
FB05	10/14	1130	Sed	1	X									
FB06	10/14	1118	Sed	1	X									
FB07	10/14	1135	Sed	1	X									
FB08	10/14	1140	Sed	1	X									
CR08b-SSD-COMP	10/14	1145	Sed	16	X	X	X	X	X	X	X	X	X	X
CR15A-5	10/14	1300	Sed	1	X									
CR15A-11	10/14	1800	Sed	1	X									
CR15B-0-10cm	10/14	1540	Sed	1	X									
CR15B-5	10/14	1345	Sed	1	X									
CR16A-0-10cm	10/14	1410	Sed	1	X									

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Roxanne Peyton	Printed Name:	Printed Name:	Printed Name:
	Company: MFA	Company:	Company:	Company:
	Date & Time:	Date & Time:	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Mall foster

Project Name: -

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: _____

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	NO
Were custody papers included with the cooler?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 2.6

Time: _____

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D00256S

Cooler Accepted by: WL Date: 10/16/15 Time: 1520

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	NO
What kind of packing material was used? ...	Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other:		
Was sufficient ice used (if appropriate)?	NA	YES	NO
Were all bottles sealed in individual plastic bags?		YES	NO
Did all bottles arrive in good condition (unbroken)?		YES	NO
Were all bottle labels complete and legible?		YES	NO
Did the number of containers listed on COC match with the number of containers received?		YES	NO
Did all bottle labels and tags agree with custody papers?		YES	NO
Were all bottles used correct for the requested analyses?		YES	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	YES	NO
Were all VOC vials free of air bubbles?	NA	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO
Date VOC Trip Blank was made at ARI	NA		

Was Sample Split by ARI : NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: WL Date: 10/20/15 Time: 1408

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC
cro8A-SSD-comp	cro8b-SSD-comp		

Additional Notes, Discrepancies, & Resolutions: * 3 of 5 jars missing from sample cr15C-SSD. 3 extra jars, labeled as cr16C-SSD (crossed out on COC). 1 of 3 jars missing from sample cr15C-SBSD. 6 of 6 jars missing from sample cro8b-SSD-comp. 6 extra jars labeled cro8A-SSD-comp.

By: WL Date: 10/20/15

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm
• • •	• • •	● ● ●

Small → "sm" (< 2 mm)

Peabubbles → "pb" (2 to < 4 mm)

Large → "lg" (4 to < 6 mm)

Headspace → "hs" (> 6 mm)

Subject: RE: AON4-Seaport Landing
From: Roxanne Degens <rdegens@maulfoster.com>
Date: 10/20/2015 4:03 PM
To: Mark Harris <markh@arilabs.com>

Mark -
In looking through the COCs earlier, I noticed that I had miswritten/not included an analyte on some of the COCs. The following samples must additionally be analyzed for SVOAs:

CR17D-SSD
CR17D-SBSD
CR08A-SBSD
CR10-SSD-COMP
CR08A-SSD-COMP
CR08b-SBSD
CR26-SBSD
CR19F-SBSD
CR19F-SBSD-DUP
CR19F-SSD
CR18B-SBSD
CR18B-SSD

Please let me know if this will cause any issues. SVOAs is part of the SMS suite. Thanks!

ROXANNE DEGENS | MAUL FOSTER & ALONGI, INC.

d. 206.724.0612 | p. 206 858 7620 | c. 206.450.3396
411 First Avenue South, Suite 610, Seattle, WA 98104
www.maulfoster.com

-----Original Message-----
From: Mark Harris [mailto:markh@arilabs.com]
Sent: Tuesday, October 20, 2015 2:27 PM
To: Madi Novak <mnovak@maulfoster.com>; Mike Murray <mmurray@maulfoster.com>; Mary Benzinger <mbenzinger@maulfoster.com>
Cc: Roxanne Degens <rdegens@maulfoster.com>
Subject: Re: AON4-Seaport Landing

Will do.

On 10/20/2015 2:21 PM, Madi Novak wrote:
> Thanks Mark,

Yes, please run NWTPH-Dx for B02-S-5.0 and B03-S-5.0. Thank you!

MADI NOVAK | MAUL FOSTER & ALONGI, INC.
direct. 503 501 5212 | main. 971 544 2139 | cell. 971 227 1060
|www.maulfoster.com
2001 NW 19th Avenue, Suite 200, Portland, OR 97209

-----Original Message-----
From: Mark Harris [mailto:markh@arilabs.com]
Sent: Tuesday, October 20, 2015 2:20 PM
To: Madi Novak; Mike Murray; Mary Benzinger
Cc: Roxanne Degens
Subject: Re: AON4-Seaport Landing

Here are the soil HCID results. Let me know if you'd like and TPH-Dx follow-ups.

Mark H.

On 10/19/2015 1:29 PM, Madi Novak wrote:

> Yes, please go ahead and trigger -Dx analysis for B02-GW-6 and B03-GW-10. Let's do -Gx for B02-GW-6 as well. Thank you.
>
> MADI NOVAK | MAUL FOSTER & ALONGI, INC.
> direct. 503 501 5212 | main. 971 544 2139 | cell. 971 227 1060
> |www.maulfoster.com
> 2001 NW 19th Avenue, Suite 200, Portland, OR 97209
>
> -----Original Message-----
> From: Mark Harris [mailto:markh@arilabs.com]
> Sent: Monday, October 19, 2015 1:28 PM
> To: Madi Novak; Mike Murray; Mary Benzinger
> Subject: AON4-Seaport Landing
>
> All:
>
> One set of HCID analyses are done for some soil samples.

Let me know if you'd like us to trigger any NWTPH-Dx analyses based on these results.

Mark H.

--
Mark Harris
Project Manager
Analytical Resources, Inc.
206/695-6210
markh@arilabs.com

How was your customer experience?
Please take our 5 minute online customer survey<https://www.surveymonkey.com/s/WPDBVJK>.

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--
Mark Harris
Project Manager
Analytical Resources, Inc.
206/695-6210
markh@arilabs.com

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Mark Harris
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Analytical Resources, Inc.
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markh@arilabs.com

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Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: AOW2
Client: Maul Foster & Alongi
Project Event: 1044.02.01-02
Project Name: Seaport Landing

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	CR16A-5.0	AOW2A	15-19551	Sediment	10/14/15 14:15	10/16/15 15:20
2.	CR16A-14	AOW2B	15-19552	Sediment	10/14/15 14:17	10/16/15 15:20
3.	CR16B-0-10CM	AOW2C	15-19553	Sediment	10/14/15 14:40	10/16/15 15:20
4.	CR16B-10.0	AOW2D	15-19554	Sediment	10/14/15 14:43	10/16/15 15:20
5.	CR16B-13.0	AOW2E	15-19555	Sediment	10/14/15 14:45	10/16/15 15:20
6.	CR15C-SSD	AOW2F	15-19556	Sediment	10/14/15 16:26	10/16/15 15:20
7.	CR15C-5.0	AOW2G	15-19557	Sediment	10/14/15 16:34	10/16/15 15:20
8.	CR15D-0-10CM	AOW2H	15-19558	Sediment	10/14/15 16:41	10/16/15 15:20
9.	CR15C-SBSD	AOW2I	15-19559	Sediment	10/14/15 16:40	10/16/15 15:20
10.	CR16C-SSD	AOW2J	15-19560	Sediment	10/14/15	10/16/15 15:20
11.	FB05	AOW2K	15-19561	Sediment	10/14/15 11:30	10/16/15 15:20
12.	FB06	AOW2L	15-19562	Sediment	10/14/15 11:18	10/16/15 15:20
13.	FB07	AOW2M	15-19563	Sediment	10/14/15 11:35	10/16/15 15:20
14.	FB08	AOW2N	15-19564	Sediment	10/14/15 11:40	10/16/15 15:20
15.	CR08b-SSD-COMP	AOW2O	15-19565	Sediment	10/14/15 11:45	10/16/15 15:20
16.	CR15A-5	AOW2P	15-19566	Sediment	10/14/15 13:00	10/16/15 15:20
17.	CR15A-11	AOW2Q	15-19567	Sediment	10/14/15 13:00	10/16/15 15:20
18.	CR15B-0-10CM	AOW2R	15-19568	Sediment	10/14/15 13:40	10/16/15 15:20
19.	CR15B-5	AOW2S	15-19569	Sediment	10/14/15 13:45	10/16/15 15:20
20.	CR16A-0-10CM	AOW2T	15-19570	Sediment	10/14/15 14:10	10/16/15 15:20

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

AOW2:00010

Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for
NR	Spiked compound recovery is not reported due to chromatographic interference
NS	The flagged analyte was not spiked into the sample
M	Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
Y	The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
EMPC	Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**
C	The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
P	The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference
X	Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**
Z	Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

AOW2 : 00011

Geotechnical Data

A	The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
F	Samples were frozen prior to particle size determination
SM	Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
SS	Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
W	Weight of sample in some pipette aliquots was below the level required for accurate weighting

AOW2:00012

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 2

Sample ID: CR15C-SSD
SAMPLE

Lab Sample ID: AOW2F
LIMS ID: 15-19556
Matrix: Sediment
Data Release Authorized:
Reported: 11/18/15

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted: 10/30/15
Date Analyzed: 11/14/15 23:35
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.19 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 60.8%

CAS Number	Analyte	LOQ	Result	
108-95-2	**Phenol**	**20**	**50**	
106-46-7	1,4-Dichlorobenzene	20	< 20	U
100-51-6	Benzyl Alcohol	20	< 20	U
95-50-1	1,2-Dichlorobenzene	20	< 20	U
95-48-7	2-Methylphenol	20	< 20	U
106-44-5	**4-Methylphenol**	**20**	**89**	
105-67-9	2,4-Dimethylphenol	98	< 98	U
65-85-0	**Benzoic Acid**	**200**	**250**	**Q**
120-82-1	1,2,4-Trichlorobenzene	20	< 20	U
91-20-3	**Naphthalene**	**20**	**64**	
87-68-3	Hexachlorobutadiene	20	< 20	U
91-57-6	**2-Methylnaphthalene**	**20**	**19**	**J**
131-11-3	Dimethylphthalate	20	< 20	U
208-96-8	**Acenaphthylene**	**20**	**15**	**J**
83-32-9	**Acenaphthene**	**20**	**38**	
132-64-9	**Dibenzofuran**	**20**	**24**	
84-66-2	**Diethylphthalate**	**20**	**21**	**QB**
86-73-7	**Fluorene**	**20**	**29**	
86-30-6	N-Nitrosodiphenylamine	20	< 20	U
118-74-1	Hexachlorobenzene	20	< 20	U
87-86-5	Pentachlorophenol	98	< 98	U
85-01-8	**Phenanthrene**	**20**	**91**	
120-12-7	**Anthracene**	**20**	**18**	**J**
84-74-2	Di-n-Butylphthalate	20	< 20	U
206-44-0	**Fluoranthene**	**20**	**120**	
129-00-0	**Pyrene**	**20**	**98**	
85-68-7	Butylbenzylphthalate	20	< 20	U
56-55-3	**Benzo(a)anthracene**	**20**	**56**	
117-81-7	**bis(2-Ethylhexyl)phthalate**	**49**	**29**	**J**
218-01-9	**Chrysene**	**20**	**61**	
117-84-0	Di-n-Octyl phthalate	20	< 20	U
50-32-8	**Benzo(a)pyrene**	**20**	**31**	
193-39-5	**Indeno(1,2,3-cd)pyrene**	**20**	**18**	**J**
53-70-3	Dibenz(a,h)anthracene	20	< 20	U
191-24-2	**Benzo(g,h,i)perylene**	**20**	**23**	
90-12-0	**1-Methylnaphthalene**	**20**	**15**	**J**
TOTBFA	**Total Benzofluoranthenes**	**39**	**100**	

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS **Sample ID: CR15C-SSD**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AOW2F
LIMS ID: 15-19556
Matrix: Sediment
Date Analyzed: 11/14/15 23:35

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	72.4%	2-Fluorobiphenyl	60.6%
d14-p-Terphenyl	82.4%	d4-1,2-Dichlorobenzene	54.2%
d5-Phenol	50.9%	2-Fluorophenol	45.9%
2,4,6-Tribromophenol	81.1%	d4-2-Chlorophenol	58.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS **Sample ID: CR15C-SBSD**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AOW2I
LIMS ID: 15-19559
Matrix: Sediment
Data Release Authorized:
Reported: 11/18/15

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted: 10/30/15
Date Analyzed: 11/15/15 00:11
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.26 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 39.7%

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	20	< 20 U
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	**4-Methylphenol**	**20**	**52**
105-67-9	2,4-Dimethylphenol	98	< 98 U
65-85-0	**Benzoic Acid**	**200**	**160 JQ**
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	**Naphthalene**	**20**	**35**
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	**2-Methylnaphthalene**	**20**	**18 J**
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	**Acenaphthylene**	**20**	**15 J**
83-32-9	**Acenaphthene**	**20**	**37**
132-64-9	**Dibenzofuran**	**20**	**21**
84-66-2	**Diethylphthalate**	**20**	**26 QB**
86-73-7	**Fluorene**	**20**	**20**
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	98	< 98 U
85-01-8	**Phenanthrene**	**20**	**69**
120-12-7	**Anthracene**	**20**	**20**
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	**Fluoranthene**	**20**	**110**
129-00-0	**Pyrene**	**20**	**80**
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	**Benzo(a)anthracene**	**20**	**64**
117-81-7	bis(2-Ethylhexyl)phthalate	49	< 49 U
218-01-9	**Chrysene**	**20**	**69**
117-84-0	Di-n-Octyl phthalate	20	< 20 U
50-32-8	**Benzo(a)pyrene**	**20**	**35**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**20**	**17 J**
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	**Benzo(g,h,i)perylene**	**20**	**14 J**
90-12-0	**1-Methylnaphthalene**	**20**	**18 J**
TOTBFA	**Total Benzofluoranthenes**	**39**	**100**

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS **Sample ID: CR15C-SBSD**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AOW2I
LIMS ID: 15-19559
Matrix: Sediment
Date Analyzed: 11/15/15 00:11

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	55.0%	2-Fluorobiphenyl	51.6%
d14-p-Terphenyl	61.0%	d4-1,2-Dichlorobenzene	45.0%
d5-Phenol	38.8%	2-Fluorophenol	35.2%
2,4,6-Tribromophenol	64.1%	d4-2-Chlorophenol	44.1%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR06b-SSD-COMP SAMPLE

Lab Sample ID: AOW20
LIMS ID: 15-19565
Matrix: Sediment
Data Release Authorized:
Reported: 11/18/15

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing 1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted: 10/30/15
Date Analyzed: 11/15/15 00:47
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.42 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 54.8%

CAS Number	Analyte	LOQ	Result
108-95-2	**Phenol**	**19**	**71**
106-46-7	1,4-Dichlorobenzene	19	< 19 U
100-51-6	Benzyl Alcohol	19	< 19 U
95-50-1	1,2-Dichlorobenzene	19	< 19 U
95-48-7	**2-Methylphenol**	**19**	**14 J**
106-44-5	**4-Methylphenol**	**19**	**210**
105-67-9	2,4-Dimethylphenol	96	< 96 U
65-85-0	**Benzoic Acid**	**190**	**330 Q**
120-82-1	1,2,4-Trichlorobenzene	19	< 19 U
91-20-3	**Naphthalene**	**19**	**170**
87-68-3	Hexachlorobutadiene	19	< 19 U
91-57-6	2-Methylnaphthalene	19	< 19 U
131-11-3	Dimethylphthalate	19	< 19 U
208-96-8	**Acenaphthylene**	**19**	**51**
83-32-9	**Acenaphthene**	**19**	**51**
132-64-9	**Dibenzofuran**	**19**	**53**
84-66-2	**Diethylphthalate**	**19**	**36 QB**
86-73-7	**Fluorene**	**19**	**52**
86-30-6	N-Nitrosodiphenylamine	19	< 19 U
118-74-1	Hexachlorobenzene	19	< 19 U
87-86-5	Pentachlorophenol	96	< 96 U
85-01-8	**Phenanthrene**	**19**	**220**
120-12-7	**Anthracene**	**19**	**71**
84-74-2	Di-n-Butylphthalate	19	< 19 U
206-44-0	**Fluoranthene**	**19**	**280**
129-00-0	**Pyrene**	**19**	**250**
85-68-7	**Butylbenzylphthalate**	**19**	**310**
56-55-3	**Benzo(a)anthracene**	**19**	**94**
117-81-7	bis(2-Ethylhexyl)phthalate	48	< 48 U
218-01-9	**Chrysene**	**19**	**130**
117-84-0	Di-n-Octyl phthalate	19	< 19 U
50-32-8	**Benzo(a)pyrene**	**19**	**67**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**19**	**46**
53-70-3	**Dibenz(a,h)anthracene**	**19**	**12 J**
191-24-2	**Benzo(g,h,i)perylene**	**19**	**54**
90-12-0	**1-Methylnaphthalene**	**19**	**29**
TOTBFA	**Total Benzofluoranthenes**	**38**	**220**

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: CR08b-SSD-COMP SAMPLE

Lab Sample ID: AOW20
LIMS ID: 15-19565
Matrix: Sediment
Date Analyzed: 11/15/15 00:47

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	74.6%	2-Fluorobiphenyl	66.6%
d14-p-Terphenyl	76.2%	d4-1,2-Dichlorobenzene	66.8%
d5-Phenol	57.9%	2-Fluorophenol	61.2%
2,4,6-Tribromophenol	89.7%	d4-2-Chlorophenol	70.1%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 2

Sample ID: MB-103015
METHOD BLANK

Lab Sample ID: MB-103015
LIMS ID: 15-19556
Matrix: Sediment
Data Release Authorized:
Reported: 11/18/15

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/30/15
Date Analyzed: 11/05/15 21:17
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	LOQ	Result
108-95-2	Phenol	20	< 20 U
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	4-Methylphenol	20	< 20 U
105-67-9	2,4-Dimethylphenol	100	< 100 U
65-85-0	Benzoic Acid	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	Naphthalene	20	< 20 U
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	< 20 U
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	Acenaphthylene	20	< 20 U
83-32-9	Acenaphthene	20	< 20 U
132-64-9	Dibenzofuran	20	< 20 U
84-66-2	**Diethylphthalate**	**20**	**21**
86-73-7	Fluorene	20	< 20 U
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	100	< 100 U
85-01-8	Phenanthrene	20	< 20 U
120-12-7	Anthracene	20	< 20 U
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	Fluoranthene	20	< 20 U
129-00-0	Pyrene	20	< 20 U
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	Benzo(a)anthracene	20	< 20 U
117-81-7	bis(2-Ethylhexyl)phthalate	50	< 50 U
218-01-9	Chrysene	20	< 20 U
117-84-0	Di-n-Octyl phthalate	20	< 20 U
50-32-8	Benzo(a)pyrene	20	< 20 U
193-39-5	Indeno(1,2,3-cd)pyrene	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	20	< 20 U
90-12-0	1-Methylnaphthalene	20	< 20 U
TOTBFA	Total Benzofluoranthenes	40	< 40 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546

Sample ID: MB-103015
METHOD BLANK

Lab Sample ID: MB-103015
LIMS ID: 15-19556
Matrix: Sediment
Date Analyzed: 11/05/15 21:17

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

CAS Number	Analyte	LOQ	Result

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	61.0%	2-Fluorobiphenyl	65.0%
d14-p-Terphenyl	94.2%	d4-1,2-Dichlorobenzene	65.0%
d5-Phenol	65.6%	2-Fluorophenol	61.7%
2,4,6-Tribromophenol	74.3%	d4-2-Chlorophenol	66.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270 GC/MS
Page 1 of 2

Sample ID: LCS-103015
LAB CONTROL

Lab Sample ID: LCS-103015
LIMS ID: 15-19556
Matrix: Sediment
Data Release Authorized:
Reported: 11/18/15

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted: 10/30/15
Date Analyzed: 11/05/15 21:52
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Phenol	418	500	83.6%
1,4-Dichlorobenzene	339	500	67.8%
Benzyl Alcohol	401	500	80.2%
1,2-Dichlorobenzene	368	500	73.6%
2-Methylphenol	346	500	69.2%
4-Methylphenol	393	500	78.6%
2,4-Dimethylphenol	822	1500	54.8%
Benzoic Acid	2160	2750	78.5%
1,2,4-Trichlorobenzene	349	500	69.8%
Naphthalene	351	500	70.2%
Hexachlorobutadiene	390	500	78.0%
2-Methylnaphthalene	374	500	74.8%
Dimethylphthalate	372	500	74.4%
Acenaphthylene	356	500	71.2%
Acenaphthene	371	500	74.2%
Dibenzofuran	375	500	75.0%
Diethylphthalate	410 B	500	82.0%
Fluorene	342	500	68.4%
N-Nitrosodiphenylamine	368	500	73.6%
Hexachlorobenzene	350	500	70.0%
Pentachlorophenol	977	1500	65.1%
Phenanthrene	402	500	80.4%
Anthracene	405	500	81.0%
Di-n-Butylphthalate	446	500	89.2%
Fluoranthene	386	500	77.2%
Pyrene	371	500	74.2%
Butylbenzylphthalate	398	500	79.6%
Benzo(a)anthracene	401	500	80.2%
bis(2-Ethylhexyl)phthalate	372	500	74.4%
Chrysene	389	500	77.8%
Di-n-Octyl phthalate	353	500	70.6%
Benzo(a)pyrene	384	500	76.8%
Indeno(1,2,3-cd)pyrene	362	500	72.4%
Dibenz(a,h)anthracene	371	500	74.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270 GC/MS

Sample ID: LCS-103015
LAB CONTROL

Lab Sample ID: LCS-103015
LIMS ID: 15-19556
Matrix: Sediment
Date Analyzed: 11/05/15 21:52

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Analyte	Lab Control	Spike Added	Recovery
Benzo(g,h,i)perylene	304	500	60.8%
1-Methylnaphthalene	350	500	70.0%
Total Benzofluoranthenes	806	1000	80.6%

Semivolatile Surrogate Recovery	
d5-Nitrobenzene	63.8%
2-Fluorobiphenyl	65.2%
d14-p-Terphenyl	88.6%
d4-1,2-Dichlorobenzene	59.4%
d5-Phenol	65.6%
2-Fluorophenol	66.0%
2,4,6-Tribromophenol	70.7%
d4-2-Chlorophenol	66.8%

Reported in µg/kg (ppb)

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT OUT
MB-103015	61.0%	65.0%	94.2%	65.0%	65.6%	61.7%	74.3%	66.7%	0
LCS-103015	63.8%	65.2%	88.6%	59.4%	65.6%	66.0%	70.7%	66.8%	0
CR15C-SSD	72.4%	60.6%	82.4%	54.2%	50.9%	45.9%	81.1%	58.8%	0
CR15C-SBSD	55.0%	51.6%	61.0%	45.0%	38.8%	35.2%	64.1%	44.1%	0
CR08b-SSD-COMP	74.6%	66.6%	76.2%	66.8%	57.9%	61.2%	89.7%	70.1%	0

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(30-120)	(30-120)
(FBP) = 2-Fluorobiphenyl	(35-120)	(35-120)
(TPH) = d14-p-Terphenyl	(37-120)	(37-120)
(DCB) = d4-1,2-Dichlorobenzene	(32-120)	(32-120)
(PHL) = d5-Phenol	(29-120)	(29-120)
(2FP) = 2-Fluorophenol	(27-120)	(27-120)
(TBP) = 2,4,6-Tribromophenol	(24-134)	(24-134)
(2CP) = d4-2-Chlorophenol	(31-120)	(31-120)

Prep Method: SW3546
Log Number Range: 15-19556 to 15-19565

ARI Labs, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i
Lab File ID: 15111403.D
Analysis Type:
Lab Sample ID: ICV 5
Method: \\target\share\chem3\nt10.i\20151114.b\ABN.m

Injection Date: 14-NOV-2015 12:09
Init. Cal. Date(s): 19-OCT-2015 19-OCT-2015
Init. Cal. Times: 11:52 16:03
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RF5	CCAL RRF5	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
$ 1 2-Fluorophenol	1.12958	0.98032	0.98032	0.010	-13.21370	20.00000	Averaged	
$ 2 Phenol-d5	1.36520	1.13439	1.13439	0.010	-16.90661	20.00000	Averaged	
3 Phenol	1.33180	1.10533	1.10533	0.100	-17.00502	20.00000	Averaged	
$ 5 2-Chlorophenol-d4	1.33265	1.26674	1.26674	0.010	-4.94562	20.00000	Averaged	
4 Bis(2-Chloroethyl)ether	1.01930	0.79941	0.79941	0.700	-21.57225	20.00000	Averaged	<-
6 2-Chlorophenol	1.30689	1.28200	1.28200	0.800	-1.90460	20.00000	Averaged	
7 1,3-Dichlorobenzene	1.60078	1.54397	1.54397	0.010	-3.54909	20.00000	Averaged	
9 1,4-Dichlorobenzene	1.54535	1.45107	1.45107	0.010	-6.10132	20.00000	Averaged	
$ 10 1,2-Dichlorobenzene-d4	0.99122	0.96956	0.96956	0.010	-2.18580	20.00000	Averaged	
12 1,2-Dichlorobenzene	1.44684	1.42493	1.42493	0.010	-1.51401	20.00000	Averaged	
11 Benzyl alcohol	0.63765	0.61868	0.61868	0.010	-2.97423	20.00000	Averaged	
14 2,2'-oxybis(1-Chloropropane	0.45840	0.43519	0.43519	0.010	-5.06371	20.00000	Averaged	
13 2-Methylphenol	0.99636	0.87219	0.87219	0.700	-12.46244	20.00000	Averaged	
17 Hexachloroethane	0.61781	0.68425	0.68425	0.300	10.75475	20.00000	Averaged	
16 N-Nitroso-di-n-propylamine	0.74117	0.73679	0.73679	0.500	-0.59170	20.00000	Averaged	
15 4-Methylphenol	1.00886	0.95885	0.95885	0.600	-4.95718	20.00000	Averaged	
$ 18 Nitrobenzene-d5	0.39605	0.41261	0.41261	0.010	4.18241	20.00000	Averaged	
19 Nitrobenzene	0.36379	0.38536	0.38536	0.200	5.92827	20.00000	Averaged	
20 Isophorone	0.57522	0.57445	0.57445	0.300	-0.13479	20.00000	Averaged	
21 2-Nitrophenol	0.21477	0.20907	0.20907	0.100	-2.65471	20.00000	Averaged	
22 2,4-Dimethylphenol	0.39317	0.42421	0.42421	0.200	7.89512	20.00000	Averaged	
23 Bis(2-Chloroethoxy)methane	0.32972	0.28007	0.28007	0.050	-15.05717	20.00000	Averaged	
24 Benzoic acid	20.00000	15.43857	0.18026	0.010	-22.80714	20.00000	Quadratic	<-
25 2,4-Dichlorophenol	0.32107	0.33912	0.33912	0.100	5.62338	20.00000	Averaged	
26 1,2,4-Trichlorobenzene	0.37492	0.36985	0.36985	0.010	-1.35257	20.00000	Averaged	
28 Naphthalene	1.03606	0.92566	0.92566	0.100	-10.65624	20.00000	Averaged	
29 4-Chloroaniline	0.41428	0.37549	0.37549	0.010	-9.36314	20.00000	Averaged	
30 Hexachlorobutadiene	0.24781	0.27807	0.27807	0.010	12.21075	20.00000	Averaged	
31 4-Chloro-3-methylphenol	0.33608	0.34643	0.34643	0.200	3.07743	20.00000	Averaged	
32 2-Methylnaphthalene	0.74547	0.73816	0.73816	0.300	-0.98109	20.00000	Averaged	
33 Hexachlorocyclopentadiene	0.41843	0.48613	0.48613	0.001	16.17855	20.00000	Averaged	
34 2,4,6-Trichlorophenol	0.37961	0.42039	0.42039	0.200	10.74070	20.00000	Averaged	
35 2,4,5-Trichlorophenol	0.39251	0.45345	0.45345	0.200	15.52692	20.00000	Averaged	
$ 36 2-Fluorobiphenyl	1.40765	1.33204	1.33204	0.010	-5.37119	20.00000	Averaged	
37 2-Chloronaphthalene	1.14337	1.14997	1.14997	0.700	0.57749	20.00000	Averaged	
38 2-Nitroaniline	0.31622	0.40203	0.40203	0.010	27.13477	20.00000	Averaged	<-
39 Dimethylphthalate	1.36783	1.52406	1.52406	0.010	11.42196	20.00000	Averaged	
40 Acenaphthylene	1.73670	1.75215	1.75215	0.900	0.88965	20.00000	Averaged	
41 2,6-Dinitrotoluene	0.28981	0.32357	0.32357	0.100	11.64737	20.00000	Averaged	
43 3-Nitroaniline	0.28271	0.24382	0.24382	0.010	-13.75648	20.00000	Averaged	
44 Acenaphthene	1.04524	1.02061	1.02061	0.100	-2.35672	20.00000	Averaged	
45 2,4-Dinitrophenol	20.00000	19.95149	0.16875	0.030	-0.24255	20.00000	Quadratic	

ARI Labs, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i
Lab File ID: 15111403.D
Analysis Type:
Lab Sample ID: ICV 5
Method: \\target\share\chem3\nt10.i\20151114.b\ABN.m

Injection Date: 14-NOV-2015 12:09
Init. Cal. Date(s): 19-OCT-2015 19-OCT-2015
Init. Cal. Times: 11:52 16:03
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RF5	CCAL RRF5	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
46 Dibenzofuran	1.57152	1.56593	1.56593	0.800	-0.35557	20.00000	Averaged	
47 4-Nitrophenol	10.00000	13.43358	0.35747	0.010	34.33584	20.00000	Quadratic	<-
48 2,4-Dinitrotoluene	0.39543	0.44242	0.44242	0.200	11.88253	20.00000	Averaged	
50 Diethylphthalate	1.32554	1.82004	1.82004	0.010	37.30561	20.00000	Averaged	<-
49 Fluorene	1.34379	1.20933	1.20933	0.100	-10.00593	20.00000	Averaged	
51 4-Chlorophenyl-phenylether	0.68765	0.71361	0.71361	0.100	3.77493	20.00000	Averaged	
52 4-Nitroaniline	0.30110	0.27918	0.27918	0.010	-7.27836	20.00000	Averaged	
53 4,6-Dinitro-2-methylphenol	20.00000	18.45121	0.13467	0.001	-7.74397	20.00000	Quadratic	
54 N-Nitrosodiphenylamine	0.54831	0.50803	0.50803	0.010	-7.34588	20.00000	Averaged	
$ 55 2,4,6-Tribromophenol	0.34466	0.40646	0.40646	0.010	17.93047	20.00000	Averaged	
56 4-Bromophenyl-phenylether	0.27932	0.29241	0.29241	0.100	4.68494	20.00000	Averaged	
57 Hexachlorobenzene	0.36460	0.33543	0.33543	0.100	-8.00104	20.00000	Averaged	
58 Pentachlorophenol	10.00000	7.95604	0.16235	0.010	-20.43960	20.00000	Quadratic	<-
60 Phenanthrene	1.02053	0.95681	0.95681	0.700	-6.24361	20.00000	Averaged	
61 Anthracene	1.04166	1.02305	1.02305	0.700	-1.78690	20.00000	Averaged	
62 Carbazole	0.87135	0.79066	0.79066	0.010	-9.26048	20.00000	Averaged	
63 Di-n-butylphthalate	1.31288	1.40257	1.40257	0.010	6.83226	20.00000	Averaged	
64 Fluoranthene	1.11470	1.02121	1.02121	0.600	-8.38756	20.00000	Averaged	
65 Pyrene	1.18016	1.00630	1.00630	0.600	-14.73179	20.00000	Averaged	
$ 66 Terphenyl-d14	0.74289	0.66949	0.66949	0.010	-9.88103	20.00000	Averaged	
67 Butylbenzylphthalate	0.50597	0.53414	0.53414	0.010	5.56781	20.00000	Averaged	
68 Benzo(a)anthracene	1.12072	1.07562	1.07562	0.700	-4.02433	20.00000	Averaged	
70 3,3'-Dichlorobenzidine	0.75137	0.72269	0.72269	0.010	-3.81794	20.00000	Averaged	
71 Chrysene	0.97701	0.91661	0.91661	0.700	-6.18140	20.00000	Averaged	
72 bis(2-Ethylhexyl)phthalate	0.52679	0.48036	0.48036	0.010	-8.81366	20.00000	Averaged	
73 Di-n-octylphthalate	1.07536	0.91915	0.91915	0.010	-14.52593	20.00000	Averaged	
74 Benzo(b)fluoranthene	1.08810	1.03403	1.03403	0.700	-4.96944	20.00000	Averaged	
75 Benzo(k)fluoranthene	1.08482	0.99545	0.99545	0.700	-8.23784	20.00000	Averaged	
76 Benzo(a)pyrene	1.03138	0.99224	0.99224	0.700	-3.79407	20.00000	Averaged	
78 Indeno(1,2,3-cd)pyrene	1.37485	1.40557	1.40557	0.500	2.23424	20.00000	Averaged	
79 Dibenzo(a,h)anthracene	1.13622	1.09199	1.09199	0.400	-3.89259	20.00000	Averaged	
80 Benzo(g,h,i)perylene	1.23143	1.18040	1.18040	0.500	-4.14398	20.00000	Averaged	
90 N-Nitrosodimethylamine	0.53343	0.47585	0.47585	0.010	-10.79437	20.00000	Averaged	
91 Aniline	1.56324	1.29410	1.29410	0.010	-17.21667	20.00000	Averaged	
93 Benzidine	0.38521	0.16659	0.16659	0.010	-56.75226	20.00000	Averaged	<-
103 Pyridine	0.85366	0.79840	0.79840	0.010	-6.47352	20.00000	Averaged	
105 1-methylnaphthalene	0.76506	0.70658	0.70658	0.010	-7.64354	20.00000	Averaged	
111 Azobenzene (1,2-DP-Hydrazin	1.22084	1.62369	1.62369	0.010	32.99768	20.00000	Averaged	<-
187 Total Benzofluoranthenes	1.04123	0.97581	0.97581	0.010	-6.28350	20.00000	Averaged	
99 Perylene	0.99701	0.95088	0.95088	0.010	-4.62702	20.00000	Averaged	
98 Retene	++++	0.00066	0.00066	0.010	++++	20.00000	Averaged	<-
120 2,3,4,6-Tetrachlorophenol	0.35337	0.33535	0.33535	0.010	-5.09982	20.00000	Averaged	

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: MB-103015**
Extraction Method: SW3546 **METHOD BLANK**

Lab Sample ID: MB-103015
LIMS ID: 15-19556
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/19/15

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/30/15
Date Analyzed: 11/05/15 21:17
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	Dibenz(a,h)anthracene	5.0	< 5.0 U
106-46-7	1,4-Dichlorobenzene	5.0	< 5.0 U
120-82-1	1,2,4-Trichlorobenzene	5.0	< 5.0 U
118-74-1	Hexachlorobenzene	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	5.0	< 5.0 U
131-11-3	Dimethylphthalate	5.0	< 5.0 U
85-68-7	Butylbenzylphthalate	5.0	< 5.0 U
95-48-7	2-Methylphenol	5.0	< 5.0 U
105-67-9	2,4-Dimethylphenol	25	< 25 U
86-30-6	N-Nitrosodiphenylamine	5.0	< 5.0 U
100-51-6	Benzyl Alcohol	20	< 20 U
87-86-5	Pentachlorophenol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	5.0	< 5.0 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	57.9%
d14-p-Terphenyl	75.6% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR15C-SSD**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AOW2F
LIMS ID: 15-19556
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/19/15

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted: 10/30/15
Date Analyzed: 11/14/15 23:35
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.19 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 60.8%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**4.9**	**4.0 J**
106-46-7	1,4-Dichlorobenzene	4.9	< 4.9 U
120-82-1	1,2,4-Trichlorobenzene	4.9	< 4.9 U
118-74-1	Hexachlorobenzene	4.9	< 4.9 U
87-68-3	Hexachlorobutadiene	4.9	< 4.9 U
131-11-3	Dimethylphthalate	4.9	< 4.9 U
85-68-7	Butylbenzylphthalate	4.9	< 4.9 U
95-48-7	2-Methylphenol	4.9	< 4.9 U
105-67-9	2,4-Dimethylphenol	24	< 24 U
86-30-6	N-Nitrosodiphenylamine	4.9	< 4.9 U
100-51-6	Benzyl Alcohol	20	< 20 U
87-86-5	Pentachlorophenol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	4.9	< 4.9 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery	
2-Fluorophenol	48.0%
d14-p-Terphenyl	73.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR15C-SBSD**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AOW2I
LIMS ID: 15-19559
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/19/15

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted: 10/30/15
Date Analyzed: 11/15/15 00:11
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.26 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 39.7%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**4.9**	**4.3 J**
106-46-7	1,4-Dichlorobenzene	4.9	< 4.9 U
120-82-1	1,2,4-Trichlorobenzene	4.9	< 4.9 U
118-74-1	Hexachlorobenzene	4.9	< 4.9 U
87-68-3	Hexachlorobutadiene	4.9	< 4.9 U
131-11-3	Dimethylphthalate	4.9	< 4.9 U
85-68-7	Butylbenzylphthalate	4.9	< 4.9 U
95-48-7	2-Methylphenol	4.9	< 4.9 U
105-67-9	2,4-Dimethylphenol	24	< 24 U
86-30-6	N-Nitrosodiphenylamine	4.9	< 4.9 U
100-51-6	Benzyl Alcohol	20	< 20 U
87-86-5	Pentachlorophenol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	4.9	< 4.9 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery	
2-Fluorophenol	33.7%
d14-p-Terphenyl	61.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR08b-SSD-COMP**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: AOW20
LIMS ID: 15-19565
Matrix: Sediment
Data Release Authorized:
Reported: 11/19/15

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted: 10/30/15
Date Analyzed: 11/15/15 00:47
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.42 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 54.8%
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**4.8**	**12**
106-46-7	1,4-Dichlorobenzene	4.8	< 4.8 U
120-82-1	1,2,4-Trichlorobenzene	4.8	< 4.8 U
118-74-1	Hexachlorobenzene	4.8	< 4.8 U
87-68-3	Hexachlorobutadiene	4.8	< 4.8 U
131-11-3	Dimethylphthalate	4.8	< 4.8 U
85-68-7	**Butylbenzylphthalate**	**4.8**	**320**
95-48-7	2-Methylphenol	4.8	< 4.8 U
105-67-9	2,4-Dimethylphenol	24	< 24 U
86-30-6	N-Nitrosodiphenylamine	4.8	< 4.8 U
100-51-6	Benzyl Alcohol	19	< 19 U
87-86-5	**Pentachlorophenol**	**19**	**11 JQ**
95-50-1	1,2-Dichlorobenzene	4.8	< 4.8 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery	
2-Fluorophenol	56.3%
d14-p-Terphenyl	78.6%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: LCS-103015**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-103015
LIMS ID: 15-19556
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/19/15

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/30/15
Date Analyzed LCS: 11/05/15 21:52
Instrument/Analyst LCS: NT10/YZ

Sample Amount LCS: 10.00 g-dry-wt
Final Extract Volume LCS: 1.0 mL
Dilution Factor LCS: 1.00

Analyte	LCS	Spike Added	Recovery
Dibenz(a,h)anthracene	334	500	66.8%
1,4-Dichlorobenzene	316	500	63.2%
1,2,4-Trichlorobenzene	324	500	64.8%
Hexachlorobenzene	333	500	66.6%
Hexachlorobutadiene	364	500	72.8%
Dimethylphthalate	378	500	75.6%
Butylbenzylphthalate	416	500	83.2%
2-Methylphenol	317	500	63.4%
2,4-Dimethylphenol	770	1500	51.3%
N-Nitrosodiphenylamine	346	500	69.2%
Benzyl Alcohol	416	500	83.2%
Pentachlorophenol	1210 EQ	1500	80.7%
1,2-Dichlorobenzene	328	500	65.6%

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	60.9%
d14-p-Terphenyl	71.2% Q

ANALYTICAL RESOURCES INCORPORATED

SIM SW8270 SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	FPH	TER	TOT OUT
MB-103015	57.9%	75.6% Q	0
LCS-103015	60.9%	71.2% Q	0
CR15C-SSD	48.0%	73.8%	0
CR15C-SBSD	33.7%	61.2%	0
CR08b-SSD-COMP	56.3%	78.6%	0

	QC LIMITS	
(FPH) = 2-Fluorophenol	(27-120)	(27-120)
(TER) = d14-p-Terphenyl	(37-120)	(37-120)

Prep Method: SW3546
Log Number Range: 15-19556 to 15-19565

ARI Labs, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i
Lab File ID: CC1105A.D
Analysis Type:
Lab Sample ID: CC1105A
Method: \\target\share\chem3\nt10.i\20151105.b\SIM.b\SIMABN2.m

Injection Date: 05-NOV-2015 14:04
Init. Cal. Date(s): 19-OCT-2015 19-OCT-2015
Init. Cal. Times: 11:52 16:39
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RF1	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
S 1 2-Fluorophenol	1.04543	0.98207	0.010	-6.06090	20.00000	Averaged	
3 Phenol	1.55661	1.46467	0.010	-5.90683	20.00000	Averaged	
7 1,3-Dichlorobenzene	1.76229	1.78433	0.010	1.25101	20.00000	Averaged	
9 1,4-Dichlorobenzene	1.73930	1.78433	0.010	2.58940	20.00000	Averaged	
11 Benzyl alcohol	0.81726	0.79485	0.010	-2.74242	20.00000	Averaged	
12 1,2-Dichlorobenzene	1.62946	1.72457	0.010	5.83701	20.00000	Averaged	
13 2-Methylphenol	0.93390	0.81370	0.010	-12.87015	20.00000	Averaged	
15 4-Methylphenol	0.91605	0.81780	0.010	-10.72571	20.00000	Averaged	
16 N-Nitroso-di-n-propylamine	0.61594	0.57662	0.050	-6.38240	20.00000	Averaged	
22 2,4-Dimethylphenol	0.39393	0.33255	0.010	-15.58052	20.00000	Averaged	
26 1,2,4-Trichlorobenzene	0.39456	0.41910	0.010	6.21998	20.00000	Averaged	
30 Hexachlorobutadiene	0.30361	0.33208	0.010	9.37722	20.00000	Averaged	
39 Dimethylphthalate	1.14558	1.01470	0.010	-11.42453	20.00000	Averaged	
50 Diethylphthalate	1.23806	1.13213	0.010	-8.55608	20.00000	Averaged	
54 N-Nitrosodiphenylamine	0.61955	0.57444	0.010	-7.27995	20.00000	Averaged	
57 Hexachlorobenzene	0.41451	0.46057	0.010	11.11164	20.00000	Averaged	
58 Pentachlorophenol	0.21311	0.15371	0.005	-27.87342	20.00000	Averaged	<-
S 66 Terphenyl-d14	0.36942	0.25581	0.010	-30.75549	20.00000	Averaged	<-
67 Butylbenzylphthalate	0.41305	0.39038	0.010	-5.48875	20.00000	Averaged	
79 Dibenzo(a,h)anthracene	1.15706	1.04200	0.010	-9.94423	20.00000	Averaged	
90 N-Nitrosodimethylamine	0.44352	0.46419	0.010	4.66003	20.00000	Averaged	

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR15C-SSD**
Page 1 of 1

Lab Sample ID: AOW2F
LIMS ID: 15-19556
Matrix: Sediment
Data Release Authorized:
Reported: 11/11/15

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted: 10/26/18
Date Analyzed: 11/05/15 05:51
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Silica-Florisil Cleanup: Yes
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.69	0.65-0.89		0.995	1.55	
2,3,7,8-TCDD	0.71	0.65-0.89		0.995	2.70	
1,2,3,7,8-PeCDF	1.58	1.32-1.78		0.995	0.408	J
2,3,4,7,8-PeCDF	1.26	1.32-1.78		0.995	0.505	JEMPC
1,2,3,7,8-PeCDD	1.57	1.32-1.78		0.995	3.65	
1,2,3,4,7,8-HxCDF	1.02	1.05-1.43		0.995	1.25	EMPC
1,2,3,6,7,8-HxCDF	1.27	1.05-1.43		0.995	0.806	J
2,3,4,6,7,8-HxCDF	1.01	1.05-1.43		0.995	1.21	EMPC
1,2,3,7,8,9-HxCDF	1.25	1.05-1.43		0.995	0.338	BJ
1,2,3,4,7,8-HxCDD	1.41	1.05-1.43		0.995	1.22	
1,2,3,6,7,8-HxCDD	1.29	1.05-1.43		0.995	5.48	
1,2,3,7,8,9-HxCDD	1.24	1.05-1.43		0.995	10.0	
1,2,3,4,6,7,8-HpCDF	0.96	0.88-1.20		0.995	25.3	
1,2,3,4,7,8,9-HpCDF	0.87	0.88-1.20		0.995	0.959	JEMPC
1,2,3,4,6,7,8-HpCDD	1.02	0.88-1.20		0.995	100	
OCDF	0.86	0.76-1.02		1.99	33.1	
OCDD	0.90	0.76-1.02		9.95	790	

Homologue Group	EDL	RL	Result	
Total TCDF		0.995	13.7	EMPC
Total TCDD		0.995	20.3	EMPC
Total PeCDF		1.99	12.6	EMPC
Total PeCDD		0.995	26.5	
Total HxCDF		1.99	28.1	EMPC
Total HxCDD		1.99	76.1	EMPC
Total HpCDF		1.99	60.7	EMPC
Total HpCDD		1.99	275	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 10.2

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 10.2

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: CR15C-SSD

Lab Sample ID: AOW2F
LIMS ID: 15-19556
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted: 10/26/18
Date Analyzed: 11/05/15 05:51
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.77	0.65-0.89	90.3	24-169	
13C-2,3,7,8-TCDD	0.79	0.65-0.89	84.7	25-164	
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	91.8	24-185	
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	91.0	21-178	
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	89.4	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	86.4	26-152	
13C-1,2,3,6,7,8-HxCDF	0.51	0.43-0.59	83.7	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	92.0	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	89.4	29-147	
13C-1,2,3,4,7,8-HxCDD	1.28	1.05-1.43	94.1	32-141	
13C-1,2,3,6,7,8-HxCDD	1.23	1.05-1.43	86.9	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	82.7	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	82.4	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	88.4	23-140	
13C-OCDD	0.88	0.76-1.02	81.8	17-157	
37Cl4-2,3,7,8-TCDD			92.6	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR08b-SSD-COMP**
Page 1 of 1

Lab Sample ID: AOW20
LIMS ID: 15-19565
Matrix: Sediment
Data Release Authorized:
Reported: 11/11/15

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted: 10/26/18
Date Analyzed: 11/05/15 06:44
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.2 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Silica-Florisil Cleanup: Yes
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.69	0.65-0.89		0.984	2.48	
2,3,7,8-TCDD	0.78	0.65-0.89		0.984	2.79	
1,2,3,7,8-PeCDF	1.61	1.32-1.78		0.984	0.978	J
2,3,4,7,8-PeCDF	1.48	1.32-1.78		0.984	1.06	
1,2,3,7,8-PeCDD	1.64	1.32-1.78		0.984	4.81	
1,2,3,4,7,8-HxCDF	1.10	1.05-1.43		0.984	4.39	
1,2,3,6,7,8-HxCDF	1.15	1.05-1.43		0.984	2.13	
2,3,4,6,7,8-HxCDF	1.18	1.05-1.43		0.984	3.84	
1,2,3,7,8,9-HxCDF	1.17	1.05-1.43		0.984	1.62	
1,2,3,4,7,8-HxCDD	1.18	1.05-1.43		0.984	2.96	
1,2,3,6,7,8-HxCDD	1.28	1.05-1.43		0.984	22.3	
1,2,3,7,8,9-HxCDD	1.28	1.05-1.43		0.984	13.9	
1,2,3,4,6,7,8-HpCDF	0.96	0.88-1.20		0.984	75.8	
1,2,3,4,7,8,9-HpCDF	0.94	0.88-1.20		0.984	3.72	
1,2,3,4,6,7,8-HpCDD	1.02	0.88-1.20		0.984	955	
OCDF	0.83	0.76-1.02		1.97	128	
OCDD	0.89	0.76-1.02		9.84	22,200	E

Homologue Group	EDL	RL	Result	
Total TCDF		0.984	21.7	EMPC
Total TCDD		0.984	25.0	EMPC
Total PeCDF		1.97	35.9	EMPC
Total PeCDD		0.984	38.2	
Total HxCDF		1.97	119	EMPC
Total HxCDD		1.97	321	
Total HpCDF		1.97	243	EMPC
Total HpCDD		1.97	4,120	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 30.4

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 30.4

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: CR08b-SSD-COMP

Lab Sample ID: AOW20
LIMS ID: 15-19565
Matrix: Sediment
Data Release Authorized: AW
Reported: 11/11/15

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted: 10/26/18
Date Analyzed: 11/05/15 06:44
Instrument/Analyst: AS1/PK

Sample Amount: 10.2 g-dry-wt
Final Extract Volume: 20 uL
Extract Split: 1.00
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.77	0.65-0.89	92.6	24-169	
13C-2,3,7,8-TCDD	0.79	0.65-0.89	85.4	25-164	
13C-1,2,3,7,8-PeCDF	1.56	1.32-1.78	92.5	24-185	
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	91.9	21-178	
13C-1,2,3,7,8-PeCDD	1.59	1.32-1.78	91.5	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	87.3	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	83.7	26-123	
13C-2,3,4,6,7,8-HxCDF	0.51	0.43-0.59	90.3	28-136	
13C-1,2,3,7,8,9-HxCDF	0.51	0.43-0.59	85.8	29-147	
13C-1,2,3,4,7,8-HxCDD	1.28	1.05-1.43	93.6	32-141	
13C-1,2,3,6,7,8-HxCDD	1.26	1.05-1.43	87.5	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	80.9	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	80.5	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	87.2	23-140	
13C-OCDD	0.89	0.76-1.02	86.1	17-157	
37Cl4-2,3,7,8-TCDD			94.2	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: MB-102615

Lab Sample ID: MB-102615
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 11/05/15 00:25
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF		0.65-0.89	0.0500	1.00	< 0.0500	U
2,3,7,8-TCDD		0.65-0.89	0.0560	1.00	< 0.0560	U
1,2,3,7,8-PeCDF		1.32-1.78	0.0580	1.00	< 0.0580	U
2,3,4,7,8-PeCDF		1.32-1.78	0.0600	1.00	< 0.0600	U
1,2,3,7,8-PeCDD		1.32-1.78	0.0980	1.00	< 0.0980	U
1,2,3,4,7,8-HxCDF		1.05-1.43	0.0640	1.00	< 0.0640	U
1,2,3,6,7,8-HxCDF		1.05-1.43	0.0580	1.00	< 0.0580	U
2,3,4,6,7,8-HxCDF		1.05-1.43	0.0620	1.00	< 0.0620	U
1,2,3,7,8,9-HxCDF	1.11	1.05-1.43		1.00	0.116	J
1,2,3,4,7,8-HxCDD		1.05-1.43	0.0840	1.00	< 0.0840	U
1,2,3,6,7,8-HxCDD		1.05-1.43	0.0880	1.00	< 0.0880	U
1,2,3,7,8,9-HxCDD		1.05-1.43	0.0880	1.00	< 0.0880	U
1,2,3,4,6,7,8-HpCDF	0.84	0.88-1.20		1.00	0.196	JEMPC
1,2,3,4,7,8,9-HpCDF		0.88-1.20	0.0600	1.00	< 0.0600	U
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20		1.00	1.99	
OCDF	0.72	0.76-1.02		2.00	0.776	JEMPC
OCDD	0.86	0.76-1.02		10.0	16.9	

Homologue Group	EDL	RL	Result	
Total TCDF	0.0500	1.00	< 0.0500	U
Total TCDD	0.0560	1.00	0.0524	EMPC
Total PeCDF	0.0600	2.00	< 0.0600	U
Total PeCDD	0.0980	1.00	0.253	EMPC
Total HxCDF		2.00	0.117	
Total HxCDD	0.0880	2.00	1.31	EMPC
Total HpCDF		2.00	0.426	EMPC
Total HpCDD		2.00	5.27	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 0.04

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 0.15

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: MB-102615

Lab Sample ID: MB-102615
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 11/05/15 00:25
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	99.6	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	95.8	25-164	
13C-1,2,3,7,8-PeCDF	1.59	1.32-1.78	103	24-185	
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	96.9	21-178	
13C-1,2,3,7,8-PeCDD	1.59	1.32-1.78	98.0	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	99.9	26-152	
13C-1,2,3,6,7,8-HxCDF	0.51	0.43-0.59	101	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	99.4	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	92.8	29-147	
13C-1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	103	32-141	
13C-1,2,3,6,7,8-HxCDD	1.26	1.05-1.43	99.0	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	90.7	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	91.9	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.07	0.88-1.20	98.5	23-140	
13C-OCDD	0.91	0.76-1.02	84.7	17-157	
37Cl4-2,3,7,8-TCDD			105	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-102615

Lab Sample ID: OPR-102615
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 11/05/15 01:26
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	RL	Result
2,3,7,8-TCDF	0.70	0.65-0.89	1.00	20.6
2,3,7,8-TCDD	0.74	0.65-0.89	1.00	21.4
1,2,3,7,8-PeCDF	1.43	1.32-1.78	1.00	103
2,3,4,7,8-PeCDF	1.44	1.32-1.78	1.00	104
1,2,3,7,8-PeCDD	1.56	1.32-1.78	1.00	104
1,2,3,4,7,8-HxCDF	1.14	1.05-1.43	1.00	105
1,2,3,6,7,8-HxCDF	1.14	1.05-1.43	1.00	105
2,3,4,6,7,8-HxCDF	1.15	1.05-1.43	1.00	105
1,2,3,7,8,9-HxCDF	1.15	1.05-1.43	1.00	105
1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	1.00	102
1,2,3,6,7,8-HxCDD	1.19	1.05-1.43	1.00	104
1,2,3,7,8,9-HxCDD	1.23	1.05-1.43	1.00	107
1,2,3,4,6,7,8-HpCDF	0.98	0.88-1.20	1.00	108
1,2,3,4,7,8,9-HpCDF	0.99	0.88-1.20	1.00	109
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20	1.00	104
OCDF	0.82	0.76-1.02	2.00	199
OCDD	0.90	0.76-1.02	10.0	212

Homologue Group	EDL	RL	Result	
Total TCDF		1.00	21.4	EMPC
Total TCDD		1.00	22.0	EMPC
Total PeCDF		2.00	211	EMPC
Total PeCDD		1.00	104	EMPC
Total HxCDF		2.00	421	EMPC
Total HxCDD		2.00	314	EMPC
Total HpCDF		2.00	217	
Total HpCDD		2.00	106	

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-102615

Lab Sample ID: OPR-102615
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 11/05/15 01:26
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.77	0.65-0.89	93.5	24-169	
13C-2,3,7,8-TCDD	0.80	0.65-0.89	89.2	25-164	
13C-1,2,3,7,8-PeCDF	1.55	1.32-1.78	97.5	24-185	
13C-2,3,4,7,8-PeCDF	1.55	1.32-1.78	92.4	21-178	
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	93.9	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	90.4	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	88.6	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	89.2	28-136	
13C-1,2,3,7,8,9-HxCDF	0.51	0.43-0.59	84.5	29-147	
13C-1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	95.2	32-141	
13C-1,2,3,6,7,8-HxCDD	1.26	1.05-1.43	89.2	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	82.3	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.43	0.37-0.51	82.6	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.02	0.88-1.20	88.8	23-140	
13C-OCDD	0.90	0.76-1.02	77.0	17-157	
37Cl4-2,3,7,8-TCDD			99.1	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-102615

Lab Sample ID: OPR-102615
LIMS ID: 15-19544
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/11/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 11/05/15 01:26
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	OPR	Spiked	Recovery	Limits
2,3,7,8-TCDF	20.6	20.0	103	75-158
2,3,7,8-TCDD	21.4	20.0	107	67-158
1,2,3,7,8-PeCDF	103	100	103	80-134
2,3,4,7,8-PeCDF	104	100	104	68-160
1,2,3,7,8-PeCDD	104	100	104	70-142
1,2,3,4,7,8-HxCDF	105	100	105	72-134
1,2,3,6,7,8-HxCDF	105	100	105	84-130
2,3,4,6,7,8-HxCDF	105	100	105	70-156
1,2,3,7,8,9-HxCDF	105	100	105	78-130
1,2,3,4,7,8-HxCDD	102	100	102	70-164
1,2,3,6,7,8-HxCDD	104	100	104	76-134
1,2,3,7,8,9-HxCDD	107	100	107	64-162
1,2,3,4,6,7,8-HpCDF	108	100	108	82-132
1,2,3,4,7,8,9-HpCDF	109	100	109	78-138
1,2,3,4,6,7,8-HpCDD	104	100	104	70-140
OCDF	199	200	99.5	63-170
OCDD	212	200	106	78-144

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR15C-SSD
SAMPLE

Lab Sample ID: AOW2F
LIMS ID: 15-19556
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted: 10/26/15
Date Analyzed: 10/30/15 00:29
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.10 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 60.8%

CAS Number	Analyte	LOQ	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
11100-14-4	Aroclor 1268	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	71.8%
Tetrachlorometaxylene	80.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR15C-SBSD
SAMPLE

Lab Sample ID: AOW2I
LIMS ID: 15-19559
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted: 10/26/15
Date Analyzed: 10/30/15 00:50
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.45 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 39.7%

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	18	< 18 U
53469-21-9	Aroclor 1242	18	< 18 U
12672-29-6	Aroclor 1248	18	< 18 U
11097-69-1	Aroclor 1254	18	< 18 U
11096-82-5	Aroclor 1260	18	< 18 U
11104-28-2	Aroclor 1221	18	< 18 U
11141-16-5	Aroclor 1232	18	< 18 U
11100-14-4	Aroclor 1268	18	< 18 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	70.5%
Tetrachlorometaxylene	79.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR08b-SSD-COMP
SAMPLE

Lab Sample ID: AOW20
LIMS ID: 15-19565
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Date Extracted: 10/26/15
Date Analyzed: 10/30/15 01:11
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.44 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 54.8%

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	18	< 18 U
53469-21-9	Aroclor 1242	18	< 18 U
12672-29-6	Aroclor 1248	18	< 18 U
11097-69-1	Aroclor 1254	18	< 18 U
11096-82-5	**Aroclor 1260**	**18**	**14 J**
11104-28-2	Aroclor 1221	18	< 18 U
11141-16-5	Aroclor 1232	18	< 18 U
11100-14-4	Aroclor 1268	18	< 18 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	64.2%
Tetrachlorometaxylene	74.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: MB-102615
METHOD BLANK

Lab Sample ID: MB-102615
LIMS ID: 15-19556
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 10/29/15 18:54
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: NA

CAS Number	Analyte	LOQ	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
11100-14-4	Aroclor 1268	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	71.8%
Tetrachlorometaxylene	77.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Page 1 of 1

Sample ID: LCS-102615
LAB CONTROL

Lab Sample ID: LCS-102615
LIMS ID: 15-19556
Matrix: Sediment
Data Release Authorized:
Reported: 11/03/15

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/26/15
Date Analyzed: 10/29/15 19:14
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Aroclor 1016	405	500	81.0%
Aroclor 1260	407	500	81.4%

PCB Surrogate Recovery

Decachlorobiphenyl	74.0%
Tetrachlorometaxylene	82.0%

Results reported in µg/kg (ppb)

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB SOIL/SOLID/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-102615	71.8%	40-133	77.5%	53-120	0
LCS-102615	74.0%	40-133	82.0%	53-120	0
CR15C-SSD	71.8%	40-133	80.5%	53-120	0
CR15C-SBSD	70.5%	40-133	79.0%	53-120	0
CR08b-SSD-COMP	64.2%	40-133	74.0%	53-120	0

Microwave (MARS) Control Limits PCBSMP
Prep Method: SW3546
Log Number Range: 15-19556 to 15-19565

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Extraction Method: SW3546
Page 1 of 1

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Matrix: Sediment

Date Received: 10/16/15

Data Release Authorized:
Reported: 11/02/15

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range/Surrogate	LOQ	Result
MB-102315	Method Blank	10/23/15	10/28/15	1.00	Diesel Range	5.0	< 5.0 U
15-19556	HC ID: ---		FID3B	1.0	Motor Oil Range	10	< 10 U
					o-Terphenyl		74.0%
AOW2F	CR15C-SSD	10/23/15	10/29/15	1.00	**Diesel Range**	**13**	**77**
15-19556	HC ID: **DIESEL/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**25**	**190**
					o-Terphenyl		74.8%
AOW2O	CR08b-SSD-COMP	10/23/15	10/29/15	1.00	**Diesel Range**	**11**	**130**
15-19565	HC ID: **DIESEL/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**22**	**320**
					o-Terphenyl		68.1%

Reported in mg/kg (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
LOQ-Limit of Quantitation

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: LCS-102315
LAB CONTROL

Lab Sample ID: LCS-102315
LIMS ID: 15-19556
Matrix: Sediment
Data Release Authorized:
Reported: 11/02/15

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 10/23/15
Date Analyzed: 10/28/15 22:59
Instrument/Analyst: FID3B/ML

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
Diesel	109	150	72.7%

TPHD Surrogate Recovery

o-Terphenyl	74.6%

Results reported in mg/kg

FORM III

ANALYTICAL RESOURCES INCORPORATED

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	OTER	TOT OUT
102315MB	74.0%	0
102315LCS	74.6%	0
CR15C-SSD	74.8%	0
CR08b-SSD-COMP	68.1%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3546
Log Number Range: 15-19556 to 15-19565

FORM-II TPHD

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

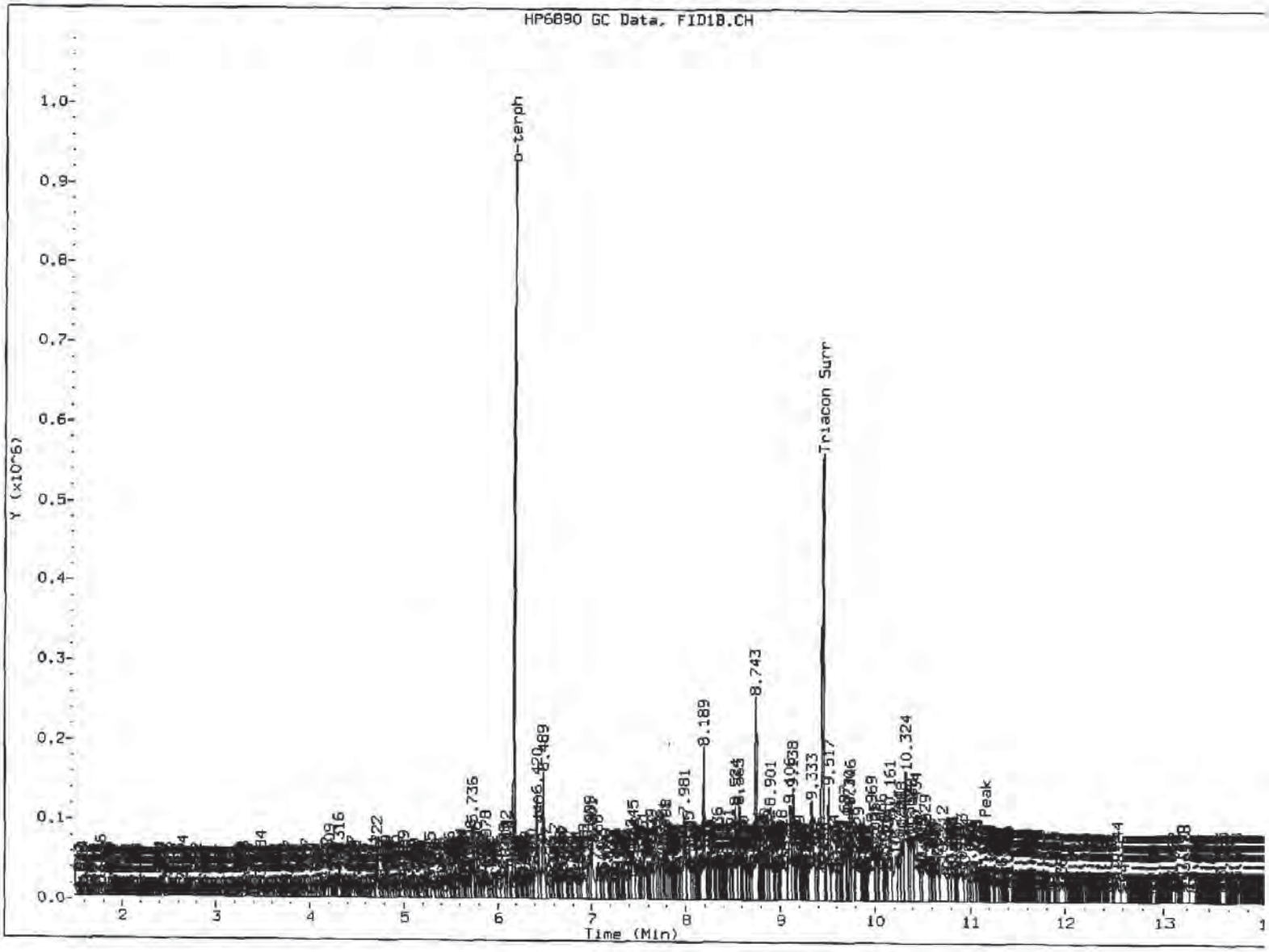
Matrix: Sediment
Date Received: 10/16/15

ARI Job: AOW2
Project: Seaport Landing
1044.02.01-02

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep Date
15-19556-102315MB1	Method Blank	10.0 g	1.00 mL	-	10/23/15
15-19556-102315LCS1	Lab Control	10.0 g	1.00 mL	-	10/23/15
15-19556-AOW2F	CR15C-SSD	3.94 g	1.00 mL	D	10/23/15
15-19565-AOW2O	CR08b-SSD-COMP	4.53 g	1.00 mL	D	10/23/15

Basis: D=Dry Weight W=As Received

FID:3B-2C/RTX-1 AOW2F FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5) Skimmed surrogate

Analyst: MM Date: 10/29/15

Data File: \\target\share\chem2\fid3b.i\20151028.b\15102842.D

Page 1

Date : 29-OCT-2015 01:49

Client ID: CR15C-SSD

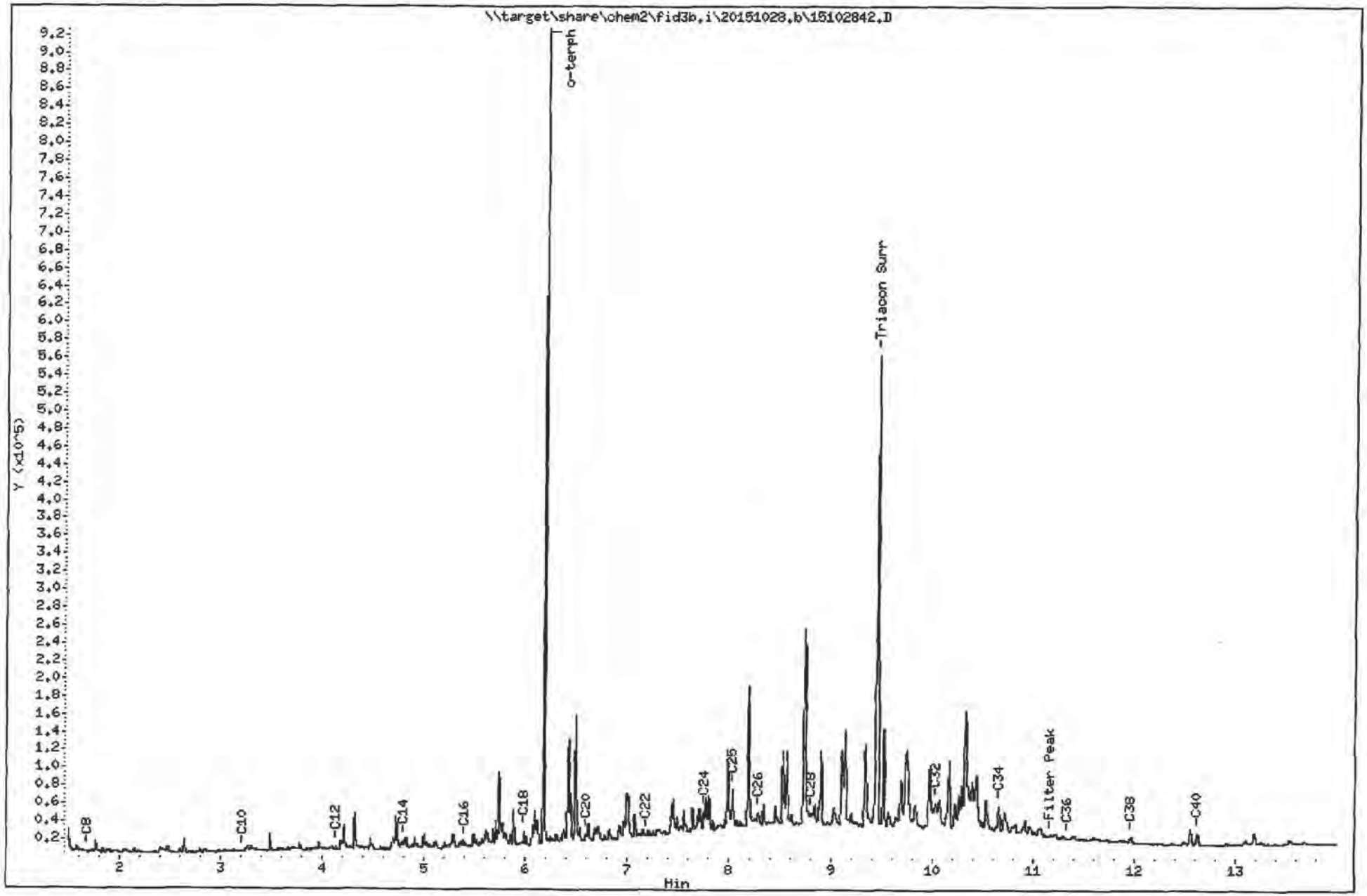
Instrument: fid3b.i

Sample Info: AOW2F

Operator: ML

Column phase: RTX-1

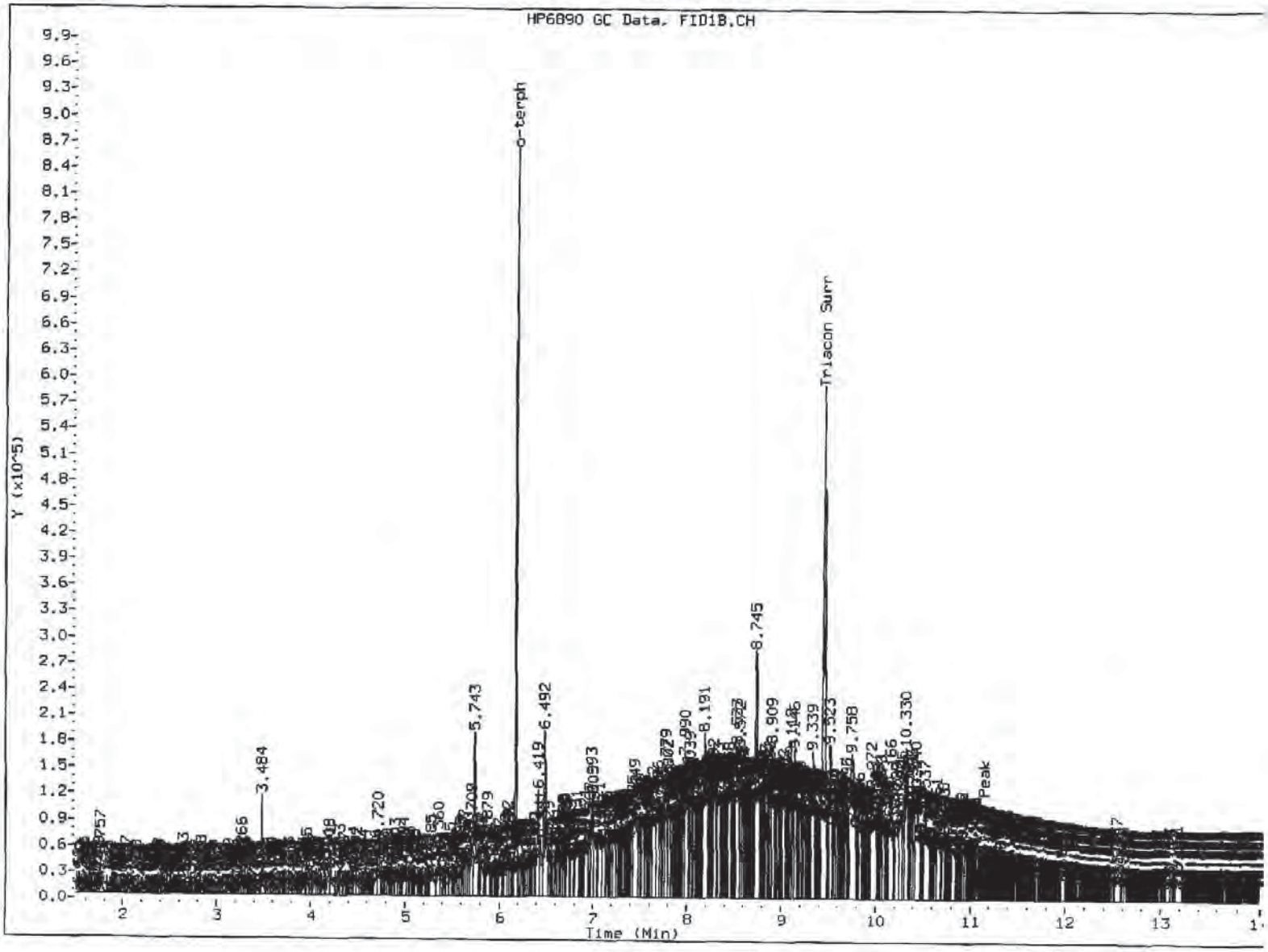
Column diameter: 0.25



AOW2:00053

FID:3B-2C/RTX-1 AOW2O

FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5.) Skimmed surrogate

Analyst: ML Date: 10/29/15

AOW2:00054

Data File: \\target\share\chem2\fid3b.i\20151028.b\15102843.D

Date : 29-OCT-2015 02:10

Client ID: CR08b-SSD-COMP

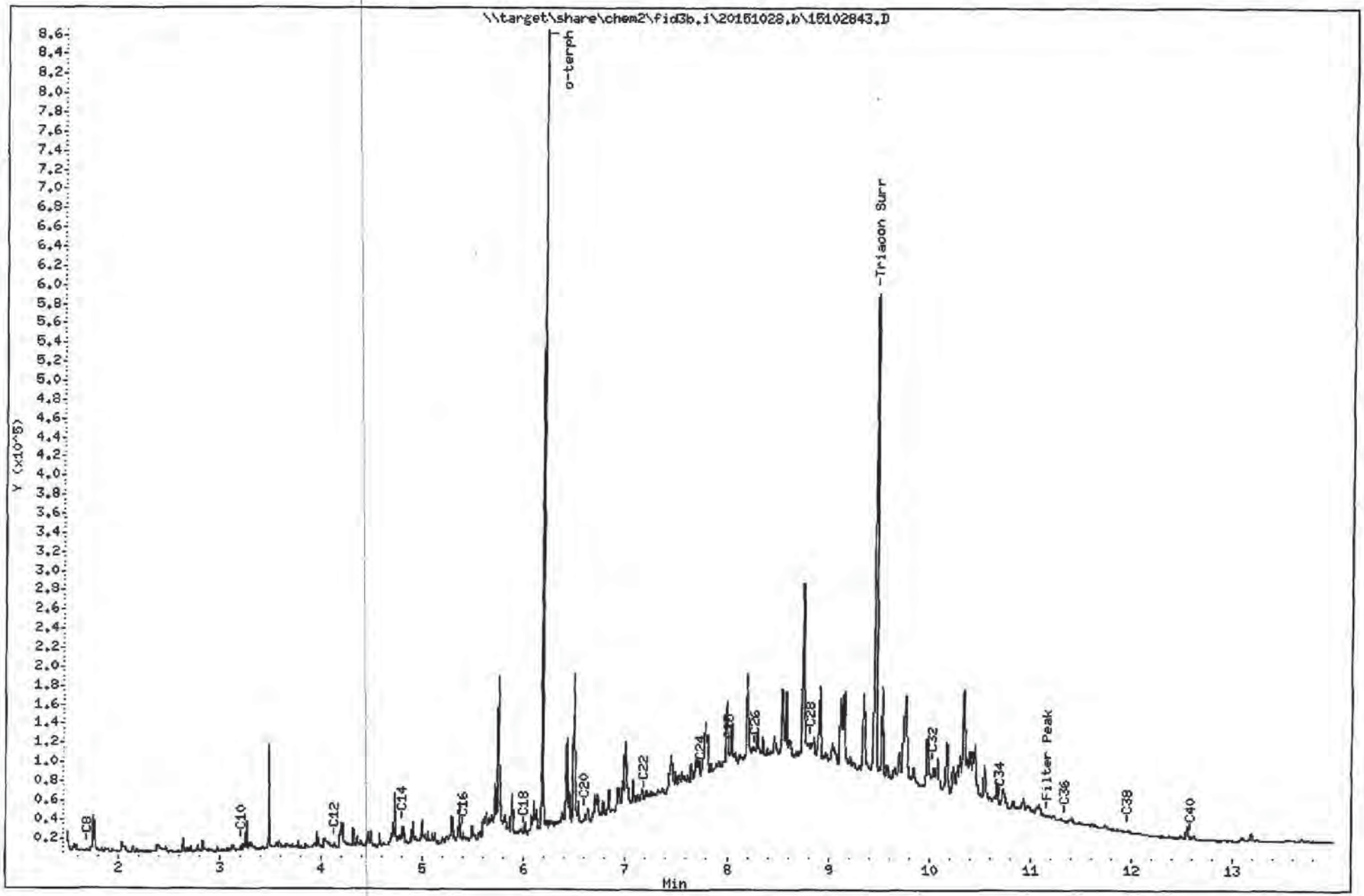
Sample Info: AOW20

Column phase: RTX-1

Instrument: fid3b.i

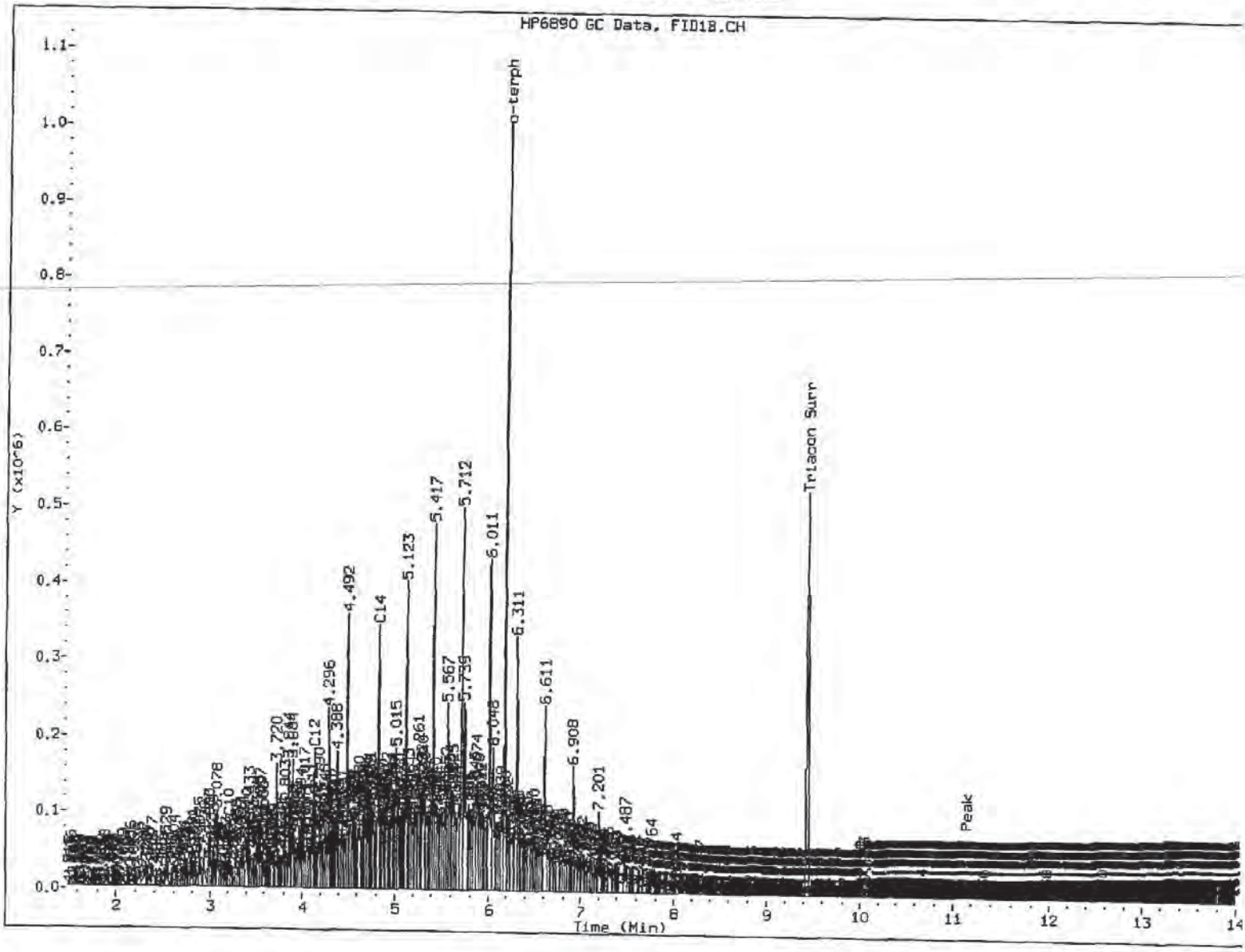
Operator: ML

Column diameter: 0.25



AOW2:00055

FID:3B-2C/RTX-1 AOV8LCSS1 FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5) Skimmed surrogate

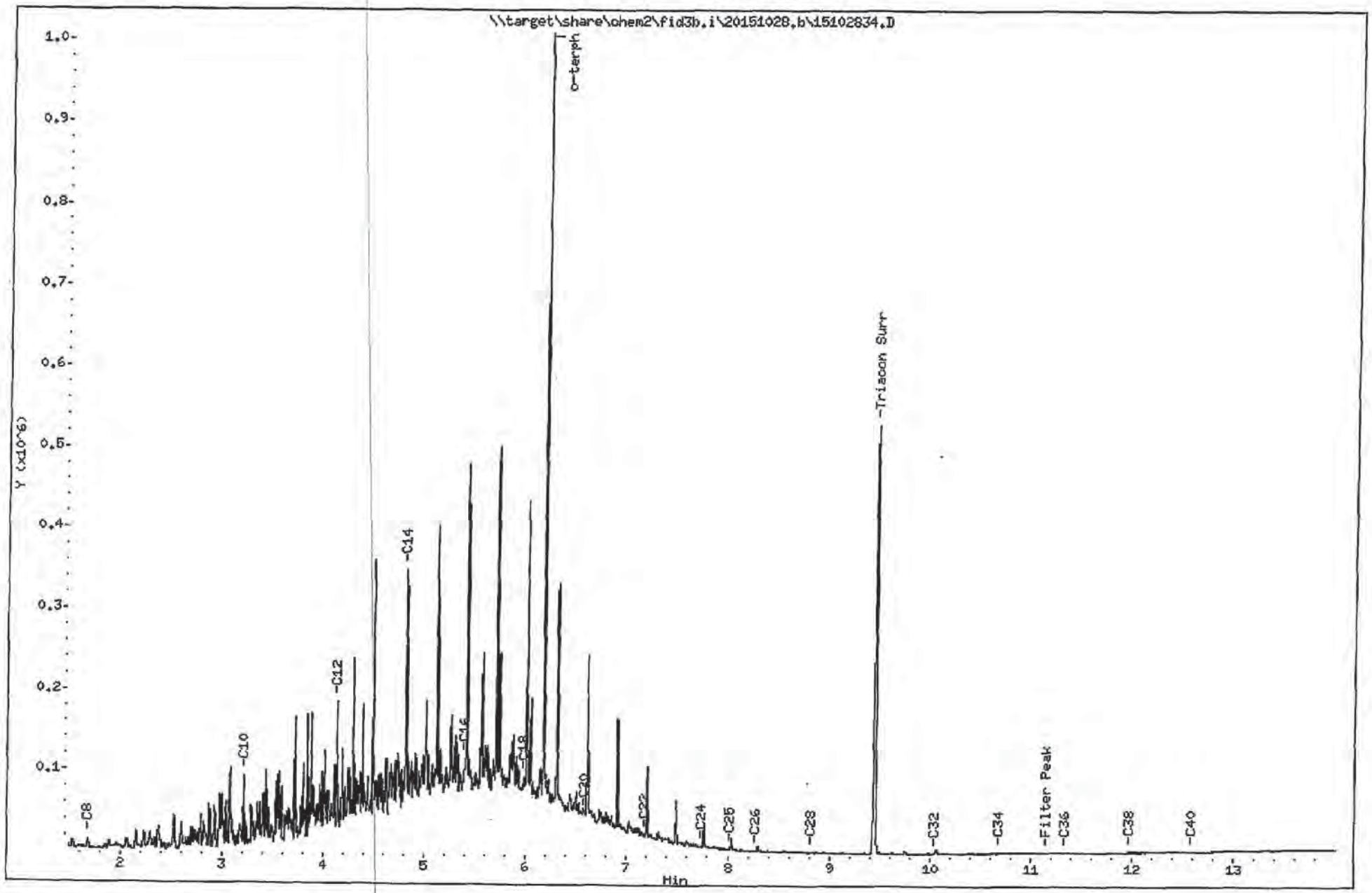
Analyst: MM Date: 10/29/15

Data File: \\target\share\chem2\fid3b.i\20151028.b\15102834.D
Date : 28-OCT-2015 22:59
Client ID: AOV8LCSS1
Sample Info: AOV8LCSS1

Column phase: RTX-1

Instrument: fid3b.i

Operator: ML
Column diameter: 0.25



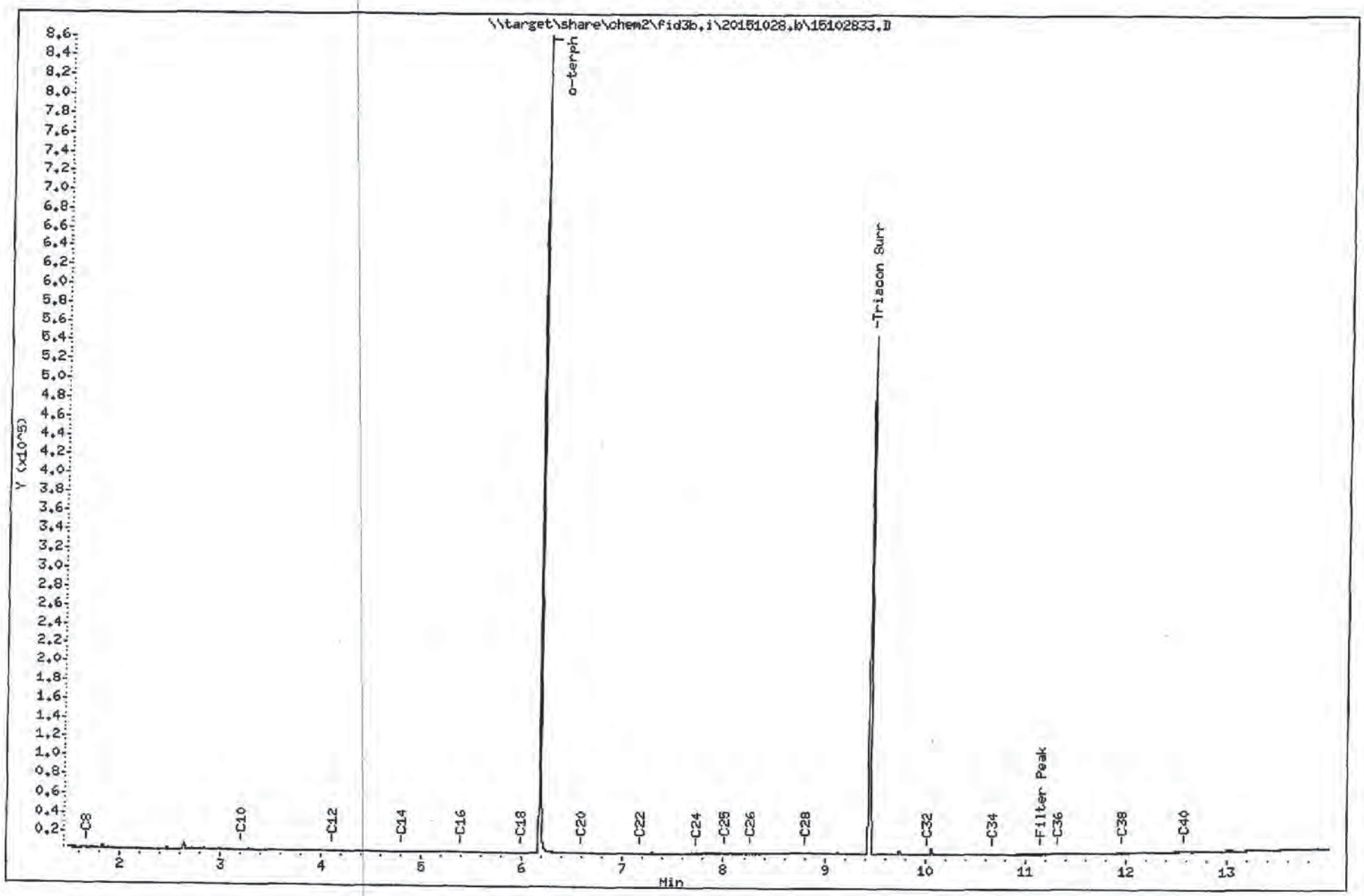
AOW2:00057

Data File: \\target\share\chem2\fid3b.i\20151028.b\15102833.D
Date : 28-OCT-2015 22:38
Client ID: AOV8MBS1
Sample Info: AOV8MBS1

Instrument: fid3b.i

Operator: ML
Column diameter: 0.25

Column phase: RTX-1



SAMPLE RESULTS-CONVENTIONALS
AOW2-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 11/12/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Client ID: CR15C-SSD
ARI ID: 15-19556 AOW2F

Analyte	Date	Method	Units	RL	Sample
Total Solids	10/21/15 102115#1	SM2540G	Percent	0.01	35.10
Total Organic Carbon	11/09/15 110915#1	Plumb,1981	Percent	0.020	3.17

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
AOW2-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: JJ
Reported: 11/12/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Client ID: CR15C-SBSD
ARI ID: 15-19559 AOW2I

Analyte	Date	Method	Units	RL	Sample
Total Solids	10/21/15 102115#1	SM2540G	Percent	0.01	57.47
Total Organic Carbon	11/09/15 110915#1	Plumb,1981	Percent	0.020	1.73

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
AOW2-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: JJ
Reported: 11/12/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Client ID: CR08b-SSD-COMP
ARI ID: 15-19565 AOW20

Analyte	Date	Method	Units	RL	Sample
Total Solids	10/21/15 102115#1	SM2540G	Percent	0.01	44.38
Total Organic Carbon	11/10/15 111015#1	Plumb,1981	Percent	0.020	2.05

RL Analytical reporting limit
U Undetected at reported detection limit

METHOD BLANK RESULTS-CONVENTIONALS
AOW2-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: W
Reported: 11/12/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Analyte	Date	Units	Blank	QC ID
Total Solids	10/21/15	Percent	< 0.01 U	ICB
Total Organic Carbon	11/09/15	Percent	< 0.020 U	ICB
	11/10/15		< 0.020 U	ICB

LAB CONTROL RESULTS-CONVENTIONALS
AOW2-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: LJ
Reported: 11/12/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Total Organic Carbon	ICVL	11/09/15	Percent	0.096	0.100	96.0%
Plumb,1981	ICVL	11/10/15		0.092	0.100	92.0%

STANDARD REFERENCE RESULTS-CONVENTIONALS
AOW2-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: W
Reported: 11/12/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Date	Units	SRM	True Value	Recovery
Total Organic Carbon	11/09/15	Percent	3.03	2.99	101.3%
NIST 1941B	11/10/15		2.89	2.99	96.7%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR15C-SSD
SAMPLE

Lab Sample ID: AOW2F
LIMS ID: 15-19556
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Percent Total Solids: 36.2%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	11/02/15	6010C	11/03/15	**7440-38-2**	**Arsenic**	10	**20**	
3050B	11/02/15	6010C	11/03/15	7440-43-9	Cadmium	0.5	0.5	U
3050B	11/02/15	6010C	11/03/15	**7440-47-3**	**Chromium**	1	**40**	
3050B	11/02/15	6010C	11/03/15	**7440-50-8**	**Copper**	0.5	**51.9**	
3050B	11/02/15	6010C	11/03/15	**7439-92-1**	**Lead**	5	**11**	
CLP	11/02/15	7471A	11/06/15	7439-97-6	Mercury	0.06	0.06	U
3050B	11/02/15	6010C	11/03/15	7440-22-4	Silver	0.8	0.8	U
3050B	11/02/15	6010C	11/03/15	**7440-66-6**	**Zinc**	3	**77**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR15C-SBSD
SAMPLE

Lab Sample ID: AOW2I
LIMS ID: 15-19559
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Percent Total Solids: 57.4%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	11/02/15	6010C	11/03/15	**7440-38-2**	**Arsenic**	8	**21**	
3050B	11/02/15	6010C	11/03/15	7440-43-9	Cadmium	0.3	0.3	U
3050B	11/02/15	6010C	11/03/15	**7440-47-3**	**Chromium**	0.8	**34.5**	
3050B	11/02/15	6010C	11/03/15	**7440-50-8**	**Copper**	0.3	**54.7**	
3050B	11/02/15	6010C	11/03/15	**7439-92-1**	**Lead**	3	**9**	
CLP	11/02/15	7471A	11/06/15	**7439-97-6**	**Mercury**	0.04	**0.04**	
3050B	11/02/15	6010C	11/03/15	7440-22-4	Silver	0.5	0.5	U
3050B	11/02/15	6010C	11/03/15	**7440-66-6**	**Zinc**	2	**69**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR08b-SSD-COMP
SAMPLE

Lab Sample ID: AOW20
LIMS ID: 15-19565
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOW2-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/14/15
Date Received: 10/16/15

Percent Total Solids: 43.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	11/02/15	6010C	11/03/15	**7440-38-2**	**Arsenic**	10	**20**	
3050B	11/02/15	6010C	11/03/15	7440-43-9	Cadmium	0.4	0.4	U
3050B	11/02/15	6010C	11/03/15	**7440-47-3**	**Chromium**	1	**42**	
3050B	11/02/15	6010C	11/03/15	**7440-50-8**	**Copper**	0.4	**61.1**	
3050B	11/02/15	6010C	11/03/15	**7439-92-1**	**Lead**	4	**14**	
CLP	11/02/15	7471A	11/06/15	**7439-97-6**	**Mercury**	0.05	**0.06**	
3050B	11/02/15	6010C	11/03/15	7440-22-4	Silver	0.7	0.7	U
3050B	11/02/15	6010C	11/03/15	**7440-66-6**	**Zinc**	2	**90**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: AOW1MB
LIMS ID: 15-19550
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	11/02/15	6010C	11/03/15	7440-38-2	Arsenic	5	5	U
3050B	11/02/15	6010C	11/03/15	7440-43-9	Cadmium	0.2	0.2	U
3050B	11/02/15	6010C	11/03/15	7440-47-3	Chromium	0.5	0.5	U
3050B	11/02/15	6010C	11/03/15	7440-50-8	Copper	0.2	0.2	U
3050B	11/02/15	6010C	11/03/15	7439-92-1	Lead	2	2	U
CLP	11/02/15	7471A	11/06/15	7439-97-6	Mercury	0.02	0.02	U
3050B	11/02/15	6010C	11/03/15	7440-22-4	Silver	0.3	0.3	U
3050B	11/02/15	6010C	11/03/15	7440-66-6	Zinc	1	1	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: AOW1LCS
LIMS ID: 15-19550
Matrix: Sediment
Data Release Authorized:
Reported: 11/07/15

QC Report No: AOW1-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	6010C	200	200	100%	
Cadmium	6010C	49.7	50.0	99.4%	
Chromium	6010C	50.9	50.0	102%	
Copper	6010C	47.6	50.0	95.2%	
Lead	6010C	197	200	98.5%	
Mercury	7471A	0.49	0.50	98.0%	
Silver	6010C	51.3	50.0	103%	
Zinc	6010C	47	50	94.0%	

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%

October 28, 2015

NVL LABS
INDUSTRIAL HYGIENE SERVICES
Laboratory | Management | Training

Mark Harris
Analytical Resources, Incorporated
4611 S. 134th Place Suite 100
Tukwila, WA 98168

RE: Bulk Asbestos Fiber Analysis; NVL Batch # 1519448.00

Client Project: ARI Project AOW2 Seaport Landing
Location: N-A

Dear Mr. Harris,

Enclosed please find test results for the 1 sample(s) submitted to our laboratory for analysis on 10/23/2015.

Examination of these samples was conducted for the presence of identifiable asbestos fibers using polarized light microscopy (PLM) with dispersion staining in accordance with both **EPA 600/M4-82-020**, Interim Method for the Determination of Asbestos in Bulk Insulation Samples and **EPA 600/R-93/116** Method for the Determination of Asbestos in Bulk Building Materials.

For samples containing more than one separable layer of materials, the report will include findings for each layer (labeled Layer 1 and Layer 2, etc. for each individual layer). The asbestos concentration in the sample is determined by calibrated visual estimation.

For those samples with asbestos concentrations between 1 and 10 percent based on visual estimation, the EPA recommends a procedure known as point counting (NESHAPS, 40 CFR Part 61). Point counting is a statistically more accurate means of quantification for samples with low concentrations of asbestos.

The detection limit for the calibrated visual estimation is <1%, 400 point counts is 0.25% and 1000 point counts is 0.1%

Samples are archived for two weeks following analysis. Samples that are not retrieved by the client are discarded after two weeks.

Thank you for using our laboratory services. Please do not hesitate to call if there is anything further we can assist you with.

Sincerely,

Nick Ly, Technical Director

Enc.: Sample Results

NVLAP
Lab Code: 102063-0

1.888.NVL.LABS
1.888.(685.5227)
www.nvllabs.com

NVL Laboratories, Inc.
4708 Aurora Ave N, Seattle, WA 98103
p 206.547.0100 | f 206.634.1936

AOW2 : 00070

NVL Laboratories, Inc.
4708 Aurora Ave N, Seattle, WA 98103
p 206.547.0100 | f 206.634.1936 | www.nvllabs.com

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: Analytical Resources, Incorporated
Address: 4611 S. 134th Place Suite 100
Tukwila, WA 98168

Attention: Mr. Mark Harris
Project Location: N-A

Batch #: 1519448.00
Client Project #: ARI Project AOW2 Seaport Landing
Date Received: 10/23/2015
Samples Received: 1
Samples Analyzed: 1
Method: EPA/600/R-93/116
& EPA/600/M4-82-020

Lab ID: 15116162 **Client Sample #: 15-19565-AOW2O**

Location: N-A

Comments: Sample was dried prior to analysis. Qualitative analysis was conducted for presence of asbestos.

Layer 1 of 1 **Description:** Black wet sludge sample

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Fine particles, Paint, Rusted metal	Cellulose	**None Detected ND**
Mica		

Sampled by: Client
Analyzed by: Nadezhda Prysyazhnyuk **Date:** 10/28/2015
Reviewed by: Nick Ly **Date:** 10/28/2015

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

AOW2 : 00071

NVL Laboratories, Inc.
4708 Aurora Ave N, Seattle, WA 98103
p 206.547.0100 | f 206.634.1936 | www.nvllabs.com

ASBESTOS LABORATORY SERVICES

NVL LABS

Company Analytical Resources, Incorporated
Address 4611 S. 134th Place Suite 100
Tukwila, WA 98168
Project Manager Mr. Mark Harris
Phone (206) 695-6200

NVL Batch Number 1519448.00
TAT 5 Days **AH** No
Rush TAT
Due Date 10/30/2015 **Time** 12:10 PM
Email markh@arilabs.com
Fax (206) 695-6202

Project Name/Number: ARI Project AOW2 Seaport Landing **Project Location:** N-A

Subcategory PLM Bulk
Item Code ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

Total Number of Samples 1 Rush Samples

	Lab ID	Sample ID	Description	A/R
1	15116162	15-19565-AOW2O		A

	Print Name	Signature	Company	Date	Time
Sampled by	Client				
Relinquished by	UPS				

Office Use Only	Print Name	Signature	Company	Date	Time
Received by	Maxwell Raymond		NVL	10/23/15	1210
Analyzed by	Nadezhda		NVL	10/28/15	4:37 PM
Results Called by					
☐ **Faxed** ☐ **Emailed**					

Special Instructions:

Date: 10/23/2015
Time: 5:37 PM
Entered By: Justin Shearer

AOW2 : 00072

SUBCONTRACTOR ANALYSIS REQUEST
CUSTODY TRANSFER 10/20/15

ANALYTICAL RESOURCES INCORPORATED

1519448

Laboratory: NVL Laboratories, Inc
Lab Contact: Perry Cheston
Lab Address: 4708 Aurora Ave. N.
Seattle, WA 98103
Phone: 206-547-0100
Fax: 206-344-1878

Analytical Protocol: PSDDA
Special Instructions:

ARI Client: Maul Foster & Alongi
Project ID: Seaport Landing
ARI PM: Mark Harris
Phone: 206-695-6210
Fax: 206-695-6201
Email: subdata@arilabs.com

Requested Turn Around: **10/30/15**
Email Results (Y/N): **Yes**

Limits of Liability. *Subcontractor is expected to perform all requested services in accordance with appropriate methodology following Standard Operating Procedures that meet standards for the industry. The total liability of ARI, its officers, agents, employees, or sucessors, arising out of or in connection with the requested services, shall not exceed the negotiated amount for said services. The agreement by the Subcontractor to perform services requested by ARI releases ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Subcontractor.*

ARI ID	Client ID/ Add'l ID	Sampled	Matrix	Bottles	Analyses
15-19565-AOW20	CR08b-SSD-COMP	10/14/15 11:45	Sediment	1	Asbestos (Sub)

Special Instructions: None

Carrier UPS		Airbill 1Z 832 695 03 5570 9540		Date 10/22/15	
Relinquished by W	Company ARI	Date 10/22/15		Time 927	
Received by	Company NVL	Date 10/23/		Time 1210 UPS	

Subcontractor Custody Form - **AOW2**
Page 1 of 1

AOW2 : 00073

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Organic Extractions Laboratory Analyst Notes

ARI Job No.: ACW2 (RE) Client ID: Navi Foster & Alaugi

Batch ID:

Parameter: BAN/SIM SVOA Client Project: Seaport Landing

Screens: Soil/Sediment/Solid/Other:	Analyst/Date
☒ No Anomalies (standard soil/wet sediment/sand/gravel)=	RH 10/21/15
☐ Standing Water Decanted (Not shared)= F O	
☐ Standing Water Homogenized (Shared samples)=	
☒ Clay/Clumps (Difficult to homogenize)= I, G	RH 10/21/15
☐ Rocks (%+size)?	
☐ Organics (Leaves/sticks/grass)=	
☐ Oily, obvious fuel/sulfur odors=	
☐ Received in 32oz jar(s)=Homogenized in Pyrex dish=	
☐ Other (Details)=	
Aqueous:	
☐ No Anomalies	
☐ Turbid/Color=	
☐ Particulates(%)=(Note: >5%=Notify Supervisor/Lead)	
☐ Emulsions (%)=	
☐ Oily, obvious fuel/sulfur odors=	
☐ Other (Details)=	
☐ Received in 1.0L Bottle(s)=No Bottle Rinse=	
☒ Other Notes/Comments= (Note problems, concerns, corrective actions). Original Extracts	
Samples F, I, O lost due to GPC malfunction. Samples pulled from freezer to re-extract.	SP 10/29/15
☐ Share Samples Y / N	
☐ Multiple Jars (Y) N O7	RH 10/21/15
☐ Sample Pre-Screens indicate analyte activity=	
☐ Sample weights/volumes reduced based on Pre-Screen=	11/18/15

Analytical Resources, Incorporated
Analytical Chemists and Consultants

7 December 2015

Madi Novak
Maul, Foster and Alongi, Inc
2001 NW 19th Avenue
Suite 200
Portland, OR 97209

RE: Project: Seaport Landing
ARI Job No.: ART5

Dear Madi:

Please find enclosed the final results for the samples from the project referenced above. These samples were originally received on October 16, 2015. These samples were analyzed for PCBs as requested.

These analyses proceeded without incident of note.

An electronic copy of these reports will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

cc: file ART5

Enclosures

MDH/mdh

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 7091	Turn-around Requested:	Page: 1 of 2	
ARI Client Company: Maul Foster & Alongi, Inc.	Phone: (503) 501 3212	Date: 10/16	Ice Present? Yes
Client Contact: Madi Norak		No. of Coolers:	Cooler Temps:
Client Project Name: Seaport Landing			
Client Project #: 1044.0201-02	Samplers: RDJ MRH		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: TOC	Phenol	PAH	PCB	Mercury	metals	TPH	Dioxin/Furan	Notes/Comments: Archive
CR19F-SBSD	10/16	0940	Sed	2	X	X	X	X	X	X			
CR19F-SBSD-DUP	10/16	0945	Sed	2	X	X	X	X	X	X			
CR19F-SSD	10/16	0950	Sed	5	X	X	X	X	X	X	X	X	
~~CR19D-SSD-COMP~~	~~10/16~~	~~0940~~	~~Sed~~	~~4~~									
CR19G-0-10cm	10/16	0927	Sed	1									X
CR19G-9.0	10/16	0930	Sed	1									X
CR19F-5.0	10/16	0950	Sed	1									X
CR19F-9.0	10/16	0945	Sed	1									X
CR18B-SBSD	10/16	1200	Sed	2	X	X	X	X	X	X	X		NO TPH
CR18B-SSD	10/16	1205	Sed	4	X	X	X	X	X	X	X	X	

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Archive remaining volume.	Printed Name: Roxanne Degens	Printed Name: Emily Litwin	Printed Name:	Printed Name:
	Company: MFA	Company: ARI	Company:	Company:
	Date & Time: 10/16 1520	Date & Time: 10/16/16 1520	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Mail foster

Project Name: _____

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: _____

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	NO
Were custody papers included with the cooler?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 2.6

Time: _____

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D00256S

Cooler Accepted by: ul Date: 10/16/15 Time: 1520

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	NO
What kind of packing material was used? ...	Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other:		
Was sufficient ice used (if appropriate)?	NA	YES	NO
Were all bottles sealed in individual plastic bags?		YES	NO
Did all bottles arrive in good condition (unbroken)?		YES	NO
Were all bottle labels complete and legible?		YES	NO
Did the number of containers listed on COC match with the number of containers received?		YES	NO
Did all bottle labels and tags agree with custody papers?		YES	NO
Were all bottles used correct for the requested analyses?		YES	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	YES	NO
Were all VOC vials free of air bubbles?	NA	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO
Date VOC Trip Blank was made at ARI	NA		

Was Sample Split by ARI : NA YES Date/Time: _____ Equipment: _____ Split by: _____

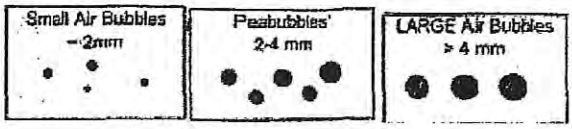
Samples Logged by: ul Date: 10/20/15 Time: 1420

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:



Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: ART5
Client: Maul Foster & Alongi
Project Event: 1044.02.01-02
Project Name: Seaport Landing

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	CR18B-SBSD	ART5A	15-23180	Sediment	10/16/15 12:00	10/16/15 15:20
2.	CR18B-SSD	ART5B	15-23181	Sediment	10/16/15 12:05	10/16/15 15:20

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: MB-120315
METHOD BLANK

Lab Sample ID: MB-120315
LIMS ID: 15-23180
Matrix: Sediment
Data Release Authorized:
Reported: 12/07/15

QC Report No: ART5-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 12/03/15
Date Analyzed: 12/04/15 14:26
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

CAS Number	Analyte	LOQ	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
11100-14-4	Aroclor 1268	20	< 20 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	81.0%
Tetrachlorometaxylene	65.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD **Sample ID: CR18B-SBSD**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: ART5A
LIMS ID: 15-23180
Matrix: Sediment
Data Release Authorized:
Reported: 12/04/15

QC Report No: ART5-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Date Extracted: 12/03/15
Date Analyzed: 12/04/15 13:43
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.35 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 46.7%

CAS Number	Analyte	LOQ	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
11100-14-4	Aroclor 1268	19	< 19 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	66.8%
Tetrachlorometaxylene	61.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD **Sample ID: CR18B-SSD**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: ART5B
LIMS ID: 15-23181
Matrix: Sediment
Data Release Authorized:
Reported: 12/04/15

QC Report No: ART5-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: 10/16/15
Date Received: 10/16/15

Date Extracted: 12/03/15
Date Analyzed: 12/04/15 14:05
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.50 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 45.4%

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	18	< 18 U
53469-21-9	Aroclor 1242	18	< 18 U
12672-29-6	Aroclor 1248	18	< 18 U
11097-69-1	Aroclor 1254	18	< 18 U
11096-82-5	Aroclor 1260	18	< 18 U
11104-28-2	Aroclor 1221	18	< 18 U
11141-16-5	Aroclor 1232	18	< 18 U
11100-14-4	Aroclor 1268	18	< 18 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	75.0%
Tetrachlorometaxylene	65.8%

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB SOIL/SOLID/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: ART5-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
CR18B-SBSD	66.8%	40-133	61.2%	53-120	0
CR18B-SSD	75.0%	40-133	65.8%	53-120	0

Microwave (MARS) Control Limits PCBSMP
Prep Method: SW3546
Log Number Range: 15-23180 to 15-23181

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Page 1 of 1

Sample ID: LCS-120315
LAB CONTROL

Lab Sample ID: LCS-120315
LIMS ID: 15-23180
Matrix: Sediment
Data Release Authorized:
Reported: 12/07/15

QC Report No: ART5-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02
Date Sampled: NA
Date Received: NA

Date Extracted: 12/03/15
Date Analyzed: 12/04/15 14:48
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Aroclor 1016	407	500	81.4%
Aroclor 1260	470	500	94.0%

PCB Surrogate Recovery

Decachlorobiphenyl	80.5%
Tetrachlorometaxylene	66.0%

Results reported in µg/kg (ppb)

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB SOIL/SOLID/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: ART5-Maul Foster & Alongi
Project: Seaport Landing
1044.02.01-02

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-120315	81.0%	40-133	65.2%	53-120	0
LCS-120315	80.5%	40-133	66.0%	53-120	0
CR18B-SBSD	66.8%	40-133	61.2%	53-120	0
CR18B-SSD	75.0%	40-133	65.8%	53-120	0

Microwave (MARS) Control Limits PCBSMP
Prep Method: SW3546
Log Number Range: 15-23180 to 15-23181

Analytical Resources, Incorporated
Analytical Chemists and Consultants

16 December 2015

Madi Novak
Maul, Foster and Alongi, Inc
2001 NW 19th Avenue
Suite 200
Portland, OR 97209

RE: Project: Seaport Landing
ARI Job No.: ASF7

Dear Madi:

Please find enclosed the final results for the samples from the project referenced above. These samples were originally received on October 16, 2015. These samples were analyzed for TOC as requested.

These analyses proceeded without incident of note.

An electronic copy of these reports will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

cc: file ASF7

Enclosures

MDH/mdh

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Subject: AOV9 - new test request
From: Mary Benzinger <mbenzinger@maulfoster.com>
Date: 12/4/2015 1:21 PM
To: Mark Harris <markh@arilabs.com>
CC: Roxanne Degens <rdegens@maulfoster.com>, Madi Novak <mnovak@maulfoster.com>

Hi Mark,
We would like to request TOC analysis for the following samples from workorder AOV9:
CR08b-SBSD
CR26-SBSD

Could you let us know when we could expect TOC results on a standard TAT? Depending on the date, we may need to request rush, in which case we'll need to find out what capacity ARI has for rushing these two.

Thank you!

Mary Benzinger | MAUL FOSTER & ALONGI, INC.

d. 503 501 5247 | p. 971 544 2139 | c. 503 319 7132
2001 NW 19th Avenue, Suite 200, Portland, OR 97209
www.maulfoster.com

From: Mark Harris [mailto:markh@arilabs.com]
Sent: Thursday, December 03, 2015 2:27 PM
To: Mary Benzinger <mbenzinger@maulfoster.com>
Subject: Re: AOV9 - pages needed

Can do.

On 12/3/2015 2:24 PM, Mary Benzinger wrote:

> Alright, hopefully it's a straightforward analysis.
>
> Could you send AOV9 today? This is the one with 3 missing pages. Thanks,
>
> **Mary Benzinger** | MAUL FOSTER & ALONGI, INC.
>
> d. 503 501 5247 | p. 971 544 2139 | c. 503 319 7132
> 2001 NW 19th Avenue, Suite 200, Portland, OR 97209
> www.maulfoster.com
>
> ---
>
> **From:** Mark Harris [mailto:markh@arilabs.com]
> **Sent:** Thursday, December 03, 2015 2:09 PM
> **To:** Mary Benzinger <mbenzinger@maulfoster.com>
> **Subject:** Re: AOW1 - missing PCB, AOV9 - pages needed, CR19D-SSD-CONV report

ASF7 : 00002 12/4/2015 1:42 I

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: ASF7
Client: Maul Foster & Alongi
Project Event: 1044.02.01-02
Project Name: Seaport Landing

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	CR08b-SBSD	ASF7A	15-23755	Sediment	10/15/15 15:07	10/16/15 11:16
2.	CR26-SBSD	ASF7B	15-23756	Sediment	10/15/15 16:23	10/16/15 11:16

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

ASF7 : 00004

Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for
NR	Spiked compound recovery is not reported due to chromatographic interference
NS	The flagged analyte was not spiked into the sample
M	Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
Y	The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
EMPC	Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**
C	The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
P	The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference
X	Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**
Z	Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

ASF7 : 00005

Geotechnical Data

A	The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
F	Samples were frozen prior to particle size determination
SM	Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
SS	Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
W	Weight of sample in some pipette aliquots was below the level required for accurate weighting

ASF7 : 00006

SAMPLE RESULTS-CONVENTIONALS
ASF7-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: CJ
Reported: 12/16/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Client ID: CR08b-SBSD
ARI ID: 15-23755 ASF7A

Analyte	Date	Method	Units	RL	Sample
Total Solids	12/10/15 121015#1	SM2540G	Percent	0.01	55.76
Total Organic Carbon	12/15/15 121515#1	Plumb,1981	Percent	0.020	3.08

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
ASF7-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 12/16/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: 10/15/15
Date Received: 10/16/15

Client ID: CR26-SBSD
ARI ID: 15-23756 ASF7B

Analyte	Date	Method	Units	RL	Sample
Total Solids	12/10/15 121015#1	SM2540G	Percent	0.01	46.69
Total Organic Carbon	12/15/15 121515#1	Plumb,1981	Percent	0.020	1.52

RL Analytical reporting limit
U Undetected at reported detection limit

METHOD BLANK RESULTS-CONVENTIONALS
ASF7-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: ✓
Reported: 12/16/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Analyte	Date	Units	Blank	QC ID
Total Solids	12/10/15	Percent	< 0.01 U	ICB
Total Organic Carbon	12/15/15	Percent	< 0.020 U	ICB

LAB CONTROL RESULTS-CONVENTIONALS
ASF7-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: W
Reported: 12/16/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Total Organic Carbon Plumb,1981	ICVL	12/15/15	Percent	0.105	0.100	105.0%

STANDARD REFERENCE RESULTS-CONVENTIONALS
ASF7-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized: J
Reported: 12/16/15

Project: Seaport Landing
Event: 1044.02.01-02
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Date	Units	SRM	True Value	Recovery
Total Organic Carbon NIST 1941B	12/15/15	Percent	2.95	2.99	98.7%

Chain of Custody Record & Laboratory Analysis Request

20000.604

ARI Assigned Number: AOV9	Turn-around Requested: Standard	Page: 3 of 3	
ARI Client Company: Mail Foster & Alongi	Phone: (503) 501-5212	Date: 10/15/15	Ice Present? yes
Client Contact: Madi Novak		No. of Coolers:	Cooler Temps:
Client Project Name: Seaport Landing			
Client Project #: 1044.02.01-02	Samplers: RD + MRM		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: Archive	PAH	PCB	Phenol	Metals	Dioxin/Furan	Asbestos	Mercury	Notes/Comments
CR026-SBSD	10/15/15	1507	Sed	6	X	X	X	X	X	X	X	X	
CR25-0-10cm	10/15/15	1553	sed	1	X								
CR25.5.0	10/15/15	1555	sed	1	X								
CR26-SSD	10/15/15	1620	sed	5	X								
CR26-SBSD	10/15/15	1623	sed	3	X	X	X	X	X			X	

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Archive all remaining volume.	Printed Name: Roxanne Rogers	Printed Name: Archie Triggs	Printed Name:	Printed Name: Chris Arndt
	Company: MFA	Company: M.C. DL	Company:	Company: ARI
	Date & Time: 10/15/15	Date & Time: 10/16/15 8:35	Date & Time:	Date & Time: 10/16/15 1114

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Maul Foster & Alongi

COC No(s): _____ NA

Assigned ARI Job No: AOV9

Project Name: _____

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	NO
Were custody papers included with the cooler?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO
Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)	5.1	4.8
Time: _____		

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D00265

Cooler Accepted by: CA Date: 10/22/15 Time: 1116

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	NO
What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____			
Was sufficient ice used (if appropriate)?	NA	YES	NO
Were all bottles sealed in individual plastic bags?		YES	NO
Did all bottles arrive in good condition (unbroken)?		YES	NO
Were all bottle labels complete and legible?		YES	NO
Did the number of containers listed on COC match with the number of containers received?		YES	NO
Did all bottle labels and tags agree with custody papers?		YES	NO
Were all bottles used correct for the requested analyses?		YES	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	YES	NO
Were all VOC vials free of air bubbles?	NA	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO
Date VOC Trip Blank was made at ARI	NA		

Was Sample Split by ARI : NA YES Date/Time: _____ Equipment: _____ Split by: _____

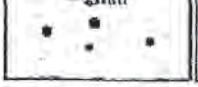
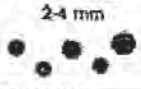
Samples Logged by: VL Date: 10/20/15 Time: 1237

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles >4 mm
		

Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

Analytical Resources, Incorporated
Analytical Chemists and Consultants

27 January 2016

Madi Novak
Maul, Foster and Alongi, Inc
2001 NW 19th Avenue
Suite 200
Portland, OR 97209

RE: Project: Seaport Landing
ARI Job No.: AUD1

Dear Madi:

Please find enclosed the original chain of custody record and the final results for the sample from the project referenced above. One water sample was received on January 14, 2016. The sample was analyzed for SVOCs, dioxins/furans, PCBs, NWTPH-Dx and total and dissolved metals as requested. It was noted upon sample receipt that no bottle was received for TSS analysis. This analysis was canceled as instructed.

The percent difference (%D) for benzoic acid was not within control limits for the CCAL that bracketed the SVOC analysis of this sample. All positive results for this compound have been flagged with a "Q" qualifier to denote the high %D.

The remaining analyses proceeded without incident of note.

An electronic copy of these reports will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

cc: file AUD1

Enclosures

MDH/mdh

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: AUD1	Turn-around Requested:	Page: 1 of 1	
ARI Client Company: MFA	Phone: 503 544 2139	Date: 1-14-16	Ice Present? Yes
Client Contact: Madi Novak		No. of Coolers: 1	Cooler Temps: 0.4
Client Project Name: Seaport Authority			
Client Project #:	Samplers: Madi Novak		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: TPH-Dx	PAHs 8270	SVOAs 8270	TSS SM 2540D	Hg 7470	* Metals 200.8/6010	PCBs Aroclors 8082		Notes/Comments
Storm-01	1/12/16	8:30	W	6	X	X	X	X	X	X	X		* Metals = Total and Dissolved As, Cd, Cr, Cu, Pb, Hg, Ag, Zn Lab to filter for diss

Comments/Special Instructions: See attached for reporting limit requirements. No hardcopy report, please issue electronic report + EDD	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Erik Naylor	Printed Name: Tyler Rankin	Printed Name:	Printed Name:
	Company: MFA	Company: ARI	Company:	Company:
	Date & Time: 1100 1/13/16	Date & Time: 1-14-16 1022	Date & Time:	Date & Time:

AUD1:08982

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: MFA

Project Name: Seaport Authority

COC No(s): _____ NA

Delivered by: Fed-Ex (UPS) Courier Hand Delivered Other: _____

Assigned ARI Job No: AUD1

Tracking No: 1Z87V5210194585688 NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 0.4 ___ ___ ___ ___ ___

Time: _____

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: Dec5276

Cooler Accepted by: TR Date: 1-14-16 Time: 1022

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ...	(Bubble Wrap) (Wet Ice) Gel Packs Baggies Foam Block Paper Other: _____		
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		TR (YES)	(NO)
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	(YES)	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	(NA)		_____

Was Sample Split by ARI : (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: TR Date: 1-14-16 Time: 1335

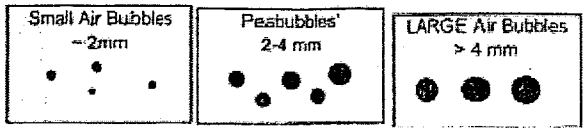
***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

Client requested TSS analysis on COC but did not receive a bottle for TSS. Did not log for TSS.

By: Date:



Small → "sm" (< 2 mm)	
Peabubbles → "pb" (2 to < 4 mm)	
Large → "lg" (4 to < 6 mm)	
Headspace → "hs" (> 6 mm)	

PRESERVATION VERIFICATION 01/14/16
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **AUD1**

PC: Mark
VTSR: 01/14/16

Inquiry Number: NONE
Analysis Requested: 01/14/16
Contact: Novak, Madi
Client: Maul Foster & Alongi
Logged by: TR
Sample Set Used: Yes-481
Validatable Package: No
Deliverables:

Project #:
Project: Seaport Authority
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	TPHD <2	Fe2+ <2	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
16-500 **AUD1A**	Storm-01						TOT Pass															
16-501 **AUD1B**	Storm-01						DIS Fail									N						

AUD1 : 16000

Checked By TR Date 1-14-16

Subject: RE: Incoming Seaport Stormwater
From: Madi Novak <mnovak@maulfoster.com>
Date: 1/14/2016 1:47 PM
To: Mark Harris <markh@arilabs.com>, Mary Benzinger <mbenzinger@maulfoster.com>
CC: Erik Naylor <enaylor@maulfoster.com>

Yeah. . .I was afraid of that. Let's not do TSS. Thank you.

From: Mark Harris [mailto:markh@arilabs.com]
Sent: Thursday, January 14, 2016 1:47 PM
To: Mary Benzinger <mbenzinger@maulfoster.com>
Cc: Madi Novak <mnovak@maulfoster.com>; Erik Naylor <enaylor@maulfoster.com>
Subject: Re: Incoming Seaport Stormwater

This sample arrived and we're logging it but we did not receive a TSS bottle and there are no additional ambers for the organics so we don't have extra volume that we can use...

On 1/13/2016 10:24 AM, Mary Benzinger wrote:

> Hi Mark,
> We are shipping one stormwater sample (sample name Storm-01) to ARI today. This sample is associated with the Seaport project (1044.02.01). It will need to be analyzed for SMS parameters, Dioxins/Furans, TPH, and TSS. The COC includes an attachment that indicates the SVOC list and target reporting limits.
>
> For SVOCs, we only need to report the compounds listed on this attachment.
>
> For PCB Aroclors, we need to include Aroclor 1268.
>
> Could you send a login confirmation to myself and Madi Novak once this sample has been logged in? Let us know if you have any questions.
>
> Thank you!
>
> **Mary Benzinger** | MAUL FOSTER & ALONGI, INC.
>
> d. 503 501 5247 | p. 971 544 2139| c. 503 319 7132
> 2001 NW 19th Avenue, Suite 200, Portland, OR 97209
> www.maulfoster.com



--
Mark Harris
Project Manager
Analytical Resources, Inc.
206/695-6210
markh@arilabs.com

How was your customer experience?
Please take our 5 minute online customer survey <https://www.surveymonkey.com/s/WPDBVJK>.

AUD1 : 00005

This correspondence contains confidential information from Analytical Resources, Inc. (ARI) The information contained herein is intended solely for the use of the individual(s) named above. If you are not the intended recipient, any copying, distribution, disclosure, or use of the text and/or attached document(s) is strictly prohibited.

If you have received this correspondence in error, please notify sender immediately. Thank you.

AUD1 : 00006

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: AUD1
Client: Maul Foster & Alongi
Project Event: N/A
Project Name: Seaport Authority

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	Storm-01	AUD1A	16-500	Water	01/12/16 08:30	01/14/16 10:22
2.	Storm-01	AUD1B	16-501	Water	01/12/16 08:30	01/14/16 10:22

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

AUD1 : 00008

Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).

S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte

NA The flagged analyte was not analyzed for

NR Spiked compound recovery is not reported due to chromatographic interference

NS The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

EMPC Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

X Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**

Z Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

AUD1 : 00003

Geotechnical Data

A — The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F — Samples were frozen prior to particle size determination

SM — Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS — Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W — Weight of sample in some pipette aliquots was below the level required for accurate weighting

AUD1 : 00010

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
Page 1 of 1

Sample ID: Storm-01
SAMPLE

Lab Sample ID: AUD1A
LIMS ID: 16-500
Matrix: Water
Data Release Authorized:
Reported: 01/20/16

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority
NA
Date Sampled: 01/12/16
Date Received: 01/14/16

Date Extracted: 01/18/16
Date Analyzed: 01/19/16 17:09
Instrument/Analyst: NT6/JZ

Sample Amount: 460 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
108-95-2	Phenol	1.1	< 1.1 U
106-46-7	1,4-Dichlorobenzene	1.1	< 1.1 U
100-51-6	Benzyl Alcohol	2.2	< 2.2 U
95-50-1	1,2-Dichlorobenzene	1.1	< 1.1 U
95-48-7	2-Methylphenol	1.1	< 1.1 U
106-44-5	4-Methylphenol	2.2	< 2.2 U
105-67-9	2,4-Dimethylphenol	3.3	< 3.3 U
65-85-0	Benzoic Acid	22	< 22 U
120-82-1	1,2,4-Trichlorobenzene	1.1	< 1.1 U
91-20-3	Naphthalene	1.1	< 1.1 U
87-68-3	Hexachlorobutadiene	3.3	< 3.3 U
91-57-6	2-Methylnaphthalene	1.1	< 1.1 U
131-11-3	Dimethylphthalate	1.1	< 1.1 U
208-96-8	Acenaphthylene	1.1	< 1.1 U
83-32-9	Acenaphthene	1.1	< 1.1 U
132-64-9	Dibenzofuran	1.1	< 1.1 U
84-66-2	Diethylphthalate	1.1	< 1.1 U
86-73-7	Fluorene	1.1	< 1.1 U
86-30-6	N-Nitrosodiphenylamine	1.1	< 1.1 U
118-74-1	Hexachlorobenzene	1.1	< 1.1 U
87-86-5	Pentachlorophenol	11	< 11 U
85-01-8	Phenanthrene	1.1	< 1.1 U
120-12-7	Anthracene	1.1	< 1.1 U
84-74-2	Di-n-Butylphthalate	1.1	< 1.1 U
206-44-0	Fluoranthene	1.1	< 1.1 U
129-00-0	Pyrene	1.1	< 1.1 U
85-68-7	Butylbenzylphthalate	1.1	< 1.1 U
56-55-3	Benzo(a)anthracene	1.1	< 1.1 U
117-81-7	bis(2-Ethylhexyl)phthalate	3.3	< 3.3 U
218-01-9	Chrysene	1.1	< 1.1 U
117-84-0	Di-n-Octyl phthalate	1.1	< 1.1 U
50-32-8	Benzo(a)pyrene	1.1	< 1.1 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.1	< 1.1 U
53-70-3	Dibenz(a,h)anthracene	1.1	< 1.1 U
191-24-2	Benzo(g,h,i)perylene	1.1	< 1.1 U
TOTBFA	Total Benzofluoranthenes	2.2	< 2.2 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	68.8%	2-Fluorobiphenyl	76.8%
d14-p-Terphenyl	85.2%	d4-1,2-Dichlorobenzene	72.4%
d5-Phenol	68.0%	2-Fluorophenol	68.5%
2,4,6-Tribromophenol	89.9%	d4-2-Chlorophenol	70.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3520C
Page 1 of 1

Sample ID: MB-011816
METHOD BLANK

Lab Sample ID: MB-011816
LIMS ID: 16-500
Matrix: Water
Data Release Authorized:
Reported: 01/20/16

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 01/18/16
Date Analyzed: 01/19/16 16:03
Instrument/Analyst: NT6/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
108-95-2	Phenol	1.0	< 1.0 U
106-46-7	1,4-Dichlorobenzene	1.0	< 1.0 U
100-51-6	Benzyl Alcohol	2.0	< 2.0 U
95-50-1	1,2-Dichlorobenzene	1.0	< 1.0 U
95-48-7	2-Methylphenol	1.0	< 1.0 U
106-44-5	4-Methylphenol	2.0	< 2.0 U
105-67-9	2,4-Dimethylphenol	3.0	< 3.0 U
65-85-0	Benzoic Acid	20	< 20 U
120-82-1	1,2,4-Trichlorobenzene	1.0	< 1.0 U
91-20-3	Naphthalene	1.0	< 1.0 U
87-68-3	Hexachlorobutadiene	3.0	< 3.0 U
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
131-11-3	Dimethylphthalate	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
83-32-9	Acenaphthene	1.0	< 1.0 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
84-66-2	Diethylphthalate	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
86-30-6	N-Nitrosodiphenylamine	1.0	< 1.0 U
118-74-1	Hexachlorobenzene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	10	< 10 U
85-01-8	Phenanthrene	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
84-74-2	Di-n-Butylphthalate	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
85-68-7	Butylbenzylphthalate	1.0	< 1.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
117-81-7	bis(2-Ethylhexyl)phthalate	3.0	< 3.0 U
218-01-9	Chrysene	1.0	< 1.0 U
117-84-0	Di-n-Octyl phthalate	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	2.0	< 2.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	67.6%	2-Fluorobiphenyl	76.0%
d14-p-Terphenyl	88.8%	d4-1,2-Dichlorobenzene	65.6%
d5-Phenol	68.0%	2-Fluorophenol	68.8%
2,4,6-Tribromophenol	78.4%	d4-2-Chlorophenol	70.9%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Page 1 of 1

Sample ID: LCS-011816
LAB CONTROL

Lab Sample ID: LCS-011816
LIMS ID: 16-500
Matrix: Water
Data Release Authorized:
Reported: 01/20/16

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority

Date Sampled: 01/12/16
Date Received: 01/14/16

Date Extracted: 01/18/16
Date Analyzed: 01/19/16 16:36
Instrument/Analyst: NT6/JZ
GPC Cleanup: NO

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

Analyte	Lab Control	Spike Added	Recovery
Phenol	14.2	25.0	56.8%
1,4-Dichlorobenzene	15.7	25.0	62.8%
Benzyl Alcohol	18.3	25.0	73.2%
1,2-Dichlorobenzene	16.0	25.0	64.0%
2-Methylphenol	13.8	25.0	55.2%
4-Methylphenol	14.6	25.0	58.4%
2,4-Dimethylphenol	42.0	75.0	56.0%
Benzoic Acid	85.4 Q	138	61.9%
1,2,4-Trichlorobenzene	16.4	25.0	65.6%
Naphthalene	17.4	25.0	69.6%
Hexachlorobutadiene	13.0	25.0	52.0%
2-Methylnaphthalene	19.3	25.0	77.2%
Dimethylphthalate	24.4	25.0	97.6%
Acenaphthylene	19.9	25.0	79.6%
Acenaphthene	20.7	25.0	82.8%
Dibenzofuran	20.5	25.0	82.0%
Diethylphthalate	22.6	25.0	90.4%
Fluorene	20.2	25.0	80.8%
N-Nitrosodiphenylamine	22.2	25.0	88.8%
Hexachlorobenzene	25.6	25.0	102%
Pentachlorophenol	52.5	75.0	70.0%
Phenanthrene	20.5	25.0	82.0%
Anthracene	20.4	25.0	81.6%
Di-n-Butylphthalate	22.6	25.0	90.4%
Fluoranthene	21.8	25.0	87.2%
Pyrene	21.2	25.0	84.8%
Butylbenzylphthalate	23.9	25.0	95.6%
Benzo(a)anthracene	21.6	25.0	86.4%
bis(2-Ethylhexyl)phthalate	24.8	25.0	99.2%
Chrysene	21.6	25.0	86.4%
Di-n-Octyl phthalate	23.4	25.0	93.6%
Benzo(a)pyrene	23.1	25.0	92.4%
Indeno(1,2,3-cd)pyrene	22.3	25.0	89.2%
Dibenz(a,h)anthracene	22.5	25.0	90.0%
Benzo(g,h,i)perylene	21.6	25.0	86.4%
Total Benzofluoranthenes	43.2	50.0	86.4%

Semivolatile Surrogate Recovery

d5-Nitrobenzene	67.2%	2-Fluorobiphenyl	76.4%
d14-p-Terphenyl	92.8%	d4-1,2-Dichlorobenzene	64.0%
d5-Phenol	69.3%	2-Fluorophenol	65.9%
2,4,6-Tribromophenol	102%	d4-2-Chlorophenol	69.9%

Results reported in µg/L

FORM III

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES WATER SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT OUT
MB-011816	67.6%	76.0%	88.8%	65.6%	68.0%	68.8%	78.4%	70.9%	0
LCS-011816	67.2%	76.4%	92.8%	64.0%	69.3%	65.9%	102%	69.9%	0
Storm-01	68.8%	76.8%	85.2%	72.4%	68.0%	68.5%	89.9%	70.7%	0

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(27-120)	(27-120)
(FBP) = 2-Fluorobiphenyl	(33-120)	(33-120)
(TPH) = d14-p-Terphenyl	(28-120)	(28-120)
(DCB) = d4-1,2-Dichlorobenzene	(20-120)	(20-120)
(PHL) = d5-Phenol	(38-120)	(38-120)
(2FP) = 2-Fluorophenol	(33-120)	(33-120)
(TBP) = 2,4,6-Tribromophenol	(52-120)	(52-120)
(2CP) = d4-2-Chlorophenol	(41-120)	(41-120)

Prep Method: SW3520C
Log Number Range: 16-500 to 16-500

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt6.i Injection Date: 19-JAN-2016 10:47
Lab File ID: 16011901.d Init. Cal. Date(s): 13-NOV-2015 13-NOV-2015
Analysis Type: Init. Cal. Times: 09:35 12:56
Lab Sample ID: ICV160119 Quant Type: ISTD
Method: /chem2/nt6.i/20160119.b/SW846151113.m

01/19/16

COMPOUND	RRF / AMOUNT	RF25	CCAL RRF25	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE
$ 1 2-Fluorophenol	1.27351	1.18512	1.18512	0.010	-6.94068	20.00000	Averaged
$ 2 Phenol-d5	1.55455	1.41951	1.41951	0.010	-8.68630	20.00000	Averaged
3 Phenol	2.08784	1.81695	1.81695	0.800	-12.97460	20.00000	Averaged
$ 5 2-Chlorophenol-d4	1.19548	1.11857	1.11857	0.010	-6.43352	20.00000	Averaged
4 Bis(2-Chloroethyl)ether	1.21538	1.13330	1.13330	0.700	-6.75361	20.00000	Averaged
6 2-Chlorophenol	1.45829	1.38582	1.38582	0.800	-4.97002	20.00000	Averaged
7 1,3-Dichlorobenzene	1.30509	1.25857	1.25857	0.010	-3.56431	20.00000	Averaged
9 1,4-Dichlorobenzene	1.25644	1.19836	1.19836	0.010	-4.62257	20.00000	Averaged
$ 10 1,2-Dichlorobenzene-d4	0.84356	0.82564	0.82564	0.010	-2.12445	20.00000	Averaged
12 1,2-Dichlorobenzene	1.20831	1.15403	1.15403	0.010	-4.49221	20.00000	Averaged
11 Benzyl alcohol	0.90601	0.79420	0.79420	0.010	-12.34075	20.00000	Averaged
14 2,2'-oxybis(1-Chloropropane	1.27312	1.08198	1.08198	0.010	-15.01342	20.00000	Averaged
13 2-Methylphenol	1.48137	1.26494	1.26494	0.700	-14.61026	20.00000	Averaged
17 Hexachloroethane	0.53246	0.43899	0.43899	0.300	-17.55331	20.00000	Averaged
16 N-Nitroso-di-n-propylamine	0.96878	0.77894	0.77894	0.500	-19.59652	20.00000	Averaged
15 4-Methylphenol	1.50906	1.32576	1.32576	0.600	-12.14652	20.00000	Averaged
$ 18 Nitrobenzene-d5	0.45557	0.38465	0.38465	0.010	-15.56772	20.00000	Averaged
19 Nitrobenzene	0.42823	0.36285	0.36285	0.200	-15.26781	20.00000	Averaged
20 Isophorone	0.74609	0.60829	0.60829	0.400	-18.46963	20.00000	Averaged
21 2-Nitrophenol	0.20385	0.24322	0.24322	0.100	19.31309	20.00000	Averaged
22 2,4-Dimethylphenol	0.46628	0.42416	0.42416	0.200	-9.03256	20.00000	Averaged
23 Bis(2-Chloroethoxy)methane	0.42153	0.38656	0.38656	0.300	-8.29543	20.00000	Averaged
24 Benzoic acid	53.05805	75.00000	0.26538	0.010	-29.25593	20.00000	Linear <-
25 2,4-Dichlorophenol	0.38278	0.37904	0.37904	0.200	-0.97572	20.00000	Averaged
26 1,2,4-Trichlorobenzene	0.36588	0.36276	0.36276	0.010	-0.85381	20.00000	Averaged
28 Naphthalene	0.93617	0.88461	0.88461	0.700	-5.50761	20.00000	Averaged
29 4-Chloroaniline	0.39867	0.39123	0.39123	0.010	-1.86707	20.00000	Averaged
30 Hexachlorobutadiene	0.25930	0.24095	0.24095	0.010	-7.07980	20.00000	Averaged
31 4-Chloro-3-methylphenol	0.37958	0.36694	0.36694	0.200	-3.32958	20.00000	Averaged
32 2-Methylnaphthalene	0.51267	0.54079	0.54079	0.400	5.48543	20.00000	Averaged
33 Hexachlorocyclopentadiene	0.38935	0.34591	0.34591	0.050	-11.15616	20.00000	Averaged
34 2,4,6-Trichlorophenol	0.52518	0.54035	0.54035	0.200	2.88736	20.00000	Averaged
35 2,4,5-Trichlorophenol	0.54622	0.57934	0.57934	0.200	6.06288	20.00000	Averaged
$ 36 2-Fluorobiphenyl	1.27890	1.26161	1.26161	0.010	-1.35204	20.00000	Averaged
37 2-Chloronaphthalene	0.99481	0.97261	0.97261	0.800	-2.23207	20.00000	Averaged

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt6.i Injection Date: 19-JAN-2016 10:47
Lab File ID: 16011901.d Init. Cal. Date(s): 13-NOV-2015 13-NOV-2015
Analysis Type: Init. Cal. Times: 09:35 12:56
Lab Sample ID: ICV160119 Quant Type: ISTD
Method: /chem2/nt6.i/20160119.b/SW846151113.m

COMPOUND	RRF / AMOUNT	RF25	CCAL RRF25	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
38 2-Nitroaniline	0.33640	0.31201	0.31201	0.010	-7.24911	20.00000	Averaged	
39 Dimethylphthalate	1.11709	1.12104	1.12104	0.010	0.35305	20.00000	Averaged	
40 Acenaphthylene	1.58334	1.56661	1.56661	0.900	-1.05648	20.00000	Averaged	
41 2,6-Dinitrotoluene	0.25021	0.30390	0.30390	0.100	21.45890	20.00000	Averaged	<-
43 3-Nitroaniline	0.23344	0.28110	0.28110	0.010	20.41476	20.00000	Averaged	<-
44 Acenaphthene	1.00987	1.04829	1.04829	0.900	3.80427	20.00000	Averaged	
45 2,4-Dinitrophenol	78.73641	75.00000	0.21892	0.010	4.98188	20.00000	Quadratic	
46 Dibenzofuran	1.50813	1.48891	1.48891	0.080	-1.27490	20.00000	Averaged	
47 4-Nitrophenol	14.21450	25.00000	0.17744	0.010	-43.14202	20.00000	Linear	<-
48 2,4-Dinitrotoluene	0.33386	0.39893	0.39893	0.200	19.48944	20.00000	Averaged	
50 Diethylphthalate	1.16750	1.04223	1.04223	0.010	-10.73000	20.00000	Averaged	
49 Fluorene	1.35471	1.30378	1.30378	0.900	-3.75977	20.00000	Averaged	
51 4-Chlorophenyl-phenylether	0.73392	0.70424	0.70424	0.400	-4.04498	20.00000	Averaged	
52 4-Nitroaniline	0.23089	0.28051	0.28051	0.010	21.49054	20.00000	Averaged	<-
53 4,6-Dinitro-2-methylphenol	76.57041	75.00000	0.16526	0.010	2.09389	20.00000	Linear	
54 N-Nitrosodiphenylamine	0.44433	0.42710	0.42710	0.010	-3.87775	20.00000	Averaged	
$ 55 2,4,6-Tribromophenol	0.21421	0.24961	0.24961	0.010	16.52802	20.00000	Averaged	
56 4-Bromophenyl-phenylether	0.21834	0.22846	0.22846	0.100	4.63160	20.00000	Averaged	
57 Hexachlorobenzene	0.23056	0.25123	0.25123	0.100	8.96540	20.00000	Averaged	
58 Pentachlorophenol	0.20668	0.20127	0.20127	0.050	-2.61748	20.00000	Averaged	
60 Phenanthrene	0.93735	0.87411	0.87411	0.700	-6.74729	20.00000	Averaged	
61 Anthracene	0.94283	0.88593	0.88593	0.700	-6.03535	20.00000	Averaged	
62 Carbazole	0.69141	0.64475	0.64475	0.010	-6.74907	20.00000	Averaged	
63 Di-n-butylphthalate	0.85780	0.78845	0.78845	0.010	-8.08476	20.00000	Averaged	
64 Fluoranthene	1.06567	1.02508	1.02508	0.600	-3.80832	20.00000	Averaged	
65 Pyrene	1.03095	0.96803	0.96803	0.600	-6.10309	20.00000	Averaged	
$ 66 Terphenyl-d14	0.74273	0.73828	0.73828	0.010	-0.59924	20.00000	Averaged	
67 Butylbenzylphthalate	0.37745	0.34988	0.34988	0.010	-7.30569	20.00000	Averaged	
68 Benzo(a)anthracene	1.08873	0.99758	0.99758	0.800	-8.37178	20.00000	Averaged	
70 3,3'-Dichlorobenzidine	0.40423	0.44759	0.44759	0.010	10.72561	20.00000	Averaged	
71 Chrysene	0.97429	0.93612	0.93612	0.700	-3.91775	20.00000	Averaged	
72 bis(2-Ethylhexyl)phthalate	0.48712	0.48698	0.48698	0.010	-0.02868	20.00000	Averaged	
73 Di-n-octylphthalate	0.82996	0.79198	0.79198	0.010	-4.57719	20.00000	Averaged	
74 Benzo(b)fluoranthene	1.02526	1.04086	1.04086	0.700	1.52161	20.00000	Averaged	
75 Benzo(k)fluoranthene	1.00067	0.92421	0.92421	0.700	-7.64141	20.00000	Averaged	

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt6.i Injection Date: 19-JAN-2016 10:47
Lab File ID: 16011901.d Init. Cal. Date(s): 13-NOV-2015 13-NOV-2015
Analysis Type: Init. Cal. Times: 09:35 12:56
Lab Sample ID: ICV160119 Quant Type: ISTD
Method: /chem2/nt6.i/20160119.b/SW846151113.m

COMPOUND	RRF / AMOUNT	RF25	CCAL RRF25	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE
187 Total Benzofluoranthenes	0.96018	0.92346	0.92346	0.010	-3.82444	20.00000	Averaged
76 Benzo(a)pyrene	0.89244	0.86935	0.86935	0.700	-2.58765	20.00000	Averaged
78 Indeno(1,2,3-cd)pyrene	1.18486	1.16946	1.16946	0.500	-1.29941	20.00000	Averaged
79 Dibenzo(a,h)anthracene	0.98618	0.95893	0.95893	0.400	-2.76319	20.00000	Averaged
80 Benzo(g,h,i)perylene	1.00028	0.96234	0.96234	0.500	-3.79347	20.00000	Averaged
90 N-Nitrosodimethylamine	0.85199	0.72581	0.72581	0.010	-14.80965	20.00000	Averaged
103 Pyridine	1.43320	1.16760	1.16760	0.010	-18.53205	20.00000	Averaged
105 1-methylnaphthalene	0.53657	0.56284	0.56284	0.010	4.89682	20.00000	Averaged
144 alpha-Terpineol	0.25594	0.22187	0.22187	0.010	-13.31274	20.00000	Averaged
133 Butylatedhydroxytoluene	1.15402	1.09832	1.09832	0.010	-4.82726	20.00000	Averaged
115 Tributyl Phosphate	0.70385	0.63439	0.63439	0.010	-9.86911	20.00000	Averaged
116 Dibutyl Phenyl Phosphate	0.48471	0.45654	0.45654	0.010	-5.81327	20.00000	Averaged
117 Butyl Diphenyl Phosphate	0.16459	0.14052	0.14052	0.010	-14.62661	20.00000	Averaged

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

Sample ID: MB-012116

Lab Sample ID: MB-012116
LIMS ID: 16-500
Matrix: Water
Data Release Authorized: MW
Reported: 01/26/16

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 01/21/16
Date Analyzed: 01/25/16 12:27
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 1000 mL
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.68	0.65-0.89		10.0	0.230	J
2,3,7,8-TCDD		0.65-0.89	0.260	10.0	< 0.260	U
1,2,3,7,8-PeCDF	0.96	1.32-1.78		10.0	0.460	JEMPC
2,3,4,7,8-PeCDF		1.32-1.78	0.340	10.0	< 0.340	U
1,2,3,7,8-PeCDD		1.32-1.78	0.360	10.0	< 0.360	U
1,2,3,4,7,8-HxCDF		1.05-1.43	0.300	10.0	< 0.300	U
1,2,3,6,7,8-HxCDF		1.05-1.43	0.280	10.0	< 0.280	U
2,3,4,6,7,8-HxCDF	1.48	1.05-1.43		10.0	0.220	JEMPC
1,2,3,7,8,9-HxCDF	1.63	1.05-1.43		10.0	1.04	JEMPC
1,2,3,4,7,8-HxCDD		1.05-1.43	0.300	10.0	< 0.300	U
1,2,3,6,7,8-HxCDD	0.90	1.05-1.43		10.0	0.340	JEMPC
1,2,3,7,8,9-HxCDD		1.05-1.43	0.320	10.0	< 0.320	U
1,2,3,4,6,7,8-HpCDF	0.86	0.88-1.20		10.0	0.620	JEMPC
1,2,3,4,7,8,9-HpCDF		0.88-1.20	0.460	10.0	< 0.460	U
1,2,3,4,6,7,8-HpCDD	1.11	0.88-1.20		10.0	2.88	J
OCDF	0.84	0.76-1.02		20.0	4.53	J
OCDD	0.93	0.76-1.02		20.0	47.2	

Homologue Group	EDL	RL	Result	
Total TCDF		10.0	0.230	
Total TCDD	0.260	10.0	0.698	EMPC
Total PeCDF		20.0	0.451	EMPC
Total PeCDD	0.360	10.0	< 0.360	U
Total HxCDF		20.0	1.25	EMPC
Total HxCDD		20.0	0.838	EMPC
Total HpCDF		20.0	2.29	EMPC
Total HpCDD		20.0	5.49	EMPC

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 0.25

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 0.67

Reported in pg/L

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: MB-012116**

Lab Sample ID: MB-012116
LIMS ID: 16-500
Matrix: Water
Data Release Authorized:
Reported: 01/26/16

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 01/21/16
Date Analyzed: 01/25/16 12:27
Instrument/Analyst: AS1/PK

Sample Amount: 1000 mL
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.79	0.65-0.89	99.8	24-169	
13C-2,3,7,8-TCDD	0.79	0.65-0.89	87.4	25-164	
13C-1,2,3,7,8-PeCDF	1.58	1.32-1.78	99.6	24-185	
13C-2,3,4,7,8-PeCDF	1.58	1.32-1.78	97.6	21-178	
13C-1,2,3,7,8-PeCDD	1.59	1.32-1.78	91.0	25-181	
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	96.6	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	95.5	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	96.0	28-136	
13C-1,2,3,7,8,9-HxCDF	0.51	0.43-0.59	90.4	29-147	
13C-1,2,3,4,7,8-HxCDD	1.29	1.05-1.43	91.6	32-141	
13C-1,2,3,6,7,8-HxCDD	1.23	1.05-1.43	85.5	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	89.1	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	88.7	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.06	0.88-1.20	86.2	23-140	
13C-OCDD	0.90	0.76-1.02	71.5	17-157	
37Cl4-2,3,7,8-TCDD			101	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: OPR-012116**

Lab Sample ID: OPR-012116
LIMS ID: 16-500
Matrix: Water
Data Release Authorized: MW
Reported: 01/26/16

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 01/21/16
Date Analyzed: 01/25/16 14:12
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 1000 mL
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	RL	Result
2,3,7,8-TCDF	0.73	0.65-0.89	10.0	239
2,3,7,8-TCDD	0.76	0.65-0.89	10.0	241
1,2,3,7,8-PeCDF	1.52	1.32-1.78	10.0	1,190
2,3,4,7,8-PeCDF	1.50	1.32-1.78	10.0	1,180
1,2,3,7,8-PeCDD	1.54	1.32-1.78	10.0	1,140
1,2,3,4,7,8-HxCDF	1.18	1.05-1.43	10.0	1,180
1,2,3,6,7,8-HxCDF	1.19	1.05-1.43	10.0	1,150
2,3,4,6,7,8-HxCDF	1.19	1.05-1.43	10.0	1,180
1,2,3,7,8,9-HxCDF	1.19	1.05-1.43	10.0	1,150
1,2,3,4,7,8-HxCDD	1.24	1.05-1.43	10.0	1,160
1,2,3,6,7,8-HxCDD	1.26	1.05-1.43	10.0	1,150
1,2,3,7,8,9-HxCDD	1.24	1.05-1.43	10.0	1,170
1,2,3,4,6,7,8-HpCDF	0.99	0.88-1.20	10.0	1,220
1,2,3,4,7,8,9-HpCDF	0.98	0.88-1.20	10.0	1,170
1,2,3,4,6,7,8-HpCDD	1.01	0.88-1.20	10.0	1,150
OCDF	0.87	0.76-1.02	20.0	2,310
OCDD	0.89	0.76-1.02	20.0	2,260

Homologue Group	EDL	RL	Result	
Total TCDF		10.0	251	EMPC
Total TCDD		10.0	248	
Total PeCDF		20.0	2,420	EMPC
Total PeCDD		10.0	1,150	EMPC
Total HxCDF		20.0	4,670	EMPC
Total HxCDD		20.0	3,480	EMPC
Total HpCDF		20.0	2,400	EMPC
Total HpCDD		20.0	1,160	

Reported in pg/L

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-012116

Lab Sample ID: OPR-012116
LIMS ID: 16-500
Matrix: Water
Data Release Authorized: MW
Reported: 01/26/16

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 01/21/16
Date Analyzed: 01/25/16 14:12
Instrument/Analyst: AS1/PK

Sample Amount: 1000 mL
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	98.1	24-169	
13C-2,3,7,8-TCDD	0.79	0.65-0.89	86.3	25-164	
13C-1,2,3,7,8-PeCDF	1.58	1.32-1.78	99.2	24-185	
13C-2,3,4,7,8-PeCDF	1.58	1.32-1.78	99.0	21-178	
13C-1,2,3,7,8-PeCDD	1.59	1.32-1.78	91.3	25-181	
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	97.1	26-152	
13C-1,2,3,6,7,8-HxCDF	0.51	0.43-0.59	95.3	26-123	
13C-2,3,4,6,7,8-HxCDF	0.53	0.43-0.59	96.8	28-136	
13C-1,2,3,7,8,9-HxCDF	0.53	0.43-0.59	92.2	29-147	
13C-1,2,3,4,7,8-HxCDD	1.29	1.05-1.43	90.3	32-141	
13C-1,2,3,6,7,8-HxCDD	1.26	1.05-1.43	85.4	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	91.8	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	92.4	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.06	0.88-1.20	89.0	23-140	
13C-OCDD	0.90	0.76-1.02	75.4	17-157	
37C14-2,3,7,8-TCDD			98.6	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: OPR-012116**

Lab Sample ID: OPR-012116
LIMS ID: 16-500
Matrix: Water
Data Release Authorized:
Reported: 01/26/16

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 01/21/16
Date Analyzed: 01/25/16 14:12
Instrument/Analyst: AS1/PK

Sample Amount: 1000 mL
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	OPR	Spiked	Recovery	Limits
2,3,7,8-TCDF	239	200	120	75-158
2,3,7,8-TCDD	241	200	120	67-158
1,2,3,7,8-PeCDF	1190	1000	119	80-134
2,3,4,7,8-PeCDF	1180	1000	118	68-160
1,2,3,7,8-PeCDD	1140	1000	114	70-142
1,2,3,4,7,8-HxCDF	1180	1000	118	72-134
1,2,3,6,7,8-HxCDF	1150	1000	115	84-130
2,3,4,6,7,8-HxCDF	1180	1000	118	70-156
1,2,3,7,8,9-HxCDF	1150	1000	115	78-130
1,2,3,4,7,8-HxCDD	1160	1000	116	70-164
1,2,3,6,7,8-HxCDD	1150	1000	115	76-134
1,2,3,7,8,9-HxCDD	1170	1000	117	64-162
1,2,3,4,6,7,8-HpCDF	1220	1000	122	82-132
1,2,3,4,7,8,9-HpCDF	1170	1000	117	78-138
1,2,3,4,6,7,8-HpCDD	1150	1000	115	70-140
OCDF	2310	2000	116	63-170
OCDD	2260	2000	113	78-144

Reported in pg/L

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: Storm-01

Lab Sample ID: AUD1A
LIMS ID: 16-500
Matrix: Water
Data Release Authorized: MW
Reported: 01/26/16

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority
NA
Date Sampled: 01/12/16
Date Received: 01/14/16

Date Extracted: 01/21/16
Date Analyzed: 01/25/16 13:19
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 780 mL
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.43	0.65-0.89		12.8	0.872	BJEMPC
2,3,7,8-TCDD		0.65-0.89	0.564	12.8	< 0.564	U
1,2,3,7,8-PeCDF	1.14	1.32-1.78		12.8	1.13	BJEMPC
2,3,4,7,8-PeCDF		1.32-1.78	0.615	12.8	< 0.615	U
1,2,3,7,8-PeCDD	1.75	1.32-1.78		12.8	1.58	J
1,2,3,4,7,8-HxCDF	1.09	1.05-1.43		12.8	1.64	J
1,2,3,6,7,8-HxCDF	1.74	1.05-1.43		12.8	1.38	JEMPC
2,3,4,6,7,8-HxCDF	0.89	1.05-1.43		12.8	2.26	BJEMPC
1,2,3,7,8,9-HxCDF	0.93	1.05-1.43		12.8	0.949	BJEMPC
1,2,3,4,7,8-HxCDD	3.18	1.05-1.43		12.8	0.795	JEMPC
1,2,3,6,7,8-HxCDD	1.37	1.05-1.43		12.8	15.8	
1,2,3,7,8,9-HxCDD	1.38	1.05-1.43		12.8	3.01	J
1,2,3,4,6,7,8-HpCDF	0.97	0.88-1.20		12.8	35.1	
1,2,3,4,7,8,9-HpCDF	0.75	0.88-1.20		12.8	2.67	JEMPC
1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20		12.8	164	
OCDF	0.90	0.76-1.02		25.6	91.5	
OCDD	0.88	0.76-1.02		25.6	1,000	

Homologue Group	EDL	RL	Result	
Total TCDF		12.8	9.23	EMPC
Total TCDD	0.564	12.8	39.8	EMPC
Total PeCDF		25.6	30.1	EMPC
Total PeCDD		12.8	18.6	EMPC
Total HxCDF		25.6	88.0	EMPC
Total HxCDD		25.6	100	EMPC
Total HpCDF		25.6	130	EMPC
Total HpCDD		25.6	290	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 6.63

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 7.00

Reported in pg/L

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: Storm-01**

Lab Sample ID: AUD1A
LIMS ID: 16-500
Matrix: Water
Data Release Authorized:
Reported: 01/26/16

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority
NA
Date Sampled: 01/12/16
Date Received: 01/14/16

Date Extracted: 01/21/16
Date Analyzed: 01/25/16 13:19
Instrument/Analyst: AS1/PK

Sample Amount: 780 mL
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	94.5	24-169	
13C-2,3,7,8-TCDD	0.79	0.65-0.89	81.3	25-164	
13C-1,2,3,7,8-PeCDF	1.59	1.32-1.78	92.4	24-185	
13C-2,3,4,7,8-PeCDF	1.59	1.32-1.78	89.3	21-178	
13C-1,2,3,7,8-PeCDD	1.58	1.32-1.78	83.0	25-181	
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	92.3	26-152	
13C-1,2,3,6,7,8-HxCDF	0.53	0.43-0.59	91.6	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	93.3	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	87.7	29-147	
13C-1,2,3,4,7,8-HxCDD	1.30	1.05-1.43	88.1	32-141	
13C-1,2,3,6,7,8-HxCDD	1.24	1.05-1.43	82.6	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	89.9	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.46	0.37-0.51	88.4	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	87.1	23-140	
13C-OCDD	0.90	0.76-1.02	75.3	17-157	
37Cl4-2,3,7,8-TCDD			93.9	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3510C
Page 1 of 1

Sample ID: MB-011516
METHOD BLANK

Lab Sample ID: MB-011516
LIMS ID: 16-500
Matrix: Water
Data Release Authorized: MW
Reported: 01/20/16

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority
Date Sampled: NA
Date Received: NA

Date Extracted: 01/15/16
Date Analyzed: 01/18/16 14:19
Instrument/Analyst: ECD7/JGR
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	LOQ	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
11100-14-4	Aroclor 1268	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	60.8%
Tetrachlorometaxylene	80.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3510C

Sample ID: Storm-01
SAMPLE

Lab Sample ID: AUD1A
LIMS ID: 16-500
Matrix: Water
Data Release Authorized:
Reported: 01/20/16

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority

Date Sampled: 01/12/16
Date Received: 01/14/16

Date Extracted: 01/15/16
Date Analyzed: 01/18/16 15:00
Instrument/Analyst: ECD7/JGR
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	LOQ	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
11100-14-4	Aroclor 1268	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	86.8%
Tetrachlorometaxylene	81.8%

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB WATER SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-011516	60.8%	29-120	80.2%	35-120	0
LCS-011516	77.8%	29-120	81.8%	35-120	0
Storm-01	86.8%	29-120	81.8%	35-120	0

Prep Method: SW3510C
Log Number Range: 16-500 to 16-500

FORM-II SW8082

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Page 1 of 1

Sample ID: LCS-011516
LAB CONTROL

Lab Sample ID: LCS-011516
LIMS ID: 16-500
Matrix: Water
Data Release Authorized: MW
Reported: 01/20/16

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority
Date Sampled: NA
Date Received: NA

Date Extracted: 01/15/16
Date Analyzed: 01/18/16 14:40
Instrument/Analyst: ECD7/JGR
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

Analyte	Lab Control	Spike Added	Recovery
Aroclor 1016	4.25	5.00	85.0%
Aroclor 1260	4.56	5.00	91.2%

PCB Surrogate Recovery

Decachlorobiphenyl	77.8%
Tetrachlorometaxylene	81.8%

Results reported in µg/L

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Extraction Method: SW3510C
Page 1 of 1

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority

Matrix: Water

Date Received: 01/14/16

Data Release Authorized:
Reported: 01/18/16

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DF	Range/Surrogate	RL	Result
MB-011516	Method Blank	01/15/16	01/15/16	1.00	Diesel Range	0.10	< 0.10 U
16-500	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		98.9%
AUD1A	Storm-01	01/15/16	01/15/16	1.00	Diesel Range	0.10	< 0.10 U
16-500	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		98.7%

Reported in mg/L (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
RL-Reporting limit.

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: LCS-011516
LAB CONTROL

Lab Sample ID: LCS-011516
LIMS ID: 16-500
Matrix: Water
Data Release Authorized:
Reported: 01/18/16

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority

Date Sampled: NA
Date Received: NA

Date Extracted: 01/15/16
Date Analyzed: 01/15/16 19:41
Instrument/Analyst: FID3B/JLW

Sample Amount: 500 mL
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
Diesel	2.70	3.00	90.0%

TPHD Surrogate Recovery

o-Terphenyl	97.1%

Results reported in mg/L

FORM III

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job: AUD1
Matrix: Water Project: Seaport Authority
Date Received: 01/14/16

ARI ID	Client ID	Samp Amt	Final Vol	Prep Date
16-500-011516MB1	Method Blank	500 mL	1.00 mL	01/15/16
16-500-011516LCS1	Lab Control	500 mL	1.00 mL	01/15/16
16-500-AUD1A	Storm-01	500 mL	1.00 mL	01/15/16

ANALYTICAL RESOURCES INCORPORATED

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority

Client ID	OTER	TOT OUT
MB-011516	98.9%	0
LCS-011516	97.1%	0
Storm-01	98.7%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3510C
Log Number Range: 16-500 to 16-500

FORM-II TPHD

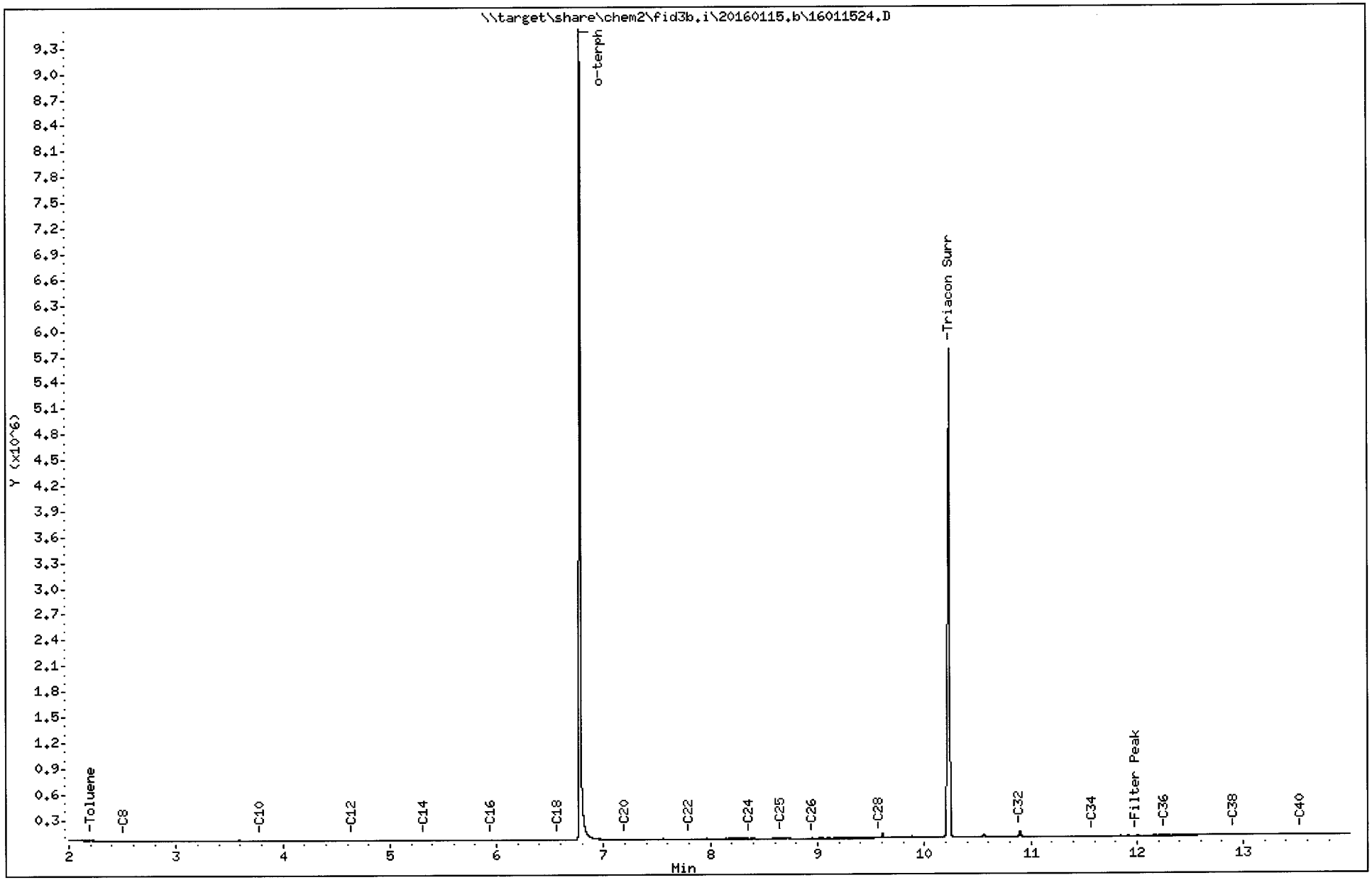
Data File: \\target\share\chem2\fid3b.i\20160115.b\16011524.D
Date : 15-JAN-2016 19:20
Client ID: AUD1MBW1
Sample Info: AUD1MBW1

Instrument: fid3b.i

Operator: ML
Column diameter: 0.25

Column phase: RTX-1

AUD1 : 99633

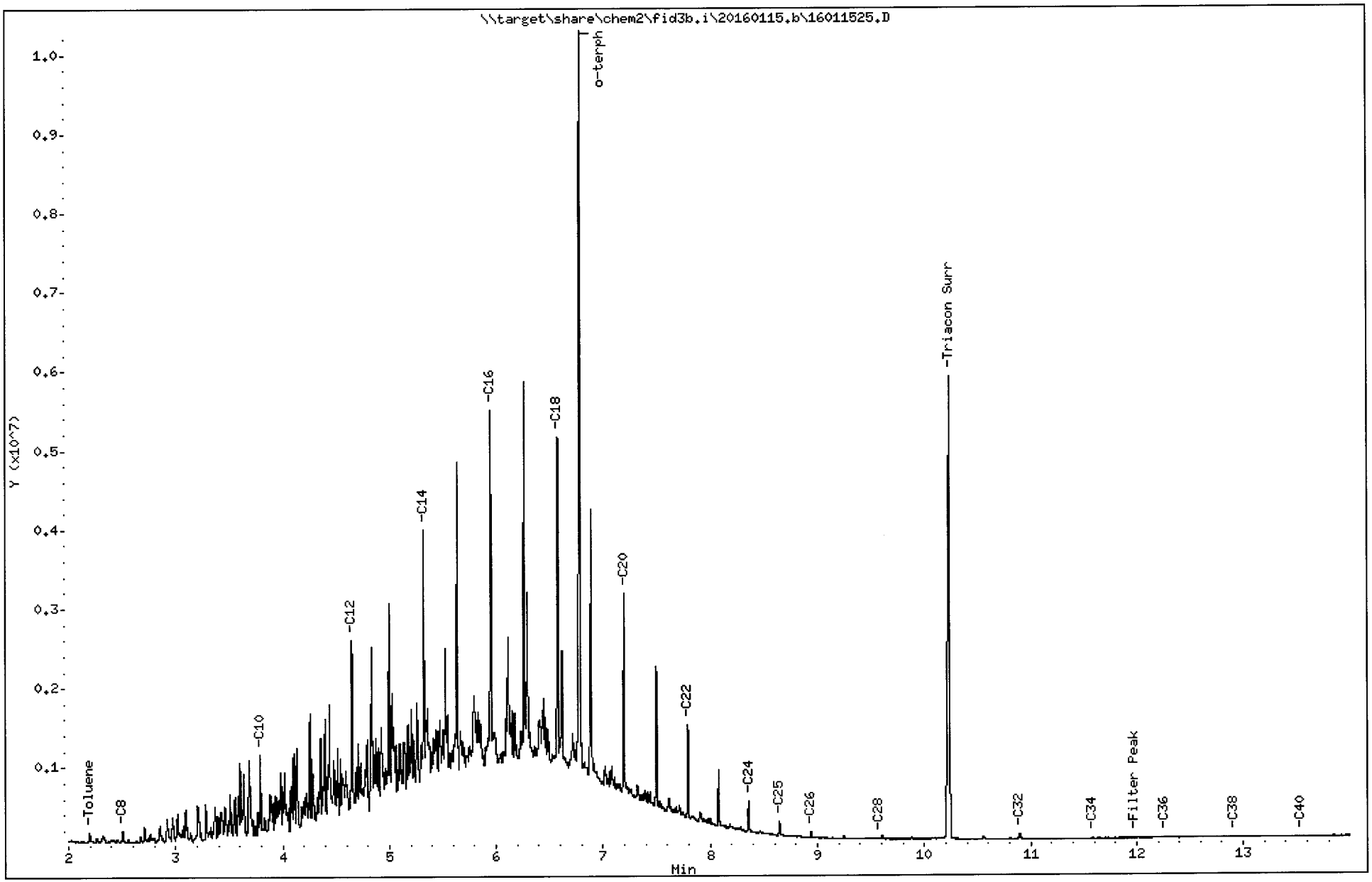


Data File: \\target\share\chem2\fid3b.i\20160115.b\16011525.D
Date : 15-JAN-2016 19:41
Client ID: AUD1LCSW1
Sample Info: AUD1LCSW1

Instrument: fid3b.i

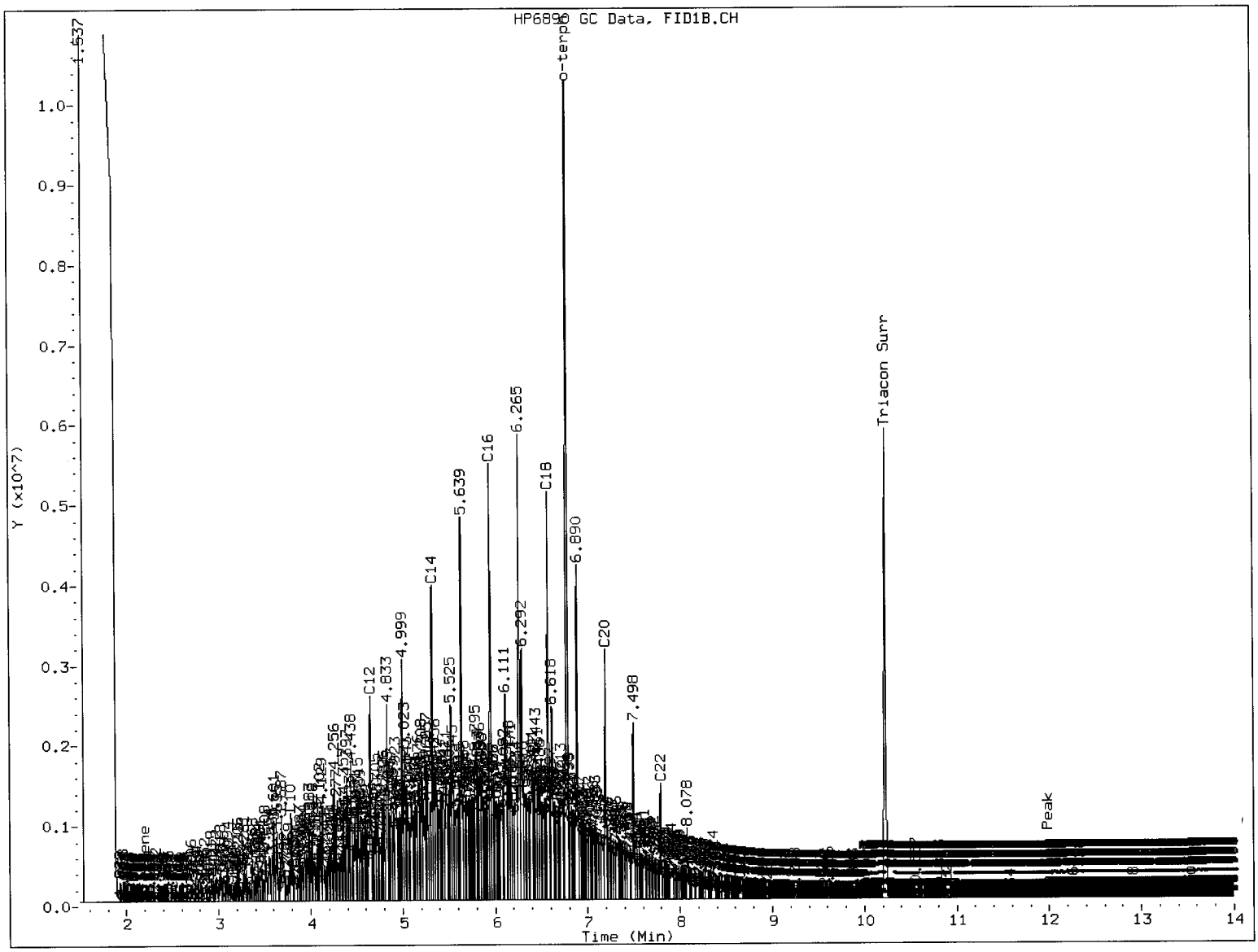
Operator: ML
Column diameter: 0.25

Column phase: RTX-1



AUD1 : 099631

FID:3B-2C/RTX-1 AUD1LCSW1 FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

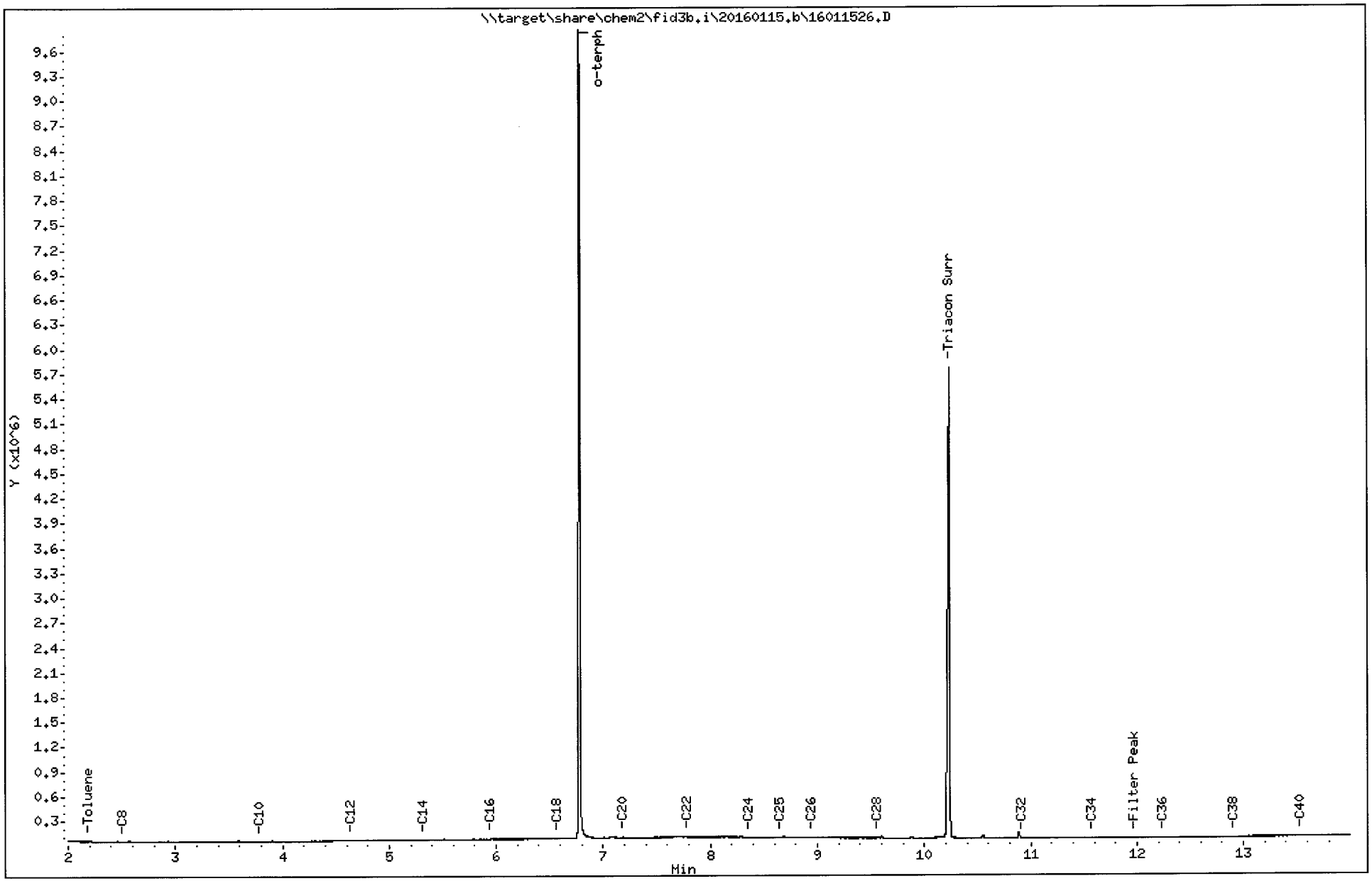
Analyst: _____ Date: 1/15/14

Data File: \\target\share\chem2\fid3b.i\20160115.b\16011526.D
Date : 15-JAN-2016 20:03
Client ID: Storm-01
Sample Info: AUD1A

Column phase: RTX-1

Instrument: fid3b.i

Operator: ML
Column diameter: 0.25



AUD1 : 66036

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: Storm-01
SAMPLE

Lab Sample ID: AUD1A
LIMS ID: 16-500
Matrix: Water
Data Release Authorized:
Reported: 01/21/16

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority

Date Sampled: 01/12/16
Date Received: 01/14/16

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	µg/L	Q
200.8	01/19/16	200.8	01/20/16	**7440-38-2**	**Arsenic**	0.2	**0.6**	
200.8	01/19/16	200.8	01/20/16	7440-43-9	Cadmium	0.1	0.1	U
200.8	01/19/16	200.8	01/20/16	**7440-47-3**	**Chromium**	0.5	**1.2**	
200.8	01/19/16	200.8	01/20/16	**7440-50-8**	**Copper**	0.5	**4.3**	
200.8	01/19/16	200.8	01/20/16	**7439-92-1**	**Lead**	0.1	**2.0**	
7470A	01/18/16	7470A	01/20/16	**7439-97-6**	**Mercury**	0.1	**0.2**	
200.8	01/19/16	200.8	01/20/16	7440-22-4	Silver	0.2	0.2	U
200.8	01/19/16	200.8	01/20/16	**7440-66-6**	**Zinc**	4	**60**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: Storm-01
DUPLICATE

Lab Sample ID: AUD1A
LIMS ID: 16-500
Matrix: Water
Data Release Authorized:
Reported: 01/21/16

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority

Date Sampled: 01/12/16
Date Received: 01/14/16

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	200.8	0.6	0.7	15.4%	+/- 0.2	L
Cadmium	200.8	0.1 U	0.1 U	0.0%	+/- 0.1	L
Chromium	200.8	1.2	1.4	15.4%	+/- 0.5	L
Copper	200.8	4.3	4.3	0.0%	+/- 20%	
Lead	200.8	2.0	2.1	4.9%	+/- 20%	
Mercury	7470A	0.2	0.0 U	66.7%	+/- 0.1	L
Silver	200.8	0.2 U	0.2 U	0.0%	+/- 0.2	L
Zinc	200.8	60	59	1.7%	+/- 20%	

Reported in µg/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: Storm-01
MATRIX SPIKE

Lab Sample ID: AUD1A
LIMS ID: 16-500
Matrix: Water
Data Release Authorized:
Reported: 01/21/16

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority

Date Sampled: 01/12/16
Date Received: 01/14/16

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	200.8	0.6	23.4	25.0	91.2%	
Cadmium	200.8	0.1 U	20.7	25.0	82.8%	
Chromium	200.8	1.2	23.7	25.0	90.0%	
Copper	200.8	4.3	26.9	25.0	90.4%	
Lead	200.8	2.0	24.6	25.0	90.4%	
Mercury	7470A	0.2	1.1	1.0	90.0%	
Silver	200.8	0.2 U	21.2	25.0	84.8%	
Zinc	200.8	60	131	80	88.8%	

Reported in µg/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked
NR-Not Recovered

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: Storm-01
SAMPLE

Lab Sample ID: AUD1B
LIMS ID: 16-501
Matrix: Water
Data Release Authorized:
Reported: 01/21/16

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority

Date Sampled: 01/12/16
Date Received: 01/14/16

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	µg/L	Q
200.8	01/19/16	200.8	01/20/16	7440-38-2	Arsenic	0.2	0.2	U
200.8	01/19/16	200.8	01/20/16	7440-43-9	Cadmium	0.1	0.1	U
200.8	01/19/16	200.8	01/20/16	**7440-47-3**	**Chromium**	0.5	**1.0**	
200.8	01/19/16	200.8	01/20/16	7440-50-8	Copper	0.5	0.5	U
200.8	01/19/16	200.8	01/20/16	7439-92-1	Lead	0.1	0.1	U
7470A	01/18/16	7470A	01/20/16	7439-97-6	Mercury	0.1	0.1	U
200.8	01/19/16	200.8	01/20/16	7440-22-4	Silver	0.2	0.2	U
200.8	01/19/16	200.8	01/20/16	**7440-66-6**	**Zinc**	4	**37**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: Storm-01 DUPLICATE

Lab Sample ID: AUD1B
LIMS ID: 16-501
Matrix: Water
Data Release Authorized:
Reported: 01/21/16

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority

Date Sampled: 01/12/16
Date Received: 01/14/16

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	200.8	0.2 U	0.2 U	0.0%	+/- 0.2	L
Cadmium	200.8	0.1 U	0.1 U	0.0%	+/- 0.1	L
Chromium	200.8	1.0	0.9	10.5%	+/- 0.5	L
Copper	200.8	0.5 U	0.5 U	0.0%	+/- 0.5	L
Lead	200.8	0.1 U	0.1 U	0.0%	+/- 0.1	L
Mercury	7470A	0.1 U	0.1 U	0.0%	+/- 0.1	L
Silver	200.8	0.2 U	0.2 U	0.0%	+/- 0.2	L
Zinc	200.8	37	37	0.0%	+/- 20%	

Reported in µg/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: Storm-01
MATRIX SPIKE

Lab Sample ID: AUD1B
LIMS ID: 16-501
Matrix: Water
Data Release Authorized:
Reported: 01/21/16

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority

Date Sampled: 01/12/16
Date Received: 01/14/16

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	200.8	0.2 U	22.7	25.0	90.8%	
Cadmium	200.8	0.1 U	19.8	25.0	79.2%	
Chromium	200.8	1.0	24.7	25.0	94.8%	
Copper	200.8	0.5 U	23.2	25.0	92.8%	
Lead	200.8	0.1 U	22.6	25.0	90.4%	
Mercury	7470A	0.1 U	1.0	1.0	100%	
Silver	200.8	0.2 U	21.5	25.0	86.0%	
Zinc	200.8	37	103	80	82.5%	

Reported in µg/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked
NR-Not Recovered

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: METHOD BLANK

Lab Sample ID: AUD1MB
LIMS ID: 16-500
Matrix: Water
Data Release Authorized:
Reported: 01/21/16

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority

Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	µg/L	Q
200.8	01/19/16	200.8	01/20/16	7440-38-2	Arsenic	0.2	0.2	U
200.8	01/19/16	200.8	01/20/16	7440-43-9	Cadmium	0.1	0.1	U
200.8	01/19/16	200.8	01/20/16	7440-47-3	Chromium	0.5	0.5	U
200.8	01/19/16	200.8	01/20/16	7440-50-8	Copper	0.5	0.5	U
200.8	01/19/16	200.8	01/20/16	7439-92-1	Lead	0.1	0.1	U
7470A	01/18/16	7470A	01/20/16	7439-97-6	Mercury	0.1	0.1	U
200.8	01/19/16	200.8	01/20/16	7440-22-4	Silver	0.2	0.2	U
200.8	01/19/16	200.8	01/20/16	7440-66-6	Zinc	4	4	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: LAB CONTROL

Lab Sample ID: AUD1LCS
LIMS ID: 16-500
Matrix: Water
Data Release Authorized:
Reported: 01/21/16

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	200.8	22.7	25.0	90.8%	
Cadmium	200.8	24.1	25.0	96.4%	
Chromium	200.8	26.2	25.0	105%	
Copper	200.8	24.9	25.0	99.6%	
Lead	200.8	26.0	25.0	104%	
Mercury	7470A	2.0	2.0	100%	
Silver	200.8	25.2	25.0	101%	
Zinc	200.8	77	80	96.2%	

Reported in µg/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: AUD1MB
LIMS ID: 16-501
Matrix: Water
Data Release Authorized:
Reported: 01/21/16

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority

Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	µg/L	Q
200.8	01/19/16	200.8	01/20/16	7440-38-2	Arsenic	0.2	0.2	U
200.8	01/19/16	200.8	01/20/16	7440-43-9	Cadmium	0.1	0.1	U
200.8	01/19/16	200.8	01/20/16	7440-47-3	Chromium	0.5	0.5	U
200.8	01/19/16	200.8	01/20/16	7440-50-8	Copper	0.5	0.5	U
200.8	01/19/16	200.8	01/20/16	7439-92-1	Lead	0.1	0.1	U
7470A	01/18/16	7470A	01/20/16	7439-97-6	Mercury	0.1	0.1	U
200.8	01/19/16	200.8	01/20/16	7440-22-4	Silver	0.2	0.2	U
200.8	01/19/16	200.8	01/20/16	7440-66-6	Zinc	4	4	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: AUD1LCS
LIMS ID: 16-501
Matrix: Water
Data Release Authorized:
Reported: 01/21/16

QC Report No: AUD1-Maul Foster & Alongi
Project: Seaport Authority

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	200.8	23.3	25.0	93.2%	
Cadmium	200.8	23.7	25.0	94.8%	
Chromium	200.8	26.1	25.0	104%	
Copper	200.8	24.8	25.0	99.2%	
Lead	200.8	25.8	25.0	103%	
Mercury	7470A	2.0	2.0	100%	
Silver	200.8	25.0	25.0	100%	
Zinc	200.8	80	80	100%	

Reported in µg/L

N-Control limit not met
Control Limits: 80-120%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

2 December 2013

Mike Murray
Maul, Foster and Alongi, Inc
2001 NW 19th Avenue
Suite 200
Portland, OR 97209

RE: Project: GHHSA
ARI Job Nos.: XN64, XO00

Dear Mike:

Please find enclosed the original chain of custody records and the final results for the samples from the project referenced above.

Analytical Resources, Inc. (ARI) accepted fourteen sediment samples on November 8, 2013. Six samples were placed on hold as instructed. The remaining samples were analyzed for NWTPH-G, SVOCs, dioxins/furans, PCBs, NWTPH-Dx, total metals, porewater salinity and conventional parameters as requested. No porewater was extracted from samples CR04, CR05 or CR06. Porewater salinity is not available for these samples.

The percent recovery for the surrogates, bromobenzene and trifluorotoluene, were low following the initial NWTPH-G analysis of sample CR06-2.5. This sample was re-extracted and re-analyzed. The percent recoveries for both surrogates were low for the re-analysis. Since the percent recoveries for all spikes and surrogates were within established QC limits for the corresponding MB and LCS, it was concluded that the sample matrix was the cause of the low surrogate recoveries. No further corrective actions were taken. The results for the original analysis only have been submitted.

The percent differences (%Ds) for two compounds were high for the CCALs that bracketed the SIM-SVOA analyses of these samples. All positive results have been flagged with a "Q" qualifier to denote the high %Ds.

The percent recovery for the surrogate, TCMX, was low following the initial PCB analysis of sample CR01-10cm. Since the percent recovery for the surrogate, DCBP, was within established QC limits for this sample, no corrective actions were taken.

A small amount of contamination was detected in the method blank associated with the sulfide analyses of these samples. Sulfide was detected in all samples associated with this blank. The concentrations of sulfide measured in all samples associated with this blank were significantly greater than the concentration found in the blank for all samples except CR04-10cm. This sample only was re-prepared and re-analyzed. The re-analysis proceeded without incident of note. The result for the re-analysis only has been submitted for this sample. The results for the original analyses have been submitted for all other samples.

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Murray, MFA
GHHSA
XN64, XO00
Sediment

2 December 2013

A matrix duplicate (MD) was prepared and analyzed for sulfide in conjunction with sample CR04-10cm. The RPD was high following the analysis of the MD. Since the percent recovery for sulfide was within acceptable QC limits for the corresponding LCS, it was concluded that a lack of sample homogeneity was the cause of the high RPD. No corrective actions were taken.

A matrix spike (MS) was prepared and analyzed for TOC in conjunction with sample CR04-10cm. The percent recovery was low following the analysis of the MS. The MS was re-prepared and re-analyzed. The percent recovery was low for the re-analysis. Since the percent recovery for TOC was within acceptable QC limits for the corresponding SRM and LCS, it was concluded that the sample matrix was the cause of the low MS recoveries. No further corrective actions were taken. The result for the original analysis only has been submitted for the MS.

An MD was prepared and analyzed for total metals in conjunction with sample CR06-2.5. The RPDs for chromium, copper and mercury were high following the analysis of the MD. Since the percent recoveries for all elements were within acceptable QC limits for the corresponding LCS, it was concluded that a lack of sample homogeneity was the cause of the high RPDs. No corrective actions were taken.

An MS was prepared and analyzed for total metals in conjunction with sample CR06-2.5. The percent recovery for mercury was low following the analysis of the MS. Since the percent recovery for mercury was within acceptable QC limits for the corresponding LCS, it was concluded that the sample matrix was the cause of the low MS recovery. No corrective actions were taken.

The remaining analyses proceeded without incident of note.

An electronic copy of this report and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

cc: files XN64, XO00

Enclosures

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: XN64	Turn-around Requested: Standard	Page: 1 of 2	
ARI Client Company: Maul Foster & Alongi	Phone: 9715442139	Date: 11/8/13	Ice Present? Y
Client Contact: Mike Murray		No. of Coolers: 3	Cooler Temps: 3.2, 0.4, 5.2
Client Project Name: GHHSA			
Client Project #: 0863.01.01	Samplers: MRM/MN		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No Containers	Analysis Requested: Dioxin/Furan	Butyl-Benzyl-Phthalate, Beta Chlorophenol	Mercury	SMS compounds with marine criteria	TOC	Conventionals TOC, TVS, Total NH4, TS, PNWS, % fines	Archive	Salinity for pore water	Notes/Comments
CR06-10cm	11/7/13	12:00	Sed.	8	X	X	X			X	X		"Conventionals" include: TOC, TVS, total solids, NH4, TS, pore water sulfides, % fines
CR06-1		12:15		4							X		Archive all remaining sample volume
CR06-2.5		12:30		8							X		
CR06-4		12:45		8							X		
CR04-10cm		13:00		8	X	X	X			X	X		
CR04-1		13:30		3							X		
CR05-10cm	11/8/13	8:25	Sed	8	X	X	X			X	X		
CR05-2.5		8:45		8							X		
CR05-3.5		9:00		2							X		
CR04-2.5		9:40		8							X		

Comments/Special Instructions	Relinquished by (Signature)	Received by (Signature)	Relinquished by (Signature)	Received by (Signature)
	Printed Name: Madi Novak	Printed Name: Jennifer Millsap	Printed Name	Printed Name
	Company: MFA	Company: ARI	Company	Company
	Date & Time: 11/8/13 2:00 pm	Date & Time: 11/8/13 1830	Date & Time	Date & Time

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: XN164	Turn-around Requested: standard
ARI Client Company: Maul Foster + Alongi	Phone: 9715442139
Client Contact: Mike Murray	
Client Project Name: DHS GHHSA	
Client Project #: 0863.01.01	Samplers: MRM/MN

Page: 2 of 2	
Date: 11/8/13	Ice Present? Y
No. of Coolers: 3	Cooler Temps: 3.2, 0.4, 5.2

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No Containers	Analysis Requested: Dioxin/Furan	Bulk benzyl butyl phthalate, pentachlorophenol	Mercury	SMS comp. w/ Marine Criteria	TOC	Conventionals	Archive	Salinity for grain size	Notes/Comments
CR04-5	11/8/13	10:00	Sed	4							X		Archive all remaining sample volume ↓
CR01-10cm	↓	11.15	↓	5	X			X	X		X	X	
CR02-10cm		11:30		5	X			X	X		X	X	
CR03-10cm		12:00		5	X			X	X		X	X	

Conventionals = TOC, TVS, total solids, NH_4, TS, pore water sulfides, % fines

Comments/Special Instructions	Relinquished by (Signature)	Received by (Signature)	Relinquished by (Signature)	Received by (Signature)
	Printed Name: Madi Novak	Printed Name: Jennifer Millsap	Printed Name:	Printed Name:
	Company: MFA	Company: ARI	Company:	Company:
	Date & Time: 11/8/13 2 pm	Date & Time: 11/8/13 1830	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

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XN164 : 11SNA

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number: XN64	Turn-around Requested: Standard
ARI Client Company: Maul Foster & Alongi	Phone: 971 544 2139
Client Contact: Mike Murray	
Client Project Name: GHHSA	
Client Project #: 0863.01.01	Samplers: MRM/MN
Page: 1 of 2	
Date: 11/8/13	Ice Present? Y
No. of Coolers: 3	Cooler Temps: 3.2, 0.4, 5.2

Sample ID	Date	Time	Matrix	No. Containers	Dioxin/Furans	Butyl-Benzyl-Phthalate, Pentachlorophenol	Mercury	SMS compounds with marked criteria	TOC	Conventionals (TOC, TVS, Total NH4, TS, PWS, %fines)	Archive	Salinity in pore water	Notes/Comments
CR06-10cm	11/7/13	12:00	Sed.	8	X	X	X	phenol		X	X		"Conventionals" include: TOC, TVS, total solids, NH4, TS, pore water sulfides, %fines
CR06-1		12:15		4	X			X	tphg, tplhc		X		Archive all remaining sample volume
CR06-2.5		12:30		8	X			X	tphg, tplhc		X		
CR06-4		12:45		8							X		
CR04-10cm		13:00		8	X	X	X	phenol		X	X		
CR04-1		13:30		3							X		
CR05-10cm	11/8/13	8:25	Sed	8	X	X	X	phenol		X	X		
CR05-2.5		8:45		8							X		
CR05-3.5		9:00		2							X		
CR04-2.5		9:40		8							X		

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Madi Novak	Printed Name: Jennifer Millsap	Printed Name:	Printed Name
	Company: MFA	Company: ARI	Company	Company
	Date & Time: 11/8/13 2:00 pm	Date & Time: 11/8/13 1830	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: XN64	Turn-around Requested: standard	Page: 2 of 2	
ARI Client Company: Maul Foster + Alongi	Phone: 9715442139	Date: 11/8/13	Ice Present? Y
Client Contact: Mike Murray		No. of Coolers: 3	Cooler Temps: 3.2, 0.4, 5.2
Client Project Name: EHS GHHSN			
Client Project #: 0863.01.01	Samplers: MRM/MN		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No Containers	Dioxin/Furan	Butylbenzyl Phthalate, Pentachlorophenol	Mercury	SMS Conventionals 33/Marine Criteria	TOC	Conventionals	Archive	Sulfides, % Fines	Notes/Comments
CR04-5	11/8/13	10:00	Sed	4		phenol				X (NO3)	X		Archive all remaining sample volume
CR01-10cm		11:15		5	X			X	X		X	X	
CR02-10cm		11:30		5	X			X	X		X	X	
CR03-10cm	↓	12:00	↓	5	X			X	X		X	X	↓

Analysis Requested

Conventionals = TOC, TVS, total solids, NH4, TS, pore water sulfides, % fines

Comments/Special Instructions	Relinquished by (Signature)	Received by (Signature)	Relinquished by: (Signature)	Received by (Signature)
	Printed Name: Madi Novak	Printed Name: Jennifer Millsap	Printed Name	Printed Name:
	Company: MFA	Company: ARI	Company:	Company:
	Date & Time: 11/8/13 2 pm	Date & Time: 11/8/13 1830	Date & Time.	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

SAMPLE LABEL

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client Maul Foster & Alongi Project Name GHH3A

COC No(s): _____ (NA) Delivered by Fed-Ex UPS Courier Hand Delivered Other: MC Delivery

Assigned ARI Job No: XN64 Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2 0-6.0 °C for chemistry) 3.2 0.4 5.2

Time: 1830

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 90877952

Cooler Accepted by: JM Date 11/8/13 Time 1830

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used?	Bubble Wrap (Wet Ice) Gel Packs Baggies Foam Block Paper Other:		
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)	(NA)	YES	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	(NA)		

Was Sample Split by ARI: (NA) YES Date/Time: _____ Equipment _____ Split by: _____

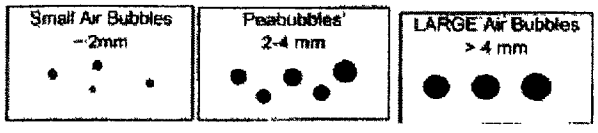
Samples Logged by: JM Date. 11/12/13 Time 1240

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By _____ Date. _____



Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

XNGU : 00007

Subject: RE: GHHSA
From: "Mike Murray" <mmurray@maulfoster.com>
Date: 11/11/2013 3:40 PM
To: "Mark Harris" <markh@arilabs.com>
CC: <mnovak@maulfoster.com>

Hi Mark, you are correct on all statements. The SMS marine chemicals we want analyzed are in Table 2 of the attached (should be the same table we circulated in August). Table 3 includes a summary of the methods we discussed.

Please let us know if you have any questions.
Thanks,
MRM

MICHAEL R. MURRAY RG | MAUL FOSTER & ALONGI, INC.

d. 503 501 5226 | p. 971 544 2139 | c. 503 310 0435 | f. 971 544 2140 |
www.maulfoster.com
2001 NW 19th Avenue, Suite 200, Portland, OR 97209

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-----Original Message-----
From: Mark Harris [mailto:markh@arilabs.com]
Sent: Monday, November 11, 2013 8:42 AM
To: Mike Murray
Subject: GHHSA

Mike:

I just have a few items to clarify on these samples:

1) For those samples that request 'butylbenzylphthalate and PCP' only, we are to only do those two compounds, not the full SMS SVOC list, correct?

2) Is the request for 'SMS compounds' the full list of compounds in the table you sent in August?

3) Is '% fines' the same as grain size?

I think that's all we need. We'll get them logged and started as soon as possible.

Mark H.

--

Mark Harris
Project Manager
Analytical Resources, Inc.

206/695-6210
markh@arilabs.com

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Attachments

T-SAP.xlsx 24.8 KB

Subject: RE: GHHSA
From: "Madi Novak" <mnovak@maulfoster.com>
Date: 11/12/2013 12:55 PM
To: "Mark Harris" <markh@arilabs.com>
CC: "Mike Murray" <mmurray@maulfoster.com>

Thanks Mark,

1) just plain phenol
2) that is fine
3) that works

MADI NOVAK | MAUL FOSTER & ALONGI, INC.

direct. 503 501 5212 | main. 971 544 2139 | cell. 971 227 1060 |www.maulfoster.com
2001 NW 19th Avenue, Suite 200, Portland, OR 97209
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-----Original Message-----
From: Mark Harris [mailto:markh@arilabs.com]
Sent: Tuesday, November 12, 2013 12:53 PM
To: Madi Novak
Subject: Re: GHHSA

Madi:

Okay, there are a couple of questions:

1) Is 'phenol' just plain phenol (by 8270), or PCP?

2) For CR04-5, we didn't receive large jars for porewater extraction. We received 4-8oz, 1-4oz and 1-2oz. We can us the 8oz but it won't leave much leftover.

3) For CR06-2.5, we didn't receive "VOA" jars. We can use the 4oz conventionals jar here and then give it to the conventionals lab if that works for you.

Mark H.

On 11/12/2013 12:28 PM, Madi Novak wrote:
> Thanks! Note the 06 sample appears to be pretty impacted. . .
>
> MADI NOVAK | MAUL FOSTER & ALONGI, INC.
>
> direct. 503 501 5212 | main. 971 544 2139 | cell. 971 227 1060
> |www.maulfoster.com
> 2001 NW 19th Avenue, Suite 200, Portland, OR 97209 Please consider the environment before printing this email.
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-----Original Message-----
From: Mark Harris [mailto:markh@arilabs.com]
Sent: Tuesday, November 12, 2013 12:22 PM
To: Madi Novak
Cc: Mike Murray
Subject: Re: GHHSA

Madi:

Got it. We'll get these tests added.

Mark H.

On 11/12/2013 12:20 PM, Madi Novak wrote:

Hi Mark,

I'd like to add analyses beyond what is already noted on the COC as follows:

CR04-10cm analyze for phenol
CR05-10cm analyze for phenol
CR06-10cm analyze for phenol
CR04-5 please analyze for conventionals (toc, tvs, total solids, ammonia, total sulfides, pore water sulfides) and phenol.
CR06-2.5 please analyze for SMS constituents, dioxins/furans, NWTPH-Gx and NWTPH-Dx

Please let me know if you have any questions.

Thank you,

MADI NOVAK | MAUL FOSTER & ALONGI, INC.

direct. 503 501 5212 | main. 971 544 2139 | cell. 971 227 1060
|www.maulfoster.com
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-----Original Message-----

From: Mark Harris [mailto:markh@arilabs.com]
Sent: Tuesday, November 12, 2013 6:25 AM
To: Mike Murray
Cc: Madi Novak
Subject: Re: GHHSA

We'll get them logged this morning.

On 11/11/2013 3:40 PM, Mike Murray wrote:
> Hi Mark, you are correct on all statements. The SMS marine chemicals we want analyzed are in Table 2 of the attached (should be the same table we circulated in August). Table 3 includes a summary of the methods we discussed.
>
> Please let us know if you have any questions.
> Thanks,
> MRM
>
> MICHAEL R. MURRAY RG | MAUL FOSTER & ALONGI, INC.
>
> d. 503 501 5226 | p. 971 544 2139 | c. 503 310 0435 | f. 971 544 2140
> | www.maulfoster.com
> 2001 NW 19th Avenue, Suite 200, Portland, OR 97209
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>
> -----Original Message-----
> From: Mark Harris [mailto:markh@arilabs.com]
> Sent: Monday, November 11, 2013 8:42 AM
> To: Mike Murray
> Subject: GHHSA
>
> Mike:
>
> I just have a few items to clarify on these samples:
>
> 1) For those samples that request 'butylbenzylphthalate and PCP' only, we are to only do those two compounds, not the full SMS SVOC list, correct?
>
> 2) Is the request for 'SMS compounds' the full list of compounds in the table you sent in August?
>
> 3) Is '% fines' the same as grain size?
>
> I think that's all we need. We'll get them logged and started as soon as

possible.

Mark H.

--

Mark Harris
Project Manager
Analytical Resources, Inc.
206/695-6210
markh@arilabs.com

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Analytical Resources, Incorporated
Analytical Chemists and Consultants

Client: Maul Foster & Alongi	**ARI Job No.:** XN64
Client Project: GHHSA	**Client Project No.:** 0863.01.01

Case Narrative

1. Seven samples were submitted for testing and preparation on November 12, 2013 and were in good condition.
2. The samples were submitted for pore water extraction by the United States Army Corp of Engineers draft interim guidelines. Four samples to be submitted for sulfide analysis would not yield the required pore water volume. The three pore water samples to be submitted for salinity analysis did yield sufficient volume for analysis. All centrifuge bottles were decontaminated, pre-rinsed with hexane and allowed to dry completely. All spoons were decontaminated, pre-rinsed with dichloromethane and allowed to air dry completely. All samples were centrifuged in a pre-cooled centrifuge (4°C) at 3,000 x g for 30 minutes, decanted and then placed in another pre-cooled centrifuge (4°C) and spun at 7,000-x g for 30 minutes. The samples were decanted into small HDPE sample bottles with no preservation.
3. Four samples were submitted for grain size analysis according to Puget Sound Estuary Protocol (PSEP) methodology. The samples were originally split under the required volume required in PSEP. The samples were resplit, and the original bench sheets are included in the raw data. The samples were run in a single batch and one sample from another job was chosen for triplicate analysis. The triplicate data is reported on the QA summary. The samples contained woody or other organic matter which may have broken down during the sieving process, affecting grain size analysis. The samples displayed an oil-like sheen and left an oil-like residue on the equipment after processing.
4. The data is reported in summary tables and plots.
5. There were no other noted anomalies in the samples or methods on this project.

Released by: _____ Date: 11/25/13
Geotechnical Laboratory Manager

Reviewed by: _____ Date: November 25, 2013
Lead Technician

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: XN64
Client: Maul Foster & Alongi
Project Event: 0863.01.01
Project Name: GHHSA

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	CR06-10cm	XN64A	13-24853	Sediment	11/07/13 12:00	11/08/13 18:30
2.	CR04-10cm	XN64B	13-24854	Sediment	11/07/13 13:00	11/08/13 18:30
3.	CR05-10cm	XN64C	13-24855	Sediment	11/08/13 08:25	11/08/13 18:30
4.	CR06-2.5	XN64D	13-24856	Sediment	11/07/13 12:30	11/08/13 18:30
5.	CR04-5	XN64E	13-24857	Sediment	11/08/13 10:00	11/08/13 18:30
6.	CR01-10cm	XN64F	13-24858	Sediment	11/08/13 11:15	11/08/13 18:30
7.	CR02-10cm	XN64G	13-24859	Sediment	11/08/13 11:30	11/08/13 18:30
8.	CR03-10cm	XN64H	13-24860	Sediment	11/08/13 11:30	11/08/13 18:30
9.	CR06-1	XN64I	13-24861	Sediment	11/07/13 12:15	11/08/13 18:30
10.	CR06-4	XN64J	13-24862	Sediment	11/07/13 12:30	11/08/13 18:30
11.	CR04-1	XN64K	13-24863	Sediment	11/07/13 13:30	11/08/13 18:30
12.	CR05-2.5	XN64L	13-24864	Sediment	11/08/13 08:45	11/08/13 18:30
13.	CR05-3.5	XN64M	13-24865	Sediment	11/08/13 09:00	11/08/13 18:30
14.	CR04-2.5	XN64N	13-24866	Sediment	11/08/13 09:40	11/08/13 18:30

XN64: 00015

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 2/14/2011

Inorganic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Duplicate RPD is not within established control limits

B — Reported value is less than the CRDL but ≥ the Reporting Limit

N — Matrix Spike recovery not within established control limits

NA — Not Applicable, analyte not spiked

H — The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible

L — Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Flagged value is not within established control limits

B — Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.

J — Estimated concentration when the value is less than ARI's established reporting limits

D — The spiked compound was not detected due to sample extract dilution

E — Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

Q — Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).

YNSU : 000015

S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte

NA The flagged analyte was not analyzed for

NR Spiked compound recovery is not reported due to chromatographic interference

NS The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

EMPC Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

X Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**

Z Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

XNGU : 00017

Geotechnical Data

A	The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
F	Samples were frozen prior to particle size determination
SM	Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
SS	Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
W	Weight of sample in some pipette aliquots was below the level required for accurate weighting

YNGH : 00019

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TPHG by Method NWTPHG
Matrix: Sediment

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
Event: 0863.01.01

Data Release Authorized:
Reported: 11/14/13

ARI ID	Client ID	Analysis Date	Basis	Range	Result
MB-111313	Method Blank	11/13/13	Dry	Gasoline	< 5.0 U
13-24856		PID1		HC ID	---
				Trifluorotoluene	93.3%
				Bromobenzene	89.6%
XN64D	CR06-2.5	11/13/13	Dry	Gasoline	< 54 U
13-24856		PID1		HC ID	---
				Trifluorotoluene	26.8%
				Bromobenzene	21.6%

Gasoline values reported in mg/kg (ppm)

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: LCS-111313
LAB CONTROL SAMPLE

Lab Sample ID: LCS-111313
LIMS ID: 13-24856
Matrix: Sediment
Data Release Authorized:
Reported: 11/14/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
Event: 0863.01.01
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 11/13/13 11:16
LCSD: 11/13/13 11:46
Instrument/Analyst LCS: PID1/PKC
LCSD: PID1/PKC

Purge Volume: 5.0 mL

Sample Amount LCS: 100 mg-dry-wt
LCSD: 100 mg-dry-wt

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Gasoline Range Hydrocarbons	121	125	96.8%	121	125	96.8%	0.0%

Reported in mg/kg (ppm)

RPD calculated using sample concentrations per SW846.

TPHG Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	107%	113%
Bromobenzene	93.3%	99.7%

ANALYTICAL RESOURCES INCORPORATED

TPHG SOIL SURROGATE RECOVERY SUMMARY

ARI Job: XN64
Matrix: Sediment

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
Event: 0863.01.01

Client ID	BFB	TFT	BBZ	TOT OUT
MB-111313	NA	93.3%	89.6%	0
LCS-111313	NA	107%	93.3%	0
LCSD-111313	NA	113%	99.7%	0
CR06-2.5	NA	26.8%*	21.6%*	2

	LCS/MB LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(80-120)	(65-128)
(BBZ) = Bromobenzene	(80-120)	(52-149)

Log Number Range: 13-24856 to 13-24856

FORM II TPHG

XN64 : 00021

Data File: /chem3/pid1.i/20131113-1.b/1113a008.d

Date : 13-NOV-2013 15:59

Client ID: CR06-2.5

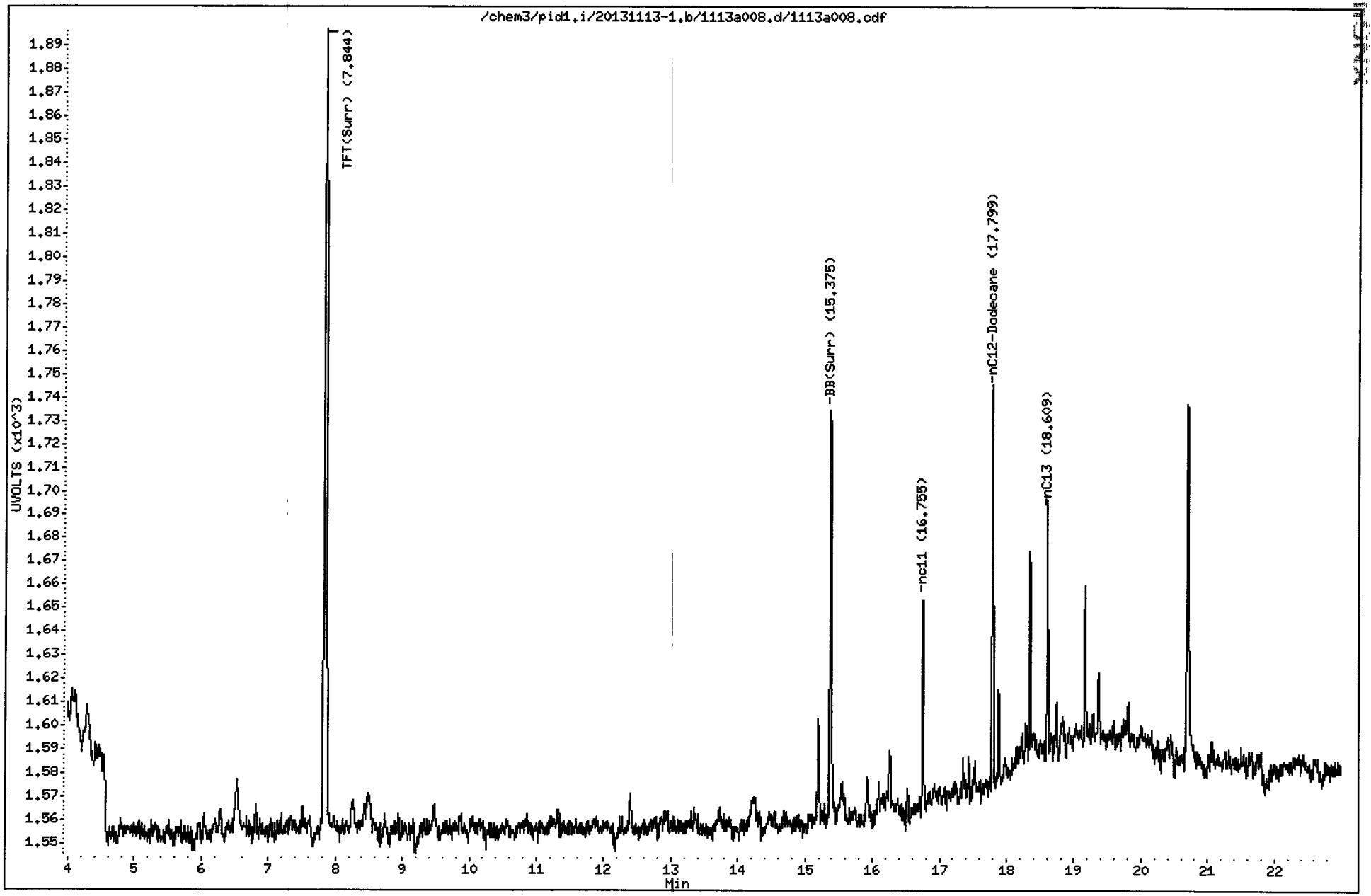
Sample Info: XN64D

Column phase: RTX 502-2 FID

Instrument: pid1.i

Operator: PC

Column diameter: 0.18



Data File: /chem3/pid1.i/20131113-1.b/1113a004.d

Date : 13-NOV-2013 11:16

Client ID:

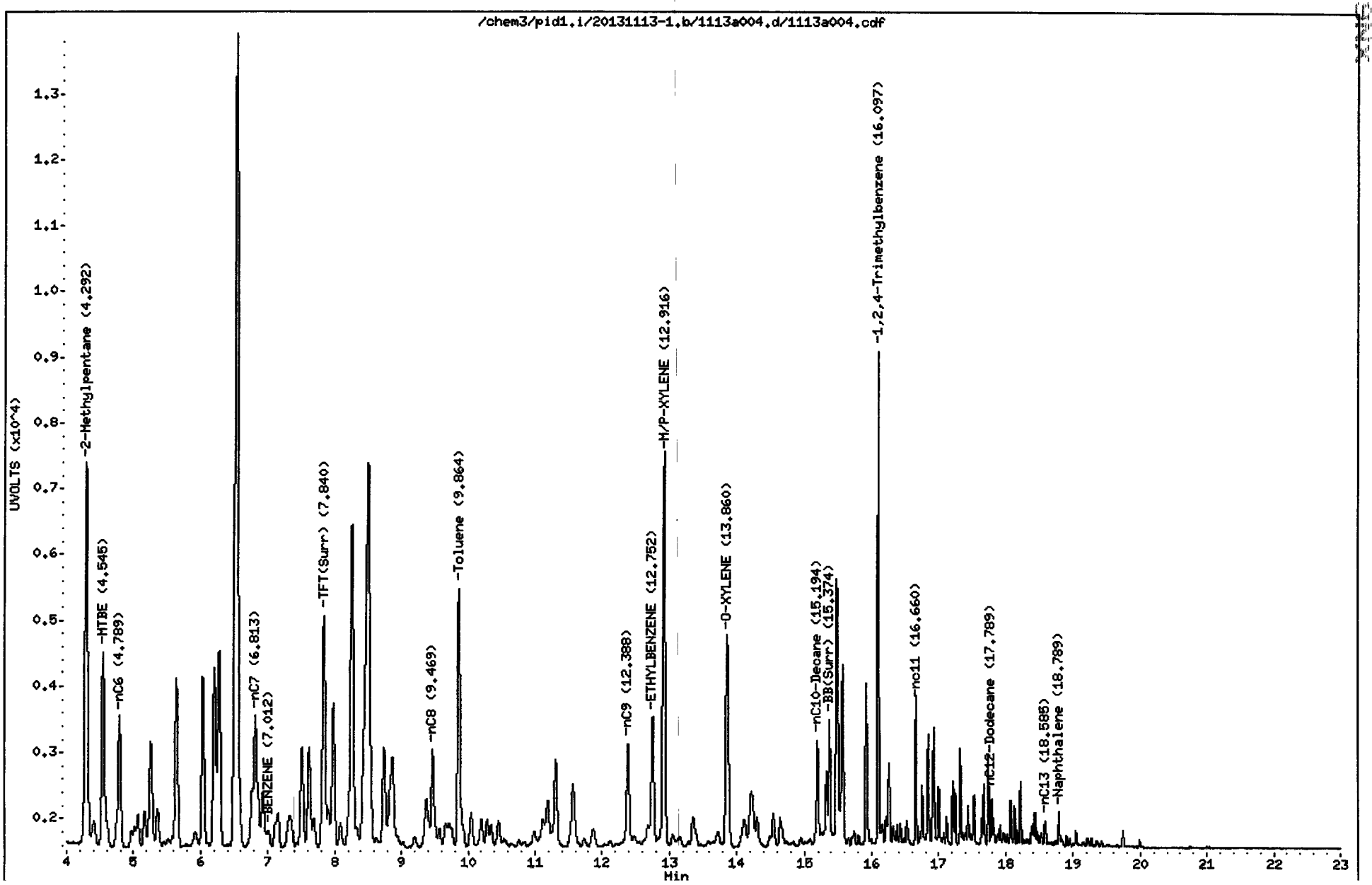
Sample Info: LCS1113

Instrument: pid1.i

Operator: PC

Column phase: RTX 502-2 FID

Column diameter: 0.18



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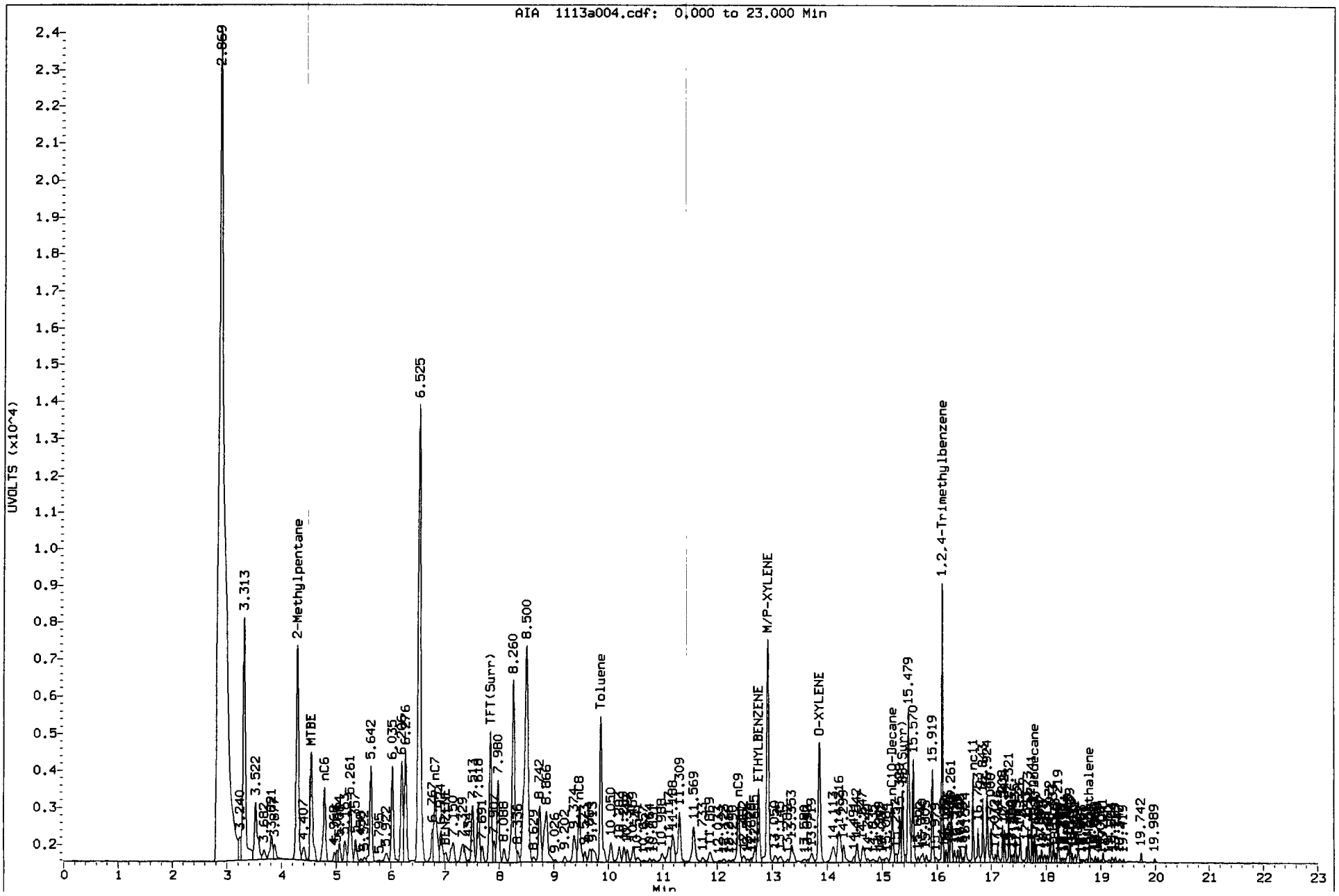
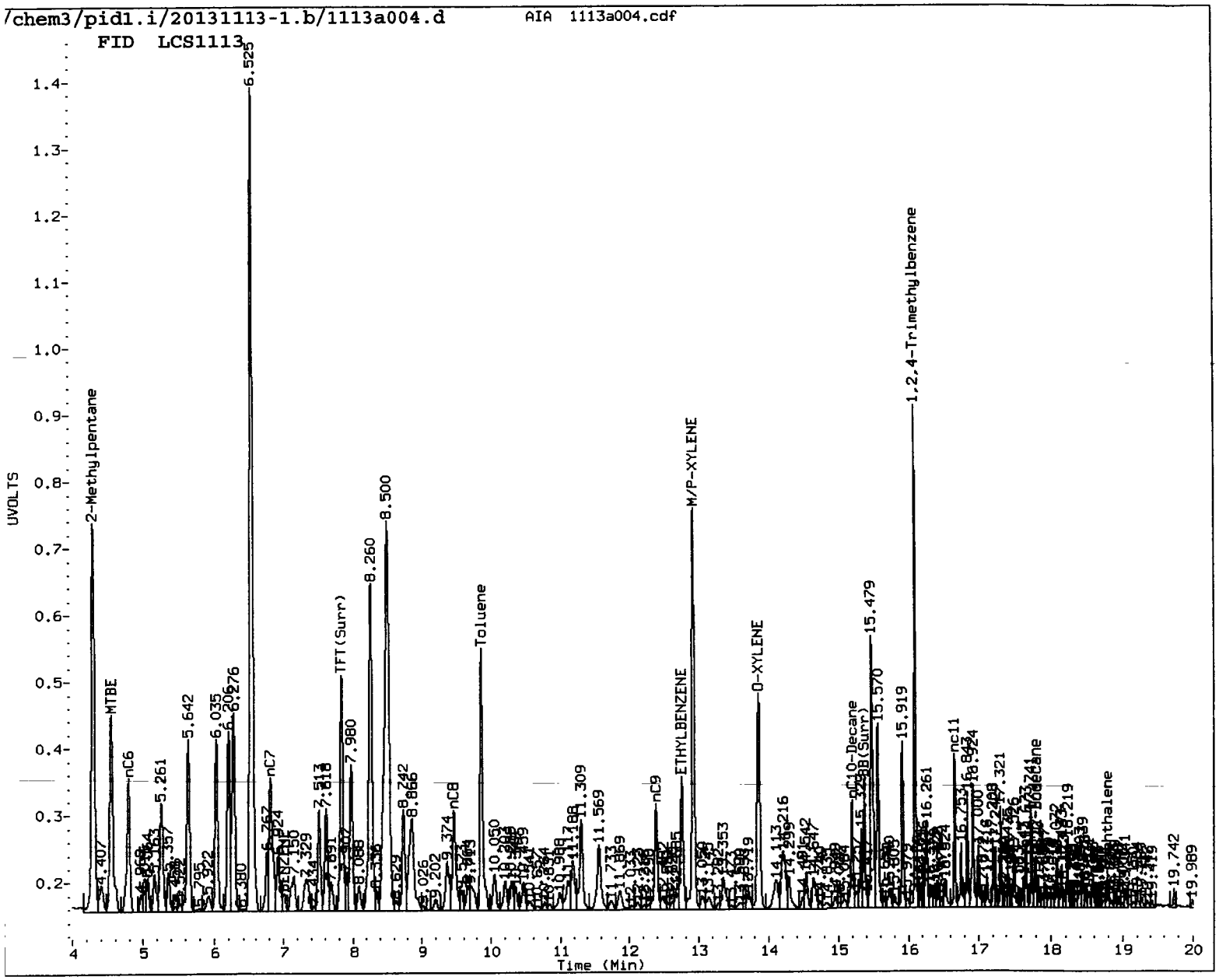
Injection Date: 13-NOV-2013 11:16
Instrument: pid1.i
Client Sample ID:





MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other _____

Analyst: _____ Date: 4/14/13

Data File: /chem3/pid1.i/20131113-1.b/1113a005.d

Date : 13-NOV-2013 11:46

Client ID:

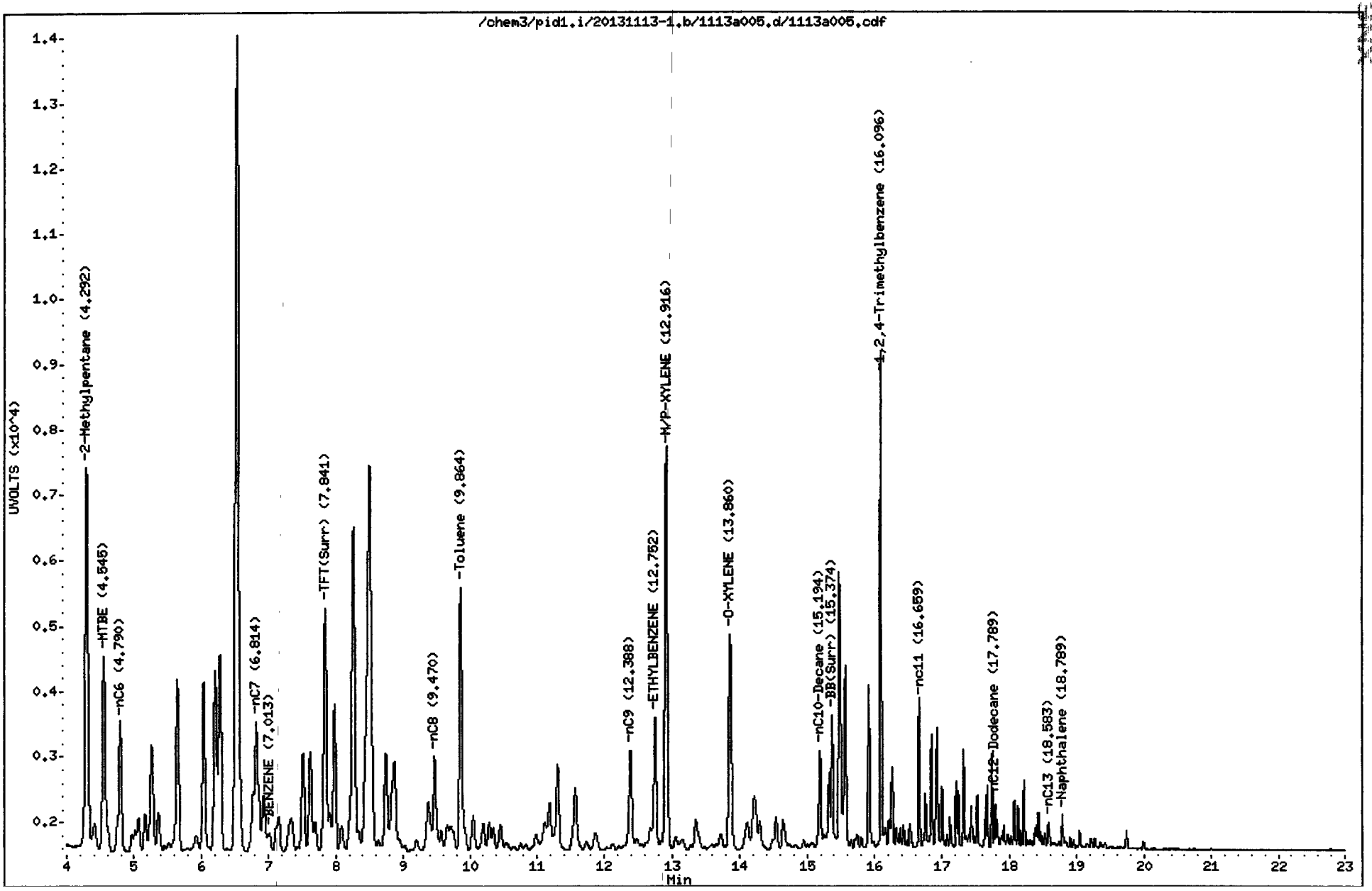
Sample Info: LCSD1113

Column phase: RTX 502-2 FID

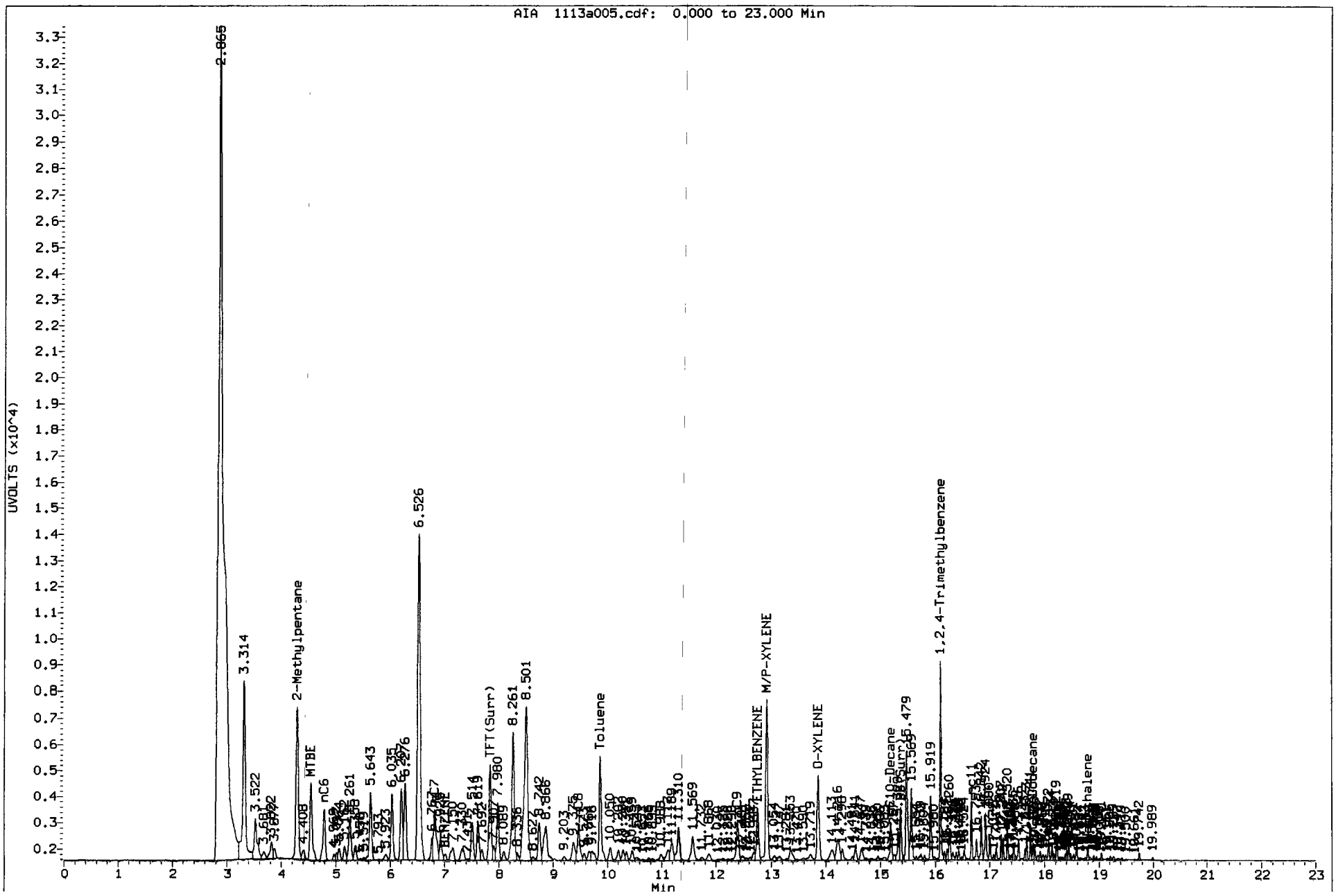
Instrument: pid1.i

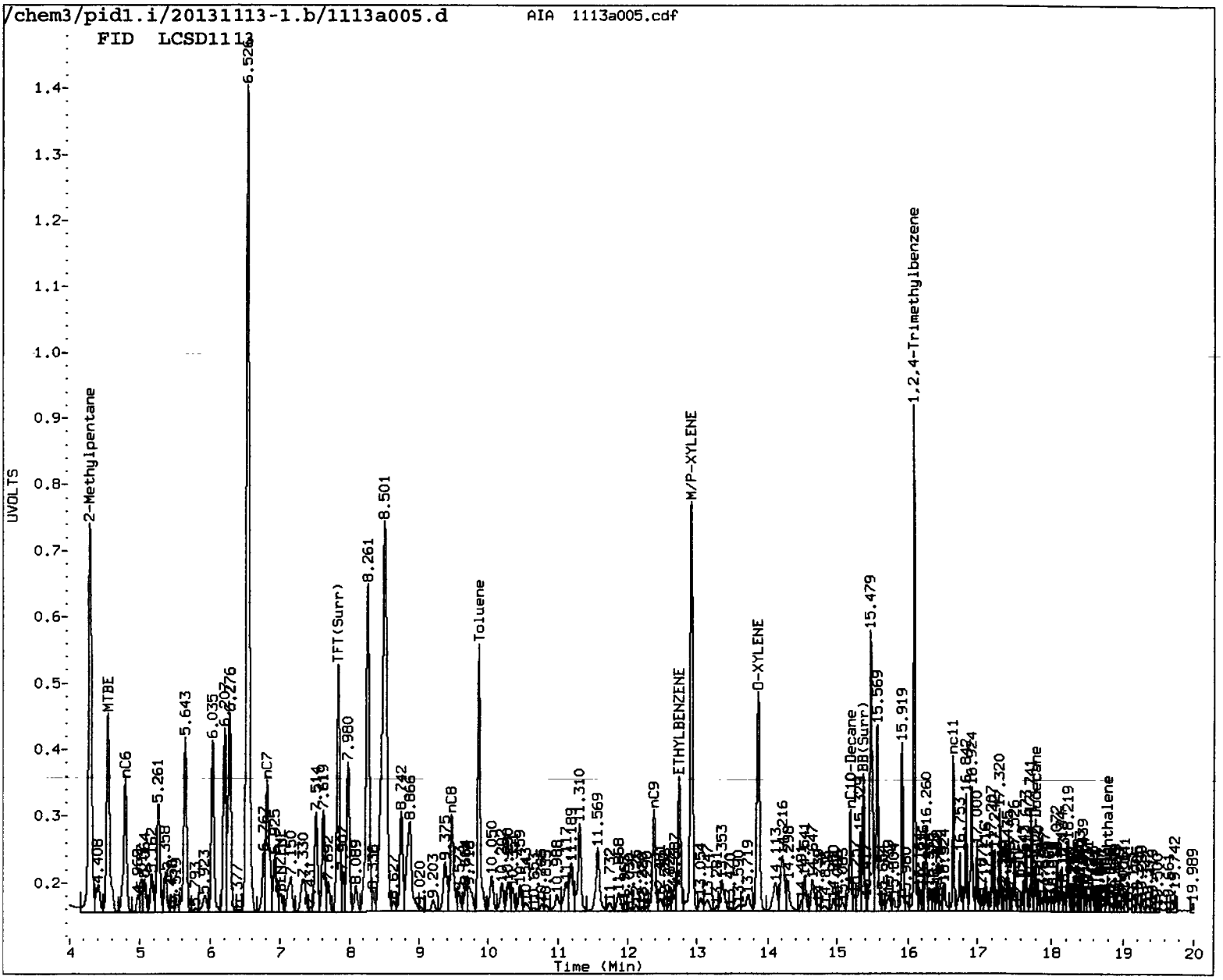
Operator: PC

Column diameter: 0.18



Data File: /chem3/pid1.i/20131113-1.b/1113a005.d/1113a005.cdf
Injection Date: 13-NOV-2013 11:46
Instrument: pid1.i
Client Sample ID:





MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other _____

Analyst: KC Date: 11/14/13

XNSH : 00028

Data File: /chem3/pid1.i/20131113-1.b/1113a007.d

Date : 13-NOV-2013 12:57

Client ID:

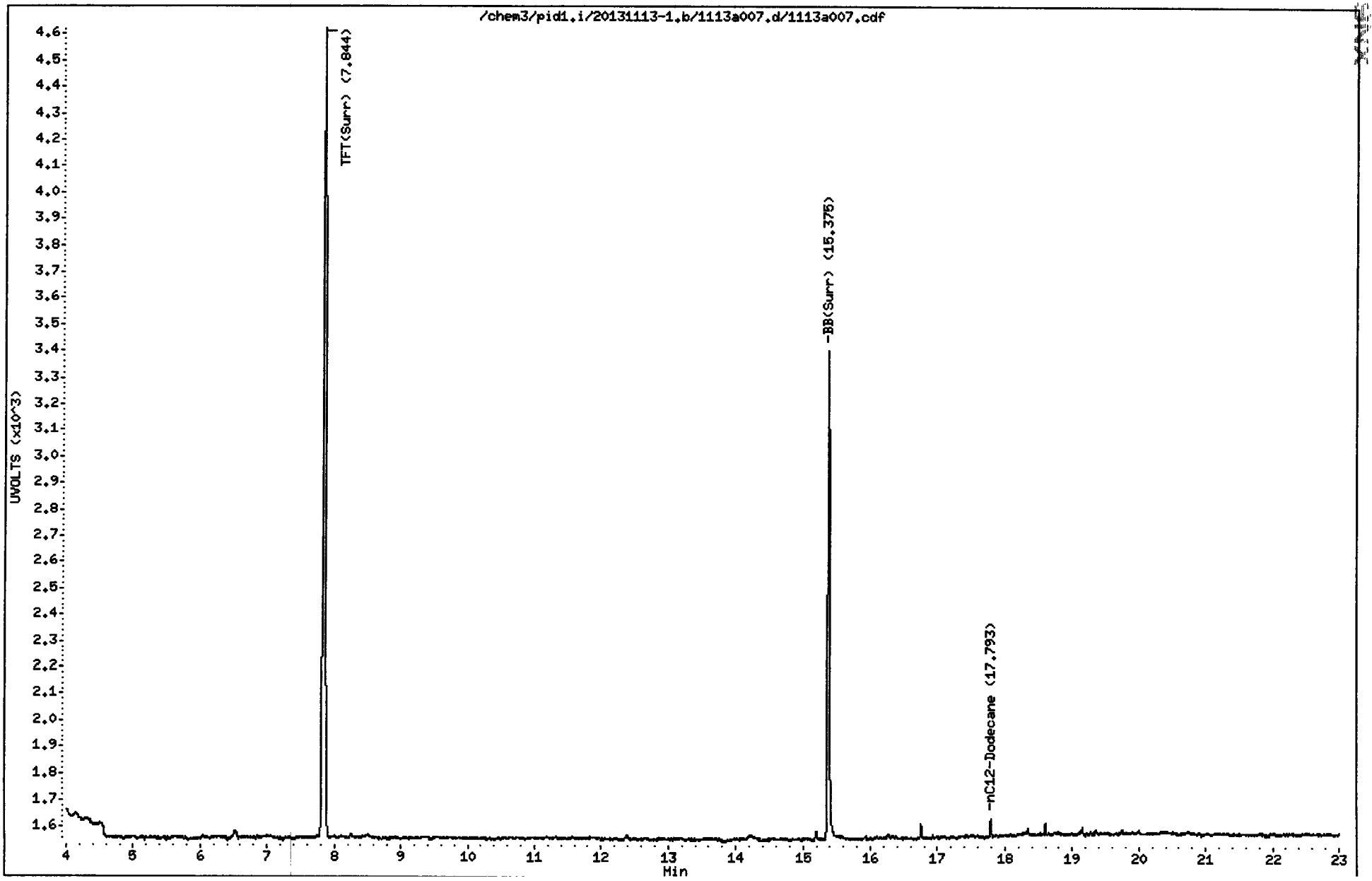
Sample Info: MB1113A

Column phase: RTX 502-2 FID

Instrument: pid1.i

Operator: PC

Column diameter: 0.18



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: MB-111513
METHOD BLANK

Lab Sample ID: MB-111513
LIMS ID: 13-24856
Matrix: Sediment
Data Release Authorized:
Reported: 11/21/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: NA
Date Received: NA

Date Extracted: 11/15/13
Date Analyzed: 11/20/13 14:58
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	RL	Result
108-95-2	Phenol	20	< 20 U
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	4-Methylphenol	20	< 20 U
105-67-9	2,4-Dimethylphenol	100	< 100 U
65-85-0	Benzoic Acid	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	Naphthalene	20	< 20 U
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	< 20 U
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	Acenaphthylene	20	< 20 U
83-32-9	Acenaphthene	20	< 20 U
132-64-9	Dibenzofuran	20	< 20 U
84-66-2	Diethylphthalate	20	< 20 U
86-73-7	Fluorene	20	< 20 U
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	100	< 100 U
85-01-8	Phenanthrene	20	< 20 U
120-12-7	Anthracene	20	< 20 U
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	Fluoranthene	20	< 20 U
129-00-0	Pyrene	20	< 20 U
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	Benzo(a)anthracene	20	< 20 U
117-81-7	bis(2-Ethylhexyl)phthalate	50	< 50 U
218-01-9	Chrysene	20	< 20 U
117-84-0	Di-n-Octyl phthalate	20	< 20 U
50-32-8	Benzo(a)pyrene	20	< 20 U
193-39-5	Indeno(1,2,3-cd)pyrene	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	20	< 20 U
TOTBFA	Total Benzofluoranthenes	40	< 40 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	64.6%	2-Fluorobiphenyl	64.0%
d14-p-Terphenyl	79.8%	d4-1,2-Dichlorobenzene	66.4%
d5-Phenol	56.9%	2-Fluorophenol	60.8%
2,4,6-Tribromophenol	61.5%	d4-2-Chlorophenol	64.1%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS **Sample ID: CR06-2.5**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: XN64D
LIMS ID: 13-24856
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/21/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Date Extracted: 11/15/13
Date Analyzed: 11/20/13 16:09
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 0.71 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 77.0%

CAS Number	Analyte	RL	Result
108-95-2	**Phenol**	**280**	**240 J**
106-46-7	1,4-Dichlorobenzene	280	< 280 U
100-51-6	Benzyl Alcohol	280	< 280 U
95-50-1	1,2-Dichlorobenzene	280	< 280 U
95-48-7	2-Methylphenol	280	< 280 U
106-44-5	**4-Methylphenol**	**280**	**420**
105-67-9	2,4-Dimethylphenol	1,400	< 1,400 U
65-85-0	**Benzoic Acid**	**2,800**	**860 J**
120-82-1	1,2,4-Trichlorobenzene	280	< 280 U
91-20-3	**Naphthalene**	**280**	**1,800**
87-68-3	Hexachlorobutadiene	280	< 280 U
91-57-6	**2-Methylnaphthalene**	**280**	**780**
131-11-3	Dimethylphthalate	280	< 280 U
208-96-8	**Acenaphthylene**	**280**	**520**
83-32-9	**Acenaphthene**	**280**	**490**
132-64-9	**Dibenzofuran**	**280**	**490**
84-66-2	**Diethylphthalate**	**280**	**270 J**
86-73-7	**Fluorene**	**280**	**650**
86-30-6	N-Nitrosodiphenylamine	280	< 280 U
118-74-1	Hexachlorobenzene	280	< 280 U
87-86-5	Pentachlorophenol	1,400	< 1,400 U
85-01-8	**Phenanthrene**	**280**	**3,600**
120-12-7	**Anthracene**	**280**	**750**
84-74-2	Di-n-Butylphthalate	280	< 280 U
206-44-0	**Fluoranthene**	**280**	**3,200**
129-00-0	**Pyrene**	**280**	**3,600**
85-68-7	Butylbenzylphthalate	280	< 280 U
56-55-3	**Benzo(a)anthracene**	**280**	**1,300**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**700**	**1,900**
218-01-9	**Chrysene**	**280**	**1,600**
117-84-0	Di-n-Octyl phthalate	280	< 280 U
50-32-8	**Benzo(a)pyrene**	**280**	**1,200**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**280**	**490**
53-70-3	Dibenz(a,h)anthracene	280	< 280 U
191-24-2	**Benzo(g,h,i)perylene**	**280**	**590**
TOTBFA	**Total Benzofluoranthenes**	**560**	**2,000**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	63.6%	2-Fluorobiphenyl	70.0%
d14-p-Terphenyl	76.4%	d4-1,2-Dichlorobenzene	63.0%
d5-Phenol	55.6%	2-Fluorophenol	59.9%
2,4,6-Tribromophenol	72.9%	d4-2-Chlorophenol	61.9%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS **Sample ID: CR01-10cm**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: XN64F
LIMS ID: 13-24858
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/21/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 11/15/13
Date Analyzed: 11/20/13 16:45
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.30 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 51.2%

CAS Number	Analyte	RL	Result
108-95-2	**Phenol**	**19**	**24**
106-46-7	1,4-Dichlorobenzene	19	< 19 U
100-51-6	Benzyl Alcohol	19	< 19 U
95-50-1	1,2-Dichlorobenzene	19	< 19 U
95-48-7	2-Methylphenol	19	< 19 U
106-44-5	**4-Methylphenol**	**19**	**30**
105-67-9	2,4-Dimethylphenol	97	< 97 U
65-85-0	Benzoic Acid	190	< 190 U
120-82-1	1,2,4-Trichlorobenzene	19	< 19 U
91-20-3	**Naphthalene**	**19**	**25**
87-68-3	Hexachlorobutadiene	19	< 19 U
91-57-6	2-Methylnaphthalene	19	< 19 U
131-11-3	Dimethylphthalate	19	< 19 U
208-96-8	Acenaphthylene	19	< 19 U
83-32-9	**Acenaphthene**	**19**	**14 J**
132-64-9	**Dibenzofuran**	**19**	**12 J**
84-66-2	**Diethylphthalate**	**19**	**56**
86-73-7	**Fluorene**	**19**	**14 J**
86-30-6	N-Nitrosodiphenylamine	19	< 19 U
118-74-1	Hexachlorobenzene	19	< 19 U
87-86-5	Pentachlorophenol	97	< 97 U
85-01-8	**Phenanthrene**	**19**	**47**
120-12-7	**Anthracene**	**19**	**14 J**
84-74-2	Di-n-Butylphthalate	19	< 19 U
206-44-0	**Fluoranthene**	**19**	**100**
129-00-0	**Pyrene**	**19**	**110**
85-68-7	Butylbenzylphthalate	19	< 19 U
56-55-3	**Benzo(a)anthracene**	**19**	**28**
117-81-7	**bis(2-Ethylhexyl)phthalate**	**48**	**29 J**
218-01-9	**Chrysene**	**19**	**35**
117-84-0	Di-n-Octyl phthalate	19	< 19 U
50-32-8	**Benzo(a)pyrene**	**19**	**21**
193-39-5	Indeno(1,2,3-cd)pyrene	19	< 19 U
53-70-3	Dibenz(a,h)anthracene	19	< 19 U
191-24-2	**Benzo(g,h,i)perylene**	**19**	**14 J**
TOTBFA	**Total Benzofluoranthenes**	**39**	**52**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	58.0%	2-Fluorobiphenyl	66.4%
d14-p-Terphenyl	71.6%	d4-1,2-Dichlorobenzene	57.6%
d5-Phenol	57.1%	2-Fluorophenol	57.2%
2,4,6-Tribromophenol	72.1%	d4-2-Chlorophenol	59.1%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS **Sample ID: CR02-10cm**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: XN64G
LIMS ID: 13-24859
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/21/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 11/15/13
Date Analyzed: 11/20/13 17:20
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.20 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 46.9%

CAS Number	Analyte	RL	Result	
108-95-2	**Phenol**	**20**	**94**	
106-46-7	**1,4-Dichlorobenzene**	**20**	**19**	**J**
100-51-6	**Benzyl Alcohol**	**20**	**31**	
95-50-1	1,2-Dichlorobenzene	20	< 20	U
95-48-7	2-Methylphenol	20	< 20	U
106-44-5	**4-Methylphenol**	**20**	**730**	
105-67-9	2,4-Dimethylphenol	98	< 98	U
65-85-0	**Benzoic Acid**	**200**	**240**	
120-82-1	1,2,4-Trichlorobenzene	20	< 20	U
91-20-3	**Naphthalene**	**20**	**280**	
87-68-3	Hexachlorobutadiene	20	< 20	U
91-57-6	**2-Methylnaphthalene**	**20**	**28**	
131-11-3	Dimethylphthalate	20	< 20	U
208-96-8	**Acenaphthylene**	**20**	**68**	
83-32-9	**Acenaphthene**	**20**	**20**	
132-64-9	**Dibenzofuran**	**20**	**20**	
84-66-2	**Diethylphthalate**	**20**	**20**	
86-73-7	**Fluorene**	**20**	**15**	**J**
86-30-6	N-Nitrosodiphenylamine	20	< 20	U
118-74-1	Hexachlorobenzene	20	< 20	U
87-86-5	Pentachlorophenol	98	< 98	U
85-01-8	**Phenanthrene**	**20**	**89**	
120-12-7	**Anthracene**	**20**	**16**	**J**
84-74-2	Di-n-Butylphthalate	20	< 20	U
206-44-0	**Fluoranthene**	**20**	**63**	
129-00-0	**Pyrene**	**20**	**61**	
85-68-7	Butylbenzylphthalate	20	< 20	U
56-55-3	**Benzo(a)anthracene**	**20**	**11**	**J**
117-81-7	bis(2-Ethylhexyl)phthalate	49	< 49	U
218-01-9	**Chrysene**	**20**	**17**	**J**
117-84-0	Di-n-Octyl phthalate	20	< 20	U
50-32-8	Benzo(a)pyrene	20	< 20	U
193-39-5	Indeno(1,2,3-cd)pyrene	20	< 20	U
53-70-3	Dibenz(a,h)anthracene	20	< 20	U
191-24-2	**Benzo(g,h,i)perylene**	**20**	**15**	**J**
TOTBFA	**Total Benzofluoranthenes**	**39**	**22**	**J**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	52.6%	2-Fluorobiphenyl	60.0%
d14-p-Terphenyl	64.8%	d4-1,2-Dichlorobenzene	51.6%
d5-Phenol	55.3%	2-Fluorophenol	53.7%
2,4,6-Tribromophenol	66.5%	d4-2-Chlorophenol	56.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR03-10cm
SAMPLE

Lab Sample ID: XN64H
LIMS ID: 13-24860
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/21/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 11/15/13
Date Analyzed: 11/20/13 17:55
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.41 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 61.6%

CAS Number	Analyte	RL	Result
108-95-2	**Phenol**	**19**	**43**
106-46-7	1,4-Dichlorobenzene	19	< 19 U
100-51-6	**Benzyl Alcohol**	**19**	**36**
95-50-1	1,2-Dichlorobenzene	19	< 19 U
95-48-7	2-Methylphenol	19	< 19 U
106-44-5	**4-Methylphenol**	**19**	**60**
105-67-9	2,4-Dimethylphenol	96	< 96 U
65-85-0	**Benzoic Acid**	**190**	**180 J**
120-82-1	1,2,4-Trichlorobenzene	19	< 19 U
91-20-3	**Naphthalene**	**19**	**23**
87-68-3	Hexachlorobutadiene	19	< 19 U
91-57-6	2-Methylnaphthalene	19	< 19 U
131-11-3	Dimethylphthalate	19	< 19 U
208-96-8	Acenaphthylene	19	< 19 U
83-32-9	Acenaphthene	19	< 19 U
132-64-9	Dibenzofuran	19	< 19 U
84-66-2	**Diethylphthalate**	**19**	**36**
86-73-7	Fluorene	19	< 19 U
86-30-6	N-Nitrosodiphenylamine	19	< 19 U
118-74-1	Hexachlorobenzene	19	< 19 U
87-86-5	Pentachlorophenol	96	< 96 U
85-01-8	**Phenanthrene**	**19**	**19**
120-12-7	Anthracene	19	< 19 U
84-74-2	Di-n-Butylphthalate	19	< 19 U
206-44-0	**Fluoranthene**	**19**	**25**
129-00-0	**Pyrene**	**19**	**21**
85-68-7	Butylbenzylphthalate	19	< 19 U
56-55-3	Benzo(a)anthracene	19	< 19 U
117-81-7	bis(2-Ethylhexyl)phthalate	48	< 48 U
218-01-9	Chrysene	19	< 19 U
117-84-0	Di-n-Octyl phthalate	19	< 19 U
50-32-8	Benzo(a)pyrene	19	< 19 U
193-39-5	Indeno(1,2,3-cd)pyrene	19	< 19 U
53-70-3	Dibenz(a,h)anthracene	19	< 19 U
191-24-2	Benzo(g,h,i)perylene	19	< 19 U
TOTBFA	**Total Benzofluoranthenes**	**38**	**13 J**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	60.8%	2-Fluorobiphenyl	66.8%
d14-p-Terphenyl	72.6%	d4-1,2-Dichlorobenzene	56.2%
d5-Phenol	61.5%	2-Fluorophenol	56.9%
2,4,6-Tribromophenol	72.1%	d4-2-Chlorophenol	60.7%

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT OUT
MB-111513	64.6%	64.0%	79.8%	66.4%	56.9%	60.8%	61.5%	64.1%	0
LCS-111513	67.0%	66.8%	79.0%	63.4%	63.9%	64.1%	71.5%	64.3%	0
CR06-2.5	63.6%	70.0%	76.4%	63.0%	55.6%	59.9%	72.9%	61.9%	0
CR01-10cm	58.0%	66.4%	71.6%	57.6%	57.1%	57.2%	72.1%	59.1%	0
CR02-10cm	52.6%	60.0%	64.8%	51.6%	55.3%	53.7%	66.5%	56.0%	0
CR03-10cm	60.8%	66.8%	72.6%	56.2%	61.5%	56.9%	72.1%	60.7%	0

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(33-120)	(30-120)
(FBP) = 2-Fluorobiphenyl	(35-120)	(35-120)
(TPH) = d14-p-Terphenyl	(42-124)	(37-120)
(DCB) = d4-1,2-Dichlorobenzene	(37-120)	(32-120)
(PHL) = d5-Phenol	(32-120)	(29-120)
(2FP) = 2-Fluorophenol	(32-120)	(27-120)
(TBP) = 2,4,6-Tribromophenol	(23-133)	(24-134)
(2CP) = d4-2-Chlorophenol	(36-120)	(31-120)

Prep Method: SW3546
Log Number Range: 13-24856 to 13-24860

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270 GC/MS

Sample ID: LCS-111513
LAB CONTROL

Lab Sample ID: LCS-111513
LIMS ID: 13-24856
Matrix: Sediment
Data Release Authorized:
Reported: 11/21/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Date Extracted: 11/15/13
Date Analyzed: 11/20/13 15:34
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Phenol	324	500	64.8%
1,4-Dichlorobenzene	345	500	69.0%
Benzyl Alcohol	312	500	62.4%
1,2-Dichlorobenzene	348	500	69.6%
2-Methylphenol	282	500	56.4%
4-Methylphenol	583	1000	58.3%
2,4-Dimethylphenol	908	1500	60.5%
Benzoic Acid	1810	2750	65.8%
1,2,4-Trichlorobenzene	347	500	69.4%
Naphthalene	329	500	65.8%
Hexachlorobutadiene	362	500	72.4%
2-Methylnaphthalene	360	500	72.0%
Dimethylphthalate	404	500	80.8%
Acenaphthylene	387	500	77.4%
Acenaphthene	350	500	70.0%
Dibenzofuran	376	500	75.2%
Diethylphthalate	412	500	82.4%
Fluorene	359	500	71.8%
N-Nitrosodiphenylamine	406	500	81.2%
Hexachlorobenzene	407	500	81.4%
Pentachlorophenol	1110	1500	74.0%
Phenanthrene	404	500	80.8%
Anthracene	383	500	76.6%
Di-n-Butylphthalate	470	500	94.0%
Fluoranthene	406	500	81.2%
Pyrene	410	500	82.0%
Butylbenzylphthalate	484	500	96.8%
Benzo(a)anthracene	393	500	78.6%
bis(2-Ethylhexyl)phthalate	466	500	93.2%
Chrysene	384	500	76.8%
Di-n-Octyl phthalate	427	500	85.4%
Benzo(a)pyrene	399	500	79.8%
Indeno(1,2,3-cd)pyrene	373	500	74.6%
Dibenz(a,h)anthracene	264	500	52.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270 GC/MS **Sample ID: LCS-111513**
 LAB CONTROL

Lab Sample ID: LCS-111513 QC Report No: XN64-Maul Foster & Alongi
LIMS ID: 13-24856 Project: GHHSA
Matrix: Sediment 0863.01.01
Date Analyzed: 11/20/13 15:34

Analyte	Lab Control	Spike Added	Recovery
Benzo(g,h,i)perylene	324	500	64.8%
Total Benzofluoranthenes	801	1000	80.1%

Semivolatile Surrogate Recovery	
d5-Nitrobenzene	67.0%
2-Fluorobiphenyl	66.8%
d14-p-Terphenyl	79.0%
d4-1,2-Dichlorobenzene	63.4%
d5-Phenol	63.9%
2-Fluorophenol	64.1%
2,4,6-Tribromophenol	71.5%
d4-2-Chlorophenol	64.3%

Reported in µg/kg (ppb)

XN64 : 00037

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: MB-111513**
Extraction Method: SW3546 **METHOD BLANK**

Lab Sample ID: MB-111513
LIMS ID: 13-24856
Matrix: Sediment
Data Release Authorized:
Reported: 11/22/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
Event: 0863.01.01
Date Sampled: NA
Date Received: NA

Date Extracted: 11/15/13
Date Analyzed: 11/20/13 14:58
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	LOQ	Result
53-70-3	Dibenz(a,h)anthracene	5.0	< 5.0 U
106-46-7	1,4-Dichlorobenzene	5.0	< 5.0 U
120-82-1	1,2,4-Trichlorobenzene	5.0	< 5.0 U
118-74-1	Hexachlorobenzene	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	5.0	< 5.0 U
131-11-3	Dimethylphthalate	5.0	< 5.0 U
85-68-7	Butylbenzylphthalate	5.0	< 5.0 U
95-48-7	2-Methylphenol	5.0	< 5.0 U
105-67-9	2,4-Dimethylphenol	25	< 25 U
86-30-6	N-Nitrosodiphenylamine	5.0	< 5.0 U
100-51-6	Benzyl Alcohol	20	< 20 U
87-86-5	Pentachlorophenol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	5.0	< 5.0 U
541-73-1	1,3-Dichlorobenzene	5.0	< 5.0 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	58.0%
d14-p-Terphenyl	76.0%

XN64 : 00039

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR06-2.5**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: XN64D
LIMS ID: 13-24856
Matrix: Sediment
Data Release Authorized:
Reported: 11/22/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
Event: 0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Date Extracted: 11/15/13
Date Analyzed: 11/20/13 16:09
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 0.71 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 77.0%

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**70**	**150**
106-46-7	1,4-Dichlorobenzene	70	< 70 U
120-82-1	1,2,4-Trichlorobenzene	70	< 70 U
118-74-1	Hexachlorobenzene	70	< 70 U
87-68-3	Hexachlorobutadiene	70	< 70 U
131-11-3	Dimethylphthalate	70	< 70 U
85-68-7	Butylbenzylphthalate	70	< 70 U
95-48-7	**2-Methylphenol**	**70**	**45 J**
105-67-9	2,4-Dimethylphenol	350	< 350 U
86-30-6	N-Nitrosodiphenylamine	70	< 70 U
100-51-6	Benzyl Alcohol	280	< 280 U
87-86-5	**Pentachlorophenol**	**280**	**240 J**
95-50-1	1,2-Dichlorobenzene	70	< 70 U
541-73-1	1,3-Dichlorobenzene	70	< 70 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	57.2%
d14-p-Terphenyl	76.6%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR01-10cm**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: XN64F
LIMS ID: 13-24858
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/22/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
Event: 0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 11/15/13
Date Analyzed: 11/20/13 16:45
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.30 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 51.2%

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**4.8**	**3.0 J**
106-46-7	1,4-Dichlorobenzene	4.8	< 4.8 U
120-82-1	1,2,4-Trichlorobenzene	4.8	< 4.8 U
118-74-1	Hexachlorobenzene	4.8	< 4.8 U
87-68-3	Hexachlorobutadiene	4.8	< 4.8 U
131-11-3	Dimethylphthalate	4.8	< 4.8 U
85-68-7	Butylbenzylphthalate	4.8	< 4.8 U
95-48-7	2-Methylphenol	4.8	< 4.8 U
105-67-9	2,4-Dimethylphenol	24	< 24 U
86-30-6	N-Nitrosodiphenylamine	4.8	< 4.8 U
100-51-6	**Benzyl Alcohol**	**19**	**15 J**
87-86-5	Pentachlorophenol	19	< 19 U
95-50-1	1,2-Dichlorobenzene	4.8	< 4.8 U
541-73-1	1,3-Dichlorobenzene	4.8	< 4.8 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	55.2%
d14-p-Terphenyl	70.4%

XN64I : 0863.01

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR02-10cm**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: XN64G
LIMS ID: 13-24859
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/22/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
Event: 0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 11/15/13
Date Analyzed: 11/20/13 17:20
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.20 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 46.9%

CAS Number	Analyte	LOQ	Result
53-70-3	Dibenz(a,h)anthracene	4.9	< 4.9 U
106-46-7	**1,4-Dichlorobenzene**	**4.9**	**16**
120-82-1	1,2,4-Trichlorobenzene	4.9	< 4.9 U
118-74-1	Hexachlorobenzene	4.9	< 4.9 U
87-68-3	Hexachlorobutadiene	4.9	< 4.9 U
131-11-3	**Dimethylphthalate**	**4.9**	**3.1 J**
85-68-7	Butylbenzylphthalate	4.9	< 4.9 U
95-48-7	2-Methylphenol	4.9	< 4.9 U
105-67-9	2,4-Dimethylphenol	24	< 24 U
86-30-6	N-Nitrosodiphenylamine	4.9	< 4.9 U
100-51-6	**Benzyl Alcohol**	**20**	**43 Q**
87-86-5	Pentachlorophenol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	4.9	< 4.9 U
541-73-1	1,3-Dichlorobenzene	4.9	< 4.9 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	52.9%
d14-p-Terphenyl	61.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR03-10cm**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: XN64H
LIMS ID: 13-24860
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/22/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
Event: 0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 11/15/13
Date Analyzed: 11/20/13 17:55
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.41 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 61.6%

CAS Number	Analyte	LOQ	Result
53-70-3	Dibenz(a,h)anthracene	4.8	< 4.8 U
106-46-7	1,4-Dichlorobenzene	4.8	< 4.8 U
120-82-1	1,2,4-Trichlorobenzene	4.8	< 4.8 U
118-74-1	Hexachlorobenzene	4.8	< 4.8 U
87-68-3	Hexachlorobutadiene	4.8	< 4.8 U
131-11-3	**Dimethylphthalate**	**4.8**	**2.5 J**
85-68-7	Butylbenzylphthalate	4.8	< 4.8 U
95-48-7	**2-Methylphenol**	**4.8**	**3.3 J**
105-67-9	2,4-Dimethylphenol	24	< 24 U
86-30-6	N-Nitrosodiphenylamine	4.8	< 4.8 U
100-51-6	**Benzyl Alcohol**	**19**	**43 Q**
87-86-5	Pentachlorophenol	19	< 19 U
95-50-1	1,2-Dichlorobenzene	4.8	< 4.8 U
541-73-1	1,3-Dichlorobenzene	4.8	< 4.8 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	56.5%
d14-p-Terphenyl	67.8%

XN64H : 08012

ANALYTICAL RESOURCES INCORPORATED

SIM SW8270 SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01

Client ID	FPH	TER	TOT OUT
MB-111513	58.0%	76.0%	0
LCS-111513	62.8%	74.8%	0
CR06-2.5	57.2%	76.6%	0
CR01-10cm	55.2%	70.4%	0
CR02-10cm	52.9%	61.2%	0
CR03-10cm	56.5%	67.8%	0

	LCS/MB LIMITS	QC LIMITS
(FPH) = 2-Fluorophenol	(32-120)	(27-120)
(TER) = d14-p-Terphenyl	(42-124)	(37-120)

Prep Method: SW3546
Log Number Range: 13-24856 to 13-24860

XN64I : 080413

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: LCS-111513**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-111513
LIMS ID: 13-24856
Matrix: Sediment
Data Release Authorized:
Reported: 11/22/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
Event: 0863.01.01
Date Sampled: NA
Date Received: NA

Date Extracted: 11/15/13
Date Analyzed LCS: 11/20/13 15:34
Instrument/Analyst LCS: NT10/YZ

Sample Amount LCS: 10.00 g-dry-wt
Final Extract Volume LCS: 1.0 mL
Dilution Factor LCS: 1.00

Analyte	LCS		Spike Added	Recovery
Dibenz(a,h)anthracene	268		500	53.6%
1,4-Dichlorobenzene	323		500	64.6%
1,2,4-Trichlorobenzene	337		500	67.4%
Hexachlorobenzene	389		500	77.8%
Hexachlorobutadiene	345		500	69.0%
Dimethylphthalate	395		500	79.0%
Butylbenzylphthalate	497	Q	500	99.4%
2-Methylphenol	287		500	57.4%
2,4-Dimethylphenol	898		1500	59.9%
N-Nitrosodiphenylamine	405		500	81.0%
Benzyl Alcohol	369	Q	500	73.8%
Pentachlorophenol	1140	E	1500	76.0%
1,2-Dichlorobenzene	335		500	67.0%
1,3-Dichlorobenzene	325		500	65.0%

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	62.8%
d14-p-Terphenyl	74.8%

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i Injection Date: 20-NOV-2013 13:25
Lab File ID: cc1120.d Init. Cal. Date(s): 18-NOV-2013 18-NOV-2013
Analysis Type: Init. Cal. Times: 12:57 17:06
Lab Sample ID: CC1120 Quant Type: ISTD
Method: /chem1/nt10.i/20131120.b/SIM.b/SIMABN2.m

COMPOUND	RRF / AMOUNT	RF1	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
$ 1 2-Fluorophenol	1.38322	1.30899	0.010	-5.36686	20.00000	Averaged	
3 Phenol	1.61320	1.38756	0.010	-13.98709	20.00000	Averaged	
7 1,3-Dichlorobenzene	1.56138	1.49622	0.010	-4.17358	20.00000	Averaged	
9 1,4-Dichlorobenzene	1.52875	1.43658	0.010	-6.02923	20.00000	Averaged	
11 Benzyl alcohol	0.77619	0.54595	0.010	-29.66251	20.00000	Averaged	<-
12 1,2-Dichlorobenzene	1.44302	1.37869	0.010	-4.45818	20.00000	Averaged	
13 2-Methylphenol	1.29978	1.15552	0.010	-11.09903	20.00000	Averaged	
15 4-Methylphenol	1.35246	1.11087	0.010	-17.86342	20.00000	Averaged	
16 N-Nitroso-di-n-propylamine	0.61576	0.60800	0.050	-1.26034	20.00000	Averaged	
22 2,4-Dimethylphenol	0.38359	0.36366	0.010	-5.19602	20.00000	Averaged	
26 1,2,4-Trichlorobenzene	0.40429	0.38951	0.010	-3.65675	20.00000	Averaged	
30 Hexachlorobutadiene	0.23352	0.22840	0.010	-2.19038	20.00000	Averaged	
39 Dimethylphthalate	1.32454	1.33403	0.010	0.71718	20.00000	Averaged	
50 Diethylphthalate	1.47908	1.50022	0.010	1.42921	20.00000	Averaged	
54 N-Nitrosodiphenylamine	0.49786	0.50051	0.010	0.53071	20.00000	Averaged	
57 Hexachlorobenzene	0.32846	0.32612	0.010	-0.71223	20.00000	Averaged	
58 Pentachlorophenol	0.22846	0.22091	0.005	-3.30315	20.00000	Averaged	
$ 66 Terphenyl-d14	0.50821	0.49737	0.010	-2.13243	20.00000	Averaged	
67 Butylbenzylphthalate	0.38795	0.46893	0.010	20.87418	20.00000	Averaged	<-
79 Dibenzo(a,h)anthracene	1.10683	1.13862	0.010	2.87234	20.00000	Averaged	
90 N-Nitrosodimethylamine	0.56255	0.61737	0.010	9.74446	20.00000	Averaged	

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: CR06-10cm**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: XN64A
LIMS ID: 13-24853
Matrix: Sediment
Data Release Authorized:
Reported: 12/02/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Date Extracted: 11/27/13
Date Analyzed: 11/30/13 16:35
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 0.65 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 78.7%

CAS Number	Analyte	RL	Result
108-95-2	**Phenol**	**310**	**370**
87-86-5	Pentachlorophenol	1,500	< 1,500 U
85-68-7	Butylbenzylphthalate	310	< 310 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	64.0%	2-Fluorobiphenyl	65.2%
d14-p-Terphenyl	67.2%	d4-1,2-Dichlorobenzene	60.2%
d5-Phenol	62.0%	2-Fluorophenol	58.1%
2,4,6-Tribromophenol	61.1%	d4-2-Chlorophenol	62.1%

XNGU : 0863.01.01

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: CR04-10cm**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: XN64B
LIMS ID: 13-24854
Matrix: Sediment
Data Release Authorized:
Reported: 12/02/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Date Extracted: 11/27/13
Date Analyzed: 11/30/13 17:10
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 3.44 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 71.5%

CAS Number	Analyte	RL	Result
108-95-2	**Phenol**	**58**	**290**
87-86-5	Pentachlorophenol	290	< 290 U
85-68-7	Butylbenzylphthalate	58	< 58 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	66.0%	2-Fluorobiphenyl	71.4%
d14-p-Terphenyl	61.8%	d4-1,2-Dichlorobenzene	51.0%
d5-Phenol	56.9%	2-Fluorophenol	50.8%
2,4,6-Tribromophenol	69.1%	d4-2-Chlorophenol	56.4%

XN64B : 0863A17

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: CR05-10cm**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: XN64C
LIMS ID: 13-24855
Matrix: Sediment
Data Release Authorized:
Reported: 12/02/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 11/27/13
Date Analyzed: 11/30/13 17:46
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 3.38 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 74.1%

CAS Number	Analyte	RL	Result
108-95-2	**Phenol**	**59**	**570**
87-86-5	Pentachlorophenol	300	< 300 U
85-68-7	Butylbenzylphthalate	59	< 59 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	71.4%	2-Fluorobiphenyl	65.6%
d14-p-Terphenyl	64.0%	d4-1,2-Dichlorobenzene	55.2%
d5-Phenol	62.0%	2-Fluorophenol	54.9%
2,4,6-Tribromophenol	64.8%	d4-2-Chlorophenol	60.8%

XN64C : 0604L8

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: CR04-5**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: XN64E
LIMS ID: 13-24857
Matrix: Sediment
Data Release Authorized:
Reported: 12/02/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 11/27/13
Date Analyzed: 11/30/13 18:21
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 4.15 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: 80.3%

CAS Number	Analyte	RL	Result
108-95-2	**Phenol**	**48**	**980**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Phenol	62.3%
2-Fluorophenol	50.8%
2,4,6-Tribromophenol	60.5%
d4-2-Chlorophenol	55.5%

XN64H : 8808

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS **Sample ID: MB-112713**
Extraction Method: SW3546 **METHOD BLANK**

Lab Sample ID: MB-112713
LIMS ID: 13-24853
Matrix: Sediment
Data Release Authorized:
Reported: 12/02/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: NA
Date Received: NA

Date Extracted: 11/27/13
Date Analyzed: 11/30/13 15:25
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	RL	Result
108-95-2	Phenol	20	< 20 U
87-86-5	Pentachlorophenol	100	< 100 U
85-68-7	Butylbenzylphthalate	20	< 20 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	61.0%	2-Fluorobiphenyl	59.4%
d14-p-Terphenyl	71.2%	d4-1,2-Dichlorobenzene	62.0%
d5-Phenol	62.7%	2-Fluorophenol	60.1%
2,4,6-Tribromophenol	55.5%	d4-2-Chlorophenol	64.0%

XN64 : 00050

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA Semivolatiles by SW8270D GC/MS
Page 1 of 1

Sample ID: LCS-112713
LAB CONTROL

Lab Sample ID: LCS-112713
LIMS ID: 13-24853
Matrix: Sediment
Data Release Authorized:
Reported: 12/02/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Date Extracted: 11/27/13
Date Analyzed: 11/30/13 16:00
Instrument/Analyst: NT10/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Phenol	322	500	64.4%
Pentachlorophenol	726 Q	1500	48.4%
Butylbenzylphthalate	470	500	94.0%

Semivolatile Surrogate Recovery

d5-Nitrobenzene	59.4%
2-Fluorobiphenyl	58.8%
d14-p-Terphenyl	72.2%
d4-1,2-Dichlorobenzene	54.4%
d5-Phenol	61.5%
2-Fluorophenol	58.0%
2,4,6-Tribromophenol	62.8%
d4-2-Chlorophenol	59.5%

Reported in µg/kg (ppb)

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT OUT
MB-112713	61.0%	59.4%	71.2%	62.0%	62.7%	60.1%	55.5%	64.0%	0
LCS-112713	59.4%	58.8%	72.2%	54.4%	61.5%	58.0%	62.8%	59.5%	0
CR06-10cm	64.0%	65.2%	67.2%	60.2%	62.0%	58.1%	61.1%	62.1%	0
CR04-10cm	66.0%	71.4%	61.8%	51.0%	56.9%	50.8%	69.1%	56.4%	0
CR05-10cm	71.4%	65.6%	64.0%	55.2%	62.0%	54.9%	64.8%	60.8%	0

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(33-120)	(30-120)
(FBP) = 2-Fluorobiphenyl	(35-120)	(35-120)
(TPH) = d14-p-Terphenyl	(42-124)	(37-120)
(DCB) = d4-1,2-Dichlorobenzene	(37-120)	(32-120)
(PHL) = d5-Phenol	(32-120)	(29-120)
(2FP) = 2-Fluorophenol	(32-120)	(27-120)
(TBP) = 2,4,6-Tribromophenol	(23-133)	(24-134)
(2CP) = d4-2-Chlorophenol	(36-120)	(31-120)

Prep Method: SW3546
Log Number Range: 13-24853 to 13-24855

FORM-II SW8270

XN64 : 00052

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01

Client ID	PHL	2FP	TBP	2CP	TOT OUT
CR04-5	62.3%	50.8%	60.5%	55.5%	0

	LCS/MB LIMITS	QC LIMITS
(PHL) = d5-Phenol	(32-120)	(29-120)
(2FP) = 2-Fluorophenol	(32-120)	(27-120)
(TBP) = 2,4,6-Tribromophenol	(23-133)	(24-134)
(2CP) = d4-2-Chlorophenol	(36-120)	(31-120)

Prep Method: SW3546
Log Number Range: 13-24857 to 13-24857

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i Injection Date: 30-NOV-2013 14:15
Lab File ID: cc1130.d Init. Cal. Date(s): 18-NOV-2013 18-NOV-2013
Analysis Type: Init. Cal. Times: 12:57 17:06
Lab Sample ID: ABN 5 Quant Type: ISTD
Method: /chem1/nt10.i/20131130.b/ABN.m

COMPOUND	RRF / AMOUNT	RF5	CCAL RRF5	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
$ 1 2-Fluorophenol	1.33752	1.34316	1.34316	0.010	0.42122	20.00000	Averaged	
$ 2 Phenol-d5	1.67903	1.76680	1.76680	0.010	5.22762	20.00000	Averaged	
3 Phenol	1.64980	1.69868	1.69868	0.100	2.96273	20.00000	Averaged	
$ 5 2-Chlorophenol-d4	1.46461	1.46737	1.46737	0.010	0.18817	20.00000	Averaged	
4 Bis(2-Chloroethyl)ether	1.13893	1.18807	1.18807	0.700	4.31473	20.00000	Averaged	
6 2-Chlorophenol	1.46555	1.50423	1.50423	0.800	2.63963	20.00000	Averaged	
7 1,3-Dichlorobenzene	1.50753	1.45671	1.45671	0.010	-3.37073	20.00000	Averaged	
9 1,4-Dichlorobenzene	1.45615	1.42731	1.42731	0.010	-1.98057	20.00000	Averaged	
$ 10 1,2-Dichlorobenzene-d4	1.05860	1.03186	1.03186	0.010	-2.52571	20.00000	Averaged	
12 1,2-Dichlorobenzene	1.40987	1.36328	1.36328	0.010	-3.30494	20.00000	Averaged	
11 Benzyl alcohol	0.75201	0.68021	0.68021	0.010	-9.54771	20.00000	Averaged	
14 2,2'-oxybis(1-Chloropropane	0.43859	0.42280	0.42280	0.010	-3.60025	20.00000	Averaged	
13 2-Methylphenol	1.30286	1.31369	1.31369	0.700	0.83087	20.00000	Averaged	
17 Hexachloroethane	0.56357	0.54992	0.54992	0.300	-2.42211	20.00000	Averaged	
16 N-Nitroso-di-n-propylamine	0.66921	0.73985	0.73985	0.500	10.55710	20.00000	Averaged	
15 4-Methylphenol	1.35046	1.37131	1.37131	0.600	1.54365	20.00000	Averaged	
$ 18 Nitrobenzene-d5	0.37070	0.37690	0.37690	0.010	1.66998	20.00000	Averaged	
19 Nitrobenzene	0.31004	0.32068	0.32068	0.200	3.43116	20.00000	Averaged	
20 Isophorone	0.55731	0.58888	0.58888	0.300	5.66490	20.00000	Averaged	
21 2-Nitrophenol	0.24272	0.24399	0.24399	0.100	0.52330	20.00000	Averaged	
22 2,4-Dimethylphenol	0.38529	0.37385	0.37385	0.200	-2.96952	20.00000	Averaged	
23 Bis(2-Chloroethoxy)methane	0.35632	0.37333	0.37333	0.050	4.77269	20.00000	Averaged	
24 Benzoic acid	0.30601	0.26338	0.26338	0.010	-13.93292	20.00000	Averaged	
25 2,4-Dichlorophenol	0.36046	0.41793	0.41793	0.100	15.94310	20.00000	Averaged	
26 1,2,4-Trichlorobenzene	0.38026	0.35588	0.35588	0.010	-6.41096	20.00000	Averaged	
28 Naphthalene	1.04402	1.01224	1.01224	0.100	-3.04360	20.00000	Averaged	
29 4-Chloroaniline	0.40752	0.43494	0.43494	0.010	6.73065	20.00000	Averaged	
30 Hexachlorobutadiene	0.23172	0.21277	0.21277	0.010	-8.17927	20.00000	Averaged	
31 4-Chloro-3-methylphenol	0.32584	0.34666	0.34666	0.200	6.39045	20.00000	Averaged	
32 2-Methylnaphthalene	0.73051	0.73095	0.73095	0.300	0.05998	20.00000	Averaged	
33 Hexachlorocyclopentadiene	0.50700	0.29528	0.29528	0.001	-41.75949	20.00000	Averaged	<-
34 2,4,6-Trichlorophenol	0.48707	0.47548	0.47548	0.200	-2.37996	20.00000	Averaged	
35 2,4,5-Trichlorophenol	0.50939	0.50924	0.50924	0.200	-0.02896	20.00000	Averaged	
$ 36 2-Fluorobiphenyl	1.55155	1.51018	1.51018	0.010	-2.66625	20.00000	Averaged	
37 2-Chloronaphthalene	1.16558	1.13475	1.13475	0.700	-2.64502	20.00000	Averaged	

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i
Lab File ID: cc1130.d
Analysis Type:
Lab Sample ID: ABN 5
Method: /chem1/nt10.i/20131130.b/ABN.m

Injection Date: 30-NOV-2013 14:15
Init. Cal. Date(s): 18-NOV-2013 18-NOV-2013
Init. Cal. Times: 12:57 17:06
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RF5	CCAL RRF5	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
38 2-Nitroaniline	0.23475	0.24809	0.24809	0.010	5.68109	20.00000	Averaged	
39 Dimethylphthalate	1.27144	1.23018	1.23018	0.010	-3.24557	20.00000	Averaged	
40 Acenaphthylene	1.93144	1.70905	1.70905	0.900	-11.51387	20.00000	Averaged	
41 2,6-Dinitrotoluene	0.29938	0.30586	0.30586	0.100	2.16402	20.00000	Averaged	
43 3-Nitroaniline	0.26355	0.27431	0.27431	0.010	4.08108	20.00000	Averaged	
44 Acenaphthene	1.10793	1.08908	1.08908	0.100	-1.70133	20.00000	Averaged	
45 2,4-Dinitrophenol	16.88949	20.00000	0.23757	0.030	-15.55253	20.00000	Quadratic	
46 Dibenzofuran	1.61373	1.57411	1.57411	0.800	-2.45529	20.00000	Averaged	
47 4-Nitrophenol	0.15330	0.14702	0.14702	0.010	-4.09852	20.00000	Averaged	
48 2,4-Dinitrotoluene	0.39663	0.40616	0.40616	0.200	2.40385	20.00000	Averaged	
50 Diethylphthalate	1.21570	1.17752	1.17752	0.010	-3.14028	20.00000	Averaged	
49 Fluorene	1.39934	1.36129	1.36129	0.100	-2.71971	20.00000	Averaged	
51 4-Chlorophenyl-phenylether	0.72393	0.68927	0.68927	0.100	-4.78774	20.00000	Averaged	
52 4-Nitroaniline	0.25521	0.28063	0.28063	0.010	9.96049	20.00000	Averaged	
53 4,6-Dinitro-2-methylphenol	0.19322	0.22219	0.22219	0.001	14.99232	20.00000	Averaged	
54 N-Nitrosodiphenylamine	0.49888	0.48789	0.48789	0.010	-2.20376	20.00000	Averaged	
$ 55 2,4,6-Tribromophenol	0.32583	0.30139	0.30139	0.010	-7.50140	20.00000	Averaged	
56 4-Bromophenyl-phenylether	0.27481	0.26681	0.26681	0.100	-2.91384	20.00000	Averaged	
57 Hexachlorobenzene	0.30461	0.28307	0.28307	0.100	-7.06893	20.00000	Averaged	
58 Pentachlorophenol	0.24013	0.15990	0.15990	0.010	-33.41037	20.00000	Averaged	<-
60 Phenanthrene	1.07912	1.04348	1.04348	0.700	-3.30326	20.00000	Averaged	
61 Anthracene	1.13273	1.13095	1.13095	0.700	-0.15729	20.00000	Averaged	
62 Carbazole	0.80682	0.78067	0.78067	0.010	-3.24134	20.00000	Averaged	
63 Di-n-butylphthalate	1.13123	1.22086	1.22086	0.010	7.92264	20.00000	Averaged	
64 Fluoranthene	1.38260	1.37203	1.37203	0.600	-0.76422	20.00000	Averaged	
65 Pyrene	1.28185	1.36007	1.36007	0.600	6.10263	20.00000	Averaged	
$ 66 Terphenyl-d14	0.78868	0.79464	0.79464	0.010	0.75639	20.00000	Averaged	
67 Butylbenzylphthalate	0.41048	0.46207	0.46207	0.010	12.56816	20.00000	Averaged	
68 Benzo(a)anthracene	1.24366	1.21618	1.21618	0.700	-2.20941	20.00000	Averaged	
70 3,3'-Dichlorobenzidine	0.55098	0.51627	0.51627	0.010	-6.30086	20.00000	Averaged	
71 Chrysene	1.10420	1.08574	1.08574	0.700	-1.67179	20.00000	Averaged	
72 bis(2-Ethylhexyl)phthalate	0.48960	0.49585	0.49585	0.010	1.27708	20.00000	Averaged	
73 Di-n-octylphthalate	1.00124	0.93208	0.93208	0.010	-6.90672	20.00000	Averaged	
74 Benzo(b)fluoranthene	1.18784	1.14841	1.14841	0.700	-3.31942	20.00000	Averaged	
75 Benzo(k)fluoranthene	1.19134	1.20474	1.20474	0.700	1.12484	20.00000	Averaged	

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt10.i Injection Date: 30-NOV-2013 14:15
Lab File ID: cc1130.d Init. Cal. Date(s): 18-NOV-2013 18-NOV-2013
Analysis Type: Init. Cal. Times: 12:57 17:06
Lab Sample ID: ABN 5 Quant Type: ISTD
Method: /chem1/nt10.i/20131130.b/ABN.m

COMPOUND	RRF / AMOUNT	RF5	CCAL RRF5	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
76 Benzo(a)pyrene	1.04130	1.02577	1.02577	0.700	-1.49136	20.00000	Averaged	
78 Indeno(1,2,3-cd)pyrene	1.31830	1.22128	1.22128	0.500	-7.35969	20.00000	Averaged	
79 Dibenzo(a,h)anthracene	1.03965	0.92626	0.92626	0.400	-10.90674	20.00000	Averaged	
80 Benzo(g,h,i)perylene	1.13505	1.05475	1.05475	0.500	-7.07445	20.00000	Averaged	
90 N-Nitrosodimethylamine	0.59522	0.70862	0.70862	0.010	19.05172	20.00000	Averaged	
91 Aniline	3.20010	3.08583	3.08583	0.010	-3.57071	20.00000	Averaged	
93 Benzidine	0.26426	0.11931	0.11931	0.010	-54.85056	20.00000	Averaged	<-
103 Pyridine	0.58020	0.52374	0.52374	0.010	-9.73196	20.00000	Averaged	
105 1-methylnaphthalene	0.66247	0.67212	0.67212	0.010	1.45537	20.00000	Averaged	
111 Azobenzene (1,2-DP-Hydrazin	0.92896	0.88274	0.88274	0.010	-4.97580	20.00000	Averaged	
187 Total Benzofluoranthenes	1.17065	1.14890	1.14890	0.010	-1.85796	20.00000	Averaged	
99 Perylene	1.00589	0.97543	0.97543	0.010	-3.02855	20.00000	Averaged	
98 Retene	0.00018	0.00031	0.00031	0.010	77.41910	20.00000	Averaged	<-
120 2,3,4,6-Tetrachlorophenol	0.41983	0.37849	0.37849	0.010	-9.84831	20.00000	Averaged	

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: MB-111813**
Page 1 of 1

Lab Sample ID: MB-111813
LIMS ID: 13-24853
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/26/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: NA
Date Received: NA

Date Extracted: 11/18/13
Date Analyzed: 11/23/13 08:06
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF		0.65-0.89	0.0360	1.00	< 0.0360	U
2,3,7,8-TCDD	0.26	0.65-0.89		1.00	0.136	JEMPC
1,2,3,7,8-PeCDF	0.83	1.32-1.78		1.00	0.0300	JEMPC
2,3,4,7,8-PeCDF		1.32-1.78	0.0320	1.00	< 0.0320	U
1,2,3,7,8-PeCDD	1.47	1.32-1.78		1.00	0.0940	J
1,2,3,4,7,8-HxCDF		1.05-1.43	0.0300	1.00	< 0.0300	U
1,2,3,6,7,8-HxCDF		1.05-1.43	0.0300	1.00	< 0.0300	U
2,3,4,6,7,8-HxCDF		1.05-1.43	0.0320	1.00	< 0.0320	U
1,2,3,7,8,9-HxCDF		1.05-1.43	0.0380	1.00	< 0.0380	U
1,2,3,4,7,8-HxCDD	1.08	1.05-1.43		1.00	0.162	J
1,2,3,6,7,8-HxCDD	0.74	1.05-1.43		1.00	0.148	JEMPC
1,2,3,7,8,9-HxCDD	1.50	1.05-1.43		1.00	0.214	JEMPC
1,2,3,4,6,7,8-HpCDF		0.88-1.20	0.0280	1.00	< 0.0280	U
1,2,3,4,7,8,9-HpCDF		0.88-1.20	0.0420	1.00	< 0.0420	U
1,2,3,4,6,7,8-HpCDD	1.06	0.88-1.20		1.00	3.93	
OCDF		0.76-1.02	0.0640	2.00	< 0.0640	U
OCDD	0.87	0.76-1.02		2.00	21.7	

Homologue Group	EDL	RL	Result	
Total TCDF	0.0360	1.00	< 0.0360	U
Total TCDD		1.00	0.243	EMPC
Total PeCDF		2.00	0.0575	EMPC
Total PeCDD		1.00	1.08	EMPC
Total HxCDF	0.0380	2.00	< 0.0380	U
Total HxCDD		2.00	3.93	EMPC
Total HpCDF	0.0420	2.00	< 0.0420	U
Total HpCDD		2.00	11.4	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 0.33

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 0.34

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: MB-111813**

Lab Sample ID: MB-111813
LIMS ID: 13-24853
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/26/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: NA
Date Received: NA

Date Extracted: 11/18/13
Date Analyzed: 11/23/13 08:06
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	101	24-169	
13C-2,3,7,8-TCDD	0.79	0.65-0.89	103	25-164	
13C-1,2,3,7,8-PeCDF	1.56	1.32-1.78	131	24-185	
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	129	21-178	
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	135	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	100	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	94.6	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	98.0	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	98.4	29-147	
13C-1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	106	32-141	
13C-1,2,3,6,7,8-HxCDD	1.24	1.05-1.43	96.5	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	89.2	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	100	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.06	0.88-1.20	105	23-140	
13C-OCDD	0.89	0.76-1.02	92.0	17-157	
37Cl4-2,3,7,8-TCDD			104	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: OPR-111813**

Lab Sample ID: OPR-111813
LIMS ID: 13-24853
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/26/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: NA
Date Received: NA

Date Extracted: 11/18/13
Date Analyzed: 11/22/13 12:52
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	RL	Result
2,3,7,8-TCDF	0.71	0.65-0.89	1.00	21.7
2,3,7,8-TCDD	0.78	0.65-0.89	1.00	22.0
1,2,3,7,8-PeCDF	1.44	1.32-1.78	1.00	110
2,3,4,7,8-PeCDF	1.47	1.32-1.78	1.00	107
1,2,3,7,8-PeCDD	1.55	1.32-1.78	1.00	110
1,2,3,4,7,8-HxCDF	1.16	1.05-1.43	1.00	109
1,2,3,6,7,8-HxCDF	1.20	1.05-1.43	1.00	126
2,3,4,6,7,8-HxCDF	1.17	1.05-1.43	1.00	112
1,2,3,7,8,9-HxCDF	1.14	1.05-1.43	1.00	108
1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	1.00	107
1,2,3,6,7,8-HxCDD	1.25	1.05-1.43	1.00	119
1,2,3,7,8,9-HxCDD	1.24	1.05-1.43	1.00	112
1,2,3,4,6,7,8-HpCDF	0.96	0.88-1.20	1.00	119
1,2,3,4,7,8,9-HpCDF	0.95	0.88-1.20	1.00	109
1,2,3,4,6,7,8-HpCDD	1.02	0.88-1.20	1.00	110
OCDF	0.87	0.76-1.02	2.00	219
OCDD	0.91	0.76-1.02	2.00	228

Homologue Group	EDL	RL	Result	
Total TCDF		1.00	22.8	EMPC
Total TCDD		1.00	22.9	EMPC
Total PeCDF		2.00	223	EMPC
Total PeCDD		1.00	111	EMPC
Total HxCDF		2.00	456	EMPC
Total HxCDD		2.00	340	EMPC
Total HpCDF		2.00	228	
Total HpCDD		2.00	114	

Reported in pg/g

VNCH : 00059

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: OPR-111813**

Lab Sample ID: OPR-111813
LIMS ID: 13-24853
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/26/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: NA
Date Received: NA

Date Extracted: 11/18/13
Date Analyzed: 11/22/13 12:52
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	108	22-152	
13C-2,3,7,8-TCDD	0.79	0.65-0.89	102	20-175	
13C-1,2,3,7,8-PeCDF	1.62	1.32-1.78	118	21-192	
13C-2,3,4,7,8-PeCDF	1.58	1.32-1.78	109	13-328	
13C-1,2,3,7,8-PeCDD	1.58	1.32-1.78	113	21-227	
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	111	19-202	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	97.3	21-159	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	106	22-176	
13C-1,2,3,7,8,9-HxCDF	0.50	0.43-0.59	105	17-205	
13C-1,2,3,4,7,8-HxCDD	1.25	1.05-1.43	113	21-193	
13C-1,2,3,6,7,8-HxCDD	1.23	1.05-1.43	101	25-163	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	96.4	21-158	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	103	20-186	
13C-1,2,3,4,6,7,8-HpCDD	1.08	0.88-1.20	107	26-166	
13C-OCDD	0.89	0.76-1.02	92.4	13-198	
37Cl4-2,3,7,8-TCDD			101	31-191	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: OPR-111813**

Lab Sample ID: OPR-111813
LIMS ID: 13-24853
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/26/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: NA
Date Received: NA

Date Extracted: 11/18/13
Date Analyzed: 11/22/13 12:52
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	OPR	Spiked	Recovery	Limits
2,3,7,8-TCDF	21.7	20.0	108	75-158
2,3,7,8-TCDD	22.0	20.0	110	67-158
1,2,3,7,8-PeCDF	110	100	110	80-134
2,3,4,7,8-PeCDF	107	100	107	68-160
1,2,3,7,8-PeCDD	110	100	110	70-142
1,2,3,4,7,8-HxCDF	109	100	109	72-134
1,2,3,6,7,8-HxCDF	126	100	126	84-130
2,3,4,6,7,8-HxCDF	112	100	112	70-156
1,2,3,7,8,9-HxCDF	108	100	108	78-130
1,2,3,4,7,8-HxCDD	107	100	107	70-164
1,2,3,6,7,8-HxCDD	119	100	119	76-134
1,2,3,7,8,9-HxCDD	112	100	112	64-162
1,2,3,4,6,7,8-HpCDF	119	100	119	82-132
1,2,3,4,7,8,9-HpCDF	109	100	109	78-138
1,2,3,4,6,7,8-HpCDD	110	100	110	70-140
OCDF	219	200	110	63-170
OCDD	228	200	114	78-144

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR06-10cm**

Lab Sample ID: XN64A
LIMS ID: 13-24853
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/26/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Date Extracted: 11/18/13
Date Analyzed: 11/22/13 23:04
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.66	0.65-0.89		1.00	4.87	
2,3,7,8-TCDD	0.69	0.65-0.89		1.00	2.09	
1,2,3,7,8-PeCDF	1.44	1.32-1.78		1.00	3.28	
2,3,4,7,8-PeCDF	1.58	1.32-1.78		1.00	5.96	
1,2,3,7,8-PeCDD	1.52	1.32-1.78		1.00	9.35	
1,2,3,4,7,8-HxCDF	1.15	1.05-1.43		1.00	18.1	
1,2,3,6,7,8-HxCDF	1.14	1.05-1.43		1.00	8.90	
2,3,4,6,7,8-HxCDF	1.15	1.05-1.43		1.00	16.9	
1,2,3,7,8,9-HxCDF	1.19	1.05-1.43		1.00	4.79	
1,2,3,4,7,8-HxCDD	1.19	1.05-1.43		1.00	12.7	
1,2,3,6,7,8-HxCDD	1.23	1.05-1.43		1.00	63.8	
1,2,3,7,8,9-HxCDD	1.22	1.05-1.43		1.00	16.5	
1,2,3,4,6,7,8-HpCDF	0.97	0.88-1.20		1.00	258	
1,2,3,4,7,8,9-HpCDF	0.94	0.88-1.20		1.00	13.2	
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20		1.00	1,080	
OCDF	0.86	0.76-1.02		2.00	680	
OCDD	0.89	0.76-1.02		2.00	7,830	E

Homologue Group	EDL	RL	Result	
Total TCDF		1.00	82.8	EMPC
Total TCDD		1.00	42.6	EMPC
Total PeCDF		2.00	203	EMPC
Total PeCDD		1.00	88.7	
Total HxCDF		2.00	463	EMPC
Total HxCDD		2.00	742	EMPC
Total HpCDF		2.00	950	
Total HpCDD		2.00	2,480	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 44.0

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 44.0

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR06-10cm**

Lab Sample ID: XN64A
LIMS ID: 13-24853
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/26/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Date Extracted: 11/18/13
Date Analyzed: 11/22/13 23:04
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	53.0	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	64.4	25-164	
13C-1,2,3,7,8-PeCDF	1.58	1.32-1.78	71.8	24-185	
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	72.1	21-178	
13C-1,2,3,7,8-PeCDD	1.56	1.32-1.78	77.0	25-181	
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	63.0	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	58.2	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	61.3	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	62.8	29-147	
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	66.8	32-141	
13C-1,2,3,6,7,8-HxCDD	1.24	1.05-1.43	60.8	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.43	0.37-0.51	54.2	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	67.9	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	65.5	23-140	
13C-OCDD	0.89	0.76-1.02	53.1	17-157	
37Cl4-2,3,7,8-TCDD			85.7	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR04-10cm**

Lab Sample ID: XN64B
LIMS ID: 13-24854
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/26/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Date Extracted: 11/18/13
Date Analyzed: 11/23/13 00:01
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.68	0.65-0.89		0.999	3.53	
2,3,7,8-TCDD	0.62	0.65-0.89		0.999	1.14	BEMPC
1,2,3,7,8-PeCDF	1.34	1.32-1.78		0.999	2.06	
2,3,4,7,8-PeCDF	1.44	1.32-1.78		0.999	3.43	
1,2,3,7,8-PeCDD	1.57	1.32-1.78		0.999	4.34	
1,2,3,4,7,8-HxCDF	1.21	1.05-1.43		0.999	7.26	
1,2,3,6,7,8-HxCDF	1.22	1.05-1.43		0.999	3.38	
2,3,4,6,7,8-HxCDF	1.16	1.05-1.43		0.999	5.09	
1,2,3,7,8,9-HxCDF	1.21	1.05-1.43		0.999	2.45	
1,2,3,4,7,8-HxCDD	1.23	1.05-1.43		0.999	4.26	
1,2,3,6,7,8-HxCDD	1.26	1.05-1.43		0.999	54.5	
1,2,3,7,8,9-HxCDD	1.26	1.05-1.43		0.999	10.2	
1,2,3,4,6,7,8-HpCDF	0.98	0.88-1.20		0.999	165	
1,2,3,4,7,8,9-HpCDF	0.89	0.88-1.20		0.999	7.55	EMPC
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20		0.999	817	
OCDF	0.85	0.76-1.02		2.00	476	
OCDD	0.89	0.76-1.02		2.00	5,340	E

Homologue Group	EDL	RL	Result	
Total TCDF		0.999	27.9	EMPC
Total TCDD		0.999	17.5	EMPC
Total PeCDF		2.00	101	EMPC
Total PeCDD		0.999	68.7	EMPC
Total HxCDF		2.00	301	EMPC
Total HxCDD		2.00	350	EMPC
Total HpCDF		2.00	678	EMPC
Total HpCDD		2.00	1,530	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 27.3

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 27.3

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR04-10cm**

Lab Sample ID: XN64B
LIMS ID: 13-24854
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/26/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Date Extracted: 11/18/13
Date Analyzed: 11/23/13 00:01
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	50.7	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	75.7	25-164	
13C-1,2,3,7,8-PeCDF	1.58	1.32-1.78	88.0	24-185	
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	87.7	21-178	
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	93.0	25-181	
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	79.0	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	71.2	26-123	
13C-2,3,4,6,7,8-HxCDF	0.53	0.43-0.59	76.7	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	80.5	29-147	
13C-1,2,3,4,7,8-HxCDD	1.25	1.05-1.43	78.1	32-141	
13C-1,2,3,6,7,8-HxCDD	1.22	1.05-1.43	75.4	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	66.9	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	84.1	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	80.2	23-140	
13C-OCDD	0.89	0.76-1.02	64.9	17-157	
37Cl4-2,3,7,8-TCDD			84.3	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR05-10cm**

Lab Sample ID: XN64C
LIMS ID: 13-24855
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/26/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 11/18/13
Date Analyzed: 11/23/13 00:55
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.77	0.65-0.89		0.999	6.30	
2,3,7,8-TCDD	0.73	0.65-0.89		0.999	3.00	
1,2,3,7,8-PeCDF	1.49	1.32-1.78		0.999	4.73	
2,3,4,7,8-PeCDF	1.52	1.32-1.78		0.999	5.82	
1,2,3,7,8-PeCDD	1.60	1.32-1.78		0.999	13.9	
1,2,3,4,7,8-HxCDF	1.12	1.05-1.43		0.999	15.3	
1,2,3,6,7,8-HxCDF	1.17	1.05-1.43		0.999	10.9	
2,3,4,6,7,8-HxCDF	1.18	1.05-1.43		0.999	11.1	
1,2,3,7,8,9-HxCDF	1.11	1.05-1.43		0.999	6.11	
1,2,3,4,7,8-HxCDD	1.26	1.05-1.43		0.999	11.2	
1,2,3,6,7,8-HxCDD	1.24	1.05-1.43		0.999	136	
1,2,3,7,8,9-HxCDD	1.25	1.05-1.43		0.999	29.9	
1,2,3,4,6,7,8-HpCDF	0.98	0.88-1.20		0.999	437	
1,2,3,4,7,8,9-HpCDF	1.05	0.88-1.20		0.999	19.8	
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20		0.999	1,820	
OCDF	0.86	0.76-1.02		2.00	863	
OCDD	0.89	0.76-1.02		2.00	10,300	E

Homologue Group	EDL	RL	Result	
Total TCDF		0.999	78.1	EMPC
Total TCDD		0.999	73.6	EMPC
Total PeCDF		2.00	281	EMPC
Total PeCDD		0.999	334	EMPC
Total HxCDF		2.00	853	
Total HxCDD		2.00	1,010	EMPC
Total HpCDF		2.00	1,560	
Total HpCDD		2.00	3,750	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 67.6

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 67.6

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR05-10cm**

Lab Sample ID: XN64C
LIMS ID: 13-24855
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/26/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 11/18/13
Date Analyzed: 11/23/13 00:55
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	67.0	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	86.8	25-164	
13C-1,2,3,7,8-PeCDF	1.58	1.32-1.78	102	24-185	
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	97.1	21-178	
13C-1,2,3,7,8-PeCDD	1.56	1.32-1.78	104	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	88.7	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	78.9	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	83.3	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	80.4	29-147	
13C-1,2,3,4,7,8-HxCDD	1.24	1.05-1.43	88.0	32-141	
13C-1,2,3,6,7,8-HxCDD	1.25	1.05-1.43	81.4	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	69.6	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	86.7	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.06	0.88-1.20	82.4	23-140	
13C-OCDD	0.89	0.76-1.02	66.5	17-157	
37Cl4-2,3,7,8-TCDD			86.6	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR06-2.5**

Lab Sample ID: XN64D
LIMS ID: 13-24856
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/26/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Date Extracted: 11/18/13
Date Analyzed: 11/23/13 01:49
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.75	0.65-0.89		0.999	4.95	
2,3,7,8-TCDD	0.72	0.65-0.89		0.999	2.11	
1,2,3,7,8-PeCDF	1.42	1.32-1.78		0.999	3.24	
2,3,4,7,8-PeCDF	1.52	1.32-1.78		0.999	5.87	
1,2,3,7,8-PeCDD	1.45	1.32-1.78		0.999	8.27	
1,2,3,4,7,8-HxCDF	1.16	1.05-1.43		0.999	21.7	
1,2,3,6,7,8-HxCDF	1.18	1.05-1.43		0.999	8.35	
2,3,4,6,7,8-HxCDF	1.18	1.05-1.43		0.999	16.3	
1,2,3,7,8,9-HxCDF	1.15	1.05-1.43		0.999	4.66	
1,2,3,4,7,8-HxCDD	1.21	1.05-1.43		0.999	8.21	
1,2,3,6,7,8-HxCDD	1.25	1.05-1.43		0.999	72.8	
1,2,3,7,8,9-HxCDD	1.28	1.05-1.43		0.999	15.4	
1,2,3,4,6,7,8-HpCDF	0.99	0.88-1.20		0.999	276	
1,2,3,4,7,8,9-HpCDF	0.98	0.88-1.20		0.999	15.5	
1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20		0.999	1,090	
OCDF	0.87	0.76-1.02		2.00	652	
OCDD	0.88	0.76-1.02		2.00	6,810	E

Homologue Group	EDL	RL	Result	
Total TCDF		0.999	62.3	EMPC
Total TCDD		0.999	28.7	
Total PeCDF		2.00	147	EMPC
Total PeCDD		0.999	67.0	EMPC
Total HxCDF		2.00	518	EMPC
Total HxCDD		2.00	783	EMPC
Total HpCDF		2.00	1,120	EMPC
Total HpCDD		2.00	2,050	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 43.5

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 43.5

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR06-2.5**

Lab Sample ID: XN64D
LIMS ID: 13-24856
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/26/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Date Extracted: 11/18/13
Date Analyzed: 11/23/13 01:49
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	52.4	24-169	
13C-2,3,7,8-TCDD	0.80	0.65-0.89	65.4	25-164	
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	76.0	24-185	
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	76.5	21-178	
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	80.6	25-181	
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	66.0	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	60.5	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	64.1	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	67.0	29-147	
13C-1,2,3,4,7,8-HxCDD	1.29	1.05-1.43	69.2	32-141	
13C-1,2,3,6,7,8-HxCDD	1.24	1.05-1.43	64.1	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	63.3	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	83.3	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.06	0.88-1.20	77.5	23-140	
13C-OCDD	0.89	0.76-1.02	70.3	17-157	
37Cl4-2,3,7,8-TCDD			84.5	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR01-10cm**

Lab Sample ID: XN64F
LIMS ID: 13-24858
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/26/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 11/18/13
Date Analyzed: 11/23/13 02:43
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.70	0.65-0.89		0.995	1.96	
2,3,7,8-TCDD	0.70	0.65-0.89		0.995	2.62	
1,2,3,7,8-PeCDF	1.48	1.32-1.78		0.995	0.683	J
2,3,4,7,8-PeCDF	1.74	1.32-1.78		0.995	0.814	J
1,2,3,7,8-PeCDD	1.60	1.32-1.78		0.995	3.93	
1,2,3,4,7,8-HxCDF	1.21	1.05-1.43		0.995	2.77	
1,2,3,6,7,8-HxCDF	1.17	1.05-1.43		0.995	1.19	
2,3,4,6,7,8-HxCDF	1.11	1.05-1.43		0.995	1.80	
1,2,3,7,8,9-HxCDF	1.05	1.05-1.43		0.995	0.778	JEMPC
1,2,3,4,7,8-HxCDD	1.18	1.05-1.43		0.995	1.76	
1,2,3,6,7,8-HxCDD	1.24	1.05-1.43		0.995	9.98	
1,2,3,7,8,9-HxCDD	1.28	1.05-1.43		0.995	11.1	
1,2,3,4,6,7,8-HpCDF	0.98	0.88-1.20		0.995	31.9	
1,2,3,4,7,8,9-HpCDF	1.00	0.88-1.20		0.995	1.59	
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20		0.995	211	
OCDF	0.86	0.76-1.02		1.99	51.0	
OCDD	0.89	0.76-1.02		1.99	1,690	

Homologue Group	EDL	RL	Result	
Total TCDF		0.995	12.4	EMPC
Total TCDD		0.995	17.4	EMPC
Total PeCDF		1.99	18.0	EMPC
Total PeCDD		0.995	25.8	
Total HxCDF		1.99	52.5	EMPC
Total HxCDD		1.99	97.0	
Total HpCDF		1.99	87.1	EMPC
Total HpCDD		1.99	485	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 12.9

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 12.9

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR01-10cm**

Lab Sample ID: XN64F
LIMS ID: 13-24858
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/26/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 11/18/13
Date Analyzed: 11/23/13 02:43
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	73.1	24-169	
13C-2,3,7,8-TCDD	0.79	0.65-0.89	84.6	25-164	
13C-1,2,3,7,8-PeCDF	1.58	1.32-1.78	115	24-185	
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	115	21-178	
13C-1,2,3,7,8-PeCDD	1.59	1.32-1.78	119	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	89.7	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	82.2	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	87.7	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	87.9	29-147	
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	90.8	32-141	
13C-1,2,3,6,7,8-HxCDD	1.25	1.05-1.43	84.5	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	79.5	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	98.3	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	93.8	23-140	
13C-OCDD	0.89	0.76-1.02	90.0	17-157	
37Cl4-2,3,7,8-TCDD			85.0	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR02-10cm**

Lab Sample ID: XN64G
LIMS ID: 13-24859
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/26/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 11/18/13
Date Analyzed: 11/23/13 03:37
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.71	0.65-0.89		0.998	2.18	
2,3,7,8-TCDD	0.75	0.65-0.89		0.998	2.89	
1,2,3,7,8-PeCDF	1.33	1.32-1.78		0.998	0.804	J
2,3,4,7,8-PeCDF	1.63	1.32-1.78		0.998	1.13	
1,2,3,7,8-PeCDD	1.50	1.32-1.78		0.998	4.53	
1,2,3,4,7,8-HxCDF	1.11	1.05-1.43		0.998	4.60	
1,2,3,6,7,8-HxCDF	1.20	1.05-1.43		0.998	3.22	
2,3,4,6,7,8-HxCDF	1.17	1.05-1.43		0.998	5.58	
1,2,3,7,8,9-HxCDF	1.14	1.05-1.43		0.998	0.886	J
1,2,3,4,7,8-HxCDD	1.18	1.05-1.43		0.998	1.96	
1,2,3,6,7,8-HxCDD	1.24	1.05-1.43		0.998	10.4	
1,2,3,7,8,9-HxCDD	1.23	1.05-1.43		0.998	12.4	
1,2,3,4,6,7,8-HpCDF	0.98	0.88-1.20		0.998	113	
1,2,3,4,7,8,9-HpCDF	0.97	0.88-1.20		0.998	4.94	
1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20		0.998	201	
OCDF	0.85	0.76-1.02		2.00	211	
OCDD	0.89	0.76-1.02		2.00	1,550	

Homologue Group	EDL	RL	Result	
Total TCDF		0.998	33.0	EMPC
Total TCDD		0.998	28.1	EMPC
Total PeCDF		2.00	47.6	EMPC
Total PeCDD		0.998	34.9	
Total HxCDF		2.00	125	
Total HxCDD		2.00	114	
Total HpCDF		2.00	310	
Total HpCDD		2.00	433	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 15.6

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 15.6

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR02-10cm**

Lab Sample ID: XN64G
LIMS ID: 13-24859
Matrix: Sediment
Data Release Authorized:
Reported: 11/26/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 11/18/13
Date Analyzed: 11/23/13 03:37
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	94.6	24-169	
13C-2,3,7,8-TCDD	0.77	0.65-0.89	92.5	25-164	
13C-1,2,3,7,8-PeCDF	1.58	1.32-1.78	119	24-185	
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	120	21-178	
13C-1,2,3,7,8-PeCDD	1.58	1.32-1.78	125	25-181	
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	87.6	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	81.5	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	89.2	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	91.3	29-147	
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	93.6	32-141	
13C-1,2,3,6,7,8-HxCDD	1.25	1.05-1.43	85.4	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	86.1	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	105	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	103	23-140	
13C-OCDD	0.89	0.76-1.02	101	17-157	
37Cl4-2,3,7,8-TCDD			92.5	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR03-10cm**

Lab Sample ID: XN64H
LIMS ID: 13-24860
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/26/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 11/18/13
Date Analyzed: 11/23/13 04:31
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.1 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF	0.77	0.65-0.89		0.993	1.34	
2,3,7,8-TCDD	0.73	0.65-0.89		0.993	3.56	
1,2,3,7,8-PeCDF	1.55	1.32-1.78		0.993	0.508	J
2,3,4,7,8-PeCDF	1.70	1.32-1.78		0.993	0.594	J
1,2,3,7,8-PeCDD	1.61	1.32-1.78		0.993	5.08	
1,2,3,4,7,8-HxCDF	1.18	1.05-1.43		0.993	1.02	
1,2,3,6,7,8-HxCDF	1.13	1.05-1.43		0.993	0.862	J
2,3,4,6,7,8-HxCDF	1.25	1.05-1.43		0.993	0.785	J
1,2,3,7,8,9-HxCDF	1.36	1.05-1.43		0.993	0.268	J
1,2,3,4,7,8-HxCDD	1.28	1.05-1.43		0.993	1.42	B
1,2,3,6,7,8-HxCDD	1.27	1.05-1.43		0.993	4.81	
1,2,3,7,8,9-HxCDD	1.23	1.05-1.43		0.993	12.9	
1,2,3,4,6,7,8-HpCDF	0.96	0.88-1.20		0.993	24.7	
1,2,3,4,7,8,9-HpCDF	0.92	0.88-1.20		0.993	0.894	J
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20		0.993	66.1	
OCDF	0.86	0.76-1.02		1.99	36.4	
OCDD	0.89	0.76-1.02		1.99	489	

Homologue Group	EDL	RL	Result	
Total TCDF		0.993	16.7	EMPC
Total TCDD		0.993	24.7	EMPC
Total PeCDF		1.99	13.2	EMPC
Total PeCDD		0.993	30.6	
Total HxCDF		1.99	24.4	EMPC
Total HxCDD		1.99	80.8	EMPC
Total HpCDF		1.99	55.9	
Total HpCDD		1.99	167	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 12.2

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 12.2

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR03-10cm**

Lab Sample ID: XN64H
LIMS ID: 13-24860
Matrix: Sediment
Data Release Authorized:
Reported: 11/26/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 11/18/13
Date Analyzed: 11/23/13 04:31
Instrument/Analyst: AS1/PK

Sample Amount: 10.1 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	83.5	24-169	
13C-2,3,7,8-TCDD	0.78	0.65-0.89	90.3	25-164	
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	113	24-185	
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	116	21-178	
13C-1,2,3,7,8-PeCDD	1.58	1.32-1.78	118	25-181	
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	90.1	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	82.5	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	87.4	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	89.6	29-147	
13C-1,2,3,4,7,8-HxCDD	1.25	1.05-1.43	91.8	32-141	
13C-1,2,3,6,7,8-HxCDD	1.24	1.05-1.43	83.1	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	82.9	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	101	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.06	0.88-1.20	96.1	23-140	
13C-OCDD	0.90	0.76-1.02	94.1	17-157	
37Cl4-2,3,7,8-TCDD			91.2	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD **Sample ID: MB-111513**
Extraction Method: SW3546 **METHOD BLANK**

Lab Sample ID: MB-111513
LIMS ID: 13-24856
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/22/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: NA
Date Received: NA

Date Extracted: 11/15/13
Date Analyzed: 11/21/13 17:41
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

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	64.8%

XN64 : 00076

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD **Sample ID: CR06-2.5**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: XN64D
LIMS ID: 13-24856
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/22/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Date Extracted: 11/15/13
Date Analyzed: 11/21/13 18:42
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.06 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 77.0%

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	99	< 99 Y
11097-69-1	Aroclor 1254	200	< 200 Y
11096-82-5	**Aroclor 1260**	**20**	**690**
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	92.2%
Tetrachlorometaxylene	60.5%

XN64I : 00077

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD **Sample ID: CR01-10cm**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: XN64F
LIMS ID: 13-24858
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/22/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 11/15/13
Date Analyzed: 11/21/13 19:02
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.39 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 51.2%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	18	< 18 U
53469-21-9	Aroclor 1242	18	< 18 U
12672-29-6	Aroclor 1248	18	< 18 U
11097-69-1	Aroclor 1254	18	< 18 U
11096-82-5	Aroclor 1260	18	< 18 U
11104-28-2	Aroclor 1221	18	< 18 U
11141-16-5	Aroclor 1232	23	< 23 Y

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	57.0%
Tetrachlorometaxylene	55.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR02-10cm
SAMPLE

Lab Sample ID: XN64G
LIMS ID: 13-24859
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/22/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 11/15/13
Date Analyzed: 11/21/13 19:22
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.32 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 46.9%

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**	**12 J**
11096-82-5	Aroclor 1260	19	< 19 U
11104-28-2	Aroclor 1221	19	< 19 U
11141-16-5	Aroclor 1232	38	< 38 Y

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	60.0%
Tetrachlorometaxylene	59.5%

XN64 : 00079

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD **Sample ID: CR03-10cm**
Extraction Method: SW3546 **SAMPLE**
Page 1 of 1

Lab Sample ID: XN64H
LIMS ID: 13-24860
Matrix: Sediment
Data Release Authorized:
Reported: 11/22/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 11/15/13
Date Analyzed: 11/21/13 19:42
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.38 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 61.6%

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	46	< 46 Y

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	68.8%
Tetrachlorometaxylene	67.2%

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB SOIL/SOLID/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-111513	77.2%	61-114	64.8%	52-117	0
LCS-111513	77.2%	61-114	64.5%	52-117	0
CR06-2.5	92.2%	54-115	60.5%	57-109	0
CR01-10cm	57.0%	54-115	55.5%*	57-109	1
CR02-10cm	60.0%	54-115	59.5%	57-109	0
CR03-10cm	68.8%	54-115	67.2%	57-109	0

Microwave (MARS) Control Limits PCBSMM
Prep Method: SW3546
Log Number Range: 13-24856 to 13-24860

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Page 1 of 1

Sample ID: LCS-111513
LAB CONTROL

Lab Sample ID: LCS-111513
LIMS ID: 13-24856
Matrix: Sediment
Data Release Authorized: MW
Reported: 11/22/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: NA
Date Received: NA

Date Extracted: 11/15/13
Date Analyzed: 11/21/13 18:01
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Aroclor 1016	345	500	69.0%
Aroclor 1260	369	500	73.8%

PCB Surrogate Recovery

Decachlorobiphenyl	77.2%
Tetrachlorometaxylene	64.5%

Results reported in µg/kg (ppb)

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS

NWTPHD by GC/FID
Extraction Method: SW3546

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01

Matrix: Sediment

Date Received: 11/08/13

Data Release Authorized:
Reported: 11/19/13

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range/Surrogate	LOQ	Result
MB-111413	Method Blank	11/14/13	11/15/13	10.0	Diesel Range	50	< 50 U
13-24856	HC ID: ---		FID9	1.0	Motor Oil Range	100	< 100 U
					o-Terphenyl		77.0%
XN64D	CR06-2.5	11/14/13	11/15/13	10.0	**Diesel Range**	**220**	**18,000 E**
13-24856	HC ID: **DIESEL/MOTOR OIL**		FID9	1.0	**Motor Oil Range**	**430**	**61,000 E**
					o-Terphenyl		66.6%
XN64D DL	CR06-2.5	11/14/13	11/18/13	10.0	**Diesel Range**	**2,200**	**20,000**
13-24856	HC ID: **DIESEL/MOTOR OIL**		FID9	10	**Motor Oil Range**	**4,300**	**60,000**
					o-Terphenyl		63.3%

Reported in mg/kg (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
LOQ-Limit of Quantitation

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

XN64J 00023

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: LCS-111413
LAB CONTROL

Lab Sample ID: LCS-111413
LIMS ID: 13-24856
Matrix: Sediment
Data Release Authorized:
Reported: 11/19/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: NA
Date Received: NA

Date Extracted: 11/14/13
Date Analyzed: 11/15/13 13:34
Instrument/Analyst: FID9/JLW

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 10 mL
Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
Diesel	1,240	1,500	82.7%

TPHD Surrogate Recovery

o-Terphenyl	77.1%

Results reported in mg/kg

XN64 : 000811

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Sediment
Date Received: 11/08/13

ARI Job: XN64
Project: GHHSA
0863.01.01

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep Date
13-24856-111413MB1	Method Blank	10.0 g	10.0 mL	-	11/14/13
13-24856-111413LCS1	Lab Control	10.0 g	10.0 mL	-	11/14/13
13-24856-XN64D	CR06-2.5	2.31 g	10.0 mL	D	11/14/13

Basis: D=Dry Weight W=As Received

ANALYTICAL RESOURCES INCORPORATED

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01

Client ID	OTER	TOT OUT
111413MBS	77.0%	0
111413LCS	77.1%	0
CR06-2.5	66.6%	0
CR06-2.5 DL	63.3%	0

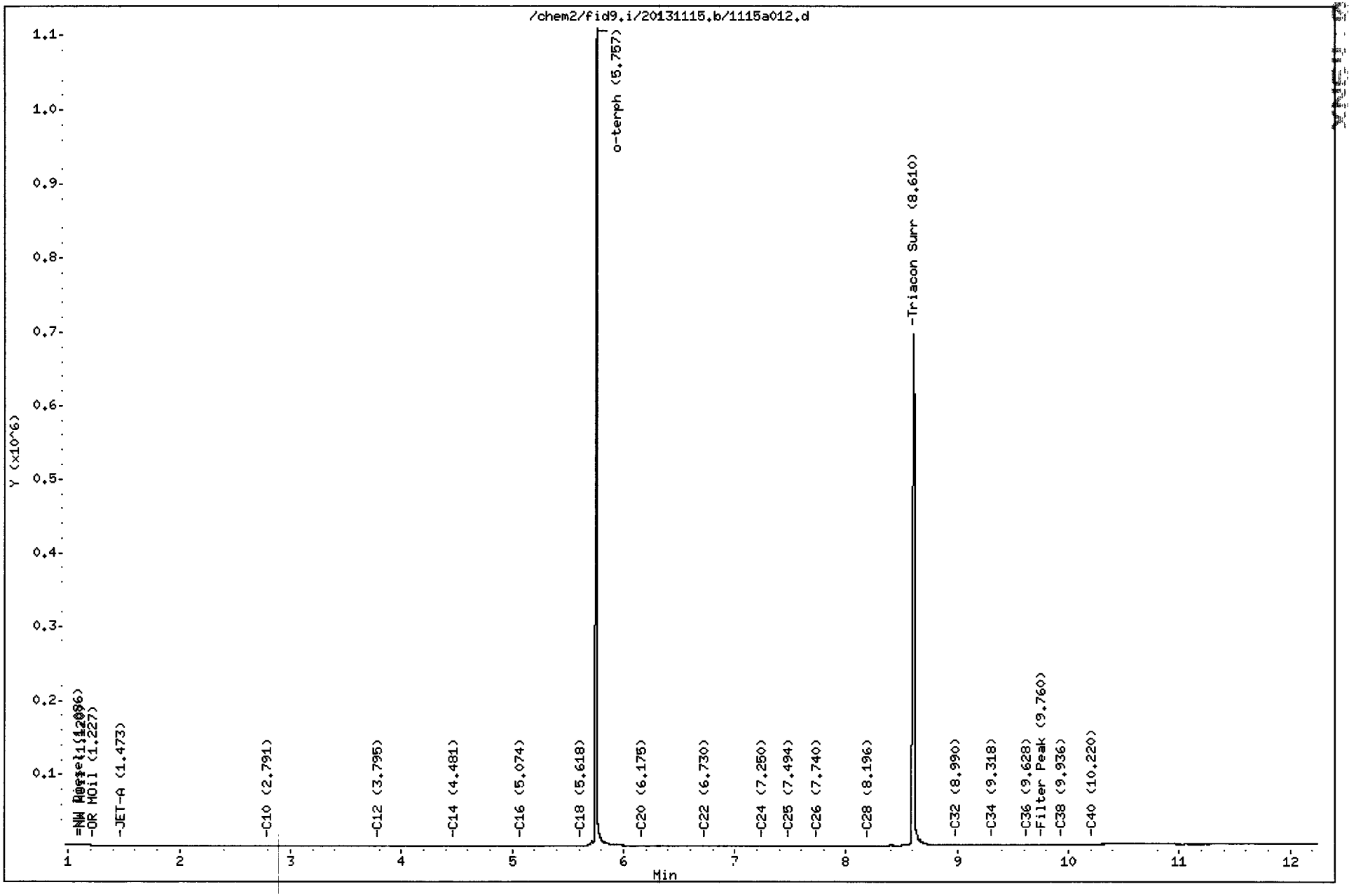
	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: DL
Log Number Range: 13-24856 to 13-24856

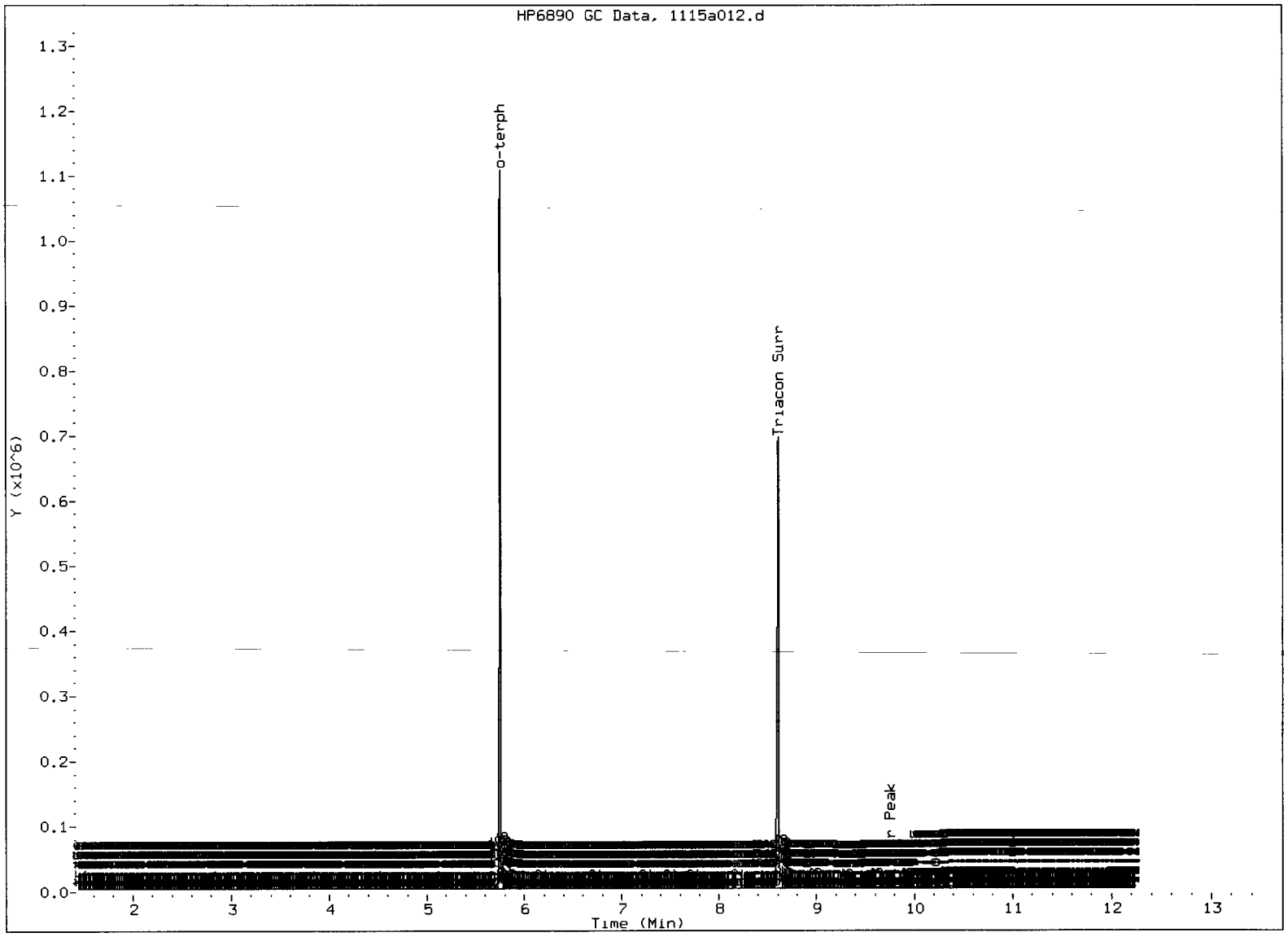
Data File: /chem2/fid9.i/20131115.b/1115a012.d
Date : 15-NOV-2013 13:13
Client ID: XN64MBS1
Sample Info: XN64MBS1

Instrument: fid9.i
Operator: JW
Column diameter: 0.25

Column phase: RTX-1



FID:9A-2C/RTX-1 XN64MBS1 FID:9A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation
5. Surrogate Skimmed

Analyst: _____ Date: 11/19/17

Data File: /chem2/fid9.i/20131115.b/1115a013.d

Date : 15-NOV-2013 13:34

Client ID: XN64LCSS1

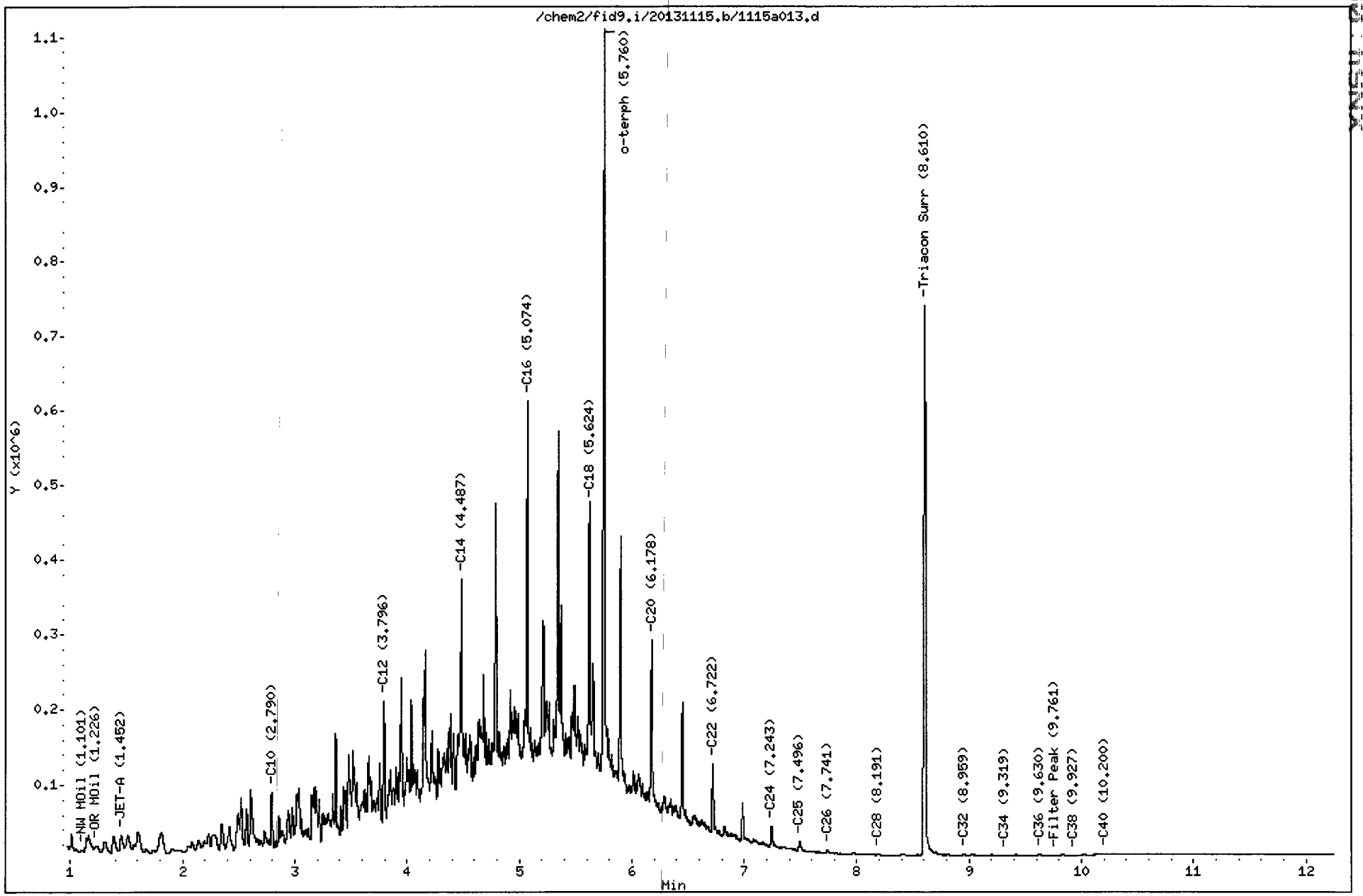
Sample Info: XN64LCSS1

Column phase: RTX-1

Instrument: fid9.i

Operator: JW

Column diameter: 0.25



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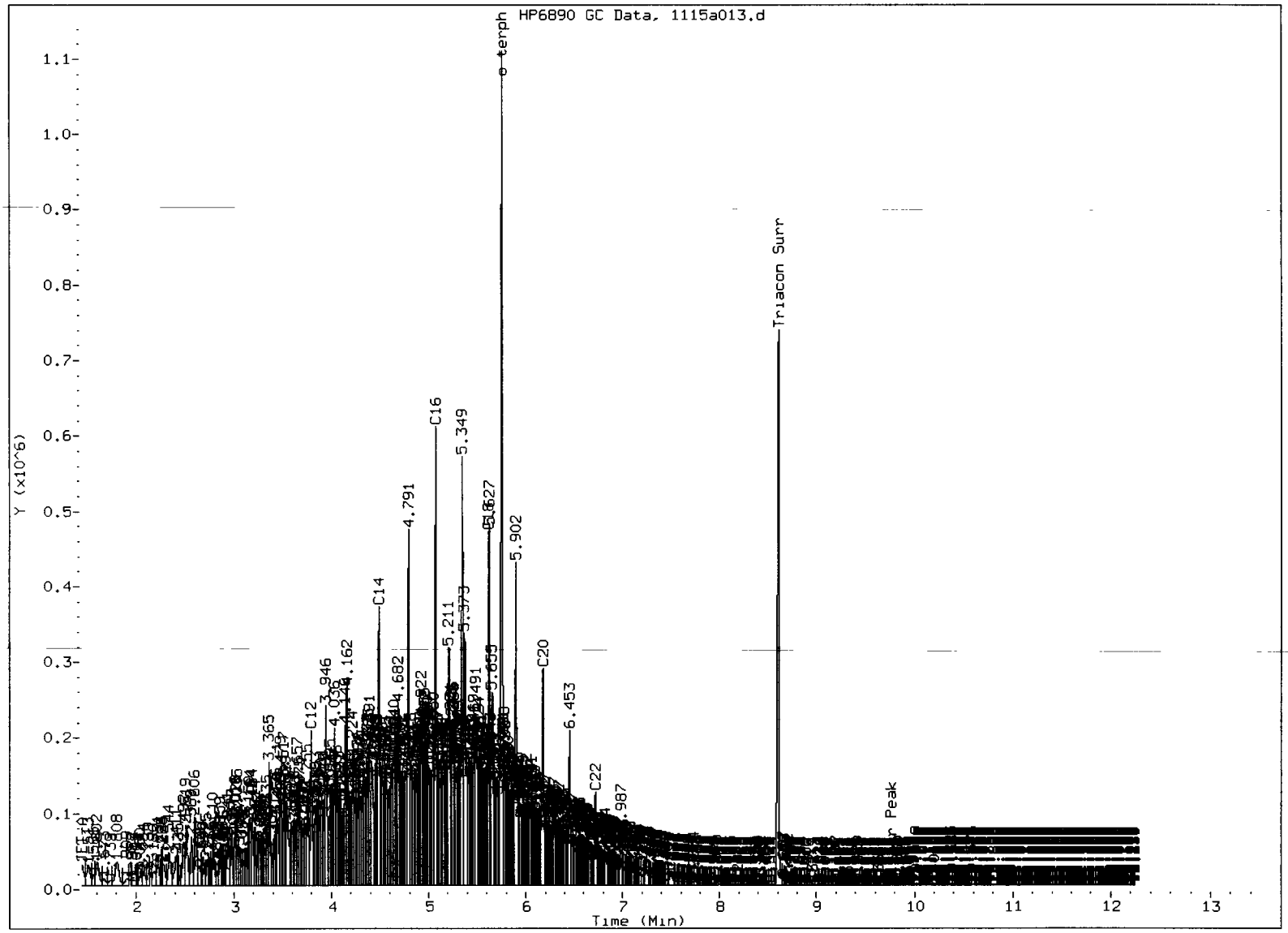


MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation
5. Surrogate Skimmed

(5)

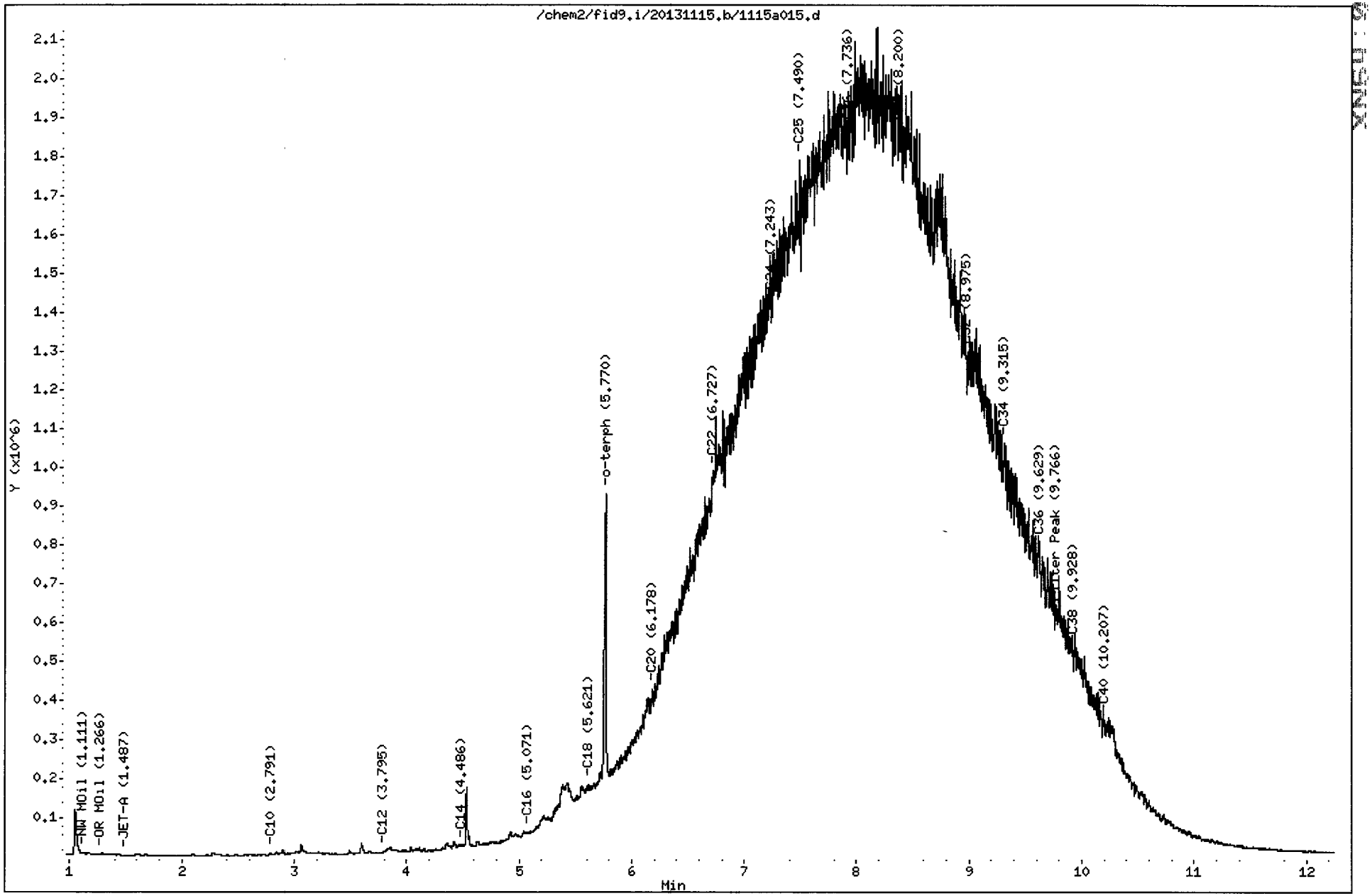
Analyst: JW Date: 11/19/12

XNGU : 00000

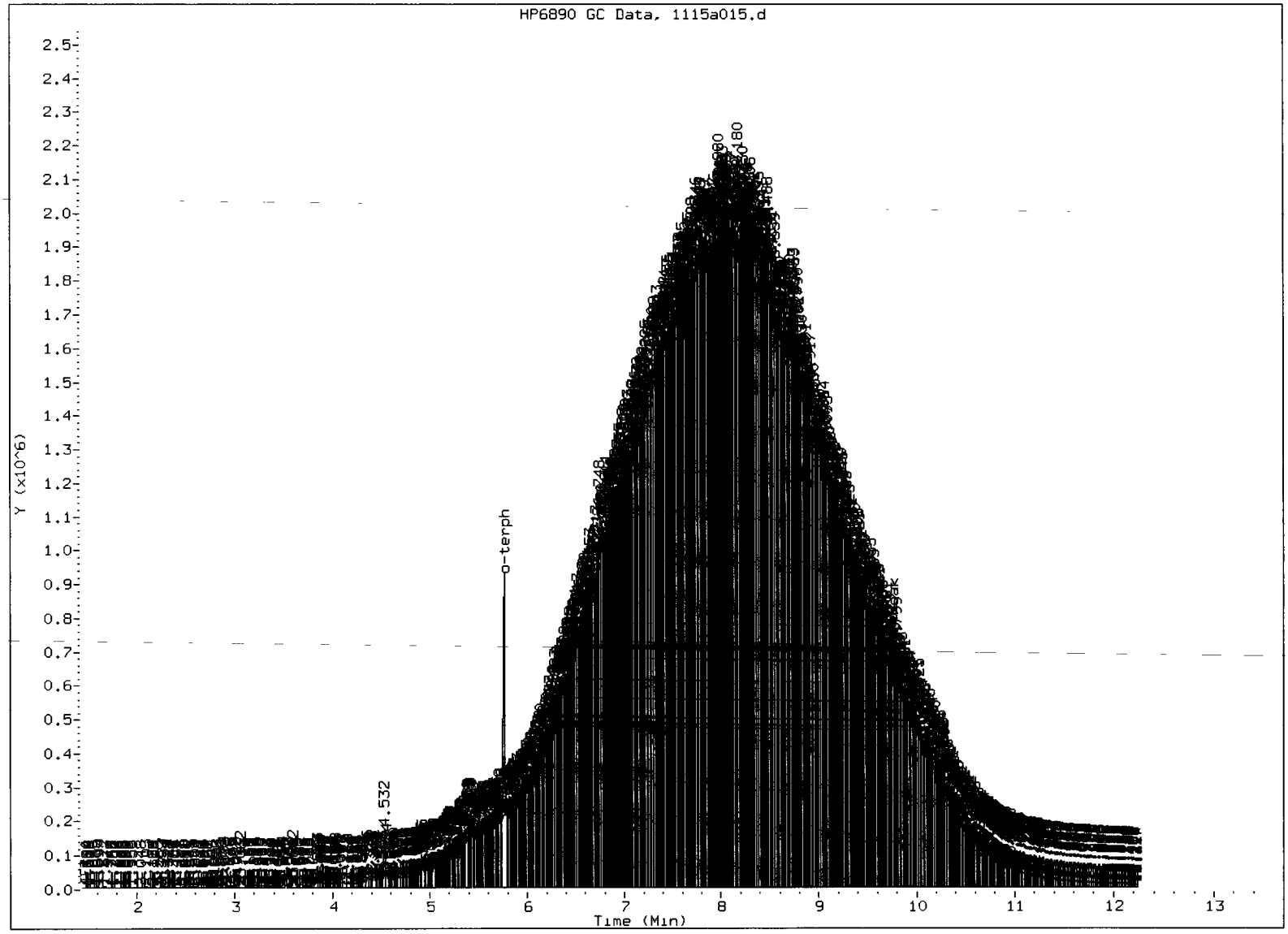
Data File: /chem2/fid9.i/20131115.b/1115a015.d
Date : 15-NOV-2013 14:16
Client ID: CR06-2.5
Sample Info: XN64D

Instrument: fid9.i
Operator: JW
Column diameter: 0.25

Column phase: RTX-1



FID:9A-2C/RTX-1 XN64D FID:9A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation
5. Surrogate Skimmed

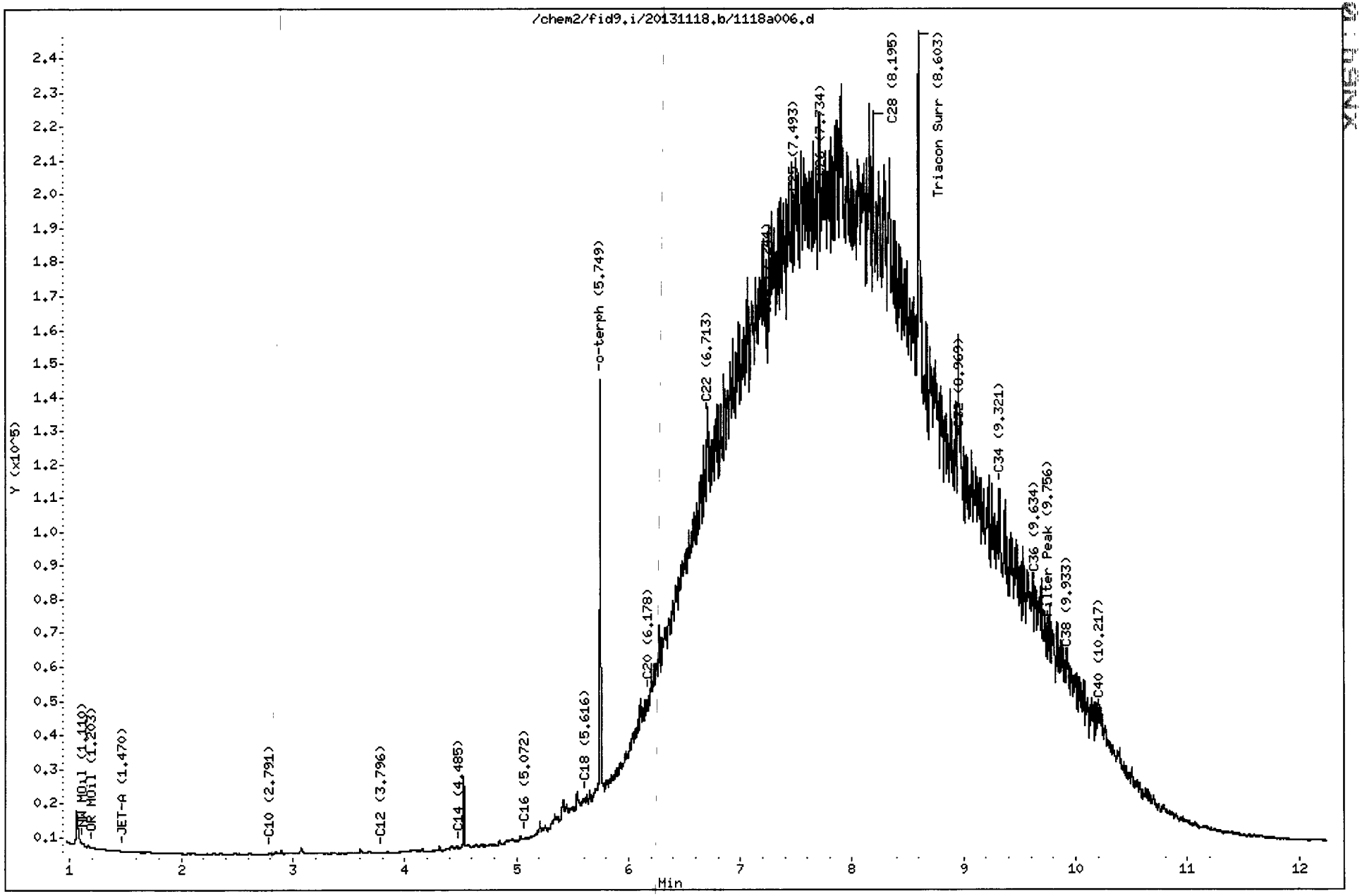
Analyst: JW Date: 11/19/15

Data File: /chem2/fid9.i/20131118.b/1118a006.d
Date : 18-NOV-2013 12:29
Client ID: CR06-2.5
Sample Info: XN64D,10

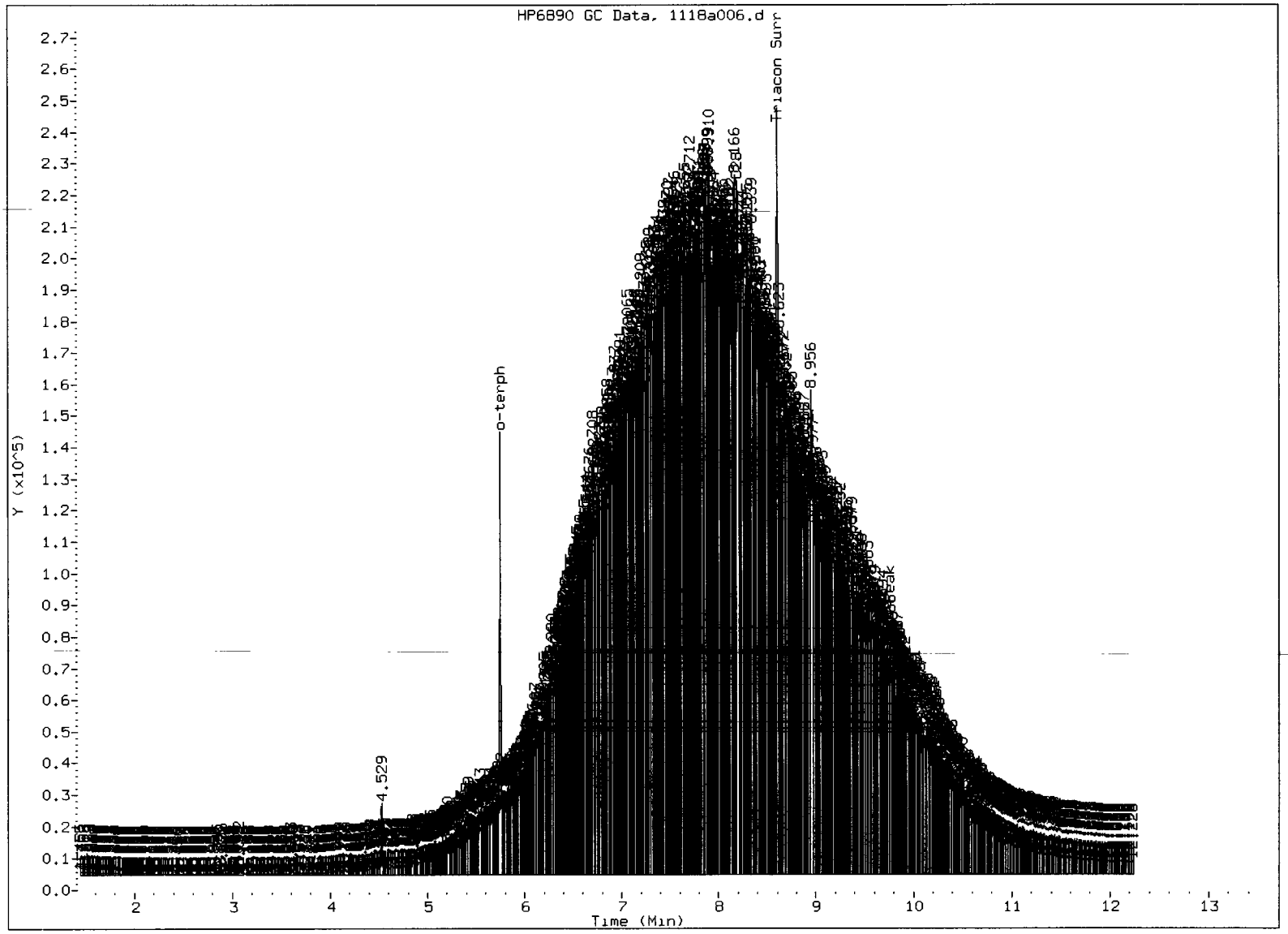
Column phase: RTX-1

Instrument: fid9.i

Operator: JW
Column diameter: 0.25



FID:9A-2C/RTX-1 XN64D FID:9A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation
5. Surrogate Skimmed

Analyst: JU Date: 11/19/12

SAMPLE RESULTS-CONVENTIONALS
XN64-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 11/26/13

Project: GHHSA
Event: 0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Client ID: CR06-10cm
ARI ID: 13-24853 XN64A

Analyte	Date	Method	Units	RL	Sample
Total Solids	11/13/13 111313#1	SM2540G	Percent	0.01	21.40
Preserved Total Solids	11/13/13 111313#1	SM2540G	Percent	0.01	19.81
Total Volatile Solids	11/13/13 111313#1	SM2540E	Percent	0.01	60.05
N-Ammonia	11/13/13 111313#1	EPA 350.1M	mg-N/kg	0.46	1.37
Sulfide	11/12/13 111213#1	EPA 376.2	mg/kg	50.2	906
Total Organic Carbon	11/26/13 112613#1	Plumb,1981	Percent	0.198	35.6

RL Analytical reporting limit
U Undetected at reported detection limit

Ammonia determined on 2N KCl extracts.

XNGU : 00005

SAMPLE RESULTS-CONVENTIONALS
XN64-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 11/26/13

Project: GHHSA
Event: 0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Client ID: CR04-10cm
ARI ID: 13-24854 XN64B

Analyte	Date	Method	Units	RL	Sample
Total Solids	11/13/13 111313#1	SM2540G	Percent	0.01	20.62
Preserved Total Solids	11/13/13 111313#1	SM2540G	Percent	0.01	22.16
Total Volatile Solids	11/13/13 111313#1	SM2540E	Percent	0.01	59.91
N-Ammonia	11/13/13 111313#1	EPA 350.1M	mg-N/kg	0.47	< 0.47 U
Sulfide	11/14/13 111413#1	EPA 376.2	mg/kg	4.49	6.46
Total Organic Carbon	11/26/13 112613#1	Plumb,1981	Percent	0.196	31.4

RL Analytical reporting limit
U Undetected at reported detection limit

Ammonia determined on 2N KCl extracts.

XN64 : 00000

SAMPLE RESULTS-CONVENTIONALS
XN64-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 11/26/13

Project: GHHSA
Event: 0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Client ID: CR05-10cm
ARI ID: 13-24855 XN64C

Analyte	Date	Method	Units	RL	Sample
Total Solids	11/13/13 111313#1	SM2540G	Percent	0.01	30.32
Preserved Total Solids	11/13/13 111313#1	SM2540G	Percent	0.01	31.81
Total Volatile Solids	11/13/13 111313#1	SM2540E	Percent	0.01	36.49
N-Ammonia	11/13/13 111313#1	EPA 350.1M	mg-N/kg	0.31	7.21
Sulfide	11/12/13 111213#1	EPA 376.2	mg/kg	31.1	320
Total Organic Carbon	11/26/13 112613#1	Plumb,1981	Percent	0.200	13.6

RL Analytical reporting limit
U Undetected at reported detection limit

Ammonia determined on 2N KCl extracts.

XN64 : 00097

SAMPLE RESULTS-CONVENTIONALS
XN64-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 11/26/13

Project: GHHSA
Event: 0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Client ID: CR06-2.5
ARI ID: 13-24856 XN64D

Analyte	Date	Method	Units	RL	Sample
Total Solids	11/13/13 111313#1	SM2540G	Percent	0.01	21.59
Preserved Total Solids	11/13/13 111313#1	SM2540G	Percent	0.01	21.85
Total Volatile Solids	11/13/13 111313#1	SM2540E	Percent	0.01	69.23
N-Ammonia	11/13/13 111313#1	EPA 350.1M	mg-N/kg	0.42	14.0
Sulfide	11/12/13 111213#1	EPA 376.2	mg/kg	225	2,910
Total Organic Carbon	11/26/13 112613#1	Plumb,1981	Percent	0.198	49.5

RL Analytical reporting limit
U Undetected at reported detection limit

Ammonia determined on 2N KCl extracts.

XN64 : 000058

SAMPLE RESULTS-CONVENTIONALS
XN64-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 11/26/13

Project: GHHSA
Event: 0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Client ID: CR04-5
ARI ID: 13-24857 XN64E

Analyte	Date	Method	Units	RL	Sample
Total Solids	11/13/13 111313#1	SM2540G	Percent	0.01	19.98
Preserved Total Solids	11/13/13 111313#1	SM2540G	Percent	0.01	24.44
Total Volatile Solids	11/13/13 111313#1	SM2540E	Percent	0.01	38.20
N-Ammonia	11/13/13 111313#1	EPA 350.1M	mg-N/kg	0.45	15.2
Sulfide	11/12/13 111213#1	EPA 376.2	mg/kg	20.1	179
Total Organic Carbon	11/26/13 112613#1	Plumb,1981	Percent	0.196	16.5

RL Analytical reporting limit
U Undetected at reported detection limit

Ammonia determined on 2N KCl extracts.

XN64I : 00099

SAMPLE RESULTS-CONVENTIONALS
XN64-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 11/26/13

Project: GHHSA
Event: 0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Client ID: CR01-10cm
ARI ID: 13-24858 XN64F

Analyte	Date	Method	Units	RL	Sample
Total Solids	11/13/13 111313#1	SM2540G	Percent	0.01	44.09
Total Organic Carbon	11/26/13 112613#1	Plumb,1981	Percent	0.020	2.06

RL Analytical reporting limit
U Undetected at reported detection limit

XN64U : 0601 0a

SAMPLE RESULTS-CONVENTIONALS
XN64-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 11/26/13

Project: GHHSA
Event: 0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Client ID: CR02-10cm
ARI ID: 13-24859 XN64G

Analyte	Date	Method	Units	RL	Sample
Total Solids	11/13/13 111313#1	SM2540G	Percent	0.01	51.80
Total Organic Carbon	11/26/13 112613#1	Plumb,1981	Percent	0.020	3.21

RL Analytical reporting limit
U Undetected at reported detection limit

XNGU : 00101

SAMPLE RESULTS-CONVENTIONALS
XN64-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 11/26/13

Project: GHHSA
Event: 0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Client ID: CR03-10cm
ARI ID: 13-24860 XN64H

Analyte	Date	Method	Units	RL	Sample
Total Solids	11/13/13 111313#1	SM2540G	Percent	0.01	36.40
Total Organic Carbon	11/26/13 112613#1	Plumb,1981	Percent	0.020	2.91

RL Analytical reporting limit
U Undetected at reported detection limit

XN64:00102

METHOD BLANK RESULTS-CONVENTIONALS
XN64-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 11/26/13

Project: GHHSA
Event: 0863.01.01
Date Sampled: NA
Date Received: NA

Analyte	Date	Units	Blank	QC ID
Total Solids	11/13/13	Percent	< 0.01 U	ICB
Preserved Total Solids	11/13/13	Percent	< 0.01 U	ICB
Total Volatile Solids	11/13/13	Percent	< 0.01 U	ICB
N-Ammonia	11/13/13	mg-N/kg	< 0.10 U	PREP
Sulfide	11/12/13	mg/kg	0.17	PREP
	11/14/13		< 0.05 U	PREP
Total Organic Carbon	11/26/13	Percent	< 0.020 U	ICB

XN64:00103

LAB CONTROL RESULTS-CONVENTIONALS
XN64-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 11/26/13

Project: GHHSA
Event: 0863.01.01
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Sulfide	PREP	11/12/13	mg/kg	6.37	6.79	93.8%
EPA 376.2	PREP	11/14/13		6.20	6.31	98.3%
Total Organic Carbon Plumb,1981	ICVL	11/26/13	Percent	0.098	0.100	98.0%

XN64 : 0001 QU

STANDARD REFERENCE RESULTS-CONVENTIONALS
XN64-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 11/26/13

Project: GHHSA
Event: 0863.01.01
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Date	Units	SRM	True Value	Recovery
N-Ammonia ERA #040912	11/13/13	mg-N/kg	102	100	102.0%
Total Organic Carbon NIST 1941B	11/26/13	Percent	3.36	2.99	112.4%

XNSU : 001165

REPLICATE RESULTS-CONVENTIONALS
XN64-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 11/26/13

Project: GHHSA
Event: 0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Analyte	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: XN64A Client ID: CR06-10cm					
Total Solids	11/13/13	Percent	21.40	22.11 21.57	1.7%
Preserved Total Solids	11/13/13	Percent	19.81	21.39	7.7%
Total Volatile Solids	11/13/13	Percent	60.05	59.01 59.81	0.9%
Total Organic Carbon	11/26/13	Percent	35.6	33.7 31.3	6.4%
ARI ID: XN64B Client ID: CR04-10cm					
Sulfide	11/14/13	mg/kg	6.46	0.67	162.4%

XNSU:0016

MS/MSD RESULTS-CONVENTIONALS
XN64-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 11/26/13

Project: GHHSA
Event: 0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Analyte	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: XN64A Client ID: CR06-10cm						
Total Organic Carbon	11/26/13	Percent	35.6	64.5	45.5	63.4%
ARI ID: XN64B Client ID: CR04-10cm						
Sulfide	11/14/13	mg/kg	6.46	525	566	91.6%

XN64 : 00107

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR06-10cm
SAMPLE

Lab Sample ID: XN64A
LIMS ID: 13-24853
Matrix: Sediment
Data Release Authorized:
Reported: 11/20/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Percent Total Solids: 23.3%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
CLP	11/14/13	7471A	11/18/13	**7439-97-6**	**Mercury**	0.08	**0.55**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

XN64A : 00198

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR04-10cm
SAMPLE

Lab Sample ID: XN64B
LIMS ID: 13-24854
Matrix: Sediment
Data Release Authorized:
Reported: 11/20/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Percent Total Solids: 20.7%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
CLP	11/14/13	7471A	11/18/13	**7439-97-6**	**Mercury**	0.1	**6.2**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

XN64H : 022409

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR05-10cm
SAMPLE

Lab Sample ID: XN64C
LIMS ID: 13-24855
Matrix: Sediment
Data Release Authorized:
Reported: 11/20/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Percent Total Solids: 26.9%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
CLP	11/14/13	7471A	11/18/13	**7439-97-6**	**Mercury**	0.09	**0.16**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR06-2.5
SAMPLE

Lab Sample ID: XN64D
LIMS ID: 13-24856
Matrix: Sediment
Data Release Authorized:
Reported: 11/20/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Percent Total Solids: 20.3%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	11/14/13	6010C	11/19/13	7440-38-2	Arsenic	20	20	U
3050B	11/14/13	6010C	11/19/13	7440-43-9	Cadmium	1	1	U
3050B	11/14/13	6010C	11/19/13	**7440-47-3**	**Chromium**	2	**26**	
3050B	11/14/13	6010C	11/19/13	**7440-50-8**	**Copper**	1	**96**	
3050B	11/14/13	6010C	11/19/13	**7439-92-1**	**Lead**	10	**110**	
CLP	11/14/13	7471A	11/18/13	**7439-97-6**	**Mercury**	0.08	**0.53**	
3050B	11/14/13	6010C	11/19/13	7440-22-4	Silver	1	1	U
3050B	11/14/13	6010C	11/19/13	**7440-66-6**	**Zinc**	5	**237**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

XN64I : 0001 1 1

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR06-2.5
DUPLICATE

Lab Sample ID: XN64D
LIMS ID: 13-24856
Matrix: Sediment
Data Release Authorized:
Reported: 11/20/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	6010C	20 U	20 U	0.0%	+/- 20	L
Cadmium	6010C	1 U	1 U	0.0%	+/- 1	L
Chromium	6010C	26	91	111%	+/- 20%	*
Copper	6010C	96	237	84.7%	+/- 20%	*
Lead	6010C	110	120	8.7%	+/- 20%	
Mercury	7471A	0.53	0.41	25.5%	+/- 0.08	L*
Silver	6010C	1 U	1 U	0.0%	+/- 1	L
Zinc	6010C	237	211	11.6%	+/- 20%	

Reported in mg/kg-dry

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

XN64D : 00412

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: CR06-2.5
MATRIX SPIKE

Lab Sample ID: XN64D
LIMS ID: 13-24856
Matrix: Sediment
Data Release Authorized:
Reported: 11/20/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample		Spike	Spike Added	% Recovery	Q
Arsenic	6010C	20	U	970	979	99.1%	
Cadmium	6010C	1	U	242	245	98.8%	
Chromium	6010C	26		276	245	102%	
Copper	6010C	96		389	245	120%	
Lead	6010C	110		1,090	979	100%	
Mercury	7471A	0.53		1.66	0.854	132%	N
Silver	6010C	1	U	237	245	96.7%	
Zinc	6010C	237		476	245	97.6%	

Reported in mg/kg-dry

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

XNS4: 80113

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: CR01-10cm
SAMPLE

Lab Sample ID: XN64F
LIMS ID: 13-24858
Matrix: Sediment
Data Release Authorized:
Reported: 11/20/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Percent Total Solids: 43.4%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	11/14/13	6010C	11/19/13	7440-38-2	Arsenic	10	10	U
3050B	11/14/13	6010C	11/19/13	**7440-43-9**	**Cadmium**	0.5	**0.5**	
3050B	11/14/13	6010C	11/19/13	**7440-47-3**	**Chromium**	1	**40**	
3050B	11/14/13	6010C	11/19/13	**7440-50-8**	**Copper**	0.5	**58.0**	
3050B	11/14/13	6010C	11/19/13	**7439-92-1**	**Lead**	5	**7**	
CLP	11/14/13	7471A	11/18/13	**7439-97-6**	**Mercury**	0.04	**0.05**	
3050B	11/14/13	6010C	11/19/13	7440-22-4	Silver	0.7	0.7	U
3050B	11/14/13	6010C	11/19/13	**7440-66-6**	**Zinc**	2	**87**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

XN64I : 0001 1 U

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR02-10cm
SAMPLE

Lab Sample ID: XN64G
LIMS ID: 13-24859
Matrix: Sediment
Data Release Authorized:
Reported: 11/20/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Percent Total Solids: 50.5%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	11/14/13	6010C	11/19/13	7440-38-2	Arsenic	9	9	U
3050B	11/14/13	6010C	11/19/13	**7440-43-9**	**Cadmium**	0.4	**0.4**	
3050B	11/14/13	6010C	11/19/13	**7440-47-3**	**Chromium**	0.9	**38.5**	
3050B	11/14/13	6010C	11/19/13	**7440-50-8**	**Copper**	0.4	**56.3**	
3050B	11/14/13	6010C	11/19/13	**7439-92-1**	**Lead**	4	**9**	
CLP	11/14/13	7471A	11/18/13	**7439-97-6**	**Mercury**	0.04	**0.10**	
3050B	11/14/13	6010C	11/19/13	7440-22-4	Silver	0.6	0.6	U
3050B	11/14/13	6010C	11/19/13	**7440-66-6**	**Zinc**	2	**79**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

XN64H : 0001 15

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR03-10cm
SAMPLE

Lab Sample ID: XN64H
LIMS ID: 13-24860
Matrix: Sediment
Data Release Authorized:
Reported: 11/20/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Percent Total Solids: 35.2%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	11/14/13	6010C	11/19/13	7440-38-2	Arsenic	10	10	U
3050B	11/14/13	6010C	11/19/13	7440-43-9	Cadmium	0.5	0.5	U
3050B	11/14/13	6010C	11/19/13	**7440-47-3**	**Chromium**	1	**48**	
3050B	11/14/13	6010C	11/19/13	**7440-50-8**	**Copper**	0.5	**65.4**	
3050B	11/14/13	6010C	11/19/13	**7439-92-1**	**Lead**	5	**8**	
CLP	11/14/13	7471A	11/18/13	**7439-97-6**	**Mercury**	0.06	**0.09**	
3050B	11/14/13	6010C	11/19/13	7440-22-4	Silver	0.8	0.8	U
3050B	11/14/13	6010C	11/19/13	**7440-66-6**	**Zinc**	3	**91**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: METHOD BLANK**

Lab Sample ID: XN64MB
LIMS ID: 13-24858
Matrix: Sediment
Data Release Authorized:
Reported: 11/20/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	11/14/13	6010C	11/19/13	7440-38-2	Arsenic	5	5	U
3050B	11/14/13	6010C	11/19/13	7440-43-9	Cadmium	0.2	0.2	U
3050B	11/14/13	6010C	11/19/13	7440-47-3	Chromium	0.5	0.5	U
3050B	11/14/13	6010C	11/19/13	7440-50-8	Copper	0.2	0.2	U
3050B	11/14/13	6010C	11/19/13	7439-92-1	Lead	2	2	U
CLP	11/14/13	7471A	11/18/13	7439-97-6	Mercury	0.02	0.02	U
3050B	11/14/13	6010C	11/19/13	7440-22-4	Silver	0.3	0.3	U
3050B	11/14/13	6010C	11/19/13	7440-66-6	Zinc	1	1	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: LAB CONTROL**

Lab Sample ID: XN64LCS
LIMS ID: 13-24858
Matrix: Sediment
Data Release Authorized:
Reported: 11/20/13

QC Report No: XN64-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	6010C	194	200	97.0%	
Cadmium	6010C	48.4	50.0	96.8%	
Chromium	6010C	50.5	50.0	101%	
Copper	6010C	49.2	50.0	98.4%	
Lead	6010C	195	200	97.5%	
Mercury	7471A	0.51	0.50	102%	
Silver	6010C	50.5	50.0	101%	
Zinc	6010C	48	50	96.0%	

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%

XN64 · QA19

Maul Foster & Alongi
GHHSA
0863.01.01

Apparent Grain Size Distribution Summary
Percent Finer Than Indicated Size

Sample No.	Gravel			Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt				Clay	
Phi Size	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
Sieve Size (microns)	3/8"	#4 (4750)	#10 (2000)	#18 (1000)	#35 (500)	#60 (250)	#120 (125)	#230 (63)	31.00	15.60	7.80	3.90	2.00	1.00
XN50 B	100.0	86.0	69.2	55.5	40.6	22.8	12.5	9.0	8.5	7.5	6.4	5.2	3.5	2.8
	100.0	89.7	71.9	59.5	43.7	25.3	14.7	11.4	9.3	8.1	7.1	5.5	4.3	3.0
	100.0	82.2	66.7	54.2	39.7	22.5	12.4	9.1	8.6	7.6	6.6	5.2	3.8	2.8
CR06-10cm	100.0	87.1	77.3	64.3	48.7	36.7	31.6	29.7	25.5	20.5	15.9	12.2	9.5	7.4
CR04-10cm	100.0	84.3	77.2	63.4	49.2	40.7	37.0	35.6	28.5	22.6	16.4	11.6	8.7	6.1
CR05-10cm	100.0	89.8	79.8	68.4	55.2	44.7	38.8	35.3	27.2	19.4	14.3	9.9	7.8	5.4
CR04-5	100.0	87.8	76.4	63.5	52.8	46.7	43.5	42.1	40.9	30.3	21.3	15.2	10.9	7.2

Notes to the Testing:

1. Organic matter was not removed prior to testing, thus the reported values are the "apparent" grain size distribution. See narrative for discussion of the testing.

Maul Foster & Alongi
GHHSA
0863.01.01

Apparent Grain Size Distribution Summary
Percent Retained in Each Size Fraction

Sample No.	Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Coarse Silt	Medium Silt	Fine Silt	Very Fine Silt	Clay			Total Fines
Phi Size	< -1	-1 to 0	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	> 10	> 4
Sieve Size (microns)	> #10 (2000)	10 to 18 (2000-1000)	18-35 (1000-500)	35-60 (500-250)	60-120 (250-125)	120-230 (125-62)	62.5-31.0	31 0-15.6	15 6-7.8	7 8-3 9	3 9-2.0	2.0-1.0	<1.0	<230 (<62)
XN50 B	30.8	13.7	14.9	17.8	10.4	3.4	0.5	1.0	1.0	1.3	1.7	0.6	2.8	9.0
	28.1	12.4	15.8	18.4	10.6	3.4	2.1	1.2	1.0	1.6	1.3	1.3	3.0	11.4
	33.3	12.5	14.5	17.2	10.1	3.3	0.5	1.1	1.0	1.4	1.4	1.0	2.8	9.1
CR06-10cm	22.7	13.0	15.7	11.9	5.1	2.0	4.1	5.1	4.5	3.7	2.7	2.1	7.4	29.7
CR04-10cm	22.8	13.8	14.2	8.5	3.7	1.4	7.2	5.9	6.2	4.8	2.9	2.6	6.1	35.6
CR05-10cm	20.2	11.4	13.2	10.5	6.0	3.5	8.1	7.7	5.1	4.5	2.1	2.4	5.4	35.3
CR04-5	23.6	13.0	10.7	6.1	3.2	1.4	1.3	10.6	8.9	6.1	4.3	3.7	7.2	42.1

Notes to the Testing:

1. Organic matter was not removed prior to testing, thus the reported values are the "apparent" grain size distribution. See narrative for discussion of the testing.

QA SUMMARY

Client:	Maul Foster & Alongi	Client Project:	GHHSA
ARI Trip. Sample ID:	XN50 B	Client Project No.:	0863 01 01
		Batch No.:	XN64-1

Relative Standard Deviation, By Phi Size

Sample ID	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
XN50 B	100.0	86.0	69 2	55.5	40.6	22.8	12.5	9.0	8 5	7.5	6 4	5.2	3.5	2.8
	100.0	89.7	71.9	59.5	43.7	25.3	14 7	11.4	9.3	8.1	7.1	5.5	4.3	3.0
	100.0	82.2	66.7	54.2	39 7	22 5	12.4	9.1	8.6	7 6	6 6	5.2	3.8	2.8
AVE	100.0	86.0	69 3	56.4	41.3	23 5	13.2	9.8	8.8	7.7	6 7	5.3	3.8	2.9
STDEV	0.0	3.8	2.6	2 8	2 1	1.6	1.3	1.3	0.4	0.3	0 3	0.2	0.4	0.1
%RSD	0 0	4.4	3.8	4.9	5.1	6.6	10 0	13.5	4.6	4.4	4.9	3.6	10 3	3.5

The Triplicate Applies To The Following Samples

Client ID	Date Sampled	Date Extracted	Date Complete	QA Ratio (95-105)	Data Qualifiers	Pipette Portion (5.0-25.0g)
XN50 B	11/8/2013	11/12/2013	11/14/2013	99.0		6.6
	11/8/2013	11/12/2013	11/14/2013	100.8		8.5
	11/8/2013	11/12/2013	11/14/2013	99 0		6.6
CR06-10cm	11/7/2013	11/15/2013	11/22/2013	100.1		12.4
CR04-10cm	11/7/2013	11/15/2013	11/22/2013	96.0		13.7
CR05-10cm	11/8/2013	11/15/2013	11/22/2013	101.6		13 0
CR04-5	11/8/2013	11/15/2013	11/22/2013	97.4		14.0

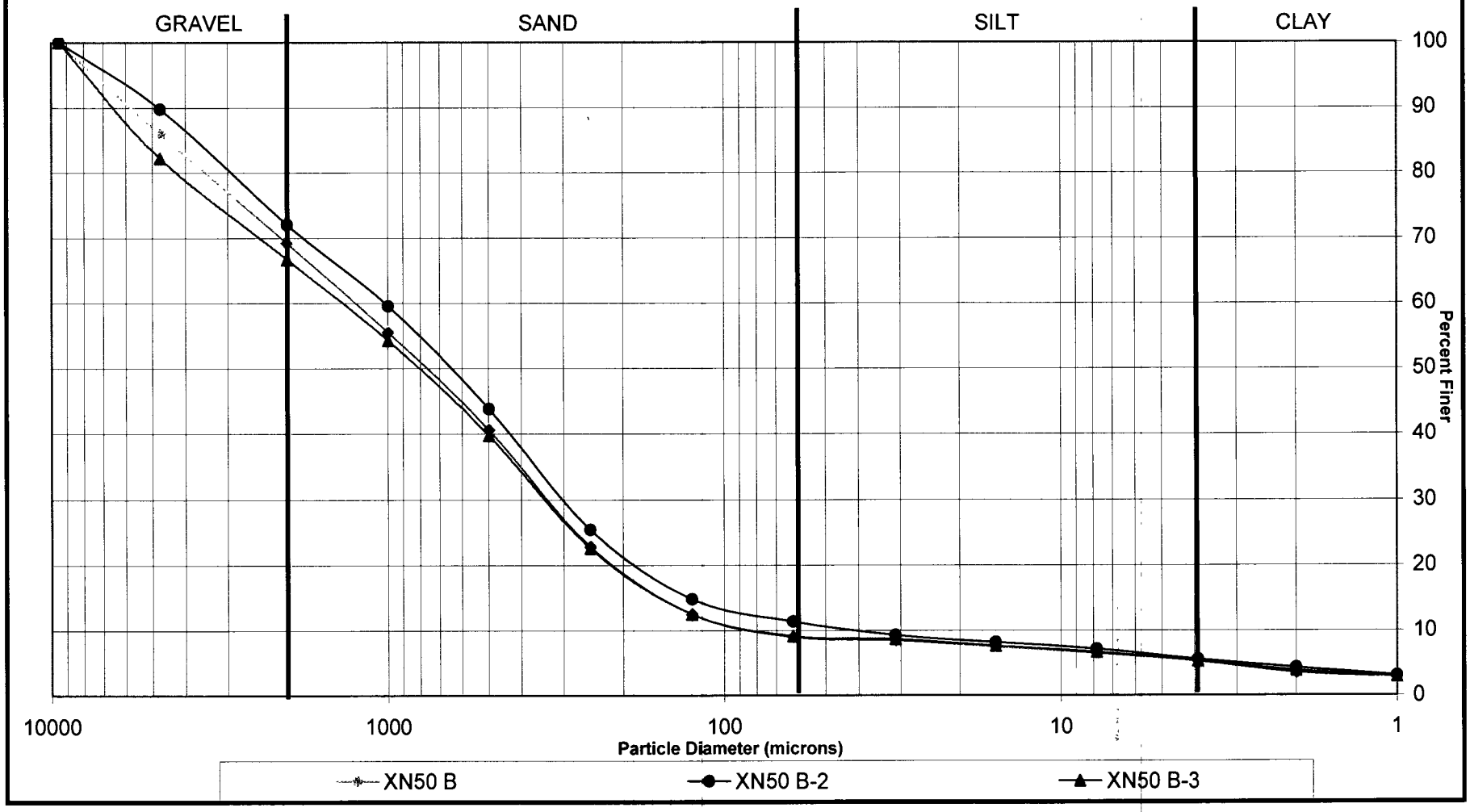
* ARI Internal QA limits = 95-105%

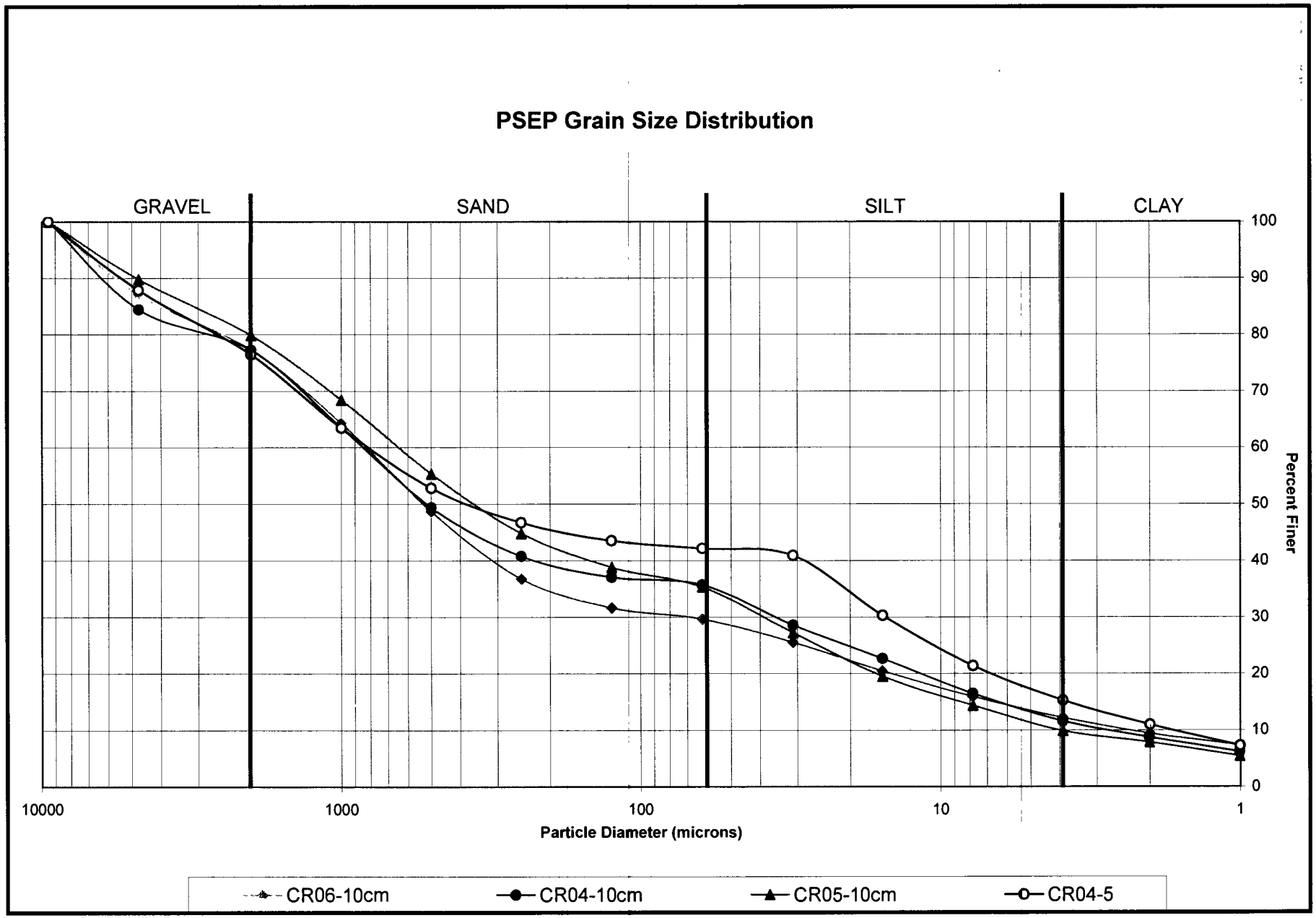
Notes to the Testing:

1 Organic matter was not removed prior to testing, thus the reported values are the "apparent" grain size distribution. See narrative for discussion of the testing.

PSEP Grain Size Distribution

Triplicate Sample Plot




PSEP Grain Size Distribution
GRAVEL
SAND
SILT
CLAY
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
10000
1000
100
10
1
Particle Diameter (microns)
CR06-10cm
CR04-10cm
CR05-10cm
CR04-5

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: X000	Turn-around Requested:	Page: 1 of 1	
ARI Client Company: Maul Foster & Alongi	Phone:	Date: 11/14/13	Ice Present? NO
Client Contact: Murray, Mike		No. of Coolers: NA	Cooler Temps: NA
Client Project Name: GHHSA			
Client Project #: 0463.01.01	Samplers: ML		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: Sulfide	Notes/Comments
CR01-10cm	11/14/13	11:45 ML	H_2O	1	✓	
CR02-10cm	11/14/13	11:25	H_2O	1	✓	
CR02-10cm 3	11/14/13	11:25	H_2O	1	✓	

Comments/Special Instructions	Relinquished by (Signature)	Received by: (Signature)	Relinquished by (Signature)	Received by: (Signature)
	Printed Name: Max Litwin	Printed Name: Jennifer Millsap	Printed Name:	Printed Name
	Company: ARI	Company: ARI	Company:	Company:
	Date & Time: 11/14/13	Date & Time: 11/14/13 1145	Date & Time:	Date & Time.

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Revised 12/05, ITEM X

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: XO00
Client: Maul Foster & Alongi
Project Event: 0863.01.01
Project Name: GHHSA

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	CR01-10CM	XO00A	13-25167	Pore Water	11/14/13 11:25	11/14/13 11:45
2.	CR02-10CM	XO00B	13-25168	Pore Water	11/14/13 11:25	11/14/13 11:45
3.	CR03-10CM	XO00C	13-25169	Pore Water	11/14/13 11:25	11/14/13 11:45

XNGU : 0P125

SAMPLE RESULTS-CONVENTIONALS
XO00-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Pore Water
Data Release Authorized:
Reported: 11/15/13

Project: GHHSA
Event: 0863.01.01
Date Sampled: 11/14/13
Date Received: 11/14/13

Client ID: CR01-10cm
ARI ID: 13-25167 XO00A

Analyte	Date Batch	Method	Units	RL	Sample
Conductivity	11/15/13 111513#1	EPA 120.1	umhos/cm	1.00	18,700
Salinity	11/15/13 111513#1	SM 2520.B	ppt	0.10	11.0

RL Analytical reporting limit
U Undetected at reported detection limit

XNSU:00125

SAMPLE RESULTS-CONVENTIONALS
XO00-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Pore Water
Data Release Authorized:
Reported: 11/15/13

Project: GHHSA
Event: 0863.01.01
Date Sampled: 11/14/13
Date Received: 11/14/13

Client ID: CR02-10cm
ARI ID: 13-25168 XO00B

Analyte	Date Batch	Method	Units	RL	Sample
Conductivity	11/15/13 111513#1	EPA 120.1	umhos/cm	1.00	12,200
Salinity	11/15/13 111513#1	SM 2520.B	ppt	0.10	6.90

RL Analytical reporting limit
U Undetected at reported detection limit

XNGU:00127

SAMPLE RESULTS-CONVENTIONALS
XO00-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Pore Water
Data Release Authorized:
Reported: 11/15/13

Project: GHHSA
Event: 0863.01.01
Date Sampled: 11/14/13
Date Received: 11/14/13

Client ID: CR03-10cm
ARI ID: 13-25169 XO00C

Analyte	Date Batch	Method	Units	RL	Sample
Conductivity	11/15/13 111513#1	EPA 120.1	umhos/cm	1.00	17,500
Salinity	11/15/13 111513#1	SM 2520.B	ppt	0.10	10.2

RL Analytical reporting limit
U Undetected at reported detection limit

XMGU:00128

METHOD BLANK RESULTS-CONVENTIONALS
XO00-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Pore Water
Data Release Authorized:
Reported: 11/15/13

Project: GHHSA
Event: 0863.01.01
Date Sampled: NA
Date Received: NA

Analyte	Method	Date	Units	Blank	ID
Conductivity	EPA 120.1	11/15/13	umhos/cm	< 1.00 U	
Salinity	SM 2520.B	11/15/13	ppt	< 0.10 U	

XNSV : 0812S

LAB CONTROL RESULTS-CONVENTIONALS
XO00-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Pore Water
Data Release Authorized:
Reported: 11/15/13

Project: GHHSA
Event: 0863.01.01
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Salinity SM 2520.B	ICVL	11/15/13	ppt	46,700	47,600	98.1%

XNS11:00130

STANDARD REFERENCE RESULTS-CONVENTIONALS
XO00-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Pore Water
Data Release Authorized:
Reported: 11/15/13

Project: GHHSA
Event: 0863.01.01
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Method	Date	Units	SRM	True Value	Recovery
Conductivity Ricca #4110724	EPA 120.1	11/15/13	umhos/cm	974	1,000	97.4%

XNSU 00131

REPLICATE RESULTS-CONVENTIONALS
XO00-Maul Foster & Alongi

ANALYTICAL RESOURCES INCORPORATED

Matrix: Pore Water
Data Release Authorized:
Reported: 11/15/13

Project: GHHSA
Event: 0863.01.01
Date Sampled: 11/14/13
Date Received: 11/14/13

Analyte	Method	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: XO00A	**Client ID: CR01-10cm**					
Conductivity	EPA 120.1	11/15/13	umhos/cm	18,700	18,700	0.0%
Salinity	SM 2520.B	11/15/13	ppt	11.0	11.0	0.0%

XNCU:00122

Analytical Resources, Incorporated
Analytical Chemists and Consultants

23 December 2013

Mike Murray
Maul, Foster and Alongi, Inc
2001 NW 19th Avenue
Suite 200
Portland, OR 97209

RE: Project: GHHSA
ARI Job No.: XQ70

Dear Mike:

Please find enclosed copies of the original chain of custody records and the final results for the samples from the project referenced above. These samples were originally accepted on November 8, 2013. These samples were analyzed for SVOCs, dioxins/furans, PCBs, NWTPH-Dx and total mercury as requested on 12/6/13.

The percent differences (%Ds) for several compounds were high for the CCALs that bracketed the SVOA and SIM-SVOA analyses of these samples. All positive results have been flagged with a "Q" qualifier to denote the high %Ds.

All samples were initially analyzed for SVOAs and SIM-SVOAs on 12/16/13. The areas for the internal standards were not within control limits following the analyses of these samples. All samples were diluted and re-analyzed on 12/19/13. The re-analyses proceeded without incident of note. The results for the re-analyses only have been submitted.

The remaining analyses proceeded without incident of note.

An electronic copy of this report and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

cc: file XQ70

Enclosures

MDH/mdh

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Subject: RE: XN64-GHHSA
From: "Mike Murray" <mmurray@maulfoster.com>
Date: 12/6/2013 11:22 AM
To: "Mark Harris" <markh@arilabs.com>
CC: "Madi Novak" <mnovak@maulfoster.com>, "Mary Benzinger" <mbenzinger@maulfoster.com>

Hi Mark, we finished our initial evaluation and would like to run some follow-up analysis.

Since we are up against the hold time for mercury, the mercury analysis would have to happen pretty soon.

We would like to run archived samples: CR04-2.5 and CR05-2.5 for dioxin/furans and mercury.

We would like to run archived samples: CR04-10cm, CR04-2.5, CR05-10cm, and CR05-2.5 for SVOCs, PCBs and TPH-Dx.

Standard TAT is fine.

Lastly could you provide us with a cost for this follow-up analysis for our budget?

Let me know if you have any questions.

Thanks and have a nice weekend.
Mike

MICHAEL R. MURRAY RG | MAUL FOSTER & ALONGI, INC.

d. 503 501 5226 | p. 971 544 2139 | c. 503 310 0435 | f. 971 544 2140 |
www.maulfoster.com
2001 NW 19th Avenue, Suite 200, Portland, OR 97209

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-----Original Message-----
From: Mark Harris [mailto:markh@arilabs.com]
Sent: Tuesday, December 03, 2013 8:32 AM
To: Mary Benzinger
Cc: Madi Novak; Mike Murray
Subject: Re: XN64-GHHSA

Mary:

No problem. It's in 2 parts due to the size of the file.

This is one of two and the EDD for XN64.

Mark H.

On 12/2/2013 5:30 PM, Mary Benzinger wrote:

Hi Mark,
Thanks for the final EDD and cover letter.
Since there are so many parts to this report, and I don't want to miss anything, could you send these as a single report?
Thank you!

Mary Benzinger | MAUL FOSTER & ALONGI, INC.

d. 503 501 5247 | p. 503 501 5214| c. 503 319 7132|
www.maulfoster.com
2001 NW 19th Avenue, Suite 200, Portland, OR 97209

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-----Original Message-----
From: Mark Harris [mailto:markh@arilabs.com]
Sent: Monday, December 02, 2013 2:08 PM
To: Madi Novak; Mike Murray; Mary Benzinger
Subject: XN64-GHHSA

All:

Attached are the final EDD for the bulk of the sediment samples (XO00 was for the porewaters and that one was complete and final.) and a copy of the narrative. No data have change so I omitted the actual sample reports. If you'd like those re-sent and an 'intact'/complete report, let me know. The hard copy will mail tomorrow.

Let me know if you have any questions.

Mark H.

--

Mark Harris
Project Manager
Analytical Resources, Inc.
206/695-6210
markh@arilabs.com

How was your customer experience?
Please take our 5 minute online customer survey <https://www.surveymonkey.com/s/WPDBVJK>.

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Inc. (ARI) The information contained herein is intended solely for the use of the individual(s) named above. If you are not the intended recipient, any copying, distribution, disclosure, or use of the text and/or attached document(s) is strictly prohibited.

If you have received this correspondence in error, please notify sender immediately. Thank you.

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number: XN64	Turn-around Requested: Standard	Page: 1 of 2	
ARI Client Company: Maul Foster & Alongi	Phone: 9715442139	Date: 11/8/13	Ice Present? Y
Client Contact: Mike Murray		No. of Coolers: 3	Cooler Temps: 3.2, 0.4, 5.2
Client Project Name: GHHSA			
Client Project #: 0863.01.01	Samplers: MRM/MN		

Analysis Requested

Sample ID	Date	Time	Matrix	No Containers	Dioxin/Furan	Butyl-Benzyl-Phthalate, Perka Chlorophenol	Mercury	SMS compounds with marine criteria	TOC	Conventionals TOC, TVS, Total NH4, TS, PWS, % solids	Archive	Salinity in pore water	Notes/Comments
CR06-10cm	11/7/13	12:00	Sed.	8	X	X	X			X	X		"Conventionals" include: TOC, TVS, total solids, NH4, TS, pore water sulfides, % fines
CR06-1		12:15		4							X		Archive all remaining sample volume
CR06-2.5		12:30		8							X		
CR06-4		12:45		8							X		
CR04-10cm		13:00		8	X	X	X			X	X		
CR04-1		13:30		3							X		
CR05-10cm	11/8/13	8.25	Sed	8	X	X	X			X	X		
CR05-2.5		8.45		8							X		
CR05-3.5		9:00		2							X		
CR04-2.5		9:40		8							X		

Comments/Special Instructions	Relinquished by (Signature)	Received by (Signature)	Relinquished by (Signature)	Received by (Signature)
	Printed Name: Mad. Novak	Printed Name: Jennifer Millsap	Printed Name	Printed Name
	Company: MFA	Company: ARI	Company	Company
	Date & Time: 11/8/13 2:00 pm	Date & Time: 11/8/13 1830	Date & Time	Date & Time

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: XN64	Turn-around Requested: standard	Page: 2 of 2	
ARI Client Company: Maul Foster + Alongi	Phone: 9715442139	Date: 11/8/13	Ice Present? Y
Client Contact: Mike Murray		No. of Coolers: 3	Cooler Temps: 3.2, 0.4, 5.2
Client Project Name: 6115 GHHSA			
Client Project #: 0863.01.01	Samplers: MRM/MN		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No Containers	Analysis Requested: Dioxins/Furans	Butylbenzyl, Phthalates, Pentachlorophenol	Mercury	SVOCs compounded w/ Modified Criteria	TOC	Conventionals	Archive	Salinity & Particle Size	Notes/Comments
CR04-5	11/8/13	10:00	Sed	4							X		Archive all remaining sample volume ↓
CR01-10cm	↓	11.15	↓	5	X			X	X		X	X	
CR02-10cm		11:30		5	X			X	X		X	X	
CR03-10cm		12:00		5	X			X	X		X	X	

Conventionals = TOC, TVS, total solids, NH_4, TS, pore water sulfides, % fines

Comments/Special Instructions	Relinquished by (Signature)	Received by (Signature)	Relinquished by (Signature)	Received by (Signature)
	Printed Name: Madi Novak	Printed Name: Jennifer Millsap	Printed Name:	Printed Name:
	Company: MFA	Company: ARI	Company:	Company:
	Date & Time: 11/8/13 2 pm	Date & Time: 11/8/13 1830	Date & Time:	Date & Time:

ENVIRONMENTAL CHEMISTS

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: XN64	Turn-around Requested: Standard	Page: 1 of 2	
ARI Client Company: Maul Foster & Alongi	Phone: 971 544 2139	Date: 11/8/13	Ice Present? Y
Client Contact: Mike Murray		No. of Coolers: 3	Cooler Temps: 3.2, 0.4, 5.2
Client Project Name: GHHSA			
Client Project #: 0963.01.01	Samplers: MRM/MN		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: Dioxin/Furan	Benzyl Butyl Phthalate, Pentachlorophenol	Mercury	SMS compounds with marine criteria	TOC	Conventionals (TOC, TVS, Total NH4, TS, PAHs, %fines)	Archive	Salinity in pore water	Notes/Comments
CR06-10cm	11/7/13	12:00	Sed.	8	X	X	X	phenol		X	X		"Conventionals" include: TOC, TVS, total solids, NH4, TS, pore water solids, %fines
CR06-1		12:15		4	X			X	tphg, tplvk		X		Archive all remaining sample volume
CR06-2.5		12:30		8	X			X	tphg, tplvk		X		
CR06-4		12:45		8							X		
CR04-10cm		13:00		8	X	X	X	phenol		X	X		
CR04-1		13:30		3							X		
CR05-10cm	11/8/13	8.25	sed	8	X	X	X	phenol		X	X		
CR05-2.5		8.45		8							X		
CR05-3.5		9:00		2							X		
CR04-2.5		9:40		8							X		

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Madi Novak	Printed Name: Jennifer Millsap	Printed Name:	Printed Name
	Company: MFA	Company: ARI	Company	Company
	Date & Time: 11/8/13 2:00 pm	Date & Time: 11/8/13 1830	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

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Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: XN64	Turn-around Requested: standard	Page: 2 of 2	
ARI Client Company: Maul Foster + Alongi	Phone: 9715442139	Date: 11/8/13	Ice Present? Y
Client Contact: Mike Murray		No. of Coolers: 3	Cooler Temps: 3.2, 0.4, 5.2
Client Project Name: FHS GHFSA			
Client Project #: 0863.01 01	Samplers: MRM/MN		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No Containers	Analysis Requested: D. oxin/ Furan	Butylbenzyl Phthalate/ Pentachloro Phenol	Mercury	SVOCs compound list/ Mercury	TOC	Conventionals	Archive	Sulfides/ Ammonia/ Solids	Notes/Comments
CR04-5	11/8/13	10:00	Sed	4		phenol				X (NH3)	X		Archive all
CR01-10cm		11.15		5	X			X	X		X	X	remaining
CR02-10cm		11:30		5	X			X	X		X	X	sample
CR03-10cm	↓	12:00	↓	5	X			X	X		X	X	volume ↓

Comments/Special Instructions	Relinquished by (Signature)	Received by (Signature)	Relinquished by: (Signature)	Received by (Signature)
	Printed Name: Madi Novak	Printed Name: Jennifer Mills	Printed Name	Printed Name:
	Company: MFA	Company: ARI	Company:	Company:
	Date & Time: 11/8/13 2 pm	Date & Time: 11/8/13 1830	Date & Time.	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

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XENCO Laboratories

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client Maul Foster & Alongi Project Name GHH3A

COC No(s): _____ (NA) Delivered by Fed-Ex UPS (Courier) Hand Delivered Other: MC Delivery

Assigned ARI Job No: XN64 Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2 0-6.0 °C for chemistry) 3.2 0.4 5.2

Time: 1830

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 90877452

Cooler Accepted by: JM Date 11/8/13 Time 1830

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used?	Bubble Wrap (Wet Ice) Gel Packs Baggies Foam Block Paper Other		
Was sufficient ice used (if appropriate)?		NA (YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)		(NA) YES	NO
Were all VOC vials free of air bubbles?		(NA) YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI		(NA)	

Was Sample Split by ARI: (NA) YES Date/Time: _____ Equipment _____ Split by: _____

Samples Logged by: JM Date. 11/12/13 Time 1240

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By Date.

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm
		

Small → "sm" (< 2 mm)	
Peabubbles → "pb" (2 to < 4 mm)	
Large → "lg" (4 to < 6 mm)	
Headspace → "hs" (> 6 mm)	

XN64 00007

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: XQ70
Client: Maul Foster & Alongi
Project Event: 0863.01.01
Project Name: GHHSA

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	CR04-10cm	XQ70A	13-26908	Sediment	11/07/13 13:00	11/08/13 18:30
2.	CR05-10cm	XQ70B	13-26909	Sediment	11/08/13 08:25	11/08/13 18:30
3.	CR05-2.5	XQ70C	13-26910	Sediment	11/08/13 08:45	11/08/13 18:30
4.	CR04-2.5	XQ70D	13-26911	Sediment	11/08/13 09:40	11/08/13 18:30

XQ70 : 00010

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 2/14/2011

Inorganic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Duplicate RPD is not within established control limits

B — Reported value is less than the CRDL but ≥ the Reporting Limit

N — Matrix Spike recovery not within established control limits

NA — Not Applicable, analyte not spiked

H — The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible

L — Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Flagged value is not within established control limits

B — Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.

J — Estimated concentration when the value is less than ARI's established reporting limits

D — The spiked compound was not detected due to sample extract dilution

E — Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

Q — Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).

S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte

NA The flagged analyte was not analyzed for

NR Spiked compound recovery is not reported due to chromatographic interference

NS The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

EMPC Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

X Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**

Z Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

YQ7Q : QQQ12

Geotechnical Data

A	The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
F	Samples were frozen prior to particle size determination
SM	Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
SS	Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
W	Weight of sample in some pipette aliquots was below the level required for accurate weighting

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: MB-121013
METHOD BLANK

Lab Sample ID: MB-121013
LIMS ID: 13-26908
Matrix: Sediment
Data Release Authorized:
Reported: 12/20/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: NA
Date Received: NA

Date Extracted: 12/10/13
Date Analyzed: 12/16/13 22:31
Instrument/Analyst: NT14/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	RL	Result
108-95-2	Phenol	20	< 20 U
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	4-Methylphenol	20	< 20 U
105-67-9	2,4-Dimethylphenol	100	< 100 U
65-85-0	Benzoic Acid	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	Naphthalene	20	< 20 U
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	< 20 U
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	Acenaphthylene	20	< 20 U
83-32-9	Acenaphthene	20	< 20 U
132-64-9	Dibenzofuran	20	< 20 U
84-66-2	Diethylphthalate	20	< 20 U
86-73-7	Fluorene	20	< 20 U
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	100	< 100 U
85-01-8	Phenanthrene	20	< 20 U
120-12-7	Anthracene	20	< 20 U
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	Fluoranthene	20	< 20 U
129-00-0	Pyrene	20	< 20 U
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	Benzo(a)anthracene	20	< 20 U
117-81-7	bis(2-Ethylhexyl)phthalate	50	< 50 U
218-01-9	Chrysene	20	< 20 U
117-84-0	Di-n-Octyl phthalate	20	< 20 U
50-32-8	Benzo(a)pyrene	20	< 20 U
193-39-5	Indeno(1,2,3-cd)pyrene	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	20	< 20 U
TOTBFA	Total Benzofluoranthenes	40	< 40 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	73.6%	2-Fluorobiphenyl	68.8%
d14-p-Terphenyl	96.4%	d4-1,2-Dichlorobenzene	67.6%
d5-Phenol	76.1%	2-Fluorophenol	74.8%
2,4,6-Tribromophenol	88.8%	d4-2-Chlorophenol	73.1%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR04-10cm
SAMPLE

Lab Sample ID: XQ70A
LIMS ID: 13-26908
Matrix: Sediment
Data Release Authorized:
Reported: 12/20/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Date Extracted: 12/10/13
Date Analyzed: 12/19/13 14:35
Instrument/Analyst: NT14/YZ
GPC Cleanup: Yes

Sample Amount: 2.37 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 5.00
Percent Moisture: 80.3%

CAS Number	Analyte	RL	Result
108-95-2	**Phenol**	**420**	**460**
106-46-7	1,4-Dichlorobenzene	420	< 420 U
100-51-6	Benzyl Alcohol	420	< 420 U
95-50-1	1,2-Dichlorobenzene	420	< 420 U
95-48-7	2-Methylphenol	420	< 420 U
106-44-5	4-Methylphenol	420	< 420 U
105-67-9	2,4-Dimethylphenol	2,100	< 2,100 U
65-85-0	**Benzoic Acid**	**4,200**	**1,700 J**
120-82-1	1,2,4-Trichlorobenzene	420	< 420 U
91-20-3	**Naphthalene**	**420**	**420**
87-68-3	Hexachlorobutadiene	420	< 420 U
91-57-6	2-Methylnaphthalene	420	< 420 U
131-11-3	Dimethylphthalate	420	< 420 U
208-96-8	Acenaphthylene	420	< 420 U
83-32-9	Acenaphthene	420	< 420 U
132-64-9	Dibenzofuran	420	< 420 U
84-66-2	Diethylphthalate	420	< 420 U
86-73-7	Fluorene	420	< 420 U
86-30-6	N-Nitrosodiphenylamine	420	< 420 U
118-74-1	Hexachlorobenzene	420	< 420 U
87-86-5	Pentachlorophenol	2,100	< 2,100 U
85-01-8	**Phenanthrene**	**420**	**320 J**
120-12-7	Anthracene	420	< 420 U
84-74-2	Di-n-Butylphthalate	420	< 420 U
206-44-0	**Fluoranthene**	**420**	**590 Q**
129-00-0	**Pyrene**	**420**	**700**
85-68-7	Butylbenzylphthalate	420	< 420 U
56-55-3	**Benzo(a)anthracene**	**420**	**250 J**
117-81-7	bis(2-Ethylhexyl)phthalate	1,000	< 1,000 U
218-01-9	**Chrysene**	**420**	**530**
117-84-0	Di-n-Octyl phthalate	420	< 420 U
50-32-8	**Benzo(a)pyrene**	**420**	**300 JQ**
193-39-5	Indeno(1,2,3-cd)pyrene	420	< 420 U
53-70-3	Dibenz(a,h)anthracene	420	< 420 U
191-24-2	**Benzo(g,h,i)perylene**	**420**	**230 JQ**
TOTBFA	**Total Benzofluoranthenes**	**840**	**550 J**

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	76.0%	2-Fluorobiphenyl	76.0%
d14-p-Terphenyl	94.0%	d4-1,2-Dichlorobenzene	63.0%
d5-Phenol	80.0%	2-Fluorophenol	74.0%
2,4,6-Tribromophenol	101%	d4-2-Chlorophenol	74.7%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR05-10cm
SAMPLE

Lab Sample ID: XQ70B
LIMS ID: 13-26909
Matrix: Sediment
Data Release Authorized:
Reported: 12/20/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 12/10/13
Date Analyzed: 12/19/13 15:10
Instrument/Analyst: NT14/YZ
GPC Cleanup: Yes

Sample Amount: 4.31 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 5.00
Percent Moisture: 73.1%

CAS Number	Analyte	RL	Result	
108-95-2	**Phenol**	**230**	**600**	
106-46-7	**1,4-Dichlorobenzene**	**230**	**1,100**	
100-51-6	Benzyl Alcohol	230	< 230	U
95-50-1	1,2-Dichlorobenzene	230	< 230	U
95-48-7	2-Methylphenol	230	< 230	U
106-44-5	**4-Methylphenol**	**230**	**310**	
105-67-9	2,4-Dimethylphenol	1,200	< 1,200	U
65-85-0	**Benzoic Acid**	**2,300**	**950**	**J**
120-82-1	1,2,4-Trichlorobenzene	230	< 230	U
91-20-3	**Naphthalene**	**230**	**720**	
87-68-3	Hexachlorobutadiene	230	< 230	U
91-57-6	**2-Methylnaphthalene**	**230**	**310**	
131-11-3	Dimethylphthalate	230	< 230	U
208-96-8	**Acenaphthylene**	**230**	**170**	**J**
83-32-9	**Acenaphthene**	**230**	**210**	**J**
132-64-9	**Dibenzofuran**	**230**	**310**	
84-66-2	Diethylphthalate	230	< 230	U
86-73-7	**Fluorene**	**230**	**260**	
86-30-6	N-Nitrosodiphenylamine	230	< 230	U
118-74-1	Hexachlorobenzene	230	< 230	U
87-86-5	Pentachlorophenol	1,200	< 1,200	U
85-01-8	**Phenanthrene**	**230**	**700**	
120-12-7	**Anthracene**	**230**	**230**	
84-74-2	Di-n-Butylphthalate	230	< 230	U
206-44-0	**Fluoranthene**	**230**	**1,300**	**Q**
129-00-0	**Pyrene**	**230**	**1,300**	
85-68-7	Butylbenzylphthalate	230	< 230	U
56-55-3	**Benzo(a)anthracene**	**230**	**390**	
117-81-7	**bis(2-Ethylhexyl)phthalate**	**580**	**960**	
218-01-9	**Chrysene**	**230**	**420**	
117-84-0	Di-n-Octyl phthalate	230	< 230	U
50-32-8	**Benzo(a)pyrene**	**230**	**340**	**Q**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**230**	**200**	**JQ**
53-70-3	Dibenz(a,h)anthracene	230	< 230	U
191-24-2	**Benzo(g,h,i)perylene**	**230**	**260**	**Q**
TOTBFA	**Total Benzofluoranthenes**	**460**	**660**	

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	69.0%	2-Fluorobiphenyl	75.0%
d14-p-Terphenyl	92.0%	d4-1,2-Dichlorobenzene	59.0%
d5-Phenol	76.7%	2-Fluorophenol	68.0%
2,4,6-Tribromophenol	92.0%	d4-2-Chlorophenol	72.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR05-2.5
SAMPLE

Lab Sample ID: XQ70C
LIMS ID: 13-26910
Matrix: Sediment
Data Release Authorized:
Reported: 12/20/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 12/10/13
Date Analyzed: 12/19/13 15:44
Instrument/Analyst: NT14/YZ
GPC Cleanup: Yes

Sample Amount: 2.85 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 5.00
Percent Moisture: 74.2%

CAS Number	Analyte	RL	Result	
108-95-2	**Phenol**	**350**	**530**	
106-46-7	**1,4-Dichlorobenzene**	**350**	**600**	
100-51-6	Benzyl Alcohol	350	< 350	U
95-50-1	1,2-Dichlorobenzene	350	< 350	U
95-48-7	2-Methylphenol	350	< 350	U
106-44-5	**4-Methylphenol**	**350**	**280**	**J**
105-67-9	2,4-Dimethylphenol	1,800	< 1,800	U
65-85-0	Benzoic Acid	3,500	< 3,500	U
120-82-1	1,2,4-Trichlorobenzene	350	< 350	U
91-20-3	**Naphthalene**	**350**	**440**	
87-68-3	Hexachlorobutadiene	350	< 350	U
91-57-6	2-Methylnaphthalene	350	< 350	U
131-11-3	Dimethylphthalate	350	< 350	U
208-96-8	Acenaphthylene	350	< 350	U
83-32-9	**Acenaphthene**	**350**	**390**	
132-64-9	**Dibenzofuran**	**350**	**230**	**J**
84-66-2	Diethylphthalate	350	< 350	U
86-73-7	**Fluorene**	**350**	**230**	**J**
86-30-6	N-Nitrosodiphenylamine	350	< 350	U
118-74-1	Hexachlorobenzene	350	< 350	U
87-86-5	Pentachlorophenol	1,800	< 1,800	U
85-01-8	**Phenanthrene**	**350**	**470**	
120-12-7	**Anthracene**	**350**	**320**	**J**
84-74-2	Di-n-Butylphthalate	350	< 350	U
206-44-0	**Fluoranthene**	**350**	**3,900**	**Q**
129-00-0	**Pyrene**	**350**	**3,100**	
85-68-7	Butylbenzylphthalate	350	< 350	U
56-55-3	**Benzo(a)anthracene**	**350**	**680**	
117-81-7	**bis(2-Ethylhexyl)phthalate**	**880**	**9,400**	
218-01-9	**Chrysene**	**350**	**460**	
117-84-0	Di-n-Octyl phthalate	350	< 350	U
50-32-8	**Benzo(a)pyrene**	**350**	**530**	**Q**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**350**	**190**	**JQ**
53-70-3	Dibenz(a,h)anthracene	350	< 350	U
191-24-2	**Benzo(g,h,i)perylene**	**350**	**300**	**JQ**
TOTBFA	**Total Benzofluoranthenes**	**700**	**810**	

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	71.0%	2-Fluorobiphenyl	72.0%
d14-p-Terphenyl	87.0%	d4-1,2-Dichlorobenzene	58.0%
d5-Phenol	75.3%	2-Fluorophenol	68.0%
2,4,6-Tribromophenol	93.3%	d4-2-Chlorophenol	67.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS **Sample ID: CR04-2.5**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: XQ70D
LIMS ID: 13-26911
Matrix: Sediment
Data Release Authorized: MW
Reported: 12/20/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 12/10/13
Date Analyzed: 12/19/13 16:18
Instrument/Analyst: NT14/YZ
GPC Cleanup: Yes

Sample Amount: 3.10 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 5.00
Percent Moisture: 82.8%

CAS Number	Analyte	RL	Result	
108-95-2	**Phenol**	**320**	**390**	
106-46-7	1,4-Dichlorobenzene	320	< 320	U
100-51-6	Benzyl Alcohol	320	< 320	U
95-50-1	1,2-Dichlorobenzene	320	< 320	U
95-48-7	2-Methylphenol	320	< 320	U
106-44-5	4-Methylphenol	320	< 320	U
105-67-9	2,4-Dimethylphenol	1,600	< 1,600	U
65-85-0	Benzoic Acid	3,200	< 3,200	U
120-82-1	1,2,4-Trichlorobenzene	320	< 320	U
91-20-3	**Naphthalene**	**320**	**340**	
87-68-3	Hexachlorobutadiene	320	< 320	U
91-57-6	2-Methylnaphthalene	320	< 320	U
131-11-3	Dimethylphthalate	320	< 320	U
208-96-8	Acenaphthylene	320	< 320	U
83-32-9	**Acenaphthene**	**320**	**180**	**J**
132-64-9	**Dibenzofuran**	**320**	**210**	**J**
84-66-2	Diethylphthalate	320	< 320	U
86-73-7	**Fluorene**	**320**	**180**	**J**
86-30-6	N-Nitrosodiphenylamine	320	< 320	U
118-74-1	Hexachlorobenzene	320	< 320	U
87-86-5	Pentachlorophenol	1,600	< 1,600	U
85-01-8	**Phenanthrene**	**320**	**370**	
120-12-7	**Anthracene**	**320**	**290**	**J**
84-74-2	Di-n-Butylphthalate	320	< 320	U
206-44-0	**Fluoranthene**	**320**	**2,200**	**Q**
129-00-0	**Pyrene**	**320**	**1,800**	
85-68-7	Butylbenzylphthalate	320	< 320	U
56-55-3	**Benzo(a)anthracene**	**320**	**640**	
117-81-7	**bis(2-Ethylhexyl)phthalate**	**810**	**870**	
218-01-9	**Chrysene**	**320**	**940**	
117-84-0	Di-n-Octyl phthalate	320	< 320	U
50-32-8	**Benzo(a)pyrene**	**320**	**680**	**Q**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**320**	**480**	**Q**
53-70-3	Dibenz(a,h)anthracene	320	< 320	U
191-24-2	**Benzo(g,h,i)perylene**	**320**	**660**	**Q**
TOTBFA	**Total Benzofluoranthenes**	**640**	**1,700**	

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	68.0%	2-Fluorobiphenyl	70.0%
d14-p-Terphenyl	85.0%	d4-1,2-Dichlorobenzene	58.0%
d5-Phenol	76.0%	2-Fluorophenol	67.3%
2,4,6-Tribromophenol	90.7%	d4-2-Chlorophenol	71.3%

XQ70:00019

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT OUT
MB-121013	73.6%	68.8%	96.4%	67.6%	76.1%	74.8%	88.8%	73.1%	0
LCS-121013	72.8%	69.0%	86.0%	64.4%	76.9%	69.7%	89.1%	69.7%	0
CR04-10cm	76.0%	76.0%	94.0%	63.0%	80.0%	74.0%	101%	74.7%	0
CR05-10cm	69.0%	75.0%	92.0%	59.0%	76.7%	68.0%	92.0%	72.0%	0
CR05-2.5	71.0%	72.0%	87.0%	58.0%	75.3%	68.0%	93.3%	67.3%	0
CR04-2.5	68.0%	70.0%	85.0%	58.0%	76.0%	67.3%	90.7%	71.3%	0

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(33-120)	(30-120)
(FBP) = 2-Fluorobiphenyl	(35-120)	(35-120)
(TPH) = d14-p-Terphenyl	(42-124)	(37-120)
(DCB) = d4-1,2-Dichlorobenzene	(37-120)	(32-120)
(PHL) = d5-Phenol	(32-120)	(29-120)
(2FP) = 2-Fluorophenol	(32-120)	(27-120)
(TBP) = 2,4,6-Tribromophenol	(23-133)	(24-134)
(2CP) = d4-2-Chlorophenol	(36-120)	(31-120)

Prep Method: SW3546
Log Number Range: 13-26908 to 13-26911

FORM-II SW8270

XQ70 : 00019

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270 GC/MS

Sample ID: LCS-121013
LAB CONTROL

Lab Sample ID: LCS-121013
LIMS ID: 13-26908
Matrix: Sediment
Data Release Authorized: MW
Reported: 12/20/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Date Extracted: 12/10/13
Date Analyzed: 12/16/13 23:05
Instrument/Analyst: NT14/YZ
GPC Cleanup: Yes

Sample Amount: 10.00 g
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Phenol	409 Q	500	81.8%
1,4-Dichlorobenzene	362	500	72.4%
Benzyl Alcohol	443	500	88.6%
1,2-Dichlorobenzene	359	500	71.8%
2-Methylphenol	347 Q	500	69.4%
4-Methylphenol	704	1000	70.4%
2,4-Dimethylphenol	1030	1500	68.7%
Benzoic Acid	1750	2750	63.6%
1,2,4-Trichlorobenzene	359	500	71.8%
Naphthalene	349	500	69.8%
Hexachlorobutadiene	346	500	69.2%
2-Methylnaphthalene	384	500	76.8%
Dimethylphthalate	440	500	88.0%
Acenaphthylene	371	500	74.2%
Acenaphthene	369	500	73.8%
Dibenzofuran	371	500	74.2%
Diethylphthalate	465	500	93.0%
Fluorene	402	500	80.4%
N-Nitrosodiphenylamine	497	500	99.4%
Hexachlorobenzene	431	500	86.2%
Pentachlorophenol	1260	1500	84.0%
Phenanthrene	418	500	83.6%
Anthracene	420	500	84.0%
Di-n-Butylphthalate	499	500	99.8%
Fluoranthene	487	500	97.4%
Pyrene	451	500	90.2%
Butylbenzylphthalate	538	500	108%
Benzo(a)anthracene	449	500	89.8%
bis(2-Ethylhexyl)phthalate	453	500	90.6%
Chrysene	405	500	81.0%
Di-n-Octyl phthalate	411	500	82.2%
Benzo(a)pyrene	473 Q	500	94.6%
Indeno(1,2,3-cd)pyrene	326	500	65.2%
Dibenz(a,h)anthracene	239	500	47.8%

XQ70 : 00020

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270 GC/MS

Sample ID: LCS-121013
LAB CONTROL

Lab Sample ID: LCS-121013
LIMS ID: 13-26908
Matrix: Sediment
Date Analyzed: 12/16/13 23:05

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01

Analyte	Lab Control	Spike Added	Recovery
Benzo(g,h,i)perylene	298 Q	500	59.6%
Total Benzofluoranthenes	804	1000	80.4%

Semivolatile Surrogate Recovery

d5-Nitrobenzene	72.8%
2-Fluorobiphenyl	69.0%
d14-p-Terphenyl	86.0%
d4-1,2-Dichlorobenzene	64.4%
d5-Phenol	76.9%
2-Fluorophenol	69.7%
2,4,6-Tribromophenol	89.1%
d4-2-Chlorophenol	69.7%

Reported in µg/kg (ppb)

XQ70 : 00021

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt14.i Injection Date: 16-DEC-2013 14:35
Lab File ID: cc1216.d Init. Cal. Date(s): 11-DEC-2013 11-DEC-2013
Analysis Type: Init. Cal. Times: 13:42 18:15
Lab Sample ID: CC1216 Quant Type: ISTD
Method: /chem3/nt14.i/20131216.b/ABN.m

COMPOUND	RRF / AMOUNT	RF5	CCAL RRF5	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
$ 1 2-Fluorophenol	1.17428	1.24341	1.24341	0.010	5.88625	20.00000	Averaged	
$ 2 Phenol-d5	1.53259	1.86495	1.86495	0.010	21.68632	20.00000	Averaged	<-
3 Phenol	1.72460	2.28443	2.28443	0.100	32.46149	20.00000	Averaged	<-
$ 5 2-Chlorophenol-d4	1.26113	1.48243	1.48243	0.010	17.54756	20.00000	Averaged	
4 Bis(2-Chloroethyl)ether	1.21185	1.36504	1.36504	0.700	12.64150	20.00000	Averaged	
6 2-Chlorophenol	1.39571	1.58374	1.58374	0.800	13.47235	20.00000	Averaged	
7 1,3-Dichlorobenzene	1.35866	1.39327	1.39327	0.010	2.54760	20.00000	Averaged	
9 1,4-Dichlorobenzene	1.37673	1.47273	1.47273	0.010	6.97294	20.00000	Averaged	
$ 10 1,2-Dichlorobenzene-d4	0.91055	0.92994	0.92994	0.010	2.12977	20.00000	Averaged	
12 1,2-Dichlorobenzene	1.30836	1.39328	1.39328	0.010	6.49053	20.00000	Averaged	
11 Benzyl alcohol	0.71262	0.71605	0.71605	0.010	0.48076	20.00000	Averaged	
14 2,2'-oxybis(1-Chloropropane	0.41510	0.44252	0.44252	0.010	6.60507	20.00000	Averaged	
13 2-Methylphenol	1.28565	1.63760	1.63760	0.700	27.37490	20.00000	Averaged	<-
17 Hexachloroethane	0.50480	0.58400	0.58400	0.300	15.68841	20.00000	Averaged	
16 N-Nitroso-di-n-propylamine	0.82009	0.92258	0.92258	0.500	12.49799	20.00000	Averaged	
15 4-Methylphenol	1.32235	1.52759	1.52759	0.600	15.52060	20.00000	Averaged	
$ 18 Nitrobenzene-d5	0.34376	0.36571	0.36571	0.010	6.38390	20.00000	Averaged	
19 Nitrobenzene	0.31920	0.34108	0.34108	0.200	6.85376	20.00000	Averaged	
20 Isophorone	0.53787	0.62730	0.62730	0.300	16.62654	20.00000	Averaged	
21 2-Nitrophenol	0.17764	0.20043	0.20043	0.100	12.83152	20.00000	Averaged	
22 2,4-Dimethylphenol	0.34055	0.33896	0.33896	0.200	-0.46801	20.00000	Averaged	
23 Bis(2-Chloroethoxy)methane	0.36439	0.39087	0.39087	0.050	7.26782	20.00000	Averaged	
24 Benzoic acid	22.13133	20.00000	0.29393	0.010	10.65666	20.00000	Quadratic	
25 2,4-Dichlorophenol	0.30590	0.29214	0.29214	0.100	-4.49796	20.00000	Averaged	
26 1,2,4-Trichlorobenzene	0.28701	0.28540	0.28540	0.010	-0.56085	20.00000	Averaged	
28 Naphthalene	0.97655	0.91734	0.91734	0.100	-6.06334	20.00000	Averaged	
29 4-Chloroaniline	0.35123	0.35058	0.35058	0.010	-0.18568	20.00000	Averaged	
30 Hexachlorobutadiene	0.15785	0.14396	0.14396	0.010	-8.79813	20.00000	Averaged	
31 4-Chloro-3-methylphenol	0.27785	0.31047	0.31047	0.200	11.74054	20.00000	Averaged	
32 2-Methylnaphthalene	0.60064	0.65374	0.65374	0.300	8.84080	20.00000	Averaged	
33 Hexachlorocyclopentadiene	0.28573	0.28156	0.28156	0.001	-1.46152	20.00000	Averaged	
34 2,4,6-Trichlorophenol	0.33472	0.33706	0.33706	0.200	0.69917	20.00000	Averaged	
35 2,4,5-Trichlorophenol	0.34791	0.37941	0.37941	0.200	9.05304	20.00000	Averaged	
$ 36 2-Fluorobiphenyl	1.17682	1.17950	1.17950	0.010	0.22809	20.00000	Averaged	
37 2-Chloronaphthalene	0.91423	0.95716	0.95716	0.700	4.69518	20.00000	Averaged	

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt14.i Injection Date: 16-DEC-2013 14:35
Lab File ID: cc1216.d Init. Cal. Date(s): 11-DEC-2013 11-DEC-2013
Analysis Type: Init. Cal. Times: 13:42 18:15
Lab Sample ID: CC1216 Quant Type: ISTD
Method: /chem3/nt14.i/20131216.b/ABN.m

COMPOUND	RRF / AMOUNT	RF5	CCAL RRF5	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
38 2-Nitroaniline	0.24954	0.32129	0.32129	0.010	28.75471	20.00000	Averaged	<-
39 Dimethylphthalate	1.02784	0.99658	0.99658	0.010	-3.04148	20.00000	Averaged	
40 Acenaphthylene	1.49257	1.50210	1.50210	0.900	0.63883	20.00000	Averaged	
41 2,6-Dinitrotoluene	0.21189	0.22920	0.22920	0.100	8.16670	20.00000	Averaged	
43 3-Nitroaniline	0.24052	0.31026	0.31026	0.010	28.99449	20.00000	Averaged	<-
44 Acenaphthene	0.98795	0.99989	0.99989	0.100	1.20896	20.00000	Averaged	
45 2,4-Dinitrophenol	23.16297	20.00000	0.20780	0.030	15.81487	20.00000	Quadratic	
46 Dibenzofuran	1.35835	1.36137	1.36137	0.800	0.22181	20.00000	Averaged	
47 4-Nitrophenol	12.21840	10.00000	0.18571	0.010	22.18400	20.00000	Quadratic	<-
48 2,4-Dinitrotoluene	0.28642	0.34410	0.34410	0.200	20.13907	20.00000	Averaged	<-
50 Diethylphthalate	1.04034	1.11819	1.11819	0.010	7.48333	20.00000	Averaged	
49 Fluorene	1.11381	1.19567	1.19567	0.100	7.34932	20.00000	Averaged	
51 4-Chlorophenyl-phenylether	0.52797	0.55611	0.55611	0.100	5.33073	20.00000	Averaged	
52 4-Nitroaniline	0.23548	0.30333	0.30333	0.010	28.80928	20.00000	Averaged	<-
53 4,6-Dinitro-2-methylphenol	21.44275	20.00000	0.15670	0.001	7.21377	20.00000	Quadratic	
54 N-Nitrosodiphenylamine	0.45731	0.48842	0.48842	0.010	6.80253	20.00000	Averaged	
$ 55 2,4,6-Tribromophenol	0.14057	0.15699	0.15699	0.010	11.67677	20.00000	Averaged	
56 4-Bromophenyl-phenylether	0.17470	0.17810	0.17810	0.100	1.94559	20.00000	Averaged	
57 Hexachlorobenzene	0.18922	0.19402	0.19402	0.100	2.53893	20.00000	Averaged	
58 Pentachlorophenol	0.13759	0.15143	0.15143	0.010	10.06242	20.00000	Averaged	
60 Phenanthrene	0.98991	1.00125	1.00125	0.700	1.14616	20.00000	Averaged	
61 Anthracene	0.93027	1.00068	1.00068	0.700	7.56870	20.00000	Averaged	
62 Carbazole	0.78633	0.80297	0.80297	0.010	2.11592	20.00000	Averaged	
63 Di-n-butylphthalate	4.97069	5.00000	0.99244	0.010	-0.58611	20.00000	Quadratic	
64 Fluoranthene	0.96832	1.02085	1.02085	0.600	5.42503	20.00000	Averaged	
65 Pyrene	1.05920	1.13312	1.13312	0.600	6.97928	20.00000	Averaged	
$ 66 Terphenyl-d14	0.54772	0.60324	0.60324	0.010	10.13620	20.00000	Averaged	
67 Butylbenzylphthalate	5.99504	5.00000	0.48742	0.010	19.90087	20.00000	Quadratic	
68 Benzo(a)anthracene	0.96296	1.05793	1.05793	0.700	9.86156	20.00000	Averaged	
70 3,3'-Dichlorobenzidine	0.37653	0.50746	0.50746	0.010	34.77172	20.00000	Averaged	<-
71 Chrysene	0.96364	1.00119	1.00119	0.700	3.89666	20.00000	Averaged	
72 bis(2-Ethylhexyl)phthalate	5.09548	5.00000	0.48263	0.010	1.90964	20.00000	Quadratic	
73 Di-n-octylphthalate	0.90626	0.85470	0.85470	0.010	-5.68872	20.00000	Averaged	
74 Benzo(b)fluoranthene	0.95807	1.16281	1.16281	0.700	21.37041	20.00000	Averaged	<-
75 Benzo(k)fluoranthene	1.08338	1.05983	1.05983	0.700	-2.17316	20.00000	Averaged	

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt14.i Injection Date: 19-DEC-2013 13:20
Lab File ID: cc1219.d Init. Cal. Date(s): 11-DEC-2013 11-DEC-2013
Analysis Type: Init. Cal. Times: 13:42 18:15
Lab Sample ID: CC1219 Quant Type: ISTD
Method: /chem3/nt14.i/20131219.b/ABN.m

COMPOUND	RRF / AMOUNT	RF5	CCAL RRF5	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
$ 1 2-Fluorophenol	1.17428	1.25110	1.25110	0.010	6.54152	20.00000	Averaged	
$ 2 Phenol-d5	1.53259	1.68197	1.68197	0.010	9.74747	20.00000	Averaged	
3 Phenol	1.72460	2.06212	2.06212	0.100	19.57082	20.00000	Averaged	
$ 5 2-Chlorophenol-d4	1.26113	1.35866	1.35866	0.010	7.73355	20.00000	Averaged	
7 1,3-Dichlorobenzene	1.35866	1.37381	1.37381	0.010	1.11576	20.00000	Averaged	
9 1,4-Dichlorobenzene	1.37673	1.40685	1.40685	0.010	2.18783	20.00000	Averaged	
$ 10 1,2-Dichlorobenzene-d4	0.91055	0.90961	0.90961	0.010	-0.10237	20.00000	Averaged	
12 1,2-Dichlorobenzene	1.30836	1.33676	1.33676	0.010	2.17026	20.00000	Averaged	
11 Benzyl alcohol	0.71262	0.60029	0.60029	0.010	-15.76266	20.00000	Averaged	
13 2-Methylphenol	1.28565	1.38979	1.38979	0.700	8.10015	20.00000	Averaged	
17 Hexachloroethane	0.50480	0.54043	0.54043	0.300	7.05796	20.00000	Averaged	
15 4-Methylphenol	1.32235	1.55612	1.55612	0.600	17.67807	20.00000	Averaged	
$ 18 Nitrobenzene-d5	0.34376	0.43301	0.43301	0.010	25.96305	20.00000	Averaged	<-
22 2,4-Dimethylphenol	0.34055	0.41148	0.41148	0.200	20.82758	20.00000	Averaged	<-
24 Benzoic acid	22.66401	20.00000	0.30132	0.010	13.32003	20.00000	Quadratic	
26 1,2,4-Trichlorobenzene	0.28701	0.28579	0.28579	0.010	-0.42499	20.00000	Averaged	
28 Naphthalene	0.97655	0.99956	0.99956	0.100	2.35549	20.00000	Averaged	
30 Hexachlorobutadiene	0.15785	0.16150	0.16150	0.010	2.31186	20.00000	Averaged	
32 2-Methylnaphthalene	0.60064	0.63776	0.63776	0.300	6.17978	20.00000	Averaged	
$ 36 2-Fluorobiphenyl	1.17682	1.14344	1.14344	0.010	-2.83614	20.00000	Averaged	
39 Dimethylphthalate	1.02784	1.08929	1.08929	0.010	5.97840	20.00000	Averaged	
40 Acenaphthylene	1.49257	1.66949	1.66949	0.900	11.85318	20.00000	Averaged	
44 Acenaphthene	0.98795	1.02363	1.02363	0.100	3.61189	20.00000	Averaged	
46 Dibenzofuran	1.35835	1.35620	1.35620	0.800	-0.15867	20.00000	Averaged	
50 Diethylphthalate	1.04034	1.08344	1.08344	0.010	4.14230	20.00000	Averaged	
49 Fluorene	1.11381	1.13689	1.13689	0.100	2.07158	20.00000	Averaged	
54 N-Nitrosodiphenylamine	0.45731	0.49072	0.49072	0.010	7.30647	20.00000	Averaged	
$ S5 2,4,6-Tribromophenol	0.14057	0.15985	0.15985	0.010	13.71325	20.00000	Averaged	
57 Hexachlorobenzene	0.18922	0.18957	0.18957	0.100	0.18562	20.00000	Averaged	
58 Pentachlorophenol	0.13759	0.14640	0.14640	0.010	6.40405	20.00000	Averaged	
60 Phenanthrene	0.98991	1.01301	1.01301	0.700	2.33394	20.00000	Averaged	
61 Anthracene	0.93027	1.04290	1.04290	0.700	12.10716	20.00000	Averaged	
62 Carbazole	0.78633	0.91010	0.91010	0.010	15.74008	20.00000	Averaged	
63 Di-n-butylphthalate	5.99374	5.00000	1.20308	0.010	19.87484	20.00000	Quadratic	
64 Fluoranthene	0.96832	1.23153	1.23153	0.600	27.18196	20.00000	Averaged	<-

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt14.i Injection Date: 19-DEC-2013 13:20
Lab File ID: cc1219.d Init. Cal. Date(s): 11-DEC-2013 11-DEC-2013
Analysis Type: Init. Cal. Times: 13:42 18:15
Lab Sample ID: CC1219 Quant Type: ISTD
Method: /chem3/nt14.i/20131219.b/ABN.m

COMPOUND	RRF / AMOUNT	RF5	CCAL RRF5	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
65 Pyrene	1.05920	1.21808	1.21808	0.600	15.00059	20.00000	Averaged	
$ 66 Terphenyl-d14	0.54772	0.60372	0.60372	0.010	10.22380	20.00000	Averaged	
67 Butylbenzylphthalate	5.93567	5.00000	0.48241	0.010	18.71334	20.00000	Quadratic	
68 Benzo(a)anthracene	0.96296	1.03775	1.03775	0.700	7.76626	20.00000	Averaged	
71 Chrysene	0.96364	0.99857	0.99857	0.700	3.62404	20.00000	Averaged	
72 bis(2-Ethylhexyl)phthalate	5.06179	5.00000	0.47942	0.010	1.23574	20.00000	Quadratic	
73 Di-n-octylphthalate	0.90626	0.84799	0.84799	0.010	-6.42947	20.00000	Averaged	
76 Benzo(a)pyrene	0.75649	0.91728	0.91728	0.700	21.25560	20.00000	Averaged	<-
78 Indeno(1,2,3-cd)pyrene	6.32074	5.00000	1.23958	0.500	26.41483	20.00000	Quadratic	<-
79 Dibenzo(a,h)anthracene	6.52311	5.00000	1.00184	0.400	30.46223	20.00000	Quadratic	<-
80 Benzo(g,h,i)perylene	0.74846	0.97758	0.97758	0.500	30.61294	20.00000	Averaged	<-
105 1-methylnaphthalene	0.55159	0.58695	0.58695	0.010	6.41015	20.00000	Averaged	
187 Total Benzofluoranthenes	0.94535	1.00637	1.00637	0.010	6.45522	20.00000	Averaged	
98 Retene	++++	0.00018	0.00018	0.010	++++	20.00000	Averaged	<-
120 2,3,4,6-Tetrachlorophenol	0.24889	0.28706	0.28706	0.010	15.33455	20.00000	Averaged	

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: MB-121013**
Extraction Method: SW3546 **METHOD BLANK**

Lab Sample ID: MB-121013
LIMS ID: 13-26908
Matrix: Sediment
Data Release Authorized:
Reported: 12/20/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
Event: 0863.01.01
Date Sampled: NA
Date Received: NA

Date Extracted: 12/10/13
Date Analyzed: 12/16/13 22:31
Instrument/Analyst: NT14/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	LOQ	Result
53-70-3	Dibenz(a,h)anthracene	5.0	< 5.0 U
106-46-7	1,4-Dichlorobenzene	5.0	< 5.0 U
120-82-1	1,2,4-Trichlorobenzene	5.0	< 5.0 U
118-74-1	Hexachlorobenzene	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	5.0	< 5.0 U
131-11-3	Dimethylphthalate	5.0	< 5.0 U
85-68-7	Butylbenzylphthalate	5.0	< 5.0 U
95-48-7	2-Methylphenol	5.0	< 5.0 U
105-67-9	2,4-Dimethylphenol	25	< 25 U
86-30-6	N-Nitrosodiphenylamine	5.0	< 5.0 U
100-51-6	Benzyl Alcohol	20	< 20 U
87-86-5	Pentachlorophenol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	5.0	< 5.0 U
541-73-1	1,3-Dichlorobenzene	5.0	< 5.0 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	73.6%
d14-p-Terphenyl	93.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR04-10cm**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: XQ70A
LIMS ID: 13-26908
Matrix: Sediment
Data Release Authorized: TMM
Reported: 12/20/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
Event: 0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Date Extracted: 12/10/13
Date Analyzed: 12/19/13 14:35
Instrument/Analyst: NT14/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 2.37 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 5.00
Percent Moisture: 80.3%

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**100**	**120 Q**
106-46-7	1,4-Dichlorobenzene	100	< 100 U
120-82-1	1,2,4-Trichlorobenzene	100	< 100 U
118-74-1	Hexachlorobenzene	100	< 100 U
87-68-3	Hexachlorobutadiene	100	< 100 U
131-11-3	Dimethylphthalate	100	< 100 U
85-68-7	Butylbenzylphthalate	100	< 100 U
95-48-7	2-Methylphenol	100	< 100 U
105-67-9	2,4-Dimethylphenol	530	< 530 U
86-30-6	N-Nitrosodiphenylamine	100	< 100 U
100-51-6	Benzyl Alcohol	420	< 420 U
87-86-5	**Pentachlorophenol**	**420**	**270 J**
95-50-1	1,2-Dichlorobenzene	100	< 100 U
541-73-1	1,3-Dichlorobenzene	100	< 100 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	72.0%
d14-p-Terphenyl	95.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR05-10cm**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: XQ70B
LIMS ID: 13-26909
Matrix: Sediment
Data Release Authorized: MW
Reported: 12/20/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
Event: 0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 12/10/13
Date Analyzed: 12/19/13 15:10
Instrument/Analyst: NT14/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 4.31 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 5.00
Percent Moisture: 73.1%

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**58**	**94 Q**
106-46-7	**1,4-Dichlorobenzene**	**58**	**1,000**
120-82-1	**1,2,4-Trichlorobenzene**	**58**	**43 J**
118-74-1	Hexachlorobenzene	58	< 58 U
87-68-3	Hexachlorobutadiene	58	< 58 U
131-11-3	Dimethylphthalate	58	< 58 U
85-68-7	Butylbenzylphthalate	58	< 58 U
95-48-7	**2-Methylphenol**	**58**	**44 J**
105-67-9	2,4-Dimethylphenol	290	< 290 U
86-30-6	N-Nitrosodiphenylamine	58	< 58 U
100-51-6	Benzyl Alcohol	230	< 230 U
87-86-5	Pentachlorophenol	230	< 230 U
95-50-1	1,2-Dichlorobenzene	58	< 58 U
541-73-1	**1,3-Dichlorobenzene**	**58**	**620**

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	66.0%
d14-p-Terphenyl	96.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR05-2.5**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: XQ70C
LIMS ID: 13-26910
Matrix: Sediment
Data Release Authorized:
Reported: 12/20/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
Event: 0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 12/10/13
Date Analyzed: 12/19/13 15:44
Instrument/Analyst: NT14/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 2.85 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 5.00
Percent Moisture: 74.2%

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**88**	**190 Q**
106-46-7	**1,4-Dichlorobenzene**	**88**	**540**
120-82-1	**1,2,4-Trichlorobenzene**	**88**	**74 J**
118-74-1	Hexachlorobenzene	88	< 88 U
87-68-3	Hexachlorobutadiene	88	< 88 U
131-11-3	Dimethylphthalate	88	< 88 U
85-68-7	Butylbenzylphthalate	88	< 88 U
95-48-7	2-Methylphenol	88	< 88 U
105-67-9	2,4-Dimethylphenol	440	< 440 U
86-30-6	N-Nitrosodiphenylamine	88	< 88 U
100-51-6	Benzyl Alcohol	350	< 350 U
87-86-5	Pentachlorophenol	350	< 350 U
95-50-1	1,2-Dichlorobenzene	88	< 88 U
541-73-1	**1,3-Dichlorobenzene**	**88**	**280**

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	66.0%
d14-p-Terphenyl	92.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: CR04-2.5**
Extraction Method: SW3546 **SAMPLE**

Lab Sample ID: XQ70D
LIMS ID: 13-26911
Matrix: Sediment
Data Release Authorized: MW
Reported: 12/20/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
Event: 0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 12/10/13
Date Analyzed: 12/19/13 16:18
Instrument/Analyst: NT14/YZ
GPC Cleanup: Yes
Silica Gel Cleanup: No
Alumina Cleanup: No

Sample Amount: 3.10 g-dry-wt
Final Extract Volume: 1.0 mL
Dilution Factor: 5.00
Percent Moisture: 82.8%

CAS Number	Analyte	LOQ	Result
53-70-3	**Dibenz(a,h)anthracene**	**81**	**360 Q**
106-46-7	1,4-Dichlorobenzene	81	< 81 U
120-82-1	1,2,4-Trichlorobenzene	81	< 81 U
118-74-1	Hexachlorobenzene	81	< 81 U
87-68-3	Hexachlorobutadiene	81	< 81 U
131-11-3	Dimethylphthalate	81	< 81 U
85-68-7	Butylbenzylphthalate	81	< 81 U
95-48-7	2-Methylphenol	81	< 81 U
105-67-9	2,4-Dimethylphenol	400	< 400 U
86-30-6	N-Nitrosodiphenylamine	81	< 81 U
100-51-6	Benzyl Alcohol	320	< 320 U
87-86-5	**Pentachlorophenol**	**320**	**400**
95-50-1	1,2-Dichlorobenzene	81	< 81 U
541-73-1	1,3-Dichlorobenzene	81	< 81 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery	
2-Fluorophenol	66.7%
d14-p-Terphenyl	88.0%

XQ70 : 00028

ANALYTICAL RESOURCES INCORPORATED

SIM SW8270 SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01

Client ID	FPH	TER	TOT OUT
MB-121013	73.6%	93.0%	0
LCS-121013	67.3%	85.0%	0
CR04-10cm	72.0%	95.0%	0
CR05-10cm	66.0%	96.0%	0
CR05-2.5	66.0%	92.0%	0
CR04-2.5	66.7%	88.0%	0

	LCS/MB LIMITS	QC LIMITS
(FPH) = 2-Fluorophenol	(32-120)	(27-120)
(TER) = d14-p-Terphenyl	(42-124)	(37-120)

Prep Method: SW3546
Log Number Range: 13-26908 to 13-26911

FORM-II SIM SW8270

XQ70 : 00091

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by Selected Ion Monitoring GC/MS **Sample ID: LCS-121013**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-121013
LIMS ID: 13-26908
Matrix: Sediment
Data Release Authorized:
Reported: 12/20/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
Event: 0863.01.01
Date Sampled: NA
Date Received: NA

Date Extracted: 12/10/13
Date Analyzed LCS: 12/16/13 23:05
Instrument/Analyst LCS: NT14/YZ

Sample Amount LCS: 10.00 g-dry-wt
Final Extract Volume LCS: 1.0 mL
Dilution Factor LCS: 1.00

Analyte	LCS	Spike Added	Recovery
Dibenz(a,h)anthracene	277 Q	500	55.4%
1,4-Dichlorobenzene	321	500	64.2%
1,2,4-Trichlorobenzene	324	500	64.8%
Hexachlorobenzene	397	500	79.4%
Hexachlorobutadiene	311	500	62.2%
Dimethylphthalate	431	500	86.2%
Butylbenzylphthalate	497 Q	500	99.4%
2-Methylphenol	351	500	70.2%
2,4-Dimethylphenol	1030	1500	68.7%
N-Nitrosodiphenylamine	539	500	108%
Benzyl Alcohol	472	500	94.4%
Pentachlorophenol	1060	1500	70.7%
1,2-Dichlorobenzene	327	500	65.4%
1,3-Dichlorobenzene	325	500	65.0%

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

2-Fluorophenol	67.3%
d14-p-Terphenyl	85.0%

XQ70 : 00032

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt14.i Injection Date: 16-DEC-2013 15:10
Lab File ID: cc1216a.d Init. Cal. Date(s): 11-DEC-2013 11-DEC-2013
Analysis Type: Init. Cal. Times: 13:42 18:15
Lab Sample ID: CC1216A Quant Type: ISTD
Method: /chem3/nt14.i/20131216.b/SIM.b/SIMABN2.m

COMPOUND	RRF / AMOUNT	RF1	CCAL RRF1	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
$ 1 2-Fluorophenol	1.15354	1.35715	1.35715	0.010	17.65056	20.00000	Averaged	
3 Phenol	1.64342	2.01076	2.01076	0.010	22.35191	20.00000	Averaged	<-
7 1,3-Dichlorobenzene	1.48921	1.36005	1.36005	0.010	-8.67321	20.00000	Averaged	
9 1,4-Dichlorobenzene	1.53576	1.39881	1.39881	0.010	-8.91741	20.00000	Averaged	
11 Benzyl alcohol	0.73455	0.69021	0.69021	0.010	-6.03607	20.00000	Averaged	
12 1,2-Dichlorobenzene	1.44417	1.35069	1.35069	0.010	-6.47300	20.00000	Averaged	
13 2-Methylphenol	1.16447	1.32247	1.32247	0.010	13.56828	20.00000	Averaged	
15 4-Methylphenol	1.17598	1.42684	1.42684	0.010	21.33128	20.00000	Averaged	<-
16 N-Nitroso-di-n-propylamine	0.67964	0.81381	0.81381	0.050	19.74181	20.00000	Averaged	
22 2,4-Dimethylphenol	0.31095	0.36393	0.36393	0.010	17.03836	20.00000	Averaged	
26 1,2,4-Trichlorobenzene	0.32381	0.31910	0.31910	0.010	-1.45706	20.00000	Averaged	
30 Hexachlorobutadiene	0.18925	0.18577	0.18577	0.010	-1.83458	20.00000	Averaged	
39 Dimethylphthalate	1.08013	1.09660	1.09660	0.010	1.52449	20.00000	Averaged	
50 Diethylphthalate	1.08190	1.20458	1.20458	0.010	11.33938	20.00000	Averaged	
54 N-Nitrosodiphenylamine	0.44728	0.41444	0.41444	0.010	-7.34177	20.00000	Averaged	
57 Hexachlorobenzene	0.23567	0.20797	0.20797	0.010	-11.75525	20.00000	Averaged	
58 Pentachlorophenol	1.96223	2.00000	0.13704	0.005	-1.88854	20.00000	Quadratic	
$ 66 Terphenyl-d14	0.33250	0.37945	0.37945	0.010	14.12095	20.00000	Averaged	
67 Butylbenzylphthalate	1.50861	1.00000	0.44448	0.010	50.86076	20.00000	Quadratic	<-
79 Dibenzo(a,h)anthracene	1.28459	1.00000	0.85513	0.010	28.45890	20.00000	Quadratic	<-
90 N-Nitrosodimethylamine	0.71021	0.74780	0.74780	0.010	5.29331	20.00000	Averaged	

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt14.i Injection Date: 19-DEC-2013 13:54
Lab File ID: cc1219a.d Init. Cal. Date(s): 11-DEC-2013 11-DEC-2013
Analysis Type: Init. Cal. Times: 13:42 18:15
Lab Sample ID: CC1219A Quant Type: ISTD
Method: /chem3/nt14.i/20131219.b/SIM.b/SIMABN2.m

COMPOUND	RRF / AMOUNT	RF1	CCAL RRF1	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
$ 1 2-Fluorophenol	1.15354	1.24037	1.24037	0.010	7.52656	20.00000	Averaged	
3 Phenol	1.64342	2.06332	2.06332	0.010	25.55060	20.00000	Averaged	<-
7 1,3-Dichlorobenzene	1.48921	1.38703	1.38703	0.010	-6.86159	20.00000	Averaged	
9 1,4-Dichlorobenzene	1.53576	1.41163	1.41163	0.010	-8.08209	20.00000	Averaged	
11 Benzyl alcohol	0.73455	0.59642	0.59642	0.010	-18.80423	20.00000	Averaged	
12 1,2-Dichlorobenzene	1.44417	1.34299	1.34299	0.010	-7.00601	20.00000	Averaged	
13 2-Methylphenol	1.16447	1.37427	1.37427	0.010	18.01630	20.00000	Averaged	
15 4-Methylphenol	1.17598	1.41000	1.41000	0.010	19.89964	20.00000	Averaged	
16 N-Nitroso-di-n-propylamine	0.67964	0.78820	0.78820	0.050	15.97388	20.00000	Averaged	
22 2,4-Dimethylphenol	0.31095	0.33793	0.33793	0.010	8.67849	20.00000	Averaged	
26 1,2,4-Trichlorobenzene	0.32381	0.29286	0.29286	0.010	-9.55764	20.00000	Averaged	
30 Hexachlorobutadiene	0.18925	0.17622	0.17622	0.010	-6.88463	20.00000	Averaged	
39 Dimethylphthalate	1.08013	1.09935	1.09935	0.010	1.77956	20.00000	Averaged	
50 Diethylphthalate	1.08190	1.18151	1.18151	0.010	9.20739	20.00000	Averaged	
54 N-Nitrosodiphenylamine	0.44728	0.47933	0.47933	0.010	7.16631	20.00000	Averaged	
57 Hexachlorobenzene	0.23567	0.21436	0.21436	0.010	-9.04196	20.00000	Averaged	
58 Pentachlorophenol	1.87741	2.00000	0.13089	0.005	-6.12946	20.00000	Quadratic	
$ 66 Terphenyl-d14	0.33250	0.37094	0.37094	0.010	11.56153	20.00000	Averaged	
67 Butylbenzylphthalate	1.39203	1.00000	0.40762	0.010	39.20322	20.00000	Quadratic	<-
79 Dibenzo(a,h)anthracene	1.42897	1.00000	0.95782	0.010	42.89718	20.00000	Quadratic	<-
90 N-Nitrosodimethylamine	0.71021	0.81237	0.81237	0.010	14.38476	20.00000	Averaged	

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: MB-121013**

Lab Sample ID: MB-121013
LIMS ID: 13-26910
Matrix: Sediment
Data Release Authorized:
Reported: 12/17/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: NA
Date Received: NA

Date Extracted: 12/10/13
Date Analyzed: 12/16/13 20:08
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result	
2,3,7,8-TCDF		0.65-0.89	0.0320	1.00	< 0.0320	U
2,3,7,8-TCDD	0.11	0.65-0.89		1.00	0.162	JEMPC
1,2,3,7,8-PeCDF		1.32-1.78	0.0340	1.00	< 0.0340	U
2,3,4,7,8-PeCDF		1.32-1.78	0.0420	1.00	< 0.0420	U
1,2,3,7,8-PeCDD	0.80	1.32-1.78		1.00	0.0460	JEMPC
1,2,3,4,7,8-HxCDF		1.05-1.43	0.0360	1.00	< 0.0360	U
1,2,3,6,7,8-HxCDF		1.05-1.43	0.0320	1.00	< 0.0320	U
2,3,4,6,7,8-HxCDF		1.05-1.43	0.0380	1.00	< 0.0380	U
1,2,3,7,8,9-HxCDF		1.05-1.43	0.0520	1.00	< 0.0520	U
1,2,3,4,7,8-HxCDD	1.93	1.05-1.43		1.00	0.0620	JEMPC
1,2,3,6,7,8-HxCDD		1.05-1.43	0.0740	1.00	< 0.0740	U
1,2,3,7,8,9-HxCDD	1.07	1.05-1.43		1.00	0.104	J
1,2,3,4,6,7,8-HpCDF		0.88-1.20	0.0900	1.00	< 0.0900	U
1,2,3,4,7,8,9-HpCDF		0.88-1.20	0.144	1.00	< 0.144	U
1,2,3,4,6,7,8-HpCDD	1.17	0.88-1.20		1.00	1.44	
OCDF		0.76-1.02	0.0780	2.00	< 0.0780	U
OCDD	0.84	0.76-1.02		2.00	8.80	

Homologue Group	EDL	RL	Result	
Total TCDF	0.0320	1.00	< 0.0320	U
Total TCDD		1.00	0.305	EMPC
Total PeCDF	0.0420	2.00	< 0.0420	U
Total PeCDD		1.00	0.113	EMPC
Total HxCDF	0.0520	2.00	< 0.0520	U
Total HxCDD		2.00	1.48	EMPC
Total HpCDF	0.144	2.00	< 0.144	U
Total HpCDD		2.00	3.95	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 0.24

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 0.26

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: MB-121013**

Lab Sample ID: MB-121013
LIMS ID: 13-26910
Matrix: Sediment
Data Release Authorized: MW
Reported: 12/17/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: NA
Date Received: NA

Date Extracted: 12/10/13
Date Analyzed: 12/16/13 20:08
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.77	0.65-0.89	88.8	24-169	
13C-2,3,7,8-TCDD	0.79	0.65-0.89	90.4	25-164	
13C-1,2,3,7,8-PeCDF	1.58	1.32-1.78	97.4	24-185	
13C-2,3,4,7,8-PeCDF	1.58	1.32-1.78	74.6	21-178	
13C-1,2,3,7,8-PeCDD	1.59	1.32-1.78	88.6	25-181	
13C-1,2,3,4,7,8-HxCDF	0.51	0.43-0.59	77.0	26-152	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	81.9	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	76.8	28-136	
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	69.4	29-147	
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	92.8	32-141	
13C-1,2,3,6,7,8-HxCDD	1.24	1.05-1.43	85.8	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	69.0	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	71.8	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	93.6	23-140	
13C-OCDD	0.88	0.76-1.02	79.3	17-157	
37Cl4-2,3,7,8-TCDD			95.2	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: OPR-121013**

Lab Sample ID: OPR-121013
LIMS ID: 13-26910
Matrix: Sediment
Data Release Authorized:
Reported: 12/17/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: NA
Date Received: NA

Date Extracted: 12/10/13
Date Analyzed: 12/16/13 21:01
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	RL	Result
2,3,7,8-TCDF	0.67	0.65-0.89	1.00	24.0
2,3,7,8-TCDD	0.77	0.65-0.89	1.00	22.3
1,2,3,7,8-PeCDF	1.44	1.32-1.78	1.00	116
2,3,4,7,8-PeCDF	1.44	1.32-1.78	1.00	112
1,2,3,7,8-PeCDD	1.54	1.32-1.78	1.00	110
1,2,3,4,7,8-HxCDF	1.15	1.05-1.43	1.00	111
1,2,3,6,7,8-HxCDF	1.16	1.05-1.43	1.00	113
2,3,4,6,7,8-HxCDF	1.17	1.05-1.43	1.00	114
1,2,3,7,8,9-HxCDF	1.16	1.05-1.43	1.00	111
1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	1.00	113
1,2,3,6,7,8-HxCDD	1.25	1.05-1.43	1.00	111
1,2,3,7,8,9-HxCDD	1.25	1.05-1.43	1.00	117
1,2,3,4,6,7,8-HpCDF	0.98	0.88-1.20	1.00	155
1,2,3,4,7,8,9-HpCDF	0.98	0.88-1.20	1.00	111
1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	1.00	113
OCDF	0.83	0.76-1.02	2.00	179
OCDD	0.90	0.76-1.02	2.00	236

Homologue Group	EDL	RL	Result	
Total TCDF		1.00	29.9	EMPC
Total TCDD		1.00	23.2	EMPC
Total PeCDF		2.00	247	EMPC
Total PeCDD		1.00	112	EMPC
Total HxCDF		2.00	455	EMPC
Total HxCDD		2.00	343	EMPC
Total HpCDF		2.00	267	EMPC
Total HpCDD		2.00	117	

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: OPR-121013**

Lab Sample ID: OPR-121013
LIMS ID: 13-26910
Matrix: Sediment
Data Release Authorized: MW
Reported: 12/17/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: NA
Date Received: NA

Date Extracted: 12/10/13
Date Analyzed: 12/16/13 21:01
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	86.7	22-152	
13C-2,3,7,8-TCDD	0.79	0.65-0.89	86.8	20-175	
13C-1,2,3,7,8-PeCDF	1.59	1.32-1.78	98.4	21-192	
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	81.7	13-328	
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	104	21-227	
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	75.8	19-202	
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	82.2	21-159	
13C-2,3,4,6,7,8-HxCDF	0.53	0.43-0.59	76.2	22-176	
13C-1,2,3,7,8,9-HxCDF	0.51	0.43-0.59	71.6	17-205	
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	93.2	21-193	
13C-1,2,3,6,7,8-HxCDD	1.25	1.05-1.43	85.8	25-163	
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	69.4	21-158	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	96.4	20-186	
13C-1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	94.5	26-166	
13C-OCDD	0.88	0.76-1.02	81.4	13-198	
37Cl4-2,3,7,8-TCDD			90.1	31-191	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: OPR-121013**
Page 1 of 1

Lab Sample ID: OPR-121013
LIMS ID: 13-26910
Matrix: Sediment
Data Release Authorized: MW
Reported: 12/17/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: NA
Date Received: NA

Date Extracted: 12/10/13
Date Analyzed: 12/16/13 21:01
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	OPR	Spiked	Recovery	Limits
2,3,7,8-TCDF	24.0	20.0	120	75-158
2,3,7,8-TCDD	22.3	20.0	112	67-158
1,2,3,7,8-PeCDF	116	100	116	80-134
2,3,4,7,8-PeCDF	112	100	112	68-160
1,2,3,7,8-PeCDD	110	100	110	70-142
1,2,3,4,7,8-HxCDF	111	100	111	72-134
1,2,3,6,7,8-HxCDF	113	100	113	84-130
2,3,4,6,7,8-HxCDF	114	100	114	70-156
1,2,3,7,8,9-HxCDF	111	100	111	78-130
1,2,3,4,7,8-HxCDD	113	100	113	70-164
1,2,3,6,7,8-HxCDD	111	100	111	76-134
1,2,3,7,8,9-HxCDD	117	100	117	64-162
1,2,3,4,6,7,8-HpCDF	155	100	155	82-132
1,2,3,4,7,8,9-HpCDF	111	100	111	78-138
1,2,3,4,6,7,8-HpCDD	113	100	113	70-140
OCDF	179	200	89.5	63-170
OCDD	236	200	118	78-144

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR05-2.5**

Lab Sample ID: XQ70C
LIMS ID: 13-26910
Matrix: Sediment
Data Release Authorized:
Reported: 12/17/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 12/10/13
Date Analyzed: 12/16/13 12:49
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.2 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result		
2,3,7,8-TCDF	0.69	0.65-0.89		0.984	54.3		
2,3,7,8-TCDD	0.77	0.65-0.89		0.984	5.26		
1,2,3,7,8-PeCDF	1.43	1.32-1.78		0.984	41.4		
2,3,4,7,8-PeCDF	1.48	1.32-1.78		0.984	43.5		
1,2,3,7,8-PeCDD	1.53	1.32-1.78		0.984	34.1		
1,2,3,4,7,8-HxCDF	1.19	1.05-1.43		0.984	115		
1,2,3,6,7,8-HxCDF	1.16	1.05-1.43		0.984	51.7		
2,3,4,6,7,8-HxCDF	1.22	1.05-1.43		0.984	69.3		
1,2,3,7,8,9-HxCDF	1.15	1.05-1.43		0.984	62.9		
1,2,3,4,7,8-HxCDD	1.39	1.05-1.43		0.984	24.5		
1,2,3,6,7,8-HxCDD	1.24	1.05-1.43		0.984	1,020		
1,2,3,7,8,9-HxCDD	1.24	1.05-1.43		0.984	98.1		
1,2,3,4,6,7,8-HpCDF	1.00	0.88-1.20		0.984	1,170		
1,2,3,4,7,8,9-HpCDF	0.99	0.88-1.20		0.984	81.3		
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20		9.84	12,200		#
OCDF	0.84	0.76-1.02		1.97	3,100		
OCDD	0.89	0.76-1.02		19.7	68,300	E	#

Homologue Group	EDL	RL	Result	
Total TCDF		0.984	558	EMPC
Total TCDD		0.984	180	
Total PeCDF		1.97	2,660	EMPC
Total PeCDD		0.984	862	EMPC
Total HxCDF		1.97	6,030	EMPC
Total HxCDD		1.97	4,840	
Total HpCDF		1.97	5,060	EMPC
Total HpCDD		1.97	21,300	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 359

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 359

#-Result from diluted secondary analysis.

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR05-2.5**

Lab Sample ID: XQ70C
LIMS ID: 13-26910
Matrix: Sediment
Data Release Authorized:
Reported: 12/17/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 12/10/13
Date Analyzed: 12/16/13 12:49
Instrument/Analyst: AS1/PK

Sample Amount: 10.2 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.78	0.65-0.89	70.7	24-169	
13C-2,3,7,8-TCDD	0.79	0.65-0.89	79.7	25-164	
13C-1,2,3,7,8-PeCDF	1.58	1.32-1.78	85.6	24-185	
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	84.0	21-178	
13C-1,2,3,7,8-PeCDD	1.58	1.32-1.78	89.2	25-181	
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	84.4	26-152	
13C-1,2,3,6,7,8-HxCDF	0.51	0.43-0.59	75.8	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	80.4	28-136	
13C-1,2,3,7,8,9-HxCDF	0.53	0.43-0.59	88.5	29-147	
13C-1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	87.3	32-141	
13C-1,2,3,6,7,8-HxCDD	1.25	1.05-1.43	78.6	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.49	0.37-0.51	128	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	91.4	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	86.9	23-140	
13C-OCDD	0.91	0.76-1.02	80.3	17-157	
37Cl4-2,3,7,8-TCDD			83.8	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: CR05-2.5
DILUTION

Lab Sample ID: XQ70C
LIMS ID: 13-26910
Matrix: Sediment
Data Release Authorized:
Reported: 12/17/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 12/10/13
Date Analyzed: 12/17/13 04:24
Instrument/Analyst: AS1/PK

Sample Amount: 10.2 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 10.0

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-1,2,3,4,6,7,8-HpCDD	1.09	0.88-1.20	110	23-140	
13C-OCDD	0.90	0.76-1.02	109	17-157	
37Cl4-2,3,7,8-TCDD			94.7	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B **Sample ID: CR04-2.5**
Page 1 of 1

Lab Sample ID: XQ70D
LIMS ID: 13-26911
Matrix: Sediment
Data Release Authorized: MW
Reported: 12/17/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 12/10/13
Date Analyzed: 12/16/13 13:43
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 11.9 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00
Silica-Florisil Cleanup: Yes

Analyte	Ion Ratio	Ratio Limits	EDL	RL	Result		
2,3,7,8-TCDF	0.71	0.65-0.89		0.842	16.0		
2,3,7,8-TCDD	0.77	0.65-0.89		0.842	3.97		
1,2,3,7,8-PeCDF	1.50	1.32-1.78		0.842	12.4		
2,3,4,7,8-PeCDF	1.49	1.32-1.78		0.842	15.7		
1,2,3,7,8-PeCDD	1.54	1.32-1.78		0.842	18.8		
1,2,3,4,7,8-HxCDF	1.14	1.05-1.43		0.842	35.9		
1,2,3,6,7,8-HxCDF	1.18	1.05-1.43		0.842	18.9		
2,3,4,6,7,8-HxCDF	1.35	1.05-1.43		0.842	22.2		
1,2,3,7,8,9-HxCDF	1.18	1.05-1.43		0.842	14.6		
1,2,3,4,7,8-HxCDD	1.17	1.05-1.43		0.842	32.5		
1,2,3,6,7,8-HxCDD	1.23	1.05-1.43		0.842	350		
1,2,3,7,8,9-HxCDD	1.24	1.05-1.43		0.842	48.1		
1,2,3,4,6,7,8-HpCDF	0.99	0.88-1.20		0.842	919		
1,2,3,4,7,8,9-HpCDF	0.95	0.88-1.20		0.842	42.8		
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20		4.21	4,070		#
OCDF	0.83	0.76-1.02		1.68	1,900		
OCDD	0.89	0.76-1.02		8.42	23,500	E	#

Homologue Group	EDL	RL	Result	
Total TCDF		0.842	119	EMPC
Total TCDD		0.842	32.6	EMPC
Total PeCDF		1.68	658	EMPC
Total PeCDD		0.842	133	EMPC
Total HxCDF		1.68	2,130	
Total HxCDD		1.68	1,540	EMPC
Total HpCDF		1.68	3,910	
Total HpCDD		1.68	7,520	

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 140

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 140

#-Result from diluted secondary analysis.

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: CR04-2.5

Lab Sample ID: XQ70D
LIMS ID: 13-26911
Matrix: Sediment
Data Release Authorized: MW
Reported: 12/17/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 12/10/13
Date Analyzed: 12/16/13 13:43
Instrument/Analyst: AS1/PK

Sample Amount: 11.9 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-2,3,7,8-TCDF	0.77	0.65-0.89	36.8	24-169	
13C-2,3,7,8-TCDD	0.77	0.65-0.89	58.6	25-164	
13C-1,2,3,7,8-PeCDF	1.56	1.32-1.78	70.6	24-185	
13C-2,3,4,7,8-PeCDF	1.58	1.32-1.78	65.8	21-178	
13C-1,2,3,7,8-PeCDD	1.56	1.32-1.78	73.3	25-181	
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	81.8	26-152	
13C-1,2,3,6,7,8-HxCDF	0.53	0.43-0.59	70.8	26-123	
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	72.1	28-136	
13C-1,2,3,7,8,9-HxCDF	0.51	0.43-0.59	69.7	29-147	
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	81.4	32-141	
13C-1,2,3,6,7,8-HxCDD	1.24	1.05-1.43	70.7	28-130	
13C-1,2,3,4,6,7,8-HpCDF	0.47	0.37-0.51	52.6	28-143	
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	71.8	26-138	
13C-1,2,3,4,6,7,8-HpCDD	1.06	0.88-1.20	62.1	23-140	
13C-OCDD	0.89	0.76-1.02	61.1	17-157	
37Cl4-2,3,7,8-TCDD			66.3	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: CR04-2.5
DILUTION

Lab Sample ID: XQ70D
LIMS ID: 13-26911
Matrix: Sediment
Data Release Authorized: MW
Reported: 12/17/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 12/10/13
Date Analyzed: 12/17/13 05:18
Instrument/Analyst: AS1/PK

Sample Amount: 11.9 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 5.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits	Exceedance
13C-1,2,3,4,6,7,8-HpCDD	1.06	0.88-1.20	74.7	23-140	
13C-OCDD	0.90	0.76-1.02	60.5	17-157	
37Cl4-2,3,7,8-TCDD			60.1	35-197	

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546

Sample ID: MB-120913
METHOD BLANK

Lab Sample ID: MB-120913
LIMS ID: 13-26908
Matrix: Sediment
Data Release Authorized: MW
Reported: 12/17/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: NA
Date Received: NA

Date Extracted: 12/09/13
Date Analyzed: 12/14/13 14:14
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: NA

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	88.8%
Tetrachlorometaxylene	98.0%

XQ70 : 0801C

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR04-10cm
SAMPLE

Lab Sample ID: XQ70A
LIMS ID: 13-26908
Matrix: Sediment
Data Release Authorized: MW
Reported: 12/17/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/07/13
Date Received: 11/08/13

Date Extracted: 12/09/13
Date Analyzed: 12/14/13 15:15
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.13 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 80.3%

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	29	< 29 Y
11097-69-1	Aroclor 1254	97	< 97 Y
11096-82-5	**Aroclor 1260**	**20**	**200**
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	77.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR05-10cm
SAMPLE

Lab Sample ID: XQ70B
LIMS ID: 13-26909
Matrix: Sediment
Data Release Authorized: MW
Reported: 12/17/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 12/09/13
Date Analyzed: 12/14/13 15:35
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.12 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 73.1%

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	29	< 29 Y
11097-69-1	Aroclor 1254	98	< 98 Y
11096-82-5	**Aroclor 1260**	**20**	**180**
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	77.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR05-2.5
SAMPLE

Lab Sample ID: XQ70C
LIMS ID: 13-26910
Matrix: Sediment
Data Release Authorized: MW
Reported: 12/17/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 12/09/13
Date Analyzed: 12/14/13 15:55
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.16 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 74.2%

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	97	< 97 Y
11097-69-1	**Aroclor 1254**	**19**	**490**
11096-82-5	**Aroclor 1260**	**19**	**670**
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	62.0%
Tetrachlorometaxylene	91.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: CR04-2.5
SAMPLE

Lab Sample ID: XQ70D
LIMS ID: 13-26911
Matrix: Sediment
Data Release Authorized: MW
Reported: 12/17/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Date Extracted: 12/09/13
Date Analyzed: 12/14/13 16:15
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.16 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 82.8%

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	48	< 48 Y
11097-69-1	**Aroclor 1254**	**19**	**440**
11096-82-5	**Aroclor 1260**	**19**	**730**
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	95.2%
Tetrachlorometaxylene	87.8%

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB SOIL/SOLID/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-120913	88.8%	61-114	98.0%	52-117	0
LCS-120913	89.0%	61-114	98.8%	52-117	0
CR04-10cm	82.2%	54-115	77.5%	57-109	0
CR05-10cm	75.5%	54-115	77.2%	57-109	0
CR05-2.5	62.0%	54-115	91.2%	57-109	0
CR04-2.5	95.2%	54-115	87.8%	57-109	0

Microwave (MARS) Control Limits PCBSMM
Prep Method: SW3546
Log Number Range: 13-26908 to 13-26911

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Page 1 of 1

Sample ID: LCS-120913
LAB CONTROL

Lab Sample ID: LCS-120913
LIMS ID: 13-26908
Matrix: Sediment
Data Release Authorized: MW
Reported: 12/17/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: NA
Date Received: NA

Date Extracted: 12/09/13
Date Analyzed: 12/14/13 14:34
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 5.00 g-dry-wt
Final Extract Volume: 5.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Aroclor 1016	470	500	94.0%
Aroclor 1260	412	500	82.4%

PCB Surrogate Recovery

Decachlorobiphenyl	89.0%
Tetrachlorometaxylene	98.8%

Results reported in µg/kg (ppb)

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Extraction Method: SW3546
Page 1 of 1

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01

Matrix: Sediment

Date Received: 11/08/13

Data Release Authorized: MW
Reported: 12/16/13

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range/Surrogate	LOQ	Result
MB-121013	Method Blank	12/10/13	12/12/13	10.0	Diesel Range	50	< 50 U
13-26908	HC ID: ---		FID3B	1.0	Motor Oil Range	100	< 100 U
					o-Terphenyl		89.8%
XQ70A	CR04-10cm	12/10/13	12/12/13	10.0	**Diesel Range**	**250**	**2,400**
13-26908	HC ID: **DRO/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**500**	**7,400**
					o-Terphenyl		76.4%
XQ70B	CR05-10cm	12/10/13	12/12/13	10.0	**Diesel Range**	**180**	**1,200**
13-26909	HC ID: **DRO/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**370**	**4,800**
					o-Terphenyl		85.3%
XQ70C	CR05-2.5	12/10/13	12/12/13	10.0	**Diesel Range**	**190**	**3,200**
13-26910	HC ID: **DRO/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**390**	**13,000**
					o-Terphenyl		76.2%
XQ70D	CR04-2.5	12/10/13	12/12/13	10.0	**Diesel Range**	**290**	**3,200**
13-26911	HC ID: **DRO/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**580**	**10,000**
					o-Terphenyl		74.7%

Reported in mg/kg (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
LOQ-Limit of Quantitation

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

ANALYTICAL RESOURCES INCORPORATED

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01

Client ID	OTER	TOT OUT
121013MBS	89.8%	0
121013LCS	83.1%	0
CR04-10cm	76.4%	0
CR05-10cm	85.3%	0
CR05-2.5	76.2%	0
CR04-2.5	74.7%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3546
Log Number Range: 13-26908 to 13-26911

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: LCS-121013
LAB CONTROL

Lab Sample ID: LCS-121013
LIMS ID: 13-26908
Matrix: Sediment
Data Release Authorized: MW
Reported: 12/16/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: NA
Date Received: NA

Date Extracted: 12/10/13
Date Analyzed: 12/12/13 13:47
Instrument/Analyst: FID3B/JLW

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 10 mL
Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
Diesel	1,170	1,500	78.0%

TPHD Surrogate Recovery

o-Terphenyl	83.1%

Results reported in mg/kg

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job: XQ70
Matrix: Sediment Project: GHHSA
Date Received: 11/08/13 0863.01.01

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep Date
13-26908-121013MB1	Method Blank	10.0 g	10.0 mL	-	12/10/13
13-26908-121013LCS1	Lab Control	10.0 g	10.0 mL	-	12/10/13
13-26908-XQ70A	CR04-10cm	1.98 g	10.0 mL	D	12/10/13
13-26909-XQ70B	CR05-10cm	2.70 g	10.0 mL	D	12/10/13
13-26910-XQ70C	CR05-2.5	2.59 g	10.0 mL	D	12/10/13
13-26911-XQ70D	CR04-2.5	1.73 g	10.0 mL	D	12/10/13

Basis: D=Dry Weight W=As Received

Data File: /chem3/fid3b.i/20131212.b/1212b011.d

Date : 12-DEC-2013 13:22

Client ID: XQ70MBS1

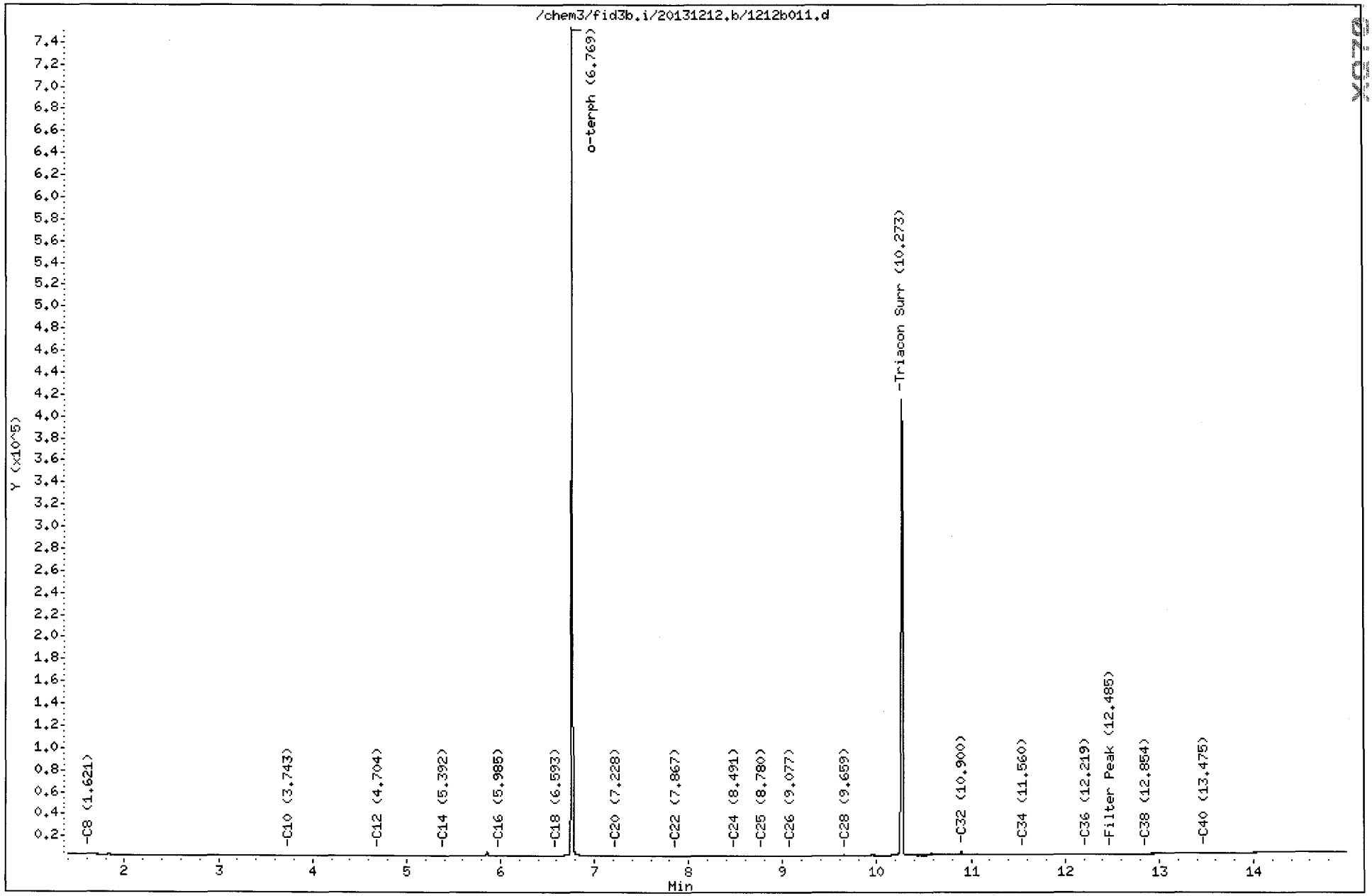
Sample Info: XQ70MBS1

Column phase: RTX-1

Instrument: fid3b.i

Operator: JW

Column diameter: 0.25



Data File: /chem3/fid3b.i/20131212.b/1212b012.d

Date : 12-DEC-2013 13:47

Client ID: XQ70LCSS1

Sample Info: XQ70LCSS1

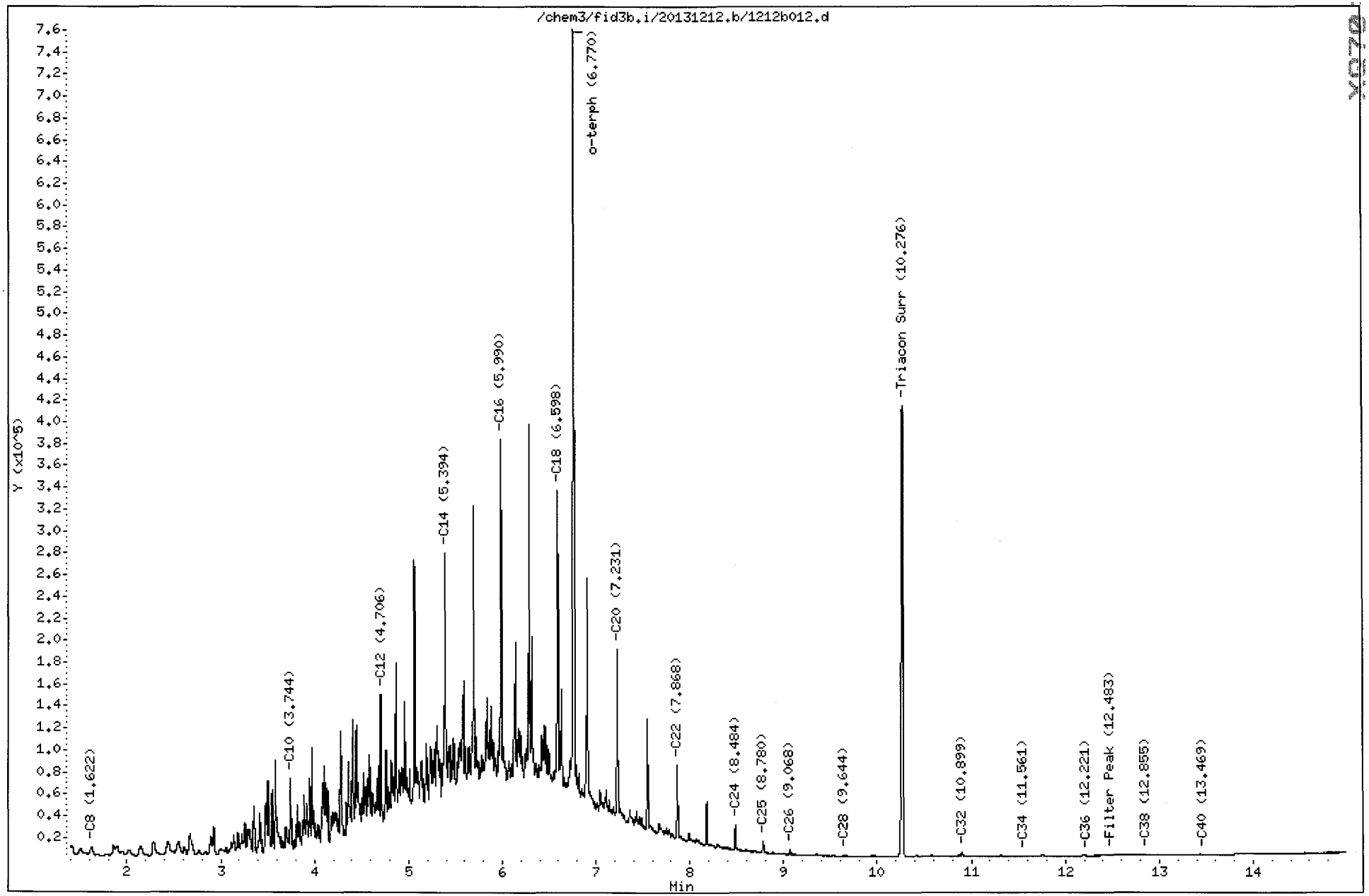
Column phase: RTX-1

Instrument: fid3b.i

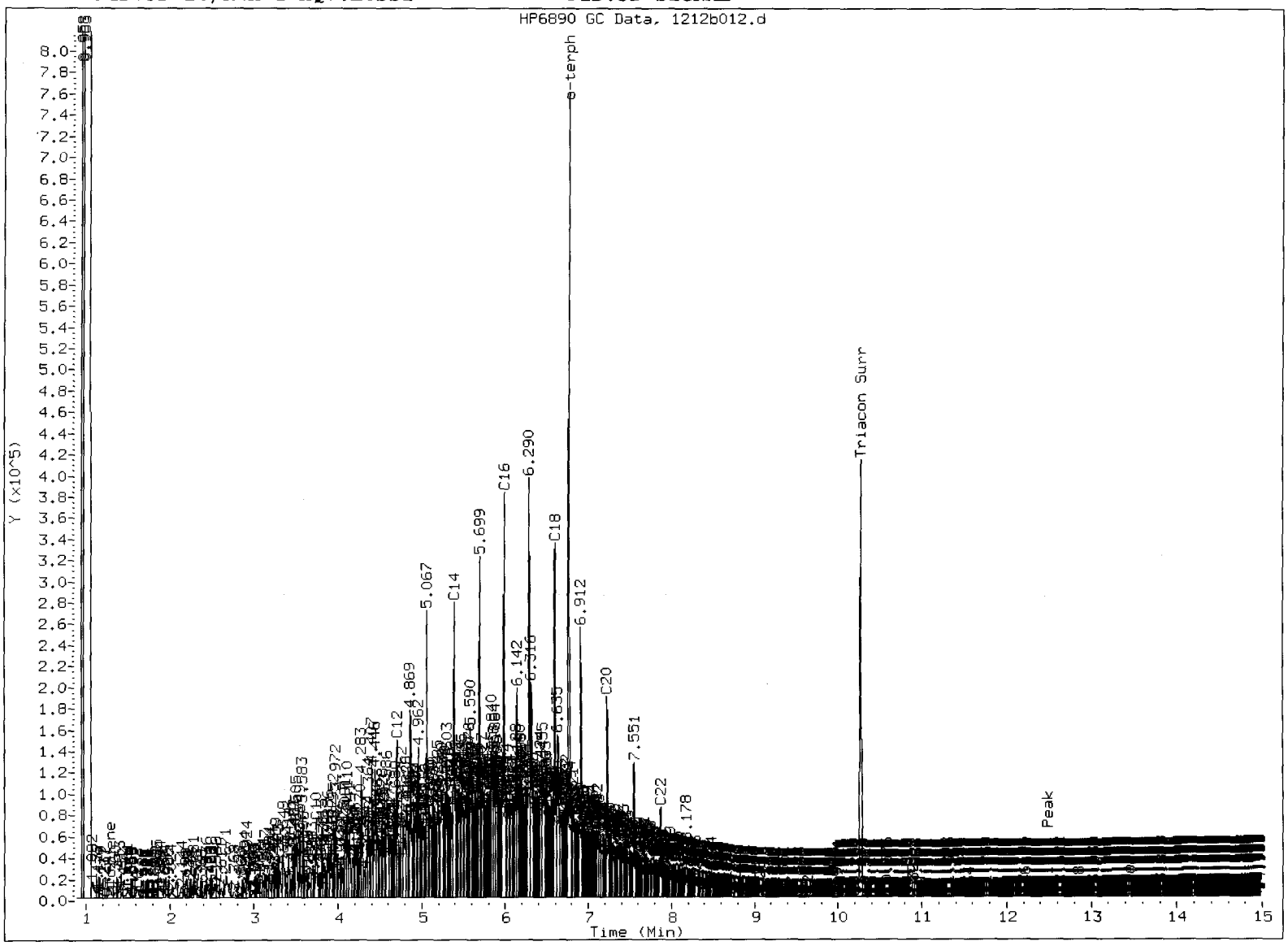
Operator: JW

Column diameter: 0.25

XQ70 00052



FID:3B-2C/RTX-1 XQ70LCSS1 FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: JW Date: 12/17/12

Data File: /chem3/fid3b.i/20131212.b/1212b014.d

Date : 12-DEC-2013 14:37

Client ID: CR04-10cm

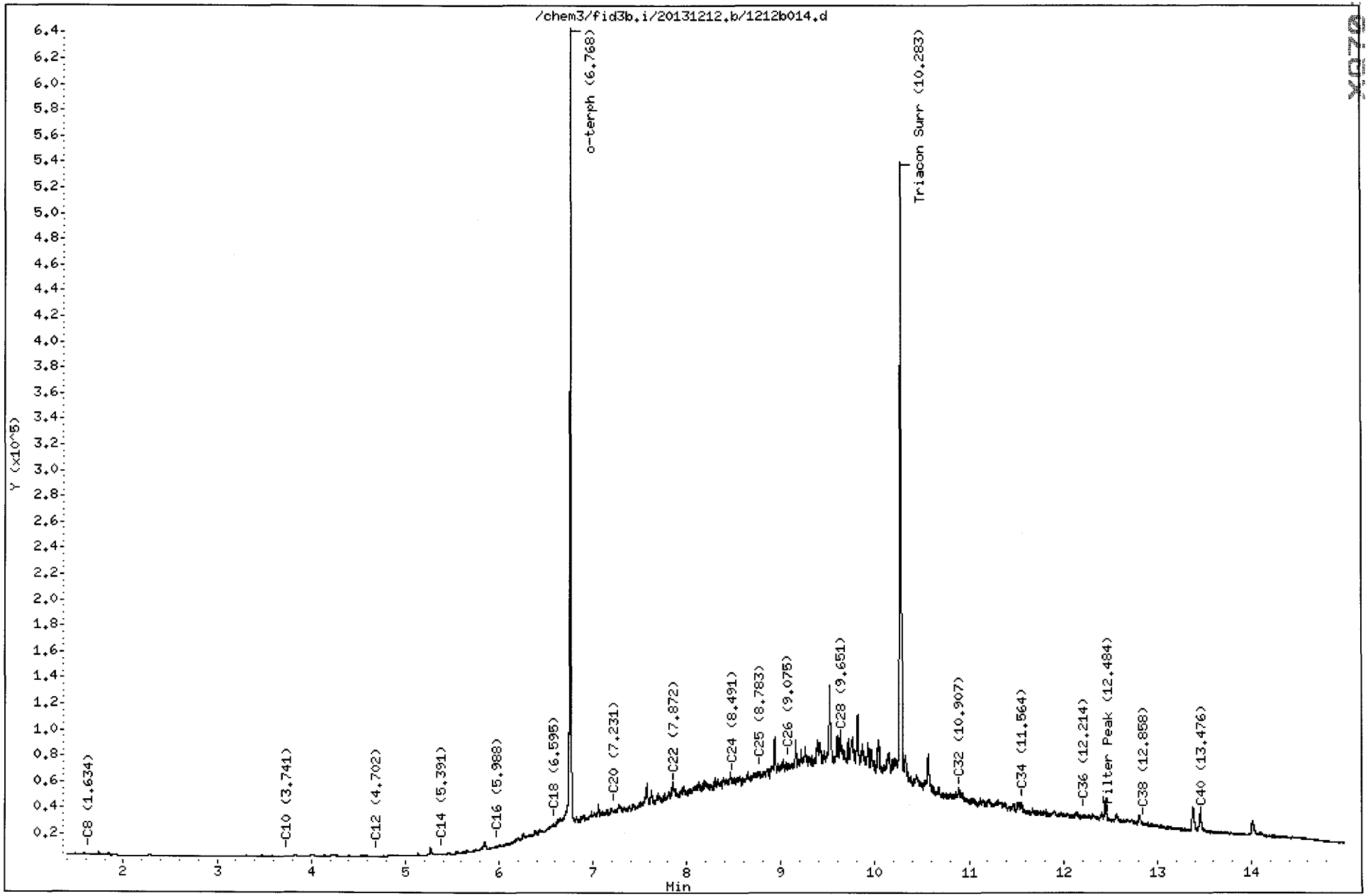
Sample Info: XQ70A

Column phase: RTX-1

Instrument: fid3b.i

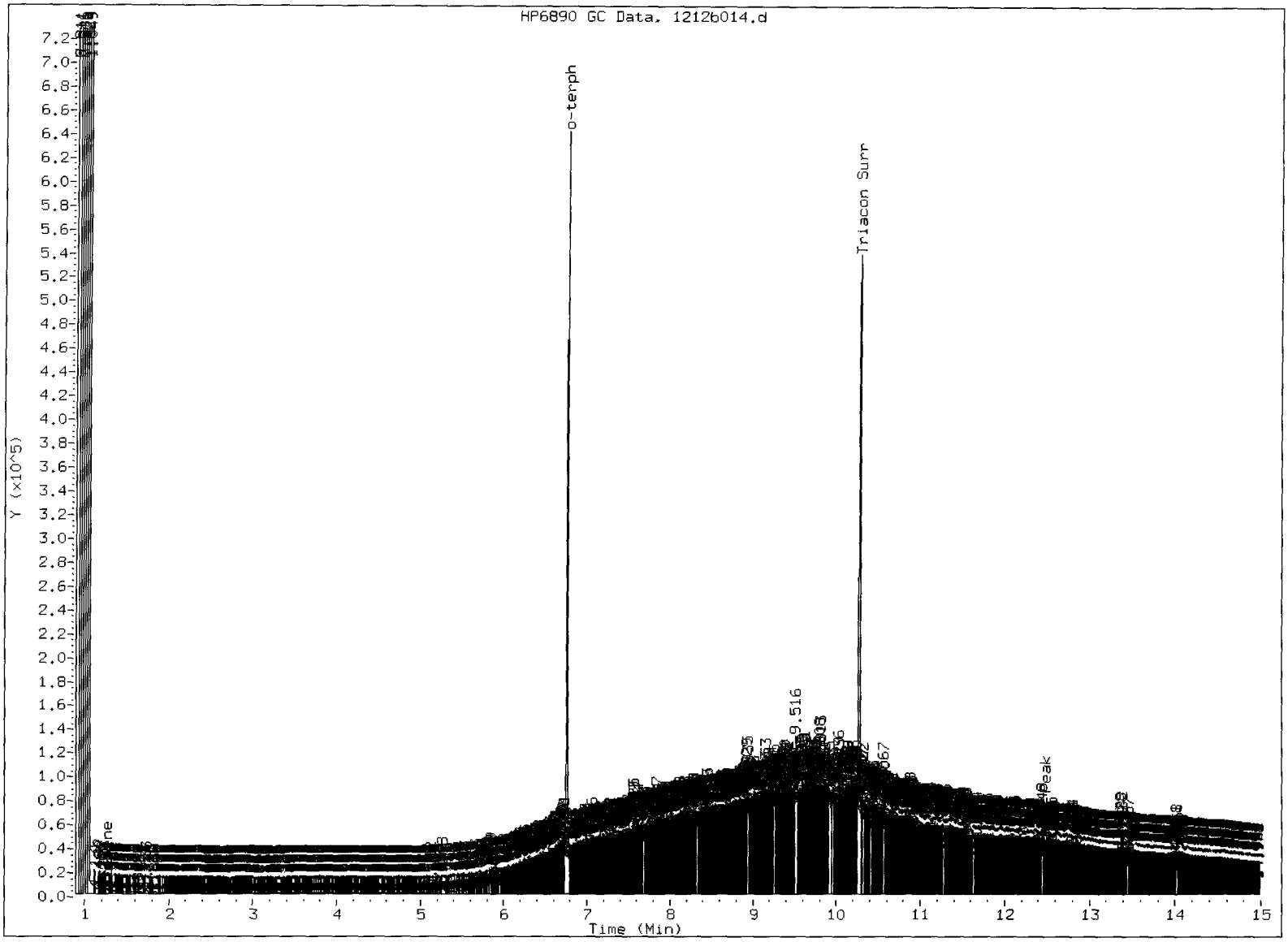
Operator: JW

Column diameter: 0.25



FID:3B-2C/RTX-1 XQ70A

FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5) Skimmed surrogate

Analyst: JW Date: 12/0/12

Data File: /chem3/fid3b.i/20131212.b/1212b015.d

Date : 12-DEC-2013 15:02

Client ID: CR05-10cm

Sample Info: XQ70B

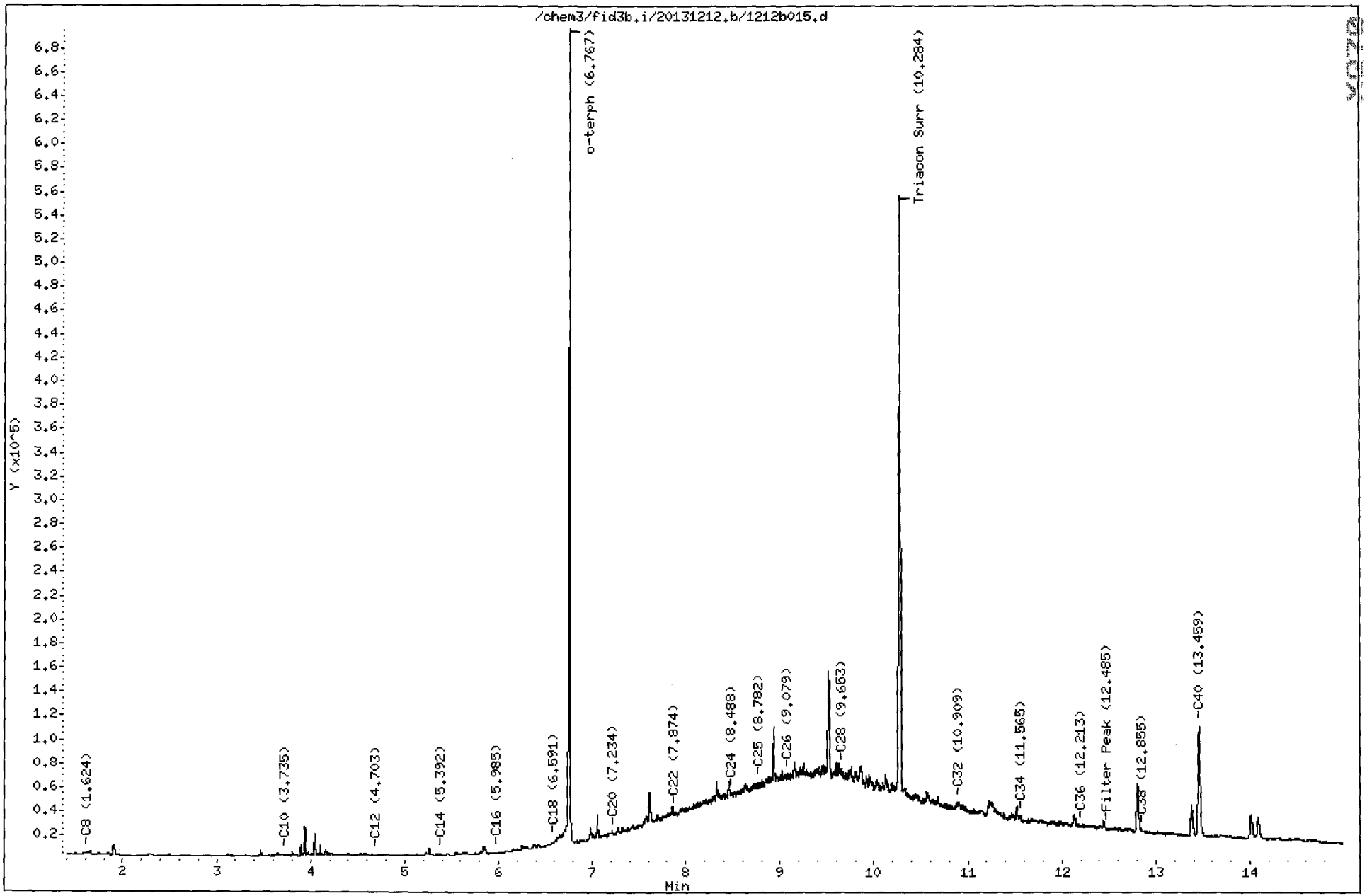
Column phase: RTX-1

Instrument: fid3b.i

Operator: JW

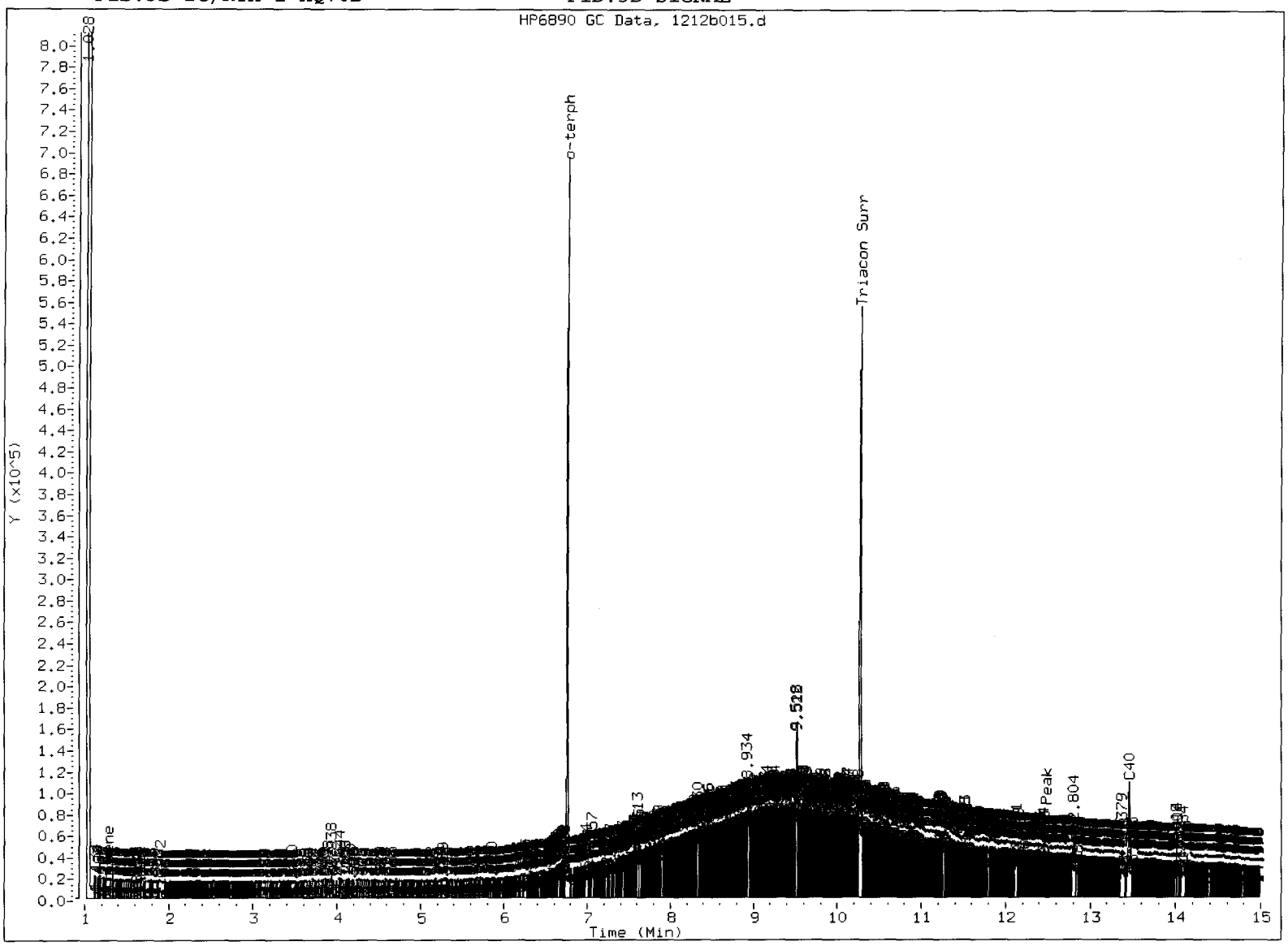
Column diameter: 0.25

XQ70 PAGE2



FID:3B-2C/RTX-1 XQ70B

FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5) Skimmed surrogate

Analyst: SU Date: 12/10/10

Data File: /chem3/fid3b.i/20131212.b/1212b016.d

Date : 12-DEC-2013 15:27

Client ID: CR05-2.5

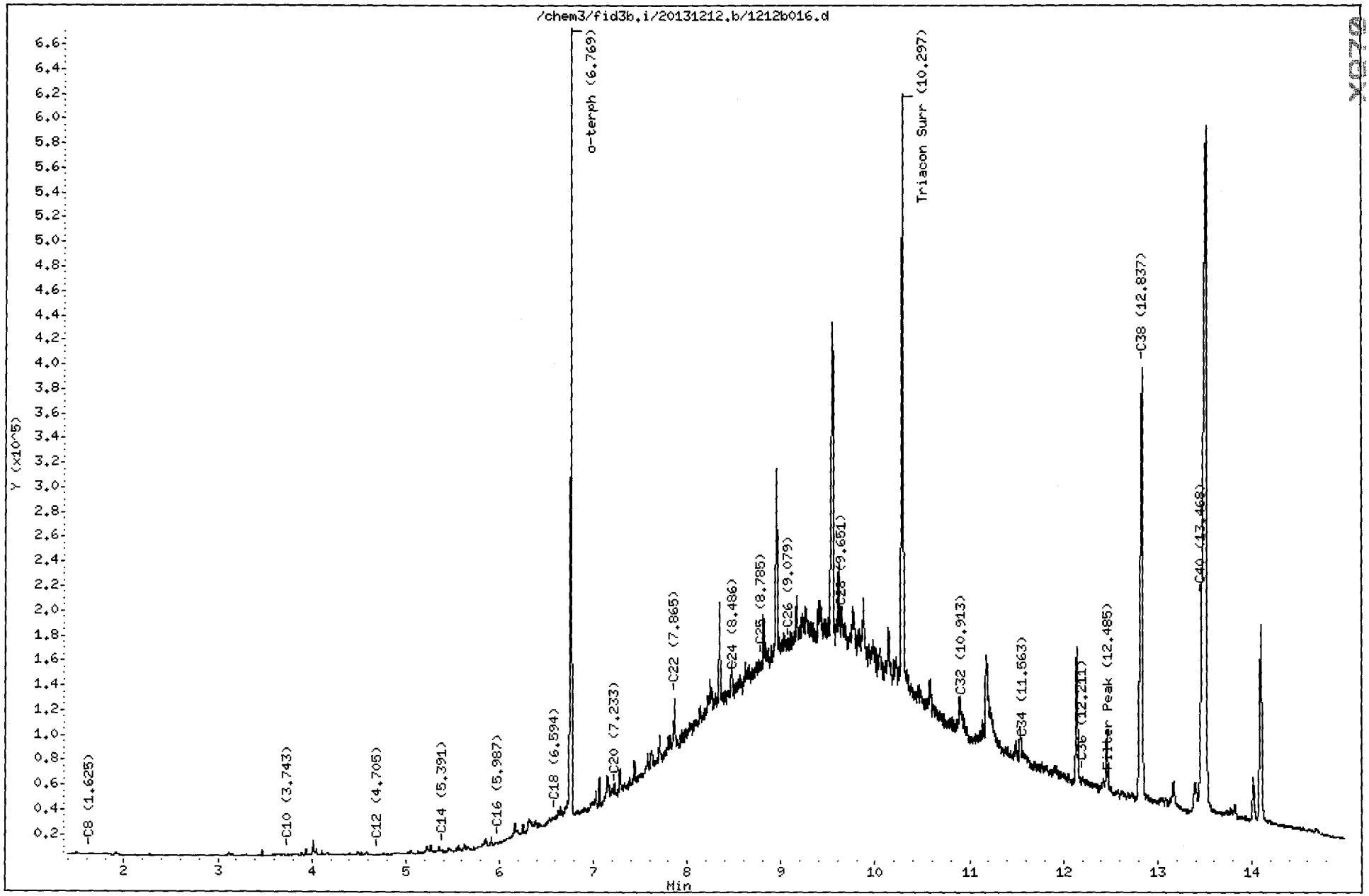
Sample Info: XQ70C

Column phase: RTX-1

Instrument: fid3b.i

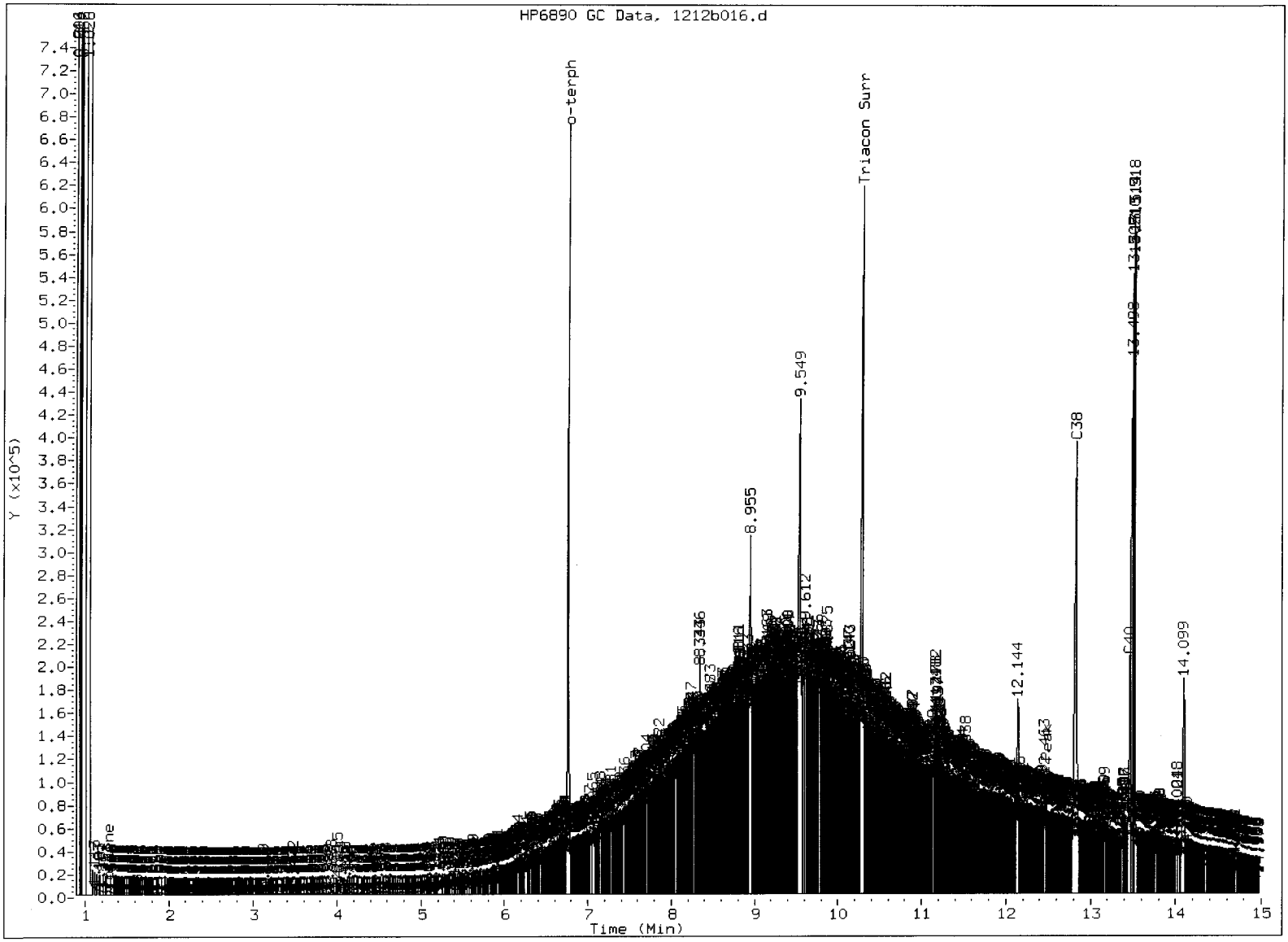
Operator: JW

Column diameter: 0.25



FID:3B-2C/RTX-1 XQ70C

FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5) Skimmed surrogate

Analyst: JW Date: 12/13/17

YQ70 : 0065

Data File: /chem3/fid3b.i/20131212.b/1212b017.d

Date : 12-DEC-2013 15:52

Client ID: CR04-2.5

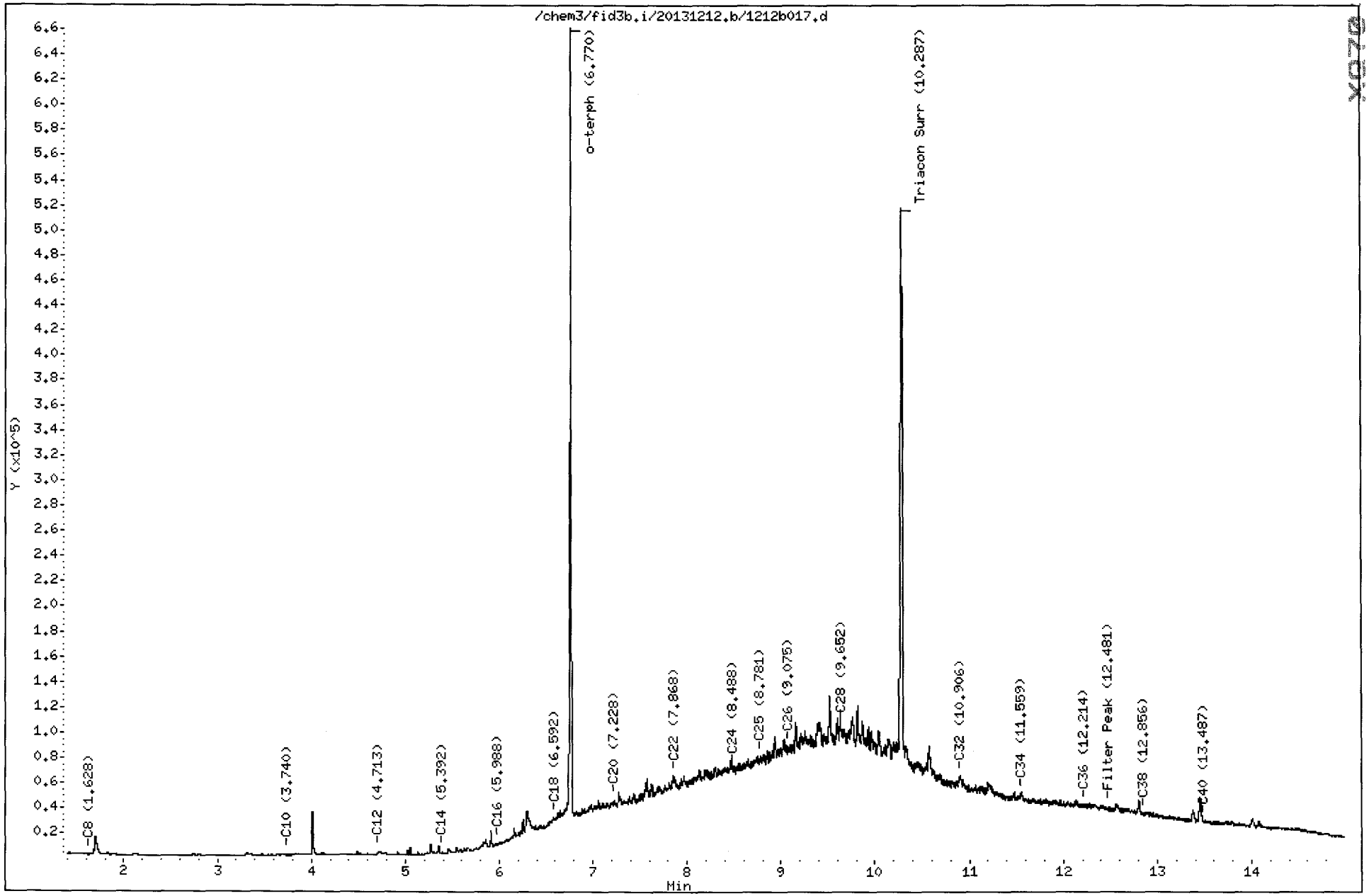
Sample Info: XQ70D

Column phase: RTX-1

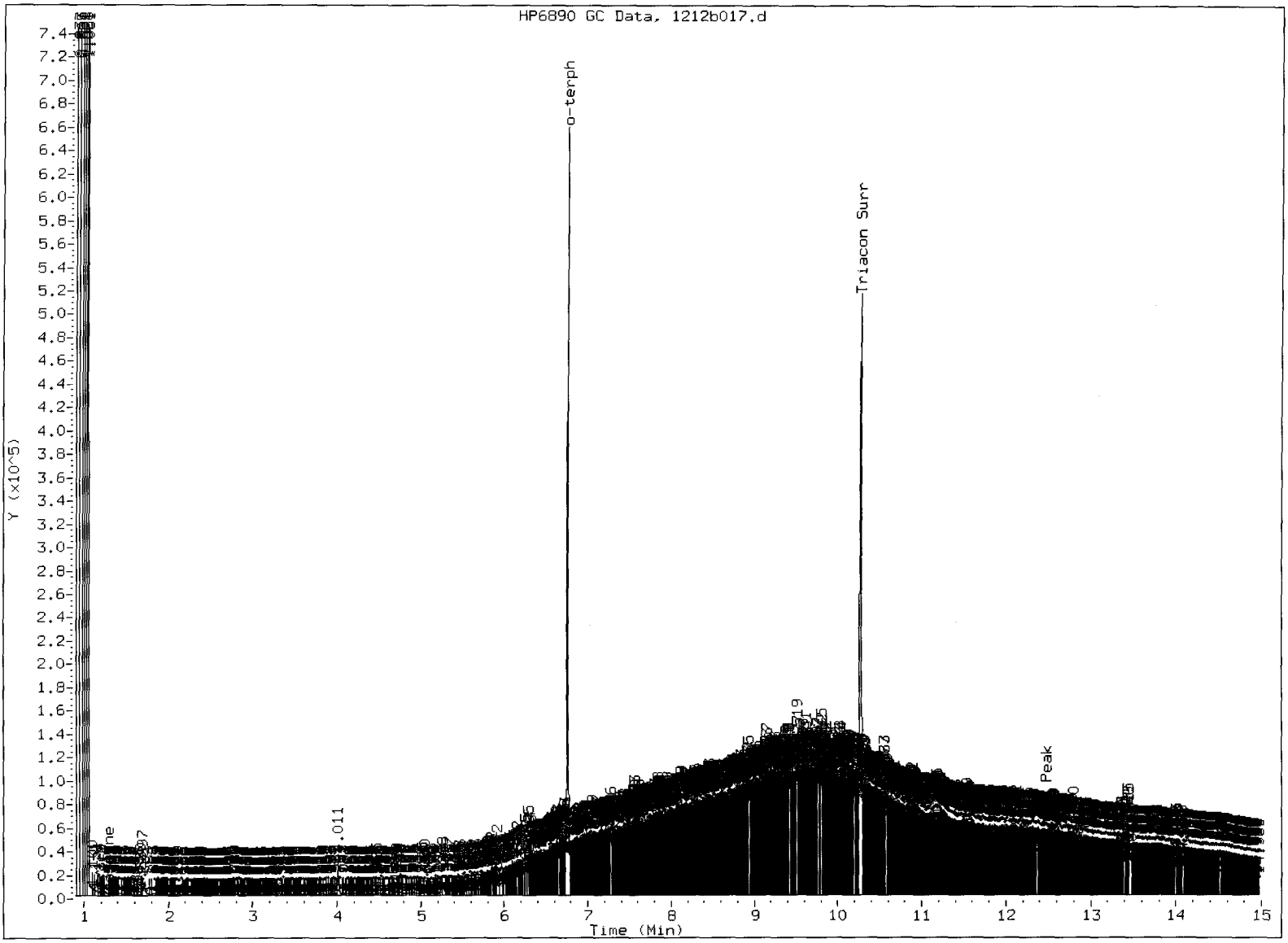
Instrument: fid3b.i

Operator: JW

Column diameter: 0.25



FID:3B-2C/RTX-1 XQ70D FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5) Skimmed surrogate

Analyst: SD Date: 12/13/12

YOTA : 00067

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR05-2.5
SAMPLE

Lab Sample ID: XQ70C
LIMS ID: 13-26910
Matrix: Sediment
Data Release Authorized:
Reported: 12/13/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Percent Total Solids: 16.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
CLP	12/10/13	7471A	12/12/13	**7439-97-6**	**Mercury**	0.1	**0.5**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: CR04-2.5
SAMPLE

Lab Sample ID: XQ70D
LIMS ID: 13-26911
Matrix: Sediment
Data Release Authorized:
Reported: 12/13/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: 11/08/13
Date Received: 11/08/13

Percent Total Solids: 15.5%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
CLP	12/10/13	7471A	12/12/13	**7439-97-6**	**Mercury**	0.1	**0.5**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

XQ70 : 00005

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: METHOD BLANK

Lab Sample ID: XQ70MB
LIMS ID: 13-26910
Matrix: Sediment
Data Release Authorized:
Reported: 12/13/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
CLP	12/10/13	7471A	12/12/13	7439-97-6	Mercury	0.02	0.02	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

XQ70:00070

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: XQ70LCS
LIMS ID: 13-26910
Matrix: Sediment
Data Release Authorized:
Reported: 12/13/13

QC Report No: XQ70-Maul Foster & Alongi
Project: GHHSA
0863.01.01
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Mercury	7471A	0.53	0.50	106%	

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%

XQ70:00074

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APPENDIX G

DATA VALIDATION MEMORANDA



DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. 0863.01.03 | APRIL 10, 2017 | GRAYS HARBOR HISTORICAL SEAPORT AUTHORITY

This report reviews the analytical results for sediment samples collected by the Maul Foster & Alongi, Inc. (MFA) project team on the property located at 500 North Custer Street in Aberdeen, Washington. The samples were collected in November 2013.

Analytical Resources, Incorporated (ARI) performed the analyses. ARI report XN64_XO00_GHHSA_rpt, which contains reports XN64 and XO00, and report XQ70_MFA_GHHSA_rpt, which contains XQ70, were reviewed. Three of the sediment samples were processed by ARI to obtain pore water and were reported in XO00. Follow-up analyses were performed on XN64 samples and reported in XQ70. The analyses performed and samples analyzed are listed below. Some analyses may not have been performed on all samples.

Analysis	Reference
Ammonia Nitrogen	USEPA 350.1 Modified
Diesel and Motor Oil	NWTPH-Dx
Dioxins/Furans	USEPA 1613B
Gasoline	NWTPH-G
Grain Size	PSEP 1986
Polychlorinated Biphenyls	USEPA 8082A
Pore Water Conductivity	USEPA 120.1
Pore Water Salinity	SM 2520B
Preserved and Total Solids	SM 2540G
Semivolatile Organic Compounds	USEPA 8270D/8270D SIM
Total Mercury	USEPA 7471A
Total Metals	USEPA 6010C
TOC	Plumb
Total Sulfides	USEPA 376.2
Total Volatile Solids	SM 2540E

NWTPH = Northwest Total Petroleum Hydrocarbons.
Plumb = Procedures for handling and chemical analysis of sediment and water samples (Plumb, 1981).
PSEP = Puget Sound Estuary Protocols.
SIM = selective ion monitoring.
SM = Standard Methods for the Examination of Water and Wastewater.
TOC = total organic carbon.
USEPA = U.S. Environmental Protection Agency.

Samples Analyzed		
SDG XN64	**SDG XO00**	**SDG XQ70**
CR01-10cm	CR01-10cm (pore water)	CR04-10cm
CR02-10cm	CR02-10cm (pore water)	CR05-10cm
CR03-10cm	CR03-10cm (pore water)	CR05-2.5
CR04-10cm	-	CR04-2.5
CR05-10cm	-	-
CR06-10cm	-	-
CR04-5	-	-
CR06-2.5	-	-

SDG = sample delivery group.

DATA QUALIFICATIONS

Analytical results were evaluated according to applicable sections of USEPA procedures (USEPA, 2008, 2010, 2011), appropriate laboratory and method-specific guidelines (ARI, 2013; USEPA, 1986), and the dioxin rules memorandum developed by MFA and approved by the Washington State Department of Ecology (MFA, 2012).

Data validation procedures were modified, as appropriate, to accommodate quality control (QC) requirements for methods not specifically addressed by the functional guidelines (e.g., total volatile solids).

Any result reported as exceeding the calibration range of the instrument was qualified as an estimate and assigned a "J" flag.

USEPA Method 1613B results reported as estimated maximum potential concentrations (EMPCs) were qualified by the reviewer with "U" (non-detect) at the reported EMPC value.

In report XQ70, the USEPA Method 1613B OCDD results for samples CR05-2.5 and CR04-2.5 exceeded the instrument calibration range. National Functional Guidelines for dioxin/furan data review state that laboratories are not required to take action when OCDD exceeds instrument calibration range (USEPA, 2011) The OCDD results were qualified "J" as estimated.

All data are considered acceptable for their intended use with the appropriate data qualifiers assigned.

HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

Holding Times

In report XN64, the USEPA Method 8270D results for phenol, pentachlorophenol, and butylbenzylphthalate from samples CR04-10cm, CR04-5, CR05-10cm, and CR06-10cm were extracted and analyzed six days after the recommended 14-day holding time. All detected results have been qualified "J" as estimated, and all non-detect results have been qualified "UJ" as estimated.

In report XQ70, samples CR04-10cm, CR05-10cm, CR05-2.5, and CR04-2.5 were extracted for analysis by NWTPH-Dx, USEPA Method 8082A, and USEPA Method 8270D/8270D SIM after the recommended 14-day holding time. Samples CR05-2.5 and CR04-2.5 were prepared and analyzed for USEPA Method 7471A total mercury after the recommended 28-day holding time. All detected results have been qualified "J" as estimated, and all non-detect results have been qualified "UJ" as estimated.

The remaining extractions and analyses were performed within the recommended holding time criteria.

Preservation and Sample Storage

The samples were preserved and stored appropriately.

BLANKS

Method Blanks

Laboratory method blank analyses were performed at the required frequencies. For purposes of data qualification, the method blanks were associated with all samples prepared in the analytical batch.

If an analyte was detected in a sample and in the associated method blank at less than ten times the method blank concentration, the sample result was qualified. USEPA Method 1613B sample results were qualified if sample concentrations were less than five times the associated method blank concentration. Reporting limits were elevated to the concentrations detected in the samples, and results were qualified as not detected "U" at the elevated method reporting limit (MRL).

For USEPA Method 1613B, if an analyte was detected in a sample and in the associated method blank below the reporting limit but above the estimated detection limit, sample detections below the level found in the method blank were qualified as "U" at the reporting limit.

In report XN64 and XQ70, the USEPA Method 1613B method blanks had detections for some analytes below the MRL and some detections for 1,2,3,4,6,7,8-HpCDD and OCDD above the MRL. All associated sample results were greater than five times the method blank concentrations; thus, no results were qualified.

In report XN64, the USEPA Method 376.2 sulfide method blank prepared on November 12, 2013, had a total sulfide detection of 0.17 milligram per kilogram (mg/kg). All associated sample detections were greater than ten times the method blank detection; thus, no results were qualified.

All remaining laboratory method blanks were non-detect.

Trip Blanks

Trip blanks were not submitted for this sampling event, as volatile organic compounds were not analyzed.

Equipment Rinsate Blanks

Equipment rinsate blanks were not collected for this sampling event. Equipment was decontaminated after each sample was collected in accordance with the sediment sampling and analysis plan (MFA, 2013).

SURROGATE RECOVERY RESULTS

When appropriate, individual samples were spiked with surrogate compounds to evaluate laboratory performance.

In report XN64, NWTPH-Gx surrogate recoveries for sample CR06-2.5 exceeded the lower percent recovery limits for both trifluorotoluene and bromobenzene. The associated result was qualified by the reviewer as follows:

Sample	Component	Original Result (mg/kg)	Qualified Result (mg/kg)
CR06-2.5	Gasoline	54 U	54 UJ

The reviewer took no action based on minor surrogate outliers or surrogate percent recoveries that were outside acceptance limits because of dilutions necessary to quantify high concentrations of target analytes present in the samples. The laboratory appropriately documented and qualified surrogate outliers. Associated batch quality assurance and QC for samples with surrogate outliers were within acceptance limits.

All remaining surrogate recoveries were within acceptance limits.

LABELED ANALOG STANDARD RECOVERY RESULTS

All USEPA Method 1613B Modified samples were spiked with C13 labeled analog standards to quantify the recovery of individual target compounds. All C13 labeled analog standard recoveries were within acceptance limits.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Matrix spike/matrix spike duplicate (MS/MSD) results are used to evaluate laboratory precision and accuracy. All MS/MSD samples were extracted and analyzed at the required frequency.

In report XN64, the USEPA Method 7471A MS exceeded the upper percent recovery acceptance limit for total mercury. The exceedance was minor and the laboratory control sample (LCS) had acceptable recovery; thus, no results were qualified.

In report XN64, the case narrative states that the USEPA 376.2 sulfide matrix duplicate exceeded relative percent difference (RPD) acceptance criteria. The matrix duplicate RPD results were not included in the QC report. The remaining batch QC had acceptable recoveries, and the laboratory stated that sample heterogeneity likely was the cause of the RPD exceedance. No results were qualified.

In report XN64, the case narrative states that the Method Plumb (1981) MS had low percent recovery for TOC and that a re-prepared MS also had low recovery. The LCS had acceptable recovery, which indicates matrix interference. The following results were qualified "J" as estimated:

Report	Sample	Component	Original Result (%)	Qualified Result (%)
XN64	CR06-10cm	TOC	35.6	35.6 J
XN64	CR04-10cm	TOC	31.4	31.4 J
XN64	CR05-10cm	TOC	13.6	13.6 J
XN64	CR06-2.5	TOC	49.5	49.5 J
XN64	CR04-5	TOC	16.5	16.5 J
XN64	CR01-10cm	TOC	2.06	2.06 J
XN64	CR02-10cm	TOC	3.21	3.21 J
XN64	CR03-10cm	TOC	2.91	2.91 J

All recoveries were within acceptance limits for percent recovery and RPDs.

LABORATORY DUPLICATE RESULTS

Duplicate results are used to evaluate laboratory precision. All duplicate samples were extracted and analyzed at the required frequency. Laboratory duplicate RPDs for USEPA Method 6010C were assessed against the RPD acceptance limit of 35 percent for soil laboratory duplicates, as presented in the National Functional Guidelines for inorganic data review (USEPA, 2010). Minor laboratory duplicate RPD exceedances and exceedances for results near the reporting limit were not qualified by the reviewer.

In report XN64, the USEPA Method 6010C laboratory duplicate exceeded RPD acceptance criteria for total chromium, total copper, and total mercury. The exceedance for total mercury was minor and the associated results were not qualified. The associated batch QC had acceptable recoveries; however, the total chromium and total copper RPD exceedances were significant. The following results were qualified:

Report	Sample	Component	Original Result (mg/kg)	Qualified Result (mg/kg)
XN64	CR06-2.5	Total Chromium	26	26 J
XN64	CR06-2.5	Total Copper	96	96 J
XN64	CR01-10cm	Total Chromium	40	40 J

Report	Sample	Component	Original Result (mg/kg)	Qualified Result (mg/kg)
XN64	CR01-10cm	Total Copper	58	58 J
XN64	CR02-10cm	Total Chromium	38.5	38.5 J
XN64	CR02-10cm	Total Copper	56.3	56.3 J
XN64	CR03-10cm	Total Chromium	48	48 J
XN64	CR03-10cm	Total Copper	65.4	65.4 J

All remaining laboratory duplicate RPDs were within acceptance limits.

LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

An LCS/laboratory control sample duplicate (LCSD) is spiked with target analytes to provide information on laboratory precision and accuracy. The LCS/LCSD samples were extracted and analyzed at the required frequency.

In report XN64, the USEPA Method 8270D SIM LCS exceeded the instrument calibration range for pentachlorophenol. The LCS percent recovery was within acceptance limits, and the associated sample detections were already qualified as estimated because they were below the MRL; thus, no results were qualified by the reviewer.

All remaining LCS/LCSD analytes were within acceptance limits for percent recovery and RPD.

FIELD DUPLICATE RESULTS

Field duplicate samples measure both field and laboratory precision. No field duplicate samples were submitted for analysis.

CONTINUING CALIBRATION VERIFICATION RESULTS

Continuing calibration verification (CCV) results are used to demonstrate instrument precision and accuracy through the end of the sample batch.

National Functional Guidelines for low/medium volatile and semivolatile data review (USEPA, 2008) state that results associated with closing CCV percent drift exceedances between 50 percent and -50 percent do not require qualification. However USEPA Method 8270D states that when CCV percent drift acceptance criteria are met for at least 80 percent of the compounds, non-detects may be reported for compounds that exceed acceptance limits if the laboratory demonstrates that quantitation limit sensitivity can still be achieved. Detected compounds associated with CCV percent drift exceedances may be reported as estimated values.

In report XN64, the USEPA Method 8270D SIM CCV exceeded percent drift criteria for benzyl alcohol and butylbenzylphthalate. In report XQ70, the USEPA Method 8270D and

8270D SIM CCVs also exceeded percent drift criteria for several compounds. Associated sample detections above the MRL were qualified with "J" as estimated. USPEA Method 8270D results associated with report XQ70 were already qualified "J" due to holding time exceedances, as noted above.

Report	Sample	Component	Original Result (µg/kg)	Qualified Result (µg/kg)
XN64	CR02-10cm	Benzyl Alcohol	43 Q	43 J
XN64	CR03-10cm	Benzyl Alcohol	43 Q	43 J

µg/kg = micrograms per kilogram.

Based on available information, all other CCVs were within acceptance limits for percent recovery.

REPORTING LIMITS

ARI used routine reporting limits for non-detect results, except when samples required dilutions because of limited sample or extract volume, high analyte concentrations, and/or matrix interferences.

Detections below the MRL were reported for some analyses: results for USEPA Method 1613B were reported to estimated detection limits, and results for USEPA Methods 8082A, 8270D, and 8270D SIM were reported to method detection limits. Some NWTPH-Gx, USEPA Method 8082A, and USEPA Method 8270D reporting limits were raised because of chromatographic interference or matrix interference. All samples in report XQ70 were diluted 1:5 for USEPA Method 8270D/8270D SIM analyses due to matrix interference.

DATA PACKAGE

The data packages were reviewed for transcription errors, omissions, and anomalies.

In report XN64, the case narrative states that the USEPA Method 7471A MS exceeded the lower acceptance limit for total mercury; however, the MS exceeded the upper acceptance limit.

In report XO00, conductivity was not indicated on the chain of custody but was analyzed for pore water extracts of samples CR01-10cm, CR02-10cm, and CR03-10cm.

All samples submitted for pore water extraction (CR01-10cm, CR02-10cm, CR03-10cm, and CR04-5) produced insufficient volume for USEPA Method 376.2 sulfides analysis. The volume of extracted pore water was sufficient to perform the remaining analyses.

No additional issues were found.

REFERENCES

ARI. 2013. Quality assurance manual. Analytical Resources, Incorporated. Tukwila, Washington.

MFA. 2012. Dioxin and furan analysis, data validation, and TEQ calculation rules. Maul Foster & Alongi, Inc. December.

MFA. 2013. Sediment sampling and analysis plan. Washington State Department of Natural Resources aquatic lands lease no. 22-A02150. Maul Foster & Alongi, Inc. September 12.

Plumb, R. H., Jr. 1981. Procedures for handling and chemical analysis of sediment and water samples. Technical report EPA/CE-81-1. U.S. Army Engineering Waterways Experiment Station, Vicksburg, MS.

USEPA. 1986. Test methods for evaluating solid waste: physical/chemical methods. EPA-530/SW-846. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. September (revision 6, February 2007).

USEPA. 2008. USEPA contract laboratory program, national functional guidelines for organics data review. EPA 540/R-08/01. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response. June.

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USEPA. 2011. USEPA contract laboratory program, national functional guidelines for chlorinated dibenzo-p-dioxins (CDDs) and chlorinated dibenzofurans (CDFs) data review. EPA-540-R-11-016. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. September.

DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. 1044.02.01 | APRIL 10, 2017 | GRAYS HARBOR HISTORICAL SEAPORT AUTHORITY

Maul Foster & Alongi, Inc. (MFA) conducted an independent review of the quality of analytical results for groundwater, sediment, soil, and stormwater samples collected at the leased tideland and in-water portion of the Seaport Landing site, located adjacent to the Chehalis River at 500 North Custer Street in Aberdeen, Washington. The samples were collected on October 12 through 16, 2015, and January 12, 2016.

Analytical Resources, Inc. (ARI) in Tukwila, Washington, and NVL Laboratories (NVL) in Seattle, Washington, performed the analyses. ARI report numbers AON0, AON1, AON2, AON3, AOT3, AOV8, AOV9, AOW1, AOW2, ART5, ASF7, and AUD1 were reviewed. The analyses performed and samples analyzed are listed below. Additional samples were submitted to ARI on hold and were archived at -18 degrees Celsius (°C). Portions of samples reported in AOV8, AOV9, and AOW2 were subcontracted to NVL for asbestos analysis and results are appended to AOV8, AOV9, and AOW2, respectively. Report ART5 is a follow-up to report AOW1 and contains results originally requested, but not reported in AOW1. Report ASF7 is a follow-up to report AOV9 and contains results for tests requested in addition to those reported in AOV9.

Analysis	Reference
Ammonia Nitrogen	USEPA 350.1 Modified
Asbestos	EPA 600/M4-82-020 and 600R-93/116
Diesel and Motor Oil	NWTPH-Dx
Dioxins and Furans	USEPA 1613B*
Grain Size	PSEP
Polychlorinated Biphenyls (PCBs)	USEPA 8082A
Semivolatile Organic Compounds (SVOCs)	USEPA 8270D / 8270D-SIM
Sulfide	SM 4500-S2D
Total and Dissolved Mercury	USEPA 7470A/7471A
Total and Dissolved Metals	USEPA 200.8/6010C
Total Organic Carbon (TOC)	Plumb, 1981
Total Solids/Preserved Total Solids/Total Volatile Solids	SM 2540G

NWTPH = Northwest Total Petroleum Hydrocarbons.
PSEP = Puget Sound Estuary Protocols (PSEP, 1997).
SIM = selective ion monitoring.
SM = Standard Methods for the Examination of Water and Wastewater.
USEPA = U.S. Environmental Protection Agency.

* The following acronyms are used to report USEPA Method 1613B congener results:

TCDD = Tetrachlorodibenzo-p-dioxin
TCDF = Tetrachlorodibenzofuran
PeCDD = Pentachlorodibenzo-p-dioxin
PeCDF = Pentachlorodibenzofuran
HxCDD = Hexachlorodibenzo-p-dioxin
HxCDF = Hexachlorodibenzofuran
HpCDD = Heptachlorodibenzo-p-dioxin
HpCDF = Heptachlorodibenzofuran
OCDD = Octachlorodibenzo-p-dioxin
OCDF = Octachlorodibenzofuran

Samples Analyzed				
Report AON0	**Report AON1**	**Report AON2**	**Report AON3**	**Report AOV8**
CR-07-SSD-COMP	CR11-14-SBSD-COMP	CR09a-SSD-COMP	CR20-S-5.0	CR17-D-SSD
CR23-S-3.0	CR-24-SSD-COMP	CR09b-SSD-COMP	CR21-S-5.0	CR17-D-SBSD
CR22-S-3.0	CR11-SBSD-23	-	CR21-GW-10	CR08A-SBSD
CR23-GW-6.0	CR12-SBSD-15	-	CR20-GW-5.0	CR10-SSD-COMP
CR22-GW-9.0	CR13-SBSD-11	-	Seep-01	CR08a-SSD-COMP
-	CR14-SBSD-12	-	-	-
Report AOT3	**Report AOV9**	**Report AOW1**	**Report AOW2**	**Report ART5**
CR19D-SSD-CONV	CR08b-SBSD	CR19F-SBSD	CR15C-SSD	CR18B-SBSD
-	CR26-SBSD	CR19F-SBSD-DUP	CR15C-SBSD	CR18B-SSD
-	-	CR19F-SSD	CR08b-SSD-COMP	-
-	-	SR18B-SBSD	-	-
-	-	SR18B-SSD	-	-
Report ASF7	**Report AUD1**	-	-	--
CR08b-SBSD	Storm-01	-	-	-
CR26-SBSD	-	-	-	-

DATA QUALIFICATIONS

Analytical results were evaluated according to applicable sections of USEPA procedures (USEPA, 2014a,b,c) and appropriate laboratory and method-specific guidelines (ARI, 2014; USEPA, 1986).

Data validation procedures were modified, as appropriate, to accommodate quality control requirements for methods not specifically addressed by the functional guidelines (e.g., NWTPH-Dx).

Where appropriate, the data were qualified using the following qualifiers:

J The analyte was positively identified but the associated numerical value is an approximate concentration because either there was an issue with the quality of the data generated or the concentration of the analyte was between the reporting limit (RL) and half the RL or the estimated detection limit (EDL).

J+ The result is an estimated value but may be biased high.

U Analysis was conducted, but the analyte was not detected at or above the selected RL. The value may represent an adjusted RL or the sample-specific EDL.

UJ The analyte was not detected (see definition of "U" and "J" qualifiers above). The reported value should be considered approximate.

R The sample results are unusable because certain quality control criteria were not met. The analyte may or may not be present in the sample.

GENERAL ASSESSMENT

Results for total and dissolved metals in water were reviewed to identify inconsistencies in any one sample. All total metals results were greater than dissolved metals results or within a reasonable relative percent difference (RPD).

ARI did not use second column confirmation for 2,3,7,8-TCDF. The reviewer confirmed that the analytical column used for USEPA Method 1613B analysis met requirements for 2,3,7,8-TCDD and 2,3,7,8-TCDF isomer specificity, therefore not requiring second column confirmation.

In reports AON1, AON2, AON3, AOV8, AOV9, AOW1, AOW2, and AUD1, USEPA Method 1613B detected results that were reported as estimated maximum potential concentrations (EMPC) were assigned by the reviewer a "U" qualifier (non-detect) at the reported EMPC value. Results detected below the RL were flagged by ARI with "J EMPC" and were also assigned by the reviewer a "U" qualifier at the reported EMPC value. In reports AON2 and AOW1, the 1,2,3,7,8-PeCDF results for samples CR09a-SSD-COMP and CR19F-SSD were flagged by ARI with "X" in addition to "EMPC," due to polychlorinated diphenyl ether interference. Qualified results are summarized below.

Report	Sample	Component	Laboratory-Reported Result (pg/g)	Result of Record (pg/g)
AON0	CR23-S-3.0	2,3,7,8-TCDF	0.0538 J EMPC	0.0538 U
AON0	CR23-S-3.0	1,2,3,6,7,8-HxCDF	0.153 J EMPC	0.153 U
AON0	CR23-S-3.0	1,2,3,7,8,9-HxCDF	0.155 J EMPC	0.155 U
AON0	CR23-S-3.0	1,2,3,4,7,8-HxCDD	0.193 J EMPC	0.193 U
AON0	CR23-S-3.0	1,2,3,4,7,8,9-HpCDF	0.221 J EMPC	0.221 U
AON0	CR23-S-3.0	Total TCDF	0.103 EMPC	0.103 U
AON0	CR23-S-3.0	Total TCDD	11.4 EMPC	11.4 U

Report	Sample	Component	Laboratory-Reported Result (pg/g)	Result of Record (pg/g)
AON0	CR23-S-3.0	Total HxCDF	5.78 EMPC	5.78 U
AON0	CR23-S-3.0	Total HxCDD	27.3 EMPC	27.3 U
AON0	CR23-S-3.0	Total HpCDF	10.2 EMPC	10.2 U
AON0	CR22-S-3.0	2,3,7,8-TCDD	1.41 J EMPC	1.41 U
AON0	CR22-S-3.0	1,2,3,4,7,8,9-HpCDF	12.5 EMPC	12.5 U
AON0	CR22-S-3.0	Total TCDF	5.25 EMPC	5.25 U
AON0	CR22-S-3.0	Total TCDD	13.6 EMPC	13.6 U
AON0	CR22-S-3.0	Total PeCDF	48.6 EMPC	48.6 U
AON0	CR22-S-3.0	Total HpCDF	695 EMPC	695 U
AON1	CR11-SBSD-23	1,2,3,6,7,8-HxCDF	0.0339 J EMPC	0.0339 U
AON1	CR11-SBSD-23	1,2,3,7,8,9-HxCDF	0.112 J EMPC	0.112 U
AON1	CR11-SBSD-23	1,2,3,4,7,8-HxCDD	0.255 J EMPC	0.255 U
AON1	CR11-SBSD-23	1,2,3,6,7,8-HxCDD	0.631 J EMPC	0.631 U
AON1	CR11-SBSD-23	1,2,3,4,6,7,8-HpCDF	0.317 J EMPC	0.317 U
AON1	CR11-SBSD-23	Total TCDF	0.303 EMPC	0.303 U
AON1	CR11-SBSD-23	Total TCDD	7.61 EMPC	7.61 U
AON1	CR11-SBSD-23	Total PeCDF	0.111 EMPC	0.111 U
AON1	CR11-SBSD-23	Total HxCDF	0.599 EMPC	0.599 U
AON1	CR11-SBSD-23	Total HxCDD	18.1 EMPC	18.1 U
AON1	CR11-SBSD-23	Total HpCDF	1.28 EMPC	1.28 U
AON2	CR09a-SSD-COMP	1.2.37.8-PeCDF	0.383 JX EMPC	0.383 U
AON2	CR09a-SSD-COMP	2,3,4,7,8-PeCDF	0.379 J EMPC	0.379 U
AON2	CR09a-SSD-COMP	1,2,3,4,7,8-HxCDF	0.991 EMPC	0.991 U
AON2	CR09a-SSD-COMP	Total TCDF	6.42 EMPC	6.42 U
AON2	CR09a-SSD-COMP	Total TCDD	8.55 EMPC	8.55 U
AON2	CR09a-SSD-COMP	Total PeCDF	10.6 EMPC	10.6 U
AON2	CR09a-SSD-COMP	Total PeCDD	12.4 EMPC	12.4 U
AON2	CR09a-SSD-COMP	Total HxCDF	22.2 EMPC	22.2 U
AON2	CR09a-SSD-COMP	Total HxCDD	48.3 EMPC	48.3 U
AON2	CR09b-SSD-COMP	2,3,7,8-TCDD	2.06 EMPC	2.06 U
AON2	CR09b-SSD-COMP	2,3,4,7,8-PeCDF	0.528 EMPC	0.528 U
AON2	CR09b-SSD-COMP	1,2,3,4,7,8-HxCDF	1.16 EMPC	1.16 U
AON2	CR09b-SSD-COMP	Total TCDF	12.5 EMPC	12.5 U
AON2	CR09b-SSD-COMP	Total TCDD	15.4 EMPC	15.4 U
AON2	CR09b-SSD-COMP	Total PeCDF	16.5 EMPC	16.5 U
AON2	CR09b-SSD-COMP	Total PeCDD	21.0 EMPC	21.0 U
AON2	CR09b-SSD-COMP	Total HxCDF	30.8 EMPC	30.8 U
AON2	CR09b-SSD-COMP	Total HxCDD	72.3 EMPC	72.3 U
AON2	CR09b-SSD-COMP	Total HpCDF	58.9 EMPC	58.9 U
AON3	CR20-S-5.0	1,2,3,7,8-PeCDF	4.85 EMPC	4.85 U
AON3	CR20-S-5.0	Total TCDF	50.9 EMPC	50.9 U
AON3	CR20-S-5.0	Total TCDD	79.6 EMPC	79.6 U

Report	Sample	Component	Laboratory-Reported Result (pg/g)	Result of Record (pg/g)
AON3	CR20-S-5.0	Total PeCDF	316 EMPC	316 U
AON3	CR20-S-5.0	Total HxCDF	1340 EMPC	1340 U
AON3	CR20-S-5.0	Total HxCDD	843 EMPC	843 U
AON3	CR20-S-5.0	Total HpCDF	3080 EMPC	3080 U
AON3	CR21-S-5.0	2,3,7,8-TCDF	0.657 J EMPC	0.657 U
AON3	CR21-S-5.0	2,3,7,8-TCDD	0.467 J EMPC	0.467 U
AON3	CR21-S-5.0	2,3,4,7,8-PeCDF	0.727 J EMPC	0.727 U
AON3	CR21-S-5.0	Total TCDF	7.08 EMPC	7.08 U
AON3	CR21-S-5.0	Total TCDD	4.89 EMPC	4.89 U
AON3	CR21-S-5.0	Total PeCDF	36.3 EMPC	36.3 U
AON3	CR21-S-5.0	Total PeCDD	14.9 EMPC	14.9 U
AON3	CR21-S-5.0	Total HxCDF	95.5 EMPC	95.5 U
AOV8	CR17-D-SSD	2,3,7,8-TCDF	0.406 J EMPC	0.406 U
AOV8	CR17-D-SSD	1,2,3,7,8-PeCDF	0.213 J EMPC	0.213 U
AOV8	CR17-D-SSD	2,3,4,7,8-PeCDF	0.239 J EMPC	0.239 U
AOV8	CR17-D-SSD	2,3,4,6,7,8-HxCDF	0.443 J EMPC	0.443 U
AOV8	CR17-D-SSD	1,2,3,7,8,9-HxCDF	0.324 J EMPC	0.324 U
AOV8	CR17-D-SSD	1,2,3,4,7,8-HxCDD	0.736 J EMPC	0.736 U
AOV8	CR17-D-SSD	1,2,3,4,7,8,9-HpCDF	0.483 J EMPC	0.483 U
AOV8	CR17-D-SSD	Total TCDF	4.27 EMPC	4.27 U
AOV8	CR17-D-SSD	Total TCDD	12.4 EMPC	12.4 U
AOV8	CR17-D-SSD	Total PeCDF	4.66 EMPC	4.66 U
AOV8	CR17-D-SSD	Total PeCDD	16.7 EMPC	16.7 U
AOV8	CR17-D-SSD	Total HxCDF	10.8 EMPC	10.8 U
AOV8	CR17-D-SSD	Total HxCDD	45.8 EMPC	45.8 U
AOV8	CR17-D-SSD	Total HpCDF	21.2 EMPC	21.2 U
AOV8	CR08A-SBSD	1,2,3,7,8,9-HxCDF	0.258 J EMPC	0.258 U
AOV8	CR08A-SBSD	1,2,3,4,7,8-HxCDD	0.583 J EMPC	0.583 U
AOV8	CR08A-SBSD	1,2,3,4,7,8,9-HpCDF	0.250 J EMPC	0.250 U
AOV8	CR08A-SBSD	Total TCDF	0.656 EMPC	0.656 U
AOV8	CR08A-SBSD	Total TCDD	12.0 EMPC	12.0 U
AOV8	CR08A-SBSD	Total PeCDF	0.428 EMPC	0.428 U
AOV8	CR08A-SBSD	Total PeCDD	12.7 EMPC	12.7 U
AOV8	CR08A-SBSD	Total HxCDF	1.27 EMPC	1.27 U
AOV8	CR08A-SBSD	Total HxCDD	33.2 EMPC	33.2 U
AOV8	CR08A-SBSD	Total HpCDF	3.43 EMPC	3.43 U
AOV8	CR08a-SSD-COMP	1,2,3,7,8-PeCDF	0.483 J EMPC	0.483 U
AOV8	CR08a-SSD-COMP	1,2,3,4,7,8,9-HpCDF	2.10 EMPC	2.10 U
AOV8	CR08a-SSD-COMP	Total TCDF	10.9 EMPC	10.9 U
AOV8	CR08a-SSD-COMP	Total TCDD	23.9 EMPC	23.9 U
AOV8	CR08a-SSD-COMP	Total PeCDF	12.8 EMPC	12.8 U
AOV8	CR08a-SSD-COMP	Total PeCDD	25.9 EMPC	25.9 U

Report	Sample	Component	Laboratory-Reported Result (pg/g)	Result of Record (pg/g)
AOV8	CR08a-SSD-COMP	Total HxCDF	44.0 EMPC	44.0 U
AOV8	CR08a-SSD-COMP	Total HxCDD	147 EMPC	147 U
AOV8	CR08a-SSD-COMP	Total HpCDF	126 EMPC	126 U
AOV9	CR08b-SBSD	1,2,3,7,8-PeCDF	0.288 J EMPC	0.288 U
AOV9	CR08b-SBSD	1,2,3,4,6,7,8-HpCDF	0.295 J EMPC	0.295 U
AOV9	CR08b-SBSD	OCDF	0.802 J EMPC	0.802 U
AOV9	CR08b-SBSD	Total TCDF	10.7 EMPC	10.7 U
AOV9	CR08b-SBSD	Total TCDD	21.4 EMPC	21.4 U
AOV9	CR08b-SBSD	Total PeCDF	2.08 EMPC	2.08 U
AOV9	CR08b-SBSD	Total PeCDD	21.9 EMPC	21.9 U
AOV9	CR08b-SBSD	Total HxCDF	0.888 EMPC	0.888 U
AOV9	CR08b-SBSD	Total HxCDD	45.4 EMPC	45.4 U
AOV9	CR08b-SBSD	Total HpCDF	0.643 EMPC	0.643 U
AOW1	CR19F-SSD	1,2,3,7,8-PeCDF	0.613 JX EMPC	0.613 U
AOW1	CR19F-SSD	1,2,3,7,8,9-HxCDF	0.571 J EMPC	0.571 U
AOW1	CR19F-SSD	Total TCDF	25.6 EMPC	25.6 U
AOW1	CR19F-SSD	Total TCDD	20.6 EMPC	20.6 U
AOW1	CR19F-SSD	Total PeCDF	23.6 EMPC	23.6 U
AOW1	CR19F-SSD	Total PeCDD	26.4 EMPC	26.4 U
AOW1	CR19F-SSD	Total HxCDF	40.2 EMPC	40.2 U
AOW1	CR19F-SSD	Total HxCDD	93.0 EMPC	93.0 U
AOW1	CR19F-SSD	Total HpCDF	62.7 EMPC	62.7 U
AOW1	CR18B-SSD	2,3,7,8-TCDF	0.381 J EMPC	0.381 U
AOW1	CR18B-SSD	1,2,3,7,8-PeCDF	0.157 J EMPC	0.157 U
AOW1	CR18B-SSD	2,3,4,7,8-PeCDF	0.183 J EMPC	0.183 U
AOW1	CR18B-SSD	1,2,3,4,7,8-HxCDF	0.424 J EMPC	0.424 U
AOW1	CR18B-SSD	1,2,3,6,7,8-HxCDF	0.294 J EMPC	0.294 U
AOW1	CR18B-SSD	Total TCDF	4.57 EMPC	4.57 U
AOW1	CR18B-SSD	Total TCDD	15.9 EMPC	15.9 U
AOW1	CR18B-SSD	Total PeCDF	4.65 EMPC	4.65 U
AOW1	CR18B-SSD	Total PeCDD	20.5 EMPC	20.5 U
AOW1	CR18B-SSD	Total HxCDF	8.92 EMPC	8.92 U
AOW1	CR18B-SSD	Total HxCDD	46.9 EMPC	46.9 U
AOW2	CR15C-SSD	2,3,4,7,8-PeCDF	0.505 J EMPC	0.505 U
AOW2	CR15C-SSD	1,2,3,4,7,8-HxCDF	1.25 EMPC	1.25 U
AOW2	CR15C-SSD	2,3,4,6,7,8-HxCDF	1.21 EMPC	1.21 U
AOW2	CR15C-SSD	1,2,3,4,7,8,9-HpCDF	0.959 J EMPC	0.959 U
AOW2	CR15C-SSD	Total TCDF	13.7 EMPC	13.7 U
AOW2	CR15C-SSD	Total TCDD	20.3 EMPC	20.3 U
AOW2	CR15C-SSD	Total PeCDF	12.6 EMPC	12.6 U
AOW2	CR15C-SSD	Total HxCDF	28.1 EMPC	28.1 U
AOW2	CR15C-SSD	Total HxCDD	76.1 EMPC	76.1 U

Report	Sample	Component	Laboratory-Reported Result (pg/g)	Result of Record (pg/g)
AOW2	CR15C-SSD	Total HpCDF	60.7 EMPC	60.7 U
AOW2	CR08b-SSD-COMP	Total TCDF	21.7 EMPC	21.7 U
AOW2	CR08b-SSD-COMP	Total TCDD	25.0 EMPC	25.0 U
AOW2	CR08b-SSD-COMP	Total PeCDF	35.9 EMPC	35.9 U
AOW2	CR08b-SSD-COMP	Total HxCDF	119 EMPC	119 U
AOW2	CR08b-SSD-COMP	Total HpCDF	243 EMPC	243 U

EMPC = estimated maximum potential concentration.
J = the result is an estimated value.
pg/g = picograms per gram.
U = the result is non-detect.

Report	Sample	Component	Laboratory-Reported Result (pg/L)	Result of Record (pg/L)
AUD1	Storm-01	2,3,7,8-TCDF	0.872 J EMPC	0.872 U
AUD1	Storm-01	1,2,3,7,8-PeCDF	1.13 J EMPC	1.13 U
AUD1	Storm-01	1,2,3,6,7,8-HxCDF	1.38 J EMPC	1.38 U
AUD1	Storm-01	2,3,4,6,7,8-HxCDF	2.26 J EMPC	2.26 U
AUD1	Storm-01	1,2,3,7,8,9-HxCDF	0.949 J EMPC	0.949 U
AUD1	Storm-01	1,2,3,4,7,8-HxCDD	0.795 J EMPC	0.795 U
AUD1	Storm-01	1,2,3,4,7,8,9-HpCDF	2.67 J EMPC	2.67 U
AUD1	Storm-01	Total TCDF	9.23 EMPC	9.23 U
AUD1	Storm-01	Total TCDD	39.8 EMPC	39.8 U
AUD1	Storm-01	Total PeCDF	30.1 EMPC	30.1 U
AUD1	Storm-01	Total PeCDD	18.6 EMPC	18.6 U
AUD1	Storm-01	Total HxCDF	88.0 EMPC	88.0 U
AUD1	Storm-01	Total HxCDD	100 EMPC	100 U
AUD1	Storm-01	Total HpCDF	130 EMPC	130 U

EMPC = estimated maximum potential concentration.
J = the result is an estimated value.
pg/L = picograms per liter.
U = the result is non-detect.

In reports AON0, AOV8, and AOW2, the USEPA Method 1613B OCDD result for samples CR22-S-3.0 and CR08a-SSD-COMP exceeded the instrument calibration range. The results have been qualified as estimated by the reviewer as follows:

Report	Sample	Component	Laboratory-Reported Result (pg/g)	Result of Record (ug/kg)
AON0	CR22-S-3.0	OCDD	30800	30800 J
AOV8	CR08a-SSD-COMP	OCDD	13700	13700 J
AOW2	CR0b-SSD-COMP	OCDD	22200	22200 J

J = the result is an estimated value.
ug/kg = micrograms per kilogram.

In report AON3, the laboratory flagged USEPA Method 8082A Aroclor 1254 results for sample CR20-S-5.0 due to primary and confirmation column relative percent differences (RPDs) greater than or equal to 40 percent. The laboratory did not detect chromatographic interference. The results were qualified "J", as estimated, by the reviewer. Qualifications are as follows:

Report	Sample	Component	Laboratory-Reported Result (ug/kg)	Result of Record (ug/kg)
AON3	CR20-S-5.0	Aroclor 1254	710	710 J
AON3	CR21-S-5.0	Aroclor 1254	73	73 J

J = the result is an estimated value.
ug/kg = micrograms per kilogram.

In report AOT3, the preserved (fixed) total solids result was greater than the total solids result. The preserved total solids value was within 20 percent of the total solids value; thus, no results were qualified.

The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

Holding Times

All TOC analysis dates exceeded the recommended 14-day holding time; however, samples from reports AON1, AON2, AOV8, AOW1, and AOW2 were prepared for analysis within 14 days of sample collection. Samples from report ASF7 were prepared from containers frozen at the time of receipt. No data required qualification.

USEPA Method 8270D and 8270D SIM extractions were conducted one to two days past the 14-day recommended holding times for sediment samples associated with reports AOV9 and AOW2. The reviewer confirmed with ARI that the affected samples were extracted from containers stored at -18°C from the time of login. Sediment sample storage at -18°C

extends USEPA Method 8270D and 8270D-SIM holding time to one year. No qualification was required.

Remaining extractions and analyses were performed within the recommended holding time criteria.

Preservation and Sample Storage

The samples were preserved and stored appropriately.

BLANKS

Method Blanks

Laboratory method blank analyses were performed at the required frequencies. For purposes of data qualification, the method blanks were associated with all samples prepared in the analytical batch.

If an analyte was detected in a sample and in the associated method blank, the sample result was qualified if the concentration was less than five times the method blank concentration for USEPA Method 1613B results and less than ten times the method blank concentration for remaining analysis results. Method reporting limits (MRLs) were elevated to the concentration detected in the samples and results were qualified as not detected "U" at the elevated MRL. The reviewer did not qualify remaining results.

Sample results less than five times the MRL were qualified by the reviewer with "J+", as estimated with a positive bias, if sample results were also within ten times a method blank concentration that was below the MRL.

For USEPA Method 1613B results, analytes detected in a sample and in the associated method blank below the MRL but above the EDL were qualified as "U" at the reporting limit. Method blank detections flagged as EMPCs did not result in qualification.

In report AON3, the USEPA Method 1613B method blank had detections for some analytes below the MRL and a detection of OCDD above the MRL. All associated sample results were above the MRL and greater than five times the method blank concentrations; thus, no results were qualified.

In reports AON0, AON1, and AON2, the soil and sediment matrix USEPA Method 1613B method blank (MB-102315) had several detections below the MRL and a detection for OCDD above the MRL. The following results were qualified

Report	Sample	Component	Laboratory-Reported Result (pg/g)	Result of Record (pg/g)
AON0	CR23-S-3.0	2,3,4,6,7,8-HxCDF	0.133 J	0.133 U

J = the result is an estimated value.
pg/g = pictograms per gram.
U = the result is non-detect.

In report AOV8, the sediment matrix USEPA Method 1613B method blank (MB-102615) had detections of some analytes below the MRL and detections of 1,2,3,4,6,7,8-HpCDD and OCDD above the MRL. All associated sample results were either qualified based on EMPC, were non-detect, or were greater than five times the method blank concentration; thus, no results were qualified.

In reports AOV9, AOW1, and AOW2, the sediment matrix USEPA Method 8270D method blank (MB-103015) had a detection of diethylphthalate above the reporting limit, at 21 ug/kg. Associated samples were qualified by the reviewer as follows:

Report	Sample	Component	Laboratory-Reported Result (ug/kg)	Result of Record (ug/kg)
AOV9	CR26-SBSD	Diethylphthalate	20	20 U
AOW1	CR19F-SBSD	Diethylphthalate	24	24 U
AOW1	CR19F-SBSD-DUP	Diethylphthalate	38	38 U
AOW1	CR19F-SSD	Diethylphthalate	22	22 U
AOW1	SR18B-SBSD	Diethylphthalate	20	20 U
AOW1	SR18B-SSD	Diethylphthalate	40	40 U
AOW2	CR15C-SSD	Diethylphthalate	21	21 U
AOW2	CR15C-SBSD	Diethylphthalate	26	26 U
AOW2	CR08b-SSD-COMP	Diethylphthalate	36	36 U

J = the result is an estimated value.
U = the result is non-detect.
ug/kg = micrograms per kilogram.

In reports AOV9, AOW1, and AOW2, the sediment matrix USEPA Method 1613B method blank (MB-102615) had a detection of 1,2,3,7,8,9-HxCDF below the MRL and detections of 1,2,3,4,6,7,8-HpCDD and OCDD above the MRL. The following results were qualified:

Report	Sample	Component	Laboratory-Reported Result (pg/g)	Result of Record (pg/g)
AOV9	CR08b-SBSD	1,2,3,7,8,9-HxCDF	0.146 J	0.146 U
AOV9	CR08b-SBSD	OCDD	45.4	45.4 U
AOW1	CR18B-SSD	1,2,3,7,8,9-HxCDF	0.226 J	0.226 U

Report	Sample	Component	Laboratory-Reported Result (pg/g)	Result of Record (pg/g)
AOW2	CR15C-SSD	1,2,3,7,8,9-HxCDF	0.338 J	0.338 U

J = the result is an estimated value.
pg/g = pictograms per gram.
U = the result is non-detect.

In report AOT3, the USEPA Method 8270D sediment matrix method blank (MB-102815) had a detection for phenol below the reporting limit, at 17 ug/kg. The associated sample, CR19D-SSD-CONV, had a phenol detection above the reporting limit, at 93 ug/kg. The reviewer qualified the result as estimated with a positive bias (J+) as follows:

Report	Sample	Component	Laboratory-Reported Result (ug/kg)	Result of Record (ug/kg)
AOT3	CR19D-SSD-CONV	Phenol	93	93 J+

J+ = the result is an estimated value with a positive bias.
U = the result is non-detect.
ug/kg = micrograms per kilogram.

All remaining method blanks were non-detect.

Trip Blanks

Trip blanks were not submitted for analysis.

Equipment Rinsate Blanks

Equipment rinsate blanks were not submitted for analysis.

SURROGATE RECOVERY RESULTS

The samples were spiked with surrogate compounds to evaluate laboratory performance on individual samples. The laboratory appropriately documented and qualified surrogate outliers. Associated batch quality assurance/quality control for samples with surrogate outliers were within acceptance limits, except where otherwise noted. Sample results associated with surrogate percent recovery exceedances caused by dilutions were not qualified by the reviewer.

In report AON0, the USEPA Method 8270D surrogate p-terphenyl-d14 result was below the lower percent recovery acceptance limit of 28 percent, at 24.9 percent for sample CR23-GW-6.0. The surrogate p-terphenyl-d14 is a base/neutral surrogate, and the remaining base/neutral surrogates for sample CR23-GW-6.0 were within percent recovery acceptance limits. No results were qualified.

In report AON0, the NWTPH-Dx surrogate o-terphenyl result was below the lower percent recovery acceptance limit of 50 percent, at 47.6 percent for sample CR23-GW-6.0. Associated sample results were qualified "J" as estimated by the reviewer as follows:

Report	Sample	Component	Laboratory-Reported Result (mg/L)	Result of Record (mg/L)
AON0	CR23-GW-6.0	Diesel	3.4	3.4 J
AON0	CR23-GW-6.0	Motor Oil	3.2	3.2 J

J = the result is an estimated value.
mg/L = milligrams per liter.

In report AON3, the USEPA Method 8082A surrogate decachlorobiphenyl exceeded the upper percent recovery acceptance limit of 120 percent, at 126 percent due to co-elution with some Aroclors compounds. The exceedance was minor, and the remaining surrogate had acceptable percent recovery; thus, no results were qualified.

All remaining surrogate recoveries were within acceptance limits.

LABELED ANALOG RECOVERY RESULTS

In reports AON0, AON2, AON3, AOV8, AOV9, AOW1, and AOW2, USEPA Method 1613B samples were spiked with carbon-13 (C13) labeled analog standards to quantify the relative response of analytes in each sample. All C13 labeled analog standard recoveries were within acceptance limits.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Matrix spike/matrix spike duplicate (MS/MSD) results are used to evaluate laboratory precision and accuracy. All MS/MSD samples were extracted and analyzed at the required frequency. Control limits were not included with most MS/MSD results. The reviewer confirmed that MS/MSDs met percent recovery and RPD acceptance criteria, with the following exceptions:

In reports AON1, sediment matrix USEPA Method 8270D MS/MSD results for 4-methylphenol were above the upper percent recovery acceptance limit, with percent recoveries of 162 percent and 139 percent, respectively. The MS/MSD results for N-nitrosodiphenylamine were below lower percent recovery acceptance limits, at 24.5 percent and 12.2 percent, respectively. The RPD for N-nitrosodiphenylamine exceeded the control limit, at 67 percent. The associated laboratory control sample (LCS) had acceptable percent recoveries for both compounds. The sample used to prepare the MS/MSD was qualified by the reviewer as follows:

Report	Sample	Component	Laboratory-Reported Result (ug/kg)	Result of Record (ug/kg)
AON1	CR12-SBSD-15	4-Methylphenol	870	870 J
AON1	CR12-SBSD-15	N-Nitrosodiphenylamine	20 U	20 UJ

J = the result is an estimated value.
ug/kg = micrograms per kilogram.
UJ = the result is non-detect and an estimated value.

In report AON1, sediment matrix USEPA Method 8270D-SIM MS/MSD results for N-nitrosodiphenylamine were below lower percent recovery acceptance limits, at 28.4 percent and 14.5 percent, respectively. The RPD for N-nitrosodiphenylamine exceeded the control limit, at 64.6 percent. The associated LCS had acceptable percent recovery. The sample used to prepare the MS/MSD was qualified as follows:

Report	Sample	Component	Laboratory-Reported Result (ug/kg)	Result of Record (ug/kg)
AON1	CR12-SBSD-15	N-Nitrosodiphenylamine	4.9 U	4.9 UJ

ug/kg = micrograms per kilogram.
UJ = the result is non-detect and an estimated value.

In report AON3, the soil matrix USEPA Method 6010C MS result for total chromium was below the lower percent recovery acceptance limit of 75 percent, at -5.4 percent. The associated LCS met percent recovery acceptance limits for total chromium. The associated laboratory duplicate exceeded RPD acceptance limits for total chromium. Associated samples are qualified in the laboratory duplicate section below.

In report AOV8, the sediment matrix USEPA Method 8270D-SIM MS/MSD results for pentachlorophenol and the MS result for 2,4-dimethylphenol were flagged with "E" by ARI due to concentrations exceeding the instrument calibration range. The reviewer confirmed that the same MS/MSD extract was analyzed by both 8270D dual scan and 8270D-SIM. The MS/MSD met percent recovery acceptance limits for pentachlorophenol and 2,4-dimethylphenol by both USEPA Method 8270D and 8270D-SIM, and analytical results for the same samples reported by both methods were consistent; thus, no results were qualified.

All remaining MS/MSD results were within acceptance limits for percent recovery and RPDs.

LABORATORY DUPLICATE RESULTS

Duplicate results are used to evaluate laboratory precision. All duplicate samples were extracted and analyzed at the required frequency. Laboratory duplicate results that had concentrations less than five times the reporting limit were not evaluated.

In report AON3, the soil matrix USEPA Method 6010C laboratory duplicate prepared with sample CR20-S-5.0 exceeded the RPD control limit of 20 percent for total chromium, at 119 percent. The associated LCS met percent recovery acceptance limits. The MS prepared with the same sample also exceeded total chromium control limits. The sample used to prepare the laboratory duplicate is likely heterogeneous. Since the matrix of sample CR20-S-5.0 is expected to be similar to the matrix of site soils, both sample results were qualified "J" as estimated by the reviewer as follows:

Report	Sample	Component	Laboratory-Reported Result (mg/kg)	Result of Record (mg/kg)
AON3	CR20-S-5.0	Total Chromium	71	71 J
AON3	CR21-S-5.0	Total Chromium	32	32 J

Report	Sample	Component	Laboratory-Reported Result (mg/kg)	Result of Record (mg/kg)

J = the result is an estimated value.
mg/kg = milligrams per kilogram.

The laboratory duplicates for solid matrix USEPA Method 6010C and 7471A batches prepared on November 2, 2015 were associated with results reported in AOV8, AOV9, AOW1, and AOW2. The laboratory duplicate results were reported only in AOW1 and met RPD control limits.

All remaining laboratory duplicate RPDs were within acceptance limits.

LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

Laboratory control sample/laboratory control sample duplicates (LCS/LCSD) are spiked with target analytes to provide information on laboratory precision and accuracy. The LCS/LCSD samples were extracted and analyzed at the required frequency. Control limits were not included with most LCS/LCSD results. The reviewer confirmed that LCS/LCSDs met percent recovery and RPD acceptance criteria, with the following exceptions:

In reports AON0 and AON3, the soil and sediment matrix USEPA Method 8270D LCS result for 4-chloroaniline was below the lower percent recovery acceptance limit of 11 percent, at 3.8 percent; the result for 3-nitroaniline was below the lower percent recovery acceptance limit of 22 percent, at 5.7 percent; and the LCS result for 3,3'-dichlorobenzidine was 0 percent. All associated sample results were non-detect. Due to the low LCS percent recoveries, the results have been qualified with "R" as rejected by the reviewer as shown in the table below. Qualifications are as follows:

Report	Sample	Component	Laboratory-Reported Result (ug/kg)	Result of Record (ug/kg)
AON0	CR07-SSD-COMP	4-Chloroaniline	97 U	97 R
AON0	CR07-SSD-COMP	3-Nitroaniline	97 U	97 R
AON0	CR07-SSD-COMP	3,3'-Dichlorobenzidine	97 U	97 R
AON0	CR23-S-3.0	4-Chloroaniline	93 U	93 R
AON0	CR23-S-3.0	3-Nitroaniline	93 U	93 R
AON0	CR23-S-3.0	3,3'-Dichlorobenzidine	93 U	93 R
AON0	CR22-S-3.0	4-Chloroaniline	190 U	190 R
AON0	CR22-S-3.0	3-Nitroaniline	190 U	190 R
AON0	CR22-S-3.0	3,3'-Dichlorobenzidine	190 U	190 R
AON3	CR20-S-5.0	4-Chloroaniline	1400 U	1400 R
AON3	CR20-S-5.0	3-Nitroaniline	1400 U	1400 R
AON3	CR20-S-5.0	3,3'-Dichlorobenzidine	1400 U	1400 R
AON3	CR21-S-5.0	4-Chloroaniline	460 U	460 R
AON3	CR21-S-5.0	3-Nitroaniline	460 U	460 R
AON3	CR21-S-5.0	3,3'-Dichlorobenzidine	460 U	460 R

Report	Sample	Component	Laboratory-Reported Result (ug/kg)	Result of Record (ug/kg)

ug/kg = micrograms per kilogram.
R = the result is rejected.

In reports AON0 and AON3, the groundwater and surface water matrix USEPA Method 8270D LCSD result for 2,2'-oxybis (1-chloropropane) was below the lower percent recovery acceptance limit of 47 percent, at 44.4 percent. The LCS result was within the percent recovery acceptance limit; thus, no results were qualified. The LCS/LCSD exceeded RPD acceptance limits of 30 percent for phenol, bis(2-chloroethyl)ether, and 2-chlorophenol. Associated samples were non-detect; thus, no results were qualified.

In reports AON1, AOV8, AOV9, AOW1, and AOW2, the USEPA Method 8270D-SIM LCS results for pentachlorophenol were flagged with "E" by ARI due to concentrations exceeding the instrument calibration range. The reviewer confirmed that the same LCS extract was analyzed by both 8270D dual scan and 8270D-SIM. The LCS met percent pentachlorophenol percent recovery acceptance limits for both methods. The pentachlorophenol results reported by both methods for the same samples were consistent; thus, no results were qualified.

All remaining LCS/LCSD results were within acceptance limits for percent recovery and RPD.

FIELD DUPLICATE RESULTS

One field duplicate was submitted for analysis with report AOW1 (CRF19F-SBSD/CRF19F-SBSD-DUP). MFA uses acceptance criteria of 100 percent RPD for results that are less than five times the MRL or 50 percent RPD for results that are greater than five times the MRL. Non-detect data are not used in the evaluation of field duplicate results. All field duplicate analytes were within the acceptance criteria.

CONTINUING CALIBRATION VERIFICATION RESULTS

Continuing calibration verification (CCV) results are used to demonstrate instrument precision and accuracy throughout the sample batch. ARI reported CCV-qualified results. CCV exceedances associated with quality control samples and surrogate results that met percent recovery acceptance limits were not qualified by the reviewer.

In reports AON1 and AON2, the solid matrix USEPA Method 8270D-SIM CCV analyzed on November 5, 2015 exceeded percent drift acceptance limits for pentachlorophenol. All associated results were qualified as estimated by the reviewer with "UJ" for non-detect results and "J" for detected results, as follows:

Report	Sample	Component	Laboratory-Reported Result (ug/kg)	Result of Record (ug/kg)
AON1	CR-24-SSD-COMP	Pentachlorophenol	86 Q	86 J

Report	Sample	Component	Laboratory-Reported Result (ug/kg)	Result of Record (ug/kg)
AON1	CR11-SBSD-23	Pentachlorophenol	19 U	19 UJ
AON1	CR12-SBSD-15	Pentachlorophenol	20 U	20 UJ
AON1	CR13-SBSD-11	Pentachlorophenol	20 U	20 UJ
AON1	CR14-SBSD-12	Pentachlorophenol	20 U	20 UJ
AON2	CR09a-SSD-COMP	Pentachlorophenol	19 U	19 UJ
AON2	CR09b-SSD-COMP	Pentachlorophenol	19 U	19 UJ

In reports AON0 and AON3, the solid matrix USEPA Method 8270D CCV analyzed on October 28, 2015 exceeded percent drift acceptance limits for phenol, carbazole, and 3,3'-dichlorobenzidine. Associated sample results have been qualified as estimated by the reviewer with "J," except for 3,3'-dichlorobenzidine results, which were already qualified in the LCS/LCSD section. Results detected below the reporting limit were already flagged by the laboratory as estimated; no additional qualification was required. Qualified results are as follows:

Report	Sample	Component	Laboratory-Reported Result (ug/kg)	Result of Record (ug/kg)
AON0	CR-07-SSD-COMP	Carbazole	24	24 J
AON0	CR23-S-3.0	Phenol	19 U	19 UJ
AON0	CR23-S-3.0	Carbazole	19 U	19 UJ
AON0	CR22-S-3.0	Phenol	38 U	38 UJ
AON0	CR22-S-3.0	Carbazole	38 U	38 UJ
AON3	CR20-S-5.0	Phenol	280 U	280 UJ
AON3	CR20-S-5.0	Carbazole	280 U	280 UJ
AON3	CR21-S-5.0	Phenol	92 U	92 UJ
AON3	CR21-S-5.0	Carbazole	92 U	92 UJ

J = the result is an estimated value.
U = the result is non-detect.
ug/kg = micrograms per kilogram.
UJ = the result is non-detect and an estimated value.

In reports AON0 and AON3, the aqueous matrix USEPA Method 8270D CCV analyzed on October 23, 2015 exceeded percent drift acceptance limits for benzoic acid, hexachlorocyclopentadiene, 2,4-dinitrophenol, 4-nitrophenol, and pentachlorophenol. Associated sample results that were non-detect have been qualified as estimated by the reviewer with "UJ." Sample results reported between one-half of the MRL and the MRL are estimated values and were not additionally qualified by the reviewer. Qualified results are summarized as follows:

Report	Sample	Component	Laboratory-Reported Result (ug/L)	Result of Record (ug/L)
AON0	CR23-GW-6.0	Hexachlorocyclopentadiene	5.0 U	5.0 UJ
AON0	CR23-GW-6.0	2,4-Dinitrophenol	20 U	20 UJ
AON0	CR23-GW-6.0	4-Nitrophenol	10 U	10 UJ

Report	Sample	Component	Laboratory-Reported Result (ug/L)	Result of Record (ug/L)
AON0	CR23-GW-6.0	Pentachlorophenol	10 U	10 UJ
AON0	CR22-GW-9.0	Benzoic acid	20 U	20 UJ
AON0	CR22-GW-9.0	Hexachlorocyclopentadiene	5.0 U	5.0 UJ
AON0	CR22-GW-9.0	2,4-Dinitrophenol	20 U	20 UJ
AON0	CR22-GW-9.0	4-Nitrophenol	10 U	10 UJ
AON0	CR22-GW-9.0	Pentachlorophenol	10 U	10 UJ
AON3	CR21-GW-10	Benzoic acid	20 U	20 UJ
AON3	CR21-GW-10	Hexachlorocyclopentadiene	5.0 U	5.0 UJ
AON3	CR21-GW-10	2,4-Dinitrophenol	20 U	20 UJ
AON3	CR21-GW-10	4-Nitrophenol	10 U	10 UJ
AON3	CR21-GW-10	Pentachlorophenol	10 U	10 UJ
AON3	CR20-GW-5.0	Benzoic acid	20 U	20 UJ
AON3	CR20-GW-5.0	Hexachlorocyclopentadiene	5.0 U	5.0 UJ
AON3	CR20-GW-5.0	2,4-Dinitrophenol	20 U	20 UJ
AON3	CR20-GW-5.0	4-Nitrophenol	10 U	10 UJ
AON3	CR20-GW-5.0	Pentachlorophenol	10 U	10 UJ
AON3	Seep-01	Benzoic acid	20 U	20 UJ
AON3	Seep-01	Hexachlorocyclopentadiene	5.0 U	5.0 UJ
AON3	Seep-01	2,4-Dinitrophenol	20 U	20 UJ
AON3	Seep-01	4-Nitrophenol	10 U	10 UJ
AON3	Seep-01	Pentachlorophenol	10 U	10 UJ

UJ = the result is non-detect and an estimated value.
ug/L = micrograms per liter.

In reports AON0 and AON3, ARI reported in the case narrative that a USEPA Method 8082A CCV exceeded the percent drift acceptance limit for Aroclor 1242. The reviewer confirmed that the CCV was associated with aqueous matrix samples. The CCVs analyzed on the secondary column met percent drift acceptance criteria, and ARI quantified results from the secondary column; thus, no qualification was required.

In reports AOV8 and AOV9, the solid matrix USEPA Method 8270D CCV analyzed on October 30, 2015 exceeded percent drift acceptance limits for 4-methylphenol and benzoic acid. Associated sample results detected below the reporting limit were already flagged by the laboratory as estimated; no additional qualification was required. Remaining qualified results are summarized below. The CCV also exceeded percent drift acceptance limits for some compounds that were not reported, and no action was required by the reviewer for these exceedances. Qualifications are as follows:

Report	Sample	Component	Laboratory-Reported Result (ug/kg)	Result of Record (ug/kg)
AOV8	CR17-D-SSD	4-Methylphenol	19 U	19 UJ
AOV8	CR17-D-SBSD	4-Methylphenol	120	120 J
AOV8	CR17-D-SSD	Benzoic Acid	230	230 J

Report	Sample	Component	Laboratory-Reported Result (ug/kg)	Result of Record (ug/kg)
AOV8	CR08A-SBSD	4-Methylphenol	190	190 J
AOV8	CR10-SSD-COMP	4-Methylphenol	160	160 J
AOV8	CR10-SSD-COMP	Benzoic Acid	210	210 J
AOV8	CR08a-SSD-COMP	4-Methylphenol	28	28 J
AOV9	CR08b-SBSD	4-Methylphenol	560	560 J
AOV9	CR08b-SBSD	Benzoic Acid	290	290 J

J = the result is an estimated value.
ug/kg = micrograms per kilogram.
UJ = the result is non-detect and an estimated value.

In reports AOV9, AOW1, and AOW2, the solid matrix USEPA Method 8270D-SIM CCV analyzed on November 5, 2015 exceeded percent drift acceptance limits for pentachlorophenol. Associated sample results that were non-detect have been qualified as estimated by the reviewer with "UJ." Associated sample results detected below the reporting limit were already flagged by the laboratory as estimated; no additional qualification was required. Qualified results are summarized below.

Report	Sample	Component	Laboratory-Reported Result (ug/kg)	Result of Record (ug/kg)
AOV9	CR26-SBSD	Pentachlorophenol	20 U	20 UJ
AOW1	CR19F-SBSD	Pentachlorophenol	20 U	20 UJ
AOW1	CR19F-SBSD-DUP	Pentachlorophenol	20 U	20 UJ
AOW2	CR15C-SSD	Pentachlorophenol	20 U	20 UJ
AOW2	CR15C-SBSD	Pentachlorophenol	20 U	20 UJ

ug/kg = micrograms per kilogram.
UJ = the result is non-detect and an estimated value.

In reports AOW1 and AOW2, the solid matrix USEPA Method 8270D CCV analyzed on November 14, 2015 exceeded percent drift acceptance limits for benzoic acid, diethylphthalate, and pentachlorophenol. Associated sample results detected below the MRL were already flagged by the laboratory as estimated; no additional qualification was required. Diethylphthalate results were already qualified by the reviewer in the method blank section above. Remaining qualified results are summarized below:

Report	Sample	Component	Laboratory-Reported Result (ug/kg)	Result of Record (ug/kg)
AOW1	CR18B-SBSD	Benzoic Acid	210	210 J
AOW1	CR18B-SBSD	Pentachlorophenol	99 U	99 UJ
AOW1	CR18B-SSD	Pentachlorophenol	99 U	99 UJ
AOW2	CR15C-SSD	Benzoic Acid	250	250 J
AOW2	CR15C-SSD	Pentachlorophenol	98 U	98 UJ
AOW2	CR15C-SBSD	Pentachlorophenol	98 U	98 UJ
AOW2	CR08b-SSD-COMP	Benzoic Acid	330	330 J

Report	Sample	Component	Laboratory-Reported Result (ug/kg)	Result of Record (ug/kg)
AOW2	CR08b-SSD-COMP	Pentachlorophenol	96 U	96 UJ

J = the result is an estimated value.
ug/kg = micrograms per kilogram.
UJ = the result is non-detect and an estimated value.

In report AUD1, ARI noted in the cover letter that USEPA Method 8270D CCV results for benzoic acid were above the acceptance limit for percent difference. The non-detect sample result has been qualified with "J" as estimated by the reviewer:

Report	Sample	Component	Laboratory-Reported Result (ug/L)	Result of Record (ug/L)
AUD1	Storm-01	Benzoic Acid	22 U	22 UJ

ug/L = micrograms per liter.
U = the result is non-detect.
UJ = the result is non-detect; RL posted is an estimated value.

The reviewer confirmed with ARI that remaining CCVs not reported by the laboratory were within acceptance limits for percent recovery.

REPORTING LIMITS

ARI evaluated USEPA Methods 6010C, 7470A, 7471A, 8082A, 8270D, and 8270D-SIM results to one-half the MRL. Non-detect results were reported at the MRL. ARI evaluated USEPA Method 1613B results to EDLs. Remaining results, including NWTPH-Dx, were evaluated and reported to MRLs. Results reported between MRL and one-half of the MRL or between the EDL and MRL were qualified by the laboratory with "J" as estimated. Some reporting limits were additionally raised due to matrix interference. NVL evaluated asbestos results to the 1 percent visual estimation detection limit.

Samples requiring dilutions because of high analyte concentrations and/or matrix interferences had elevated EDLs and/or RLs.

DATA PACKAGE

The data packages were reviewed for transcription errors, omissions, and anomalies.

In report AON2, sample CR09b-SSD-COMP was incorrectly transcribed by ARI during login as CRO96-SSD-COMP.T The sample name was corrected for the final report; however, USEPA Method 8270D and 8270D-SIM, and 8082A surrogate recovery summary pages in report AON2 display the incorrect sample name.

In report AON3, sample Seep-01 was not recorded on the chain of custody. The sample name, collection date and time, and analyses were provided by MFA after samples were received by ARI. A record of the request is included with the report.

USEPA Method 8270D analysis was added to samples in report AOW1 after samples were received by the laboratory. A record of the added analysis was not included with the final report.

In report AOW1, USEPA Method 8082A analysis was requested but not performed for samples CR18B-SBSD and CR18B-SSD. The results are reported in report ART5.

In report AUD1, total suspended solids analysis requested on the chain of custody was canceled due to insufficient sample volume. No additional action was required.

No additional issues were found.

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APPENDIX B

SEDIMENTATION AND HYDRAULICS ANALYSIS

Memorandum

To: Maul Foster Alongi

From: Tim Tschetter EIT, Larry Karpack PE

Date: March 5, 2020

Re: Seaport Landing Sedimentation and Hydraulic Analysis - Draft

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SUMMARY

This memorandum summarizes hydraulic and sedimentation analyses performed by Watershed Science and Engineering (WSE) to support Maul Foster Alongi's (MFA) Remedial Investigation (RI) for in-water portions of the Seaport Landing site. The site, owned by the Grays Harbor Seaport Authority, is located in Aberdeen, Washington near Grays Harbor at the mouth of the Chehalis River (Figure 1). The RI seeks to fill data gaps related to chemical and physical (woodwaste) contamination for in-water sediments. WSE's work included two tasks: 1) review of historical aerial imagery and topographic datasets to determine if the project site has undergone recent erosion or sediment deposition, and 2) use of a 2D hydraulic model to investigate hydraulic conditions at the site for present day and future hydrologic conditions.

The aerial imagery analysis shows that the in-water portion of the Seaport Landing site has been relatively stable over the past 75 years. Comparison of recent survey data from the site suggests there has been up to 1 foot of sediment erosion since 2009, but this erosion is spatially variable and not thought to be indicative of a long term trend at the site. Results from the hydraulic model indicate that the site is regularly exposed to flow velocities less than 2 feet per second during daily tidal cycles, and that flow velocities do not increase substantially during floods on the Chehalis River. These velocities are not expected to cause any significant erosion of sediment from in-water portions of the site.

ANALYSIS

HISTORICAL AERIAL IMAGERY

Aerial imagery from 1942 to 2017 were reviewed to document erosion, sedimentation, and channel migration that may have occurred at the site. The dates and sources of the imagery reviewed are listed in Table 1. The aerial imagery analysis indicated that the riverbanks and channel geometry have been relatively stable at the project site for the period of photographic record, and that no systematic channel widening, narrowing or migration has occurred. Figure 2 compares the 1953 and 2017 imagery, which shows the current bank position at the project site has not changed appreciably since 1953. Near the project reach some localized changes in bank position are visible. These are generally associated with changes in land use, such as the small boat moorage visible in the 1953 image immediately across the river from the project site (upstream of the present Olympic Gateway Plaza). That site is no longer maintained as a moorage and has notably accumulated sediment in the 2017 image. It should be noted that a major limitation in the aerial imagery analysis is that the position of the shoreline location varies in different images due to variations in tidal water levels, making detailed comparisons of the water's edge infeasible. However, we believe the conclusions stated above are still valid.

Table 1. Historical Aerial Imagery Reviewed

Date	Source
1942	Sanborn
10/1/1953	USGS
7/13/1974	USGS
7/10/1990	NAPP/USGS
4/1/2006	USGS
8/27/2017	USGS

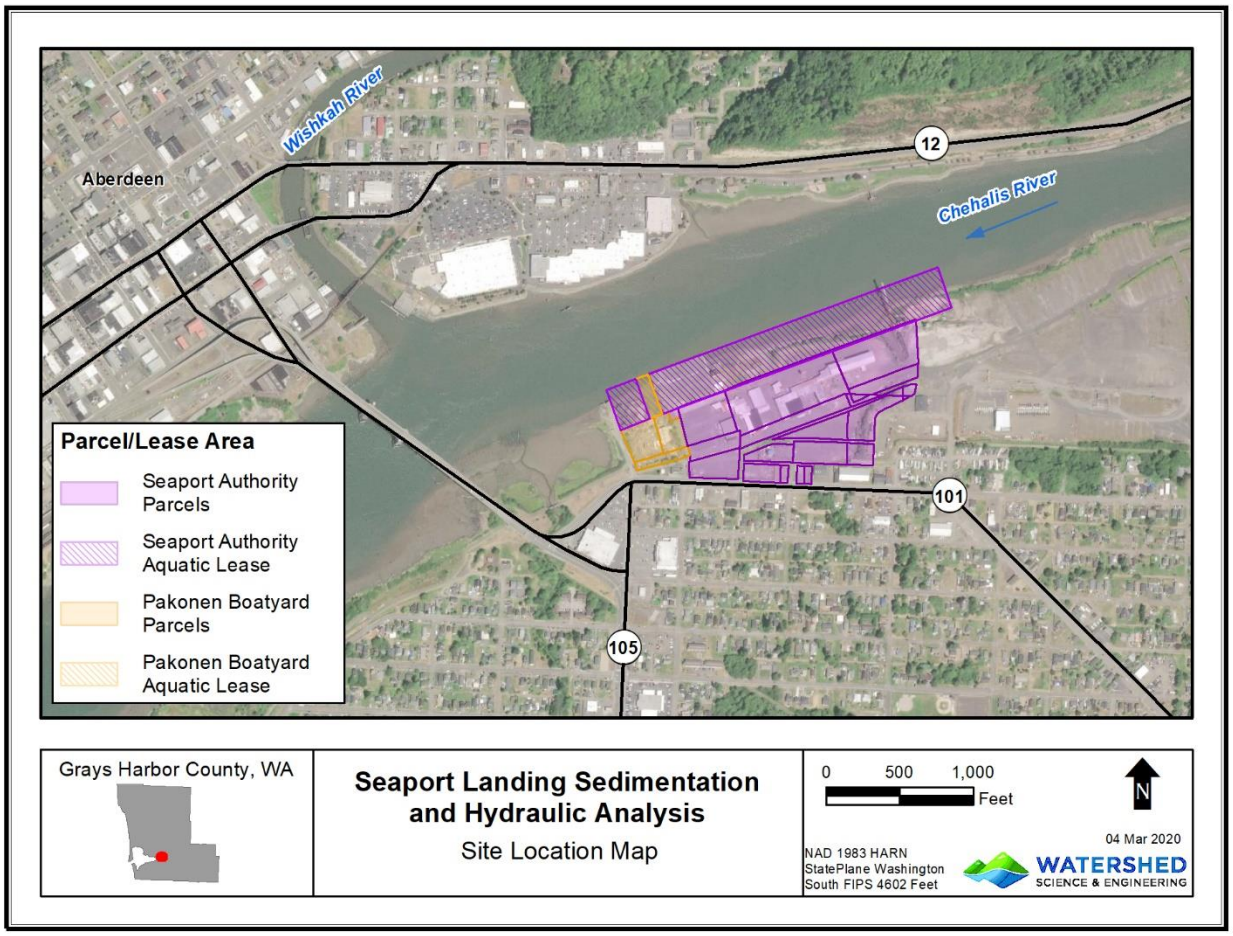

Figure 1 – Seaport Landing site location map

TOPOGRAPHIC COMPARISON

WSE compared 2016 survey data for the Seaport Landing project site versus 2009 LiDAR elevation data to investigate vertical ground elevation changes during this seven-year period. The 2016 survey included both topographic and bathymetric data. Because traditional LiDAR does not provide useful data for submerged surfaces, the LiDAR data coverage area is limited by the tidal water level at the time of the survey, which was approximately 2 feet NAVD88. From the 2016 survey, there were 563 survey points above this 2 foot elevation threshold. These points were grouped for analysis based on land cover and location (see Figure 3), and then compared to the LiDAR elevation at the survey point location. The results

of this analysis are summarized in Table 2. The root mean square (RMS) of the elevation difference is provided as an indicator of the variability in elevation changes within each classification. Elevation comparisons of this type are most appropriate in areas with low slope, where small horizontal position errors will not result in large changes in elevation. For this reason, survey points in steep slope areas were classified as a separate group. Forty-four points were surveyed on paved surfaces. For these points the mean elevation difference between the 2009 and 2016 data was 0.01 feet and the RMS was 0.11 feet indicating that the vertical datum the two datasets is the same and that the survey and LiDAR elevations are generally in close agreement with each other.

Table 2. Survey point elevation change from 2009 to 2016

Classification Group	# Points	Mean Elevation Difference 2009 to 2016 (ft)	Root Mean Square of Elevation Difference (ft)
Paved Surfaces	44	0.01	0.11
Tidal Unvegetated	41	-0.67	0.84
Tidal Vegetated	48	-1.00	1.40
Pocket Beach	32	-0.35	0.46
Tidal Inlet East	20	-0.18	0.48
Tidal Inlet West	23	-0.06	0.47
High-Slope	355	-0.69	1.82

The elevation data analysis shows that on average the ground surface for in-water portions of the Seaport Landing property has lowered slightly between 2009 and 2016. This is presumed to be the result of erosion of the bed sediments as we are not aware of any excavation or other anthropogenic changes on the site during this period.

Survey points in the unvegetated tidal area have the lowest elevations and show an average change in elevation of -0.67 feet between 2009 and 2016. The points classified as tidal-vegetated show an average change of -1.00 feet with an RMS of 1.4 feet meaning that there is significant variability in the results for these points. Three small inlets off the channel were classified independently; the Tidal Inlet East, the Pocket Beach, and the Tidal Inlet West. The average elevation changes for these areas were -0.18 feet, -0.35 feet, and -0.06 feet respectively.

While comparisons of the 2009 and 2016 elevation data indicate that in-water portions of the Seaport Landing property are generally lower in 2016 than in 2009 the magnitude of change is less than, and sometimes much less than, 1 foot and taken together with the aerial imagery evaluation we do not think this indicates a significant long term trend. WSE did not visit the project site to look for signs of active or historical erosion.

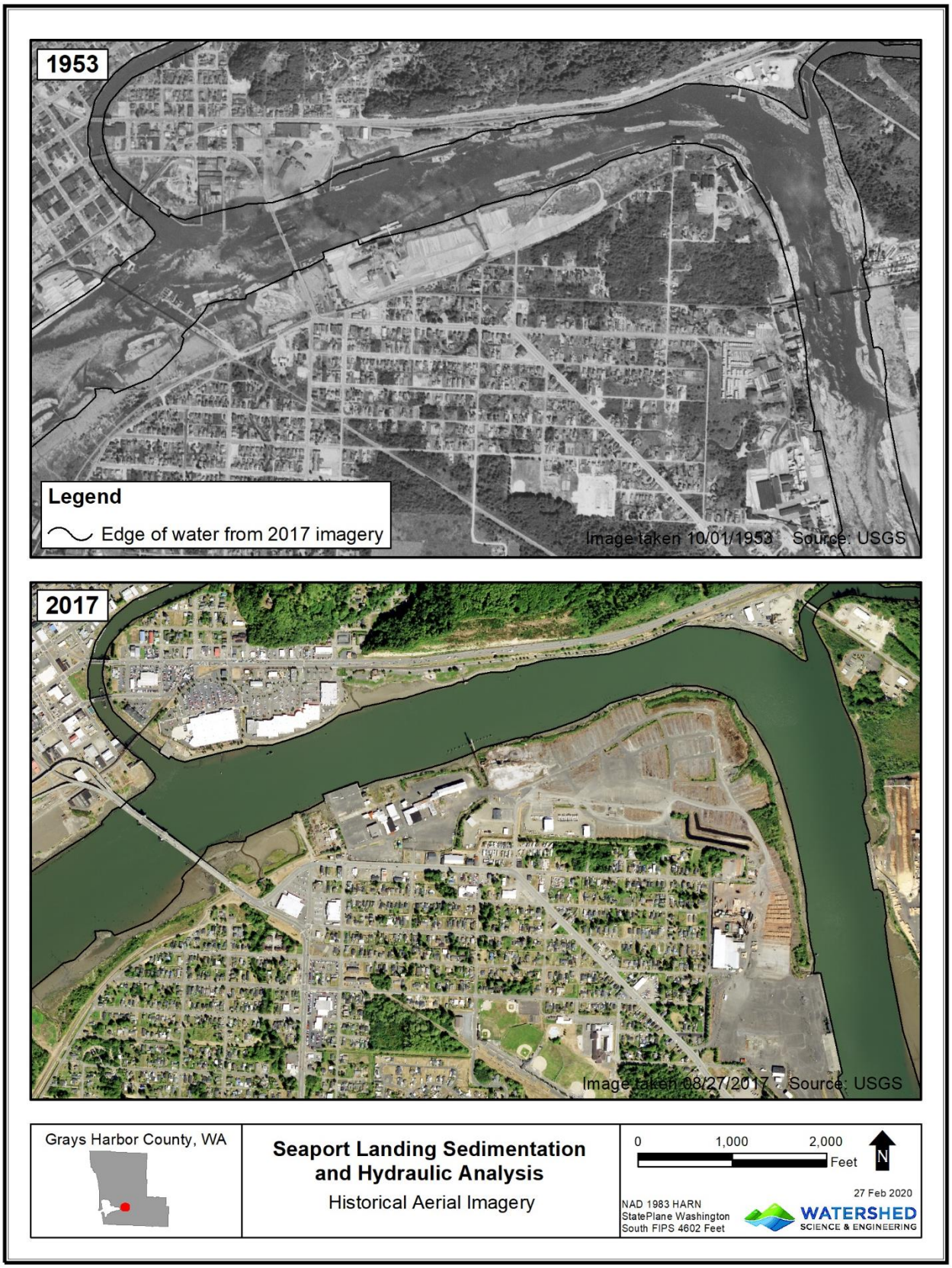

Figure 2 – Comparison of historical aerial imagery

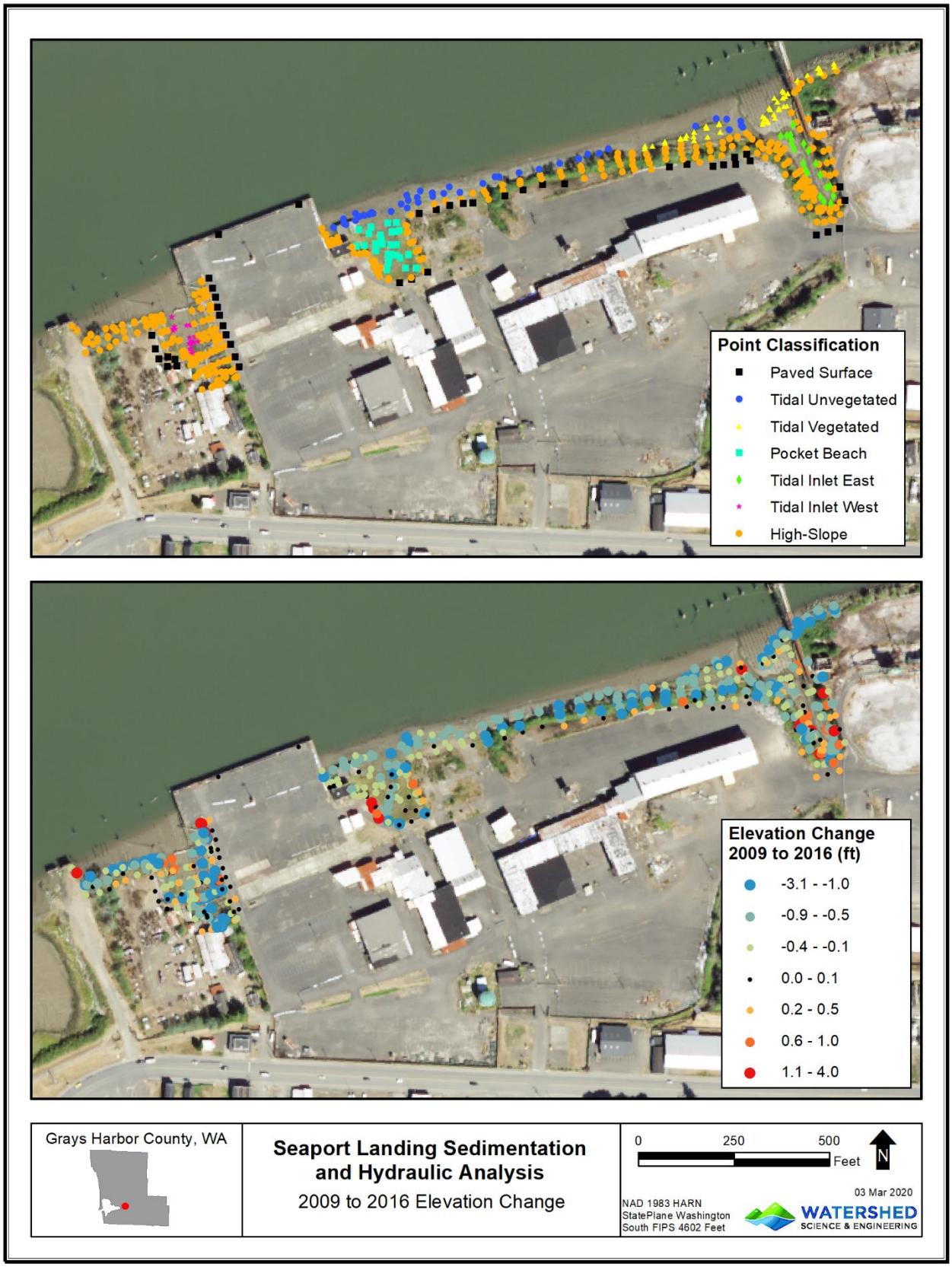

Figure 3 – 2009 to 2016 elevation change based on comparison of 2009 LiDAR with 2016 survey.

HYDRAULIC MODELING

MODEL DEVELOPMENT

To evaluate hydraulic conditions for the project site, WSE updated an existing unsteady two-dimensional (2D) RiverFlow2D hydraulic model of the Chehalis River developed for the Chehalis Basin Strategy - Reducing Flood Damage and Restoring Aquatic Species (see http://chehalisbasinstrategy.com/). The model encompasses approximately 30 miles of the mainstem Chehalis River and floodplain from Grays Harbor to Porter (Figure 4). Details of the hydraulic model development and calibration can be found in WSE (2019a).

For this project WSE updated the model terrain to include the 2016 bathymetric survey of the project site. The model does not include the timber piles in the channel near the project site, and the modeling does not consider the hydraulic effects of wind waves or boat generated waves. In order to eliminate uncertainty surrounding the coincidence of riverine peak flows and tidal water levels, the model was run with steady state hydrologic (riverine) inflows and an unsteady downstream tidal boundary. This method of analysis simulates the highest velocity flow conditions expected at the site by sustaining the peak flood discharge across all phases of the tidal cycle. Riverine inflows were specified at the upstream model extents on the Chehalis, Satsop, and Wynoochee Rivers. The modeled tidal boundary time series was developed from an observed tidal cycle recorded at the Aberdeen tide gage (NOAA ID# 9441187) on November 8-9th 2006. This tidal sequence was selected as it included a strong ebb tide that ranged from near the highest to lowest astronomical tides (+10.75 feet to -4.38 feet NAVD88, respectively). The model was run with riverine inflows corresponding to the following scenarios: mean annual flows (MAF), 2-year flood, and 10-year flood. Results from the simulations were reviewed to assess hydraulic conditions on the project site and potential effects on sedimentation.

The hydraulic model was then modified to investigate potential hydraulic changes due to predicted climate change. For the climate change scenarios, riverine inflows were increased by 26% based on earlier hydrologic modeling performed by WSE for the Chehalis Basin (WSE, 2019b). That analysis found that the predicted change in peak flows in the Chehalis Basin could average 26% by the late 21st century[1]. Tidal water levels were increased by 1.0 feet corresponding to the median predicted sea level rise at Aberdeen by the year 2078 (Miller et al, 2018).

[1] In the Chehalis Basin study the late 21st century was defined as the 45 year period from 2045 to 2099, a period centered on year 2078

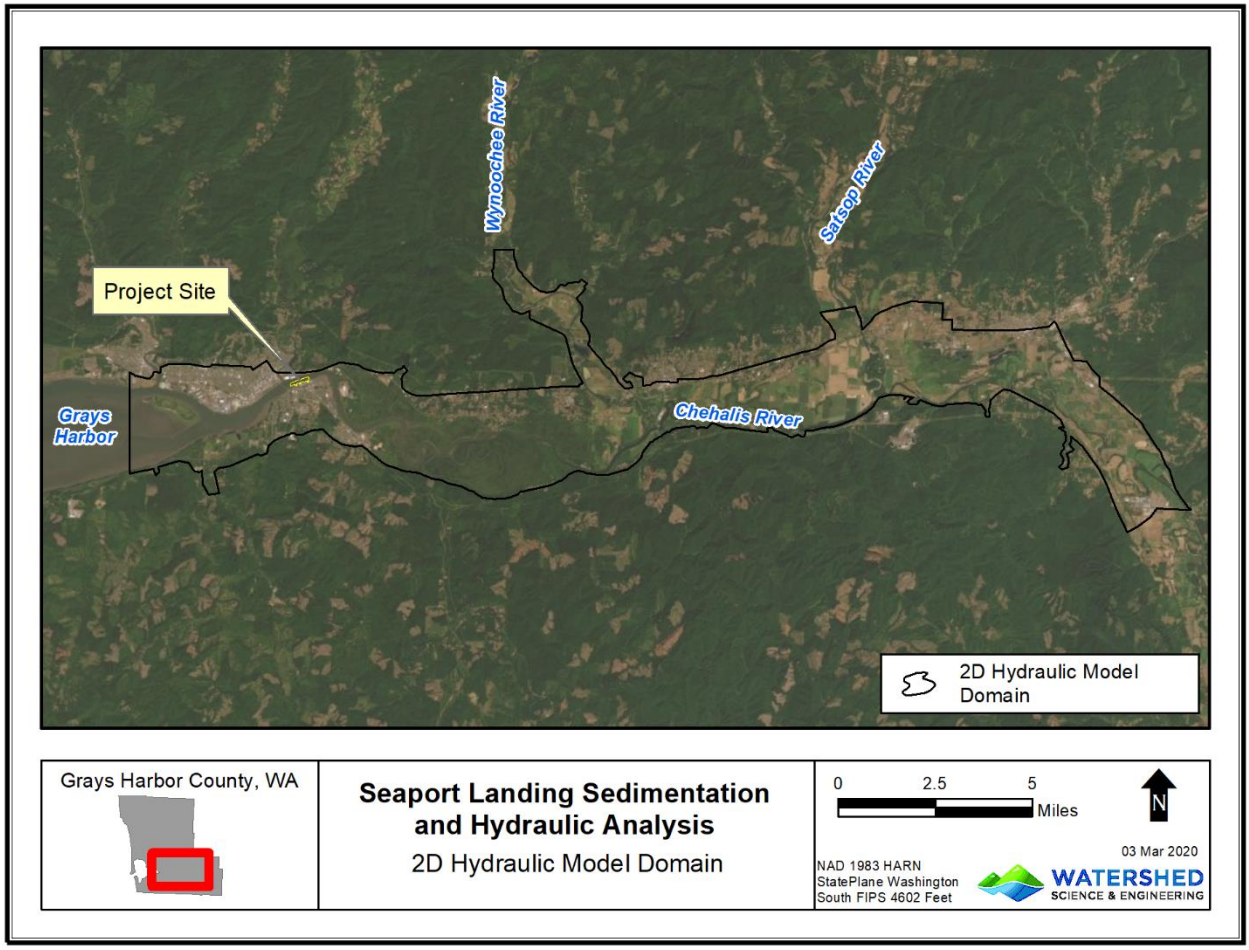

Figure 4 – 2D hydraulic model domain

MODEL RESULTS

Six simulations were completed with the hydraulic model: three using existing condition hydrologic inputs, and three using inflows modified to account for climate change. The results from these six simulations are summarized in Table 3. Velocity data is shown for two locations: one near the channel bank approximately 200 feet downstream of Tidal Inlet East at an elevation of 2 feet NAVD88, and the second location is in the center of the main channel at the project site (bed surface is at ~-36 feet NAVD88 at this location).

The discharge results presented in Table 3 show that tidal flux accounts for 35% to 93% of the peak discharge in the Chehalis River at the project site for each of the six modeled events. The peak outflowing discharge was greater than 100,000 cfs for all simulations, including the mean annual flow simulation, where the total upstream inflow in the model was less than 8,000 cfs. Additional simulations with MAF flows found that even smaller tidal fluctuations resulted in peak flows greater than 50,000 cfs on both the flood and ebb (incoming and outgoing) tides. The hydraulic simulations show that the Chehalis River near the project site experiences large tidally driven discharges daily, even in the absence of large river flood events.

Table 3. Results from 2D hydraulic model

Scenario	Total Inflow (cfs)	Peak discharge at site (cfs)	Tidal flow Increase (cfs)	Peak Velocity near bank @ 2ft elevation (fps)	Peak Velocity at channel center (fps)
Baseline (historical) hydrologic conditions					
Mean Annual Flow (MAF)	7458	107227	99769	1.5	4.0
2-year	67677	125272	57595	2.0	6.3
10-year	84093	134687	50594	2.2	7.0
Late century climate change hydrologic conditions					
Mean Annual Flow (MAF)	9397	119623	110226	1.7	4.7
2-year	85273	145882	60609	2.4	7.3
10-year	105958	160346	54388	2.6	7.9

Simulated peak velocities range from 1.5 to 2.6 feet per second (fps) near the bank on the Seaport Landing site, and from 4.0 to 7.9 fps near the center of the Chehalis River channel. The near bank velocities seen in all of the simulations are similar, which indicates that hydraulic forces are dominated by daily tidal cycles and are not significantly influenced by river flows during extreme flood events. Near-bank velocities are generally less than half of the velocity near the channel centerline due to the site's location on the inside of a bend and the fact that near-bank locations (at approximately elevation 2 feet NAVD88) are either very shallow or dry when the channel velocity is peaking on the ebb flood, as seen at hour 47 in Figure 5. The climate change simulations (Figure 6) show that peak discharges and velocity will increase at the site, but that the increases are not very large.

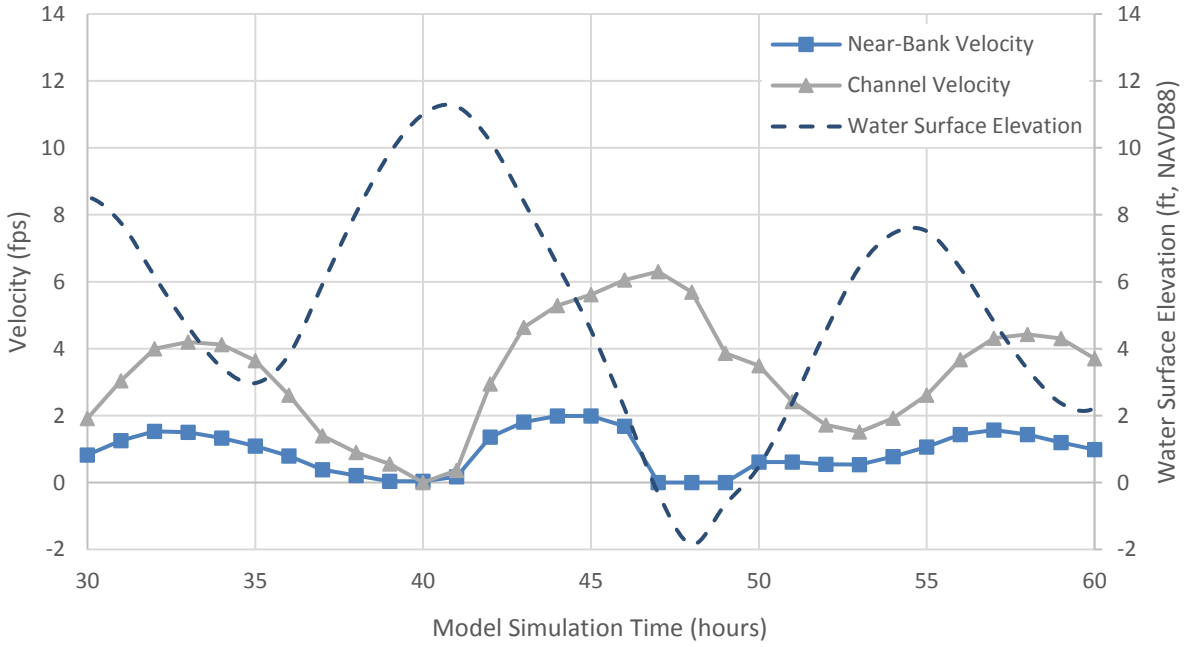

Figure 5 – Modeled water surface elevations and flow velocities during the 2-year event (baseline conditions)

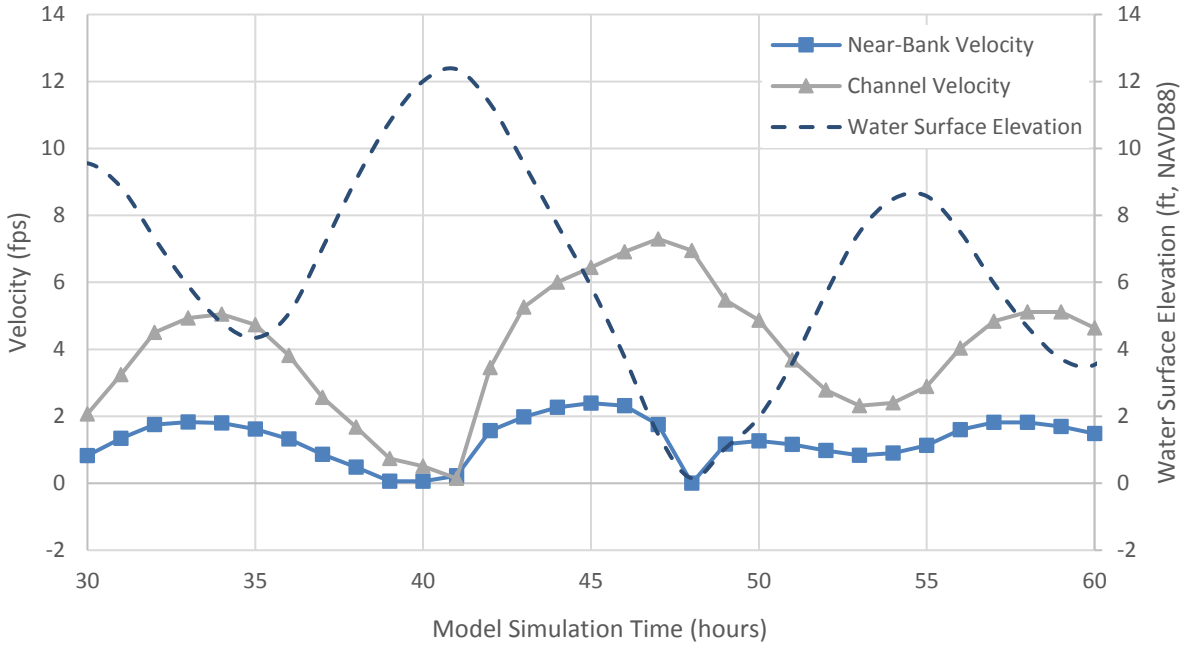

Figure 6 – Modeled water surface elevations and flow velocities during the 2-year event (with climate change)

DISCUSSION AND CONCLUSION

Review of aerial imagery by WSE indicates that the Chehalis River in the vicinity of the Seaport Landing site has been relatively stable over the past 75 years. Comparison of recent LiDAR and survey data suggests there has been up to 1 foot of sediment erosion from in-river portions of the Seaport Landing site between 2009 and 2016, but considering the findings of the aerial imagery analysis this is not believed to indicate a long term erosion trend on the property. The hydraulic modeling indicates that the site is exposed to moderate flow velocities on a daily basis during normal tidal cycles, and that flow velocities remain moderate even during large floods on the Chehalis River. In WSE's opinion significant erosion of the site due to tidal or riverine flow is unlikely. It should be noted that erosion of the bed sediments on the Seaport Landing property may be possible as a result of waves, generated either by wind in Grays Harbor or by boat traffic on the Chehalis River. Waves were not considered in the current analysis and WSE does not have additional insight into to the potential for wave induced erosion.

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WSE, 2019a. Chehalis River Existing Conditions RiverFlow2D Model Development and Calibration. Memorandum prepared by Bob Elliot, Tim Tschetter, and Larry Karpack of WSE, to Bob Montgomery of Anchor QEA, February 28, 2019.

WSE, 2019b. Chehalis River Basin Hydrologic Modeling. Memorandum prepared by Larry Karpack and Colin Butler of WSE, to Bob Montgomery of Anchor QEA, February 28, 2019.

APPENDIX C

CRITICAL AREAS REPORT

MAUL FOSTER ALONGI

GRAYS HARBOR HISTORICAL SEAPORT AUTHORITY CRITICAL AREAS REPORT

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

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GRAYS HARBOR HISTORICAL SEAPORT AUTHORITY CRITICAL AREAS REPORT

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TABLE OF CONTENTS

1 INTRODUCTION 3
2 FEATURE SUMMARY 3
3 BACKGROUND 4
3.1 Existing Conditions 4
3.2 National Wetlands Inventory 4
3.3 Sensitive Wildlife and Plants 5
3.4 State Water Classification System 5
4 METHODS 5
4.1 Wetland Determination 5
4.1.1 Hydrophytic Vegetation 6
4.1.2 Wetland Hydrology 6
4.1.3 Hydric Soils 6
4.2 Ordinary High Water Mark Determination 6
5 WETLAND RESULTS 7
5.1 Wetland A and B-1 7
5.1.1 Vegetation 7
5.1.2 Hydrology 7
5.1.3 Hydric Soils 7
5.2 Wetland B-2 7
5.2.1 Vegetation 8
5.2.2 Hydrology 8
5.2.3 Hydric Soils 8
5.3 Wetland Categorization 8
6 FISH AND WILDLIFE HABITAT CONSERVATION AREA RESULTS 8
6.1 Chehalis River 9
6.2 Shannon Slough 9
7 REGULATORY CONSIDERATIONS 9
8 DISCLAIMER 10
9 BIOLOGIST QUALIFICATIONS 10
9.1 Chad Wallin 10
10 REFERENCES 11

LIST OF FIGURES

Figure 1. Vicinity map 3

LIST OF TABLES

Table 1. Wetland delineation summary 4
Table 2. Natural water feature identification summary 4
Table 3. Definitions for USFWS plant indicator status 6
Table 4. Wetland rating and categorization summary 8
Table 5. FWHCA species summary 9

LIST OF APPENDICES

Appendix A. Critical Areas Map
Appendix B. Wetland Summaries
Appendix C. Wetland Datasheets
Appendix D: Wetland Rating Form
Appendix E: Queried Database Figures

1 INTRODUCTION

Grette Associates is under contract with Maul Foster Alongi (MFA) to prepare a critical areas report that summarizes the critical areas reconnaissance performed at the Grays Harbor Historical Seaport Authority facility located along the Chehalis River (Figure 1) within the City of Aberdeen.

The purpose of this report is to document all wetlands and fish and wildlife habitat conservation areas (FWHCAs) that are located within the subject property to satisfy the reporting requirements defined in Chapter 14.50 of the City of Aberdeen's Shoreline Master Program (SMP).

Figure 1. Vicinity map



2 FEATURE SUMMARY

Two Grette Associates biologist visited the subject property on September 3, 2019 to conduct an assessment to identify all wetlands and FWHCAs within the subject property.

Grette Associates collected wetland delineation data and delineated three wetland features (Wetland A, B-1, and B-2; Appendix A) that contained all three wetland criteria defined in the U.S. Army Corps of Engineers (USACE) *Federal Wetland Delineation Manual* (1987), and the USACE's *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (2010). Wetlands were rated according to Appendix 2 of the SMP and the

Washington State Department of Ecology's (Ecology) *Washington State Wetland Rating System for Western WA – 2014 Update* (Hruby 2014). Wetland delineation summaries, field datasheets and wetland rating forms are presented in Appendices B, C and D, respectively. A summary of the delineated wetlands is provided in Table 1.

In addition to the wetland delineation, two natural water features (Chehalis River and Shannon Slough) were identified within the subject property. An ordinary high water mark (OHWM) determination using the guidance in Ecology's *Determining OHWM for Shoreline Management Act Compliance in Washington State* (Anderson et al. 2016) was completed for the Chehalis River and Shannon Slough (Table 2).

Table 1. Wetland delineation summary

Feature	Size (Approximate)	Cowardin Class[1]	Hydrology Modifier	HGM Class	Wetland Category	Buffer Width[2]
A	18,500 sq. ft.	REM	Regularly Flooded	Freshwater Tidal Fringe[3]	III	80 ft.
B-1	24,000 sq. ft.	REM	Regularly Flooded	Freshwater Tidal Fringe[3]	III	80 ft.
B-2	23,500 sq. ft.	REM	Regularly Flooded	Riverine	III	80 ft.

[1] Classification based on Cowardin et al. (1979).
[2] Buffers are based on Appendix 2 of the SMP. Per Chapter 15.50.914 of the SMP, any substantial development that provides a disconnect to a wetland feature is considered a buffer interruption.
[3] Per Hruby 2014, freshwater tidal fringe wetlands are rated using the riverine rating form.

Table 2. Natural water feature identification summary

Feature	Water Type[1]	Buffer[2]
Chehalis River	S	0-150 ft.[3]
Shannon Slough	Np	75 ft.

[1] Natural water features were rated according to Chapter 14.50 of the SMP and WAC 222-16-030.
[2] Buffers are based on Appendix 2 of the SMP. Per Chapter 15.50.918 of the SMP, any substantial development that provides a disconnect to a stream is considered a buffer interruption.
[3] Shoreline buffer range from 0-150 feet based on the nature of the proposed land use.

3 BACKGROUND

3.1 Existing Conditions

The subject property is the historic industrial site where the Weyerhaeuser Timber Company operated their Aberdeen sawmill. With the exception of a narrow band of vegetation along portions of the shoreline that is dominated by native and non-native species, the subject property is devoid of vegetation.

Please note that the road crossing associated within Shannon Slough that is located within the subject property has been recently improved and the improvements are not reflected on any aerial images associated with this report. The improvements appear to include narrowing of the access road, culvert replacement, and bank stabilization.

3.2 National Wetlands Inventory

The U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI) was queried to determine if previously-identified wetlands are present within the subject property (USFWS 2019). According to the NWI Interactive Online Mapper, with the exception of

the Chehalis River and Shannon Slough, no aquatic features area mapped in the vicinity of the subject property (Appendix E).

3.3 Sensitive Wildlife and Plants

The Washington Department of Fish and Wildlife's (WDFW) Priority Habitats and Species (PHS) database on-line mapper was queried to determine if state or federally listed fish or wildlife species occur near the subject property (WDFW 2019a). According to the PHS database, no priority habitats or species are mapped by PHS in the upland areas within the subject property (Appendix E).

Additionally, WDFW's SalmonScape on-line mapper was queried to determine what listed SalmonScape species are identified by WDFW to occur within the Chehalis River (WDFW 2019b). According to SalmonScape, the Chehalis River is mapped as providing habitat for numerous listed SalmonScape species (Appendix E).

The Washington Department of Natural Resources' (WDNR) Wetlands of High Conservation Value mapper was queried to determine if the subject parcels occurs in a location reported to contain high quality natural heritage wetland occurrences or occurrences of natural heritage features commonly associated with wetlands (WDNR 2019a). According to WDNR's mapper, there are no records of rare plants or high quality native ecosystems occurring on or in the vicinity of the subject property (Appendix E).

3.4 State Water Classification System

The Washington Department of Natural Resources' (WDNR) Forest Practice Application Mapping Tool on-line mapper was queried to identify the water typing of any streams mapped by WDNR (WDNR 2019b). According to WDNR, the Chehalis River is mapped as *Shorelines of the State* and Shannon Slough is mapped as a non-fish habitat stream (Appendix E).

4 METHODS

4.1 Wetland Determination

The subject property was traversed and data were collected to confirm wetland boundaries. The identified wetlands were delineated according to the procedures described in the USACE's *Federal Wetland Delineation Manual* (1987), and the USACE's *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (2010). Paired data plots and soil test pits were excavated to evaluate wetland and upland conditions. Guidance from the USACE's *Regional Supplement* was used to evaluate the data at each data point.

The boundary of the wetland was established based on changes in vegetation, field indicators of hydric soils, water levels at or below 12 inches, topographic changes, and best professional judgment. Data plots were established in and adjacent to the wetland. The location of the wetland boundaries were recorded with a dGPS device.

Plants were determined to be more or less associated with wetlands based on their wetland indicator (FAC) status. The percent dominance for each plant strata was determined using the 50-20 Rule, which is the recommended method for selecting dominant species from a plant community in instances where quantitative data are

available (USACE 2010). In utilizing this rule, dominants are the most abundant species that individually or collectively accounts for more than 50 percent of the total coverage of vegetation in the stratum plus any other species that, by itself accounts for at least 20 percent of the total.

4.1.1 Hydrophytic Vegetation

The U.S. Fish and Wildlife Service (USFWS) and the NWI have established a rating system that has been applied to commonly occurring plant species on the basis of their frequency of occurrence in wetlands (Table 3). Species indicator status expresses the range in which plants may occur in wetlands and non-wetlands (uplands). Under this system, vegetation is considered hydrophytic when there is an indicator status of facultative (FAC), facultative wetland (FACW) or obligate wetland (OBL) (Table 3). The hydrophytic vegetation criterion for wetland determination is met when ***more than*** 50 percent of the dominant species in the plant community are FAC or wetter. The Corps' *National Wetland Plant List* (Lichvar 2016) was used to determine vegetation indicator status.

Table 3. Definitions for USFWS plant indicator status

Plant Indicator Status Category	Indicator Status Abbreviation	Definition (Estimated Probability of Occurrence)
Obligate Upland	UPL	Occur rarely (<1 percent) in wetlands, and almost always (>99 percent) in uplands
Facultative Upland	FACU	Occur sometimes (1 percent to <33 percent) in wetlands, but occur more often (>67 percent to 99 percent) in uplands
Facultative	FAC	Similar likelihood (33 percent to 67 percent) of occurring in both wetlands and uplands
Facultative Wetland	FACW	Occur usually in wetlands (>67 percent to 99 percent), but also occur in uplands (1 percent to 33 percent)
Obligate Wetland	OBL	Occur almost always (>99 percent) in wetlands, but rarely occur in uplands (<1 percent)
Not Listed	NL	Not listed due to insufficient information to determine status

4.1.2 Wetland Hydrology

Evidence of permanent or periodic inundation (water marks, drift lines, drainage patterns), or soil saturation to the surface for 14 consecutive days or more during the growing season meets the hydrology criterion. Oxidized root channels in the top 12 inches and hydrogen sulfide are primary indicators and water-stained leaves and geomorphic position are secondary indicators of wetland hydrology.

4.1.3 Hydric Soils

Soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper soil horizons are considered hydric soils. Field indicators include histosols, the presence of a histic epipedon, a sulfidic odor, low soil chroma, and gleying. Soil conditions were compared to the Field Indicators of Hydric Soils detailed in the USACE's *Regional Supplement*.

4.2 Ordinary High Water Mark Determination

An OHWM determination using the guidance in Ecology's *Determining OHWM for Shoreline Management Act Compliance in Washington State* (Anderson et al. 2016) was

completed for the portion of the Chehalis River and Shannon Slough within the subject property.

Please note that portions of Shannon Slough upstream of the culvert (Appendix A) were not safely accessible due to site conditions. Therefore, representative elevations were recorded using a dGPS device and utilized to determine wetland boundaries and the OHWM in this area.

5 WETLAND RESULTS

Three wetland features were identified within the subject property (Appendix A).

5.1 Wetlands A and B-1

Wetlands A and B-1 are freshwater tidal wetlands that are situated along the Chehalis River (Appendix A). These features receive daily inundation due to fluctuating river levels that are influenced from tide cycles associated with the Pacific Ocean. While this marine and freshwater interaction is taking place in the Chehalis River, the marine water (saltwater wedge) and/or estuarine environment does not appear to extend up river to the point where the subject property is located. Based on the lack of salt tolerant vegetation observed in Wetlands A and B-1 (see below), the wetlands are classified as freshwater tidal wetlands (Hruby 2014).

5.1.1 Vegetation

Vegetation observed within Wetland A and B-1 predominantly consists of soft rush (*Juncus effusus*), slough sedge (*Carex obnupta*), and Pacific silverweed (*Potentilla pacifica*). According to Hruby (2014), these species generally are not associated with estuarine wetlands. Furthermore, cattail (*Typha latifolia*) was observed in portions of Wetland A which is sensitive to brackish environments (Hruby 2014).

5.1.2 Hydrology

Hydrologic support for Wetlands A and B-1 is primarily provided by daily tidal inundation and shallow groundwater. These wetland features are situated below the OHWM of the Chehalis River within the tidally influenced area along the shoreline.

5.1.3 Hydric Soils

During Grette Associates' soils evaluation a strong hydrogen sulfide odor was observed. Per the USACE's *Regional Supplement* (2010), observing a hydrogen sulfide odor while investigating soils is a primary hydric soils indicator.

5.2 Wetland B-2

Historically, Wetland B-2 was likely a continuation of Wetland B-1 (freshwater tidal wetland); however, during the development of the subject property a road crossing was constructed in Shannon Slough to provide internal access to other portions of the sawmill facilities. The current crossing configuration includes a tidal flap gate that prevents fresh waters from back-flooding up Shannon Slough during tidal exchanges. Given its geomorphic location, Wetland B-2 is classified as a riverine wetland. Wetland B-2 is located along the margins of Shannon Slough and situated in areas that are permanently flooded and/or seasonally flooded by fluctuating water depths within the slough

(Appendix A). Please note that the open water area associated with Shannon Slough is incorporated within Wetland B-2 for mapping purposes.

5.2.1 Vegetation

Vegetation observed within Wetland B-2 largely consists of soft rush and slough sedge.

5.2.2 Hydrology

Hydrologic support for Wetland B-2 is primarily provided by permanent and/or seasonal inundation and shallow groundwater. This feature is located along the edge of Shannon Slough and at the approximate stagnant elevation of the water within the slough.

5.2.3 Hydric Soils

During Grette Associates' site assessment Wetland B-2 was largely inundated by the waters associated with Shannon Slough. As a result, soils were not investigated. Hydric soils are those soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper soil horizons (USACE 2010). Given that this wetland feature is permanently and/or regularly inundated, the soils within Wetland B-2 meet the definition of a hydric soil.

5.3 Wetland Categorization

To determine the categorization of the wetlands based on function, the wetland classification guidelines in Ecology's wetland rating system (Hruby 2014) were used. Based on this guidance, each wetland was given a score for each of three functions: Water Quality, Hydrology, and Habitat (Table 4).

Table 4. Wetland rating and categorization summary

Feature	Cowardin Class[1]	HGM Class	Water Quality	Hydrology	Habitat	Total	Category
Wetland A	REM	Freshwater Tidal Fringe[2]	8	6	4	18	III
Wetland B-1	REM	Freshwater Tidal Fringe	8	6	4	18	III
Wetland B-2	REM	Riverine	8	5	4	17	III

[1] Classification based on Cowardin et al. (1979).
[2] Per Hruby 2014, freshwater tidal fringe wetlands are rated using the riverine rating form.

Per Section 14.50.914 of the SMP, Category III wetlands with low habitat value are subject to an 80-foot wetland buffer. A high land use was assumed when determining wetland buffer widths. Furthermore, per 14.50.914(A) of the SMP, buffers shall not include areas that are disconnected functionally from a wetland; therefore, the substantial improvements function as a buffer interruption and the extent of said buffer ends at the edged on the developed area.

6 FISH AND WILDLIFE HABITAT CONSERVATION AREA RESULTS

Per Section 14.50.917 of the SMP, FWHCAs are typically those areas that support regulated fish and wildlife species or the habitats that play a critical role in sustaining said species. This section is intended to document all FWHCAs that were identified within the subject property.

6.1 Chehalis River

According to WDFW (2019a and 2019b), the Chehalis River provides habitat for numerous salmonid species. Provided below in Table 5 is the list of FWHCAs species that are typically known to occur within the Chehalis River basin.

Table 5. FWHCA species summary

FWHCA Species	State Status	Federal Status
Chinook salmon (*Oncorhynchus tshawytscha*)	Candidate	-
Coho salmon (*O. kisutch*)	Candidate	-
Chum salmon (*O. keta*)	Candidate	-
Steelhead trout (*O. mykiss*)	Candidate	-
Resident Coastal Cutthroat Trout (*O. clarki*)	-	-
Bull trout (*Salvelinus confluentus*)	Candidate	Threatened

In addition to being classified as a FWHCA, the Chehalis River is a *Water of the State*. Therefore, the river is subject to the buffer regulations defined in Section 14.50.430.2 of the SMP. Per said section, the shoreline buffer ranges from 0 feet to 150 feet depending on proposed land use. More specifically, water dependent structures and uses are not subject to a shoreline buffer whereas water-related/water-enjoyment mixed use structures and uses are subject to a 75-foot shoreline buffer and non-water oriented structures and uses are subject to a 150-foot shoreline buffer. Buffer determinations assumed high land use and the *Industrial and Port Development* shoreline environmental designation. Per 14.50.918 of the SMP, buffers shall not include areas that are disconnected functionally from a stream; therefore, the substantial improvements function as a buffer interruption and the extent of said buffer ends at the edged on the developed area.

6.2 Shannon Slough

Based on the queried databases summarized above in Section 3, Shannon Slough is not considered a FWHCA. Furthermore, there is no mapped distribution of any anadromous fish species within the slough and WDNR (2019b) maps Shannon Slough as a non-fish habitat stream. Based on this information, Shannon Slough likely does not provide habitat for fish and is classified as a non-fish habitat natural water feature. Per Section 14.50.918 of the SMP, perennial non-fish habitat natural water features are classified as a Type Np stream and are subject to a 75-foot buffer. Per 14.50.918 of the SMP, buffers shall not include areas that are disconnected functionally from a stream; therefore, the substantial improvements function as a buffer interruption and the extent of said buffer ends at the edged on the developed area.

7 REGULATORY CONSIDERATIONS

Critical areas are regulated by agencies at the local, state, and federal levels. At the local level, wetlands and streams and their associated buffers within 200 feet of *Waters of the State* are regulated under the City of Aberdeen's SMP.

At the state level, wetlands are regulated by the Washington Department of Ecology through the Federal Clean Water Act (Section 401). The requirement for a Water Quality Certification from Ecology for wetland impacts is triggered by an applicant's applying for a federal Clean Water Act Section 404 permit from the USACE. Ecology may also

issue an Administrative Order, allowing them wetland regulatory authority without a federal nexus.

Additionally, WDFW regulates work within state waters to protect fish life under the State's Hydraulic Code (Chapter 77.55 RCW) through the Hydraulic Project Approval (HPA) process.

At the federal level, impacts (specifically dredging or filling) to wetlands are regulated by the Environmental Protection Agency through the USACE. The USACE administers the federal Clean Water Act (Section 404) for projects involving dredging or filling in Waters of the US (lakes, streams, marine waters, and most non-isolated wetlands).

While it is the regulatory agencies that make the final determination regarding jurisdictional status, project proponents can infer jurisdiction using the guidance provided by each agency or local government. This inference can be used to design a project based on the anticipated regulatory constraints within the project area. However, it is the project proponent's responsibility to contact each potential regulating agency and confirm their regulatory status and requirements.

8 DISCLAIMER

The findings and conclusions documented in this report have been prepared for specific application to this proposed project site. They have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area. Our work was also performed in accordance with the terms and conditions set forth in our proposal. The conclusions and recommendations presented in this report are professional opinions based on an interpretation of information currently available to us and are made within the operation scope, budget, and schedule of this project. No warranty, expressed or implied, is made. In addition, changes in government codes, regulations, or laws may occur. Because of such changes, our observations and conclusions applicable to this site may need to be revised wholly or in part.

Wetland boundaries are based on conditions present at the time of the site visit and considered preliminary until the flagged wetland and/or drainage boundaries are validated by the appropriate jurisdictional agencies. Validation of the boundaries by the regulating agencies provide a certification, typically in writing, that the wetland boundaries verified are the boundaries that will be regulated by the agencies until a specific date or until the regulations are modified. Only the regulating agencies can provide this certification.

Since wetlands are dynamic communities affected by both natural and human activities, changes in wetland boundaries may be expected. Because of such changes, our observations and conclusions applicable to this site may need to be revised wholly or in part.

9 BIOLOGIST QUALIFICATIONS

9.1 Chad Wallin

Chad Wallin is a Biologist with extensive training in wetland science and ecology restoration. Chad also has professional experience in stream and fish restoration, marine monitoring, mitigation monitoring, and fish and wildlife assessments.

Chad has earned a Bachelor's of Arts degree in Environmental Studies from the University of Washington along with certificates in ecology restoration and wetland science.

For a list of representative projects, please contact him at Grette Associates.

10 REFERENCES

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GRAYS HARBOR HISTORICAL SEAPORT AUTHORITY CRITICAL AREAS REPORT

APPENDIX A: CRITICAL AREAS MAP

LEGEND

- APPROX. ASSESSMENT AREA BOUNDARY
- APPROX. CATEGORY III WETLAND BOUNDARY
- WB — APPROX. 80 FT. CATEGORY III WETLAND BUFFER

CHEHALIS RIVER

WETLAND B-1

OHWM

WETLAND A

CULVERT (OUTLET)

CULVERT (INLET)

WETLAND B-2 /SHANNON SLOUGH

FLOOD CONTROL STRUCTURE

SCALE IN FEET
175 0 175

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CLIENT: MFA

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GRAYS HARBOR HISTORICAL SEAPORT AUTHORITY
CRITICAL AREAS REPORT

DRAWING SCALE: SEE SCALE BAR

SITE ADDRESS: ABERDEEN, WA

CRITICAL AREAS MAP

SHEET 1 OF 3



PHOTOGRAPH: ECOLOGY'S COASTAL ATLAS DATABASE

MAUL FOSTER ALONGI
GRAYS HARBOR HISTORICAL SEAPORT AUTHORITY
CRITICAL AREAS REPORT

SITE ADDRESS: ABERDEEN, WA

OBLIQUE VIEW

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DRAWING SCALE: NTS



PHOTOGRAPH: ECOLOGY'S COASTAL ATLAS DATABASE

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CRITICAL AREAS REPORT

SITE ADDRESS: ABERDEEN, WA

DRAWING SCALE: NTS

OBLIQUE VIEW

SHEET 3 OF 3

MAUL FOSTER ALONGI

GRAYS HARBOR HISTORICAL SEAPORT AUTHORITY CRITICAL AREAS REPORT

APPENDIX B: WETLAND SUMMARY

WETLAND A SUMMARY		
Approximate Size (sq. ft.):	18,500	
Cowardin Classification[1]:	REM	
HGM Classification[2]:	Freshwater Tidal	
Wetland Category[3]:	III	
Wetland Buffer Width[4]:	80 ft.	
Sample Plot Total[5]:	2	
Hydrophytic Vegetation Present (Y/N)?	Yes	
Hydric Soil Indicator?	*Hydrogen Sulfide*	
Wetland Hydrology Present?	Yes	

Summary of Findings	
Dominant Vegetation:	Vegetation observed within Wetland A predominantly consists of soft rush, slough sedge, and Pacific silverweed.
Soil Profile:	Hydrologic support for Wetlands A is primarily provided by daily tidal inundation and shallow groundwater. These wetland features are situated below the OHWM of the Chehalis River within the tidally influenced area along the shoreline.
Primary Hydrological Support:	Hydrologic support for Wetlands A is primarily provided by daily tidal inundation and shallow groundwater.

Wetland Data Plot:	**Upland Data Plot:**
	

Notes:
[1] Classification based on Cowardin et al. (1979).
[2] HGM classification based on Brinson, M.M. (1993).
[3] Wetland rating was determined based on the guidelines defined in the local municipal code.
[4] Wetland buffer was determined based on the local municipal code.
[5] Sample plot total includes the collective amount of wetland and upland samples plots examined to define the wetland boundary.

WETLAND B-1 SUMMARY		
Approximate Size (sq. ft.):	24,000	
Cowardin Classification[1]:	REM	
HGM Classification[2]:	Freshwater Tidal	
Wetland Category[3]:	III	
Wetland Buffer Width[4]:	80 ft.	
Sample Plot Total[5]:	2	
Hydrophytic Vegetation Present (Y/N)?	Yes	
Hydric Soil Indicator?	*Hydrogen Sulfide*	
Wetland Hydrology Present?	Yes	

Summary of Findings	
Dominant Vegetation:	Vegetation observed within Wetland B-1 predominantly consists of soft rush, slough sedge, and Pacific silverweed.
Soil Profile:	Hydrologic support for Wetlands B-1 is primarily provided by daily tidal inundation and shallow groundwater. These wetland features are situated below the OHWM of the Chehalis River within the tidally influenced area along the shoreline.
Primary Hydrological Support:	Hydrologic support for Wetlands B-1 is primarily provided by daily tidal inundation and shallow groundwater.

Wetland Data Plot:	**Upland Data Plot:**
	

Notes:
[1] Classification based on Cowardin et al. (1979).
[2] HGM classification based on Brinson, M.M. (1993).
[3] Wetland rating was determined based on the guidelines defined in the local municipal code.
[4] Wetland buffer was determined based on the local municipal code.
[5] Sample plot total includes the collective amount of wetland and upland samples plots examined to define the wetland boundary.

WETLAND B-2 SUMMARY		
Approximate Size (sq. ft.):	23,500	
Cowardin Classification[1]:	REM	
HGM Classification[2]:	Riverine	
Wetland Category[3]:	III	
Wetland Buffer Width[4]:	80 ft.	
Sample Plot Total[5]:	2	
Hydrophytic Vegetation Present (Y/N)?	Yes	
Hydric Soil Indicator?	*Other*	
Wetland Hydrology Present?	Yes	

Summary of Findings	
Dominant Vegetation:	Vegetation observed within Wetland B-2 largely consists of soft rush and slough sedge.
Soil Profile:	During Grette Associates' site assessment Wetlands B-2 was largely inundated by the waters associated with Shannon Slough. As a result, soils were not investigated. Hydric soils are those soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper soil horizons (USACE 2010).
Primary Hydrological Support:	Hydrologic support for Wetlands B-2 is primarily provided by permanent and/or seasonal inundation and shallow groundwater.

Wetland Data Plot:	**Upland Data Plot:**
N/A	N/A

Notes:
[1] Classification based on Cowardin et al. (1979).
[2] HGM classification based on Brinson, M.M. (1993).
[3] Wetland rating was determined based on the guidelines defined in the local municipal code.
[4] Wetland buffer was determined based on the local municipal code.
[5] Sample plot total includes the collective amount of wetland and upland samples plots examined to define the wetland boundary.

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GRAYS HARBOR HISTORICAL SEAPORT AUTHORITY CRITICAL AREAS REPORT

APPENDIX C: WETLAND DATASHEETS

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GRAYS HARBOR HISTORICAL SEAPORT AUTHORITY CRITICAL AREAS REPORT

APPENDIX D: WETLAND RATING FORM

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APPENDIX E: QUERIED DATABASE FIGURES

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GRAYS HARBOR HISTORICAL SEAPORT AUTHORITY CRITICAL AREAS REPORT

APPENDIX A: CRITICAL AREAS MAP

LEGEND

- APPROX. ASSESSMENT AREA BOUNDARY
- APPROX. CATEGORY III WETLAND BOUNDARY
- WB — APPROX. 80 FT. CATEGORY III WETLAND BUFFER

CHEHALIS RIVER

WETLAND B-1

OHWM

WETLAND A

CULVERT (OUTLET)

CULVERT (INLET)

WETLAND B-2 /SHANNON SLOUGH

FLOOD CONTROL STRUCTURE

SCALE IN FEET
175 0 175

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CRITICAL AREAS REPORT

DRAWING SCALE: SEE SCALE BAR

SITE ADDRESS: ABERDEEN, WA

CRITICAL AREAS MAP

SHEET 1 OF 3



PHOTOGRAPH: ECOLOGY'S COASTAL ATLAS DATABASE

MAUL FOSTER ALONGI
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CRITICAL AREAS REPORT

SITE ADDRESS: ABERDEEN, WA

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CRITICAL AREAS REPORT

SITE ADDRESS: ABERDEEN, WA

DRAWING SCALE: NTS

OBLIQUE VIEW

SHEET 3 OF 3

MAUL FOSTER ALONGI

GRAYS HARBOR HISTORICAL SEAPORT AUTHORITY CRITICAL AREAS REPORT

APPENDIX B: WETLAND SUMMARY

WETLAND A SUMMARY		
Approximate Size (sq. ft.):	18,500	
Cowardin Classification[1]:	REM	
HGM Classification[2]:	Freshwater Tidal	
Wetland Category[3]:	III	
Wetland Buffer Width[4]:	80 ft.	
Sample Plot Total[5]:	2	
Hydrophytic Vegetation Present (Y/N)?	Yes	
Hydric Soil Indicator?	*Hydrogen Sulfide*	
Wetland Hydrology Present?	Yes	

Summary of Findings	
Dominant Vegetation:	Vegetation observed within Wetland A predominantly consists of soft rush, slough sedge, and Pacific silverweed.
Soil Profile:	Hydrologic support for Wetlands A is primarily provided by daily tidal inundation and shallow groundwater. These wetland features are situated below the OHWM of the Chehalis River within the tidally influenced area along the shoreline.
Primary Hydrological Support:	Hydrologic support for Wetlands A is primarily provided by daily tidal inundation and shallow groundwater.

Wetland Data Plot:	**Upland Data Plot:**
	

Notes:
[1] Classification based on Cowardin et al. (1979).
[2] HGM classification based on Brinson, M.M. (1993).
[3] Wetland rating was determined based on the guidelines defined in the local municipal code.
[4] Wetland buffer was determined based on the local municipal code.
[5] Sample plot total includes the collective amount of wetland and upland samples plots examined to define the wetland boundary.

WETLAND B-1 SUMMARY		
Approximate Size (sq. ft.):	24,000	
Cowardin Classification[1]:	REM	
HGM Classification[2]:	Freshwater Tidal	
Wetland Category[3]:	III	
Wetland Buffer Width[4]:	80 ft.	
Sample Plot Total[5]:	2	
Hydrophytic Vegetation Present (Y/N)?	Yes	
Hydric Soil Indicator?	*Hydrogen Sulfide*	
Wetland Hydrology Present?	Yes	

Summary of Findings	
Dominant Vegetation:	Vegetation observed within Wetland B-1 predominantly consists of soft rush, slough sedge, and Pacific silverweed.
Soil Profile:	Hydrologic support for Wetlands B-1 is primarily provided by daily tidal inundation and shallow groundwater. These wetland features are situated below the OHWM of the Chehalis River within the tidally influenced area along the shoreline.
Primary Hydrological Support:	Hydrologic support for Wetlands B-1 is primarily provided by daily tidal inundation and shallow groundwater.

Wetland Data Plot:	**Upland Data Plot:**
	

Notes:
[1] Classification based on Cowardin et al. (1979).
[2] HGM classification based on Brinson, M.M. (1993).
[3] Wetland rating was determined based on the guidelines defined in the local municipal code.
[4] Wetland buffer was determined based on the local municipal code.
[5] Sample plot total includes the collective amount of wetland and upland samples plots examined to define the wetland boundary.

WETLAND B-2 SUMMARY		
Approximate Size (sq. ft.):	23,500	
Cowardin Classification[1]:	REM	
HGM Classification[2]:	Riverine	
Wetland Category[3]:	III	
Wetland Buffer Width[4]:	80 ft.	
Sample Plot Total[5]:	2	
Hydrophytic Vegetation Present (Y/N)?	Yes	
Hydric Soil Indicator?	*Other*	
Wetland Hydrology Present?	Yes	

Summary of Findings	
Dominant Vegetation:	Vegetation observed within Wetland B-2 largely consists of soft rush and slough sedge.
Soil Profile:	During Grette Associates' site assessment Wetlands B-2 was largely inundated by the waters associated with Shannon Slough. As a result, soils were not investigated. Hydric soils are those soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper soil horizons (USACE 2010).
Primary Hydrological Support:	Hydrologic support for Wetlands B-2 is primarily provided by permanent and/or seasonal inundation and shallow groundwater.

Wetland Data Plot:	**Upland Data Plot:**
N/A	N/A

Notes:
[1] Classification based on Cowardin et al. (1979).
[2] HGM classification based on Brinson, M.M. (1993).
[3] Wetland rating was determined based on the guidelines defined in the local municipal code.
[4] Wetland buffer was determined based on the local municipal code.
[5] Sample plot total includes the collective amount of wetland and upland samples plots examined to define the wetland boundary.

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GRAYS HARBOR HISTORICAL SEAPORT AUTHORITY CRITICAL AREAS REPORT

APPENDIX C: WETLAND DATASHEETS

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Wy Co. Aberdeen City/County: Aberdeen / G.H. Sampling Date: 7/3/19
Applicant/Owner: State: WA Sampling Point: SP-1
Investigator(s): Wilder Section, Township, Range:
Landform (hillslope, terrace, etc.): slope / Riverine Local relief (concave, convex, none): ___ Slope (%): ___
Subregion (LRR): ___ Lat: ___ Long: ___ Datum: ___
Soil Map Unit Name: ___ NWI classification: ___
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐	
Wetland Hydrology Present?	Yes ☒ No ☐	

Remarks: Data collected in tidal area below OHWM. Wetland 1 (W1)

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50% = ___, 20% = ___		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
50% = ___, 20% = ___		= Total Cover	
Herb Stratum (Plot size: 5')			
1. POPA	20%	Y	OBL
2. CAOB	20%	Y	OBL
3. JUBA	20%	Y	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
50% = ___, 20% = ___	60%	= Total Cover	
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
50% = ___, 20% = ___		= Total Cover	
% Bare Ground in Herb Stratum ___			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 3 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ___	x1 = ___
FACW species ___	x2 = ___
FAC species ___	x3 = ___
FACU species ___	x4 = ___
UPL species ___	x5 = ___
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

☐ 1 – Rapid Test for Hydrophytic Vegetation
☒ 2 - Dominance Test is >50%
☐ 3 - Prevalence Index is ≤3.0[1]
☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
☐ 5 - Wetland Non-Vascular Plants[1]
☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

Project Site: ____

Sampling Point: SP-1

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☑ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soils Present? Yes ☑ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☑ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stresses Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☑ Depth (inches): ____

Water Table Present? Yes ☐ No ☑ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ☑ No ☐ Depth (inches): Surface

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Data collected @ low tide.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: VeryCo - Aberdeen City/County: Aberdeen/GH. Sampling Date: 9/3/19
Applicant/Owner: State: WA Sampling Point: SP-2
Investigator(s): Walter Section, Township, Range:
Landform (hillslope, terrace, etc.): flat Local relief (concave, convex, none): ___ Slope (%): ___
Subregion (LRR): ___ Lat: ___ Long: ___ Datum: ___
Soil Map Unit Name: ___ NWI classification: ___
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☒
Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	**Is the Sampled Area within a Wetland?**	**Yes ☐ No ☒**
Hydric Soil Present?	Yes ☐ No ☒		
Wetland Hydrology Present?	Yes ☐ No ☒		

Remarks: Data collected in old storage area upslope of OHWM

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50% = ___, 20% = ___		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1. Scotch broom	25%	Y	FACU
2. RUBU	25%	Y	FAC
3.			
4.			
5.			
50% = ___, 20% = ___	50%	= Total Cover	
Herb Stratum (Plot size: 5')			
1. Agrostis sp.	40%	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
50% = ___, 20% = ___	40%	= Total Cover	
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
50% = ___, 20% = ___		= Total Cover	
% Bare Ground in Herb Stratum ___			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	___	x1 =	___
FACW species	___	x2 =	___
FAC species	___	x3 =	___
FACU species	___	x4 =	___
UPL species	___	x5 =	___
Column Totals:	___ (A)		___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

Project Site: ____

SOIL

Sampling Point: SP-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-3							Rock	old gravel area

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Gravel surface

Depth (inches): ____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stresses Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): ____

Water Table Present? Yes ☐ No ☒ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): ____

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Hwy 12 – Aberdeen City/County: Aberdeen / G.H. Sampling Date: 9/3/19
Applicant/Owner: State: WA Sampling Point: SP-3
Investigator(s): Walsh Section, Township, Range:
Landform (hillslope, terrace, etc.): Slope - Bowl Local relief (concave, convex, none): ___ Slope (%): ___
Subregion (LRR): ___ Lat: ___ Long: ___ Datum: ___
Soil Map Unit Name: ___ NWI classification: ___
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐
Hydric Soil Present?	Yes ☒	No ☐	
Wetland Hydrology Present?	Yes ☒	No ☐	

Remarks: Data collected below OHWM Wetland 2 (W2)

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50% = ___, 20% = ___		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
50% = ___, 20% = ___		= Total Cover	
Herb Stratum (Plot size: 5')			
1. PODA	40%		OBL
2. CAOB	50%		OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
50% = ___, 20% = ___		= Total Cover	
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
50% = ___, 20% = ___		= Total Cover	
% Bare Ground in Herb Stratum ___			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	___	x1 =	___
FACW species	___	x2 =	___
FAC species	___	x3 =	___
FACU species	___	x4 =	___
UPL species	___	x5 =	___
Column Totals:	___ (A)		___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

Project Site: ____

Sampling Point: SP-3

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
____	____	____	____	____	____	____	____	____
____	____	____	____	____	____	____	____	____
____	____	____	____	____	____	____	____	____
____	____	____	____	____	____	____	____	____
____	____	____	____	____	____	____	____	____
____	____	____	____	____	____	____	____	____
____	____	____	____	____	____	____	____	____
____	____	____	____	____	____	____	____	____

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☒ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☒ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☒ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stresses Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): ____

Water Table Present? Yes ☐ No ☒ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): Surface

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Tidal area

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Aberdeen WayCo. City/County: Aberdeen / GH. Sampling Date: 9/3/19
Applicant/Owner: State: WA Sampling Point: SP-4
Investigator(s): Wallin Section, Township, Range:
Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): ___ Slope (%): ___
Subregion (LRR): Lat: Long: Datum:
Soil Map Unit Name: NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☒
Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☐	
Hydric Soil Present?	Yes ☐	No ☒	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒
Wetland Hydrology Present?	Yes ☐	No ☒	

Remarks: Data collected along old fillslope / ar bank above ordinary

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. THPL	20%	Y	FAC
2. PSME	10%	Y	FACU
3.			
4.			
50% = ___, 20% = ___		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1. RUDI	50%	Y	FAC
2. RONU	20%	N	FAC
3. Scotchbroom	20%	N	FACU
4.			
5.			
50% = ___, 20% = ___	90	= Total Cover	
Herb Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
50% = ___, 20% = ___		= Total Cover	
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
50% = ___, 20% = ___		= Total Cover	

% Bare Ground in Herb Stratum ___

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	___	x1 =	___
FACW species	___	x2 =	___
FAC species	___	x3 =	___
FACU species	___	x4 =	___
UPL species	___	x5 =	___
Column Totals:	___ (A)		___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

Project Site: ____

Sampling Point: SP4

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
____	____	____	____	____	____	____	____	____
____	____	____	____	____	____	____	____	____
____	____	____	____	____	____	____	____	____
____	____	____	____	____	____	____	____	____
____	____	____	____	____	____	____	____	____
____	____	____	____	____	____	____	____	____
____	____	____	____	____	____	____	____	____
____	____	____	____	____	____	____	____	____

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☒ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Fillslope/Rock

Depth (inches): surface

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Plot @ fillslope of paved area

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stresses Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): ____

Water Table Present? Yes ☐ No ☒ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): ____

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

MAUL FOSTER ALONGI

GRAYS HARBOR HISTORICAL SEAPORT AUTHORITY CRITICAL AREAS REPORT

APPENDIX D: WETLAND RATING FORM

Wetland name or number A

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland A - Chehalis River Date of site visit: 9/3/19

Rated by Wallin Trained by Ecology? X Yes ___ No Date of training 2014

HGM Class used for rating Riverine Wetland has multiple HGM classes? ___ Y X N

NOTE: Form is not complete without the figures requested *(figures can be combined).*

Source of base aerial photo/map Google Earth

OVERALL WETLAND CATEGORY III (based on functions X or special characteristics ___)

1. Category of wetland based on FUNCTIONS

___ **Category I** – Total score = 23 - 27

___ **Category II** – Total score = 20 - 22

X **Category III** – Total score = 16 - 19

___ **Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
		Circle the appropriate ratings		
Site Potential	H (M) L	H (M) L	H M (L)	
Landscape Potential	(H) M L	(H) M L	H M (L)	
Value	(H) M L	H M (L)	H (M) L	TOTAL
Score Based on Ratings	8	6	4	18

Score for each function based on three ratings *(order of ratings is not important)*

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	I II
Wetland of High Conservation Value	I
Bog	I
Mature Forest	I
Old Growth Forest	I
Coastal Lagoon	I II
Interdunal	I II III IV
None of the above	✓

Wetland name or number A

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	1
Hydroperiods	D 1.4, H 1.2	1
Location of outlet *(can be added to map of hydroperiods)*	D 1.1, D 4.1	1
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	1
Map of the contributing basin	D 4.3, D 5.3	1
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	2
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	3
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	4

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants *(can be added to figure above)*	S 4.1	
Boundary of 150 ft buffer (can be added to another figure)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

Wetland name or number A

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

   NO – go to 2 **YES** – the wetland class is **Tidal Fringe** – go to 1.1

   1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**
   *If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

   NO – go to 3 **YES** – The wetland class is **Flats**
   *If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
   ___The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   ___At least 30% of the open water area is deeper than 6.6 ft (2 m).

   NO – go to 4 **YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
   ___The wetland is on a slope (*slope can be very gradual*),
   ___The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
   ___The water leaves the wetland **without being impounded**.

   NO – go to 5 **YES –** The wetland class is **Slope**

   NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
   ___The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
   ___The overbank flooding occurs at least once every 2 years.

Wetland name or number 4

NO – go to 6 **YES** – The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

NO – go to 7 **YES** – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO – go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number A

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

R 1.0. Does the site have the potential to improve water quality?		
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event:		
Depressions cover >$^3/_4$ area of wetland	points = 8	
Depressions cover > ½ area of wetland	points = 4	
Depressions present but cover < ½ area of wetland	points = (2)	2
No depressions present	points = 0	
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes)		
Trees or shrubs > $^2/_3$ area of the wetland	points = 8	
Trees or shrubs > $^1/_3$ area of the wetland	points = 6	
Herbaceous plants (> 6 in high) > $^2/_3$ area of the wetland	points = (6)	
Herbaceous plants (> 6 in high) > $^1/_3$ area of the wetland	points = 3	6
Trees, shrubs, and ungrazed herbaceous < $^1/_3$ area of the wetland	points = 0	
Total for R 1 — Add the points in the boxes above		8

Rating of Site Potential If score is: ___ **12-16 = H** X **6-11 = M** (M) ___ **0-5 = L** *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?		
R 2.1. Is the wetland within an incorporated city or within its UGA?	(Yes) = 2 No = 0	2
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area?	(Yes) = 1 No = 0	1
R 2.3. Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years?	(Yes) = 1 No = 0	1
R 2.4. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	(Yes) = 1 No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1-R 2.4 Other sources _____	Yes = 1 (No) = 0	Ø
Total for R 2 — Add the points in the boxes above		5

Rating of Landscape Potential If score is: X **3-6 = H** (H) ___ **1 or 2 = M** ___ **0 = L** *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?		
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi?	Yes = 1 (No) = 0	Ø
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens?	Yes = (1) No = 0	1
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which the unit is found*)	Yes = (2) No = 0	2
Total for R 3 — Add the points in the boxes above		3

Rating of Value If score is: X **2-4 = H** (H) ___ **1 = M** ___ **0 = L** *Record the rating on the first page*

Wetland name or number A

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Hydrologic Functions - Indicators that site functions to reduce flooding and stream erosion

R 4.0. Does the site have the potential to reduce flooding and erosion?

R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).* If the ratio is more than 20 If the ratio is 10-20 If the ratio is 5-<10 If the ratio is 1-<5 If the ratio is < 1	points = 9 points = 6 points = 4 points = 2 points = (1)	1
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are NOT Cowardin classes).* Forest or shrub for > $^1/_3$ area OR emergent plants > $^2/_3$ area Forest or shrub for > $^1/_{10}$ area OR emergent plants > $^1/_3$ area Plants do not meet above criteria	points = (7) points = 4 points = 0	7
Total for R 4	Add the points in the boxes above	8

Rating of Site Potential If score is: ___ **12-16 = H** X **6-11 = M** ___ **0-5 = L** *Record the rating on the first page*

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?

R 5.1. Is the stream or river adjacent to the wetland downcut?	Yes = 0 (No) = 1	1
R 5.2. Does the up-gradient watershed include a UGA or incorporated area?	(Yes) = 1 No = 0	1
R 5.3. Is the up-gradient stream or river controlled by dams?	Yes = 0 (No) = 1	1
Total for R 5	Add the points in the boxes above	3

Rating of Landscape Potential If score is: X **3 = H** ___ **1 or 2 = M** ___ **0 = L** *Record the rating on the first page*

R 6.0. Are the hydrologic functions provided by the site valuable to society?

R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.* The sub-basin immediately down-gradient of the wetland has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) Surface flooding problems are in a sub-basin farther down-gradient No flooding problems anywhere downstream	points = 2 points = 1 points = (0)	Ø
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 (No) = 0	Ø
Total for R 6	Add the points in the boxes above	Ø

Rating of Value If score is: ___ **2-4 = H** ___ **1 = M** X **0 = L** *Record the rating on the first page*

Wetland name or number A

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

___Aquatic bed	4 structures or more: points = 4
_X_Emergent	3 structures: points = 2
___Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points = 1
___Forested (areas where trees have > 30% cover)	1 structure: points = (0)

If the unit has a Forested class, check if:

___The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

Ø

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

___Permanently flooded or inundated	4 or more types present: points = 3
___Seasonally flooded or inundated	3 types present: points = 2
___Occasionally flooded or inundated	2 types present: points = 1
___Saturated only	1 type present: points = 0
___Permanently flowing stream or river in, or adjacent to, the wetland	
___Seasonally flowing stream in, or adjacent to, the wetland	
___**Lake Fringe wetland**	**2 points**
_X_**Freshwater tidal wetland**	**(2 points)**

2

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.

Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted: > 19 species	points = 2
5 - 19 species	points = (1)
< 5 species	points = 0

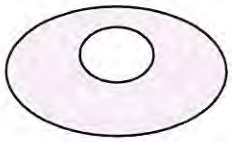
1

H 1.4. Interspersion of habitats

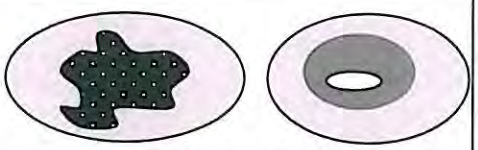
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points



Low = 1 point



Moderate = 2 points

All three diagrams in this row are **HIGH** = 3points



Ø

(3)

Wetland name or number A

3

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* X Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). ___ Standing snags (dbh > 4 in) within the wetland ___ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ___ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed)* X At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* X Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	3
Total for H 1 — Add the points in the boxes above	6

Rating of Site Potential If score is: ___ **15-18 = H** ___ **7-14 = M** X **0-6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 10-20% % undisturbed habitat ___ + [(% moderate and low intensity land uses)/2] ___ = 10/20 % If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon — points = 3 20-33% of 1 km Polygon — points = 2 10-19% of 1 km Polygon — points = 1 < 10% of 1 km Polygon — points = 0 = River area	1
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 10% % undisturbed habitat ___ + [(% moderate and low intensity land uses)/2] ___ = 10% % Undisturbed habitat > 50% of Polygon — points = 3 Undisturbed habitat 10-50% and in 1-3 patches — points = 2 Undisturbed habitat 10-50% and > 3 patches — points = 1 Undisturbed habitat < 10% of 1 km Polygon — points = 0	1
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use — points = (-2) ≤ 50% of 1 km Polygon is high intensity — points = 0	-2
Total for H 2 — Add the points in the boxes above	0

Rating of Landscape Potential If score is: ___ **4-6 = H** ___ **1-3 = M** X **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* Site meets ANY of the following criteria: — points = 2 — It has 3 or more priority habitats within 100 m (see next page) — It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) — It is mapped as a location for an individual WDFW priority species — It is a Wetland of High Conservation Value as determined by the Department of Natural Resources — It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) within 100 m — points = 1 Site does not meet any of the criteria above — points = 0	1

Rating of Value If score is: ___ **2 = H** X **1 = M** ___ **0 = L** *Record the rating on the first page*

Wetland name or number A

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE:*** *This question is independent of the land use between the wetland unit and the priority habitat.*

— **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

— **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

— **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

— **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

— **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

X **Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

— **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

X **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

— **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page).*

— **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

— **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

— **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

— **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number A

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt Yes –Go to **SC 1.1** (No= **Not an estuarine wetland**)	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? Yes = **Category I** No - Go to **SC 1.2**	**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 25) — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. Yes = **Category I** No = **Category II**	**Cat. I** **Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes – Go to **SC 2.2** No – Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? Yes = **Category I** (No = **Not a WHCV**) SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes **– Contact WNHP/WDNR and go to SC 2.4** No = **Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? Yes = **Category I** No = **Not a WHCV**	**Cat. I**
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions.*** SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? Yes – Go to **SC 3.3** No – Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to **SC 3.3** (No = **Is not a bog**) SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? Yes = **Is a Category I bog** No – Go to **SC 3.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? Yes = **Is a Category I bog** No = **Is not a bog**	**Cat. I**

Wetland name or number A

SC 4.0. Forested Wetlands Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.*** — **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. — **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). Yes = **Category I** (No) = **Not a forested wetland for this section**	**Cat. I**
SC 5.0. Wetlands in Coastal Lagoons Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? — The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* Yes – Go to **SC 5.1** (No) = **Not a wetland in a coastal lagoon** SC 5.1. Does the wetland meet all of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2) Yes = **Category I** No = **Category II**	**Cat. I** **Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: — Long Beach Peninsula: Lands west of SR 103 — Grayland-Westport: Lands west of SR 105 — Ocean Shores-Copalis: Lands west of SR 115 and SR 109 Yes – Go to **SC 6.1** (No) = **not an interdunal wetland for rating** SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = **Category I** No – Go to **SC 6.2** SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = **Category II** No – Go to **SC 6.3** SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = **Category III** No = **Category IV**	**Cat I** **Cat. II** **Cat. III** **Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	N/A

Wetland name or number A

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Wetland name or number B-1

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland B-1 - Shannon Slough Date of site visit: 9/3/19

Rated by Wallin Trained by Ecology? ✓Yes ___No Date of training 2014

HGM Class used for rating Riverine Wetland has multiple HGM classes? ___Y ✗N

NOTE: Form is not complete without the figures requested *(figures can be combined).*

Source of base aerial photo/map Google Earth

OVERALL WETLAND CATEGORY III (based on functions ✓ or special characteristics ___)

1. Category of wetland based on FUNCTIONS

___**Category I** – Total score = 23 - 27

___**Category II** – Total score = 20 - 22

✓**Category III** – Total score = 16 - 19

___**Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	Circle the appropriate ratings			
Site Potential	H (M) L	H (M) L	H M (L)	
Landscape Potential	(H) M L	(H) M L	H M (L)	
Value	(H) M L	H M (L)	H (M) L	TOTAL
Score Based on Ratings	8	6	4	18

Score for each function based on three ratings *(order of ratings is not important)*

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	I II
Wetland of High Conservation Value	I
Bog	I
Mature Forest	I
Old Growth Forest	I
Coastal Lagoon	I II
Interdunal	I II III IV
None of the above	✓

Wetland name or number B-1

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	1
Hydroperiods	D 1.4, H 1.2	1
Location of outlet *(can be added to map of hydroperiods)*	D 1.1, D 4.1	1
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	1
Map of the contributing basin	D 4.3, D 5.3	1
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	2
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	3
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	4

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants *(can be added to figure above)*	S 4.1	
Boundary of 150 ft buffer (can be added to another figure)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

Wetland name or number B-1

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

   NO – go to 2 **YES** – the wetland class is **Tidal Fringe** – go to 1.1

   1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**
   *If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

   NO – go to 3 **YES** – The wetland class is **Flats**
   *If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
   ___The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   ___At least 30% of the open water area is deeper than 6.6 ft (2 m).

   NO – go to 4 **YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
   ___The wetland is on a slope (*slope can be very gradual*),
   ___The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
   ___The water leaves the wetland **without being impounded**.

   NO – go to 5 **YES –** The wetland class is **Slope**

   NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
   ___The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
   ___The overbank flooding occurs at least once every 2 years.

Wetland name or number B-1

NO – go to 6 **YES** – The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

NO – go to 7 **YES** – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO – go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number B-1

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

R 1.0. Does the site have the potential to improve water quality?		
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event:		
Depressions cover > 3/4 area of wetland	points = 8	
Depressions cover > ½ area of wetland	points = 4	
Depressions present but cover < ½ area of wetland	points = (2)	2
No depressions present	points = 0	
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes)		
Trees or shrubs > 2/3 area of the wetland	points = 8	
Trees or shrubs > 1/3 area of the wetland	points = 6	
Herbaceous plants (> 6 in high) > 2/3 area of the wetland	points = (6)	
Herbaceous plants (> 6 in high) > 1/3 area of the wetland	points = 3	6
Trees, shrubs, and ungrazed herbaceous < 1/3 area of the wetland	points = 0	
Total for R 1 — Add the points in the boxes above		8

Rating of Site Potential If score is: ___ **12-16 = H** ~~X~~ **6-11 = M** (M) ___ **0-5 = L** *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?		
R 2.1. Is the wetland within an incorporated city or within its UGA?	(Yes) = 2 No = 0	2
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area?	(Yes) = 1 No = 0	1
R 2.3. Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years?	(Yes) = 1 No = 0	1
R 2.4. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	(Yes) = 1 No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1-R 2.4 Other sources _____	Yes = 1 (No) = 0	Ø
Total for R 2 — Add the points in the boxes above		5

Rating of Landscape Potential If score is: ~~X~~ **3-6 = H** (H) ___ **1 or 2 = M** ___ **0 = L** *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?		
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi?	Yes = 1 (No) = 0	Ø
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens?	(Yes) = 1 No = 0	1
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which the unit is found*)	(Yes) = 2 No = 0	2
Total for R 3 — Add the points in the boxes above		3

Rating of Value If score is: ~~X~~ **2-4 = H** (H) ___ **1 = M** ___ **0 = L** *Record the rating on the first page*

Wetland name or number B-1

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Hydrologic Functions - Indicators that site functions to reduce flooding and stream erosion

R 4.0. Does the site have the potential to reduce flooding and erosion?

R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).* If the ratio is more than 20	points = 9	
If the ratio is 10-20	points = 6	
If the ratio is 5-<10	points = 4	
If the ratio is 1-<5	points = 2	1
If the ratio is < 1	points = (1)	
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are NOT Cowardin classes).* Forest or shrub for > $^1/_3$ area OR emergent plants > $^2/_3$ area	points = (7)	
Forest or shrub for > $^1/_{10}$ area OR emergent plants > $^1/_3$ area	points = 4	8
Plants do not meet above criteria	points = 0	
Total for R 4	Add the points in the boxes above	9

Rating of Site Potential If score is: ___ **12-16 = H** ___ **6-11 = M** (circled) ___ **0-5 = L** *Record the rating on the first page*

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?

R 5.1. Is the stream or river adjacent to the wetland downcut?	Yes = 0 (No) = 1	1
R 5.2. Does the up-gradient watershed include a UGA or incorporated area?	(Yes) = 1 No = 0	1
R 5.3. Is the up-gradient stream or river controlled by dams?	Yes = 0 (No) = 1	1
Total for R 5	Add the points in the boxes above	3

Rating of Landscape Potential If score is: ___ **3 = H** (circled) ___ **1 or 2 = M** ___ **0 = L** *Record the rating on the first page*

R 6.0. Are the hydrologic functions provided by the site valuable to society?

R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.* The sub-basin immediately down-gradient of the wetland has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds)	points = 2	
Surface flooding problems are in a sub-basin farther down-gradient	points = 1	
No flooding problems anywhere downstream	points = (0)	Ø
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 (No) = 0	Ø
Total for R 6	Add the points in the boxes above	Ø

Rating of Value If score is: ___ **2-4 = H** ___ **1 = M** ___ **0 = L** (circled) *Record the rating on the first page*

Wetland name or number B-1

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

___Aquatic bed
__✓__Emergent
___Scrub-shrub (areas where shrubs have > 30% cover)
___Forested (areas where trees have > 30% cover)

4 structures or more: points = 4
3 structures: points = 2
2 structures: points = 1
1 structure: points = (0)

If the unit has a Forested class, check if:

___The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

Ø

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

___Permanently flooded or inundated
___Seasonally flooded or inundated
___Occasionally flooded or inundated
___Saturated only

4 or more types present: points = 3
3 types present: points = 2
2 types present: points = 1
1 type present: points = 0

___Permanently flowing stream or river in, or adjacent to, the wetland
___Seasonally flowing stream in, or adjacent to, the wetland
___**Lake Fringe wetland** **2 points**
__✓__**Freshwater tidal wetland** **(2) points**

2

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.

Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted: > 19 species — points = 2
5 - 19 species — points = (1)
< 5 species — points = 0

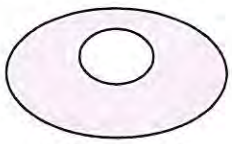
1

H 1.4. Interspersion of habitats

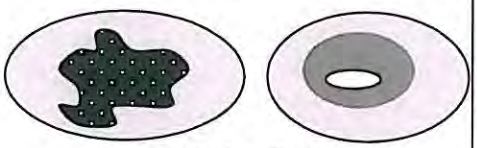
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = (0) points



Low = 1 point



Moderate = 2 points

Ø

All three diagrams in this row are **HIGH** = 3points



(3)

Wetland name or number B-1

3

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ✓ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). ___ Standing snags (dbh > 4 in) within the wetland ___ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ___ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed)* ✓ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* ✓ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	3
Total for H 1 Add the points in the boxes above	6

Rating of Site Potential If score is: ___ **15-18 = H** ___ **7-14 = M** ✓ **0-6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 15% % undisturbed habitat ___ + [(% moderate and low intensity land uses)/2] ___ = 15 % If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon points = 3 20-33% of 1 km Polygon points = 2 10-19% of 1 km Polygon points = 1 < 10% of 1 km Polygon points = 0	1
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 10% % undisturbed habitat ___ + [(% moderate and low intensity land uses)/2] ___ = 10% % Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10-50% and in 1-3 patches points = 2 Undisturbed habitat 10-50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (- 2) ≤ 50% of 1 km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	0

Rating of Landscape Potential If score is: ___ **4-6 = H** ___ **1-3 = M** ✓ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* Site meets ANY of the following criteria: points = 2 — It has 3 or more priority habitats within 100 m (see next page) — It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) — It is mapped as a location for an individual WDFW priority species — It is a Wetland of High Conservation Value as determined by the Department of Natural Resources — It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) within 100 m points = 1 Site does not meet any of the criteria above points = 0	1

Rating of Value If score is: ___ **2 = H** ✓ **1 = M** ___ **0 = L** *Record the rating on the first page*

Wetland name or number B-1

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE:*** *This question is independent of the land use between the wetland unit and the priority habitat.*

— **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

— **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

— **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

— **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

— **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

✓ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

— **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

✓ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

— **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page).*

— **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

— **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

— **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

— **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number B-1

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt Yes –Go to **SC 1.1** (No= **Not an estuarine wetland**)	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? Yes = **Category I** No - Go to **SC 1.2**	**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 25) — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. Yes = **Category I** No = **Category II**	**Cat. I** **Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes – Go to **SC 2.2** No – Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? Yes = **Category I** (No = **Not a WHCV**) SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes **– Contact WNHP/WDNR and go to SC 2.4** No = **Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? Yes = **Category I** No = **Not a WHCV**	**Cat. I**
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions.*** SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? Yes – Go to **SC 3.3** No – Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to **SC 3.3** (No = **Is not a bog**) SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? Yes = **Is a Category I bog** No – Go to **SC 3.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? Yes = **Is a Category I bog** No = **Is not a bog**	**Cat. I**

Wetland name or number B-1

SC 4.0. Forested Wetlands Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.*** — **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. — **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). Yes = **Category I** (No) = **Not a forested wetland for this section**	**Cat. I**
SC 5.0. Wetlands in Coastal Lagoons Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? — The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* Yes – Go to **SC 5.1** (No) = **Not a wetland in a coastal lagoon** SC 5.1. Does the wetland meet all of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2) Yes = **Category I** No = **Category II**	**Cat. I** **Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: — Long Beach Peninsula: Lands west of SR 103 — Grayland-Westport: Lands west of SR 105 — Ocean Shores-Copalis: Lands west of SR 115 and SR 109 Yes – Go to **SC 6.1** (No) = **not an interdunal wetland for rating** SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = **Category I** No – Go to **SC 6.2** SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = **Category II** No – Go to **SC 6.3** SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = **Category III** No = **Category IV**	**Cat I** **Cat. II** **Cat. III** **Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	N/A

Wetland name or number B-1

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Wetland name or number B-2

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland B-2 - Shannon Slaughter Date of site visit: 9/3/19

Rated by Wallin Trained by Ecology? X Yes ___No Date of training 2014

HGM Class used for rating Riverine Wetland has multiple HGM classes? ___Y X N

NOTE: Form is not complete without the figures requested *(figures can be combined).*

Source of base aerial photo/map _____

OVERALL WETLAND CATEGORY III (based on functions X or special characteristics ___)

1. Category of wetland based on FUNCTIONS

_____**Category I** – Total score = 23 - 27

_____**Category II** – Total score = 20 - 22

X **Category III** – Total score = 16 - 19

_____**Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	Circle the appropriate ratings			
Site Potential	H (M) L	H (M) L	H M (L)	
Landscape Potential	(H) M L	H (M) L	H M (L)	
Value	(H) M L	H M (L)	H (M) L	TOTAL
Score Based on Ratings	8	5	4	17

Score for each function based on three ratings *(order of ratings is not important)*

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	I II
Wetland of High Conservation Value	I
Bog	I
Mature Forest	I
Old Growth Forest	I
Coastal Lagoon	I II
Interdunal	I II III IV
None of the above	X

Wetland name or number B-2

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	1
Hydroperiods	D 1.4, H 1.2	1
Location of outlet *(can be added to map of hydroperiods)*	D 1.1, D 4.1	1
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	1
Map of the contributing basin	D 4.3, D 5.3	1
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	2
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	3
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	4

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants *(can be added to figure above)*	S 4.1	
Boundary of 150 ft buffer (can be added to another figure)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

Wetland name or number B-2

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

   NO – go to 2 **YES** – the wetland class is **Tidal Fringe** – go to 1.1

   1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**
   *If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

   NO – go to 3 **YES** – The wetland class is **Flats**
   *If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
   ___The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   ___At least 30% of the open water area is deeper than 6.6 ft (2 m).

   NO – go to 4 **YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
   ___The wetland is on a slope (*slope can be very gradual*),
   ___The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
   ___The water leaves the wetland **without being impounded**.

   NO – go to 5 **YES –** The wetland class is **Slope**

   NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
   X The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
   X The overbank flooding occurs at least once every 2 years.

Wetland name or number B2

NO – go to 6 **YES** – The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

NO – go to 7 **YES** – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO – go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number B-2

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

R 1.0. Does the site have the potential to improve water quality?		
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event:		
Depressions cover > 3/4 area of wetland	points = 8	
Depressions cover > ½ area of wetland	points = 4	
Depressions present but cover < ½ area of wetland	points = 2	Ø
No depressions present	points = 0	
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes)		
Trees or shrubs > 2/3 area of the wetland	points = 8	
Trees or shrubs > 1/3 area of the wetland	points = 6	
Herbaceous plants (> 6 in high) > 2/3 area of the wetland	points = 6	6
Herbaceous plants (> 6 in high) > 1/3 area of the wetland	points = 3	
Trees, shrubs, and ungrazed herbaceous < 1/3 area of the wetland	points = 0	
Total for R 1 — Add the points in the boxes above		6

Rating of Site Potential If score is: ___ **12-16 = H** ___ **6-11 = M** ___ **0-5 = L** *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?		
R 2.1. Is the wetland within an incorporated city or within its UGA?	Yes = 2 No = 0	2
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area?	Yes = 1 No = 0	1
R 2.3. Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years?	Yes = 1 No = 0	Ø
R 2.4. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1-R 2.4 Other sources _____	Yes = 1 No = 0	Ø
Total for R 2 — Add the points in the boxes above		4

Rating of Landscape Potential If score is: ___ **3-6 = H** ___ **1 or 2 = M** ___ **0 = L** *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?		
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi?	Yes = 1 No = 0	Ø
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens?	Yes = 1 No = 0	1
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which the unit is found*)	Yes = 2 No = 0	2
Total for R 3 — Add the points in the boxes above		3

Rating of Value If score is: ___ **2-4 = H** ___ **1 = M** ___ **0 = L** *Record the rating on the first page*

Wetland name or number B-2

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Hydrologic Functions - Indicators that site functions to reduce flooding and stream erosion

R 4.0. Does the site have the potential to reduce flooding and erosion?

R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).* If the ratio is more than 20	points = 9	
If the ratio is 10-20	points = 6	
If the ratio is 5-<10	points = 4	
If the ratio is 1-<5	points = (2)	2
If the ratio is < 1	points = 1	
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are NOT Cowardin classes).* Forest or shrub for > 1/3 area OR emergent plants > 2/3 area	points = (7)	
Forest or shrub for > 1/10 area OR emergent plants > 1/3 area	points = 4	7
Plants do not meet above criteria	points = 0	
Total for R 4	Add the points in the boxes above	9

Rating of Site Potential If score is: ___ 12-16 = H ___ X 6-11 = (M) ___ 0-5 = L *Record the rating on the first page*

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?

R 5.1. Is the stream or river adjacent to the wetland downcut? Ditch like feature	(Yes) = 0 No = 1	Ø
R 5.2. Does the up-gradient watershed include a UGA or incorporated area?	(Yes) = 1 No = 0	1
R 5.3. Is the up-gradient stream or river controlled by dams? Controlled structure upstream	(Yes) = 0 No = 1	Ø
Total for R 5	Add the points in the boxes above	1

Rating of Landscape Potential If score is: ___ 3 = H ___ X 1 or 2 = (M) ___ 0 = L *Record the rating on the first page*

R 6.0. Are the hydrologic functions provided by the site valuable to society?

R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.* The sub-basin immediately down-gradient of the wetland has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds)	points = 2	
Surface flooding problems are in a sub-basin farther down-gradient	points = 1	
No flooding problems anywhere downstream	points = (0)	Ø
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 (No) = 0	Ø
Total for R 6	Add the points in the boxes above	Ø

Rating of Value If score is: ___ 2-4 = H ___ 1 = M ___ X 0 = (L) *Record the rating on the first page*

Wetland name or number B-2

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

___Aquatic bed	4 structures or more: points = 4
_X_Emergent	3 structures: points = 2
___Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points = 1
___Forested (areas where trees have > 30% cover)	1 structure: points = (0)

If the unit has a Forested class, check if:

___The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

Ø

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

_X_Permanently flooded or inundated	4 or more types present: points = 3
_X_Seasonally flooded or inundated	3 types present: points = 2
___Occasionally flooded or inundated	2 types present: points = (1)
___Saturated only	1 type present: points = 0
___Permanently flowing stream or river in, or adjacent to, the wetland	
___Seasonally flowing stream in, or adjacent to, the wetland	
___**Lake Fringe wetland**	**2 points**
___**Freshwater tidal wetland**	**2 points**

1

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.

Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted: > 19 species	points = 2
5 - 19 species	points = (1)
< 5 species	points = 0

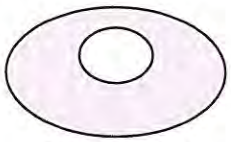
1

H 1.4. Interspersion of habitats

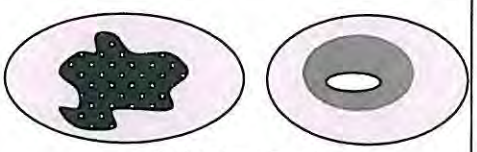
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points

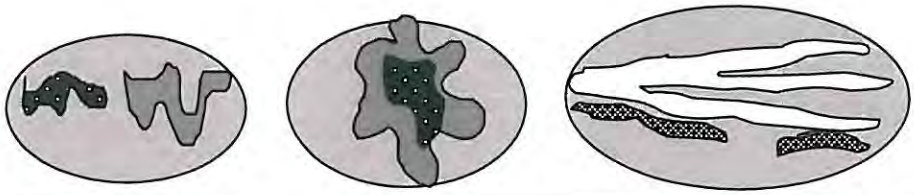


Low = 1 point



Moderate = 2 points

All three diagrams in this row are **HIGH** = 3points



Ø

2

Wetland name or number B-2

2

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ____Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). ____Standing snags (dbh > 4 in) within the wetland ____Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed)* __X__At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* __X__Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	2
Total for H 1 — Add the points in the boxes above	4

Rating of Site Potential If score is:___**15-18 = H** ___**7-14 = M** __X__**0-6 = L** (L) *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* ±15% % undisturbed habitat___ + [(% moderate and low intensity land uses)/2]__/__ = ±15% % If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon — points = 3 20-33% of 1 km Polygon — points = 2 10-19% of 1 km Polygon — points = (1) < 10% of 1 km Polygon — points = 0	1
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* ±10 % undisturbed habitat___ + [(% moderate and low intensity land uses)/2]__/__ = 10 % Undisturbed habitat > 50% of Polygon — points = 3 Undisturbed habitat 10-50% and in 1-3 patches — points = 2 Undisturbed habitat 10-50% and > 3 patches — points = (1) Undisturbed habitat < 10% of 1 km Polygon — points = 0	1
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use — points = (- 2) ≤ 50% of 1 km Polygon is high intensity — points = 0	-2
Total for H 2 — Add the points in the boxes above	0

Rating of Landscape Potential If score is:___**4-6 = H** ___**1-3 = M** __X__**< 1 = L** (L) *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* Site meets ANY of the following criteria: — points = 2 — It has 3 or more priority habitats within 100 m (see next page) — It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) — It is mapped as a location for an individual WDFW priority species — It is a Wetland of High Conservation Value as determined by the Department of Natural Resources — It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) within 100 m — points = (1) Site does not meet any of the criteria above — points = 0	1

Rating of Value If score is:___**2 = H** __X__**1 = M** ___**0 = L** (M) *Record the rating on the first page*

Wetland name or number _____

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE:*** *This question is independent of the land use between the wetland unit and the priority habitat.*

— **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

— **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

— **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

— **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

— **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

I **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

— **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

✓ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

— **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page).*

— **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

— **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

— **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

— **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number B2

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt Yes –Go to **SC 1.1** (No) = **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? Yes = **Category I** No - Go to **SC 1.2**	**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 25) — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. Yes = **Category I** No = **Category II**	**Cat. I** **Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes – Go to **SC 2.2** No – Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? Yes = **Category I** (No) = **Not a WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes – **Contact WNHP/WDNR and go to SC 2.4** No = **Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? Yes = **Category I** No = **Not a WHCV**	**Cat. I**
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions.*** SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? Yes – Go to **SC 3.3** No – Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to **SC 3.3** (No) = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? Yes = **Is a Category I bog** No – Go to **SC 3.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? Yes = **Is a Category I bog** No = **Is not a bog**	**Cat. I**

Wetland name or number B-2

SC 4.0. Forested Wetlands Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.*** — **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. — **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). Yes = **Category I** (No) = **Not a forested wetland for this section**	**Cat. I**
SC 5.0. Wetlands in Coastal Lagoons Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? — The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* Yes – Go to **SC 5.1** (No) = **Not a wetland in a coastal lagoon** SC 5.1. Does the wetland meet all of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2) Yes = **Category I** No = **Category II**	**Cat. I** **Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: — Long Beach Peninsula: Lands west of SR 103 — Grayland-Westport: Lands west of SR 105 — Ocean Shores-Copalis: Lands west of SR 115 and SR 109 Yes – Go to **SC 6.1** (No) = **not an interdunal wetland for rating** SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = **Category I** No – Go to **SC 6.2** SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = **Category II** No – Go to **SC 6.3** SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = **Category III** No = **Category IV**	**Cat I** **Cat. II** **Cat. III** **Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	N/A

Wetland name or number B-2

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Figure 1

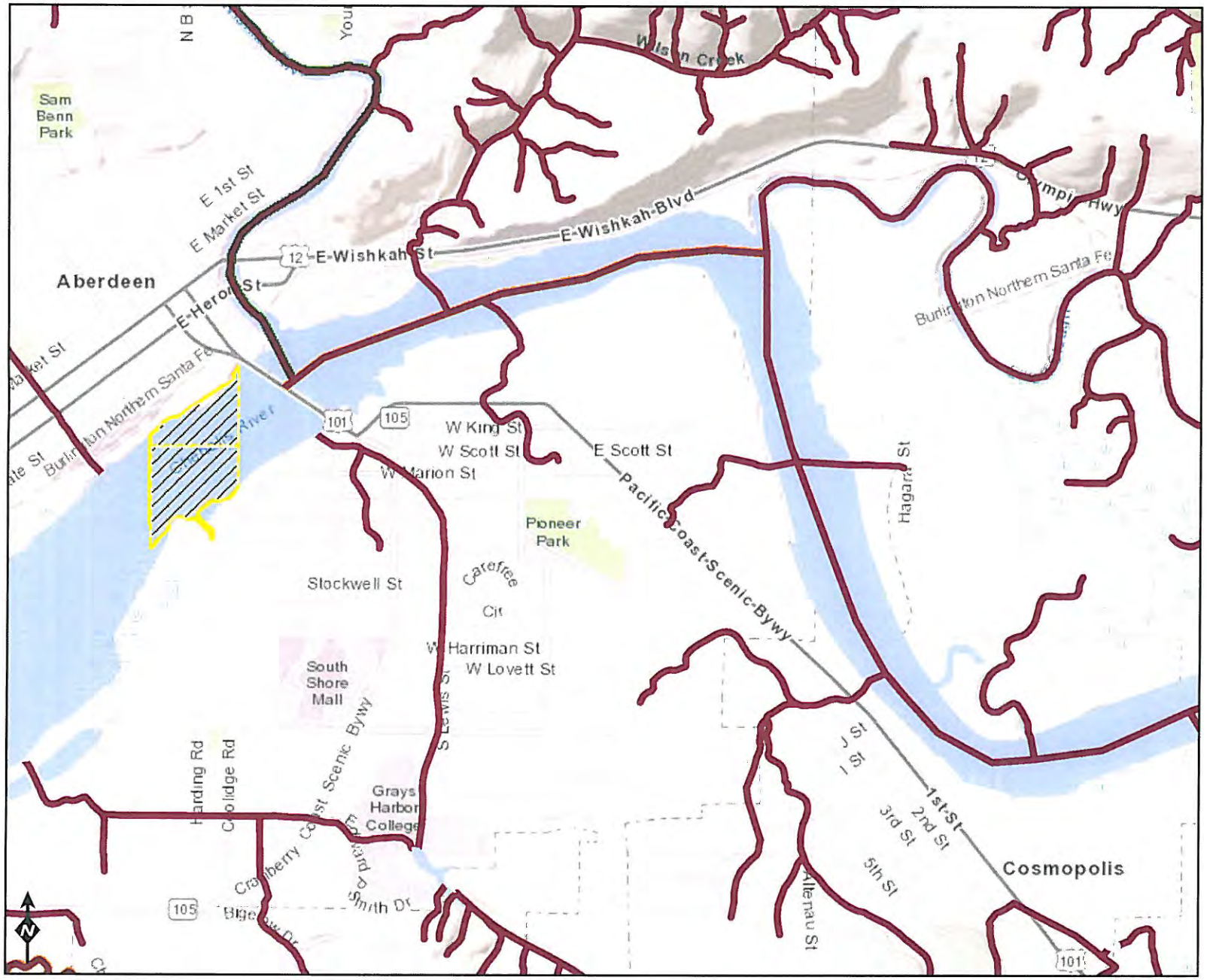

Wetland A
- Freshwater Tidal : EM
- Chehalis River Basin
Wetland B-1
- Freshwater Tidal : EM
- Chehalis River Basin
150'
Culvert
Wetland B-2
= Riverine : EM
150'
150'
Flow Control Structure
Google Earth
Curtis St
© 2018 Google
101
700 ft
N Evans St
N

Figure 7


2nd Ave
N E St
Arthur St
Essex Ave
Terrace Ave
Randal St
N B St Ln
Grant St
N A St
N F St
N C St
N G St
E 3rd St
Henry Al
Olympic Hwy
12
Sargent Rd
Hagara St
N Broadway St
N I St
N H St
S F St
S G St
N K St
S K St
S L St
S M St
W State St
River St
A
B-1
B-2
101
105
N Clark St
N Custer St
N Lawrence St
E Curtis St
E King St
E Scott St
E Marion St
E Cushing St
N Rogers St
N Decatur St
Decatur St
S Boone St
S Clark St
S Mill St
S Exchange S
Meander Way
E Schley St
Polk St
Taylor
N
3000 ft
Google Earth
© 2018 Google

October 15, 2019

Water Quality Atlas Map



Assessed Waters/Sediment

Water
- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

Sediment
- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

WQ Standards

Miles
0 0.25 0.5 1

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and

DEPARTMENT OF ECOLOGY
State of Washington

Figure 3

Figure 7J

DEPARTMENT OF ECOLOGY State of Washington

Grays Harbor County

Water quality improvement projects

Select the waterbody or pollutant name to find more information about the specific project.

Waterbody Name(s)	Pollutant(s)	Status	Project Lead(s)
Chehalis River Basin - Simpson Timberlands	Temperature	Approved by EPA	Andrew Kolosseus 360-407-7543
Chehalis River Basin - Upper Chehalis River Watershed	Dissolved Oxygen	Approved by EPA	Devan Rostorfer 360-690-4665
Chehalis River Basin - Wildcat Creek	Ammonia-N BOD (5-Day) Chlorine Fecal Coliform	Approved by EPA	Devan Rostorfer 360-690-4665
Grays Harbor	Dioxin Fecal Coliform	Approved by EPA	Devan Rostorfer 360-690-4665
Grays Harbor - Humptulips River	Temperature	Approved by EPA	Devan Rostorfer 360-690-4665
North Ocean Beaches - • Pacific Ocean • Moclips River	Shellfish Closure Response - Fecal Coliform Bacteria Source Investigation Study	Under development	Leanne Whitesell 360-407-6295

To request ADA accommodation, call Ecology at 360-407-7668, 711 (relay service), or 877-833-6341 (TTY). More about our accessibility services.

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MAUL FOSTER ALONGI

GRAYS HARBOR HISTORICAL SEAPORT AUTHORITY CRITICAL AREAS REPORT

APPENDIX E: QUERIED DATABASE FIGURES

U.S. Fish and Wildlife Service
National Wetlands Inventory

Wetlands



October 16, 2019

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
PRIORITY HABITATS AND SPECIES REPORT

SOURCE DATASET: PHSPlusPublic
REPORT DATE: 10/16/2019 12.03

Query ID: P191016120257

Common Name	Site Name	Priority Area	Accuracy	Federal Status	Sensitive Data	Source Entity
Scientific Name	Source Dataset	Occurrence Type		State Status	Resolution	Geometry Type
	Source Record	More Information (URL)		PHS Listing Status		
Notes	Source Date	Mgmt Recommendations				

DISCLAIMER. This report includes information that the Washington Department of Fish and Wildlife (WDFW) maintains in a central computer database. It is not an attempt to provide you with an official agency response as to the impacts of your project on fish and wildlife. This information only documents the location of fish and wildlife resources to the best of our knowledge. It is not a complete inventory and it is important to note that fish and wildlife resources may occur in areas not currently known to WDFW biologists, or in areas for which comprehensive surveys have not been conducted. Site specific surveys are frequently necesssary to rule out the presence of priority resources. Locations of fish and wildlife resources are subject to vraition caused by disturbance, changes in season and weather, and other factors. WDFW does not recommend using reports more than six months old.

WDFW Test Map



October 16, 2019

PHS Report Clip Area

PT

LN

POLY

AS MAPPED

SECTION

QTR-TWP

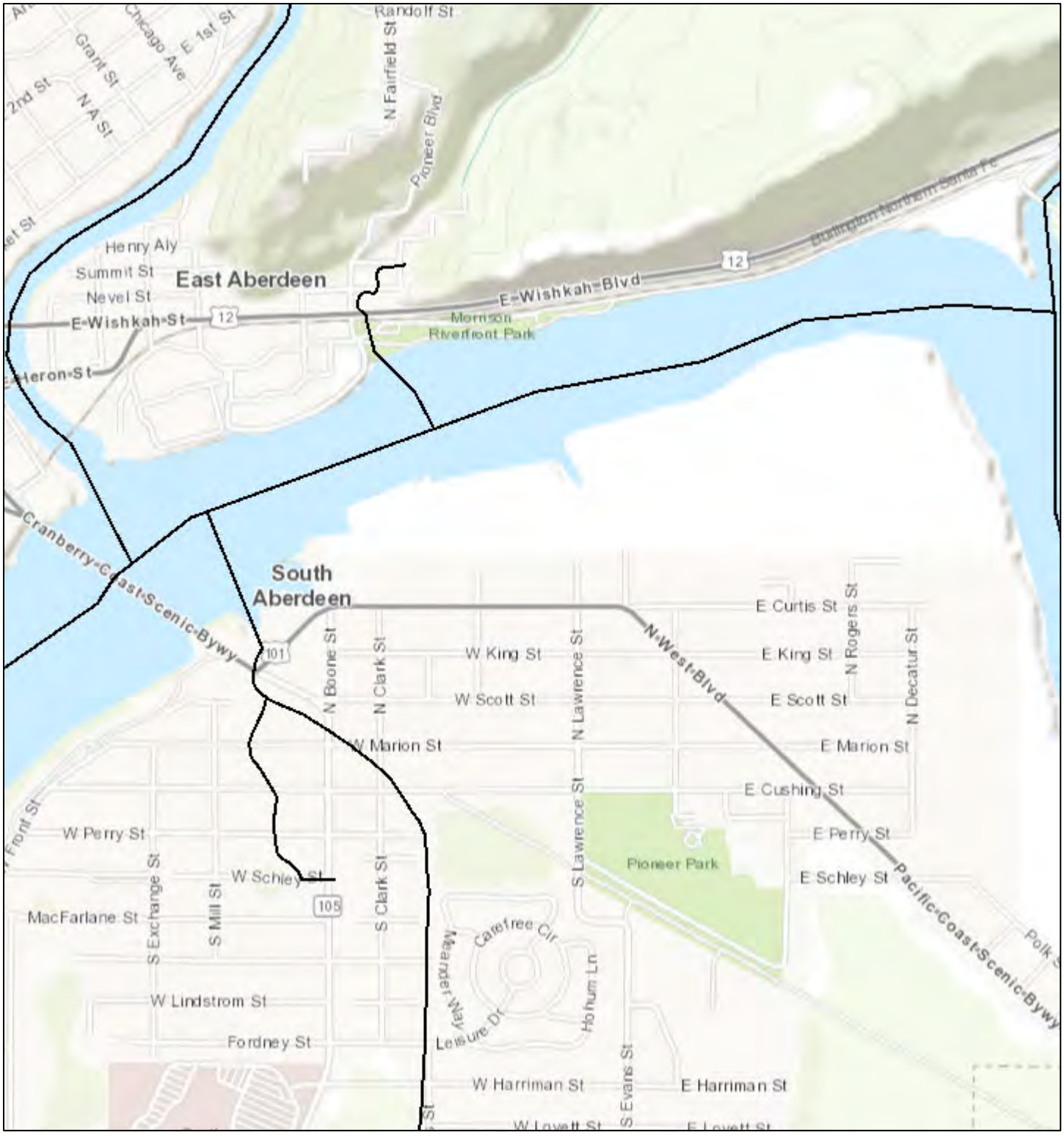
TOWNSHIP

1:19,842

0 0.15 0.3 0.6 mi

0 0.275 0.55 1.1 km

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



October 15, 2019

1:18,056

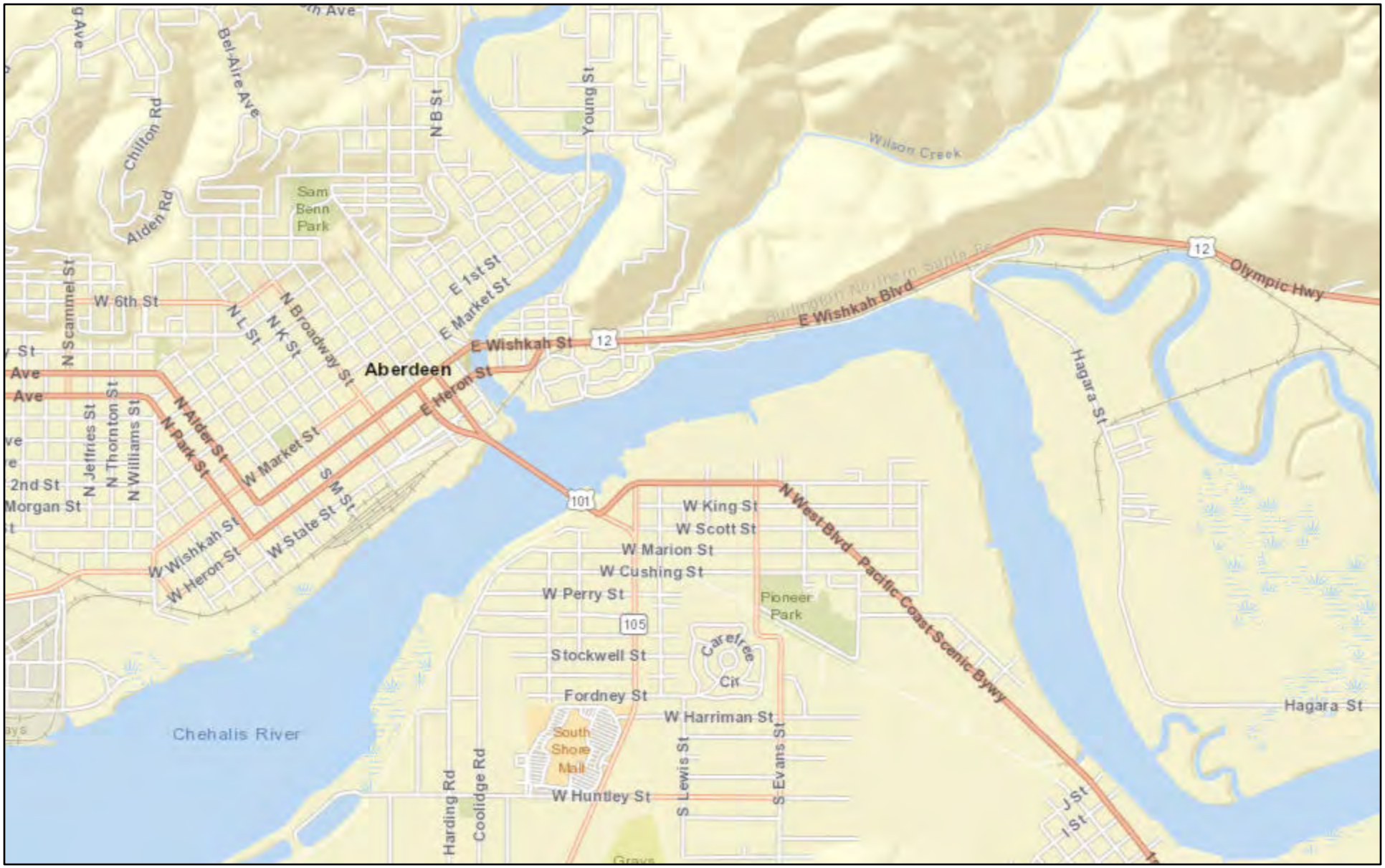
All SalmonScape Species

0 0.15 0.3 0.6 mi

0 0.25 0.5 1 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
WDFW

WA Wetlands of High Conservation Value



10/16/2019, 12:17:08 PM

Counties

1:36,112

0 0.2 0.4 0.8 mi

0 0.33 0.65 1.3 km

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan,

Washington Natural Heritage Program

Bureau of Land Management, Esri, HERE, Garmin, NGA, USGS | U.S. Fish and Wildlife Service, National Standards and Support Team, wetlands_team@fws.gov | Washington Natural Heritage Program http://www.dnr.wa.gov/natural-heritage-program |

Forest Practices Activity Map - Application #_____



Map Symbols

- Harvest Boundary
- Road Construction
- Stream
- RMZ / WMZ Buffers
- Rock Pit
- Landing
- Waste Area
- Clumped WRTS/GRTS
- Existing Structure

Additional Information

Legal Description

S03 T17.0N R09.0W, S04 T17.0N R09.0W
S15 T17.0N R09.0W, S10 T17.0N R09.0W
S09 T17.0N R09.0W, S16 T17.0N R09.0W

WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES

Extreme care was used during the compilation of this map to ensure its accuracy. However, due to changes in data and the need to rely on outside information, the Department of Natural Resources cannot accept responsibility for errors or omissions, and therefore, there are no warranties that accompany this material.

0 0.25 Miles

Date: 10/15/2019 Time: 1:59:20 PM

APPENDIX D

GEOLOGIC LOGS

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.14	**SE-01A**	**1 of 1**

Project Name	**Seaport Landing - Grays Harbor Historical Seaport Authority**	TOC Elevation (feet)	**Mudline**
Project Location	**Aberdeen, Washington**	Surface Elevation (feet)	
Start/End Date	**09/25/19 to 09/25/19**	Northing	**615665.4**
Driller/Equipment	**Research Support Services, Inc./Vibracore**	Easting	**817512.9**
Geologist/Engineer	**B. Paulik & M. Pollock**	Hole Depth	**7.2-feet**
Sample Method	**Vibracore**	Outer Hole Diam	**3.0-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 3.3 feet: SILT (ML); black; 75% fines, low plasticity, firm; 5% sand, fine; 20% woodwaste, fibers, chips, chunks; faint organic-like odor; moist.
2				VC GRAB	SE-01A-1.0-2.0	PID = 0.4 ppm			
3									
4									3.3 to 7.2 feet: SILT (ML); dark gray; 95% fines, low plasticity, firm; 5% woodwaste, fibers, chips; faint organic-like odor; moist.
5									
6									
7									

NOTES: 1. bml = below mudline. 2. VC GRAB = grab sediment sample from vibracore. 3. Depths are approximate and relative to feet bml. 4. ppm = parts per million. 5. PID = photoionization detector, sediment head space reading in ppm.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.14	**SE-01B**	**1 of 1**

Project Name	**Seaport Landing - Grays Harbor Historical Seaport Authority**	TOC Elevation (feet)	**Mudline**
Project Location	**Aberdeen, Washington**	Surface Elevation (feet)	
Start/End Date	**09/25/19 to 09/25/19**	Northing	**615683.3**
Driller/Equipment	**Research Support Services, Inc./Vibracore**	Easting	**817608.8**
Geologist/Engineer	**B. Paulik & M. Pollock**	Hole Depth	**1.6-feet**
Sample Method	**Vibracore**	Outer Hole Diam	**3.0-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1				VC GRAB	SE-01B-0.5-1.5 PID = 0.5 ppm				0.0 to 0.6 feet: SILT (ML); dark gray; 90% fines, low plasticity, soft; 10% woodwaste, fibers, small chips (<0.5 inches); wet. 0.6 to 1.4 feet: WOODWASTE; brown to gray; 20% fines; 80% woodwaste, fibers, chips, chunks (<3.0 inches); strong organic-like odor; moist. 1.4 to 1.6 feet: SILT (ML); dark gray; 80% fines, low plasticity, firm; 20% woodwaste, fibers, chips (<0.5 inches); organic-like odor; wet.

NOTES: 1. bml = below mudline. 2. VC GRAB = grab sediment sample from vibracore. 3. Depths are approximate and relative to feet bml. 4. ppm = parts per million. 5. PID = photoionization detector, sediment head space reading in ppm.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.14	**SE-01C**	**1 of 1**

Project Name	**Seaport Landing - Grays Harbor Historical Seaport Authority**	TOC Elevation (feet)	**Mudline**
Project Location	**Aberdeen, Washington**	Surface Elevation (feet)	
Start/End Date	**09/25/19 to 09/25/19**	Northing	**615734.0**
Driller/Equipment	**Research Support Services, Inc./Vibracore**	Easting	**817722.3**
Geologist/Engineer	**B. Paulik & M. Pollock**	Hole Depth	**4.6-feet**
Sample Method	**Vibracore**	Outer Hole Diam	**3.0-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 4.6 feet: SILT (ML); dark gray; 90% fines, low plasticity, firm; 10% sand, fine; trace woodwaste; faint organic-like odor; wet.
2				VC GRAB		SE-01C-2.0-3.0 PID = 0.3 ppm			
3									2.6 to 2.9 feet: Increase in woodwaste fibers up to 15%.
4									

NOTES: *1. bml = below mudline. 2. VC GRAB = grab sediment sample from vibracore. 3. Depths are approximate and relative to feet bml. 4. ppm = parts per million. 5. PID = photoionization detector, sediment head space reading in ppm.*

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.14	**SE-01D**	**1 of 1**

Project Name	**Seaport Landing - Grays Harbor Historical Seaport Authority**	TOC Elevation (feet)	**Mudline**
Project Location	**Aberdeen, Washington**	Surface Elevation (feet)	
Start/End Date	**09/25/19 to 09/25/19**	Northing	**615735.5**
Driller/Equipment	**Research Support Services, Inc./Vibracore**	Easting	**817809.0**
Geologist/Engineer	**B. Paulik & M. Pollock**	Hole Depth	**4.7-feet**
Sample Method	**Vibracore**	Outer Hole Diam	**3.0-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1				VC GRAB	SE-01D-0-1.0 PID = 0.5 ppm				0.0 to 1.6 feet: SILT (ML); gray; 80% fines, low plasticity, firm; 5% sand, fine; 15% woodwaste, shreds; faint organic-like odor; moist.
2									1.6 to 4.7 feet: SILT (ML); gray; 95% fines; low plasticity; firm; 5% woodwaste; fibers; moist.
3									
4									

NOTES: 1. bml = below mudline. 2. VC GRAB = grab sediment sample from vibracore. 3. Depths are approximate and relative to feet bml. 4. ppm = parts per million. 5. PID = photoionization detector, sediment head space reading in ppm.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.14	**SE-02A**	**1 of 1**

Project Name	**Seaport Landing - Grays Harbor Historical Seaport Authority**	TOC Elevation (feet)	**Mudline**
Project Location	**Aberdeen, Washington**	Surface Elevation (feet)	
Start/End Date	**09/26/19 to 09/26/19**	Northing	**615705.3**
Driller/Equipment	**Research Support Services, Inc./Vibracore**	Easting	**817339.0**
Geologist/Engineer	**M. Pollock & A. DeVita-McBride**	Hole Depth	**5.1-feet**
Sample Method	**Vibracore**	Outer Hole Diam	**3.0-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 2.4 feet: SILT (ML); black; 90% fines, low plasticity, soft; 10% sand, fine; trace woodwaste; wet
2									
3				VC GRAB		SE-02A-2.5-3.5			2.4 to 5.1 feet: SILT (ML); 90% fines, low plasticity, firm; 10% woodwaste, fibers, chips; moist.
4									3.4 feet: Decrease in woodwaste to 5%.
5									

NOTES: 1. bml = below mudline. 2. VC GRAB = grab sediment sample from vibracore. 3. Depths are approximate and relative to feet bml.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.14	**SE-03A**	**1 of 1**

Project Name	**Seaport Landing - Grays Harbor Historical Seaport Authority**	TOC Elevation (feet)	**Mudline**
Project Location	**Aberdeen, Washington**	Surface Elevation (feet)	
Start/End Date	**09/25/19 to 09/25/19**	Northing	**615673.5**
Driller/Equipment	**Research Support Services, Inc./Vibracore**	Easting	**817019.7**
Geologist/Engineer	**B. Paulik & M. Pollock**	Hole Depth	**5.5-feet**
Sample Method	**Vibracore**	Outer Hole Diam	**3.0-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1				VC GRAB	SE-03A-0-1.0	PID = 0.3 ppm			0.0 to 2.0 feet: SILT (ML); dark gray; 80% fines, low plasticity, soft; 10% sand, fine; 10% woodwaste, shreds; faint organic-like odor; wet. 0.3 feet to 0.4 feet: Lens of 20% woodwaste.
2									
3									2.0 to 4.5 feet: SILT (ML); gray; 90% fines, low plasticity, soft; 5% sand, fine; 5% woodwaste, fibers; moist.
4									
5									4.5 to 5.5 feet: SAND WITH SILT (SW-SM); dark gray; 10% fines, low plasticity, soft; 90% sand, medium; moist.

NOTES: 1. bml = below mudline. 2. VC GRAB = grab sediment sample from vibracore. 3. Depths are approximate and relative to feet bml. 4. ppm = parts per million. 5. PID = photoionization detector, sediment head space reading in ppm.

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.14	**SE-03B**	**1 of 1**

Project Name	**Seaport Landing - Grays Harbor Historical Seaport Authority**	TOC Elevation (feet)	**Mudline**
Project Location	**Aberdeen, Washington**	Surface Elevation (feet)	
Start/End Date	**09/25/19 to 09/25/19**	Northing	**615692.2**
Driller/Equipment	**Research Support Services, Inc./Vibracore**	Easting	**817126.2**
Geologist/Engineer	**B. Paulik & M. Pollock**	Hole Depth	**5.1-feet**
Sample Method	**Vibracore**	Outer Hole Diam	**3.0-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 5.1 feet: SILT (ML); dark gray; 80% fines, low plasticity, soft; 10% sand, fine; 10% woodwaste, shreds; faint organic-like odor; wet.
2				VC GRAB		SE-03B-1.0-2.0 PID = 0.1 ppm			1.2 to 1.9 feet: Color changes to black.
3									
4									
5									

NOTES: *1. bml = below mudline. 2. VC GRAB = grab sediment sample from vibracore. 3. Depths are approximate and relative to feet bml. 4. ppm = parts per million. 5. PID = photoionization detector, sediment head space reading in ppm.*

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.14	**SE-05A**	**1 of 1**

Project Name	**Seaport Landing - Grays Harbor Historical Seaport Authority**	TOC Elevation (feet)	**Mudline**
Project Location	**Aberdeen, Washington**	Surface Elevation (feet)	
Start/End Date	**09/23/19 to 09/23/19**	Northing	**615966.6**
Driller/Equipment	**Research Support Services, Inc./Vibracore**	Easting	**818023.1**
Geologist/Engineer	**B. Paulik & M. Pollock**	Hole Depth	**9.7-feet**
Sample Method	**Vibracore**	Outer Hole Diam	**3.0-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 2.3 feet: SILT WITH SAND (ML); gray; 80% fines, low plasticity; 20% sand, fine to medium; trace organic debris and woodwaste; wet. 0.7 feet: Color changes to black.
2						PID = 51.3 ppm			
3				VC GRAB		SE-05A-2.0-3.0			2.3 to 4.8 feet: SAND (SP); dark gray to black; 100% sand, medium to coarse; wet.
4									
5									4.8 to 6.0 feet: SILT (ML); gray; 95% fines, low plasticity; 5% sand, fine; moist
6									6.0 to 6.3 feet: SAND (SP); dark gray; 100% sand, medium to coarse; moist
7									6.3 to 9.7 feet: SILT (ML); gray; 95% fines, low plasticity; 5% sand, fine; moist
8									
9									

NOTES: 1. bml = below mudline. 2. VC GRAB = grab sediment sample from vibracore. 3. Depths are approximate and relative to feet bml. 4. ppm = parts per million. 5. PID = photoionization detector, sediment head space reading in ppm.

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.14	**SE-05B**	**1 of 1**

Project Name	**Seaport Landing - Grays Harbor Historical Seaport Authority**	TOC Elevation (feet)	**Mudline**
Project Location	**Aberdeen, Washington**	Surface Elevation (feet)	
Start/End Date	**09/26/19 to 09/26/19**	Northing	**615917.3**
Driller/Equipment	**Research Support Services, Inc./Vibracore**	Easting	**818104.6**
Geologist/Engineer	**M. Pollock & A. DeVita-McBride**	Hole Depth	**7.2-feet**
Sample Method	**Vibracore**	Outer Hole Diam	**3.0-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 6.0 feet: SILT (ML); dark gray; 95% fines, low plasticity, firm; 5% sand; trace organic debris and woodwaste; no odor; wet.
2									
3				VC	GRAB	SE-05B-2.5-3.5			3.0 to 3.2 feet: Increase in woodwaste to 5%.
4									
5									
6									6.0 to 7.2 feet: SAND WITH SILT (SP-SM); gray; 10% fines, firm; 90% sand, fine to medium; no odor; moist.
7									

NOTES: 1. bml = below mudline. 2. VC GRAB = grab sediment sample from vibracore. 3. Depths are approximate and relative to feet bml.

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.14	**SE-06A**	**1 of 1**

Project Name	**Seaport Landing - Grays Harbor Historical Seaport Authority**	TOC Elevation (feet)	**Mudline**
Project Location	**Aberdeen, Washington**	Surface Elevation (feet)	
Start/End Date	**09/25/19 to 09/25/19**	Northing	**615849.6**
Driller/Equipment	**Research Support Services, Inc./Vibracore**	Easting	**817909.8**
Geologist/Engineer	**B. Paulik & M. Pollock**	Hole Depth	**7.5-feet**
Sample Method	**Vibracore**	Outer Hole Diam	**3.0-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1				VC GRAB	SE-06A-0.5-1.5				0.0 to 4.7 feet: SILT (ML); dark gray; 75% fines, low plasticity, firm; 5% sand, fine; 20% woodwaste, chunks (1.0 to 3.0 inches); no odor; moist.
2									
3									
4									3.5 to 4.7 feet: Color changes to gray.
5									4.7 to 7.5 feet: SAND WITH SILT (SW-SM); gray; 10% fines, firm; 90% sand, medium; no odor; moist.
6									
7									

NOTES: *1. bml = below mudline. 2. VC GRAB = grab sediment sample from vibracore. 3. Depths are approximate and relative to feet bml.*

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.14	**SE-06B**	**1 of 1**

Project Name	**Seaport Landing - Grays Harbor Historical Seaport Authority**	TOC Elevation (feet)	**Mudline**
Project Location	**Aberdeen, Washington**	Surface Elevation (feet)	
Start/End Date	**09/26/19 to 09/26/19**	Northing	**615890.5**
Driller/Equipment	**Research Support Services, Inc./Vibracore**	Easting	**817823.9**
Geologist/Engineer	**M. Pollock & A. DeVita-McBride**	Hole Depth	**5.2-feet**
Sample Method	**Vibracore**	Outer Hole Diam	**3.0-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 1.5 feet: SILT (ML); black; 90% fines, low plasticity, soft; 10% sand, fine; trace woodwaste; no odor; wet.
2									1.5 to 5.2 feet: SAND (SW); gray; 5% fines; 95% sand; moderate to coarse; trace woodwaste; no odor; moist.
3									3.0 to 3.2 feet: Interval of 10% woodwaste chips
4				VC GRAB		SE-06B-3.0-4.0			
5									

NOTES: 1. bml = below mudline. 2. VC GRAB = grab sediment sample from vibracore. 3. Depths are approximate and relative to feet bml.

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.14	**SE-07A**	**1 of 1**

Project Name	**Seaport Landing - Grays Harbor Historical Seaport Authority**	TOC Elevation (feet)	**Mudline**
Project Location	**Aberdeen, Washington**	Surface Elevation (feet)	
Start/End Date	**09/26/19 to 09/26/19**	Northing	**615469.5**
Driller/Equipment	**Research Support Services, Inc./Vibracore**	Easting	**816818.5**
Geologist/Engineer	**M. Pollock & A. DeVita-McBride**	Hole Depth	**4.0-feet**
Sample Method	**Vibracore**	Outer Hole Diam	**3.0-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1				**VC GRAB**	**SE-07A-0-1.0**				*0.0 to 4.0 feet: SILT (ML); black; 60% fines, low plasticity, soft; 40% woodwaste, pulp, chips, chunks (=<2.0 inches); wet; free product (petroleum) impacts.*
2									
3									
4									

NOTES: *1. bml = below mudline. 2. VC GRAB = grab sediment sample from vibracore. 3. Depths are approximate and relative to feet bml.*

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.14	**SE-07B**	**1 of 1**

Project Name	**Seaport Landing - Grays Harbor Historical Seaport Authority**	TOC Elevation (feet)	**Mudline**
Project Location	**Aberdeen, Washington**	Surface Elevation (feet)	
Start/End Date	**09/26/19 to 09/26/19**	Northing	**615530.6**
Driller/Equipment	**Research Support Services, Inc./Vibracore**	Easting	**816792.5**
Geologist/Engineer	**M. Pollock & A. DeVita-McBride**	Hole Depth	**6.5-feet**
Sample Method	**Vibracore**	Outer Hole Diam	**3.0-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1				VC GRAB	SE-07B-0-1.0				0.0 to 6.5 feet: SILT (ML); dark gray; 90% fines, low plasticity, firm; 5% sand, fine; 5% woodwaste, chips; no odor; moist. 0.3 feet: Decrease to trace woodwaste, fine chips; increase to 10% sand.
2									
3									
4									
5									
6									

NOTES: *1. bml = below mudline. 2. VC GRAB = grab sediment sample from vibracore. 3. Depths are approximate and relative to feet bml.*

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.14	**SE-08A**	**1 of 1**

Project Name	**Seaport Landing - Grays Harbor Historical Seaport Authority**	TOC Elevation (feet)	**Mudline**
Project Location	**Aberdeen, Washington**	Surface Elevation (feet)	
Start/End Date	**09/24/19 to 09/24/19**	Northing	**615565.0**
Driller/Equipment	**Research Support Services, Inc./Vibracore**	Easting	**817053.7**
Geologist/Engineer	**B. Paulik & M. Pollock**	Hole Depth	**1.3-feet**
Sample Method	**Vibracore**	Outer Hole Diam	**3.0-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1				**VC GRAB**	**SE-08A-0-1.0 PID = 20.0 ppm**				*0.0 to 1.3 feet: WOODWASTE; gray; 15% fines; 85% woodwaste, pulp to fine chips; wet.*

NOTES: *1. bml = below mudline. 2. VC GRAB = grab sediment sample from vibracore. 3. Depths are approximate and relative to feet bml. 4. ppm = parts per million. 5. PID = photoionization detector, sediment head space reading in ppm.*

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.14	**SE-08B**	**1 of 1**

Project Name	**Seaport Landing - Grays Harbor Historical Seaport Authority**	TOC Elevation (feet)	**Mudline**
Project Location	**Aberdeen, Washington**	Surface Elevation (feet)	
Start/End Date	**09/24/19 to 09/24/19**	Northing	**615582.9**
Driller/Equipment	**Research Support Services, Inc./Vibracore**	Easting	**817102.3**
Geologist/Engineer	**B. Paulik & M. Pollock**	Hole Depth	**5.3-feet**
Sample Method	**Vibracore**	Outer Hole Diam	**3.0-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1				**VC GRAB**	**SE-08B-0-1.0**				*0.0 to 5.3 feet: SILT (ML); grayish black; 75% fines, low plasticity, soft; 10% sand, fine; 15% woodwaste, pulp to fine chips; organic-like odor; wet.*
2					**PID = 2.8 ppm**				
3									
4									
5									

NOTES: *1. bml = below mudline. 2. VC GRAB = grab sediment sample from vibracore. 3. Depths are approximate and relative to feet bml. 4. ppm = parts per million. 5. PID = photoionization detector, sediment head space reading in ppm. 6. Core collected for radioisotope analysis.*

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.14	**SE-08C**	**1 of 1**

Project Name	**Seaport Landing - Grays Harbor Historical Seaport Authority**	TOC Elevation (feet)	**Mudline**
Project Location	**Aberdeen, Washington**	Surface Elevation (feet)	
Start/End Date	**09/24/19 to 09/24/19**	Northing	**615597.0**
Driller/Equipment	**Research Support Services, Inc./Vibracore**	Easting	**817150.6**
Geologist/Engineer	**B. Paulik & M. Pollock**	Hole Depth	**4.2-feet**
Sample Method	**Vibracore**	Outer Hole Diam	**3.0-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 3.9 feet: SILT (ML); grayish black; 85% fines, low plasticity, firm; 10% sand, fine; 5% woodwaste, chips, chunks (1.0 to 3.0 inches); organic-like odor; wet.
2						PID = 0.9 ppm			
3									
4				VC GRAB		SE-08C-3.2-4.2			3.9 to 4.2 feet: WOODWASTE; 100% woodwaste; chips, chunks; organic-like odor; moist. 4.0 to 4.1 feet: Lens of silt; gray; 90% fines; low plasticity; 10% woodwaste; pulp, chips; organic-like odor; wet.

NOTES: 1. bml = below mudline. 2. VC GRAB = grab sediment sample from vibracore. 3. Depths are approximate and relative to feet bml. 4. ppm = parts per million. 5. PID = photoionization detector, sediment head space reading in ppm.

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.14	**SE-08D**	**1 of 1**

Project Name	**Seaport Landing - Grays Harbor Historical Seaport Authority**	TOC Elevation (feet)	**Mudline**
Project Location	**Aberdeen, Washington**	Surface Elevation (feet)	
Start/End Date	**09/24/19 to 09/24/19**	Northing	**615614.6**
Driller/Equipment	**Research Support Services, Inc./Vibracore**	Easting	**817196.4**
Geologist/Engineer	**B. Paulik & M. Pollock**	Hole Depth	**5.8-feet**
Sample Method	**Vibracore**	Outer Hole Diam	**3.0-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0.0 to 2.0 feet: SILT WITH SAND (ML): dark gray; 80% fines, low plasticity, firm; 15% sand; 5% woodwaste, chunks (1.0 to 3.0 inches); organic-like odor; wet.
2									
3				VC GRAB		SE-08D-2.0-3.0			2.0 to 2.75 feet: WOODWASTE; brown with gray; 10% fines; 90% woodwaste, shreds, chips, chunks (<= 4.0 inches); organic-like odor; moist.
4									2.75 to 5.75 feet: SILT (ML): dark gray; 90% fines, low plasticity, firm; 5% sand, fine; 5% woodwaste, fibers, shreds, chips (<1.0 inch); organic-like odor; moist.
5									

NOTES: *1. bml = below mudline. 2. VC GRAB = grab sediment sample from vibracore. 3. Depths are approximate and relative to feet bml.*

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.14	**SE-10**	**1 of 1**

Project Name	***Seaport Landing - Grays Harbor Historical Seaport Authority***	*TOC Elevation (feet)*	***Mudline***
Project Location	***Aberdeen, Washington***	*Surface Elevation (feet)*	
Start/End Date	***09/26/19 to 09/26/19***	*Northing*	***615459.0***
Driller/Equipment	***Research Support Services, Inc./Vibracore***	*Easting*	***816917.7***
Geologist/Engineer	***M. Pollock & A. DeVita-McBride***	*Hole Depth*	***3.7-feet***
Sample Method	***Vibracore***	*Outer Hole Diam*	***3.0-inch***

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									*0.0 to 2.0 feet: WOODWASTE (ML): brown; 20% fines; 80% woodwaste, fibers, chips; strong sulfur-like odor; wet.*
2									
3				***VC GRAB***		***SE-10-2.0-3.7***			*2.0 to 3.7 feet: SILT (ML): gray; 70% fines, low plasticity, firm; 30% woodwaste; strong sulfur-like odor; moist.*

NOTES: *1. bml = below mudline. 2. VC GRAB = grab sediment sample from vibracore. 3. Depths are approximate and relative to feet bml.*

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.14	**SE-12**	**1 of 1**

Project Name	***Seaport Landing - Grays Harbor Historical Seaport Authority***	*TOC Elevation (feet)*	***Mudline***
Project Location	***Aberdeen, Washington***	*Surface Elevation (feet)*	
Start/End Date	***09/25/19 to 09/25/19***	*Northing*	***615545.6***
Driller/Equipment	***Research Support Services, Inc./Vibracore***	*Easting*	***816909.9***
Geologist/Engineer	***B. Paulik & M. Pollock***	*Hole Depth*	***1.8-feet***
Sample Method	***Vibracore***	*Outer Hole Diam*	***3.0-inch***

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									*0.0 to 1.8 feet: SILT (ML): gray; 70% fines, low plasticity, soft; 5% sand, fine; 25% woodwaste, shreds, chips; wet.*

NOTES: *1. bml = below mudline. 2. Depths are approximate and relative to feet bml. 3. Core collected for radioisotope analysis.*

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.14	**SE-29**	**1 of 1**

Project Name	**Seaport Landing - Grays Harbor Historical Seaport Authority**	TOC Elevation (feet)	**Mudline**
Project Location	**Aberdeen, Washington**	Surface Elevation (feet)	
Start/End Date	**09/24/19 to 09/24/19**	Northing	**615491.1**
Driller/Equipment	**Research Support Services, Inc./Vibracore**	Easting	**816870.0**
Geologist/Engineer	**B. Paulik & M. Pollock**	Hole Depth	**2.5-feet**
Sample Method	**Vibracore**	Outer Hole Diam	**3.0-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1			100	VC GRAB		SE-29-0-2.0 PID = 37.1 ppm			0.0 to 2.3 feet: WOODWASTE; gray; 20% fines, soft; 80% woodwaste, pulp to chips; sulfur-like odor; wet.
2									2.3 to 2.5 feet: SILT (ML); gray; 75% fines, low plasticity, soft; 25% woodwaste, chips; organic-like odor; wet.

NOTES: *1. bml = below mudline. 2. VC GRAB = grab sediment sample from vibracore. 3. Depths are approximate and relative to feet bml. 4. ppm = parts per million. 5. PID = photoionization detector, sediment head space reading in ppm.*

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.14	**SE-30**	**1 of 1**

Project Name	**Seaport Landing - Grays Harbor Historical Seaport Authority**	TOC Elevation (feet)	**Mudline**
Project Location	**Aberdeen, Washington**	Surface Elevation (feet)	
Start/End Date	**09/26/19 to 09/26/19**	Northing	**615559.1**
Driller/Equipment	**Research Support Services, Inc./Vibracore**	Easting	**816974.6**
Geologist/Engineer	**M. Pollock & A. DeVita-McBride**	Hole Depth	**6.1-feet**
Sample Method	**Vibracore**	Outer Hole Diam	**3.0-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1				VC GRAB		SE-30-0-2.0			0.0 to 2.5 feet: WOODWASTE; black; 20% fines; 80% woodwaste, chips, chunks (<2.0 inches); strong sulfur-like odor; wet.
2									1.5 feet: Color changes to gray.
3									2.5 to 3.4 feet: SILT (ML); gray; 75% fines, low plasticity, firm; 5% sand, fine; 20% woodwaste, shreds, chips; faint sulfur-like odor; moist.
4				VC GRAB		SE-30-2.5-4.5			2.9 to 3.0 feet: Lens of 100% solid woodwaste.
5				VC GRAB		SE-30-4.5-5.5			3.4 to 6.1 feet: SILT (ML); gray; 90% fines; 5% sand, fine; 5% woodwaste, chips; no odor; moist.
6									

NOTES: *1. bml = below mudline. 2. VC GRAB = grab sediment sample from vibracore. 3. Depths are approximate and relative to feet bml.*

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.13	**RAU2-GA1**	**1 of 2**

Project Name	**Upland RI - Grays Harbor Historical Seaport Authority**	TOC Elevation (feet)	
Project Location	**Aberdeen, Washington**	Surface Elevation (feet)	
Start/End Date	**12/4/2019 to 12/4/2019**	Northing	**615307.7**
Driller/Equipment	**Holocene Drilling, Inc./Diedrich D-50**	Easting	**817000.7**
Geologist/Engineer	**R. Lewis**	Hole Depth	**26.5-feet**
Sample Method	**Standard Penetration Test**	Outer Hole Diam	**3.0-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0 to 2.5 feet: Not sampled.
2									
3			**20**	**SP**					2.5 to 3.0 feet: WOODWASTE; brown; 100% woodwaste; wet.
4						**RAU2-GA1-SO-3.25**			3.0 to 6.0 feet: SILT (ML); gray; 90% fines, medium plasticity; 10% sand, fine to medium; trace woodwaste, organics; wet.
5			**5**	**SP**					
6						**RAU2-GA1-SO-5.75**			@ 6.0 feet: Minor sheen, organic odor.
7									6.0 to 10.0 feet: SILT with SAND (ML); gray; 80% fines, medium plasticity; 20% sand, medium; trace wood debris, organics; wet.
8			**15**	**SP**					
9						**RAU2-GA1-SO-8.25**			
10									10.0 to 20.5 feet: SILTY SAND (SM); gray; 40% fines, medium plasticity; 60% sand, fine to medium; trace woodwaste, organics; wet.
11			**50**	**SP**		**RAU2-GA1-SO-10.75**			
12									
13									
14									
15			**100**	**SP**					
16						**RAU2-GA1-SO-15.5**			
17									
18									
19									
20									

NOTES: *1) bgs = below ground surface. 2) SP = split spoon. 3) Soil lithology determined from soil cuttings during drilling and split spoon sample intervals.*

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.13	**RAU2-GA1**	**2 of 2**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
21			**100**	**SP**		**RAU2-GA1-SO-20.25**			*20.5 to 26.5 feet: SAND with SILT (SP-SM); gray; 10% fines; 90% sand, medium; wet.*
22									
23									
24									
25			**100**	**SP**					
26						**RAU2-GA1-SO-25.75**			

Total Depth = 26.5 feet bgs.

Boring Completion Details:
0 to 26.5 feet: 3-inch boring.
0 to 26.5 feet: bentonite chips hydrated with potable water.

NOTES: *1) bgs = below ground surface. 2) SP = split spoon. 3) Soil lithology determined from soil cuttings during drilling and split spoon sample intervals.*

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.13	**RAU2-GA2**	**1 of 2**

Project Name	**Upland RI - Grays Harbor Historical Seaport Authority**	TOC Elevation (feet)	
Project Location	**Aberdeen, Washington**	Surface Elevation (feet)	
Start/End Date	**12/4/2019 to 12/4/2019**	Northing	**614931.7**
Driller/Equipment	**Holocene Drilling, Inc./Diedrich D-50**	Easting	**816674.7**
Geologist/Engineer	**R. Lewis**	Hole Depth	**26.5-feet**
Sample Method	**Standard Penetration Test**	Outer Hole Diam	**3.0-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1									0 to 2.5 feet: Not sampled.
2									
3			20	SP					2.5 to 4.0 feet: WOODWASTE; reddish brown; 100% woodwaste; wood chips and sawdust; wet.
4						RAU2-GA2-SO-3.25			4.0 to 5.0 feet: No recovery.
5			5	SP					5.0 to 6.0 feet: WOODWASTE; reddish brown; 100% woodwaste, wood chips and sawdust; wet.
6						RAU2-GA2-SO-5.75			6.0 to 6.5 feet: No recovery.
7									6.5 to 8.5 feet: WOODWASTE; reddish brown; 100% woodwaste, wood chips and sawdust; wet.
8			15	SP					
9						RAU2-GA2-SO-8.25			8.5 to 9.0 feet: No recovery.
10									9.0 to 10.0 feet: WOODWASTE; reddish brown; 100% woodwaste, wood chips and sawdust; wet.
11			50	SP					10.0 to 20.0 feet: SILT (ML); gray; 70% fines, medium pasticity; 30% woodwaste, chips; wet.
12						RAU2-GA2-SO-10.75			
13									
14									
15			100	SP					
16						RAU2-GA2-SO-15.75			
17									
18									
19									
20									

NOTES: *1) bgs = below ground surface. 2) SP = split spoon. 3) Soil lithology determined from soil cuttings during drilling and split spoon sample intervals.*

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
1044.02.13	**RAU2-GA2**	**2 of 2**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
21			**100**	**SP**		**RAU2-GA2-SO-20.75**			*20.0 to 21.0 feet: SAND with SILT (SW-SM); gray; 20% fines, medium plasticity; 80% sand, fine to medium; wet.*
									21.0 to 26.5 feet: SAND (SP); gray; 100% sand, medium, subrounded to subangular; wet.
22									
23									
24									
25			**100**	**SP**					
26						**RAU2-GA2-SO-25.75**			

Total Depth = 26.5 feet bgs.

Boring Completion Details:
0 to 26.5 feet: 3-inch boring.
0 to 26.5 feet: bentonite chips hydrated with potable water.

NOTES: *1) bgs = below ground surface. 2) SP = split spoon. 3) Soil lithology determined from soil cuttings during drilling and split spoon sample intervals.*

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APPENDIX E

FIELD SAMPLING DATA SHEETS



Maul Foster & Alongi, Inc.

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-01A						
Project Number	1044.02.06-02	**Sampler**	LBP; MVP						
Project Name	Seaport In-Water RI	**Sampling Date**	09/25/2019						
Sampling Event	September 2019	**Sample Name**	SE-01A-1.0-2.0						
Sub Area		**Sample Depth**	1.5						
FSDS QA:	TKS; 10/07/2019	**Easting**	817512.899	**Northing**	615665.36	**TOC**			

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
Vibracore	Sediment	Discrete	0.4	8:10:00 AM	2 oz. soil	
					4 oz. soil	1
					8 oz. soil	1
					Other	1
					Total Containers	3

Sample Description: Silt with up to 20% woodwaste consisting of chips, fibers, and chunks up to 3 inches.

General Sampling Comment Samples are a composite of sediment core between depths of 1.0 and 2.0 feet. Mid-point recorded as sample depth. Samples are intended to characterize woodwaste in the 1 foot core segment.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-01B				
Project Number	1044.02.06-02	**Sampler**	LBP; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/25/2019				
Sampling Event	September 2019	**Sample Name**	SE-01B-0.5-1.5				
Sub Area		**Sample Depth**	1				
FSDS QA:	TKS; 10/07/2019	**Easting**	817608.828	**Northing**	615683.27	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
Vibracore	Sediment	Discrete	0.5	9:02:00 AM	2 oz. soil	
					4 oz. soil	
					8 oz. soil	
					Other	1
					Total Containers	1

Sample Description: Woodwaste (chips, chunks, and fibers) with silt. Strong organic odor.

General Sampling Comment Samples are a composite of sediment core between depths of 0.5 and 1.5 feet. Mid-point recorded as sample depth. Samples are intended to characterize woodwaste in the 1 foot core segment.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-01C				
Project Number	1044.02.06-02	**Sampler**	LBP; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/25/2019				
Sampling Event	September 2019	**Sample Name**	SE-01C-2.0-3.0				
Sub Area		**Sample Depth**	2.5				
FSDS QA:	TKS; 10/07/2019	**Easting**	817722.292	**Northing**	615734.03	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
Vibracore	Sediment	Discrete	0.3	9:55:00 AM	2 oz. soil	
					4 oz. soil	
					8 oz. soil	
					Other	1
					Total Containers	1

Sample Description: Up to 15% woodwaste fibers, chunks (1") in firm silt. Faint organic odor.

General Sampling Comment Samples are a composite of sediment core between depths of 2.0 and 3.0 feet. Mid-point recorded as sample depth. Samples are intended to characterize woodwaste in the 1 foot core segment.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-01D				
Project Number	1044.02.06-02	**Sampler**	LBP; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/25/2019				
Sampling Event	September 2019	**Sample Name**	SE-01D-0-1.0				
Sub Area		**Sample Depth**	0.5				
FSDS QA:	TKS; 10/07/2019	**Easting**	817808.985	**Northing**	615735.53	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
Vibracore	Sediment	Discrete	0.5	10:36:00 AM	2 oz. soil	
					4 oz. soil	
					8 oz. soil	
					Other	1
					Total Containers	1

Sample Description: Silt with 15% woodwaste shreds. Faint organic-like odor.

General Sampling Comment Samples are a composite of sediment core between depths of 0.0 and 1.0 feet. Mid-point recorded as sample depth. Samples are intended to characterize woodwaste in the 1 foot core segment.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-02A				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/26/2019				
Sampling Event	September 2019	**Sample Name**	SE-02A-2.5-3.5				
Sub Area		**Sample Depth**	3				
FSDS QA:	TKS; 10/07/2019	**Easting**	817338.959	**Northing**	615705.28	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
Vibracore	Sediment	Discrete	--	11:50:00 AM	2 oz. soil	
					4 oz. soil	1
					8 oz. soil	1
					Other	1
					Total Containers	3

Sample Description: Silt with up to 10% woodwaste shreds and small chips. No odors.

General Sampling Comment Samples are a composite of sediment core between depths of 2.5 and 3.5 feet. Mid-point recorded as sample depth. Samples are intended to characterize woodwaste in the 1 foot core segment.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-03A				
Project Number	1044.02.06-02	**Sampler**	LBP; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/25/2019				
Sampling Event	September 2019	**Sample Name**	SE-03A-0-1.0				
Sub Area		**Sample Depth**	0.5				
FSDS QA:	TKS; 10/07/2019	**Easting**	817019.684	**Northing**	615673.50	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
Vibracore	Sediment	Discrete	0.3	11:20:00 AM	2 oz. soil	
					4 oz. soil	1
					8 oz. soil	1
					Other	1
					Total Containers	3

Sample Description: Up to 10% woodwaste in soft silt with faint organic-like odor.

General Sampling Comment Samples are a composite of sediment core between depths of 0.0 and 1.0 feet. Mid-point recorded as sample depth. Samples are intended to characterize woodwaste in the 1 foot core segment.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-03B				
Project Number	1044.02.06-02	**Sampler**	LBP; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/25/2019				
Sampling Event	September 2019	**Sample Name**	SE-03B-1.0-2.0				
Sub Area		**Sample Depth**	1.5				
FSDS QA:	TKS; 10/07/2019	**Easting**	817126.239	**Northing**	615692.22	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
Vibracore	Sediment	Discrete	0.1	11:50:00 AM	2 oz. soil	
					4 oz. soil	
					8 oz. soil	
					Other	1
					Total Containers	1

Sample Description: 10% woodwaste shreds in black silt.

General Sampling Comment Samples are a composite of sediment core between depths of 1.0 and 2.0 feet. Mid-point recorded as sample depth. Samples are intended to characterize woodwaste in the 1 foot core segment.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-05A				
Project Number	1044.02.06-02	**Sampler**	LBP; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/23/2019				
Sampling Event	September 2019	**Sample Name**	SE-05A-2.0-3.0				
Sub Area		**Sample Depth**	2.5				
FSDS QA:	TKS; 10/07/2019	**Easting**	818023.141	**Northing**	615966.55	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
Vibracore	Sediment	Discrete	51.3 ppm	2:00:00 PM	2 oz. soil	
					4 oz. soil	1
					8 oz. soil	1
					Other	1
					Total Containers	3

Sample Description: Black, silt with trace wood debris

General Sampling Comment Samples are a composite of sediment core between depths of 2.0 and 3.0 feet. Mid-point recorded as sample depth. Samples are intended to characterize woodwaste in the 1 foot core segment.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-05B				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/26/2019				
Sampling Event	September 2019	**Sample Name**	SE-05B-2.5-3.5				
Sub Area		**Sample Depth**	3				
FSDS QA:	TKS; 10/07/2019	**Easting**	818104.57	**Northing**	615917.33	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
Vibracore	Sediment	Discrete	--	4:20:00 PM	2 oz. soil	
					4 oz. soil	
					8 oz. soil	
					Other	1
					Total Containers	1

Sample Description: Trace to 5% woodwaste in dark gray silt. No odor.

General Sampling Comment Samples are a composite of sediment core between depths of 2.5 and 3.5 feet. Mid-point recorded as sample depth. Samples are intended to characterize woodwaste in the 1 foot core segment.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-06A				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/25/2019				
Sampling Event	September 2019	**Sample Name**	SE-06A-0.5-1.5				
Sub Area		**Sample Depth**	1				
FSDS QA:	TKS; 10/07/2019	**Easting**	817909.818	**Northing**	615849.62	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
Vibracore	Sediment	Discrete	--	2:15:00 PM	2 oz. soil	
					4 oz. soil	1
					8 oz. soil	1
					Other	1
					Total Containers	3

Sample Description: Up to 20% woodwaste in silt. Woodwaste consists of 1-3" chunks. No odor.

General Sampling Comment Samples are a composite of sediment core between depths of 0.5 and 1.5 feet. Mid-point recorded as sample depth. Samples are intended to characterize woodwaste in the 1 foot core segment.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-06B				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/26/2019				
Sampling Event	September 2019	**Sample Name**	SE-06B-3.0-4.0				
Sub Area		**Sample Depth**	3.5				
FSDS QA:	TKS; 10/07/2019	**Easting**	817823.914	**Northing**	615890.48	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
Vibracore	Sediment	Discrete	--	11:55:00 AM	2 oz. soil	
					4 oz. soil	
					8 oz. soil	
					Other	1
					Total Containers	1

Sample Description: Sand with up to 10% woodwaste from 3.8' to 4.0'

General Sampling Comment Samples are a composite of sediment core between depths of 3.0 and 4.0 feet. Mid-point recorded as sample depth. Samples are intended to characterize woodwaste in the 1 foot core segment.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-07A				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/26/2019				
Sampling Event	September 2019	**Sample Name**	SE-07A-0-1.0				
Sub Area		**Sample Depth**	0.5				
FSDS QA:	TKS; 10/07/2019	**Easting**	816818.518	**Northing**	615469.51	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
Vibracore	Sediment	Discrete	--	8:15:00 AM	2 oz. soil	
					4 oz. soil	1
					8 oz. soil	1
					Other	1
					Total Containers	3

Sample Description: Significant woodwaste (chips, pulp, chunks) in black silt that is impacted by free product.

General Sampling Comment Samples are a composite of sediment core between depths of 0.0 and 1.0 feet. Mid-point recorded as sample depth. Samples are intended to characterize woodwaste in the 1 foot core segment.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-07B				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/26/2019				
Sampling Event	September 2019	**Sample Name**	SE-07B-0-1.0				
Sub Area		**Sample Depth**	0.5				
FSDS QA:	TKS; 10/07/2019	**Easting**	816792.453	**Northing**	615530.59	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
Vibracore	Sediment	Discrete	--	10:00:00 AM	2 oz. soil	
					4 oz. soil	
					8 oz. soil	
					Other	1
					Total Containers	1

Sample Description: Silt with 5% woodwaste. No odor.

General Sampling Comment Samples are a composite of sediment core between depths of 0.0 and 1.0 feet. Mid-point recorded as sample depth. Samples are intended to characterize woodwaste in the 1 foot core segment.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-08A				
Project Number	1044.02.06-02	**Sampler**	LBP; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/24/2019				
Sampling Event	September 2019	**Sample Name**	SE-08A-0-1.0				
Sub Area		**Sample Depth**	0.5				
FSDS QA:	TKS; 10/07/2019	**Easting**	817053.736	**Northing**	615565	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
Vibracore	Sediment	Discrete	20.0	10:00:00 AM	2 oz. soil	
					4 oz. soil	1
					8 oz. soil	1
					Other	1
					Total Containers	3

Sample Description: Significant woodwaste, pulp to fine chips. Strong organic/sulfurous odor.

General Sampling Comment Samples are a composite of sediment core between depths of 0.0 and 1.0 feet. Mid-point recorded as sample depth. Samples are intended to characterize woodwaste in the 1 foot core segment.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-08B				
Project Number	1044.02.06-02	**Sampler**	LBP; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/24/2019				
Sampling Event	September 2019	**Sample Name**	SE-08B-0-2.461				
Sub Area		**Sample Depth**					
FSDS QA:	TKS; 10/07/2019	**Easting**	817111.749	**Northing**	615589.16	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
Vibracore	Sediment	Discrete	--	12:10:00 PM	2 oz. soil	
					4 oz. soil	
					8 oz. soil	30
					Other	7
					Total Containers	37

Sample Description: Silt with ~15% woodwaste consists of fine to trace coarse chips.

General Sampling Comment

Core collected for radioisotope analysis.
0-20 cm: samples collected in 1 cm increments
20-40 cm: samples collected in 2 cm increments
>40 cm: samples collected in 5 cm increments

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-08B				
Project Number	1044.02.06-02	**Sampler**	LBP; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/24/2019				
Sampling Event	September 2019	**Sample Name**	SE-08B-0-1.0				
Sub Area		**Sample Depth**	0.5				
FSDS QA:	TKS; 10/07/2019	**Easting**	817102.348	**Northing**	615582.90	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
Vibracore	Sediment	Discrete	2.8	10:35:00 AM	2 oz. soil	
					4 oz. soil	
					8 oz. soil	
					Other	1
					Total Containers	1

Sample Description: Silt with woodwaste consists of pulp to fine chips, trace larger chips of wood. Faint organic-like odor.

General Sampling Comment Samples are a composite of sediment core between depths of 0.0 and 1.0 feet. Mid-point recorded as sample depth. Samples are intended to characterize woodwaste in the 1 foot core segment.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-08C				
Project Number	1044.02.06-02	**Sampler**	LBP; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/24/2019				
Sampling Event	September 2019	**Sample Name**	SE-08C-3.2-4.2				
Sub Area		**Sample Depth**	3.7				
FSDS QA:	TKS; 10/07/2019	**Easting**	817150.646	**Northing**	615597.03	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
Vibracore	Sediment	Discrete	0.9	2:45:00 PM	2 oz. soil	
					4 oz. soil	1
					8 oz. soil	1
					Other	1
					Total Containers	3

Sample Description: Grab sample from interval with dense woodwaste consists of wood pulp, chips, and shreds.

General Sampling Comment Samples are a composite of sediment core between depths of 3.2 and 4.2 feet. Mid-point recorded as sample depth. Samples are intended to characterize woodwaste in the 1 foot core segment.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-08D				
Project Number	1044.02.06-02	**Sampler**	LBP; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/24/2019				
Sampling Event	September 2019	**Sample Name**	SE-08D-2.0-3.0				
Sub Area		**Sample Depth**	2.5				
FSDS QA:	TKS; 10/07/2019	**Easting**	817196.439	**Northing**	615614.58	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
Vibracore	Sediment	Discrete	0.2	1:43:00 PM	2 oz. soil	
					4 oz. soil	
					8 oz. soil	
					Other	1
					Total Containers	1

Sample Description: Significant woodwaste (pulp, fibers, chips) and silt. Strong organic odor.

General Sampling Comment Samples are a composite of sediment core between depths of 2.0 and 3.0 feet. Mid-point recorded as sample depth. Samples are intended to characterize woodwaste in the 1 foot core segment.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-10				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/26/2019				
Sampling Event	September 2019	**Sample Name**	SE-10-2.0-3.7				
Sub Area		**Sample Depth**	2.85				
FSDS QA:	TKS; 10/07/2019	**Easting**	816917.72	**Northing**	615459	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
Vibracore	Sediment	Discrete	--	1:50:00 PM	2 oz. soil	
					4 oz. soil	1
					8 oz. soil	1
					Other	9
					Total Containers	11

Sample Description: 30% woodwaste in silt. Strong sulfur-like odor.

General Sampling Comment Collected MS + MSD, TCLP, Hg+Pb
Samples are a composite of sediment core between depths of 2.0 and 3.7 feet. Mid-point recorded as sample depth. Samples are intended to characterize woodwaste in the 1.7 foot core segment.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-12				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/25/2019				
Sampling Event	September 2019	**Sample Name**	SE-12-0-1.804				
Sub Area		**Sample Depth**					
FSDS QA:	TKS; 10/07/2019	**Easting**	816909.897	**Northing**	615545.57	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
Vibracore	Sediment	Discrete	--	3:24:00 PM	2 oz. soil	
					4 oz. soil	
					8 oz. soil	33
					Other	
					Total Containers	33

Sample Description:

General Sampling Comment

Core collected for radioisotope analysis.
0-20 cm: samples collected in 1 cm increments
20-40 cm: samples collected in 2 cm increments
>40 cm: samples collected in 5 cm increments

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-14				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/27/2019				
Sampling Event	September 2019	**Sample Name**	SE-14-0-0.33				
Sub Area		**Sample Depth**	0.165				
FSDS QA:	TKS; 10/07/2019	**Easting**	816904.889	**Northing**	615447.03	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete	--	2:02:00 PM	2 oz. soil	
					4 oz. soil	3
					8 oz. soil	
					Other	7
					Total Containers	10

Sample Description:

0-2 cm: black silt (80%) with sand (10%) and gravel (10%).
2-10 cm: woodwaste (chips,shreds) with up to 15% silt.

General Sampling Comment

Samples are a composite of surface sediment sampled to a depth of 10 cm. Mid-point recorded as sample depth.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-15				
Project Number	1044.02.06-02	**Sampler**	ADM;MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/27/2019				
Sampling Event	September 2019	**Sample Name**	SE-15-0-0.33				
Sub Area		**Sample Depth**	0.165				
FSDS QA:	TKS; 10/07/2019	**Easting**	817048.03	**Northing**	615579.53	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete	--	11:24:00 AM	2 oz. soil	
					4 oz. soil	2
					8 oz. soil	
					Other	7
					Total Containers	9

Sample Description: Dark gray silt (60%) with sand (10%) and significant woodwaste chips (30%). Strong sulfur odor. Bits of masonry debris.

General Sampling Comment Samples are a composite of surface sediment sampled to a depth of 10 cm. Mid-point recorded as sample depth.

Sampled collected for bioassay.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-16				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/27/2019				
Sampling Event	September 2019	**Sample Name**	SE-16-0-0.33				
Sub Area		**Sample Depth**	0.165				
FSDS QA:	TKS; 10/07/2019	**Easting**	817209.59	**Northing**	615655.29	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete	--	9:00:00 AM	2 oz. soil	
					4 oz. soil	2
					8 oz. soil	
					Other	8
					Total Containers	10

Sample Description: Dark gray silt (90%) with sand (10%) and trace woodwaste. Soft. No odor.

General Sampling Comment Samples are a composite of surface sediment sampled to a depth of 10 cm. Midpoint recorded as sample depth.

Sample collected for bioassay.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-17				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/27/2019				
Sampling Event	September 2019	**Sample Name**	SE-17-0-0.33				
Sub Area		**Sample Depth**	0.165				
FSDS QA:	TKS; 10/07/2019	**Easting**	817514.165	**Northing**	615657.14	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete	--	9:47:00 AM	2 oz. soil	
					4 oz. soil	2
					8 oz. soil	
					Other	7
					Total Containers	9

Sample Description: Silt (85%) with sand (15%). Dark gray with orange mostly. No odor. Trace organic debris.

General Sampling Comment Targeted the same location as SE-01A. Samples are a composite of surface sediment sampled to a depth of 10 cm. Midpoint recorded as sample depth.

Sample collected for bioassay.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-18				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/27/2019				
Sampling Event	September 2019	**Sample Name**	SE-18-0-0.33				
Sub Area		**Sample Depth**	0.165				
FSDS QA:	TKS; 10/07/2019	**Easting**	817442.424	**Northing**	615790.44	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete	--	11:54:00 AM	2 oz. soil	
					4 oz. soil	2
					8 oz. soil	
					Other	8
					Total Containers	10

Sample Description: Black silt (85%) with fine sand (10%) and woodwaste (5%). No odor.

General Sampling Comment Samples are a composite of surface sediment sampled to a depth of 10 cm. Midpoint recorded as sample depth.

Sample collected for bioassay.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-19				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/27/2019				
Sampling Event	September 2019	**Sample Name**	SE-19-0-0.33				
Sub Area		**Sample Depth**	0.165				
FSDS QA:	TKS; 10/07/2019	**Easting**	817965.455	**Northing**	615939.86	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete	--	8:30:00 AM	2 oz. soil	
					4 oz. soil	2
					8 oz. soil	
					Other	7
					Total Containers	9

Sample Description:

<0.1 ft layer of brown, soft silt overlying dark gray silt (90%) with sand (10%). No woodwaste. No odor.

General Sampling Comment

Water depth 25.2 ft. Samples are a composite of surface sediment sampled to a depth of 10 cm. Midpoint recorded as sample depth.

Sample collected for bioassay.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-20				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/25/2019				
Sampling Event	September 2019	**Sample Name**	SE-20-0-0.33				
Sub Area		**Sample Depth**	0.165				
FSDS QA:	TKS; 10/07/2019	**Easting**	818048.048	**Northing**	615568.77	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete	--	6:15:00 PM	2 oz. soil	
					4 oz. soil	1
					8 oz. soil	1
					Other	8
					Total Containers	10

Sample Description: Soft silt with trace benthic organisms. Faint, organic-like odor.

General Sampling Comment Samples are a composite of surface sediment sampled to a depth of 10 cm. Midpoint recorded as sample depth.

Sample collected for bioassay.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-21A				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/27/2019				
Sampling Event	September 2019	**Sample Name**	SE-21A-0-0.33				
Sub Area		**Sample Depth**	0.165				
FSDS QA:	TKS; 10/07/2019	**Easting**	818511.923	**Northing**	616086.16	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete	--	3:07:00 PM	2 oz. soil	
					4 oz. soil	
					8 oz. soil	
					Other	1
					Total Containers	1

Sample Description: Brown silt (70%) with fine sand (15%) and large chunks (1-4") of wood waste (15%). No odor.

General Sampling Comment Samples are a composite of surface sediment sampled to a depth of 10 cm. Midpoint recorded as sample depth.

Samples of SE-21A were collected for archive. The remainder was used for composite sample SE-21-0-0.33

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-21B				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/27/2019				
Sampling Event	September 2019	**Sample Name**	SE-21B-0-0.33				
Sub Area		**Sample Depth**	0.165				
FSDS QA:	TKS; 10/07/2019	**Easting**	818485.956	**Northing**	616142.99	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete	--	3:15:00 PM	2 oz. soil	
					4 oz. soil	
					8 oz. soil	
					Other	1
					Total Containers	1

Sample Description: Dark gray silt (85%) with fine sand (10%) and fine chips of woodwaste (5%). No odor.

General Sampling Comment Samples are a composite of surface sediment sampled to a depth of 10 cm. Midpoint recorded as sample depth.

Samples of SE-21B were collected for archive. The remainder was used for composite sample SE-21-0-0.33

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-21C				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/27/2019				
Sampling Event	September 2019	**Sample Name**	SE-21C-0-0.33				
Sub Area		**Sample Depth**	0.165				
FSDS QA:	TKS; 10/07/2019	**Easting**	818503.648	**Northing**	616112.56	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete	--	3:24:00 PM	2 oz. soil	
					4 oz. soil	
					8 oz. soil	
					Other	1
					Total Containers	1

Sample Description: 1 cm layer of light brown silt. Soft overlay. Dark gray coarse sand with up to 10% woodwaste chunks (up to 3 inches).

General Sampling Comment Samples are a composite of surface sediment sampled to a depth of 10 cm. Midpoint recorded as sample depth.

Samples of SE-21C were collected for archive. The remainder was used for composite sample SE-21-0-0.33

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-21D				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/27/2019				
Sampling Event	September 2019	**Sample Name**	SE-21D-0-0.33				
Sub Area		**Sample Depth**	0.165				
FSDS QA:	TKS; 10/07/2019	**Easting**	818522.458	**Northing**	616056.47	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete	--	3:34:00 PM	2 oz. soil	
					4 oz. soil	
					8 oz. soil	
					Other	1
					Total Containers	1

Sample Description: <1 cm layer of brown, soft silt overlie dark gray coarse sand with large chunks of woodwaste (>5%). No odor.

General Sampling Comment Samples are a composite of surface sediment sampled to a depth of 10 cm. Midpoint recorded as sample depth.

Samples of SE-21D were collected for archive. The remainder was used for composite sample SE-21-0-0.33

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-22				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/27/2019				
Sampling Event	September 2019	**Sample Name**	SE-22-0-0.33				
Sub Area		**Sample Depth**	0.165				
FSDS QA:	TKS; 10/07/2019	**Easting**	818063.598	**Northing**	615318.61	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete	--	7:30:00 PM	2 oz. soil	
					4 oz. soil	2
					8 oz. soil	
					Other	7
					Total Containers	9

Sample Description: Sample collected contains silt (soft, up to 80%), woodwaste chips (up to 10%), and large pieces of riprap (10%).

General Sampling Comment Samples are a composite of surface sediment sampled to a depth of 10 cm. Midpoint recorded as sample depth.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-23				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/27/2019				
Sampling Event	September 2019	**Sample Name**	SE-23-0-0.33				
Sub Area		**Sample Depth**	0.165				
FSDS QA:	TKS; 10/07/2019	**Easting**	816856.922	**Northing**	615507.10	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete	--	10:23:00 AM	2 oz. soil	
					4 oz. soil	2
					8 oz. soil	
					Other	6
					Total Containers	8

Sample Description: Dark gray silt (80%) with fine sand (5%) and woodwaste chips (15%). No odor. Some structural/masonry pieces of brick are evident in sample.

General Sampling Comment Samples are a composite of surface sediment sampled to a depth of 10 cm. Midpoint recorded as sample depth.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-24				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/27/2019				
Sampling Event	September 2019	**Sample Name**	SE-24-0-0.33				
Sub Area		**Sample Depth**	0.165				
FSDS QA:	TKS; 10/07/2019	**Easting**	816893.880	**Northing**	615474.44	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete	--	1:13:00 PM	2 oz. soil	
					4 oz. soil	2
					8 oz. soil	
					Other	8
					Total Containers	10

Sample Description: Gray silt (70%) with fine sand (5%) and woodwaste chips & chunks (25%). No odor. Sheen observed on water in grabber upon retrieval.

General Sampling Comment Samples are a composite of surface sediment sampled to a depth of 10 cm. Midpoint recorded as sample depth.

Sample collected for bioassay.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-25				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/27/2019				
Sampling Event	September 2019	**Sample Name**	SE-25-0-0.33				
Sub Area		**Sample Depth**	0.165				
FSDS QA:	TKS; 10/07/2019	**Easting**	816914.594	**Northing**	615422.64	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete	--	6:15:00 PM	2 oz. soil	
					4 oz. soil	2
					8 oz. soil	
					Other	6
					Total Containers	8

Sample Description: Predominately woodwaste (80%, chips, pulp, chunks <4") with black to gray silt. Fain hydrocarbon-like odor.

General Sampling Comment Samples are a composite of surface sediment sampled to a depth of 10 cm. Midpoint recorded as sample depth.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-26				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/27/2019				
Sampling Event	September 2019	**Sample Name**	SE-26-0-0.33				
Sub Area		**Sample Depth**	0.165				
FSDS QA:	TKS; 10/07/2019	**Easting**	816933.865	**Northing**	615411.99	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete	--	5:25:00 PM	2 oz. soil	
					4 oz. soil	2
					8 oz. soil	
					Other	8
					Total Containers	10

Sample Description: Significant woodwaste shreds, pulp, chunks (1-3"), rootlets. Up to 20% gray silt. No odor.

General Sampling Comment Samples are a composite of surface sediment sampled to a depth of 10 cm. Midpoint recorded as sample depth.

Sample collected for bioassay.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-27				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/27/2019				
Sampling Event	September 2019	**Sample Name**	SE-27-0-0.33				
Sub Area		**Sample Depth**	0.165				
FSDS QA:	TKS; 10/07/2019	**Easting**	816971.969	**Northing**	615539.97	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete	--	2:35:00 PM	2 oz. soil	
					4 oz. soil	2
					8 oz. soil	
					Other	6
					Total Containers	8

Sample Description:

0-2 cm: brown silt (80%) with fine sand (10%) and woodwaste (10%).
2-10 cm: significant woodwaste chips and shreds.
No odor.

General Sampling Comment

Samples are a composite of surface sediment sampled to a depth of 10 cm. Midpoint recorded as sample depth.

Duplicate sample SE-27-0-0.33-DUP also collected.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-28				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/27/2019				
Sampling Event	September 2019	**Sample Name**	SE-28-0-0.33				
Sub Area		**Sample Depth**	0.165				
FSDS QA:	TKS; 10/07/2019	**Easting**	817819.311	**Northing**	615670.53	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete	--	6:40:00 PM	2 oz. soil	
					4 oz. soil	2
					8 oz. soil	
					Other	7
					Total Containers	9

Sample Description: Predominately (75%) woodwaste consisting of wood pulp, chips, and chunks <2". 25% silt. Organic-like odor.

General Sampling Comment Samples are a composite of surface sediment sampled to a depth of 10 cm. Midpoint recorded as sample depth.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-29				
Project Number	1044.02.06-02	**Sampler**	LBP; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/24/2019				
Sampling Event	September 2019	**Sample Name**	SE-29-0-2.0				
Sub Area		**Sample Depth**	1				
FSDS QA:	TKS; 10/07/2019	**Easting**	816870.004	**Northing**	615491.1	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
Vibracore	Sediment	Discrete	37.1	8:50:00 AM	2 oz. soil	
					4 oz. soil	2
					8 oz. soil	
					Other	6
					Total Containers	8

Sample Description: Significant woodwaste in form of pulp, chips, and chunks. Strong organic/sulfur-like odor.

General Sampling Comment Samples are a composite of sediment core between depths of 0.0 and 2.0 feet. Midpoint recorded as sample depth. Samples are intended to characterize woodwaste in the 2 foot core segment.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-30				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/26/2019				
Sampling Event	September 2019	**Sample Name**	SE-30-2.5-4.5				
Sub Area		**Sample Depth**	3.5				
FSDS QA:	TKS; 10/07/2019	**Easting**	816974.559	**Northing**	615559.08	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
Vibracore	Sediment	Discrete	--	3:40:00 PM	2 oz. soil	
					4 oz. soil	1
					8 oz. soil	1
					Other	7
					Total Containers	9

Sample Description: 20% woodwaste in silty sediment. Sulfur odor.

General Sampling Comment Samples are a composite of sediment core between depths of 2.5 and 4.5 feet. Midpoint recorded as sample depth. Samples are intended to characterize woodwaste in the 2 foot core segment. Collected archieve samples from core between 0-2.0 ft and 4.5-5.5 ft

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-31				
Project Number	1044.02.06-02	**Sampler**	ADM; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	09/27/2019				
Sampling Event	September 2019	**Sample Name**	SE-31-0-0.33				
Sub Area		**Sample Depth**	0.165				
FSDS QA:	TKS; 10/07/2019	**Easting**	817731.813	**Northing**	615866.85	**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete	--	12:10:00 PM	2 oz. soil	
					4 oz. soil	2
					8 oz. soil	
					Other	7
					Total Containers	9

Sample Description: Silt (50%), sand (15%), and woodwaste chips and fibers (35%). Sulfur odor.

General Sampling Comment Samples are a composite of surface sediment sampled to a depth of 10 cm. Midpoint recorded as sample depth. Collected two grabs from location to obtain adequate sediment for all samples (mixed together). Sample collected for bioassay.

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelby Tube, (7) Grab, (8) Other (Specify)

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Sediment Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-32				
Project Number	1044.02.14-02	**Sampler**	ENH; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	07/22/2020				
Sampling Event	July 2020	**Sample Name**	SE-32				
Sub Area		**Sample Depth**	0.164				
FSDS QA:	BAJ;01/27/22	**Easting**		**Northing**		**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete		9:22:00 AM	2 oz. sediment	
					4 oz. sediment	1
					8 oz. sediment	2
					Other	2
					Total Containers	5

Sample Description:

0-0.2 cm: light brown sediment film
0.2-10 cm: medium brownish gray; 90% fines, low plasticity, 10% sand, fine; trace woody material; no odor.

General Sampling Comments

DGT probe deployed in sediment without black staining. No sulfur-like odor. Sheen visible on water.
DGT Deployment: 7/21/20, 08:30, DGT Retrieval: 7/22/20, 09:24
Porewater Parameters @ retrieval:
pH=7.01, temperature=17.4 degrees C, salinity=7.52ms

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

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Sediment Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-33				
Project Number	1044.02.14-02	**Sampler**	ENH; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	07/22/2020				
Sampling Event	July 2020	**Sample Name**	SE-33				
Sub Area		**Sample Depth**	0.164				
FSDS QA:	BAJ;01/28/22	**Easting**		**Northing**		**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete		9:06:00 AM	2 oz. sediment	
					4 oz. sediment	1
					8 oz. sediment	2
					Other	2
					Total Containers	5

Sample Description:

0-0.2cm: light brown sediment film.
0.2-10cm: dark brownish-gray.
70% fines, low plasticity; 30% sand, fine; rootlets (10%); no odor.

General Sampling Comments

No sulfur odor. No visible seep in vicinity.
DGT Deployment: 7/21/20, 08:15, DGT Retrieval: 7/22/20, 09:37
Porewater Parameters @ retrieval:
pH=6.54, temperature=17.3 degrees C, salinity=5.92ms

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

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Sediment Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-34
Project Number	1044.02.14-02	**Sampler**	ENH; MVP
Project Name	Seaport In-Water RI	**Sampling Date**	07/22/2020
Sampling Event	July 2020	**Sample Name**	SE-34
Sub Area		**Sample Depth**	0.164
FSDS QA:	BAJ;01/28/22	**Easting**	**Northing**	**TOC**

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete		8:56:00 AM	2 oz. sediment	
					4 oz. sediment	1
					8 oz. sediment	2
					Other	2
					Total Containers	5

Sample Description:

0-0.2cm: light brown sediment film.
0.2-10cm: dark brownish-gray.
90% fines, low plasticity; 10% sand, fine: wood debris (chunks, twigs) 5%

General Sampling Comments

DGT probe deployed in sediment not near identified seeps. No sulfur-like odor.
DGT Deployment: 7/21/20, 08:06, DGT Retrieval: 7/22/20, 09:42
Porewater Parameters @ retrieval:
pH=6.64, temperature=17.1 degrees C, salinity=8.00ms

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

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Sediment Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-35				
Project Number	1044.02.14-02	**Sampler**	ENH; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	07/22/2020				
Sampling Event	July 2020	**Sample Name**	SE-35				
Sub Area		**Sample Depth**	0.164				
FSDS QA:	BAJ;01/28/22	**Easting**		**Northing**		**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete		8:36:00 AM	2 oz. sediment	
					4 oz. sediment	1
					8 oz. sediment	2
					Other	2
					Total Containers	5

Sample Description:

0-0.2cm: light brown sediment film. 0.2-10cm: grayish brown with dark gray/black and orange redox features throughout. 95% fines, low plasticity; 5% sand, fine; trace rootlets, woody debris (rootlets, chunks).

General Sampling Comments

DGT deployed near black-stained sediment. Sulfur-like odor.
DGT Deployment: 7/21/20, 08:01, DGT Retrieval: 7/22/20, 09:46
Porewater Parameters @ retrieval:
pH=6.73, temperature=16.9 degrees C, salinity=6.36ms

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

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Sediment Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-36				
Project Number	1044.02.14-02	**Sampler**	ENH; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	07/22/2020				
Sampling Event	July 2020	**Sample Name**	SE-36				
Sub Area		**Sample Depth**	0.164				
FSDS QA:	BAJ;01/28/22	**Easting**		**Northing**		**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete		7:56:00 AM	2 oz. sediment	
					4 oz. sediment	1
					8 oz. sediment	2
					Other	4
					Total Containers	7

Sample Description:

0-0.2cm: light brown sediment film.
0.2-10cm: brownish gray with black and reddish-orange redox.
80% fines, low plasticity; 20% sand, fine; twigs (5-10%) and wood chunks.

General Sampling Comments

Strong sulfur-like odor. DGT probe deplopyed in black-stained sediment.
DGT Deployment: 7/21/20, 07:55, DGT Retrieval: 7/22/20, 07:58
Porewater Parameters @ retrieval:
pH=6.79, temperature=17.6 degrees C, salinity=7.90ms

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

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Sediment Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-37
Project Number	1044.02.14-02	**Sampler**	ENH; MVP
Project Name	Seaport In-Water RI	**Sampling Date**	07/22/2020
Sampling Event	July 2020	**Sample Name**	SE-37
Sub Area		**Sample Depth**	0.164
FSDS QA:	BAJ;01/28/22	**Easting**	**Northing**	**TOC**

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete		10:02:00 AM	2 oz. sediment	
					4 oz. sediment	1
					8 oz. sediment	2
					Other	2
					Total Containers	5

Sample Description:

0-0.2cm: light brown sediment film.
0.2-10cm: dark brownish gray to black.
95% fines, low plasticity; 5% sand, fine; wood waste chunks (25%)

General Sampling Comments

DGT probe deployed in black-stained sediment. No sulfur odor.
DGT Deployment: 7/21/20, 07:48, DGT Retrieval: 7/22/20, 09:54
Porewater Parameters @ retrieval:
pH=6.81, temperature=16.7 degrees C, salinity=7.20ms

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

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Sediment Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-38				
Project Number	1044.02.14-02	**Sampler**	ENH; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	07/22/2020				
Sampling Event	July 2020	**Sample Name**	SE-38				
Sub Area		**Sample Depth**	0.164				
FSDS QA:	BAJ;01/28/22	**Easting**		**Northing**		**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete		10:16:00 AM	2 oz. sediment	
					4 oz. sediment	1
					8 oz. sediment	2
					Other	2
					Total Containers	5

Sample Description:

0-0.2cm: light brown sediment film. 0.2-10cm: dark brownish gray.
85% fines, low plasticity; 15% sand, fine to medium; woodwaste (chips, chunks, sawdust) 50%. Strong sulfur odor.

General Sampling Comments

Sulfur odor.
DGT Deployment: 7/21/20, 07:41, DGT Retrieval: 7/22/20, 10:14
Porewater Parameters @ retrieval:
pH=7.38, temperature=16.8 degrees C, salinity=7.97ms

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

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Sediment Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-39				
Project Number	1044.02.14-02	**Sampler**	ENH; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	07/22/2020				
Sampling Event	July 2020	**Sample Name**	SE-39				
Sub Area		**Sample Depth**	0.164				
FSDS QA:	BAJ;01/28/22	**Easting**		**Northing**		**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete		9:56:00 AM	2 oz. sediment	
					4 oz. sediment	1
					8 oz. sediment	2
					Other	2
					Total Containers	5

Sample Description:

0-3cm: orangey-red.
3-10: dark brownish-gray.
90% wood waste (chunks, chips, twigs, rootlets); 5% fines; 5% sand, fine.

General Sampling Comments

Area was not inundated at high tide.
DGT Deployment: 7/21/20, 09:24, DGT Retrieval: 7/22/20, 10:26
Porewater Parameters @ retrieval:
pH=6.45, temperature=19.6 degrees C, salinity=6.27ms

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

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Sediment Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-40				
Project Number	1044.02.14-02	**Sampler**	ENH; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	07/22/2020				
Sampling Event	July 2020	**Sample Name**	SE-40				
Sub Area		**Sample Depth**	0.164				
FSDS QA:	BAJ;01/28/22	**Easting**		**Northing**		**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete		7:16:00 AM	2 oz. sediment	
					4 oz. sediment	1
					8 oz. sediment	2
					Other	2
					Total Containers	5

Sample Description: Black; 15% fines, 15% sand, 70% gravel, fine to medium, subangular to subrounded; black and white bacteria coating grains; sulfur odor.

General Sampling Comments Seep groundwater. Plentiful white bacteria and black material. Gravelly substrate.
DGT Deployment: 7/21/20, 09:06, DGT Retrieval: 7/22/20, 07:12
Porewater Parameters @ retrieval:
pH=6.74, temperature=16.5 degrees C, salinity=17.91ms

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

Signature _____

Maul Foster & Alongi, Inc.

109 East 13th Street, Vancouver, WA 98660 (360) 694-2691

Sediment Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-41
Project Number	1044.02.14-02	**Sampler**	ENH; MVP
Project Name	Seaport In-Water RI	**Sampling Date**	07/22/2020
Sampling Event	July 2020	**Sample Name**	SE-41
Sub Area		**Sample Depth**	0.164
FSDS QA:	BAJ;01/28/22	**Easting**	**Northing**	**TOC**

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete		7:26:00 AM	2 oz. sediment	
					4 oz. sediment	1
					8 oz. sediment	2
					Other	2
					Total Containers	5

Sample Description:

0-0.2cm: light brown sediment film. 0.2-10cm: grayish-brown with red redox features throughout. 90% fines, low plasticity; 10% sand, fine; trace gravel, twigs, wood chunks (20%). Sulfur odor.

General Sampling Comments

DGT probe deployed in sediment. Faint sulfur-like odor.
DGT Deployment: 7/21/20, 09:16, DGT Retrieval: 7/22/20, 07:00
Porewater Parameters @ retrieval:
pH=6.86, temperature=17.6 degrees C, salinity=10.29ms

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

Signature _____

APPENDIX F

PHOTOGRAPH LOG

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/27/19

Surface Sediment Grabs

Location: SE-14



0 – 10 cm bml

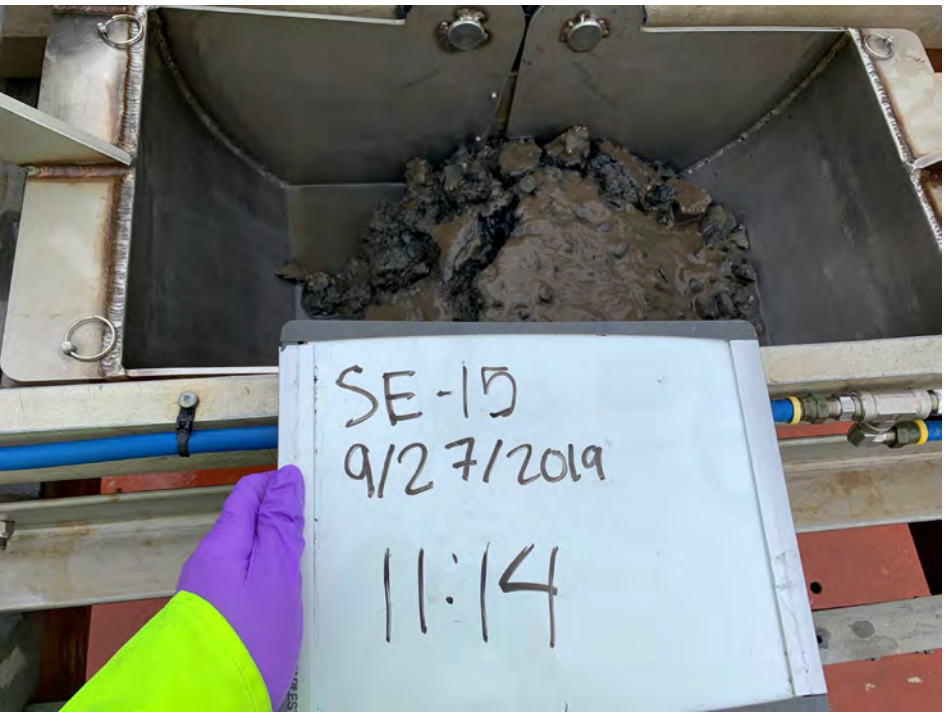
Notes:
bml = below mudline.
cm = centimeter(s).

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/27/19

Surface Sediment Grabs

Location: SE-15



0 – 10 cm bml



0 – 10 cm bml

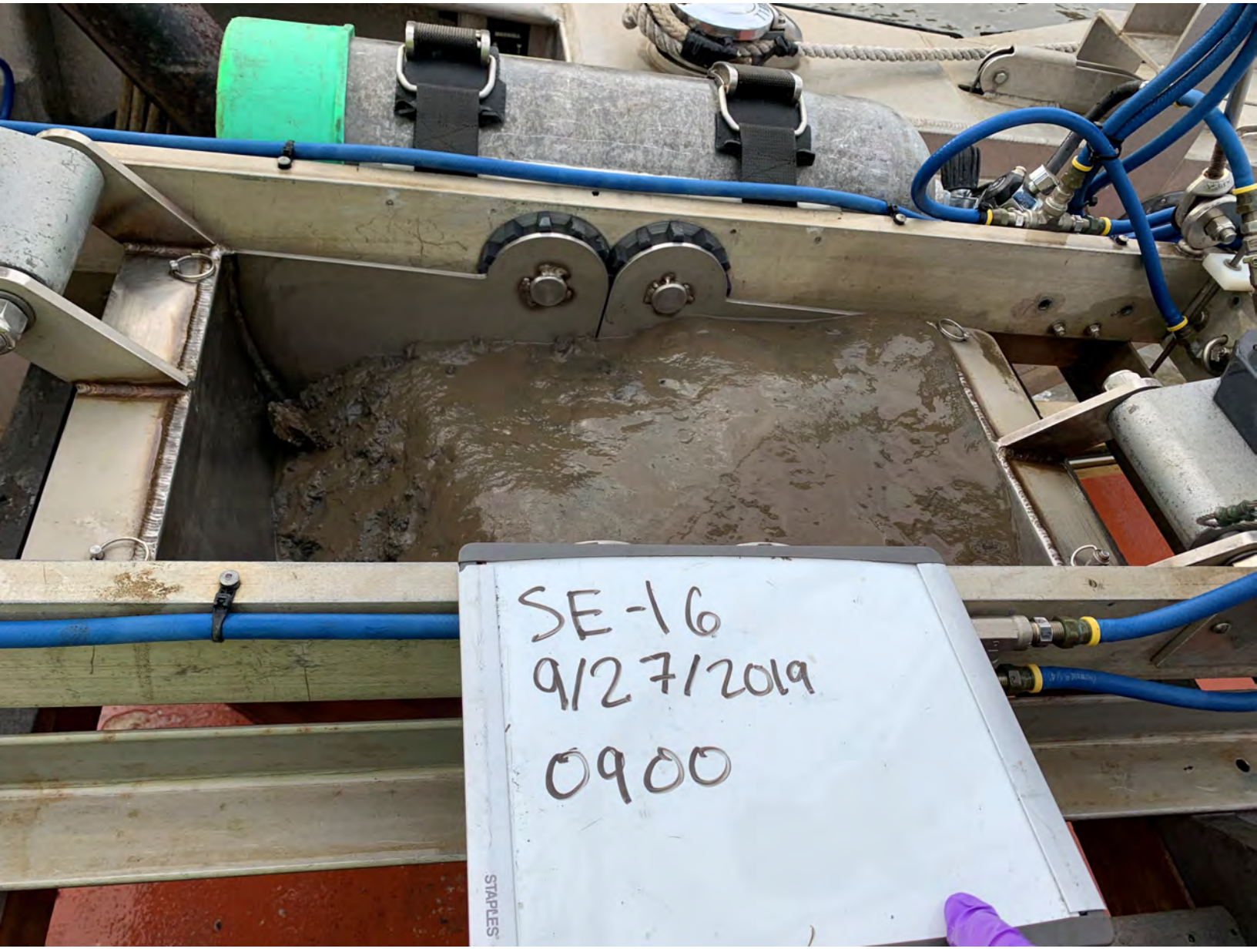
Notes:
bml = below mudline.
cm = centimeter(s).

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/27/19

Surface Sediment Grabs

Location: SE-16



0 – 10 cm bml

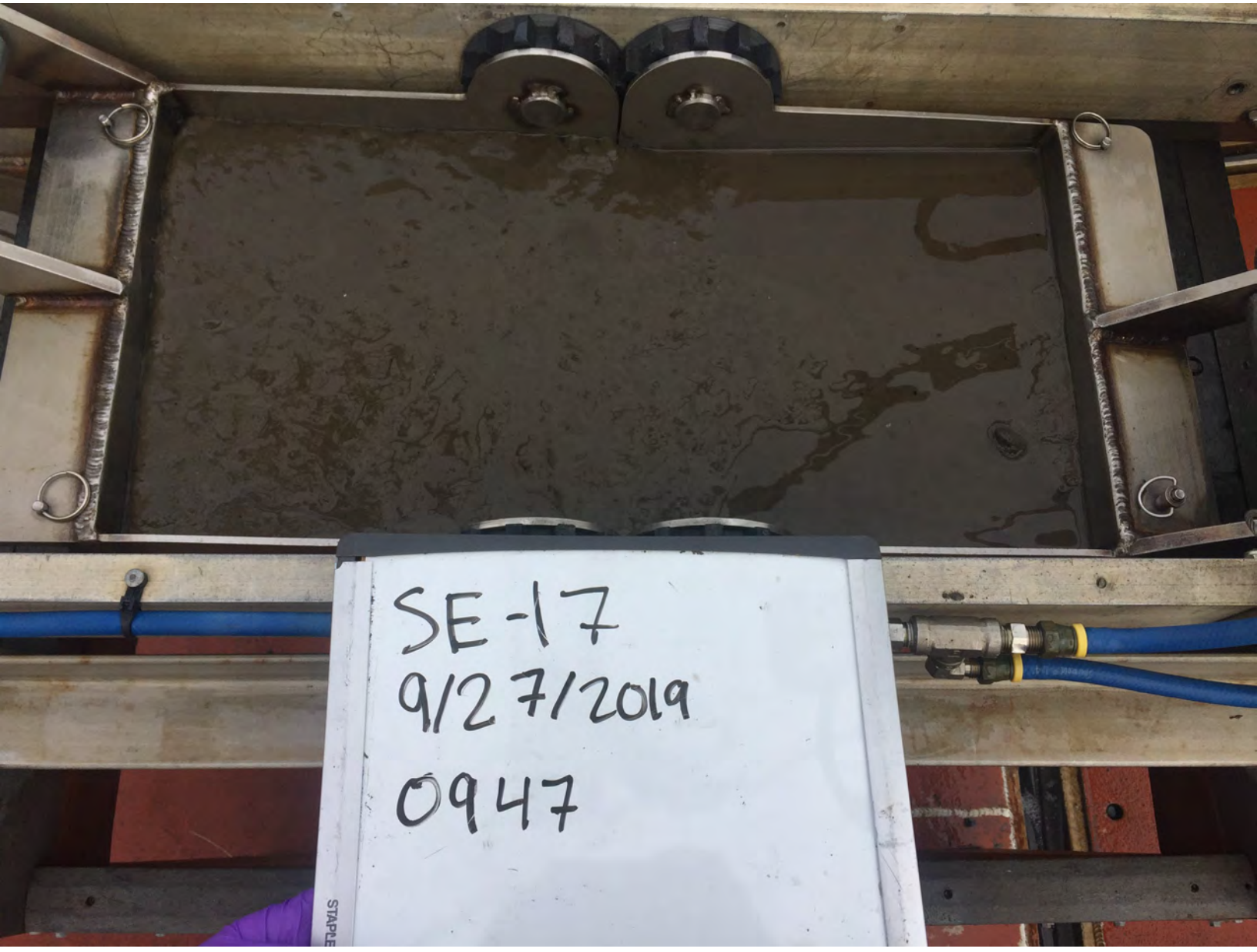
Notes:
bml = below mudline.
cm = centimeter(s).

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/27/19

Surface Sediment Grabs

Location: SE-17



0 – 10 cm bml

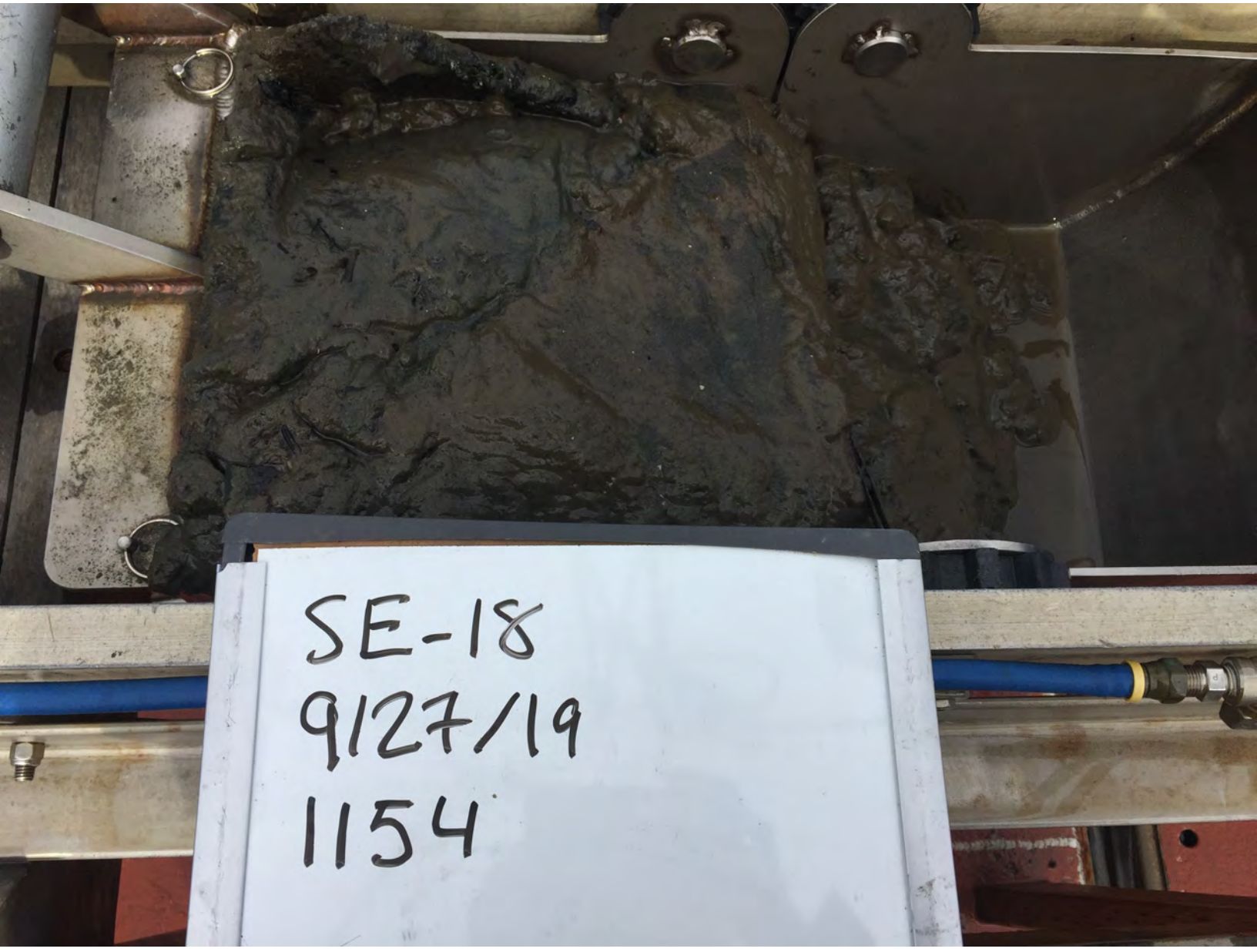
Notes:
bml = below mudline.
cm = centimeter(s).

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/27/19

Surface Sediment Grabs

Location: SE-18



0 – 10 cm bml

Notes:
bml = below mudline.
cm = centimeter(s).

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/27/19

Surface Sediment Grabs

Location: SE-19



0 – 10 cm bml

Notes:
bml = below mudline.
cm = centimeter(s).

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/27/19

Surface Sediment Grabs

Location: SE-21A



0 – 10 cm bml

Notes:
bml = below mudline.
cm = centimeter(s).

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/27/19

Surface Sediment Grabs

Location: SE-21B



0 – 10 cm bml

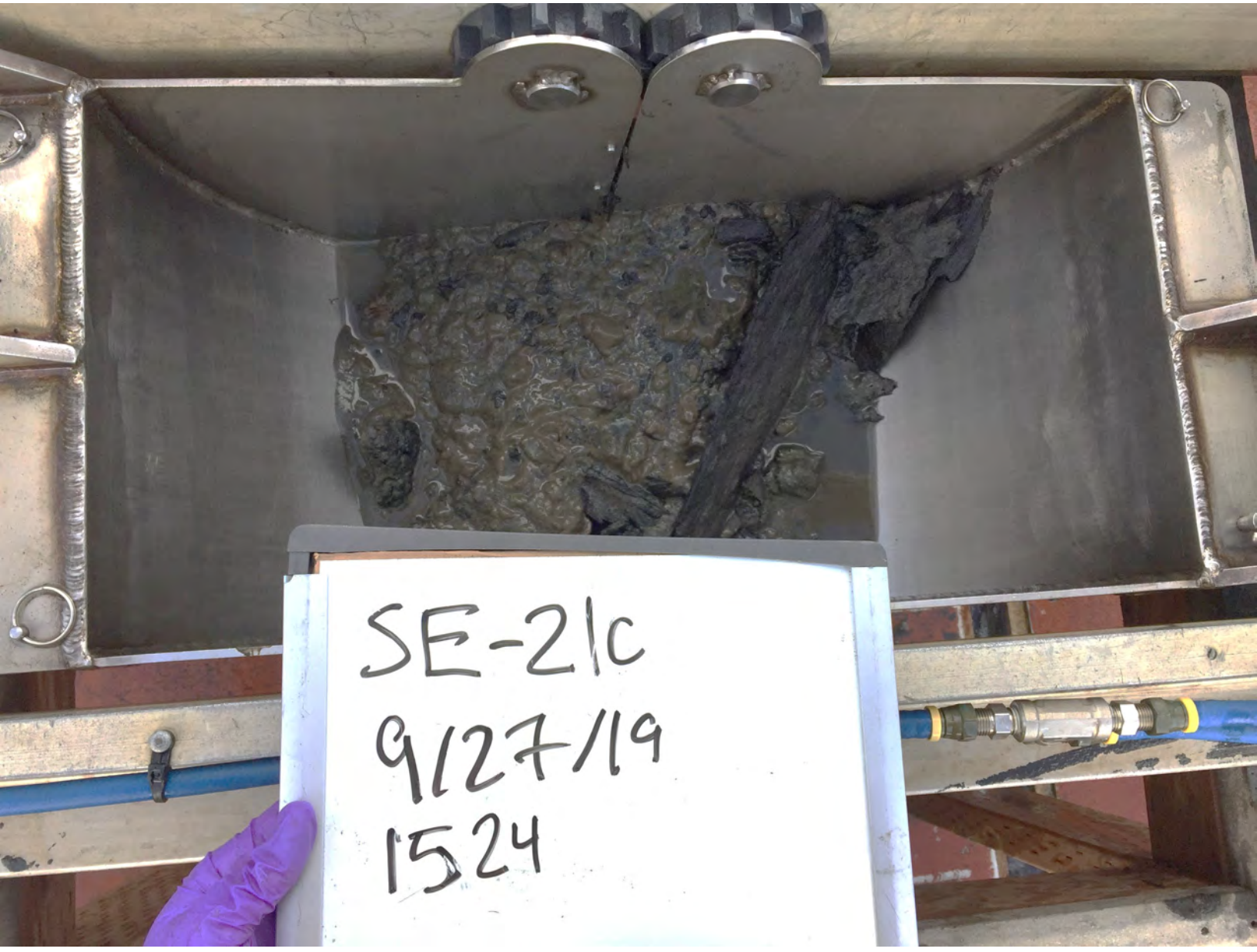
Notes:
bml = below mudline.
cm = centimeter(s).

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/27/19

Surface Sediment Grabs

Location: SE-21C



0 – 10 cm bml

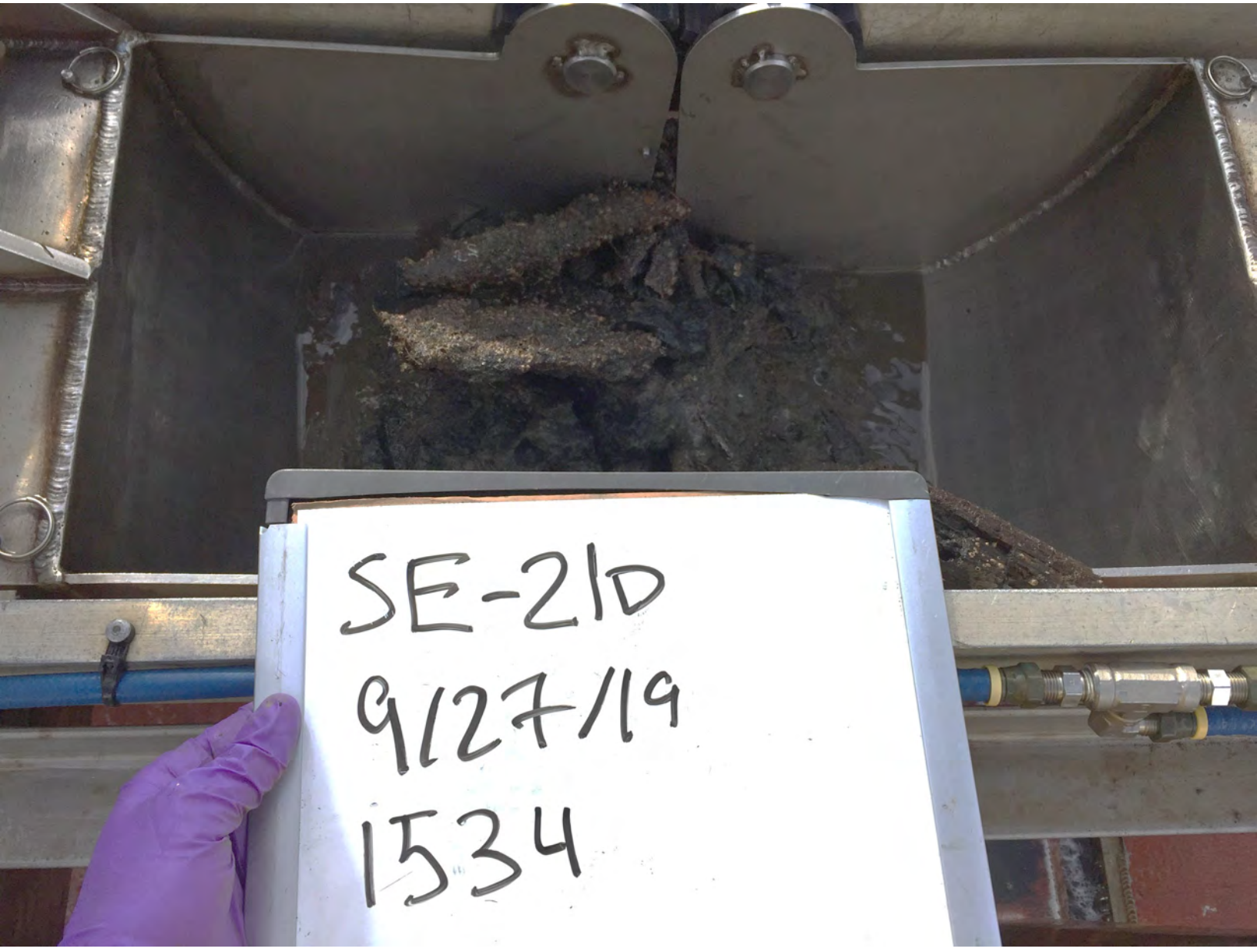
Notes:
bml = below mudline.
cm = centimeter(s).

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/27/19

Surface Sediment Grabs

Location: SE-21D



0 – 10 cm bml

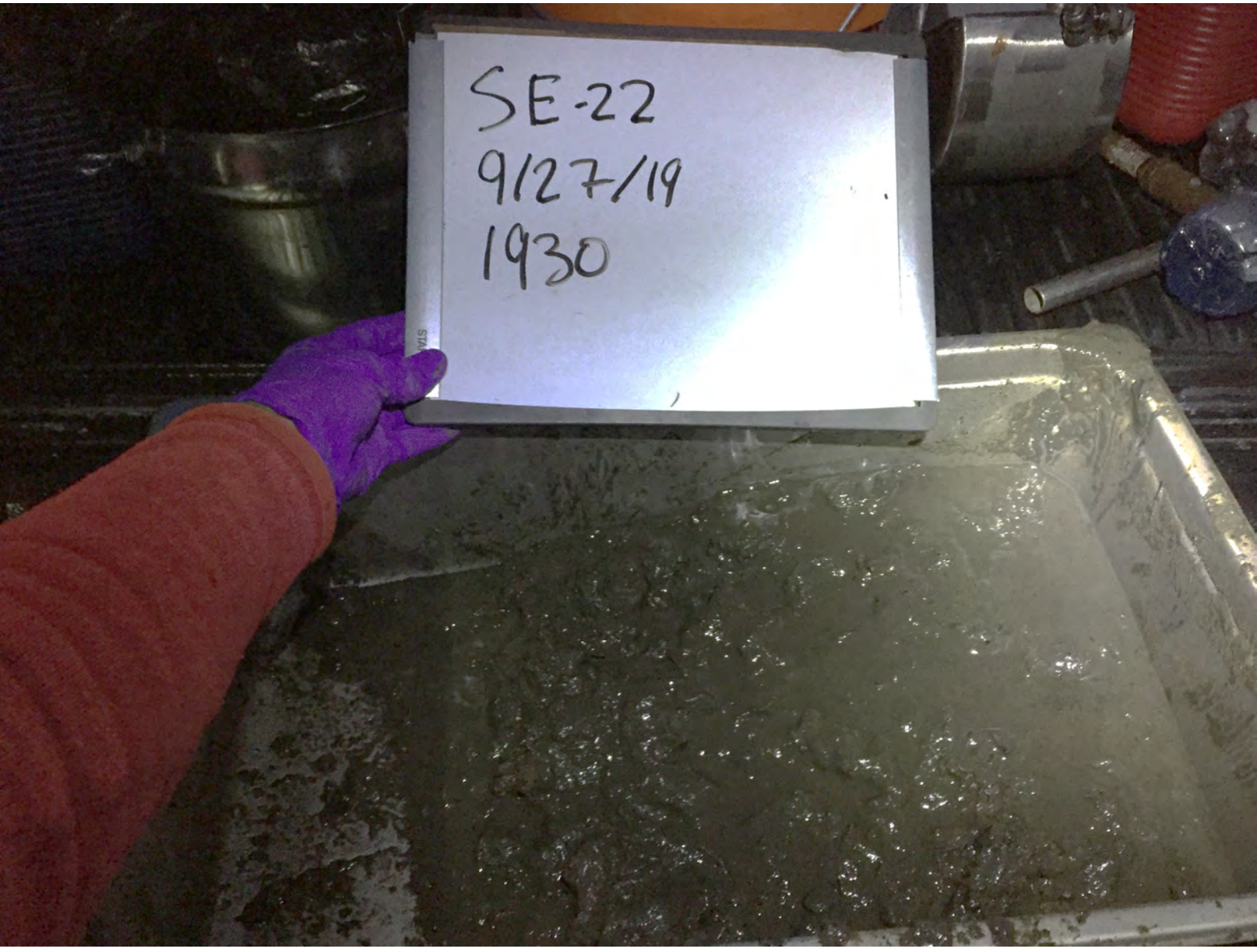
Notes:
bml = below mudline.
cm = centimeter(s).

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/27/19

Surface Sediment Grabs

Location: SE-22



0 – 10 cm bml

Notes:
bml = below mudline.
cm = centimeter(s).

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/27/19

Surface Sediment Grabs

Location: SE-23



0 – 10 cm bml

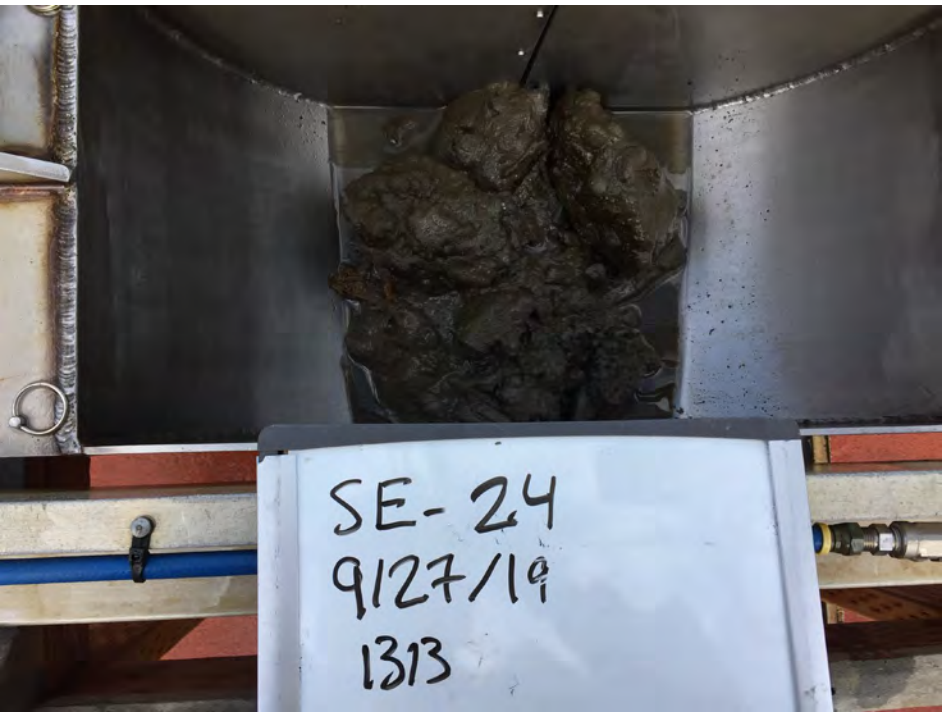
Notes:
bml = below mudline.
cm = centimeter(s).

PHOTOGRAPHS:

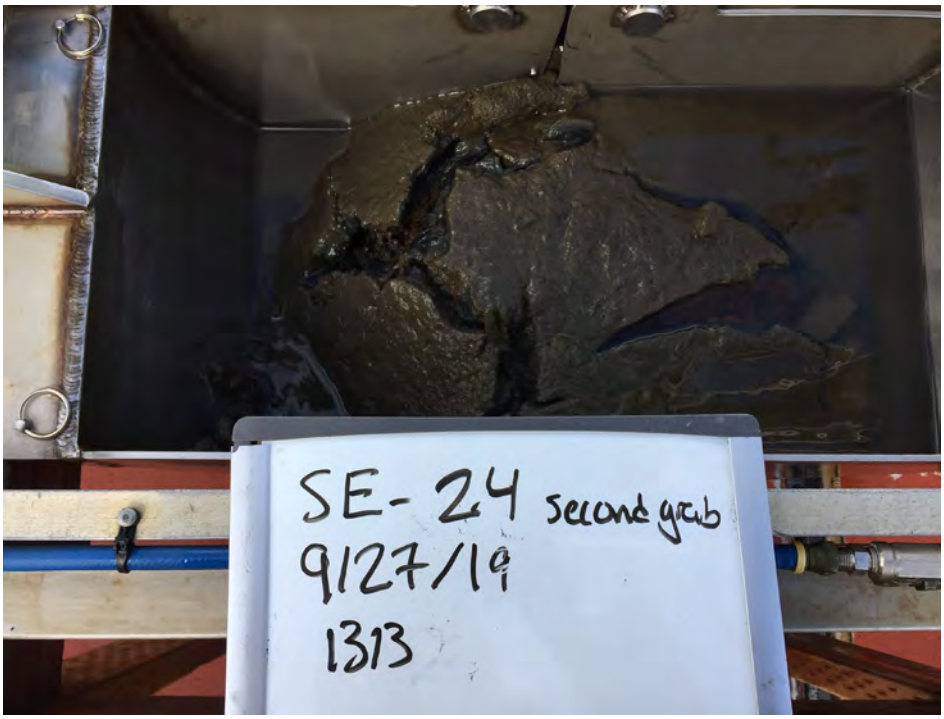
Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/27/19

Surface Sediment Grabs

Location: SE-24



0 – 10 cm bml



0 – 10 cm bml

Notes:
bml = below mudline.
cm = centimeter(s).

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/27/19

Surface Sediment Grabs

Location: SE-25



0 – 10 cm bml

Notes:
bml = below mudline.
cm = centimeter(s).

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/27/19

Surface Sediment Grabs

Location: SE-26



0 – 10 cm bml

Notes:
bml = below mudline.
cm = centimeter(s).

PHOTOGRAPHS:

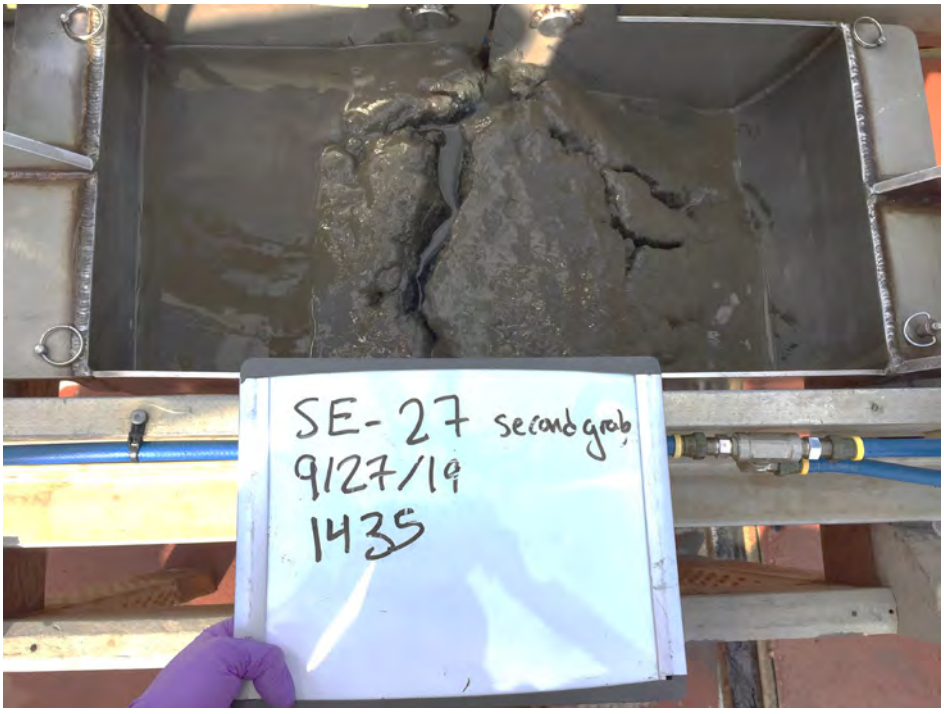
Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/27/19

Surface Sediment Grabs

Location: SE-27



0 – 10 cm bml



0 – 10 cm bml

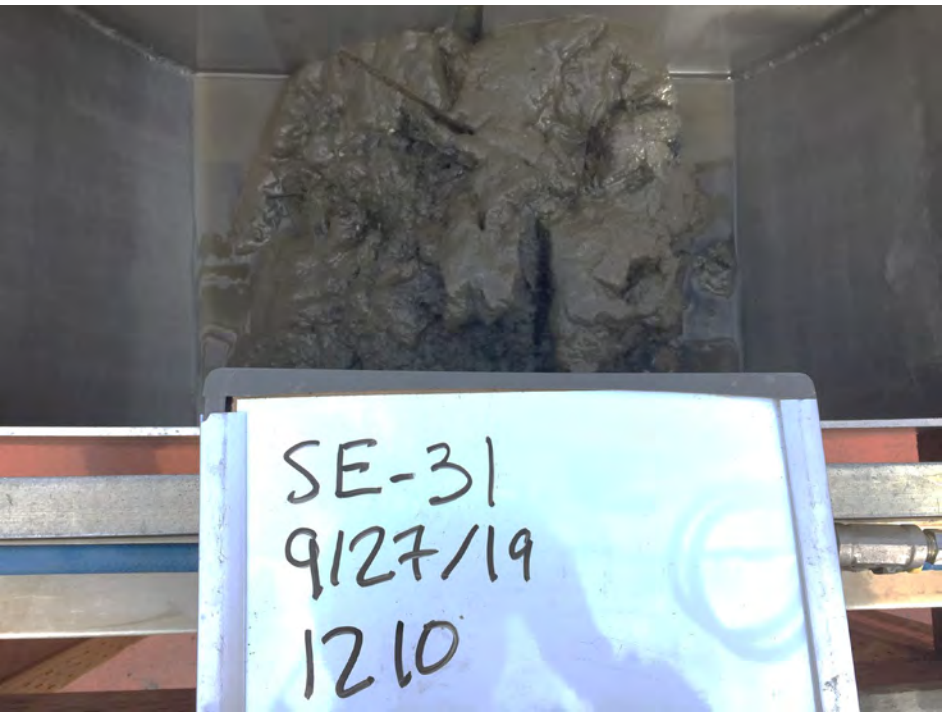
Notes:
bml = below mudline.
cm = centimeter(s).

PHOTOGRAPHS:

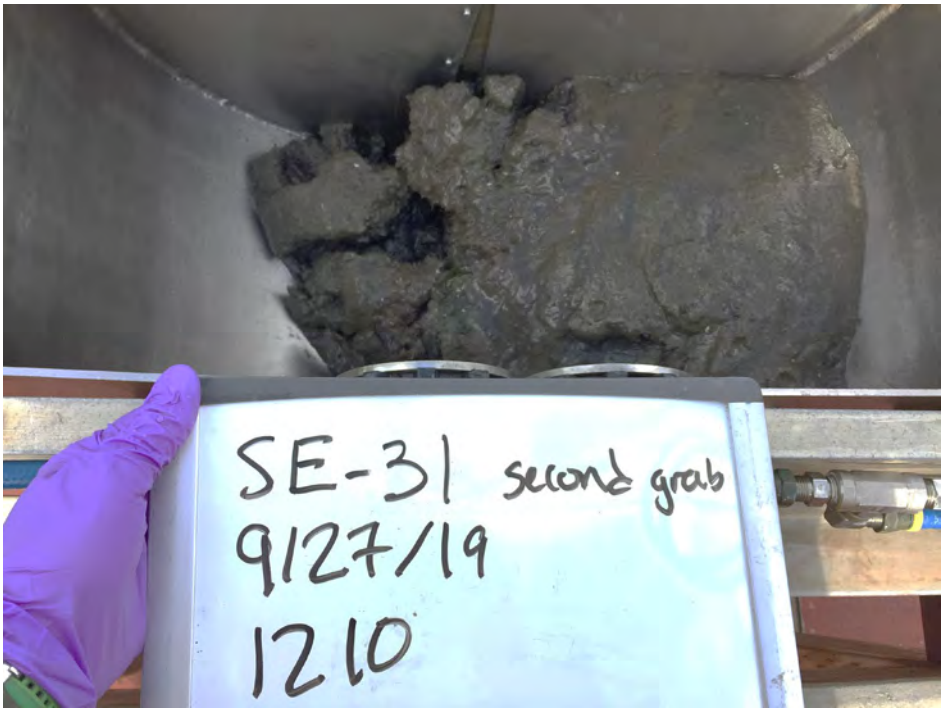
Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/27/19

Surface Sediment Grabs

Location: SE-31



0 – 10 cm bml



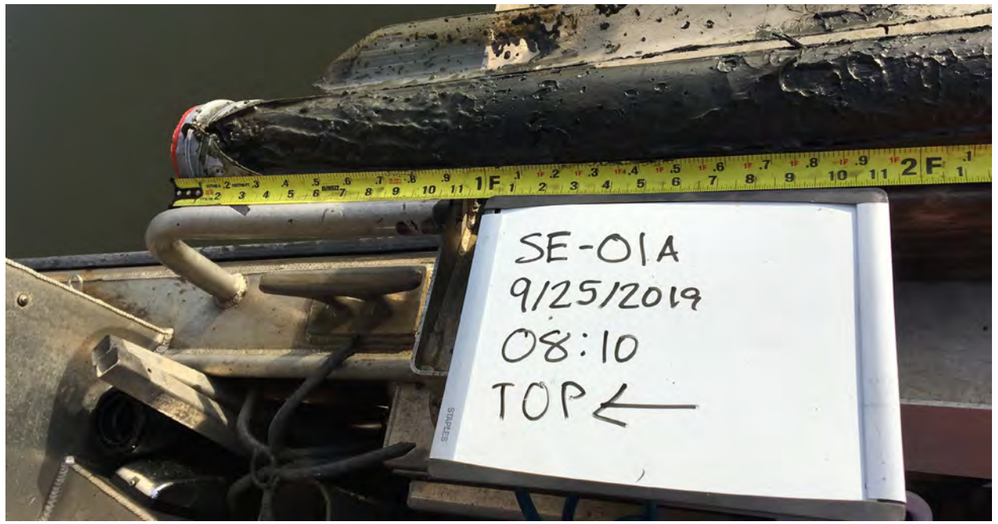
0 – 10 cm bml

Notes:
bml = below mudline.
cm = centimeter(s).

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/23/19 – 9/26/19

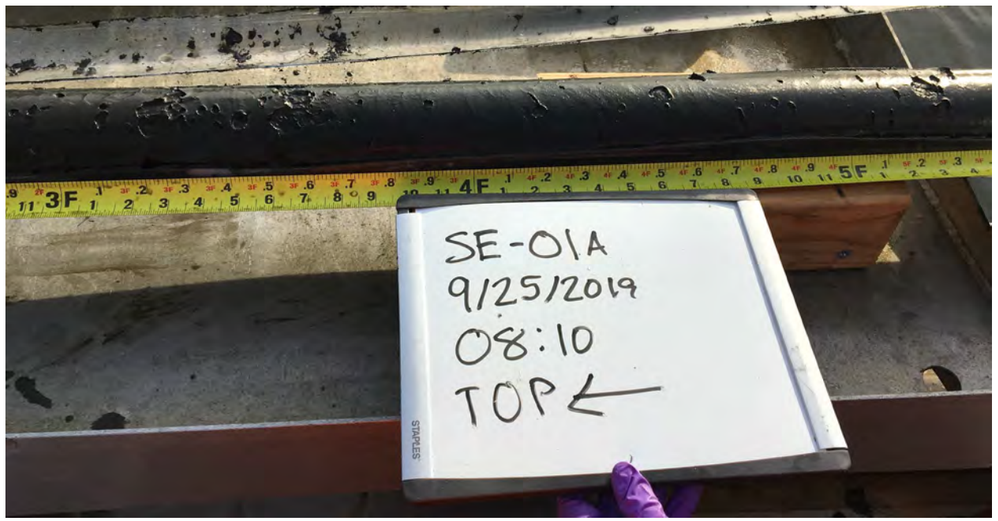
Sample Depth: 1 – 2 feet bml



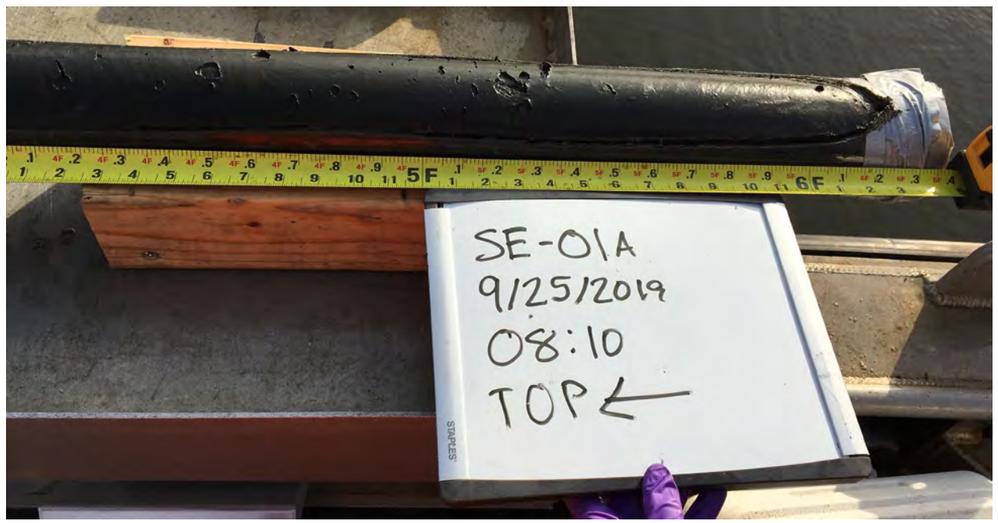
0 – 2.1 feet bml



0.8 – 3.8 feet bml



2.9 – 5.3 feet bml



4.1 – 6.2 feet bml

Notes:
Core length, including cutting in shoe, was 7.2 feet.
Scale shown in feet.
bml = below mudline.

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/23/19 – 9/26/19

Subsurface Sediment Cores
Location: SE-01B

Sample Depth: 0.5 – 1.5 feet bml (archive)



0 – 1.6 feet bml



Woodwaste at 0.8 feet bml

Notes:
Core length, including cutting in shoe, was 1.6 feet.
Scale shown in feet.
bml = below mudline.

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/23/19 – 9/26/19

Subsurface Sediment Cores
Location: SE-01C

Sample Depth: 2 – 3 feet bml (archive)



0 – 1.6 feet bml



1.4 – 2.8 feet bml



2.9 – 4 feet bml

Notes:
Core length, including cutting in shoe, was 4.6 feet.
Scale shown in feet.
bml = below mudline.

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/23/19 – 9/26/19

Subsurface Sediment Cores
Location: SE-01D

Sample Depth: 0 – 1 foot bml (archive)



0 – 1.9 feet bml



1.4 – 3.2 feet bml



2.8 – 4.7 feet bml

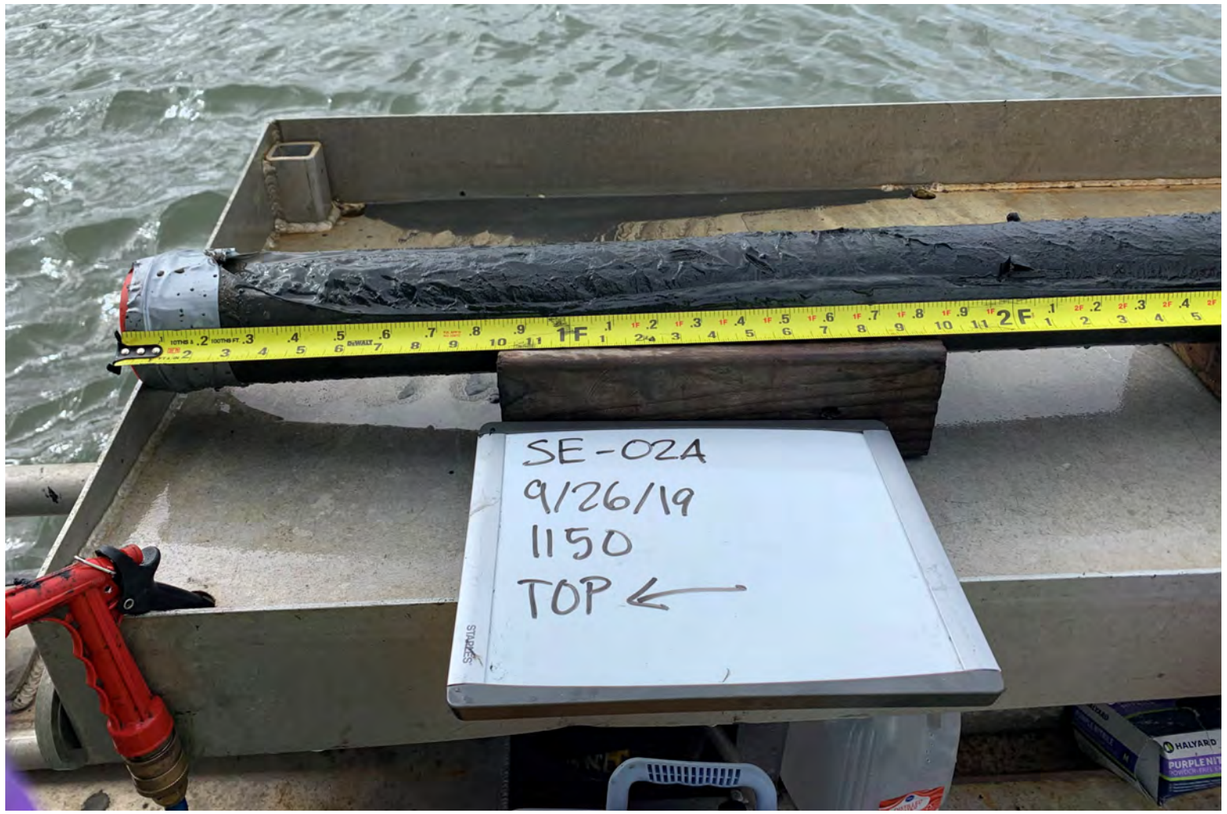
Notes:
Core length, including cutting in shoe, was 4.7 feet.
Scale shown in feet.
bml = below mudline.

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/23/19 – 9/26/19

Subsurface Sediment Cores
Location: SE-02A

Sample Depth: 2.5 – 3.5 feet bml



0 – 2.4 feet bml



1.6 – 4.7 feet bml

Notes:
Core length, including cutting in shoe, was 5.1 feet.
Scale shown in feet.
bml = below mudline.

PHOTOGRAPHS:

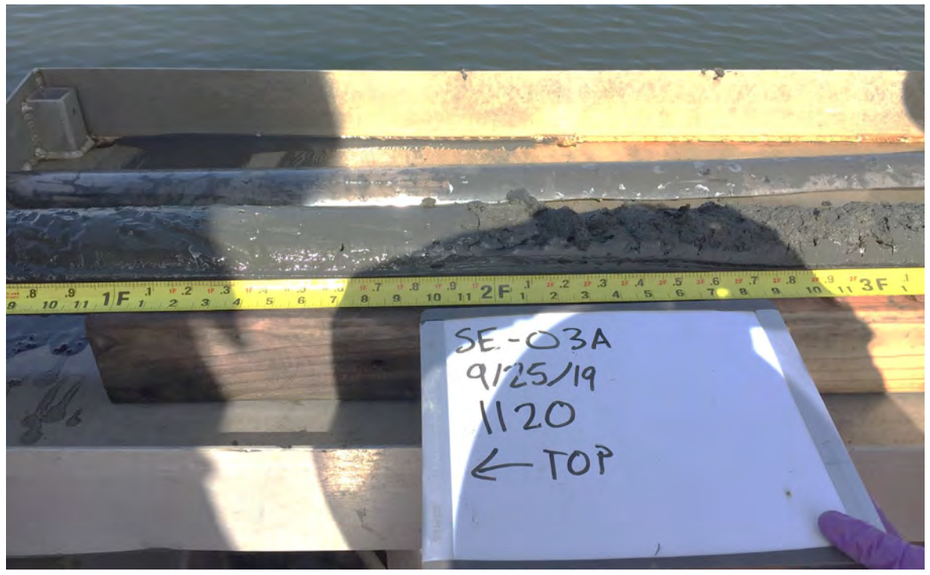
Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/23/19 – 9/26/19

Subsurface Sediment Cores
Location: SE-03A

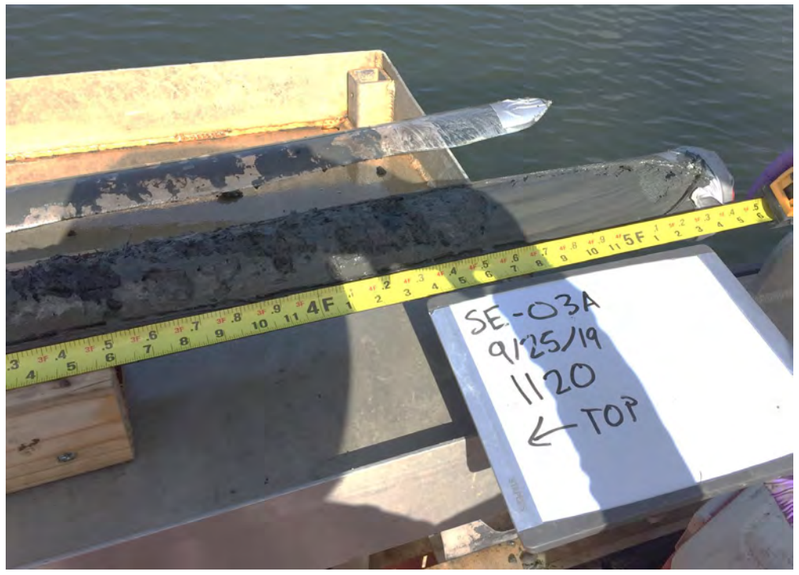
Sample Depth: 0 – 1 foot bml (archive)



0 – 1.8 feet bml



0.8 – 3.1 feet bml



3.3 – 5.5 feet bml

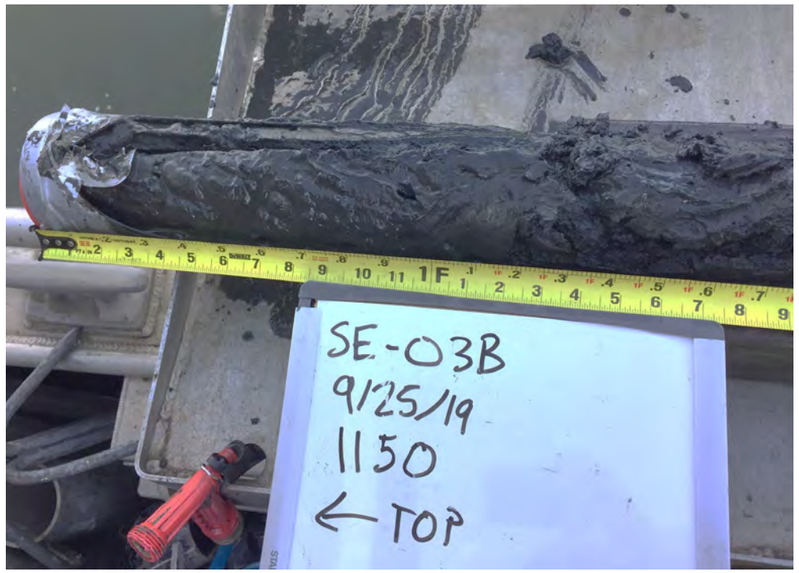
Notes:
Core length, including cutting in shoe, was 5.5 feet.
Scale shown in feet.
bml = below mudline.

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/23/19 – 9/26/19

Subsurface Sediment Cores
Location: SE-03B

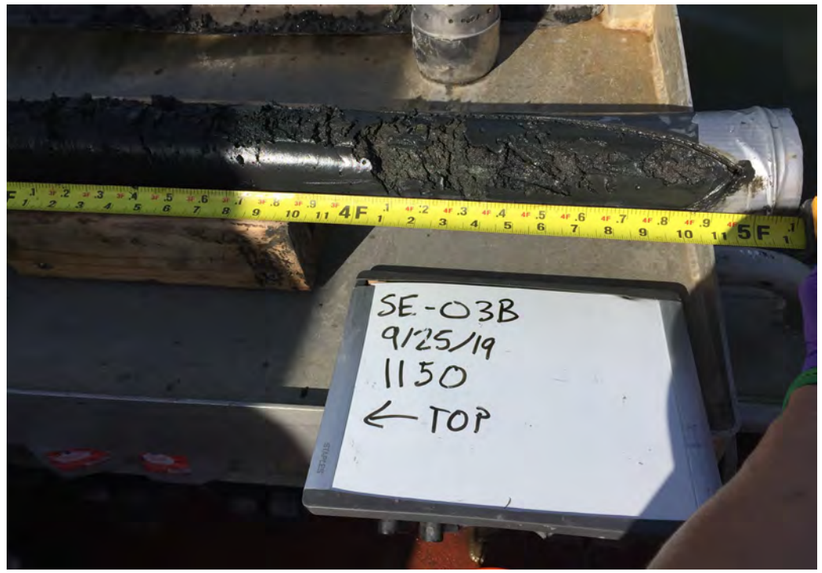
Sample Depth: 1 – 2 feet bml (archive)



0 – 1.8 feet bml



1.8 – 3.6 feet bml



3.1 – 5.1 feet bml

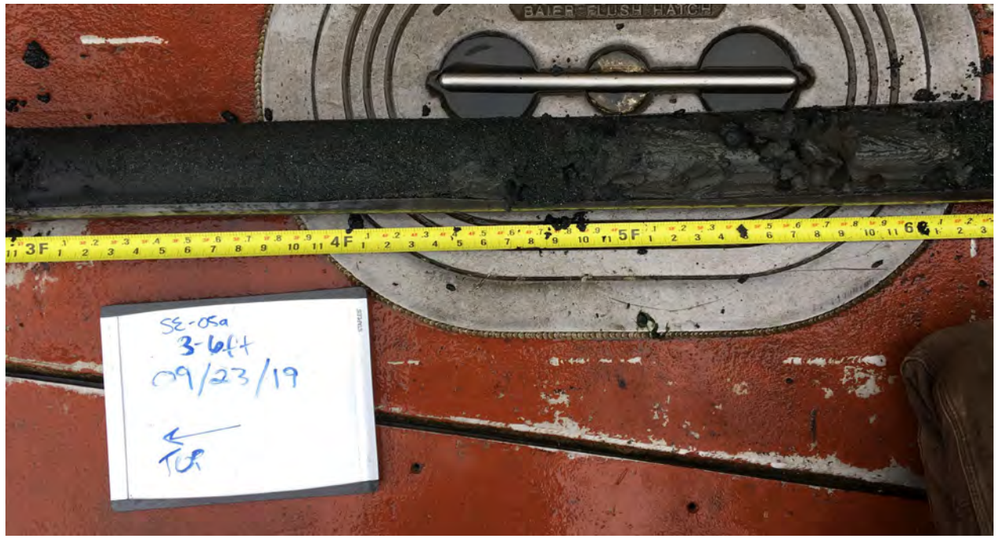
Notes:
Core length, including cutting in shoe, was 5.1 feet.
Scale shown in feet.
bml = below mudline.

PHOTOGRAPHS:

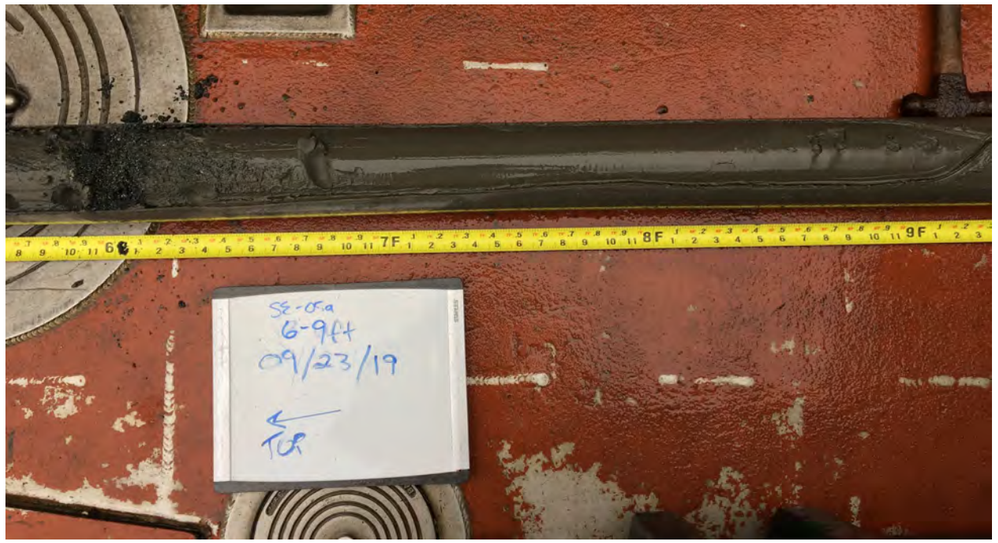
Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/23/19 – 9/26/19



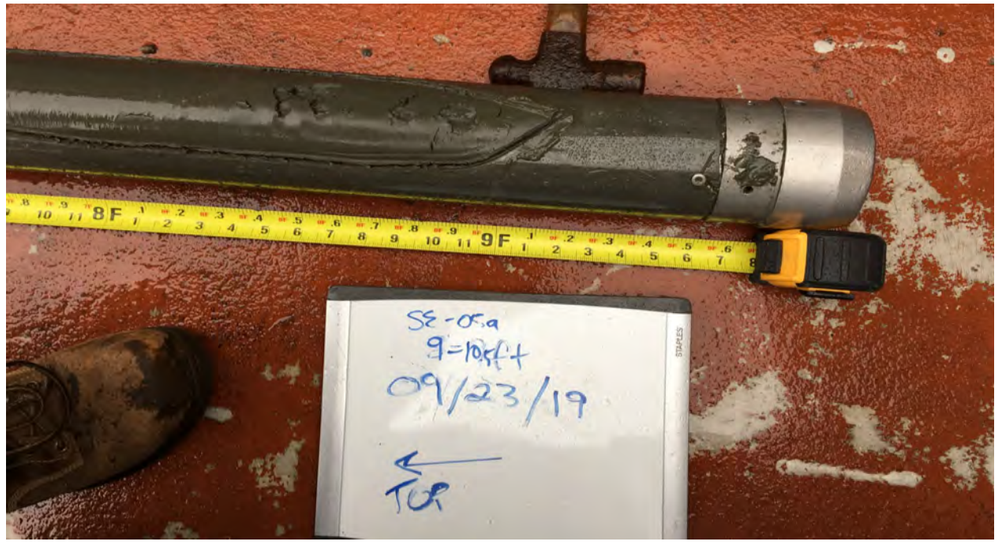
0 – 2.8 feet bml



2.9 – 6.3 feet bml



5.8 – 9.3 feet bml



7.8 – 9.7 feet bml

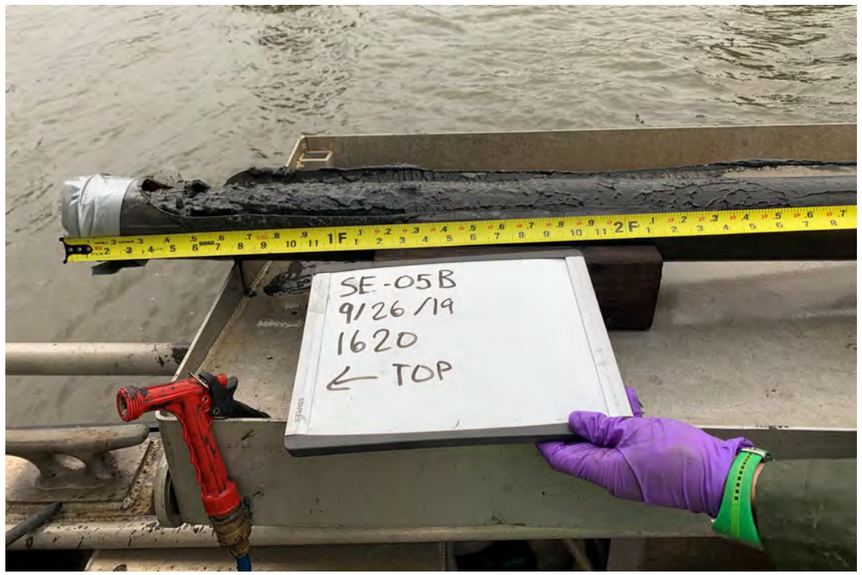
Notes:
Core length, including cutting in shoe, was 9.7 feet.
Scale shown in feet.
bml = below mudline.

PHOTOGRAPHS:

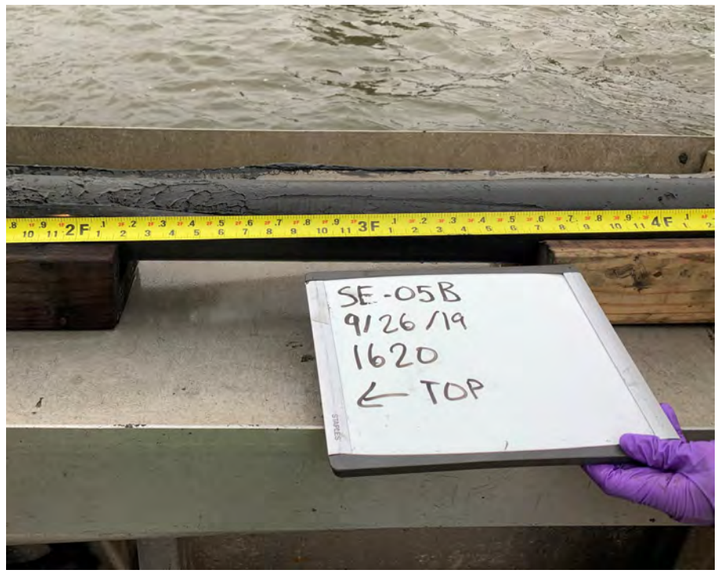
Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/23/19 – 9/26/19

Subsurface Sediment Cores
Location: SE-05B

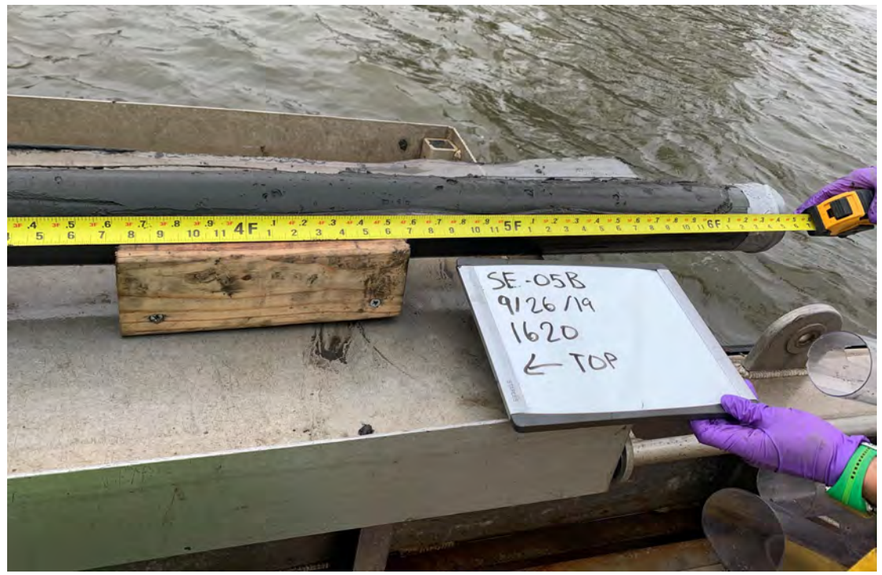
Sample Depth: 2.5 – 3.5 feet bml (archive)



0 – 2.8 feet bml



1.8 – 4.2 feet bml

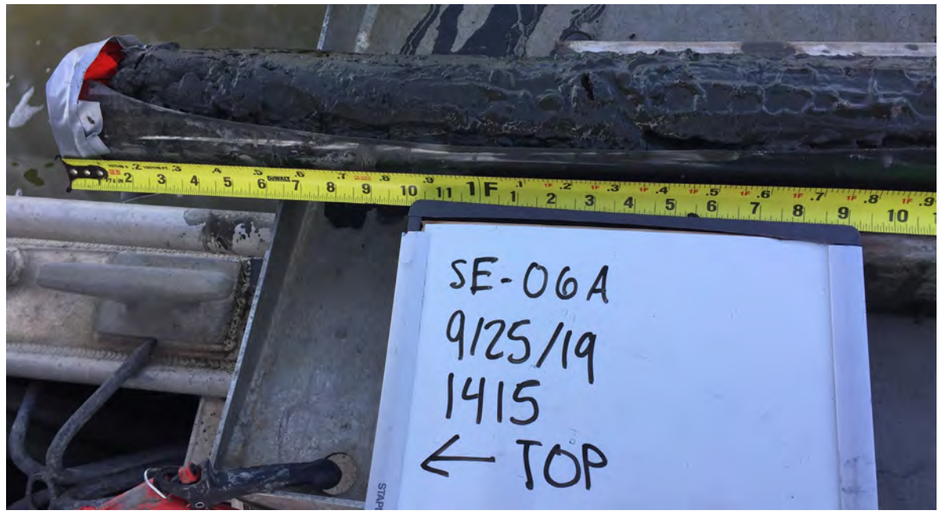


3.1 – 6.2 feet bml

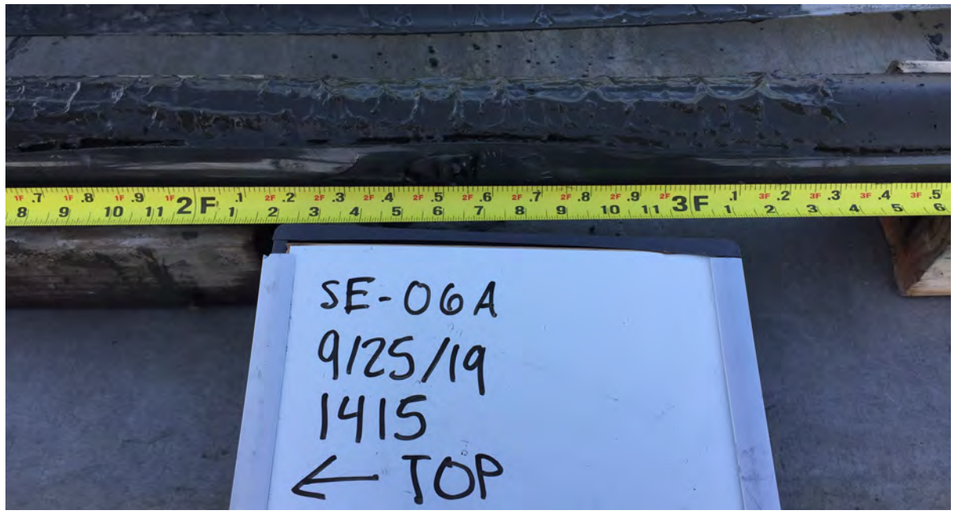
Notes:
Core length, including cutting in shoe, was 7.2 feet.
Scale shown in feet.
bml = below mudline.

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/23/19 – 9/26/19



0 – 1.9 feet bml



1.7 – 3.5 feet bml



3.7 – 5.9 feet bml



5 – 6.7 feet bml

Notes:
Core length, including cutting in shoe, was 7.5 feet.
Scale shown in feet.
bml = below mudline.

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/23/19 – 9/26/19

Subsurface Sediment Cores
Location: SE-06B

Sample Depth: 3 – 4 feet bml (archive)



0 – 2.8 feet bml



2.2 – 5.2 feet bml

Notes:
Core length, including cutting in shoe, was 5.2 feet.
Scale shown in feet.
bml = below mudline.

PHOTOGRAPHS:

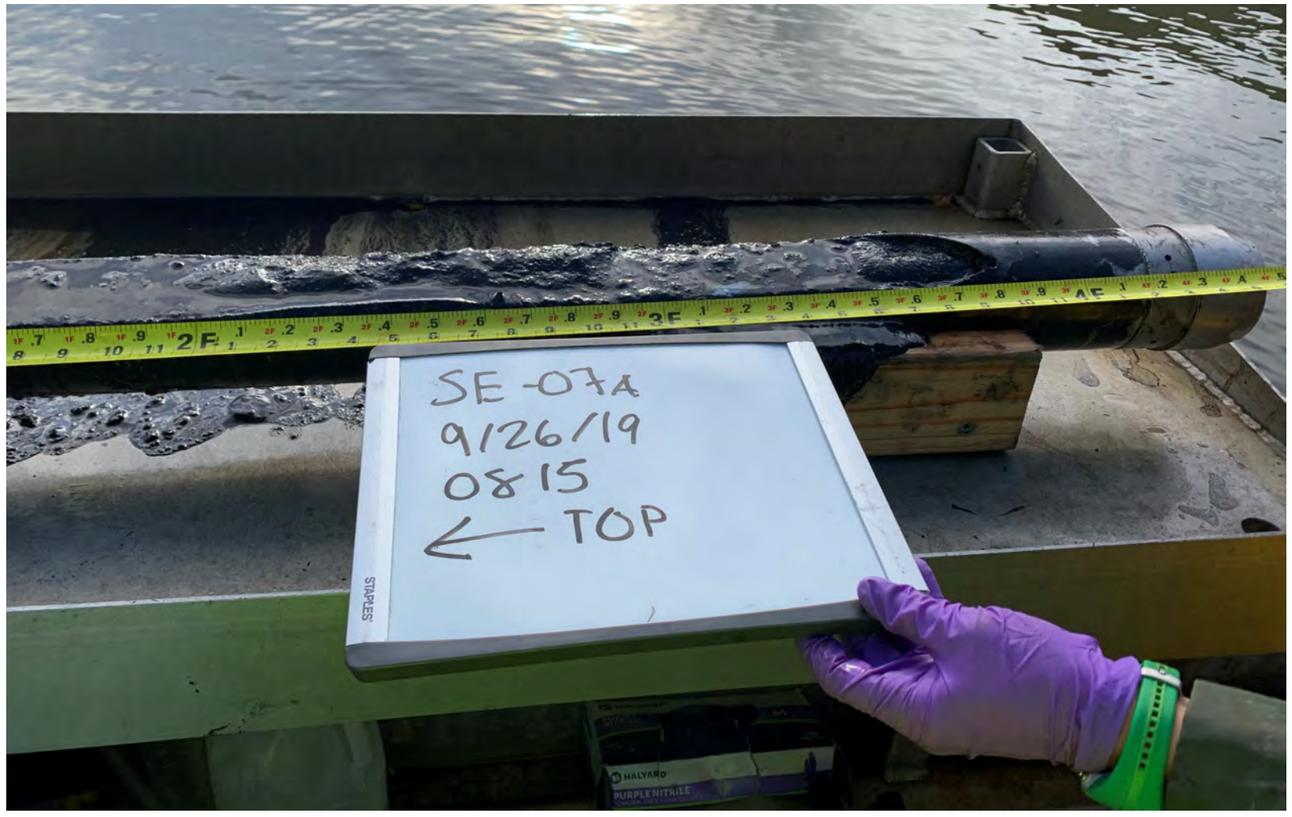
Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/23/19 – 9/26/19

Subsurface Sediment Cores
Location: SE-07A

Sample Depth: 0 – 1 foot bml



0 – 2.4 feet bml



1.7 – 4 feet bml

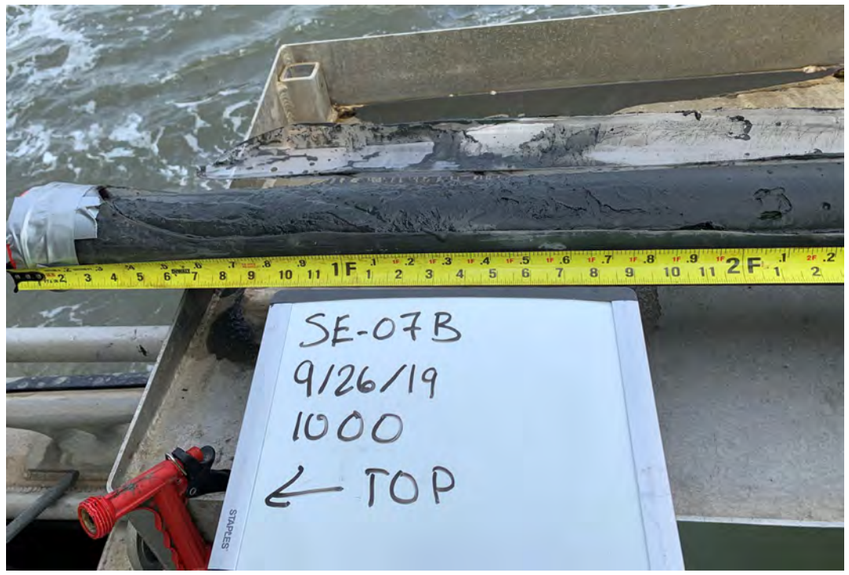
Notes:
Core length, including cutting in shoe, was 4 feet.
4.3-foot core length in photograph because of 0.3-foot section of water column included in top of liner.
Scale shown in feet.
bml = below mudline.

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/23/19 – 9/26/19

Subsurface Sediment Cores
Location: SE-07B

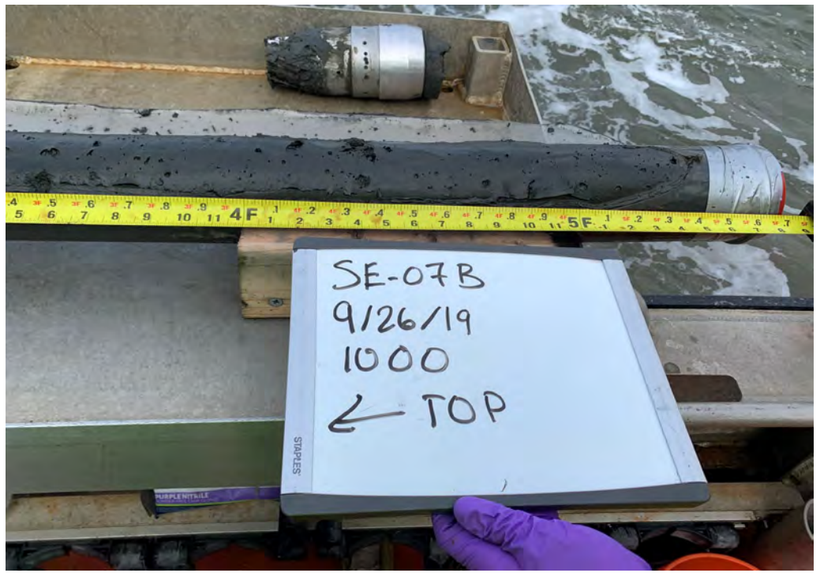
Sample Depth: 0 – 1 foot bml (archive)



0 – 2.2 feet bml



1.5 – 3.8 feet bml



3.4 – 5.7 feet bml

Notes:
Core length, including cutting in shoe, was 6.5 feet.
Scale shown in feet.
bml = below mudline.

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/23/19 – 9/26/19

Subsurface Sediment Cores
Location: SE-08A

Sample Depth: 0 – 1 foot bml



0 – 1.3 feet bml

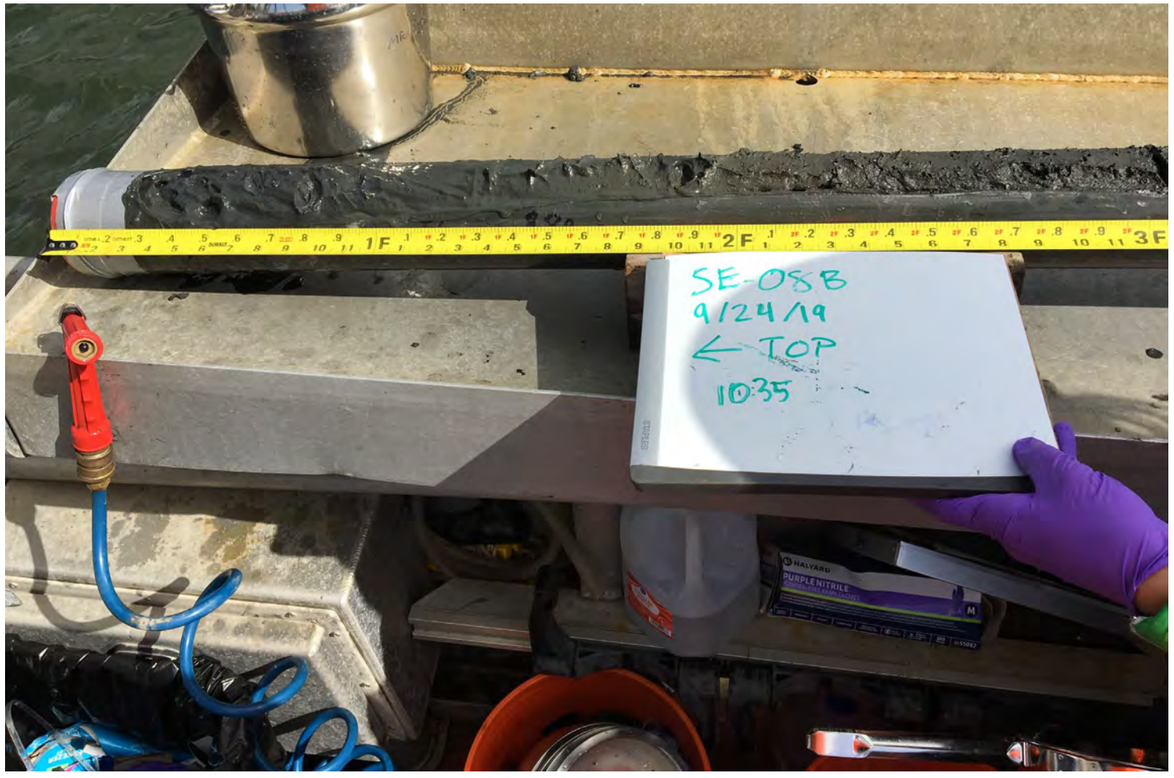
Notes:
Core length, including cutting in shoe, was 1.3 feet.
Scale shown in feet.
bml = below mudline.

PHOTOGRAPHS:

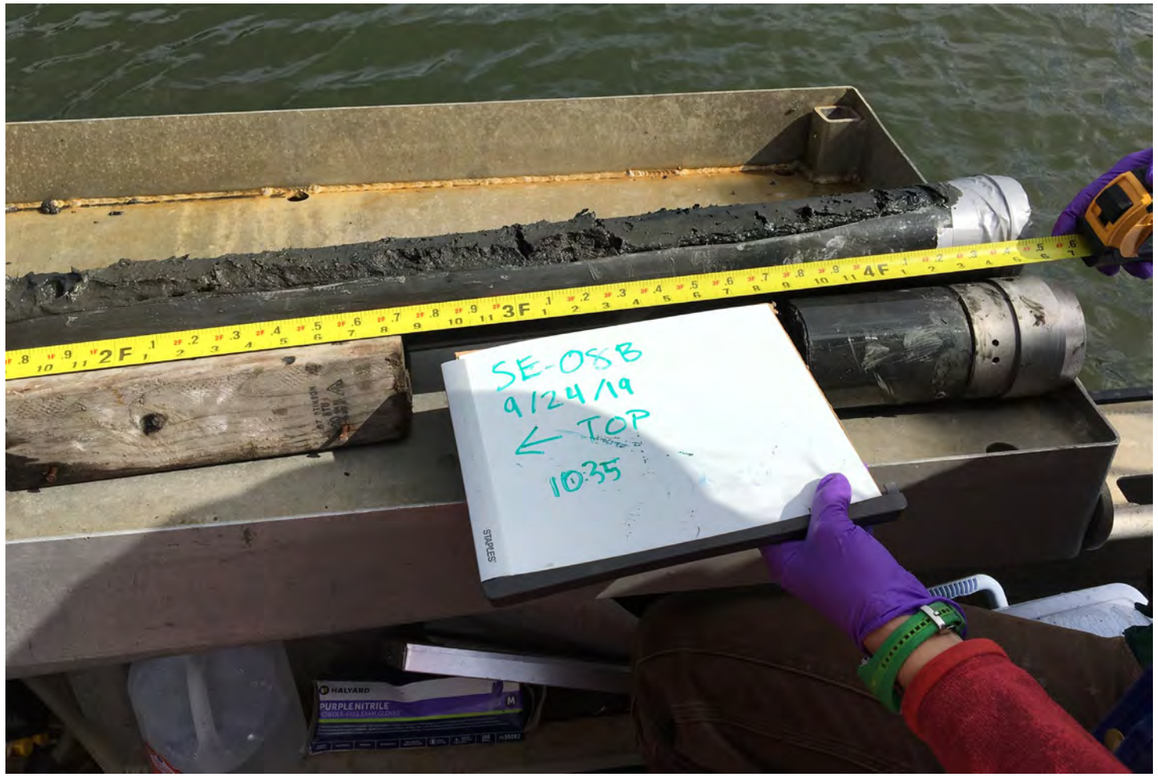
Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/23/19 – 9/26/19

Subsurface Sediment Cores
Location: SE-08B

Sample Depth: 0 – 1 foot bml (archive);
Radioisotope samples also collected at this location



0 – 3 feet bml



1.8 – 5.3 feet bml

Notes:
Core length, including cutting in shoe, was 5.3 feet.
Scale shown in feet.
bml = below mudline.

PHOTOGRAPHS:

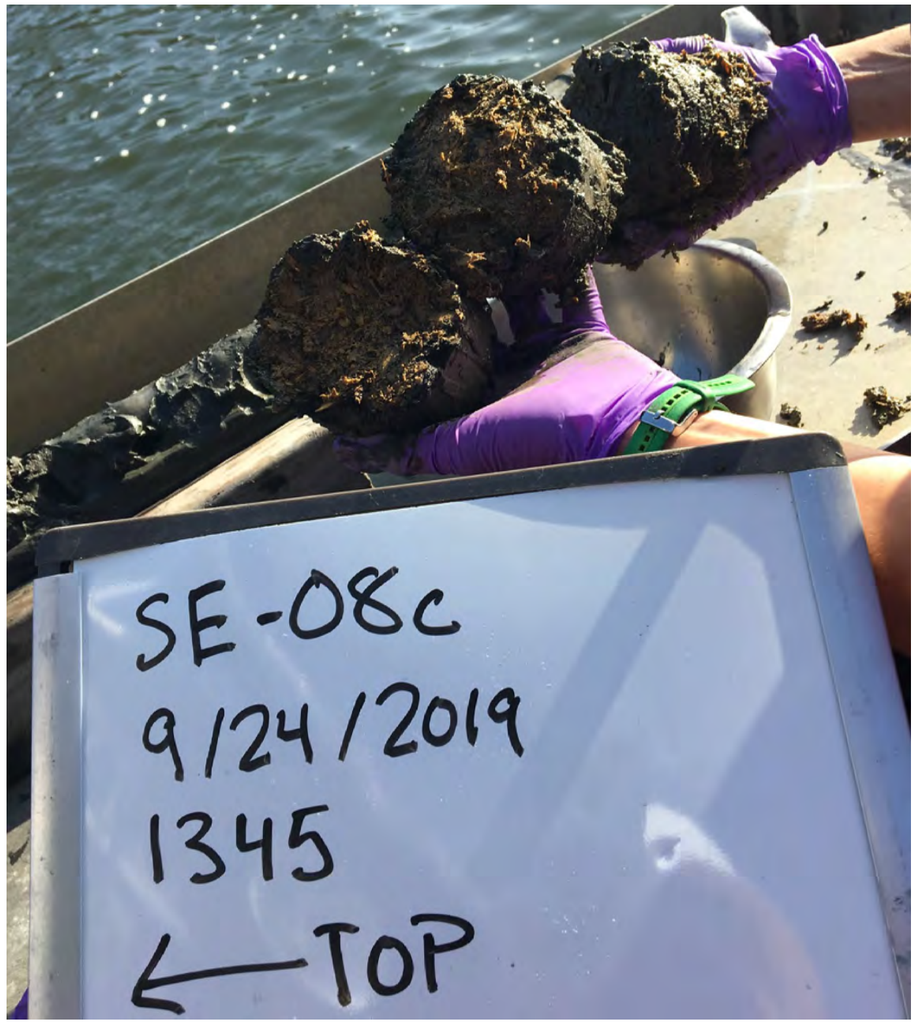
Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/23/19 – 9/26/19

Subsurface Sediment Cores
Location: SE-08C

Sample Depth: 3.2 – 4.2 feet bml



0 – 3.6 feet bml



Woodwaste at 3.9 feet bml

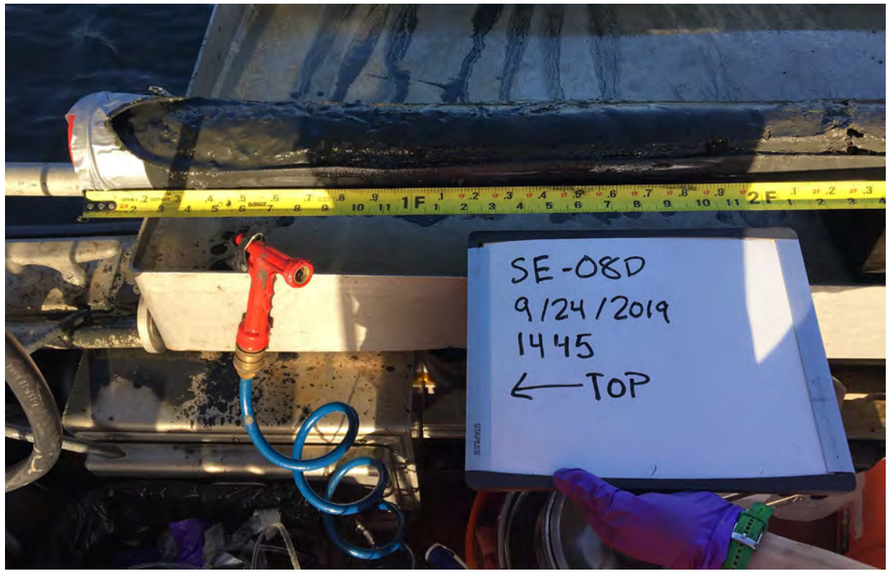
Notes:
Core length, including cutting in shoe, was 4.2 feet.
Scale shown in feet.
bml = below mudline.

PHOTOGRAPHS:

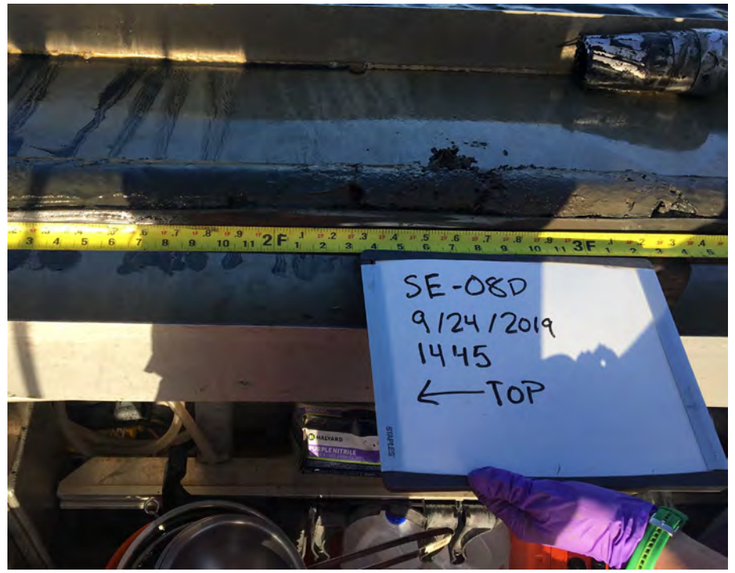
Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/23/19 – 9/26/19

Subsurface Sediment Cores
Location: SE-08D

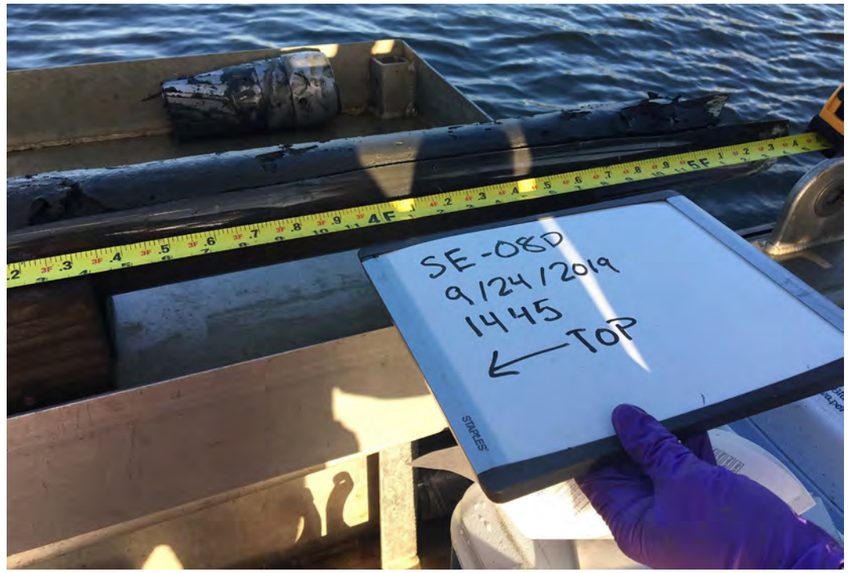
Sample Depth: 2 – 3 feet bml (archive)



0 – 2.3 feet bml



1.3 – 3.4 feet bml



3.2 – 5.4 feet bml

Notes:
Core length, including cutting in shoe, was 5.75 feet.
Scale shown in feet.
bml = below mudline.

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/23/19 – 9/26/19

Subsurface Sediment Cores
Location: SE-10

Sample Depth: 2 – 3.7 feet bml



0 – 2.3 feet bml



2.4 – 3.3 feet bml



Core in shoe at base of core

Notes:
Core length, including cutting in shoe, was 3.7 feet.
Scale shown in feet.
bml = below mudline.

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/23/19 – 9/26/19

Subsurface Sediment Cores
Location: SE-12

Radioisotope samples collected at this location



0 – 1.8 feet bml

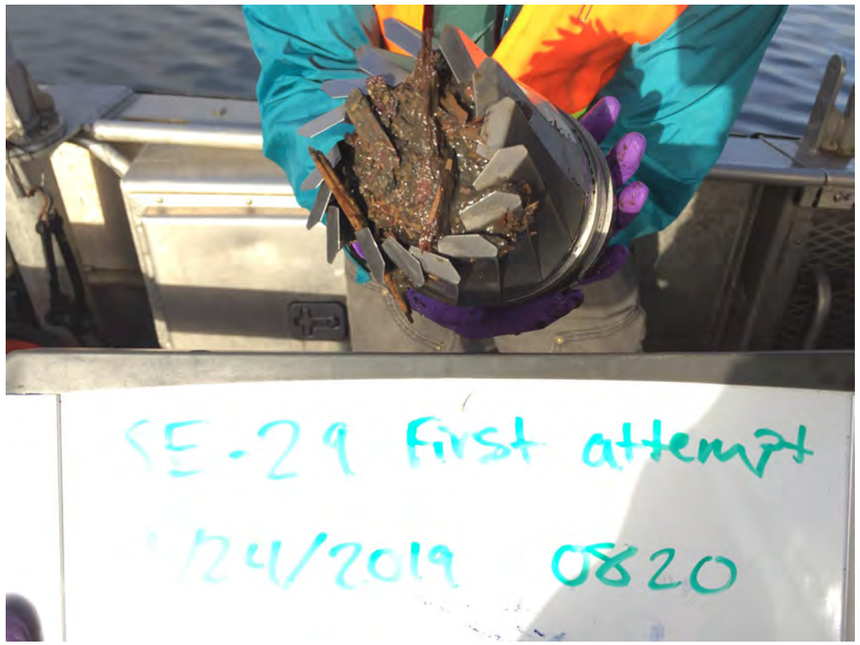
Notes:
Core length, including cutting in shoe, was 1.8 feet.
Scale shown in feet.
bml = below mudline.

PHOTOGRAPHS:

Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/23/19 – 9/26/19

Subsurface Sediment Cores
Location: SE-29

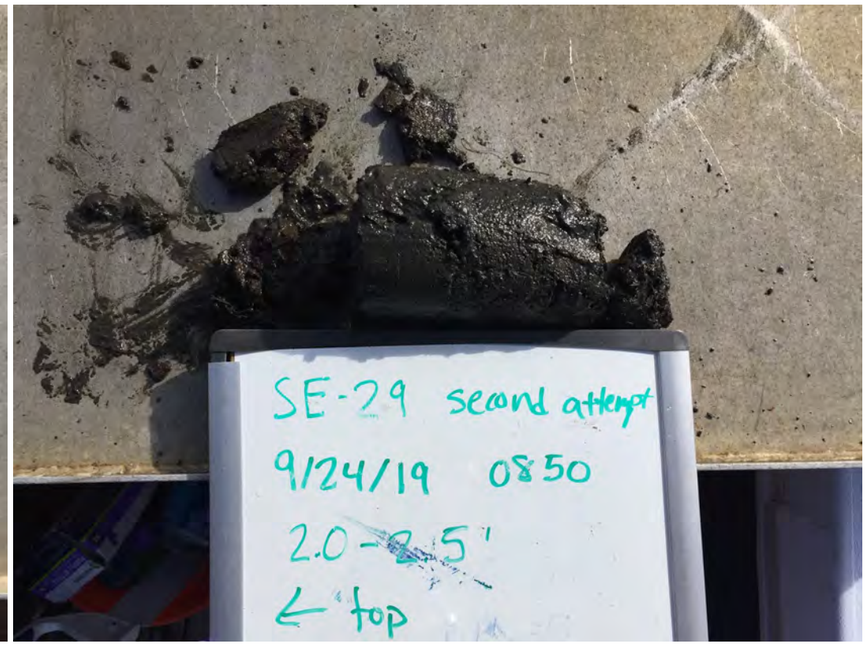
Sample Depth: 0 – 2 feet bml



Woodwaste in shoe



2 feet bml



2 – 2.5 feet bml

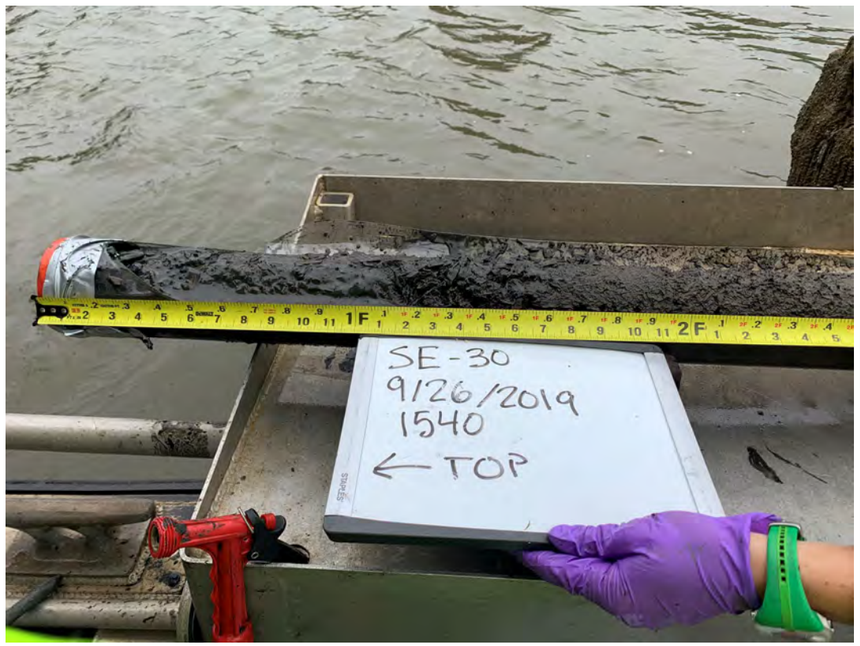
Notes:
Core length, including cutting in shoe, was 2.5 feet.
Scale shown in feet.
bml = below mudline.

PHOTOGRAPHS:

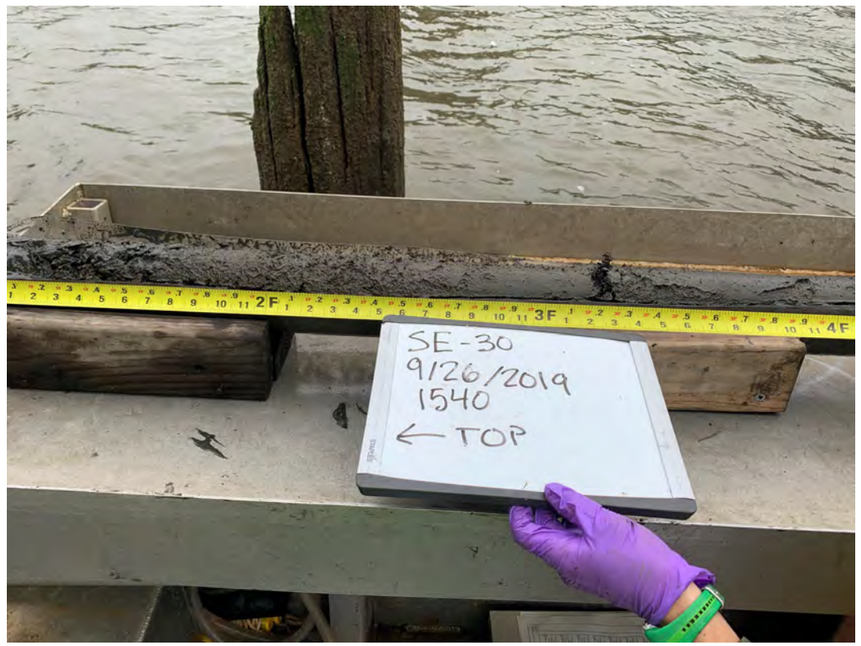
Project Name: Grays Harbor Historical Seaport Authority
Project Number: M1044.02.014
Location: Chehalis River, Aberdeen, Washington
Date: 9/23/19 – 9/26/19

Subsurface Sediment Cores
Location: SE-30

Sample Depths (feet bml): 0 – 2 (archive); 2.5 – 4.5; 4.5 – 5.5 (archive)



0 – 2.4 feet bml



1.1 – 4 feet bml



3 – 5.5 feet bml

Notes:
Core length, including cutting in shoe, was 6.1 feet.
Scale shown in feet.
bml = below mudline.

PHOTOGRAPHS

Project Name:	Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site: In-Water Remedial Investigation
Project Number:	M1044.02.014
Location:	500 N Custer Street, Aberdeen, Washington
Date:	July 21, 2020

Photo No. 1.

Description
Possible sulfide seep observed near the wharf, facing northwest toward the Chehalis River.



Photo No. 2.

Description
Close up of possible sulfide seep near the wharf as shown on photo no. 1.



PHOTOGRAPHS

Project Name:	Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site: In-Water Remedial Investigation
Project Number:	M1044.02.014
Location:	500 N Custer Street, Aberdeen, Washington
Date:	July 21, 2020

Photo No. 3.

Description
Representative photograph of decaying organic material (black material) along shoreline, facing southwest.



Photo No. 4.

Description
Possible sulfide seeps observed downstream of the mouth of Shannon Slough, facing northeast.



PHOTOGRAPHS

Project Name:	Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site: In-Water Remedial Investigation
Project Number:	M1044.02.014
Location:	500 N Custer Street, Aberdeen, Washington
Date:	July 21, 2020

Photo No. 5.

Description
Possible sulfide seeps observed downstream of the mouth of Shannon Slough, facing northeast.



Photo No. 6.

Description
Woodwaste observed near the mouth of Shannon Slough, facing east. Note possible sulfide seep (light colored substance excreting from the woodwaste), circled.



PHOTOGRAPHS

Project Name:	Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site: In-Water Remedial Investigation
Project Number:	M1044.02.014
Location:	500 N Custer Street, Aberdeen, Washington
Date:	July 21, 2020

Photo No. 7.

Description
Woodwaste and possible sulfide seeps observed near mouth of Shannon Slough, facing east.



Photo No. 8.

Description
Woodwaste and possible sulfide seeps observed near mouth of Shannon Slough, facing east.



APPENDIX G

DGT TECHNICAL MEMORANDUM



MAUL FOSTER ALONGI

MEMORANDUM

To: Joyce Mercuri and Tom Middleton, LHG Date: February 9, 2023

From: Phil Wiescher, PhD and Amanda Bixby, GIT Project No.: M1044.02.014

RE: Sulfide Measurement Methods

INTRODUCTION

Historically, sawmills operating at the Weyerhaeuser Sawmill Aberdeen/Seaport Landing site (the Site) used wood waste as fill material in the Chehalis River. The wood waste, including sawdust, woodchips, and planked fill material, was deposited in the river sediments over time. Anoxic decomposition of wood waste produces hydrogen sulfide, a hazardous substance that is toxic to benthic organisms, fish, and eelgrass when present in excess amounts (Podger, 2013). Maul Foster & Alongi, Inc. (MFA) evaluated the presence of sulfide concentrations in wood waste-impacted sediment and compared results to toxicity values to develop appropriate in-water screening criteria.

Hydrogen sulfide readily converts into sulfate or other non-toxic forms when exposed to oxygen. Because hydrogen sulfide is easily oxidized, collecting representative samples can be challenging. MFA used three methods of evaluating sulfide levels in sediment at colocated sample locations on the Site: diffusive gradients in thin films (DGT) passive samplers to assess in-situ porewater sulfide, surface sediment sampling for bulk sediment sulfides, and porewater sulfide. Sulfide sampling methods, data calculations, and analyses are described in this memorandum.

DGT SAMPLING

DGT passive samplers quantify the bioavailable fraction of sulfide present in sediment porewater. The bioavailable fraction is measure of contamination that may cause adverse biological effects to benthic or aquatic organisms and is considered a more useful measure of toxicity in sediment than bulk sediment sampling (Paulik and Anderson, 2018).

DGT Sampler Description

DGT samplers are typically deployed in sediment underwater or at low tide to minimize sulfide oxidation. While the samplers are submerged in the sediment, sulfide accumulates on a binding layer of light-yellow silver iodide gel, which turns black as sulfide accumulates. After DGT samplers are retrieved from the field, sulfide concentrations are quantified by scanning the gray-scale color on the silver iodide layer using a flatbed scanner and an image processing software (Schneider, Rasband, and

Eliceiri, 2012). Calibration and data interpretation are then conducted in accordance with the DGT Research guidance document (see Attachment A).

Field Methods

On July 21, 2020, MFA deployed ten DGT units (SE-32 through SE-41) 10 centimeters (cm) below mudline during low tide to ensure they remained submerged for the duration of deployment to avoid oxygenation (see sample locations on Figure G-1 and field photographs in Attachment B). Each sampling device was equipped with high-visibility tape. Samples were retrieved after two tide cycles (i.e., slightly over 24 hours) from deployment. At the time of retrieval, field staff obtained the in-situ porewater temperature and potential hydrogen (pH) using a Hanna Instruments 99121 direct soil pH meter and obtained the conductivity using a FieldScout direct soil EC meter. These parameters were later used to calculate hydrogen sulfide from total free sulfide results.

DGT devices that had been exposed to sulfide calibration standards were used to calibrate the DGT samplers, per the DGT Research guidance document, included as Attachment A. The gray-scale calibration strips represent the mass of sulfide per unit area. Calibration strips were simultaneously scanned with the deployed DGT samplers as a full color image (see scans in Attachment C). Note that the binding gel on some of the samplers appeared brown, which was due to iron oxide precipitate. The full color scan of the samplers and calibration strips was converted into a gray-scale image, which was then uploaded to ImageJ (Schneider, Rasband, and Eliceiri, 2012) to determine the gray-scale values of each calibration strip. Color variations were present on each strip; therefore, the mathematical mode of the gray scale value was selected as the representative gray-scale value for each DGT sample. Calculations are further described in the data analysis section below.

Data Analysis

MFA prepared a calibration curve (see Figure G-2) using the gray-scale intensity from the calibration strips (mean vs. assigned concentration). MFA then consulted Dr. Hao Zhang of Lancaster University, who helped develop the DGT samplers. Per Dr. Zhang's recommendation, the lowest sulfide concentration was excluded from the calibration curve because it skewed the curve trendline. The calibration curve equation is shown below:

$$M = 0.01 * I^{2.2928}$$

Where:

M = mass of sulfide (nanomole [nmol]/cm^2)

I = mathematical mode of gray-scale intensity of binding gel image (unitless)

Data Calculations

The mass of sulfide value from the gray-scale calibration curve and the deployment time were used in the equation (Teasedale et al., 1999) below to obtain the sulfide concentration:

$$c_{DGT} = \frac{M\Delta g}{D^{mdl} A_p t}$$

Where:

c_{DGT} = sulfide concentration (nmol/milliliter)
M = mass of accumulated sulfide (nmol)
Δg = thickness of diffusion layer (0.094 cm)
D^{mdl} = temperature-corrected diffusion coefficient of sulfide (12.41 cm^2/seconds) (DGT Research, n.d.)
A_p = cross sectional area of exposed DGT window (10^{-6} cm^2)
t = deployment time (seconds)

Sulfide was then converted to milligrams per liter (mg/L) using following conversion factors:

$$total\ S^{2-} = c_{DGT} * \frac{32{,}070\ mg}{1\ mol} * \frac{1\ mol}{1e9\ nmol} * \frac{1{,}000\ mL}{1\ L}$$

The porewater temperature was used in the Millero equation below to calculate the infinite dilution value for each sample (Limnology and Oceanography, 1988).

$$pK_1 = -98.080 + \frac{5765.4}{T} + 15.04055 ln\ T$$

Where:

pK_1 = infinite dilution value (unitless)
T = porewater temperature (degrees Celsius)

Porewater conductivity and temperature were converted to salinity using an online calculator (Oceanlife, 2018). The online salinity calculator used the complex polynomial equation adopted by Unesco/ICES/SCOR/IAPSO (Unesco, 1981).

The salinity and infinite dilution values were then used to calculate the dissociation constant for hydrogen sulfide (Limnology and Oceanography, 1988). Note that this equation is considered appropriate when salinity is between 5 and 40 and temperature is between 5 and 25 degrees Celsius; all sample parameters were within the given ranges.

$$pK_1^* = pK_1 + AS^{1/2} + BS$$

Where:

pK_1^* = dissociation constant (unitless)

A = -0.1570 (unitless)
S = salinity (parts per trillion)
B = 0.0135 (unitless)

The dissociation constant was then plugged into the below equation to calculate hydrogen sulfide (Phillips, Anderson, and Hunt, 1997).

$$H_2S = [total\ S^{2-}] * (1 - (\frac{1}{1 + 10^{(pK_1^* - pH)}})$$

Where:
H_2S = hydrogen sulfide (mg/L)
total S^{2-} = total free sulfide (mg/L)
pK_1^* = dissociation constant (unitless)
pH = potential hydrogen (unitless)

Results

Parameters used in data calculation and DGT sulfide results are presented in Table G-1. Free sulfide DGT values ranged from 0.0002 to 7.85 mg/L. The highest free sulfide value was at sample location SE-40.

Hydrogen sulfide DGT values ranged from 0.0001 to 4.17 mg/L. The highest hydrogen sulfide value was at sample location SE-33.

BULK SEDIMENT SAMPLING

Field and Analytical Methods

Co-located surface sediment samples were collected after DGT passive sampler retrieval to avoid sediment disturbance during DGT sample collection (see sample locations on Figure G-1). A decontaminated stainless-steel trowel was used to collect sediment from 0 to 10 centimeters below mudline, the area with the highest potential for benthic organism exposure. Visual and olfactory characteristics, including color, odor, sheen, texture, percentage of debris, and/or wood waste by volume, were recorded on field sampling data sheets, and soil types were classified using the Unified Soil Classification System (see Attachment D). Sample material was then placed into laboratory-supplied jars and submitted to the analytical laboratory under standard chain-of-custody procedures for analysis of bulk sulfide by Standard Method (SM) 4500-S2-D-00, total volatile solids by SM 2540G, total organic carbon by U.S. Environmental Protection Agency Method 9060A, and ammonia as nitrogen by Plumb (1981)/SM 4500-NH3.

Results

Analytical results for the surface sediment sample colocated with the DGT samples are shown on Figure G-1 and summarized below.

Bulk sediment sulfide was detected in all samples (see Table G-2). The highest bulk sediment sulfide concentration was 2,110 milligrams per kilogram (mg/kg) at sample location SE-39. Remaining bulk sediment sulfide results ranged from 204 to 921 mg/kg.

Total volatile solids were detected in all samples at concentrations ranging from 2.51 to 50.1 percent, with the highest percentage at sample location SE-39.

Total organic carbon was detected in all samples at concentrations ranging from 1 to 3.9 percent, with the highest percentage at sample location SE-39.

Ammonia as nitrogen was detected in all samples at concentrations ranging from 0.783 to 26.4 mg/kg, with the highest concentration at sample location SE-37.

POREWATER SULFIDE SAMPLING

As discussed in Section 4.2.2 of the RI, MFA conducted sediment bioassay sampling to assess the effects of sediment contamination on benthic organisms, per the Washington State Department of Ecology sediment cleanup user's manual II (Ecology, 2021). Bioassays are considered a holistic representation of sediment toxicity, as they account for bioavailability of contaminants to benthic organisms, other-than-additive effects of chemical mixtures in sediments, and toxicity of non-chemical stressors such as wood waste (Ecology, 2021).

Porewater was extracted from the bioassay sediment samples via centrifugation and analyzed for porewater sulfides by Standard Method 4500-SD-D-00. One sample from location SE-39 was too dry to extract porewater and, therefore, was not analyzed.

Results

Porewater sulfide was detected in eight of the nine analyzed samples (see Table G-2). Detected concentrations of porewater sulfide ranged from 0.06 to 0.202 mg/L. The highest concentration was detected at sample location SE-40.

DISCUSSION

DGT hydrogen sulfide, conventional parameters, and porewater sulfides data were compared to evaluate their reliability in predicting potential toxic effects to the benthic community (see Figures G-3 through G-8). Note that the sample from SE-39 was too dry to extract porewater and was not able to be analyzed; therefore, SE-39 is not shown on the figures.

Bulk sediment sulfide results do not correlate with DGT hydrogen sulfides (see Figure G-3), nor do they correlate with porewater sulfides (see Figure G-4). Bulk sediment sulfides are likely not representative of field conditions, as they represent sulfide concentrations in sediment at one point in time, when, sulfide concentrations vary significantly over time in the tidally influenced, estuarine study area. Bulk sediment sulfides also likely overestimate the bioavailable fraction because analytical results provide the concentration of total sulfides, rather than bioavailable hydrogen sulfide, which represents the toxic portion. Therefore, bulk sediment sulfides are a poor predictor of potential toxic effects to the benthic community and should not be used for cleanup level development at the Site.

Conventionals do not correlate well with DGT hydrogen sulfides (see Figures G-5 through G-7). Conventionals, specifically total volatile solids and total organic carbon, are considered reliable indicators for benthic toxicity and are further discussed in the RI.

DGT hydrogen sulfide results and porewater sulfide results are not well correlated (see Figure G-8). There is uncertainty associated with both sampling methods. To analyze porewater sulfides, the laboratory places sediment in a centrifuge to extract all available porewater. Biological receptors would likely only contact a fraction of the extracted porewater in sediment (i.e., centrifuged porewater may overestimate the bioavailable portion).

Unlike bulk sediment sulfides and porewater sulfides, DGT samplers were deployed over two tide cycles to capture sulfide variations over time. DGT sampling results are ideally represented by relatively uniform gray-scale values, or gray-scale value gradients along a depth interval. However, the silver-iodide strips from DGT samplers deployed at the Site were non-uniform, containing a wide range of gray-scale values. When analyzing the DGT strips, the mathematical mode of gray-scale values on each strip to use in sulfide calculations. Other methods to identify representative gray-scale values (e.g., median, mean) exist and influence the resulting sulfide and hydrogen sulfide calculations. Additionally, iron oxide precipitate accumulated on the strips (see brown areas on the full-color scan in Attachment C). Removal of the brown coating required soaking the DGT samplers in a 0.01 molar solution of hydroxylamine hydrochloride for three hours. MFA did not undertake this step. The brown coating may have contributed to higher gray-scale values that are not representative of sulfate concentrations. While DGT samplers accumulated sulfide over time, geochemical parameters (pH and conductivity) and temperature factored into the DGT sulfide and hydrogen sulfide calculations as well. These parameters were recorded at the time of DGT retrieval; however, these can vary over time at the Site. Due to the various factors contributing to uncertainty of DGT sulfide measurements, this sampling method may not provide a reliable predictor of bioavailable hydrogen sulfide and benthic toxicity at the Site.

There is significant uncertainty associated with the three sulfide sampling methods and results from these methods are inconsistent with each other; therefore, we do not recommend using these methods as a proxy for sediment cleanup levels. We further evaluate the correlation between wood waste presence and other wood waste parameters (other than sulfide) to inform potential cleanup objectives in the cleanup level development memorandum, included as Appendix J to the RI report.

Attachments:

Limitations
Tables
Figures
Attachment A—DGT Research Guidance
Attachment B—Field Photographs
Attachment C—DGT Scans
Attachment D—Sediment Field Sampling Data Sheets

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LIMITATIONS

The services undertaken in completing this memorandum were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This memorandum is solely for the use and information of our client unless otherwise noted. Any reliance on this memorandum by a third party is at such party's sole risk.

Opinions and recommendations contained in this memorandum apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this memorandum.

TABLES



DRAFT

Table G-1
DGT Sulfide Parameters and Calculation Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:		SE-32	SE-33	SE-34	SE-35	SE-36	SE-37	SE-38	SE-39	SE-40	SE-41
Deployment Time:		7/21/20 8:30	7/21/20 8:15	7/21/20 8:06	7/21/20 8:01	7/21/20 7:55	7/21/20 7:48	7/21/20 7:41	7/21/20 9:24	7/21/20 9:06	7/21/20 9:16
Retrieval Time:		7/22/20 9:24	7/22/20 9:37	7/22/20 9:42	7/22/20 9:46	7/22/20 7:58	7/22/20 9:54	7/22/20 10:14	7/22/20 10:26	7/22/20 7:12	7/22/20 7:00
Deployment Time (seconds):		89640	91320	92160	92700	86580	93960	95580	90120	79560	78240
Porewater Parameters during Retrieval:	pH	7.01	6.54	6.64	6.73	6.79	6.81	7.38	6.45	6.74	6.86
	Temperature (°C)	17.40	17.30	17.10	16.90	17.60	16.70	16.80	19.60	16.50	17.60
	Conductivity (mS/cm)	7.52	5.92	8.00	6.36	7.90	7.20	7.97	6.27	17.91	10.29
	Salinity (ppt)	4.9	3.8	5.3	4.2	5.2	4.8	5.3	3.9	12.9	6.9
Corrected Gray-Scale Values	Mean	16.37	180.05	14.48	24.23	98.04	207.02	81.68	21.81	197.70	35.85
	Mode	2.37	219.87	-3.13	29.37	219.87	224.87	39.37	-3.13	228.87	42.87
Sulfide from Calibration Curve (nmol/cm^2)		0.07	2344.79	4.58	23.20	2344.79	2468.85	45.43	11.72	2570.71	55.22
Sulfide (nmol/mL)		0.01	194.49	0.38	1.90	199.04	199.03	3.60	0.90	244.74	5.19
Sulfide (mg/L)		0.0002	6.24	0.01	0.06	6.38	6.38	0.12	0.03	7.85	0.17
pK_1 Calculation		7.10	7.10	7.10	7.11	7.09	7.11	7.11	7.06	7.11	7.09
Dissociation (pK_1*) Using Salinity Calculator		6.82	6.84	6.81	6.84	6.81	6.83	6.82	6.80	6.72	6.78
H_2S with sample-specific pK_1 (mg/L)		0.0001	4.17	0.01	0.03	3.25	3.27	0.02	0.02	3.85	0.08
H_2S with sample-specific pK_1 (ug/L)		0.08	4169.74	7.23	34.26	3252.79	3265.64	24.83	20.07	3847.67	75.09
Woodwaste Observation (%)		Trace	10	5	Trace	10	25.00	50	90	0	20

Notes

Sulfide and H_2S calculation results are shaded for ease of viewing.

% = percent.

°C = degrees Celsius.

cm = centimeter.

H_2S - hydrogen sulfide.

pK_1 = infinite dilution value.

pK_1* = dissociation constant.

ppt = parts per trillion.

mg/L = milligram per liter.

mL = milliliters.

mS = milliSiemens.

nmol = nanomoles.

trace = less than 5%.

ug/L = microgram per liter.

Table G-2
Bulk and Porewater Sulfide Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location	SE-32	SE-33	SE-34	SE-35	SE-36	SE-37	SE-38	SE-39	SE-40	SE-41
Collection Date	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020	07/22/2020
Collection Depth (ft bml)	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Type	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Bulk Sediment (mg/kg)										
Sulfide	337 J	473 J	921 J	447 J	546 J	204 J	365 J	2,110 J	392 J	567 J
Porewater Sulfide (mg/L)										
Sulfide	0.076	**0.104**	**0.153**	0.05 U	0.06 J	**0.163**	**0.103**	--	**0.202**	0.071
Woodwaste Observation (%)										
Woodwaste	Trace	10	5	Trace	10	25	50	90	0	20

Notes

-- = not analyzed.

% = percent.

Bold indicates a porewater sulfide value greater than the lowest available dissolved sulfides toxicity value (0.1 mg/L) provided in Podger (2013): *Sulfide Effects on Aquatic Organisms Literature Review.*

ft bml = feet below mudline.

J = result is an estimated value.

mg/kg = milligrams per kilogram.

mg/L = milligrams per liter.

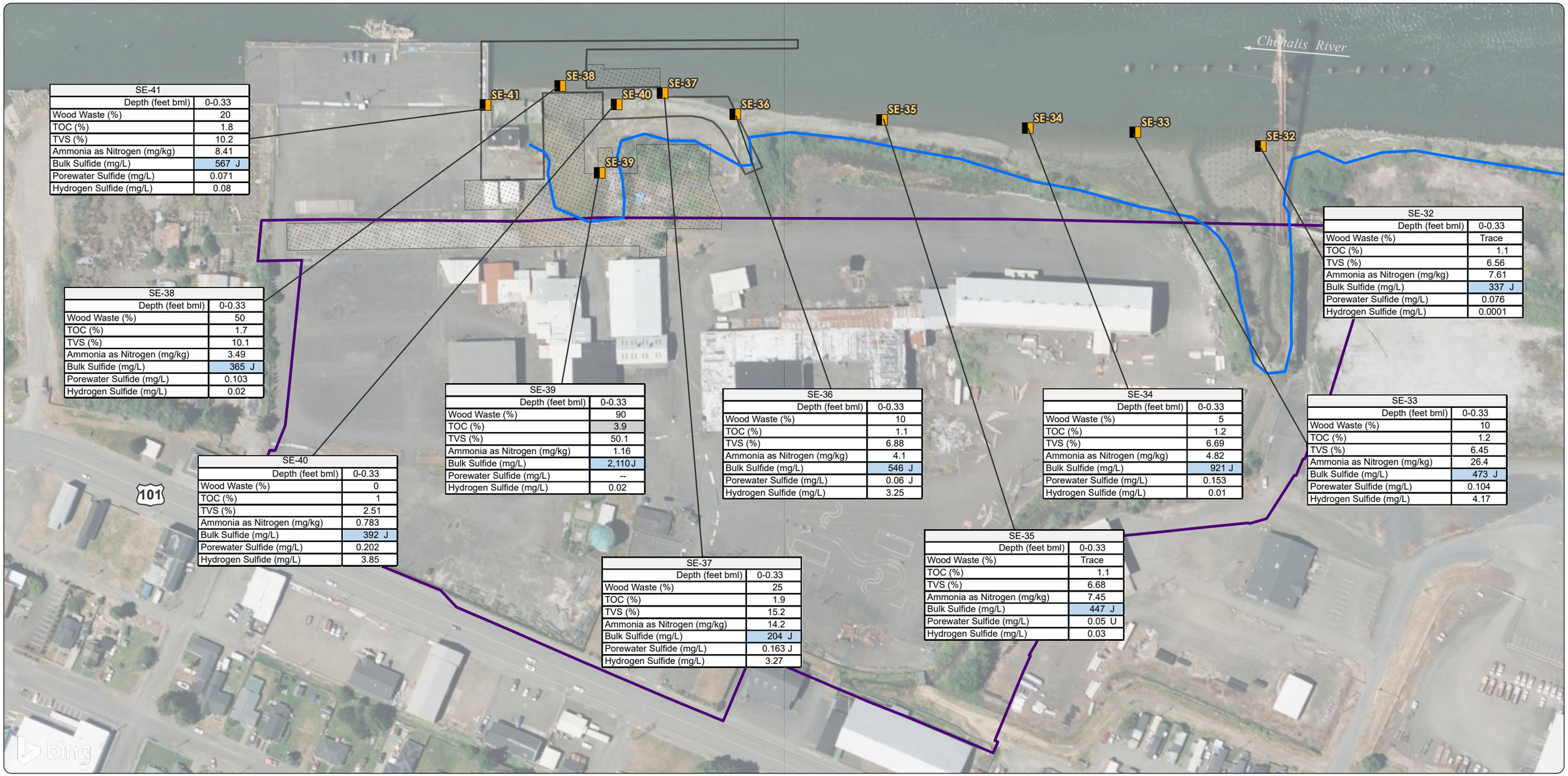
trace = less than 5%.

U = result is non-detect at reporting limit.

FIGURES



Path: X:\1044.02_14\04\Proj\1044_02_14_04.aprx



SE-41	
Depth (feet bml)	0-0.33
Wood Waste (%)	20
TOC (%)	1.8
TVS (%)	10.2
Ammonia as Nitrogen (mg/kg)	8.41
Bulk Sulfide (mg/L)	567 J
Porewater Sulfide (mg/L)	0.071
Hydrogen Sulfide (mg/L)	0.08

SE-38	
Depth (feet bml)	0-0.33
Wood Waste (%)	50
TOC (%)	1.7
TVS (%)	10.1
Ammonia as Nitrogen (mg/kg)	3.49
Bulk Sulfide (mg/L)	365 J
Porewater Sulfide (mg/L)	0.103
Hydrogen Sulfide (mg/L)	0.02

SE-40	
Depth (feet bml)	0-0.33
Wood Waste (%)	0
TOC (%)	1
TVS (%)	2.51
Ammonia as Nitrogen (mg/kg)	0.783
Bulk Sulfide (mg/L)	392 J
Porewater Sulfide (mg/L)	0.202
Hydrogen Sulfide (mg/L)	3.85

SE-39	
Depth (feet bml)	0-0.33
Wood Waste (%)	90
TOC (%)	3.9
TVS (%)	50.1
Ammonia as Nitrogen (mg/kg)	1.16
Bulk Sulfide (mg/L)	2,110 J
Porewater Sulfide (mg/L)	--
Hydrogen Sulfide (mg/L)	0.02

SE-37	
Depth (feet bml)	0-0.33
Wood Waste (%)	25
TOC (%)	1.9
TVS (%)	15.2
Ammonia as Nitrogen (mg/kg)	14.2
Bulk Sulfide (mg/L)	204 J
Porewater Sulfide (mg/L)	0.163 J
Hydrogen Sulfide (mg/L)	3.27

SE-36	
Depth (feet bml)	0-0.33
Wood Waste (%)	10
TOC (%)	1.1
TVS (%)	6.88
Ammonia as Nitrogen (mg/kg)	4.1
Bulk Sulfide (mg/L)	546 J
Porewater Sulfide (mg/L)	0.06 J
Hydrogen Sulfide (mg/L)	3.25

SE-35	
Depth (feet bml)	0-0.33
Wood Waste (%)	Trace
TOC (%)	1.1
TVS (%)	6.68
Ammonia as Nitrogen (mg/kg)	7.45
Bulk Sulfide (mg/L)	447 J
Porewater Sulfide (mg/L)	0.05 U
Hydrogen Sulfide (mg/L)	0.03

SE-34	
Depth (feet bml)	0-0.33
Wood Waste (%)	5
TOC (%)	1.2
TVS (%)	6.69
Ammonia as Nitrogen (mg/kg)	4.82
Bulk Sulfide (mg/L)	921 J
Porewater Sulfide (mg/L)	0.153
Hydrogen Sulfide (mg/L)	0.01

SE-33	
Depth (feet bml)	0-0.33
Wood Waste (%)	10
TOC (%)	1.2
TVS (%)	6.45
Ammonia as Nitrogen (mg/kg)	26.4
Bulk Sulfide (mg/L)	473 J
Porewater Sulfide (mg/L)	0.104
Hydrogen Sulfide (mg/L)	4.17

SE-32	
Depth (feet bml)	0-0.33
Wood Waste (%)	Trace
TOC (%)	1.1
TVS (%)	6.56
Ammonia as Nitrogen (mg/kg)	7.61
Bulk Sulfide (mg/L)	337 J
Porewater Sulfide (mg/L)	0.076
Hydrogen Sulfide (mg/L)	0.0001

Data Sources
Aerial photograph obtained from Esri ArcGIS Online; parcels obtained from Grays Harbor County.

Notes
Hydrogen sulfide was calculated using diffusive gradients in thin-films.
% = percent.
-- = not measured.
bml = below mud line.
DGT = diffusive gradients in thin-films.
J = result is estimated.
mg/kg = milligrams per kilogram.
mg/L = milligrams per liter.
TOC = total organic carbon.
TVS = total volatile solids.
U = result is non-detect at reporting limit.

	Detected result exceeds preliminary cleanup standard, regardless of whether TOC is within standard 0.5 to 3.5 percent range.
	Total organic carbon outside of standard 0.5 to 3.5 percent range.

Legend

- Sample Location
- Seaport Authority Property
- Former Mill
- Former Wharf Extension
- Approximate Ordinary High Water Mark

Figure G-1
Surface Sediment Locations with DGT Samplers and Wood Waste Parameters
Aberdeen, Washington

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GRAYS HARBOR HISTORICAL SEAPORT

0 75 150
Feet

Project: M1044.02.014 Produced By: jroberts Reviewed By: mpollock Print Date: 2/8/2023

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Figure G-2
DGT Calibration Curve
Grays Harbor Historical Seaport Authority

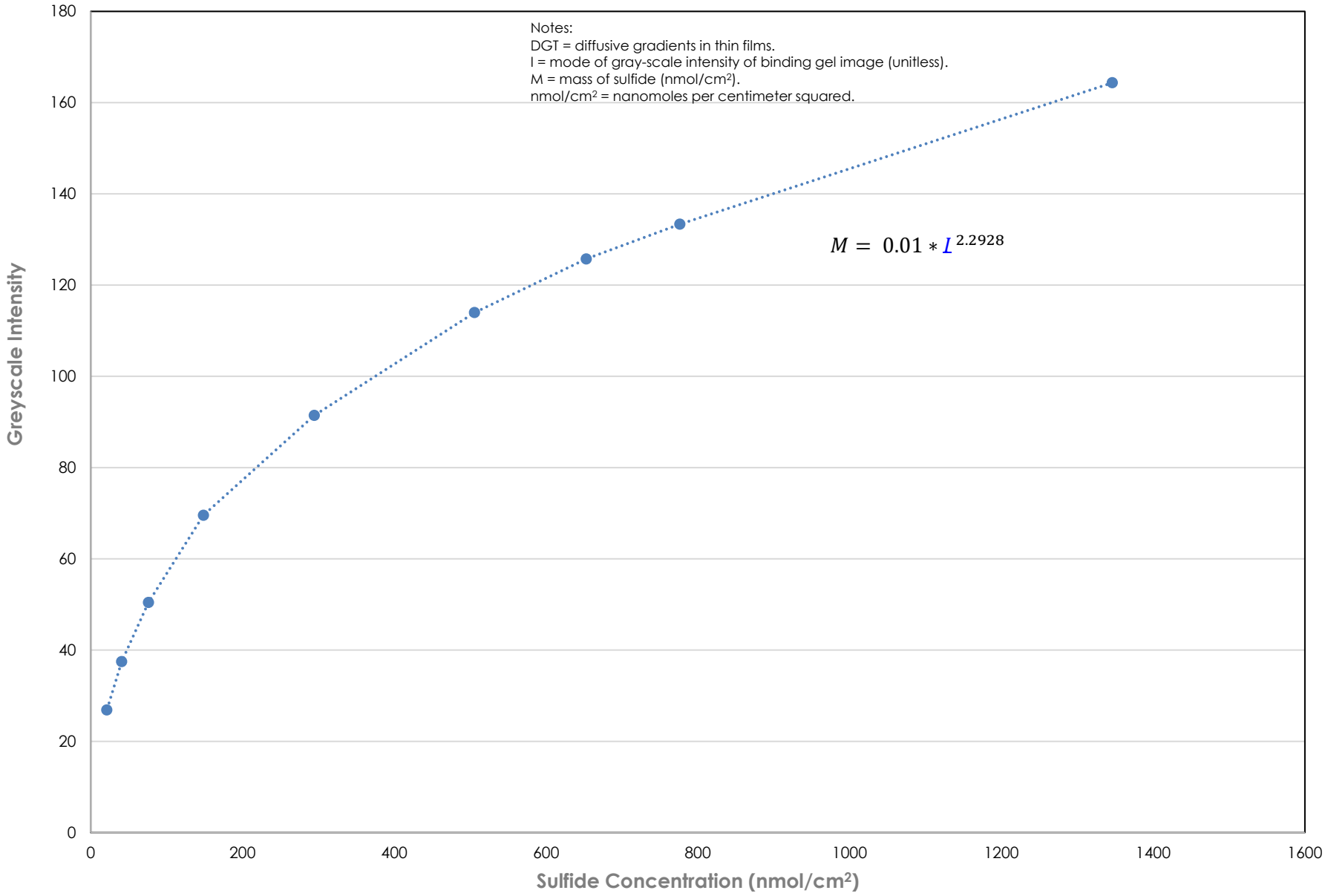

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Figure G-3
DGT H_2S vs. Bulk Sediment Sulfide Results
Grays Harbor Historical Seaport Authority

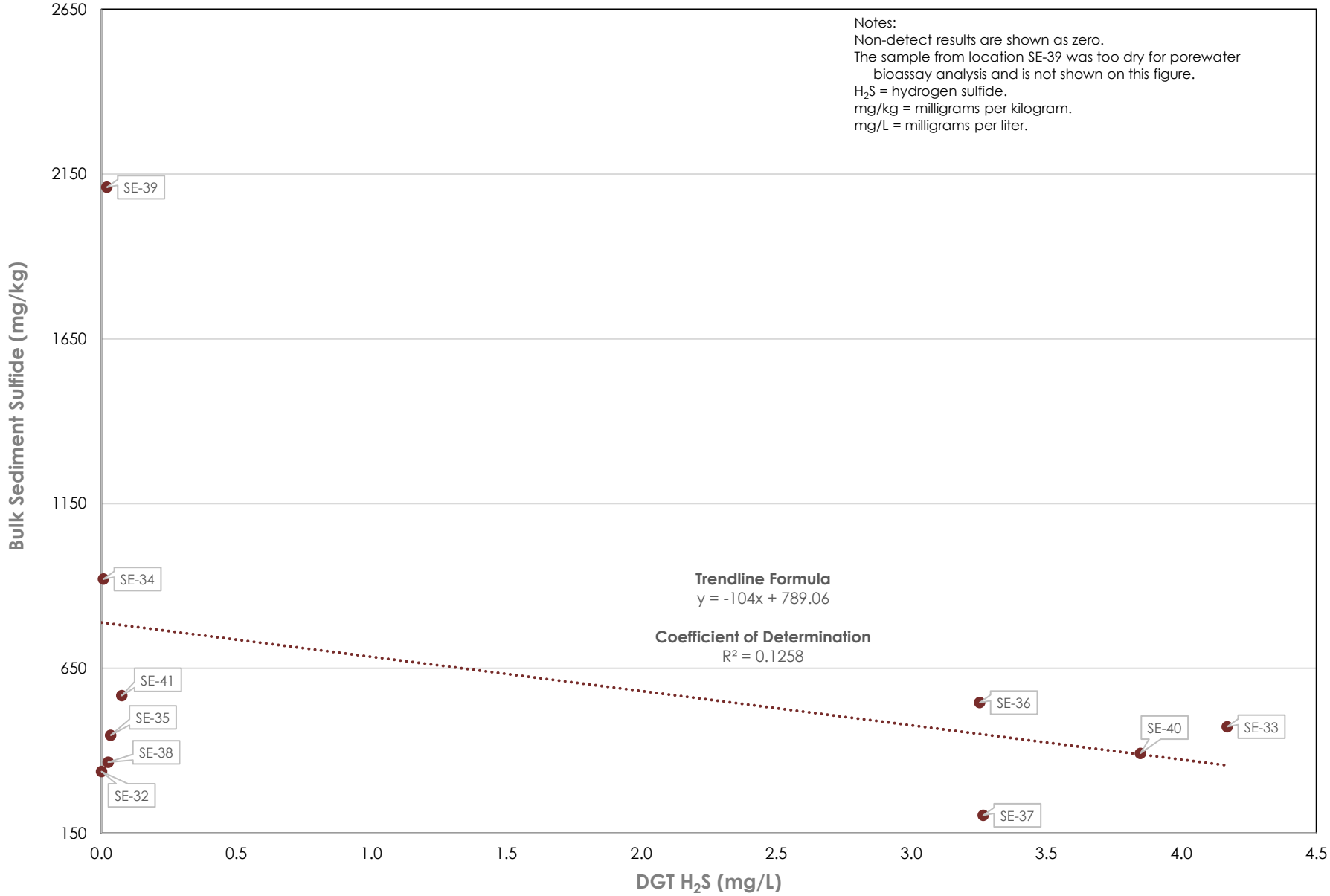

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Figure G-4
Porewater Sulfide vs. Bulk Sediment Sulfide Results
Grays Harbor Historical Seaport Authority

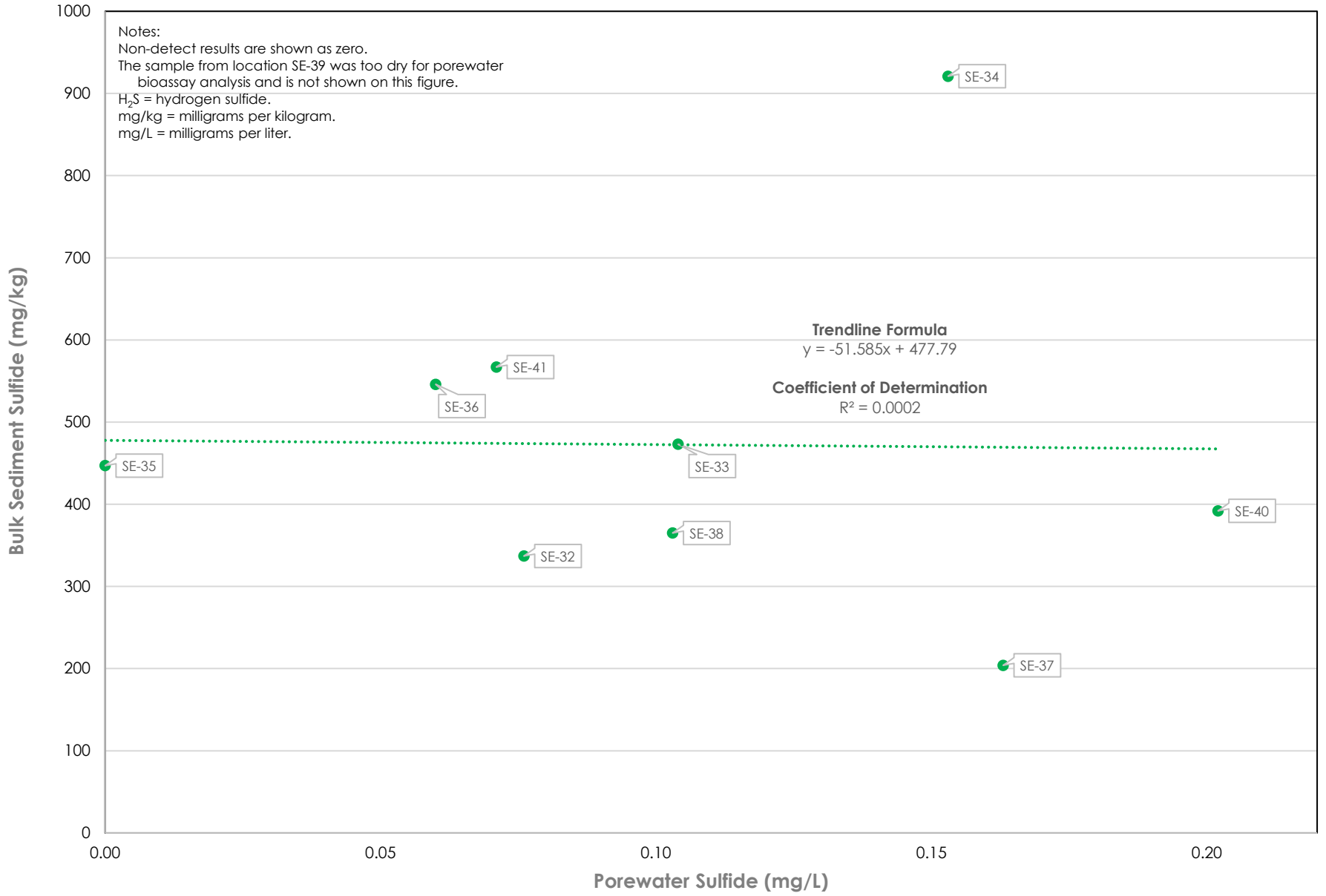

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Figure G-5
DGT H_2S vs. TVS Results
Grays Harbor Historical Seaport Authority

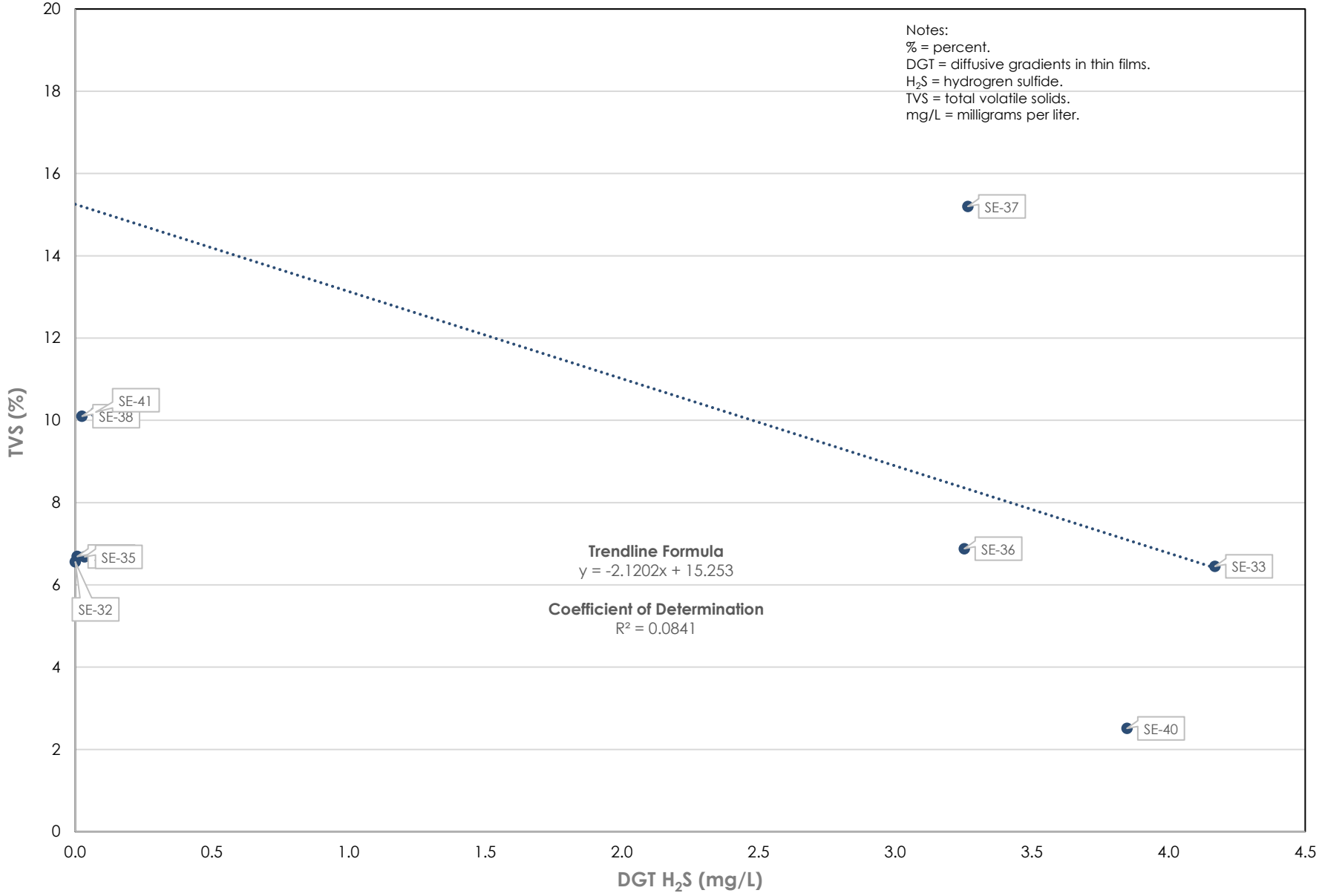

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Figure G-6
DGT H_2S vs. TOC Results
Grays Harbor Historical Seaport Authority

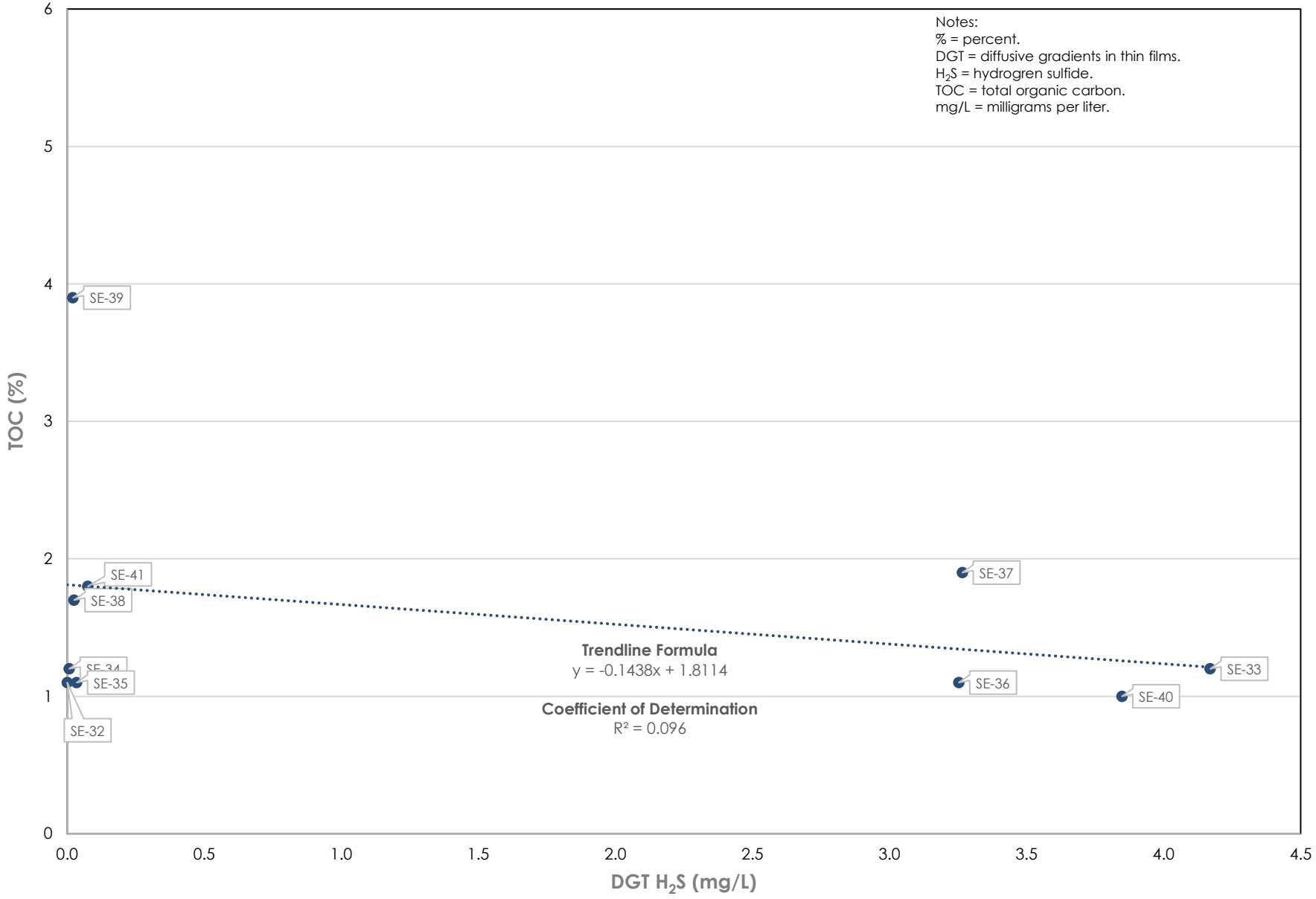

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Figure G-7
DGT H_2S vs. Ammonia as Nitrogen Results
Grays Harbor Historical Seaport Authority

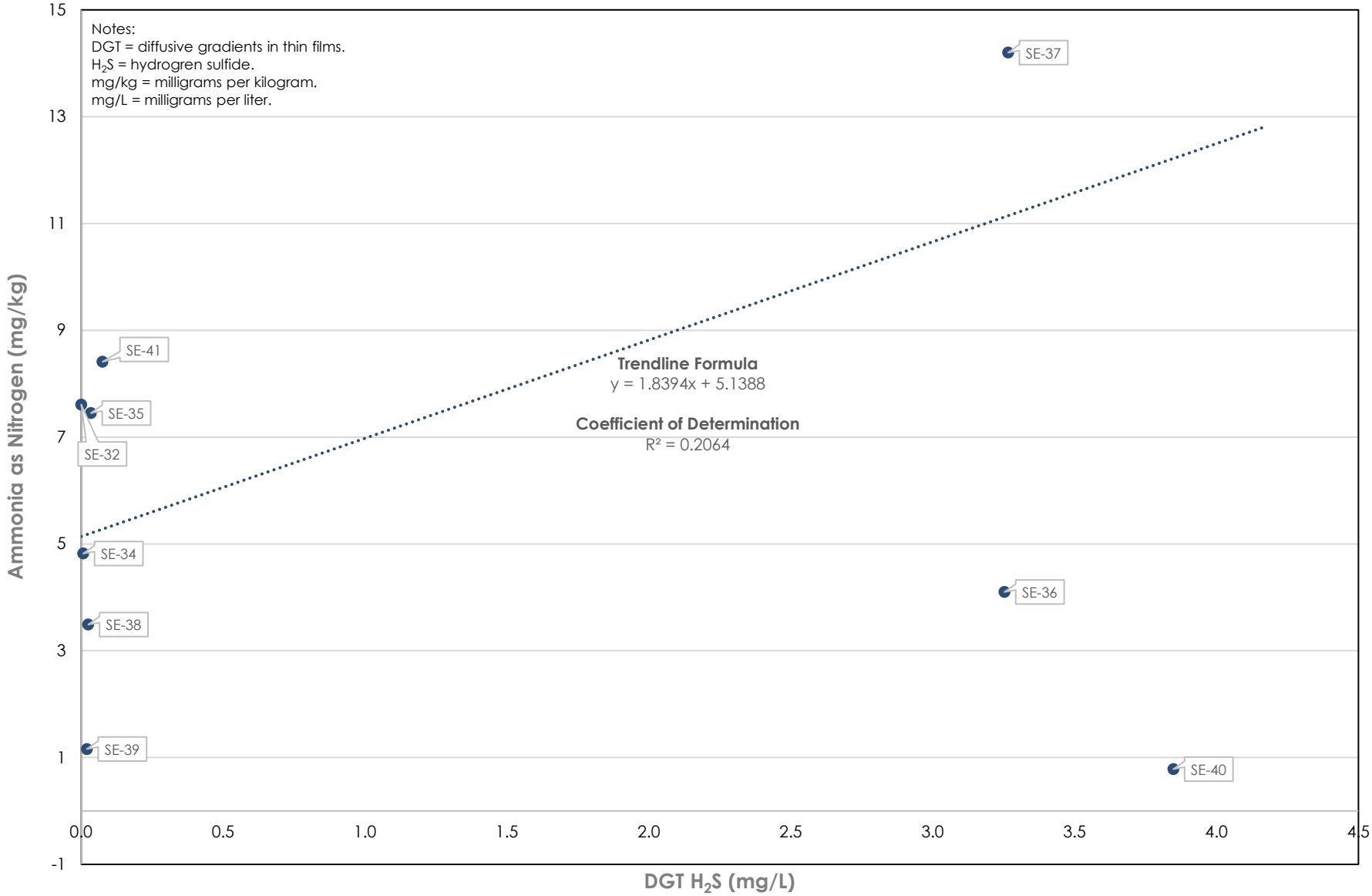

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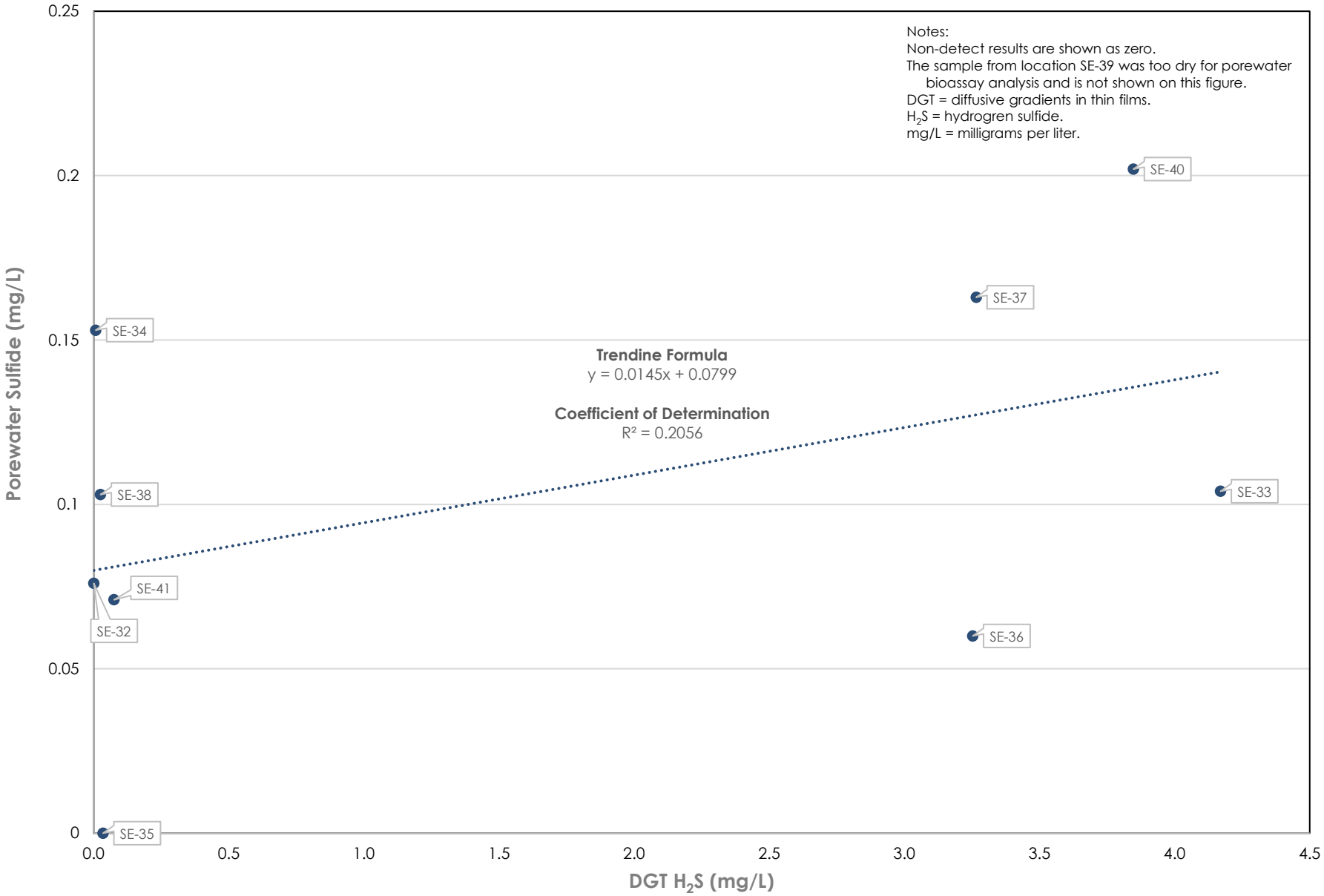
Figure G-8
DGT H_2S vs. Porewater Sulfide Results
Grays Harbor Historical Seaport Authority



ATTACHMENT A

DGT RESEARCH GUIDANCE



DGT® Research
For measurements in waters, soils & sediments

Simple protocol for using AgI DGT probes to measure sulfide in sediments

This is a simple set of instructions. Further details on sediments deployments and the basis of sulfide determination from a greyscale image are available.

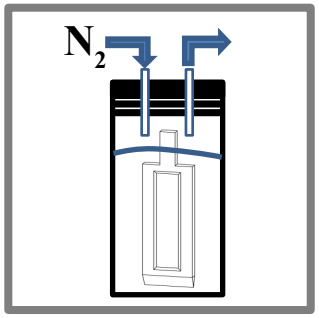
General deployment considerations

Sediments need to be sufficiently fine grained and soft to allow insertion of the probe without tearing the membrane in the exposure window. Biofouling is not a problem for deployments in sediments.

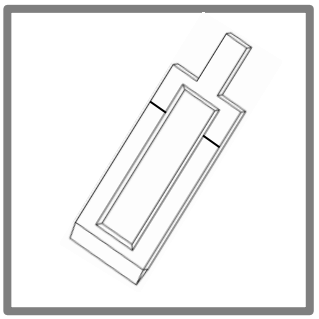
Deploying DGT probes

Deoxygenation?

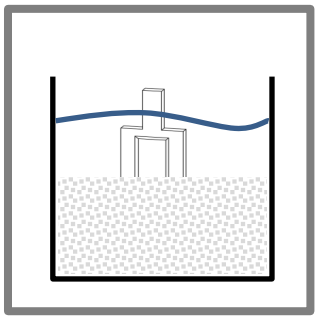
Deoxygenation (Step 1) is optional. Good results can be obtained without it. For the pros and cons of deoxygenation see either FAQs or the more detailed guide for sulfide. If you prefer to deoxygenate follow these brief instructions. Immerse the DGT probe for 24 h in a clean container filled with 0.03 M NaCl solution through which N_2 is steadily bubbled. Seal this container to maintain it oxygen-free for transportation to the deployment site (ideally no more than a few hours).



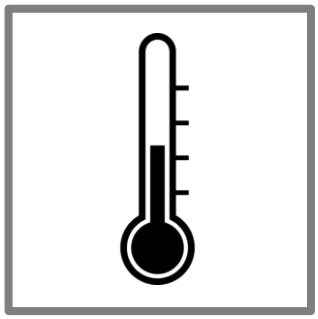
1. If probes are to be deoxygenated include this step, otherwise proceed directly to step 2. Deoxygenated probes must be deployed immediately to minimize air contact. Speed is not critical if deployment is from the plastic bag,



2. Remove the probe from either the oxygen-free container or its supplied plastic bag. Quickly mark the plastic body of the probe (permanent marker) at the intended depth for the sediment-water interface.



3. As soon as possible (within seconds) of removing the probe from its oxygen-free container or original bag, smoothly push it into the sediment until the mark is in line with the sediment-water interface. Keep the probe as vertical as possible during the insertion.



4. Record the temperature of the sediment during the deployment period. A start and end temperature will suffice. Record the deployment time to the nearest minute.

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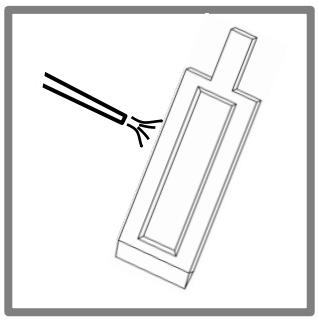
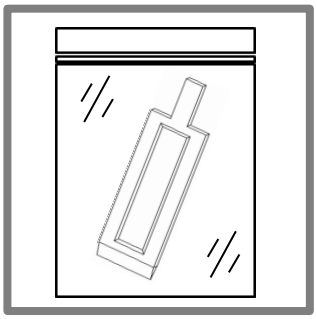
Procedure for analyzing DGT samples

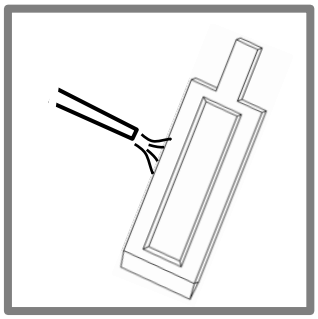
DGT Recovery and Sample Treatment



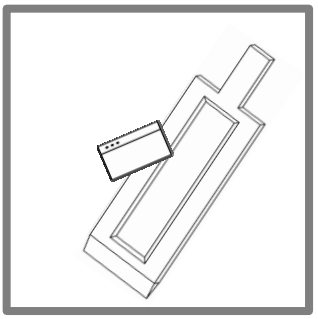
1. After retrieving the DGT probe from the sediment thoroughly rinse it with clean water.



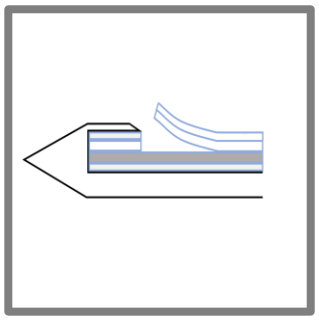
2. Place in a clean plastic bag for storage and transportation back to the lab for sample treatment.



3. Remove from the plastic bag and thoroughly rinse the probe again with clean water.



4. Either dissemble the probe or simply cut the gels and the filter membranes together along the window edges by pushing a razor blade into them in a series of guillotine-like steps.



5. Carefully lift out the four layers together.

Please note that there is a backing filter membrane layer at the bottom of the AgI binding gel.



6. Place them on a supporting sheet of fairly thick polythene. Carefully peel of the top membrane filter and clear diffusive gel to reveal the underlying AgI binding gel. Its appearance from light grey-yellow to dark grey reflects the concentration of sulfide in the sediment.

Note If the binding gel appears brown, it is due to freshly precipitated iron oxide. The iron oxide can be removed without affecting any grey coloration by placing the binding gel with underlying support in a solution of 0.01M hydroxylamine hydrochloride for 3 hours.

Rinse with water then proceed as given below.

Converting the grey and black appearance of the binding gel to concentration

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Scan

Cover the binding gel with a transparent plastic film (cling film) to prevent dehydration, ensuring that there are no air bubbles between the gel and the plastic film. Place the wet binding gel, complete with polythene supporting sheet, backing filter membrane and plastic film, on a flat bed scanner. Before scanning you need to add some other items to be scanned together. These are: firstly, a supplied moist binding gel that has not been exposed to sulfide; secondly, the ten calibration grey-scale strips. Scan and save the scanned image.

Obtain grey-scale intensity

The grey-scale intensity of the scanned images can be determined using any appropriate software. ImageJ, a versatile, public domain, image processing and analysis software package developed at National Institutes of Health, U.S., has proved to be very effective (downloadable from http://rsb.info.nih.gov/ij/). The software allows selection of sub-areas of an image, and measurements of the grey-scale intensity of features in the image. Some notes on using ImageJ are provided in the Appendix to this document.

Sample gels should be blank corrected by subtracting the grey-scale intensity measured on gels that have not been exposed to sulfide. The relation between blank-corrected grey-scale intensity and mass of accumulated sulfide in the AgI gels will be unique to the flatbed scanner that you have used and therefore a calibration must be performed.

Calibrate to quantify sulfide

The supplied set of grey-scale strips enable calibration of the gels exposed to sulfide. They have been calibrated in terms of mass of sulfide per unit area of gel by comparing their grey-scale intensity with those of standard DGT devices exposed to a set of calibrated sulfide standard solutions. The grey-scale intensities of the standards were blank corrected with reference to DGT devices from the same batch that were not exposed to sulfide. The grey-scale intensity of the supplied strips need to be measured with your scanner. Plot the grey-scale intensity values against the sulfide quantity provided (in units of nmol/cm^2) to obtain your unique calibration curve. This calibration is for your particular scanner and it needs to be done only once. It will be a curved line. If the calibration is plotted in Excel, the standard procedure for fitting a trend-line using a power function can be used to fit the curve (see Appendix).

Sensitivity range

The calibration relates the grey-scale intensity to the mass of sulfide accumulated on the binding layer. As, in practice, this mass depends on the deployment time, if sulfide is very high in the sediment, short deployment times can be used to ensure that the grey-scale range is not exceeded. Conversely, long deployment times can be used to increase sensitivity when sulfide concentrations are low. The measurement range is likely to be within 7 to 1200 nmol cm^{-2}. For a 24 hour deployment time, these correspond to pore water sulfide concentrations of 0.5 to 85 µmol L^{-1} (0.1 to 2.7 mg L^{-1}).

Calculate the DGT measured concentration in the sediment

The calibration curve provides the mass per unit area accumulated, M_A, in the deployment time, t (seconds)
This can be used to calculate the mean concentration during the deployment time of sulfide in the pore water at the surface of the device, which we call C_{DGT}.

$C_{DGT} = M_A\Delta_g/Dt$

Δ_g (usually 0.094 cm) is the total thickness of the materials in the diffusion layer (diffusive gel and filter membrane).
D (cm^2 s^{-1}) is the diffusion coefficient of analyte in the material diffusion layer for the deployment temperature (see

diffusion coefficients). Recommended units to facilitate easy calculation are shown.

Appendix

Suggestions for using ImageJ

Before following these instructions we suggest you familiarise yourself with the basic features of the software. Various short tutorials for its use are available on YouTube, among them 'Tutorial ImageJ' and 'Optical Density Using ImageJ'.

1) Open your grey-scale image in Image J; select the part you are interested in, adjust the width and length of your image (Image > properties) and invert it (Edit > Invert).

2) Transform the image to results, saving the results in Excel (the outcome is a series of grey-scale values, as each pixel of your image has a grey-scale value) (Image > Transform > Image to results).

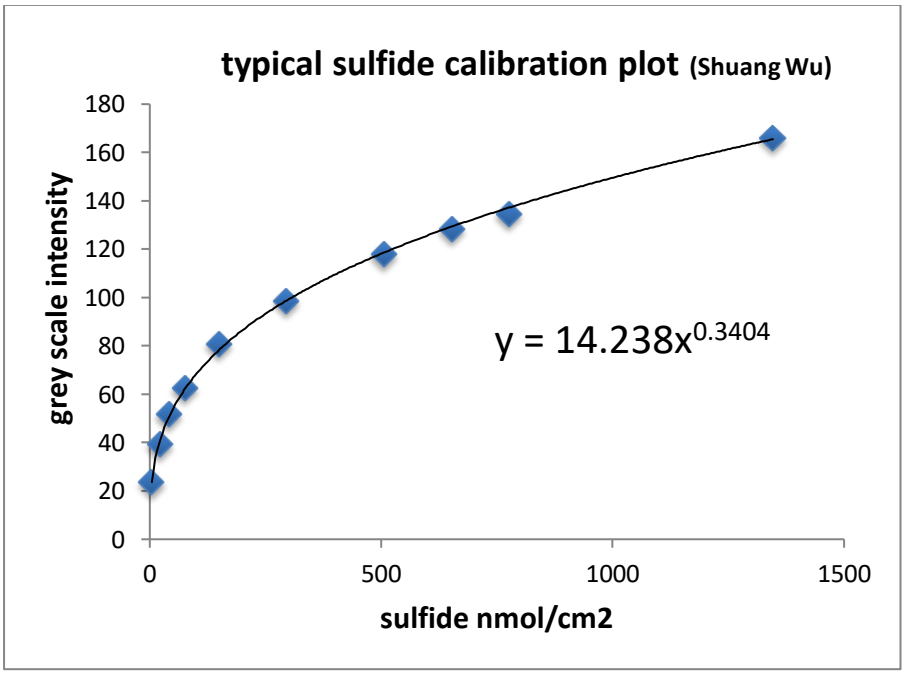
3) Blank correct in Excel by subtracting values obtained for your unexposed devices. Calculate the concentration values from the blank-corrected, grey-scale values in Excel, using the equation from your calibration plot (as in the figure above).

4) Import your calculated concentration values into Image J.

5) Transform your results to an image (Image > Transfrom > Results to Image). Now you have a 2D concentration plot. Image J allows you to manipulate this is many ways, for example conversion to a color plot (Image > lookup tables > spectrum) or insertion of a calibration bar (Analyze > Tools > calibration/scale bar).

Example calibration plot

(it is essential that you obtain your own for your chosen scanner)



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ATTACHMENT B

FIELD PHOTOGRAPHS

PHOTOGRAPHS

Project Name: Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site: In-Water Remedial Investigation
Project Number: M1044.02.014
Location: 500 N Custer Street, Aberdeen, Washington

Photo No. 1.

Description
Field staff on the bank of the Chehalis River during low tide to deploy diffusive gradients in thin films (DGT) passive sampler, looking northeast.



Photo No. 2.

Description
Field staff near deployed DGT passive sampler equipped with high-visibility tag, looking south.



PHOTOGRAPHS

Project Name: Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site: In-Water Remedial Investigation
Project Number: M1044.02.014
Location: 500 N Custer Street, Aberdeen, Washington

Photo No. 3.

Description
Planked woodwaste material in river sediments, looking southeast.



Photo No. 4.

Description
Woodwaste in riverbank sediments upstream of the chip loader, looking northeast.



PHOTOGRAPHS

Project Name: Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site: In-Water Remedial Investigation
Project Number: M1044.02.014
Location: 500 N Custer Street, Aberdeen, Washington

Photo No. 5.

Description
Field staff deploying DGT passive sampler, looking north.



Photo No. 6.

Description
High-visibility tag with sample name on DGT passive sampler.



PHOTOGRAPHS

Project Name: Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site: In-Water Remedial Investigation
Project Number: M1044.02.014
Location: 500 N Custer Street, Aberdeen, Washington

Photo No. 7.

Description
DGT sampler post-retrieval, after two tide cycles, prior to filter membrane removal. Note calibration strips.

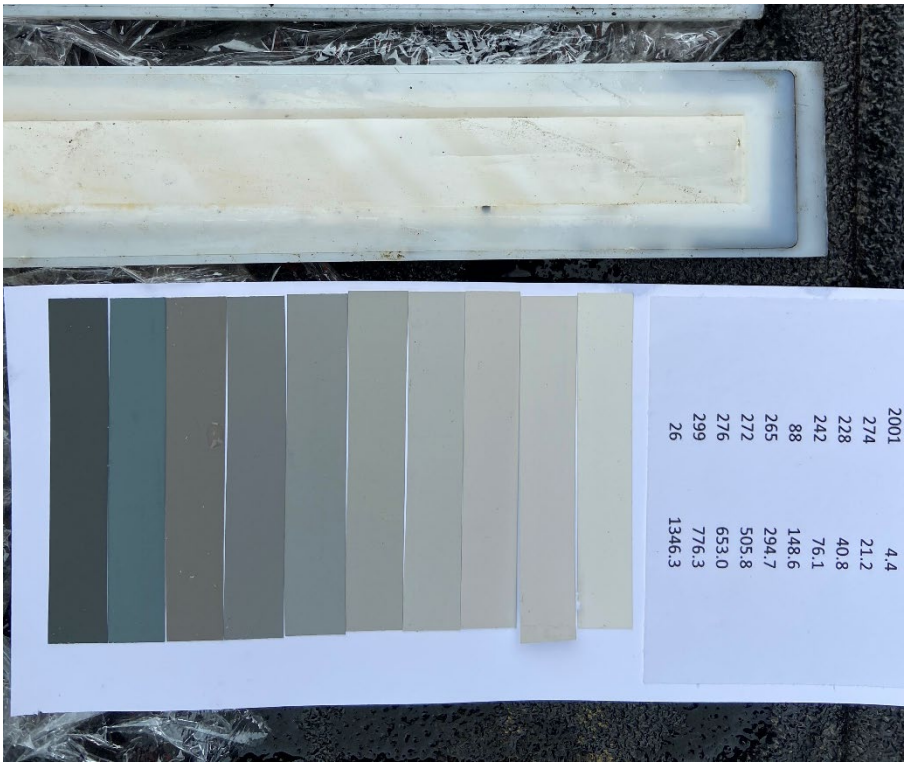


Photo No. 8.

Description
Representative photograph of discrete sediment sample collected at DGT deployment location. Sample shown was collected at location SE-35.



PHOTOGRAPHS

Project Name: Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site: In-Water Remedial Investigation
Project Number: M1044.02.014
Location: 500 N Custer Street, Aberdeen, Washington

Photo No. 9.

Description
Field staff collecting in-situ porewater conductivity, temperature, and potential hydrogen measurements.



ATTACHMENT C

DGT SCANS

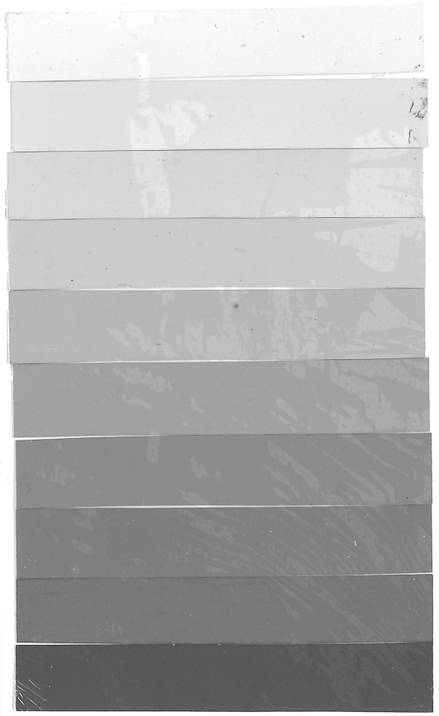
Concentration data for grey-scales

Shade code	Concentration nmol cm^{-2}
2001	4.4
274	21.2
228	40.8
242	76.1
88	148.6
265	294.7
272	505.8
276	653.0
299	776.3
26	1346.3



Concentration data for grey-scales

Shade code	Concentration nmol cm^{-2}
2001	4.4
274	21.2
228	40.8
242	76.1
88	148.6
265	294.7
272	505.8
276	653.0
299	776.3
26	1346.3



ATTACHMENT D

SEDIMENT FIELD SAMPLING DATA SHEETS



Maul Foster & Alongi, Inc.

109 East 13th Street, Vancouver, WA 98660 (360) 694-2691

Sediment Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-32				
Project Number	1044.02.14-02	**Sampler**	ENH; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	07/22/2020				
Sampling Event	July 2020	**Sample Name**	SE-32				
Sub Area		**Sample Depth**	0.164				
FSDS QA:	BAJ;01/27/22	**Easting**		**Northing**		**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete		9:22:00 AM	2 oz. sediment	
					4 oz. sediment	1
					8 oz. sediment	2
					Other	2
					Total Containers	5

Sample Description:

0-0.2 cm: light brown sediment film
0.2-10 cm: medium brownish gray; 90% fines, low plasticity, 10% sand, fine; trace woody material; no odor.

General Sampling Comments

DGT probe deployed in sediment without black staining. No sulfur-like odor. Sheen visible on water.
DGT Deployment: 7/21/20, 08:30, DGT Retrieval: 7/22/20, 09:24
Porewater Parameters @ retrieval:
pH=7.01, temperature=17.4 degrees C, salinity=7.52ms

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

Signature _____

Maul Foster & Alongi, Inc.

109 East 13th Street, Vancouver, WA 98660 (360) 694-2691

Sediment Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-33				
Project Number	1044.02.14-02	**Sampler**	ENH; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	07/22/2020				
Sampling Event	July 2020	**Sample Name**	SE-33				
Sub Area		**Sample Depth**	0.164				
FSDS QA:	BAJ;01/28/22	**Easting**		**Northing**		**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete		9:06:00 AM	2 oz. sediment	
					4 oz. sediment	1
					8 oz. sediment	2
					Other	2
					Total Containers	5

Sample Description:

0-0.2cm: light brown sediment film.
0.2-10cm: dark brownish-gray.
70% fines, low plasticity; 30% sand, fine; rootlets (10%); no odor.

General Sampling Comments

No sulfur odor. No visible seep in vicinity.
DGT Deployment: 7/21/20, 08:15, DGT Retrieval: 7/22/20, 09:37
Porewater Parameters @ retrieval:
pH=6.54, temperature=17.3 degrees C, salinity=5.92ms

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

Signature _____

Maul Foster & Alongi, Inc.

109 East 13th Street, Vancouver, WA 98660 (360) 694-2691

Sediment Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-34
Project Number	1044.02.14-02	**Sampler**	ENH; MVP
Project Name	Seaport In-Water RI	**Sampling Date**	07/22/2020
Sampling Event	July 2020	**Sample Name**	SE-34
Sub Area		**Sample Depth**	0.164
FSDS QA:	BAJ;01/28/22	**Easting**	**Northing**	**TOC**

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete		8:56:00 AM	2 oz. sediment	
					4 oz. sediment	1
					8 oz. sediment	2
					Other	2
					Total Containers	5

Sample Description:

0-0.2cm: light brown sediment film.
0.2-10cm: dark brownish-gray.
90% fines, low plasticity; 10% sand, fine: wood debris (chunks, twigs) 5%

General Sampling Comments

DGT probe deployed in sediment not near identified seeps. No sulfur-like odor.
DGT Deployment: 7/21/20, 08:06, DGT Retrieval: 7/22/20, 09:42
Porewater Parameters @ retrieval:
pH=6.64, temperature=17.1 degrees C, salinity=8.00ms

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

Signature _____

Maul Foster & Alongi, Inc.

109 East 13th Street, Vancouver, WA 98660 (360) 694-2691

Sediment Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-35				
Project Number	1044.02.14-02	**Sampler**	ENH; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	07/22/2020				
Sampling Event	July 2020	**Sample Name**	SE-35				
Sub Area		**Sample Depth**	0.164				
FSDS QA:	BAJ;01/28/22	**Easting**		**Northing**		**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete		8:36:00 AM	2 oz. sediment	
					4 oz. sediment	1
					8 oz. sediment	2
					Other	2
					Total Containers	5

Sample Description:

0-0.2cm: light brown sediment film. 0.2-10cm: grayish brown with dark gray/black and orange redox features throughout. 95% fines, low plasticity; 5% sand, fine; trace rootlets, woody debris (rootlets, chunks).

General Sampling Comments

DGT deployed near black-stained sediment. Sulfur-like odor.
DGT Deployment: 7/21/20, 08:01, DGT Retrieval: 7/22/20, 09:46
Porewater Parameters @ retrieval:
pH=6.73, temperature=16.9 degrees C, salinity=6.36ms

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

Signature _____

Maul Foster & Alongi, Inc.

109 East 13th Street, Vancouver, WA 98660 (360) 694-2691

Sediment Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-36				
Project Number	1044.02.14-02	**Sampler**	ENH; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	07/22/2020				
Sampling Event	July 2020	**Sample Name**	SE-36				
Sub Area		**Sample Depth**	0.164				
FSDS QA:	BAJ;01/28/22	**Easting**		**Northing**		**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete		7:56:00 AM	2 oz. sediment	
					4 oz. sediment	1
					8 oz. sediment	2
					Other	4
					Total Containers	7

Sample Description:

0-0.2cm: light brown sediment film.
0.2-10cm: brownish gray with black and reddish-orange redox.
80% fines, low plasticity; 20% sand, fine; twigs (5-10%) and wood chunks.

General Sampling Comments

Strong sulfur-like odor. DGT probe deplopyed in black-stained sediment.
DGT Deployment: 7/21/20, 07:55, DGT Retrieval: 7/22/20, 07:58
Porewater Parameters @ retrieval:
pH=6.79, temperature=17.6 degrees C, salinity=7.90ms

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

Signature _____

Maul Foster & Alongi, Inc.

109 East 13th Street, Vancouver, WA 98660 (360) 694-2691

Sediment Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-37
Project Number	1044.02.14-02	**Sampler**	ENH; MVP
Project Name	Seaport In-Water RI	**Sampling Date**	07/22/2020
Sampling Event	July 2020	**Sample Name**	SE-37
Sub Area		**Sample Depth**	0.164
FSDS QA:	BAJ;01/28/22	**Easting**	**Northing**	**TOC**

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete		10:02:00 AM	2 oz. sediment	
					4 oz. sediment	1
					8 oz. sediment	2
					Other	2
					Total Containers	5

Sample Description:

0-0.2cm: light brown sediment film.
0.2-10cm: dark brownish gray to black.
95% fines, low plasticity; 5% sand, fine; wood waste chunks (25%)

General Sampling Comments

DGT probe deployed in black-stained sediment. No sulfur odor.
DGT Deployment: 7/21/20, 07:48, DGT Retrieval: 7/22/20, 09:54
Porewater Parameters @ retrieval:
pH=6.81, temperature=16.7 degrees C, salinity=7.20ms

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

Signature _____

Maul Foster & Alongi, Inc.

109 East 13th Street, Vancouver, WA 98660 (360) 694-2691

Sediment Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-38				
Project Number	1044.02.14-02	**Sampler**	ENH; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	07/22/2020				
Sampling Event	July 2020	**Sample Name**	SE-38				
Sub Area		**Sample Depth**	0.164				
FSDS QA:	BAJ;01/28/22	**Easting**		**Northing**		**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete		10:16:00 AM	2 oz. sediment	
					4 oz. sediment	1
					8 oz. sediment	2
					Other	2
					Total Containers	5

Sample Description:

0-0.2cm: light brown sediment film. 0.2-10cm: dark brownish gray.
85% fines, low plasticity; 15% sand, fine to medium; woodwaste (chips, chunks, sawdust) 50%. Strong sulfur odor.

General Sampling Comments

Sulfur odor.
DGT Deployment: 7/21/20, 07:41, DGT Retrieval: 7/22/20, 10:14
Porewater Parameters @ retrieval:
pH=7.38, temperature=16.8 degrees C, salinity=7.97ms

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

Signature _____

Maul Foster & Alongi, Inc.

109 East 13th Street, Vancouver, WA 98660 (360) 694-2691

Sediment Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-39				
Project Number	1044.02.14-02	**Sampler**	ENH; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	07/22/2020				
Sampling Event	July 2020	**Sample Name**	SE-39				
Sub Area		**Sample Depth**	0.164				
FSDS QA:	BAJ;01/28/22	**Easting**		**Northing**		**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete		9:56:00 AM	2 oz. sediment	
					4 oz. sediment	1
					8 oz. sediment	2
					Other	2
					Total Containers	5

Sample Description:

0-3cm: orangey-red.
3-10: dark brownish-gray.
90% wood waste (chunks, chips, twigs, rootlets); 5% fines; 5% sand, fine.

General Sampling Comments

Area was not inundated at high tide.
DGT Deployment: 7/21/20, 09:24, DGT Retrieval: 7/22/20, 10:26
Porewater Parameters @ retrieval:
pH=6.45, temperature=19.6 degrees C, salinity=6.27ms

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

Signature _____

Maul Foster & Alongi, Inc.

109 East 13th Street, Vancouver, WA 98660 (360) 694-2691

Sediment Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-40				
Project Number	1044.02.14-02	**Sampler**	ENH; MVP				
Project Name	Seaport In-Water RI	**Sampling Date**	07/22/2020				
Sampling Event	July 2020	**Sample Name**	SE-40				
Sub Area		**Sample Depth**	0.164				
FSDS QA:	BAJ;01/28/22	**Easting**		**Northing**		**TOC**	

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete		7:16:00 AM	2 oz. sediment	
					4 oz. sediment	1
					8 oz. sediment	2
					Other	2
					Total Containers	5

Sample Description: Black; 15% fines, 15% sand, 70% gravel, fine to medium, subangular to subrounded; black and white bacteria coating grains; sulfur odor.

General Sampling Comments Seep groundwater. Plentiful white bacteria and black material. Gravelly substrate.
DGT Deployment: 7/21/20, 09:06, DGT Retrieval: 7/22/20, 07:12
Porewater Parameters @ retrieval:
pH=6.74, temperature=16.5 degrees C, salinity=17.91ms

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

Signature _____

Maul Foster & Alongi, Inc.

109 East 13th Street, Vancouver, WA 98660 (360) 694-2691

Sediment Field Sampling Data Sheet

Client Name	Grays Harbor Historical Seaport Authority	**Sample Location**	SE-41
Project Number	1044.02.14-02	**Sampler**	ENH; MVP
Project Name	Seaport In-Water RI	**Sampling Date**	07/22/2020
Sampling Event	July 2020	**Sample Name**	SE-41
Sub Area		**Sample Depth**	0.164
FSDS QA:	BAJ;01/28/22	**Easting**	**Northing**	**TOC**

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(7) Grab	Sediment	Discrete		7:26:00 AM	2 oz. sediment	
					4 oz. sediment	1
					8 oz. sediment	2
					Other	2
					Total Containers	5

Sample Description:

0-0.2cm: light brown sediment film. 0.2-10cm: grayish-brown with red redox features throughout. 90% fines, low plasticity; 10% sand, fine; trace gravel, twigs, wood chunks (20%). Sulfur odor.

General Sampling Comments

DGT probe deployed in sediment. Faint sulfur-like odor.
DGT Deployment: 7/21/20, 09:16, DGT Retrieval: 7/22/20, 07:00
Porewater Parameters @ retrieval:
pH=6.86, temperature=17.6 degrees C, salinity=10.29ms

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

Signature _____

APPENDIX H

WOOD WASTE CLEANUP LEVEL DEVELOPMENT TECHNICAL MEMORANDUM

MEMORANDUM

To:	Joyce Mercuri and Tom Middleton, LHG	Date:	February 9, 2023
From:	Phil Wiescher, PhD and Amanda Bixby, GIT	Project No.:	M1044.02.014
RE:	Site-specific Wood Waste Cleanup Level Development		

Historically, sawmills operating at the Weyerhaeuser Sawmill Aberdeen/Seaport Landing site (the Site) used wood waste as fill material in the Chehalis River. The wood waste—including sawdust, woodchips, and planked fill material—was deposited into the river sediments over time. Wood waste in large volumes can overwhelm the assimilative capacity of sediment and affect the aquatic environment physically, chemically, and biologically. Presence of wood waste can prevent biota from thriving on healthy native substrate; decrease dissolved oxygen due to microbial decomposition, which can create a toxic environment; and contribute to aquatic toxicity through decomposition by-products such as sulfides, ammonia, and phenols.

Maul Foster & Alongi, Inc. (MFA) conducted bioassay sampling and acute chronic ecological toxicity testing (i.e., bioassay testing) to evaluate the toxic effects of wood waste on benthic communities at the Site. Bioassay testing evaluates the toxicity of sediment to the benthic community by accounting for bioavailability of contaminants to benthic organisms, other-than-additive effects of chemical mixtures in sediments, and toxicity of non-chemical stressors (Ecology, 2021). In addition to bioassay testing, MFA visually assessed the percent of wood waste in samples and analyzed sediment for a variety of wood waste parameters, including total organic carbon (TOC), total volatile solids (TVS), ammonia, and total porewater sulfides. The relationship between these analyses and mortality data from bioassay testing are evaluated in this memorandum and used to develop a site-specific wood waste cleanup level.

BIOASSAY TESTING

MFA collected eight surface sediment samples from 0 to 10 centimeters below mudline for bioassay analysis in areas where chemical contamination was not anticipated (see sample locations and bioassay results on Figure H-1). The samples were submitted for standard Sediment Management Standards marine bioassay analysis by Puget Sound Estuary Program Method 1986, including a ten-day amphipod test, a 20-day juvenile polychaete survival and growth test, and a benthic larval development test. Test organisms included Eohaustorius estuaries for the ten-day amphipod bioassay, Neanthes *arenaceodentata* for the 20-day juvenile polychaete bioassay, and *Mytilus galloprovincialis* for the larval developmental bioassay. The laboratory collected three reference sediment samples from Carr Inlet in

Puget Sound, Washington for control testing. The reference sediment samples were tested concurrently with each bioassay to estimate non-treatment effects due to grain size. The organisms were cultured to appropriate conditions and introduced to sediment in glass chambers. Some chambers contained sediment from the Site, while others contained control sediments. At the end of the bioassay period, the sediments were sieved from the chambers, allowing each type of organism to be enumerated and studied. Mean mortality (percent), mean number normal, mean dry weight (milligrams per individual per day [mg/ind/day]), and/or mean ash-free dry weight (mg/ind/day) of the organisms were recorded, depending on the bioassay specifications. All reference sediments were analyzed for TVS, TOC, ammonia, and total porewater sulfides. Six of the eight bioassay samples passed the Sediment Cleanup Objective (SCO) larval bioassay test, as shown on Table H-1.

Co-located samples were analyzed for contaminants of concern associated with the Site to evaluate if non-wood waste-related factors were contributing to benthic mortality (see Table H-2). Of the eight bioassay samples, the two samples with failing results (i.e., SE-24 and SE-26) had the highest concentrations of total polychlorinated biphenyls and higher concentrations of carcinogenic polycyclic aromatic hydrocarbons. With these exceptions, sediment from the bioassay sample locations generally contained chemical concentrations below the Sediment Management Standards criteria; therefore, bioassay results do not appear to be impacted by chemical contaminants.

WOOD WASTE PARAMETERS

Total Organic Carbon

TOC was analyzed by U.S. Environmental Protection Agency (EPA) Method 9060A-modified. TOC analysis quantifies all carbon, including that in wood waste, in the sample. TOC was detected in all eight samples from 1.5 to 13 percent volume. As shown on Table H-1 and Figure H-2, bioassay samples that failed the SCO larval test contained between 7.8 and 13 percent TOC. Bioassay samples that passed contained between 1.5 and 6.6 percent TOC. Bioassay failures at a distinctly higher range of TOC (see Figure H-2) indicate elevated TOC and bioassay results are strongly correlated. Therefore, TOC is included as a component of the proposed site-specific wood waste cleanup level.

Total Volatile Solids

TVS was analyzed by Standard Methods for the Examination of Water and Wastewater (SM) 2540 G. TVS are the fraction of total solids that are lost on ignition at a higher temperature than that used to determine total solids. TVS can be used as a crude estimate of the amount of organic matter in total solids (Tetra Tech, 1986). TVS was detected in all eight samples from 5.35 to 18.9 percent volume. As shown on Table H-1 and Figure H-3, bioassay samples that failed the SCO larval test contained between 18.4 and 18.9 percent TVS. Bioassay samples that passed contained between 1.35 and 14.4 percent TVS. Bioassay failures at a distinctly higher range of TVS (see Figure H-3) indicate elevated TVS and bioassay results are strongly correlated. Therefore, TVS is included as a component of the proposed site-specific wood waste cleanup level.

Total Porewater Sulfides

Anoxic decomposition of wood waste produces hydrogen sulfide, a hazardous substance that is toxic to benthic organisms, fish, and eelgrass when present in excess amounts (Podger, 2013). Total porewater sulfides were extracted from bioassay sediment samples by centrifuge and analyzed by Method SM 4500-S2 D-00. Porewater sulfides were detected in three of the five analyzed samples, with detections ranging from 0.06 to 0.12 milligrams per liter (mg/L). As shown on Table H-1 and Figure H-4, bioassay samples that failed the SCO larval test contained porewater sulfide concentrations between 0.10 and 0.12 mg/L. Bioassay samples that passed were either non-detect with a reporting limit of 0.05 mg/L or detected at 0.06 mg/L.

Porewater sulfides appear to be well correlated with bioassay results (see Figure H-4); however, there is uncertainty associated with sulfide sampling methods. To analyze porewater sulfides, the laboratory places sediment in a centrifuge to extract porewater. Biological receptors would likely only contact a fraction of the extracted porewater in sediment (i.e., centrifuged porewater may overestimate the bioavailable portion). Additionally, porewater sulfides are likely not representative of field conditions, as they represent sulfide concentrations in sediment at one point in time, when sulfide concentrations vary significantly over time in the tidally influenced estuarine study area. Therefore, porewater sulfides are not included in our proposed site-specific wood waste cleanup level. Other sulfide sampling methods, including bulk sediment sulfides and diffusive gradients in thin films (DGT) passive sulfide samplers, also have associated uncertainty. Unlike bulk sediment sulfides and porewater sulfides that were collected during a single sampling event representing a single tide cycle, DGT samplers were deployed over two tide cycles to capture sulfide variations over time. Due to various factors contributing to uncertainty of DGT sulfide measurements (i.e., color uniformity, iron oxide precipitate on gels, and in-situ pH and conductivity), DGT sampling is not considered a reliable predictor of bioavailable hydrogen sulfide and benthic toxicity at the Site (also see Appendix G to the RI). DGT results were therefore not incorporated in the evaluation of a proposed site-specific wood waste cleanup level.

Porewater sulfides are well correlated with TOC and TVS (see Figure H-5 and H-6, respectively). By incorporating these parameters into the evaluation of a proposed site-specific wood waste cleanup level, the associated effects to benthic toxicity from porewater sulfides are accounted for.

Ammonia

Microbial metabolism of wood waste results in ammonia production, which can be toxic to benthic organisms (Ecology, 2013). Ammonia was detected in all eight samples from 3.48 to 12.9 milligrams per kilogram (mg/kg). As shown on Table H-1 and Figure H-7, bioassay samples that failed the SCO larval test contained between 3.48 and 9.49 mg/kg of ammonia. Bioassay samples that passed contained between 3.9 and 12.9 mg/kg of ammonia. Ammonia does not appear to correlate to bioassay results. Excess ammonia is harmful to benthic organisms, yet samples containing higher ammonia concentrations passed the bioassay testing (see Figure H-7). Therefore, ammonia is not included as a component of the proposed site-specific wood waste cleanup level.

Percent Wood waste

MFA field staff estimated wood waste percentages in the field. As shown on Table H-1 and Figure H-8, bioassay samples that failed the SCO larval test contained between 25 and 80 percent wood waste. Bioassay samples that passed contained between 0 and 35 percent wood waste. Wood waste percentages also correlate with TOC (Figure H-9), TVS (Figure H-10), and porewater sulfides (Figure H-11). Bulk sulfide (Figure H-12) and ammonia (Figure H-13) do not correlate well with wood waste percentage and bioassay failures (see discussion above). Because wood waste percentages correlate with the bioassay results, wood waste percent is included as a component of the recommended site-specific wood waste cleanup level.

TVS/TOC Ratio

Ecology wood waste guidance identifies the ratio of TVS to TOC as a potential proxy for toxicity, with increasing TVS/TOC ratio correlating to higher toxicity, and a ratio approaching 2 indicating high toxicity (Ecology, 2013). Ecology does note that this is a general trend observation and may not be applicable in all site-specific scenarios. MFA compared TVS/TOC data to bioassay results (see Figure H-14) and plotted TOC against TVS to evaluate the site-specific trends (see Figure H-15). Five of the six samples that passed the SCO larval test contained TVS/TOC ratios above 2. Of the two failing bioassay samples, one had a TVS/TOC ratio of 1.42, and the other had a ratio of 2.42. Therefore, it does not appear that the TVS/TOC ratio is an appropriate measure of toxicity at the Site.

DISCUSSION

Based on the relationship between the wood waste parameters and bioassay test results from site samples, MFA recommends incorporating TOC, TVS, and wood waste percent into the site-specific wood waste cleanup level. Wood waste scoring is intended to be used as a guide for wood waste compliance and individual site-specific wood waste cleanup level exceedances will be discussed with Ecology. Points will be assigned based on parameter ranges and summed to assess compliance with the site-specific wood waste cleanup level. Parameter ranges and associated scoring are presented in the table below.

Parameter	0 Point Range	1 Point Range	2 Point Range
TOC (%)	< 6	6 - 7	> 7
TVS (%)	< 14	14 - 16	> 16
Wood Waste (% Volume)	< 25	25 - <50	≥ 50

NOTES:
Based on parameter ranges, locations are awarded either zero (0), one (1), or two (2) points.
If the total points for a sample location equal or exceed two (2), the sample is not in compliance with the wood waste cleanup level.
The point of compliance is the top 10 centimeters below mudline.
% = percent.
> = greater than.
< = less than.

MFA compiled Ecology-approved site-specific wood waste cleanup levels developed for other sites (Ecology, 2013) and confirmed that the proposed the parameter ranges and scoring align (see Table H-3). At these sites wood waste percentages that required cleanup ranged from 25 percent (Scott Paper Mill Site) to 50 percent (Hylebos Waterway and Barbee Mill Sites). These percentages are consistent with the equal to or greater than 50 percent value proposed for the Site. This site-specific wood waste cleanup level, which incorporates three parameters using the above scoring matrix, will be used in conjunction with the cleanup standards proposed in the in-water remedial investigation report, of which this memorandum is an appendix, to delineate the extent of impacts to sediments at the Site.

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Podger, D. 2013. Sulfide effects on aquatic organisms. literature review.

Tetra Tech. 1986. Recommended protocols for measuring conventional sediment variables in Puget Sound. Final report. Prepared for the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers, Seattle, Washington. Prepared by Tetra Tech, Inc. March.

LIMITATIONS

The services undertaken in completing this memorandum were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This memorandum is solely for the use and information of our client unless otherwise noted. Any reliance on this memorandum by a third party is at such party's sole risk.

Opinions and recommendations contained in this memorandum apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this memorandum.

TABLES



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Table H-1
Bioassay Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location		SE-15	SE-16	SE-17	SE-18	SE-20	SE-24	SE-26	SE-31
Sample Name		SE-15-0-0.33	SE-16-0-0.33	SE-17-0-0.33	SE-18-0-0.33	SE-20-0-0.33	SE-24-0-0.33	SE-26-0-0.33	SE-31-0-0.33
Collection Date		09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/25/2019	09/27/2019	09/27/2019	09/27/2019
Collection Depth (ft bml)		0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Percent Woodwaste		30	Trace	0	5	0	25	80	35
Conventional Parameters									
Total Organic Carbon (%)		4.7	1.5	2.3	1.7	6.6	7.8	13	2.1
Total Solids (%)		43.4	52.9	43.3	46.3	36.8	35.5 J	42.4	48.8
Total Volatile Solids (%)		14.4	5.35	6.8	6.06	12.7	18.9 J	18.4	8.8
Ammonia as Nitrogen (mg/kg)		5.75	8.43	10.7	12.9	3.9	9.49	3.48	7.98
Pore Water Sulfide (mg/L)									
Sulfide		--	0.05 U	--	0.05 U	0.06 J	**0.10**	**0.12**	--
Summary of Bioassay Results[(a)]									
SCO	Amphipod	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
	Polychaete	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
	Larval	Pass	Pass	Pass	Pass	Pass	Fail	Fail	Pass
CSL	Amphipod	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
	Polychaete	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
	Larval	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass

Notes

-- = not analyzed.

Bold indicates values equal to or greater than the lowest available dissolved sulfides toxicity value (0.1 mg/L) provided in Podger (2013): *Sulfide Effects on Aquatic Organisms*

Gray shading indicates total organic carbon results outside the 0.5-3.5% range.

Orange shading indicates failure of bioassay test.

% = percent.

CSL = cleanup screening level.

ft bml = feet below mudline.

J = result is an estimated value.

mg/kg = milligrams per kilogram.

mg/L = milligrams per liter.

RI = remedial investigation.

SCO = sediment cleanup objective.

U = result is non-detect at reporting limit.

[(a)]Bioassay results adapted from table 5-1 of *Bioassay Testing Results; Sediment Quality Analysis: Seaport Landing Site, Aberdeen Washington January 8, 2020* report prepared by EcoAnalysts, Inc. Pass/fail performance criteria are provided in the report.

Table H-2
Chemical Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	SCO for Protection of Benthic Organisms[1]		SSL for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	SE-15	SE-16	SE-17	SE-18	SE-20	SE-24	SE-26	SE-31
Sample Name:				SE-15-0-0.33	SE-16-0-0.33	SE-17-0-0.33	SE-18-0-0.33	SE-20-0-0.33	SE-24-0-0.33	SE-26-0-0.33	SE-31-0-0.33
Collection Date:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/25/2019	09/27/2019	09/27/2019	09/27/2019
Collection Depth (ft bml):				0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Type:				Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Percent Woodwaste:				30	Trace	0	5	0	25	80	35
TOC:				Outside	Inside	Inside	Inside	Outside	Outside	Outside	Inside
Conventional Parameters											
Total Organic Carbon (%)	NV	NV	NV	4.7	1.5	2.3	1.7	6.6	7.8	13	2.1
Total Solids (%)	NV	NV	NV	43.4	52.9	43.3	46.3	36.8	35.5 J	42.4	48.8
Total Volatile Solids (%)	NV	NV	NV	14.4	5.35	6.8	6.06	12.7	18.9 J	18.4	8.8
Ammonia as Nitrogen (mg/kg)	230	230	NV	5.75	8.43	10.7	12.9	3.9	9.49	3.48	7.98
Grain Size (%)											
Clay	NV	NV	NV	11.2	15.4	24.1	17.4	26.6	8.3	7.1	15.9
Silt	NV	NV	NV	42.4	42.4	56.9	43.8	58.5	39.2	20.7	36.6
Sand	NV	NV	NV	21	41.8	18.5	38.8	9.74	14.3	37.2	44.4
Gravel	NV	NV	NV	25.4	0.39	0.55	0.02	5.18	38.2	35	2.99
Metals (mg/kg-dry)											
Arsenic	14	14	11	**6.2**	**4.91**	**7.09**	**5.93**	**7.96**	**8.26**	**5.11**	**6.07**
Cadmium	2.1	2.1	0.8	**0.175 J**	**0.143 J**	**0.151 J**	**0.169 J**	**0.239 J**	**0.216 J**	0.119 U	**0.165 J**
Chromium	72	72	NV	**32**	**32.2**	**36.1**	**34.5**	**32.9**	**40**	**25.7**	**34.7**
Copper	390	390	NV	**49.8**	**52**	**57.3**	**62.1**	**64.6**	**73.7**	**81.9**	**61.4**
Lead	360	360	NV	**7.52**	**6.35**	**8.21**	**7.28**	**11.7**	**32.9**	**30.4**	**7.94**
Mercury	0.41	0.41	0.2	**0.0402 J**	**0.0244 J**	**0.045 J**	**0.0386 J**	**0.069**	**0.111**	**0.104**	**0.0443 J**
Nickel	26	26	NV	**21.8**	**26.1**	**27.2**	**30.1**	**25.4**	**40.2**	**26**	**30.2**
Selenium	11	11	NV	**0.714 J**	**0.725 J**	**0.867 J**	**0.86 J**	**0.941 J**	**0.797 J**	0.593 U	**0.845 J**
Silver	0.57	0.57	NV	**0.115 J**	0.0918 U	**0.119 J**	0.111 U	**0.144 J**	**0.146 J**	0.119 U	**0.111 J**
Zinc	410	410	NV	**67.3**	**75.1**	**82.1**	**80.3**	**142**	**93**	**76**	**74.7**
Organic Chemicals (ug/kg-dry)											
2,4-Dimethylphenol	29	29	NV	60.4 U	48.8 U	59 U	57 U	71.8 U	74 U	153 U	53.8 U
2-Methylphenol	63	63	NV	30.2 U	24.4 U	29.5 U	28.4 U	35.8 U	37 U	76.6 U	26.9 U
3- & 4-Methylphenol (m,p-Cresol)	260	260	NV	**157**	**28.4 J**	29.5 U	28.4 U	**43.2 J**	**137**	**93.4 J**	**267**
Benzoic acid	650	650	NV	1,510 U	1,220 U	1,480 U	1,430 U	1,800 U	1,850 UJ	3,840 U	1,350 U
Benzyl alcohol	57	57	NV	60.4 U	48.8 U	59 U	57 U	71.8 U	74 U	153 U	53.8 U
Dibenzofuran	200	200	NV	**14.5 J**	9.74 U	**18.7 J**	11.4 U	14.3 U	**21.1 J**	**33.9 J**	10.7 U
Phenol	120	120	NV	**58.3 J**	19.5 U	23.6 U	22.8 U	28.7 U	**88.9**	**94.1 J**	**73.9**
N-Nitrosodiphenylamine	NV	28	NV	30.2 U	24.4 U	29.5 U	28.4 U	35.8 U	37 U	76.6 U	26.9 U
Organic Chemicals (ug/kg-OC)											
N-Nitrosodiphenylamine	11,000	NV	NV	643 U	1,630 U	1,280 U	1,670 U	542 U	474 U	589 U	1,280 U
Phthalates (ug/kg-dry)											
Bis(2-ethylhexyl)phthalate	500	500	NV	181 U	146 U	177 U	171 U	215 U	222 U	460 U	161 U
Butylbenzylphthalate	NV	63	NV	60.4 U	48.8 U	59 U	57 U	71.8 U	74 U	153 U	53.8 U
Diethyl phthalate	NV	200	NV	60.4 U	48.8 U	59 U	57 U	71.8 U	74 U	153 U	53.8 U
Dimethyl phthalate	NV	71	NV	60.4 U	48.8 U	59 U	57 U	71.8 U	74 U	153 U	53.8 U
Di-n-butyl phthalate	380	380	NV	60.4 U	48.8 U	59 U	57 U	71.8 U	74 U	153 U	53.8 U
Di-n-octyl phthalate	39	39	NV	96.9 U	78.3 U	94.6 U	91.4 U	115 U	119 U	246 U	86.3 U

Table H-2
Chemical Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	SCO for Protection of Benthic Organisms[1]		SSL for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	SE-15	SE-16	SE-17	SE-18	SE-20	SE-24	SE-26	SE-31
Sample Name:				SE-15-0-0.33	SE-16-0-0.33	SE-17-0-0.33	SE-18-0-0.33	SE-20-0-0.33	SE-24-0-0.33	SE-26-0-0.33	SE-31-0-0.33
Collection Date:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/25/2019	09/27/2019	09/27/2019	09/27/2019
Collection Depth (ft bml):				0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Type:				Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Percent Woodwaste:				30	Trace	0	5	0	25	80	35
TOC:				Outside	Inside	Inside	Inside	Outside	Outside	Outside	Inside
Phthalates (ug/kg-OC)											
Butylbenzylphthalate	4,900	NV	NV	1,290 U	3,250 U	2,570 U	3,350 U	1,090 U	949 U	1,180 U	2,560 U
Diethyl phthalate	61,000	NV	NV	1,290 U	3,250 U	2,570 U	3,350 U	1,090 U	949 U	1,180 U	2,560 U
Dimethyl phthalate	53,000	NV	NV	1,290 U	3,250 U	2,570 U	3,350 U	1,090 U	949 U	1,180 U	2,560 U
Chlorinated Organics (ug/kg-dry)											
1,2,4-Trichlorobenzene	NV	31	NV	30.2 U	24.4 U	29.5 U	28.4 U	35.8 U	37 U	76.6 U	26.9 U
1,2-Dichlorobenzene	NV	35	NV	30.2 U	24.4 U	29.5 U	28.4 U	35.8 U	37 U	76.6 U	26.9 U
1,4-Dichlorobenzene	NV	110	NV	30.2 U	24.4 U	29.5 U	28.4 U	35.8 U	37 U	76.6 U	26.9 U
Hexachlorobenzene	NV	22	NV	12 U	9.74 U	11.8 U	11.4 U	14.3 U	14.8 U	30.6 U	10.7 U
Hexachlorobutadiene	NV	11	NV	30.2 U	24.4 U	29.5 U	28.4 U	35.8 U	37 U	76.6 U	26.9 U
Pentachlorophenol	360	360	NV	120 U	97.4 U	118 U	114 U	143 U	148 U	306 U	107 U
Chlorinated Organics (ug/kg-OC)											
1,2,4-Trichlorobenzene	810	NV	NV	643 U	1,630 U	1,280 U	1,670 U	542 U	474 U	589 U	1,280 U
1,2-Dichlorobenzene	2,300	NV	NV	643 U	1,630 U	1,280 U	1,670 U	542 U	474 U	589 U	1,280 U
1,4-Dichlorobenzene	3,100	NV	NV	643 U	1,630 U	1,280 U	1,670 U	542 U	474 U	589 U	1,280 U
Hexachlorobenzene	380	NV	NV	255 U	649 U	513 U	671 U	217 U	190 U	235 U	510 U
Hexachlorobutadiene	3,900	NV	NV	643 U	1,630 U	1,280 U	1,670 U	542 U	474 U	589 U	1,280 U
PAHs (ug/kg-dry)											
Total PAH[d]	17,000	17,000	NV	**899 J**	**40.4 J**	**2,060 J**	22.8 U	**34.3 J**	**594 J**	**742 J**	**247 J**
1-Methylnaphthalene	NV	NV	NV	24.2 U	19.5 U	**70.6**	22.8 U	28.7 U	29.6 U	61.4 U	21.5 U
2-Methylnaphthalene	NV	670	NV	24.2 U	19.5 U	**33.7 J**	22.8 U	28.7 U	29.6 U	61.4 U	21.5 U
Total LPAH[e]	NV	5,200	NV	**93.8 J**	**13.6 J**	**1,010 J**	22.8 U	28.7 U	**223 J**	**267 J**	**160 J**
Acenaphthene	NV	500	NV	**48.7**	9.74 U	**126**	11.4 U	14.3 U	**29.3 J**	**40.8 J**	**37.2**
Acenaphthylene	NV	1,300	NV	12 U	9.74 U	**22.9 J**	11.4 U	14.3 U	14.8 U	30.6 U	**19.6 J**
Anthracene	NV	960	NV	**20.8 J**	9.74 U	**121**	11.4 U	14.3 U	**22.6 J**	30.6 U	10.7 U
Fluorene	NV	540	NV	12 U	9.74 U	**87.5**	11.4 U	14.3 U	**24.2 J**	**38.6 J**	10.7 U
Naphthalene	NV	2,100	NV	24.2 U	19.5 U	**77**	22.8 U	28.7 U	**69.8**	**75.2 J**	**74.2**
Phenanthrene	NV	1,500	NV	**24.3**	**13.6 J**	**575**	11.4 U	14.3 U	**76.8**	**112**	**28.9**
Total HPAH[f]	NV	12,000	NV	**805 J**	**26.8 J**	**945 J**	17.1 U	**34.3 J**	**371 J**	**475 J**	**87.4 J**
Benzo(a)anthracene	NV	1,300	NV	**61.2**	9.74 U	**66.5**	11.4 U	14.3 U	**41.2**	**45.8 J**	**12.5 J**
Benzo(a)pyrene	NV	1,600	NV	**45.8**	14.6 U	**38.7**	17.1 U	21.5 U	**31.8 J**	**66.5 J**	**17.3 J**
Benzo(ghi)perylene	NV	670	NV	**18.3 J**	9.74 U	11.8 U	11.4 U	14.3 U	14.8 U	30.6 U	10.7 U
Chrysene	NV	1,400	NV	**71.9**	9.74 U	**70.3**	11.4 U	14.3 U	**33.4**	**42.4 J**	10.7 U
Dibenzo(a,h)anthracene	NV	230	NV	12 U	9.74 U	11.8 U	11.4 U	14.3 U	14.8 U	30.6 U	10.7 U
Fluoranthene	NV	1,700	NV	**250**	**13.8 J**	**335**	11.4 U	**16.9 J**	**123**	**109**	**28**
Indeno(1,2,3-cd)pyrene	NV	600	NV	**20.7 J**	9.74 U	11.8 U	11.4 U	14.3 U	14.8 U	**34 J**	10.7 U
Pyrene	NV	2,600	NV	**210**	**13 J**	**401**	11.4 U	**17.4 J**	**113**	**102**	**29.6**
Benzo(b)fluoranthene	NV	NV	NV	**90.7**	14.6 U	**33.9 J**	17.1 U	21.5 U	**28.6 J**	**75.4 J**	16.1 U
Benzo(k)fluoranthene	NV	NV	NV	**36.5 J**	14.6 U	17.7 U	17.1 U	21.5 U	22.2 U	46 U	16.1 U
Total benzofluoranthenes[g]	NV	3,200	NV	**127 J**	14.6 U	**33.9 J**	17.1 U	21.5 U	**28.6 J**	**75.4 J**	16.1 U
cPAH TEQ[h]	NV	NV	21	**68 J**	14.6 U	**51.5 J**	17.1 U	21.5 U	**41.7 J**	**86.3 J**	**21.3 J**

Table H-2
Chemical Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Location:	SCO for Protection of Benthic Organisms[1]		SSL for Protection of Human Health and Higher Trophic Level Ecological Receptors[c]	SE-15	SE-16	SE-17	SE-18	SE-20	SE-24	SE-26	SE-31
Sample Name:				SE-15-0-0.33	SE-16-0-0.33	SE-17-0-0.33	SE-18-0-0.33	SE-20-0-0.33	SE-24-0-0.33	SE-26-0-0.33	SE-31-0-0.33
Collection Date:	Organic Carbon (0.5% to 3.5%)[a]	Organic Carbon (<0.5% or >3.5%)[b]		09/27/2019	09/27/2019	09/27/2019	09/27/2019	09/25/2019	09/27/2019	09/27/2019	09/27/2019
Collection Depth (ft bml):				0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33	0-0.33
Type:				Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Percent Woodwaste:				30	Trace	0	5	0	25	80	35
TOC:				Outside	Inside	Inside	Inside	Outside	Outside	Outside	Inside
PAHs (ug/kg-OC)											
2-Methylnaphthalene	38,000	NV	NV	515 U	1,300 U	**1,470 J**	1,340 U	435 U	379 U	472 U	1,020 U
Total LPAH[e]	370,000	NV	NV	**2,000 J**	**907**	**43,900**	**1,340**	435 U	**2,860 J**	**2,050 J**	**7,620**
Acenaphthene	16,000	NV	NV	**1,040**	649 U	**5,480**	671 U	217 U	**376 J**	**314 J**	**1,770**
Acenaphthylene	66,000	NV	NV	255 U	649 U	**996 J**	671 U	217 U	190 U	235 U	**933 J**
Anthracene	220,000	NV	NV	**443 J**	649 U	**5,260**	671 U	217 U	**290 J**	235 U	510 U
Fluorene	23,000	NV	NV	255 U	649 U	**3,800**	671 U	217 U	**310 J**	**297 J**	510 U
Naphthalene	99,000	NV	NV	515 U	1,300 U	**3,350**	1,340 U	435 U	**895**	**578 J**	**3,530**
Phenanthrene	100,000	NV	NV	**517**	**907 J**	**25,000**	671 U	217 U	**985**	**862**	**1,380**
Total HPAH[f]	960,000	NV	NV	**17,100 J**	**1,790 J**	**41,100 J**	1,010 U	**520 J**	**4,760 J**	**3,650 J**	**4,160 J**
Benzo(a)anthracene	110,000	NV	NV	**1,300**	649 U	**2,890**	671 U	217 U	**528**	**352 J**	**595 J**
Benzo(a)pyrene	99,000	NV	NV	**974**	973 U	**1,680**	1,010 U	326 U	**408 J**	**512 J**	**824 J**
Benzo(ghi)perylene	31,000	NV	NV	**389 J**	649 U	513 U	671 U	217 U	190 U	235 U	510 U
Chrysene	110,000	NV	NV	**1,530**	649 U	**3,060**	671 U	217 U	**428**	**326 J**	510 U
Dibenzo(a,h)anthracene	12,000	NV	NV	255 U	649 U	513 U	671 U	217 U	190 U	235 U	510 U
Fluoranthene	160,000	NV	NV	**5,320**	**920 J**	**14,600**	671 U	**256 J**	**1,580**	**838**	**1,330**
Indeno(1,2,3-cd)pyrene	34,000	NV	NV	**440 J**	649 U	513 U	671 U	217 U	190 U	**262 J**	510 U
Pyrene	1,000,000	NV	NV	**4,470**	**867 J**	**17,400**	671 U	**264 J**	**1,450**	**785**	**1,410**
Benzo(b)fluoranthene	NV	NV	NV	**1,930**	973 U	**1,470 J**	1,010 U	326 U	**367 J**	**580 J**	767 U
Benzo(k)fluoranthene	NV	NV	NV	**777 J**	973 U	770 U	1,010 U	326 U	285 U	354 U	767 U
Total benzofluoranthenes[g]	230,000	NV	NV	**2,710 J**	**973**	**1,470 J**	**1,010**	326 U	**367 J**	**580 J**	**767**
Pesticides and PCBs (ug/kg-dry)											
Aroclor 1016	NV	NV	NV	4.57 U	2.02 U	2.07 U	2.03 U	2.12 U	5.6 U	4.42 U	3.96 U
Aroclor 1221	NV	NV	NV	4.57 U	2.02 U	2.07 U	2.03 U	2.12 U	5.6 U	4.42 U	3.96 U
Aroclor 1232	NV	NV	NV	4.57 U	2.02 U	2.07 U	2.03 U	2.12 U	5.6 U	4.42 U	3.96 U
Aroclor 1242	NV	NV	NV	4.57 U	2.02 U	2.07 U	2.03 U	2.12 U	5.6 U	4.42 U	3.96 U
Aroclor 1248	NV	NV	NV	4.57 U	2.02 U	2.07 U	2.03 U	2.12 U	5.6 U	4.42 U	3.96 U
Aroclor 1254	NV	NV	NV	4.57 U	2.02 U	4.14 U	2.03 U	**2.38 J**	5.6 U	4.42 U	3.96 U
Aroclor 1260	NV	NV	NV	4.57 U	2.02 U	4.14 U	2.03 U	**2.31 J**	**42.4**	**15.5**	3.96 U
Total PCBs[i]	110	110	3.5	4.57 U	2.02 U	4.14 U	2.03 U	**4.69 J**	**42.4**	**15.5**	3.96 U
Additional SVOCs (ug/kg-dry)											
Hexachlorocyclopentadiene	NV	NV	NV	60.4 U	48.8 U	59 U	57 U	71.8 U	74 U	153 U	53.8 U
TPH (mg/kg-dry)											
Gasoline-Range Hydrocarbons	NV	NV	NV	10 U	8.42 U	13.3 U	9.11 U	13.4 U	27.9 U	9.64 U	7.73 U
Diesel-Range Hydrocarbons	340	340	NV	22.5 U	**18.5 J**	22.4 U	21.5 U	26.7 U	28.1 U	23.4 U	20.4 U
Motor-Oil-Range Hydrocarbons	3,600	3,600	NV	**374**	36.8 U	44.9 U	43 U	**610**	**559**	**842**	**58.5 J**

Table H-2
Chemical Analytical Results
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Notes

Bold font is applied to detected results, with the exception of conventional parameters and grain size.

Shading (color key below) indicates values that exceed screening criteria. All results are screened against SSLs for protection of human health and higher trophic level ecological receptors. Results are screened against SCOs for protection of benthic organisms based on individual sample TOC results.

TOC results outside 0.5-3.5%.

Detected result exceeding SCO for Protection of Benthic Organisms, Inside or Outside Organic Carbon 0.5-3.5%.

Detected result exceeding SSL for Protection of Human Health and Higher Trophic Level Ecological Receptors.

% = percent.

-- = not analyzed.

AET = apparent effects threshold.

cPAH = carcinogenic PAH.

CSL = cleanup screening level.

ft bml = feet below mudline.

HPAH = high-molecular-weight PAH.

J = result is an estimated value.

K = result is an estimated maximum potential concentration.

LPAH = low-molecular-weight PAH.

mg/kg = milligrams per kilogram.

mg/kg-dry = milligrams per kilogram, dry weight.

mg/L = milligrams per liter.

NV = no value.

PAH = polycyclic aromatic hydrocarbon.

PCB = polychlorinated biphenyl.

pg/g-dry = picograms per gram, dry weight.

RI = remedial investigation.

SCO = sediment cleanup objective.

SSL = sediment screening level.

SVOCs = semivolatile organic compounds.

TEQ = toxicity equivalence.

TOC = total organic carbon.

TPH = total petroleum hydrocarbons.

U = result is non-detect at detection limit or estimated detection limit.

ug/kg-dry = micrograms per kilogram, dry weight.

ug/kg-OC = micrograms per kilogram, organic carbon normalized.

[a]Screening level is equivalent to organic carbon normalized marine criteria. Where organic carbon normalized criteria are not available, screening level is the lowest marine or freshwater SCO or CSL.

[b]Screening level is the lowest of the following criteria: marine AET, marine sediment, or freshwater sediment SCO or CSL.

[c]Human health and higher trophic level ecological receptor screening levels are chosen from lowest of bioaccumulative and direct contact pathways. If the risk-based value is lower than natural background or PQL, the cleanup level defaults to the higher of natural background or PQL.

[d]Total PAH is the sum of detected 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluorene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene. Non-detect results are not included in the sum. When all analytical results are non-detect, the highest detection limit is used.

[e]LPAH is the sum of detected acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene. Non-detect results are not included in the sum. When all analytical results are non-detect, the highest detection limit is used.

[f]HPAH is the sum of detected benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene. Non-detect results are not included in the sum. When all analytical results are non-detect, the highest detection limit is used.

[g]Total benzofluoranthenes is the sum of detected benzo(b)fluoranthene and benzo(k)fluoranthene. Non-detect results are not included in the sum. When both analytical results are non-detect, the highest detection limit is used.

[h]cPAH TEQ is calculated with 2005 California EPA toxicity equivalence factors. Non-detect results are included at one-half the detection limit. When all cPAHs are non-detect, the highest reported detection limit is shown.

[i]Total PCBs is the sum of all detected recolors. Non-detect results are not included in the sum. When all analytical results are non-detect, the highest detection limit is used.

[1] Ecology. 2021. SCUM II Table 8-1 Marine and freshwater sediment chemical criteria for protection of the benthic community.

Table H-3
Case Study Wood Waste Cleanup Levels
Weyerhaeuser Sawmill Aberdeen/Seaport Landing Site

Parameter Range Triggering Cleanup (% Volume):	TOC	TVS	Woodwaste
Anacortes Log Yard[1]	*No unified approach; weight of evidence method.*		
Hylebos Waterway[2]	--	≥15	≥50
Port Gamble Bay[2]	*No unified approach; weight of evidence method.*		
Scott Paper Mill[2]	--	>12.2	≥25
Barbee Mill[2]	≥14	--	≥50
Grays Harbor Historical Seaport Authority	**>7**	**>16**	**≥50**

Notes

% = percent.

-- = parameter not incorporated into site-specific wood waste cleanup level.

≥ = equal to or greater than.

TOC = total organic carbon.

TVS = total volatile solids.

[1]Ecology. 2013. Wood waste cleanup, identifying, assessing, and remediating wood waste in marine and freshwater environments, guidance for implementing the cleanup provisions of the sediment management standards, Chapter 173-204 WAC. Publication no. 09-09-044. Washington State Department of Ecology. September.

[2]GeoEngineers. 2018. Draft final remedial investigation report, Anacortes Port Log Yard, Anacortes, Washington, Ecology Agreed Order no. DE 10630. Prepared for the Washington State Department of Ecology on behalf of Port of Anacortes. GeoEngineers, Inc. Seattle, Washington. June.

FIGURES



Path: X:\1044_02_14\04\Fig_Bioassay_Pie_Charts.mxd

Print Date: 3/15/2022

Reviewed By:

Produced By: jelstott

Project:



NOTES:
AM = amphipod mortality.
CSL = cleanup screening level.
LD = larval development.
PG = polychaete growth.
SCO = sediment cleanup objective.
Aquatic lease areas were digitized from print maps of Aberdeen tidelands dated Mar. 22, 2001 and Jan. 15, 1907 on file with the Office of theCommissioner of Public Lands in Olympia, Washington, and should be considered approximate.
Surface is sediment collected in the top 10 centimeters (0 to 0.33 feet below the mudline).

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This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

Source:
Aerial imagery obtained from Bing via ArcGIS Online.

Legend

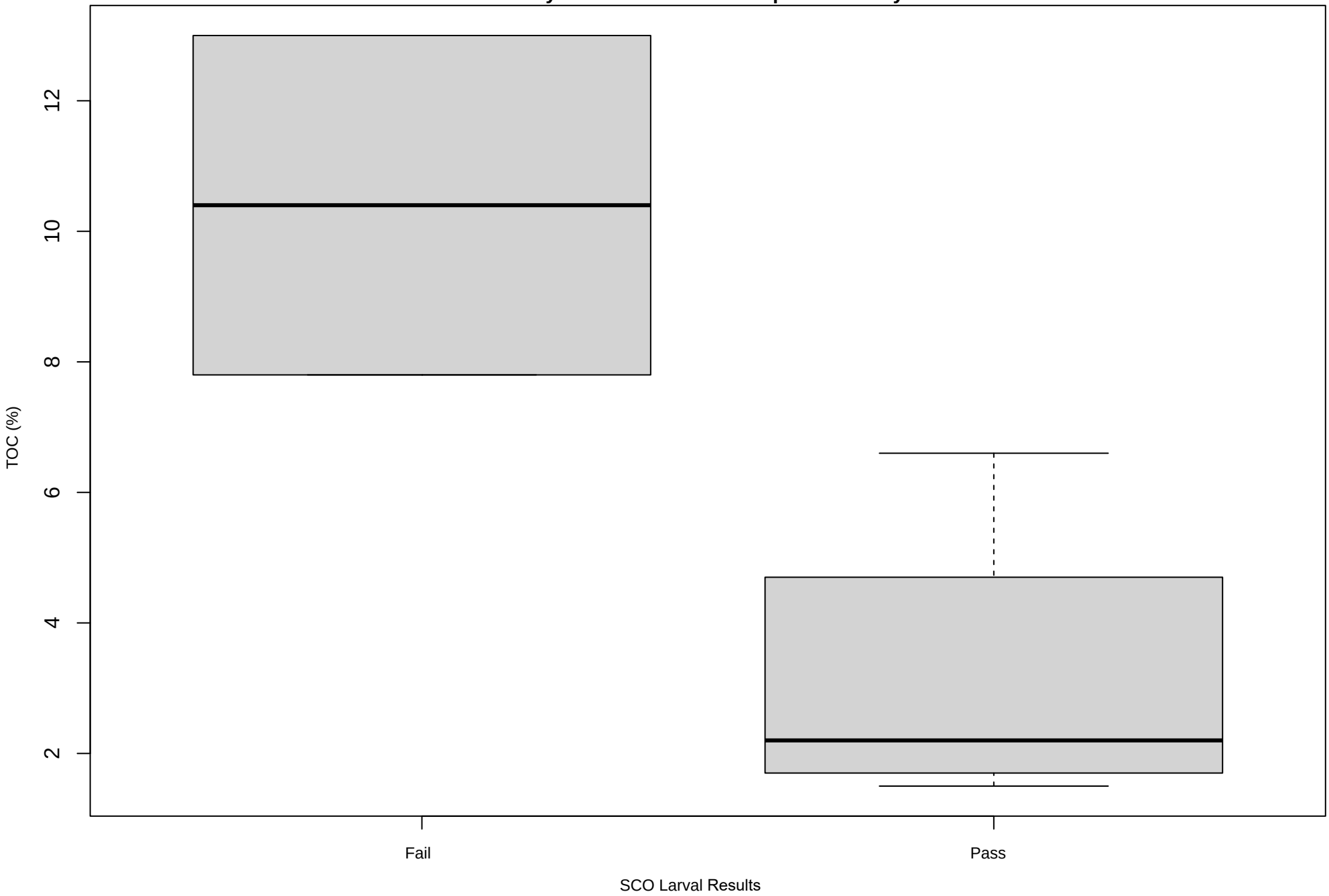
AM PG LD

- Pass
- SCO Failure
- CSL Failure
- Surface Sample
- Subsurface Sample
- Seaport Authority Site
- Approximate Aquatic Lease Area
- Approximate Ordinary High Water Mark

Figure H-1
Bioassay Results
Aberdeen, Washington

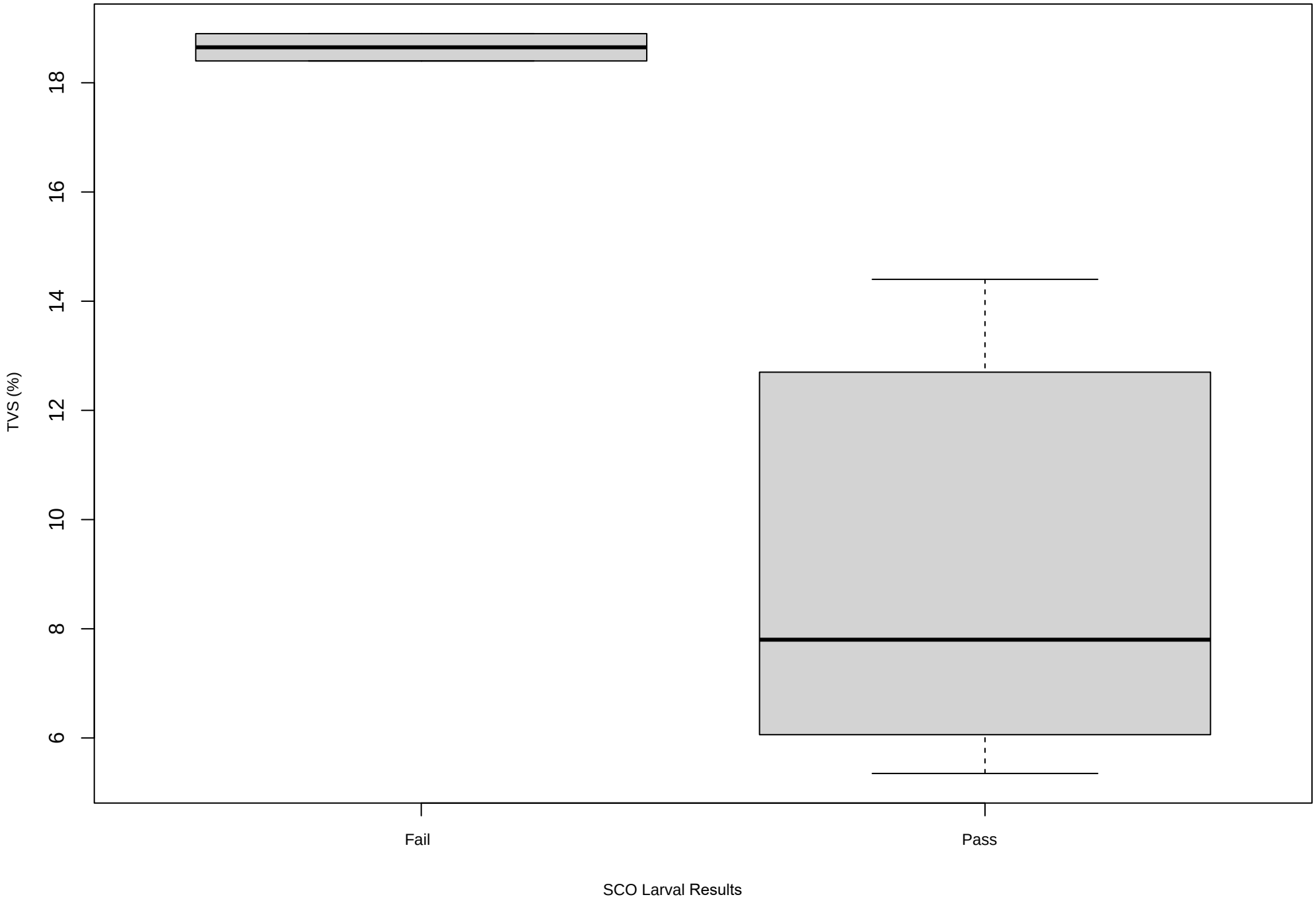
0 80 160
Feet

Figure H−2
TOC vs. Bioassay Results
Grays Harbor Historical Seaport Authority



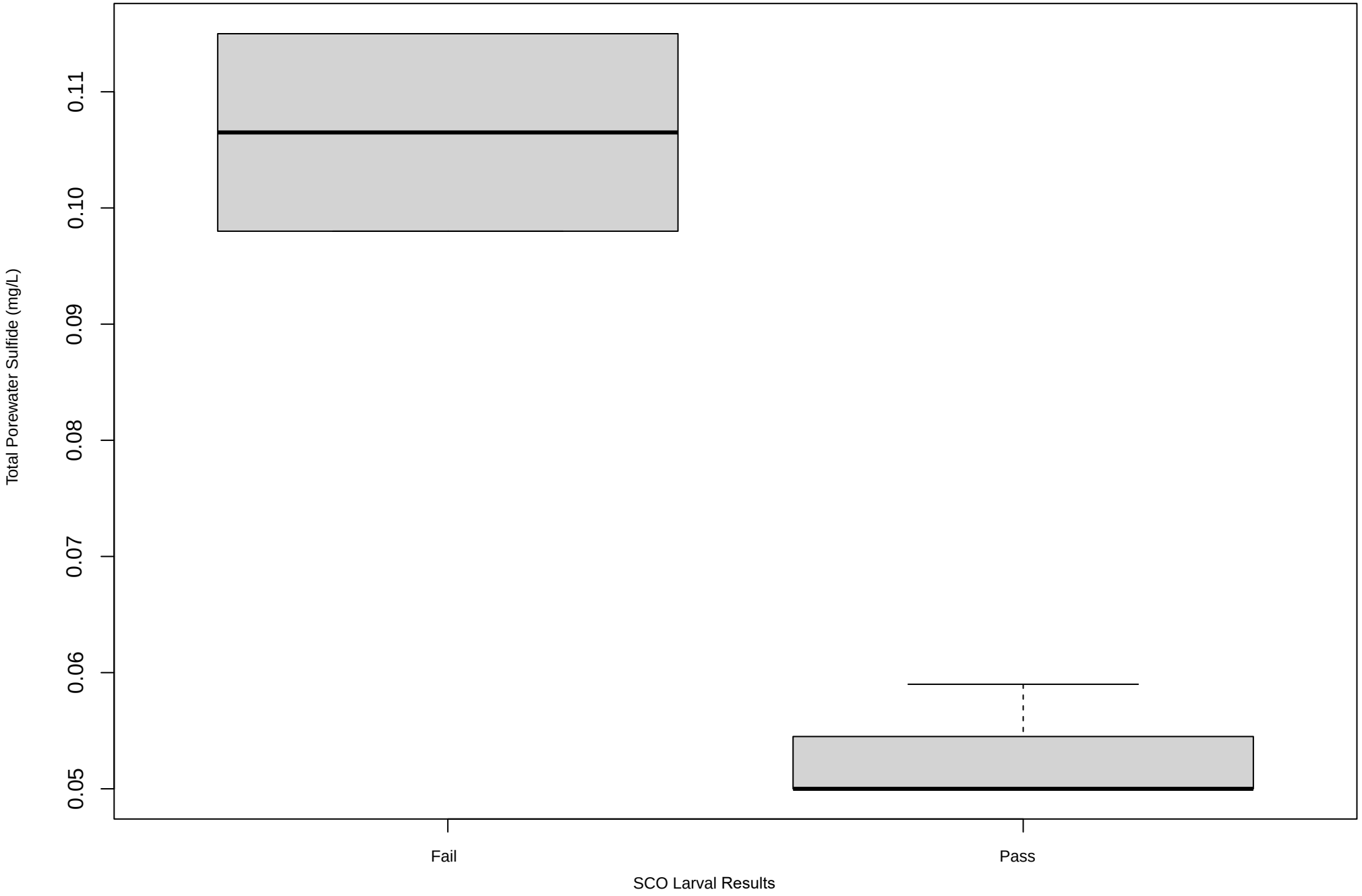
NOTES:
% = percent volume.
SCO = sediment cleanup objective.
TOC = total organic carbon.

Figure H−3
TVS vs. Bioassay Results
Grays Harbor Historical Seaport Authority



NOTES:
% = percent volume.
SCO = sediment cleanup objective.
TVS = total volatile solids.

Figure H−4
Porewater Sulfide vs. Bioassay Results
Grays Harbor Historical Seaport Authority



NOTES:
mg/L = milligrams per liter.
SCO = sediment cleanup objective.

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Figure H-5
TOC vs. Porewater Sulfide Results
Grays Harbor Historical Seaport Authority

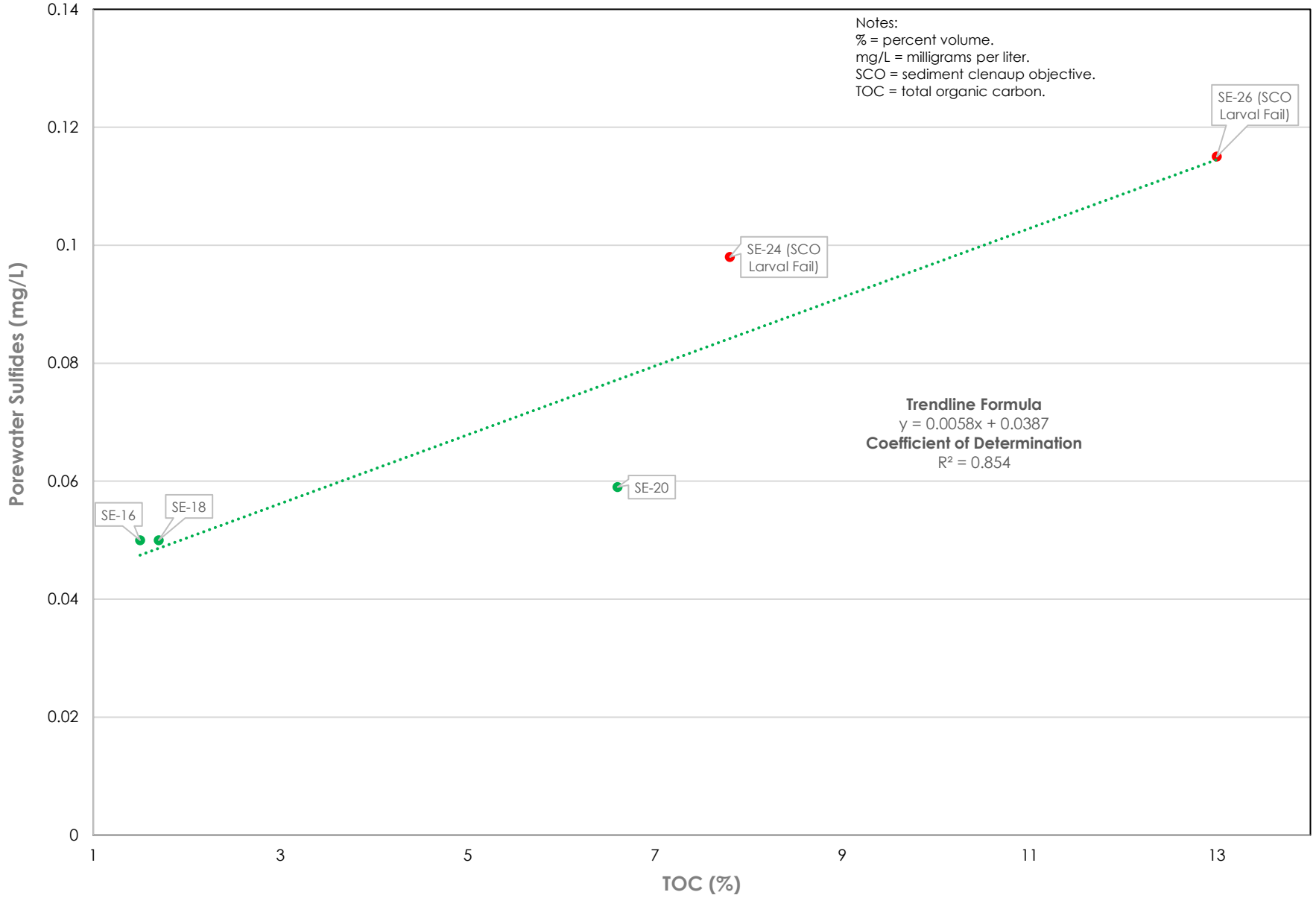

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Figure H-6
TVS vs. Porewater Sulfide Results
Grays Harbor Historical Seaport Authority

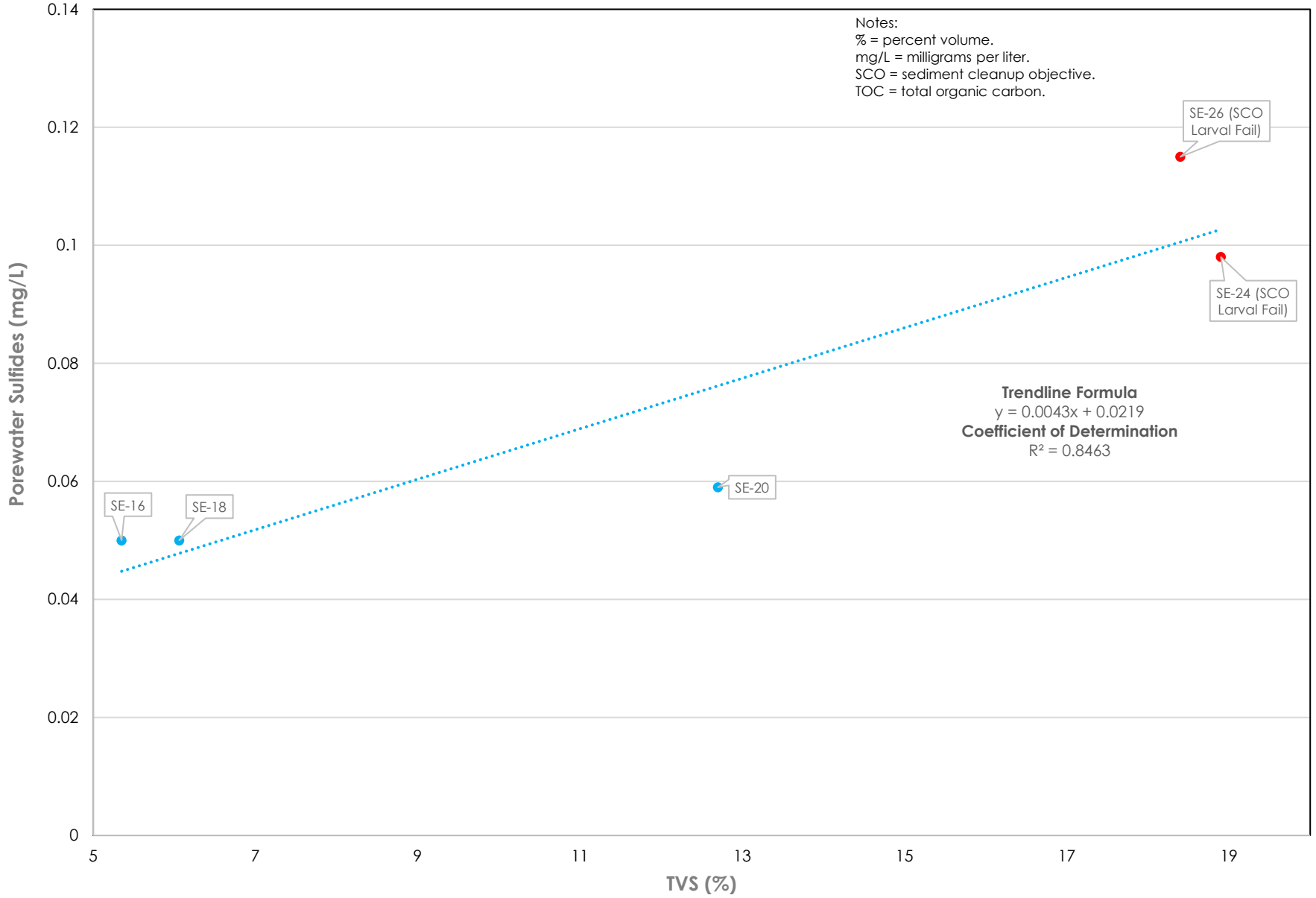
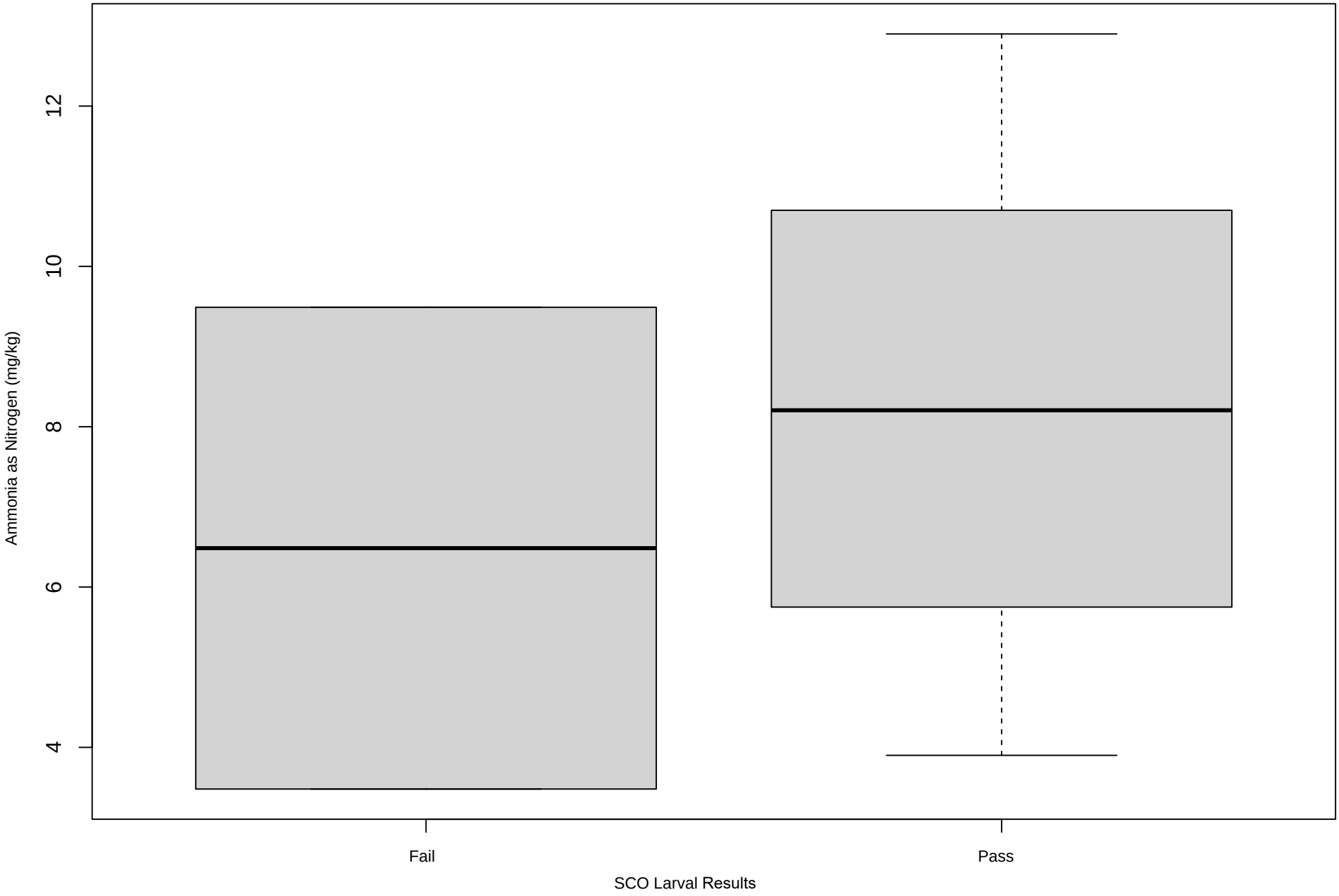
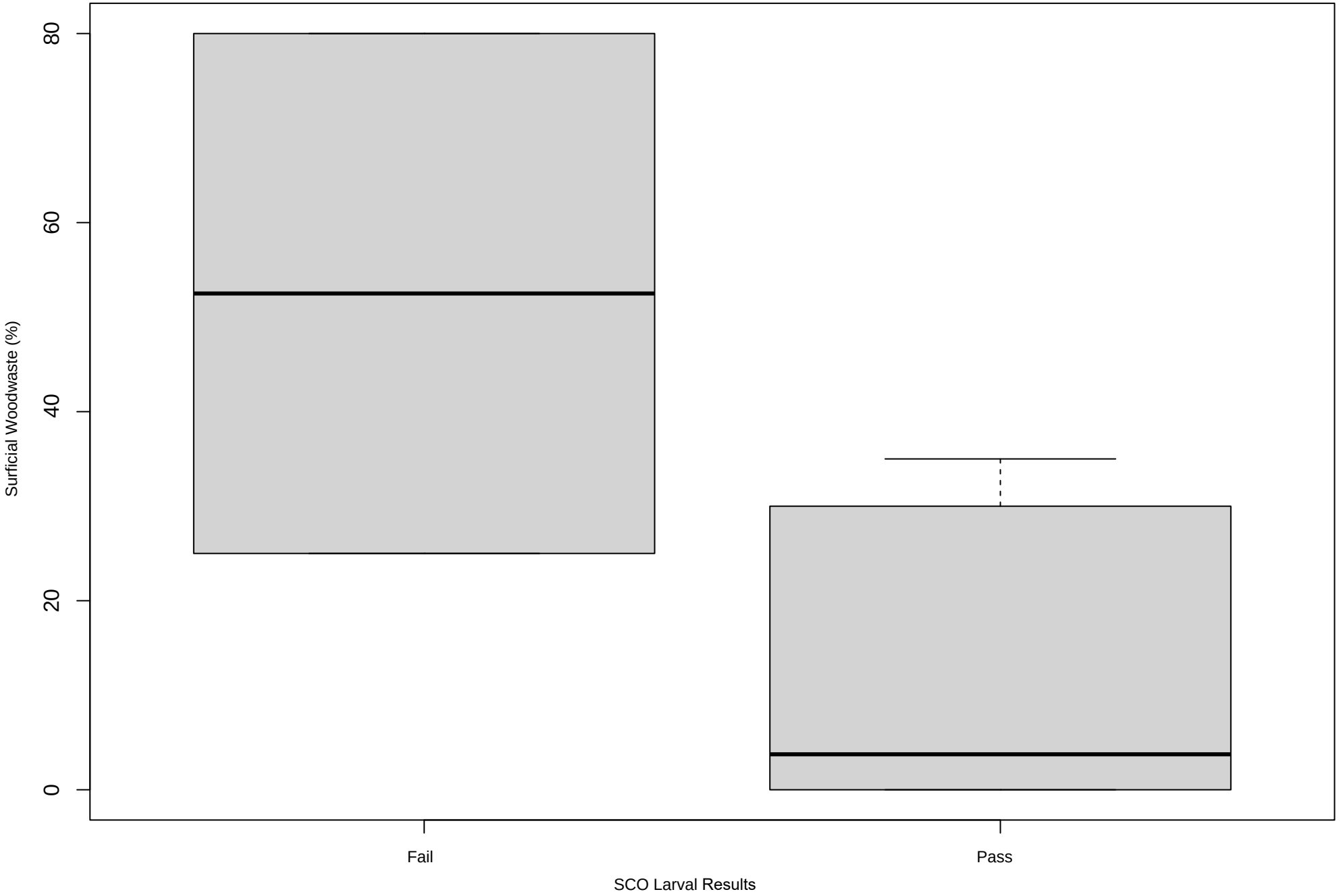


Figure H−7
Ammonia vs. Bioassay Results
Grays Harbor Historical Seaport Authority



NOTES:
mg/kg = milligrams per kilogram.
SCO = sediment cleanup objective.

Figure H−8
Wood Waste Percent vs. Bioassay Results
Grays Harbor Historical Seaport Authority



NOTES:
For visualization purposes, "trace" woodwaste observations are shown as 2.5% woodwaste.
% = percent volume.
SCO = sediment cleanup objective.

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Figure H-9
Wood Waste Percent vs TOC Results
Grays Harbor Historical Seaport Authority

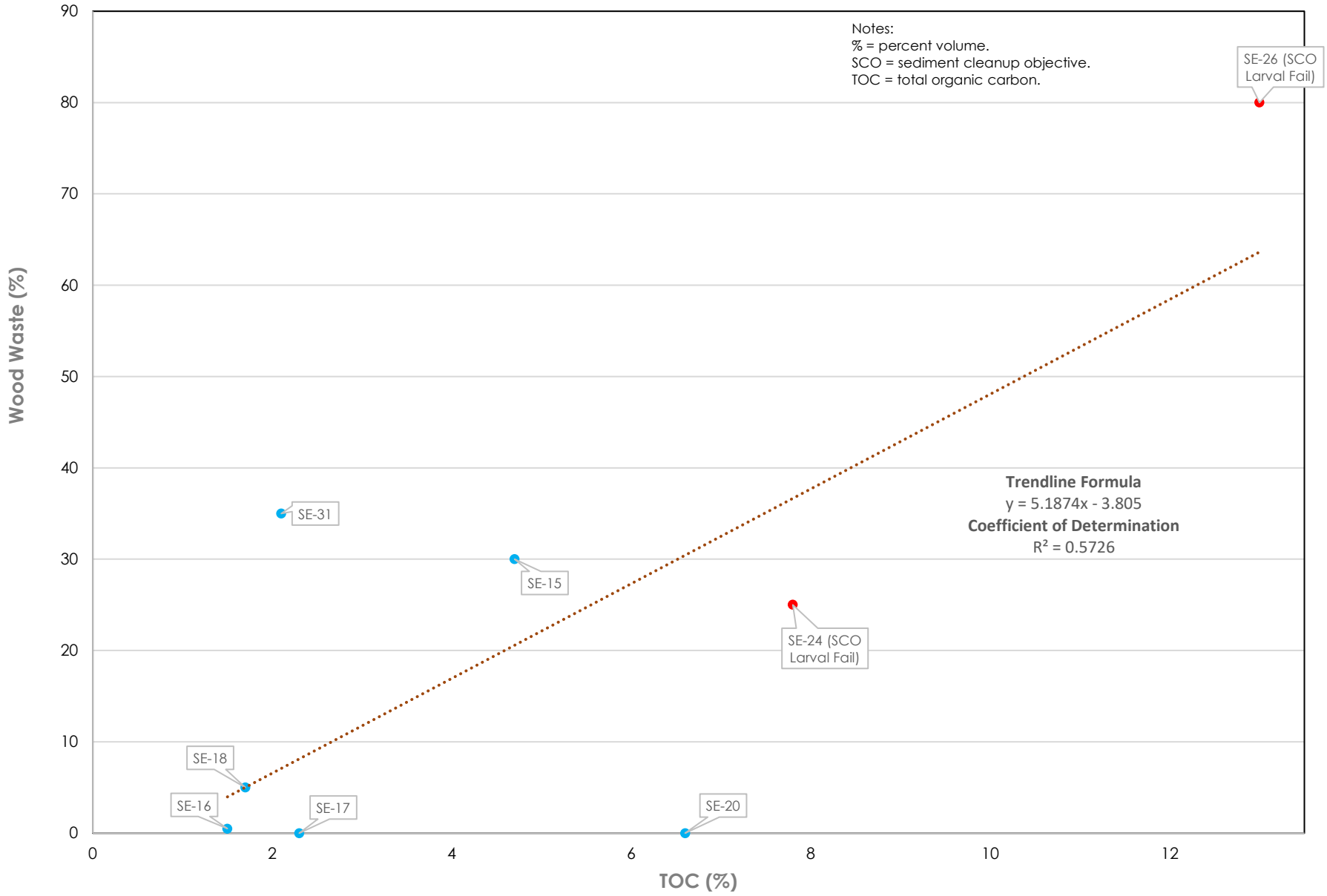

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Figure H-10
Wood Waste Percent vs. TVS Results
Grays Harbor Historical Seaport Authority

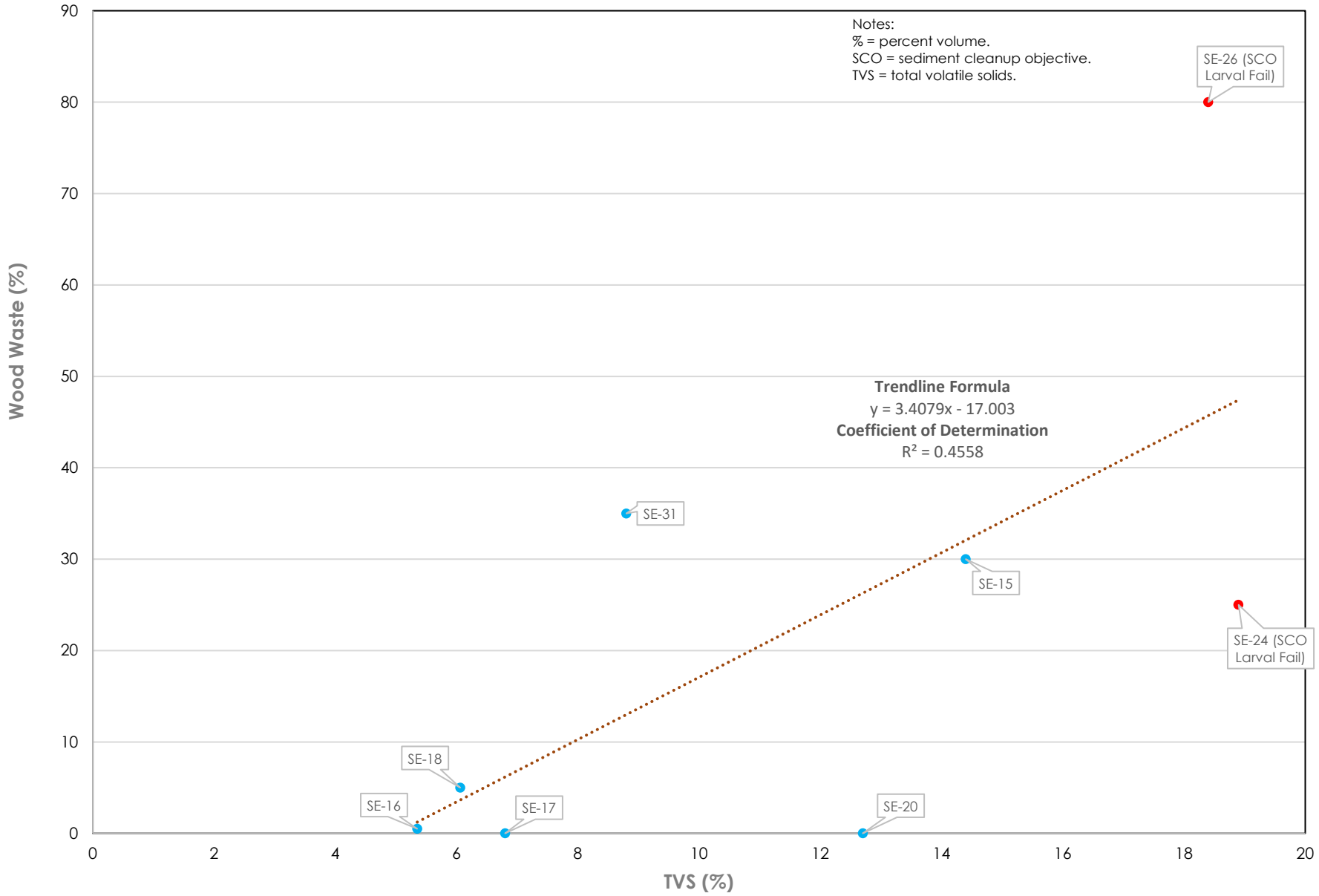

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Figure H-11
Wood Waste Percent vs. Porewater Sulfide Results
Grays Harbor Historical Seaport Authority

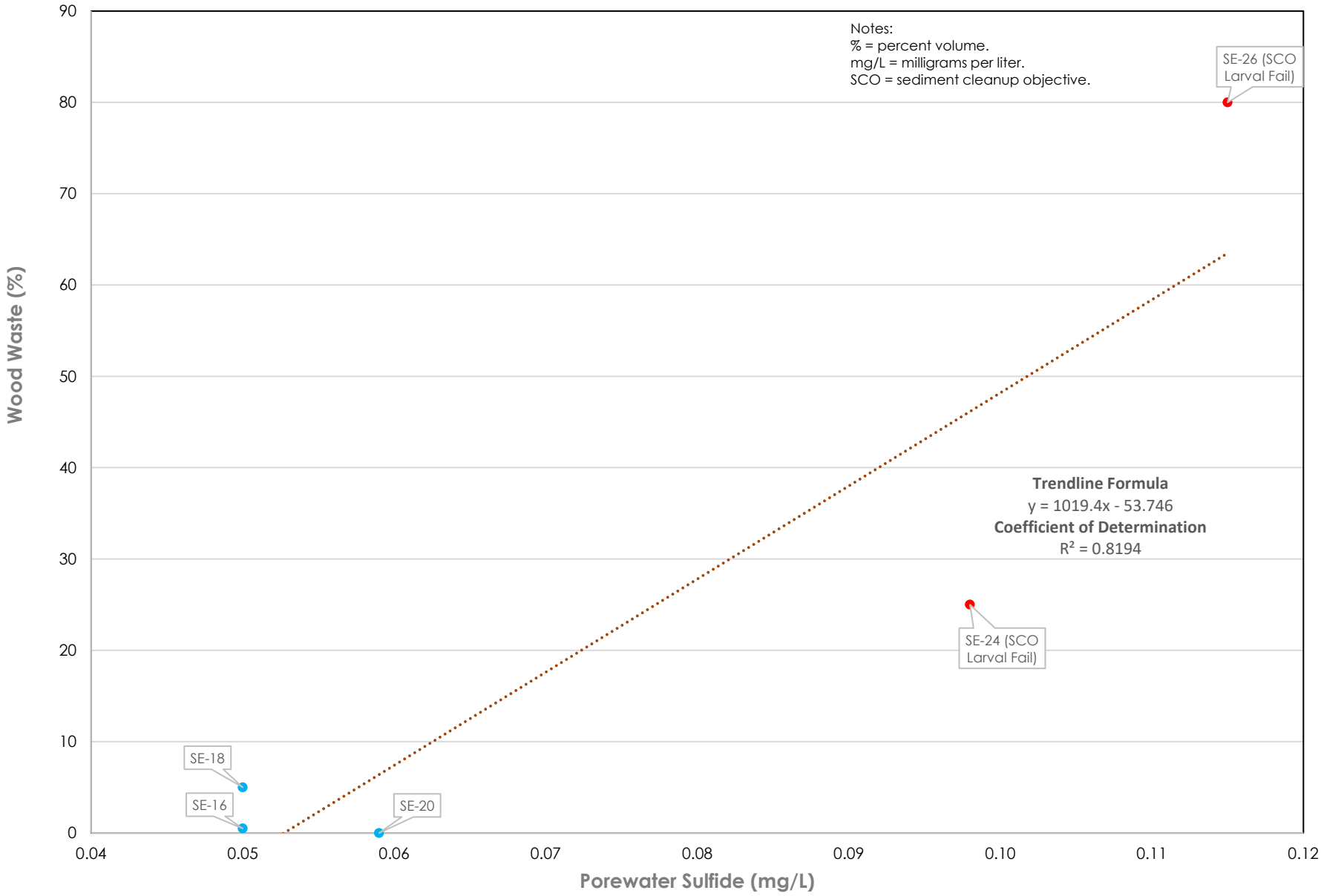

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Figure H-12
Wood Waste Percent vs. Bulk Sulfide Results
Grays Harbor Historical Seaport Authority

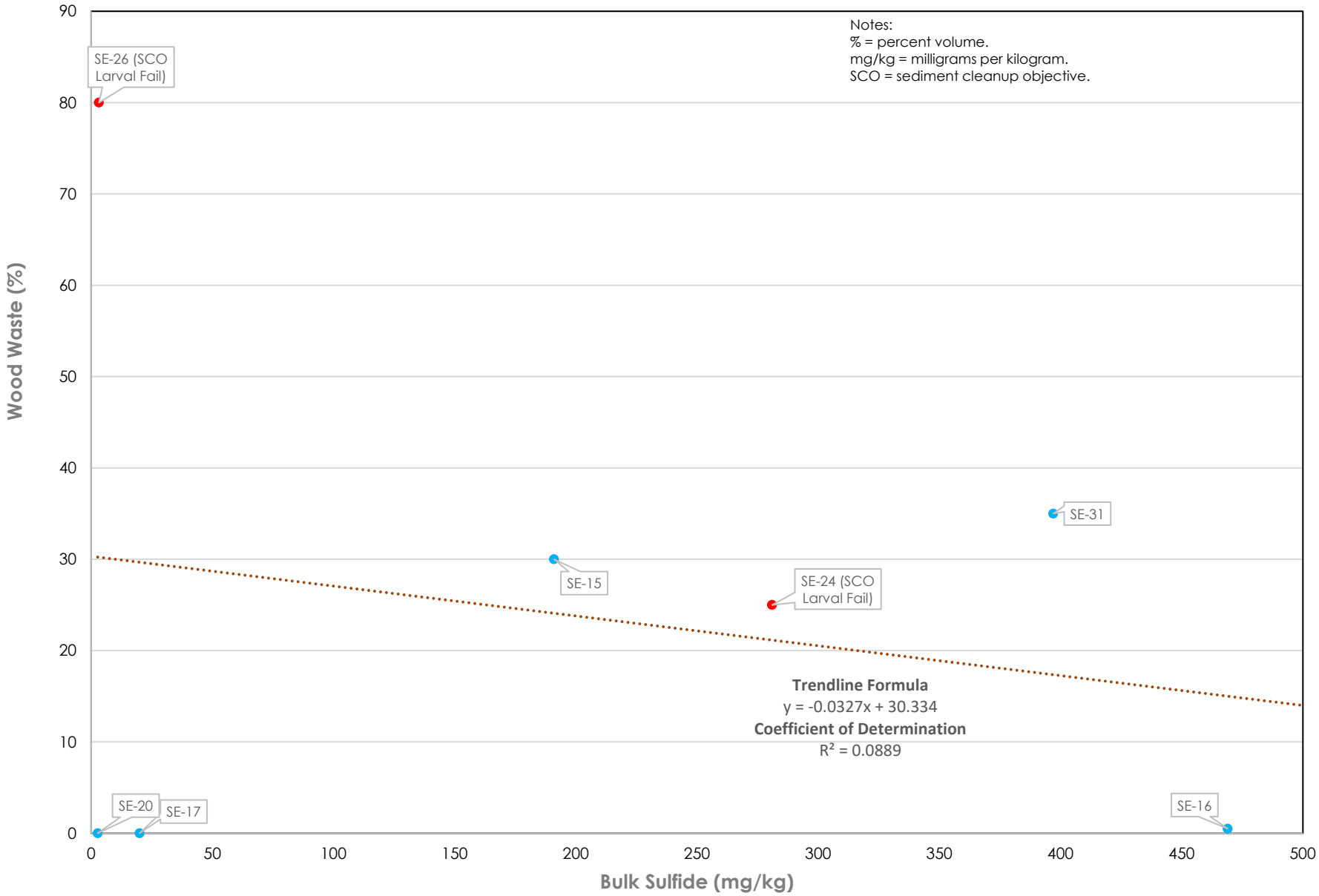

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Figure H-13
Wood Waste Percent vs. Ammonia Results
Grays Harbor Historical Seaport Authority

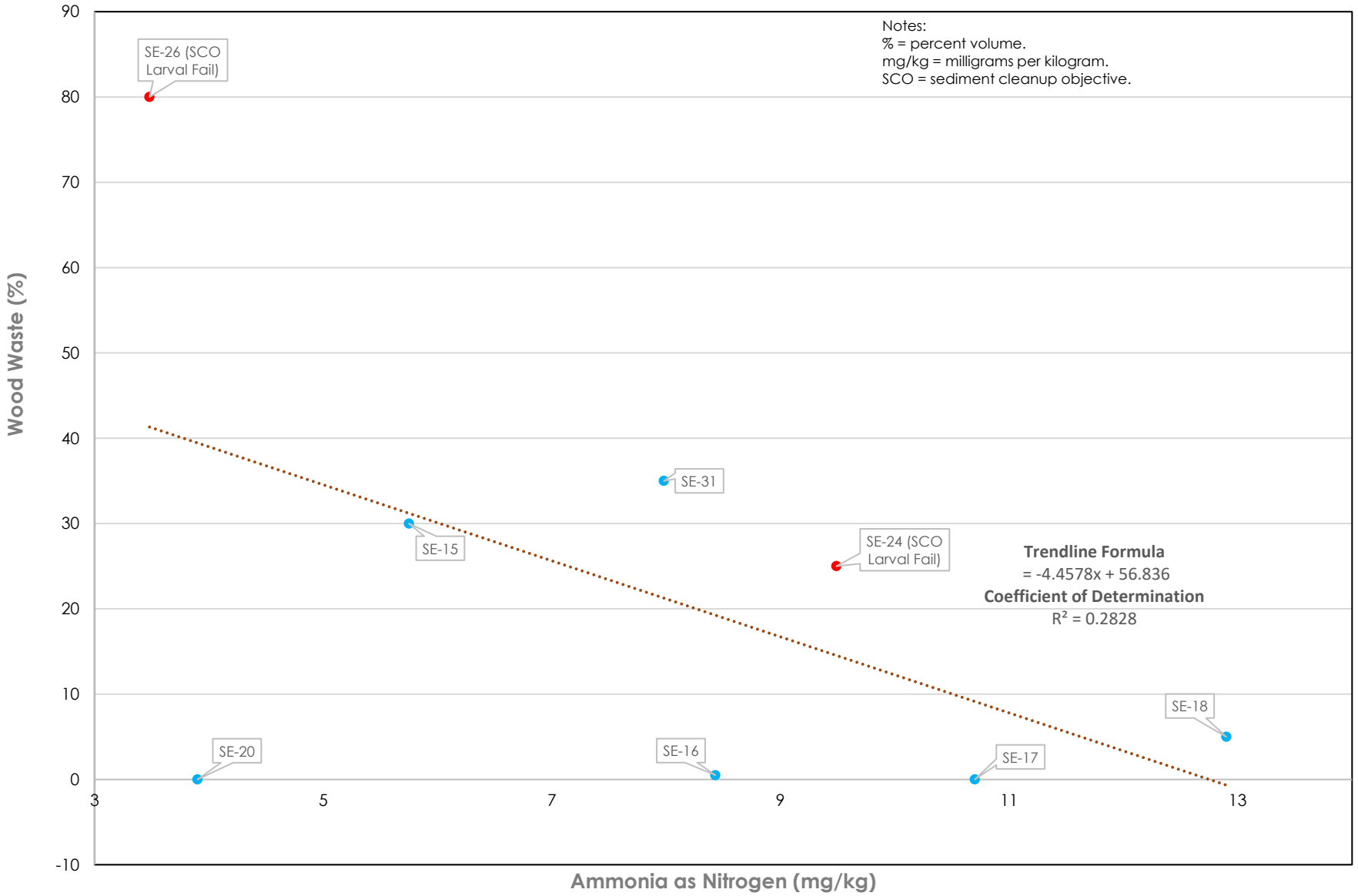
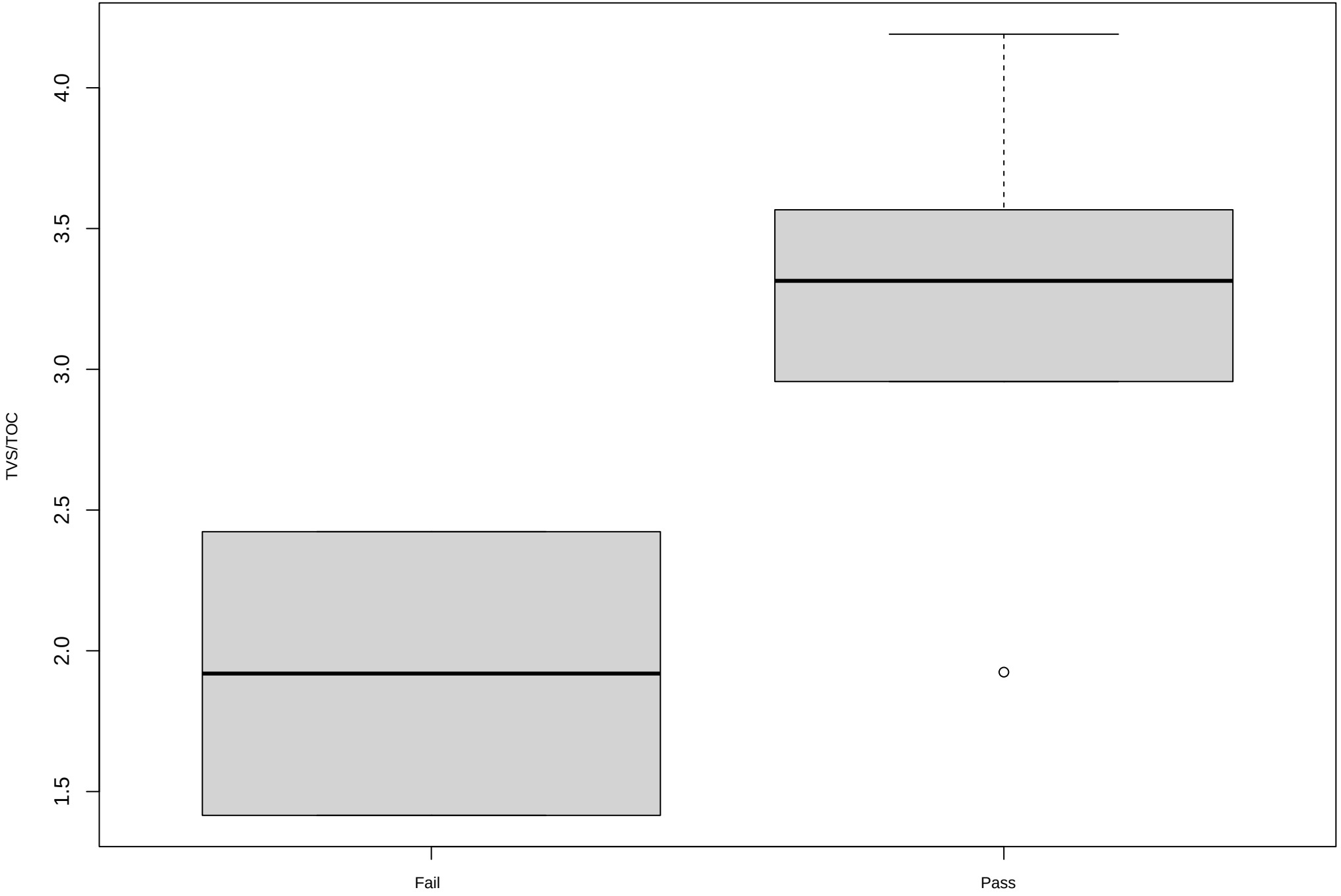


Figure H−14
TVS/TOC vs. Bioassay Results
Grays Harbor Historical Seaport Authority



NOTES:
SCO = sediment cleanup objective.
TOC = total organic carbon.
TVS = total volatile solids.

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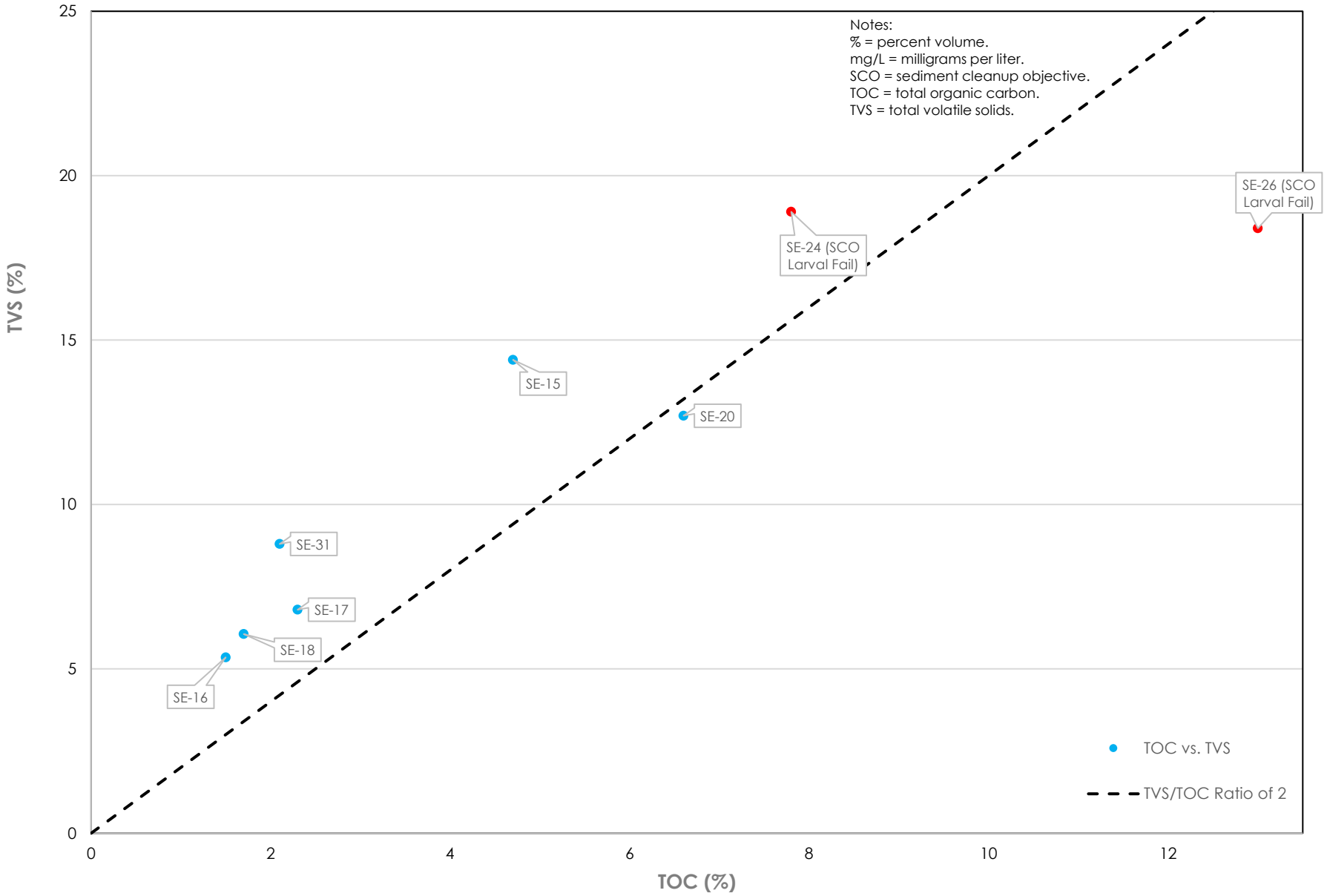
Figure H-15
TOC vs. TVS Results
Grays Harbor Historical Seaport Authority



APPENDIX I
LABORATORY REPORTS

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Thursday, January 9, 2020

Emily Hess
Maul Foster & Alongi, INC.
2001 NW 19th Ave, STE 200
Portland, OR 97209

RE: A9I0822 - Seaport Tidelands - 1044.02.06-02

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A9I0822, which was received by the laboratory on 9/25/2019 at 12:32:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: pnerenberg@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1	5.0 degC

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SE-05a-2.0-3.0	A9I0822-01	Sediment	09/23/19 14:00	09/25/19 12:32
SE-29-0-2.0	A9I0822-02	Sediment	09/24/19 08:50	09/25/19 12:32
SE-08a-0-1.0	A9I0822-03	Sediment	09/24/19 10:00	09/25/19 12:32
SE-08c-3.2-4.2	A9I0822-05	Sediment	09/24/19 14:45	09/25/19 12:32

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Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

ANALYTICAL CASE NARRATIVE

Work Order: A9I0822

Amended Report Revision 1:

This report supersedes all previous reports.

The previous report version was missing one of the subcontracted sulfide results, all are included in this version.

Philip Nerenberg
Lab Director
12/2/19

Amended Report Revision 2:

This report supersedes all previous reports.

Due to client request, 1-methylnaphthalene was added to the SVOC analyte list after the previous report version had been completed.

Philip Nerenberg
Lab Director
1/9/20

Apex Laboratories, LLC
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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Acid/Silica Gel Cleanup

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-29-0-2.0 (A9I0822-02)				**Matrix: Sediment**		**Batch: 9101201**		
Diesel	ND	23.2	46.5	mg/kg dry	1	10/16/19 21:07	NWTPH-Dx/SG	
Oil	**385**	46.5	93.0	mg/kg dry	1	10/16/19 21:07	NWTPH-Dx/SG	**F-03**
Surrogate: o-Terphenyl (Surr)		*Recovery: 92 %*		*Limits: 50-150 %*	*1*	*10/16/19 21:07*	*NWTPH-Dx/SG*	

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Philip Nerenberg, Lab Director

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-29-0-2.0 (A9I0822-02)				**Matrix: Sediment**		**Batch: 9091374**		
Gasoline Range Organics	ND	9.53	19.1	mg/kg dry	50	09/27/19 12:43	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*113 %*	*Limits: 50-150 %*	*1*	*09/27/19 12:43*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*104 %*	*50-150 %*	*1*	*09/27/19 12:43*	*NWTPH-Gx (MS)*	

Apex Laboratories

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Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

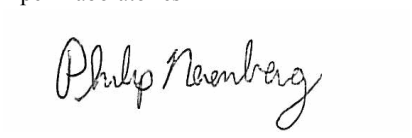
Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

ANALYTICAL SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-29-0-2.0 (A9I0822-02)				**Matrix: Sediment**		**Batch: 9091456**		**C-07**
Aroclor 1016	ND	11.6	23.2	ug/kg dry	1	10/03/19 17:48	EPA 8082A	
Aroclor 1221	ND	11.6	23.2	ug/kg dry	1	10/03/19 17:48	EPA 8082A	
Aroclor 1232	ND	11.6	23.2	ug/kg dry	1	10/03/19 17:48	EPA 8082A	
Aroclor 1242	ND	11.6	23.2	ug/kg dry	1	10/03/19 17:48	EPA 8082A	
Aroclor 1248	ND	11.6	23.2	ug/kg dry	1	10/03/19 17:48	EPA 8082A	
Aroclor 1254	ND	11.6	23.2	ug/kg dry	1	10/03/19 17:48	EPA 8082A	
Aroclor 1260	**38.9**	11.6	23.2	ug/kg dry	1	10/03/19 17:48	EPA 8082A	
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 83 %*		*Limits: 60-125 %*	*1*	*10/03/19 17:48*	*EPA 8082A*	

Apex Laboratories



Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
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Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-29-0-2.0 (A9I0822-02RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Acenaphthene	**0.135**	0.0305	0.0612	mg/kg dry	10	10/02/19 13:40	EPA 8270D	**Q-42**
Acenaphthylene	ND	0.0305	0.0612	mg/kg dry	10	10/02/19 13:40	EPA 8270D	
Anthracene	**0.204**	0.0305	0.0612	mg/kg dry	10	10/02/19 13:40	EPA 8270D	**Q-42**
Benz(a)anthracene	**0.218**	0.0305	0.0612	mg/kg dry	10	10/02/19 13:40	EPA 8270D	**Q-42**
Benzo(a)pyrene	**0.154**	0.0458	0.0917	mg/kg dry	10	10/02/19 13:40	EPA 8270D	**Q-42**
Benzo(b)fluoranthene	**0.180**	0.0458	0.0917	mg/kg dry	10	10/02/19 13:40	EPA 8270D	**Q-42**
Benzo(k)fluoranthene	**0.0758**	0.0458	0.0917	mg/kg dry	10	10/02/19 13:40	EPA 8270D	**Q-42, J**
Benzo(g,h,i)perylene	**0.0680**	0.0305	0.0612	mg/kg dry	10	10/02/19 13:40	EPA 8270D	**Q-42**
Chrysene	**0.199**	0.0305	0.0612	mg/kg dry	10	10/02/19 13:40	EPA 8270D	**Q-42**
Dibenz(a,h)anthracene	ND	0.0305	0.0612	mg/kg dry	10	10/02/19 13:40	EPA 8270D	
Fluoranthene	**1.15**	0.0305	0.0612	mg/kg dry	10	10/02/19 13:40	EPA 8270D	**Q-42**
Fluorene	**0.136**	0.0305	0.0612	mg/kg dry	10	10/02/19 13:40	EPA 8270D	**Q-42**
Indeno(1,2,3-cd)pyrene	**0.0695**	0.0305	0.0612	mg/kg dry	10	10/02/19 13:40	EPA 8270D	**Q-42**
1-Methylnaphthalene	**0.0767**	0.0612	0.122	mg/kg dry	10	10/02/19 13:40	EPA 8270D	**Q-42, J**
2-Methylnaphthalene	**0.149**	0.0612	0.122	mg/kg dry	10	10/02/19 13:40	EPA 8270D	**Q-42**
Naphthalene	**0.491**	0.0612	0.122	mg/kg dry	10	10/02/19 13:40	EPA 8270D	**Q-42**
Phenanthrene	**0.491**	0.0305	0.0612	mg/kg dry	10	10/02/19 13:40	EPA 8270D	**Q-42**
Pyrene	**0.823**	0.0305	0.0612	mg/kg dry	10	10/02/19 13:40	EPA 8270D	**Q-42**
Dibenzofuran	**0.145**	0.0305	0.0612	mg/kg dry	10	10/02/19 13:40	EPA 8270D	**Q-42**
2,4-Dimethylphenol	ND	0.153	0.305	mg/kg dry	10	10/02/19 13:40	EPA 8270D	
2-Methylphenol	ND	0.0763	0.153	mg/kg dry	10	10/02/19 13:40	EPA 8270D	
3+4-Methylphenol(s)	**1.60**	0.0763	0.153	mg/kg dry	10	10/02/19 13:40	EPA 8270D	
Pentachlorophenol (PCP)	ND	0.305	0.612	mg/kg dry	10	10/02/19 13:40	EPA 8270D	
Phenol	**0.571**	0.0612	0.122	mg/kg dry	10	10/02/19 13:40	EPA 8270D	**M-04, Q-42**
Bis(2-ethylhexyl)phthalate	ND	0.458	0.917	mg/kg dry	10	10/02/19 13:40	EPA 8270D	
Butyl benzyl phthalate	ND	0.153	0.305	mg/kg dry	10	10/02/19 13:40	EPA 8270D	
Diethylphthalate	ND	0.153	0.305	mg/kg dry	10	10/02/19 13:40	EPA 8270D	
Dimethylphthalate	ND	0.153	0.305	mg/kg dry	10	10/02/19 13:40	EPA 8270D	
Di-n-butylphthalate	**0.213**	0.153	0.305	mg/kg dry	10	10/02/19 13:40	EPA 8270D	**Q-42, J**
Di-n-octyl phthalate	ND	0.245	0.305	mg/kg dry	10	10/02/19 13:40	EPA 8270D	
N-Nitrosodiphenylamine	ND	0.0763	0.153	mg/kg dry	10	10/02/19 13:40	EPA 8270D	
Hexachlorobenzene	ND	0.0305	0.0612	mg/kg dry	10	10/02/19 13:40	EPA 8270D	
Hexachlorobutadiene	ND	0.0763	0.153	mg/kg dry	10	10/02/19 13:40	EPA 8270D	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-29-0-2.0 (A9I0822-02RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Hexachlorocyclopentadiene	ND	0.153	0.305	mg/kg dry	10	10/02/19 13:40	EPA 8270D	Q-42
1,2-Dichlorobenzene	ND	0.0763	0.153	mg/kg dry	10	10/02/19 13:40	EPA 8270D	
1,4-Dichlorobenzene	ND	0.0763	0.153	mg/kg dry	10	10/02/19 13:40	EPA 8270D	
1,2,4-Trichlorobenzene	ND	0.0763	0.153	mg/kg dry	10	10/02/19 13:40	EPA 8270D	
Benzoic acid	ND	3.83	7.63	mg/kg dry	10	10/02/19 13:40	EPA 8270D	
Benzyl alcohol	ND	0.153	0.305	mg/kg dry	10	10/02/19 13:40	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*69 %*	*Limits: 37-122 %*	*10*	*10/02/19 13:40*	*EPA 8270D*	
2-Fluorobiphenyl (Surr)			*68 %*	*44-115 %*	*10*	*10/02/19 13:40*	*EPA 8270D*	
Phenol-d6 (Surr)			*73 %*	*33-122 %*	*10*	*10/02/19 13:40*	*EPA 8270D*	
p-Terphenyl-d14 (Surr)			*69 %*	*54-127 %*	*10*	*10/02/19 13:40*	*EPA 8270D*	
2-Fluorophenol (Surr)			*68 %*	*35-115 %*	*10*	*10/02/19 13:40*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*102 %*	*39-132 %*	*10*	*10/02/19 13:40*	*EPA 8270D*	

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ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020A (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-29-0-2.0 (A9I0822-02)				**Matrix: Sediment**				
Batch: 9100517								
Arsenic	**7.45**	0.579	1.16	mg/kg dry	5	10/03/19 00:28	EPA 6020A	
Cadmium	**0.188**	0.116	0.231	mg/kg dry	5	10/03/19 00:28	EPA 6020A	**J**
Chromium	**35.1**	0.579	1.16	mg/kg dry	5	10/03/19 00:28	EPA 6020A	
Copper	**92.5**	1.16	2.31	mg/kg dry	5	10/03/19 00:28	EPA 6020A	**Q-42**
Lead	**16.2**	0.116	0.231	mg/kg dry	5	10/03/19 00:28	EPA 6020A	**Q-42**
Nickel	**33.8**	2.31	4.63	mg/kg dry	5	10/03/19 00:28	EPA 6020A	
Selenium	**0.644**	0.579	1.16	mg/kg dry	5	10/03/19 00:28	EPA 6020A	**J**
Silver	ND	0.116	0.231	mg/kg dry	5	10/03/19 00:28	EPA 6020A	
Zinc	**84.6**	2.31	4.63	mg/kg dry	5	10/03/19 00:28	EPA 6020A	

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ANALYTICAL SAMPLE RESULTS

Ammonia by Plumb Extraction, Gas Diffusion and Colorimetric Detection

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-05a-2.0-3.0 (A9I0822-01RE1)				**Matrix: Sediment**		**Batch: 9091360**		
Ammonia as N	**47.1**	0.205	0.205	mg/kg dry	1	09/27/19 15:25	Plumb/SM 4500-NH3 G	
SE-29-0-2.0 (A9I0822-02RE1)				**Matrix: Sediment**		**Batch: 9091360**		
Ammonia as N	**4.76**	0.222	0.222	mg/kg dry	1	09/27/19 15:27	Plumb/SM 4500-NH3 G	
SE-08a-0-1.0 (A9I0822-03RE1)				**Matrix: Sediment**		**Batch: 9091360**		
Ammonia as N	**8.65**	0.278	0.278	mg/kg dry	1	09/27/19 15:31	Plumb/SM 4500-NH3 G	
SE-08c-3.2-4.2 (A9I0822-05RE1)				**Matrix: Sediment**		**Batch: 9091360**		
Ammonia as N	**36.3**	0.220	0.220	mg/kg dry	1	09/27/19 15:33	Plumb/SM 4500-NH3 G	

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ANALYTICAL SAMPLE RESULTS

Demand Parameters

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-05a-2.0-3.0 (A9I0822-01)				**Matrix: Sediment**				
Batch: 9091362								
Total Organic Carbon	**23000**	200	200	mg/kg	1	10/07/19 10:00	EPA 9060Amod	
SE-29-0-2.0 (A9I0822-02)				**Matrix: Sediment**				
Batch: 9091362								
Total Organic Carbon	**99000**	200	200	mg/kg	1	10/07/19 10:58	EPA 9060Amod	
SE-08a-0-1.0 (A9I0822-03)				**Matrix: Sediment**				
Batch: 9091362								
Total Organic Carbon	**68000**	200	200	mg/kg	1	10/07/19 13:00	EPA 9060Amod	
SE-08c-3.2-4.2 (A9I0822-05)				**Matrix: Sediment**				
Batch: 9091362								
Total Organic Carbon	**71000**	200	200	mg/kg	1	10/07/19 13:25	EPA 9060Amod	

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ANALYTICAL SAMPLE RESULTS

Solid and Moisture Determinations

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-05a-2.0-3.0 (A9I0822-01)				**Matrix: Sediment**				
Batch: 9091443								
Total Solids	**47.8**	1.00	1.00	%	1	10/01/19 13:08	PSEP 1986	
Batch: 9091474								
Total Volatile Solids	**7.49**	1.00	1.00	%	1	10/02/19 15:31	SM 2540 G	
SE-29-0-2.0 (A9I0822-02)				**Matrix: Sediment**				
Batch: 9091443								
Total Solids	**42.9**	1.00	1.00	%	1	10/01/19 13:08	PSEP 1986	
Batch: 9091474								
Total Volatile Solids	**27.4**	1.00	1.00	%	1	10/02/19 15:31	SM 2540 G	
SE-08a-0-1.0 (A9I0822-03)				**Matrix: Sediment**				
Batch: 9091443								
Total Solids	**35.8**	1.00	1.00	%	1	10/01/19 13:08	PSEP 1986	
Batch: 9091474								
Total Volatile Solids	**31.7**	1.00	1.00	%	1	10/02/19 15:31	SM 2540 G	
SE-08c-3.2-4.2 (A9I0822-05)				**Matrix: Sediment**				
Batch: 9091443								
Total Solids	**44.0**	1.00	1.00	%	1	10/01/19 13:08	PSEP 1986	
Batch: 9091474								
Total Volatile Solids	**19.8**	1.00	1.00	%	1	10/02/19 15:31	SM 2540 G	

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ANALYTICAL SAMPLE RESULTS

Grain Size by ASTM D 422m/PSET Parameters

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-29-0-2.0 (A9I0822-02)				**Matrix: Sediment**		**Batch: 9100739**		
Gravel (>2.00mm)	**32.4**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 4.75 mm sieve (#4)	**27.7**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 2.00 mm sieve (#10)	**4.64**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Sand (0.063mm - 2.00mm)	**26.8**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.85 mm sieve (#20)	**4.27**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.425 mm sieve (#40)	**4.79**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.250 mm sieve (#60)	**4.44**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.150 mm sieve (#100)	**3.56**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.106 mm sieve (#140)	**3.05**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.075 mm sieve (#200)	**4.17**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.063 mm sieve (#230)	**2.55**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Silt (0.005mm < 0.063mm)	**33.3**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Clay (< 0.005 mm)	**7.50**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**

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ANALYTICAL SAMPLE RESULTS

Percent Dry Weight

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-05a-2.0-3.0 (A9I0822-01)				**Matrix: Sediment**		**Batch: 9091443**		
% Solids	**47.8**	1.00	1.00	%	1	10/01/19 13:08	EPA 8000C	
SE-29-0-2.0 (A9I0822-02)				**Matrix: Sediment**		**Batch: 9091443**		
% Solids	**42.9**	1.00	1.00	%	1	10/01/19 13:08	EPA 8000C	
SE-08a-0-1.0 (A9I0822-03)				**Matrix: Sediment**		**Batch: 9091443**		
% Solids	**35.8**	1.00	1.00	%	1	10/01/19 13:08	EPA 8000C	
SE-08c-3.2-4.2 (A9I0822-05)				**Matrix: Sediment**		**Batch: 9091443**		
% Solids	**44.0**	1.00	1.00	%	1	10/01/19 13:08	EPA 8000C	

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Analytical Resources, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

Metals and Metallic Compounds

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-29-0-2.0 (A9I0822-02)				**Matrix: Sediment**		**Batch: BHI0876**		
Batch: BHI0876								
Mercury	**0.107**	0.00992	0.0472	mg/kg dry	1	10/01/19 14:58	EPA 7471B	

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Analytical Resources, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

Wet Chemistry

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-05a-2.0-3.0 (A9I0822-01)				**Matrix: Sediment**		**Batch: BHI0874**		
Batch: BHI0874								
Total Solids, Sulfide	**44.07**	0.04	0.04	%	1	09/30/19 01:32	PSEP 1986	
Batch: BHI0893								
Sulfide	**4040**	408	408	mg/kg dry	200	10/03/19 15:30	SM 4500-S2 D-00	**D**
SE-29-0-2.0 (A9I0822-02)				**Matrix: Sediment**		**Batch: BHI0874**		
Batch: BHI0874								
Total Solids, Sulfide	**40.27**	0.04	0.04	%	1	09/30/19 01:32	PSEP 1986	
Batch: BHI0893								
Sulfide	**1510**	123	123	mg/kg dry	50	10/03/19 15:30	SM 4500-S2 D-00	**D**
SE-08a-0-1.0 (A9I0822-03)				**Matrix: Sediment**		**Batch: BHI0874**		
Batch: BHI0874								
Total Solids, Sulfide	**34.15**	0.04	0.04	%	1	09/30/19 01:32	PSEP 1986	
Batch: BHI0893								
Sulfide	**153**	13.8	13.8	mg/kg dry	5	10/03/19 15:33	SM 4500-S2 D-00	**D**
SE-08c-3.2-4.2 (A9I0822-05)				**Matrix: Sediment**		**Batch: BHI0874**		
Batch: BHI0874								
Total Solids, Sulfide	**44.83**	0.04	0.04	%	1	09/30/19 01:32	PSEP 1986	
Batch: BHI0893								
Sulfide	**124**	11.0	11.0	mg/kg dry	5	10/03/19 15:34	SM 4500-S2 D-00	**D**

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QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Acid/Silica Gel Cleanup

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9101201 - EPA 3546 w/SG+Acid (NWTPH)							**Sediment**					
Blank (9101201-BLK1)			Prepared: 10/01/19 12:56		Analyzed: 10/16/19 20:20							
NWTPH-Dx/SG												
Diesel	ND	9.09	25.0	mg/kg wet	1	---	---	---	---	---	---	
Oil	ND	18.2	50.0	mg/kg wet	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 93 %*		*Limits: 50-150 %*			*Dilution: 1x*				
LCS (9101201-BS1)			Prepared: 10/01/19 12:56		Analyzed: 10/16/19 20:43							
NWTPH-Dx/SG												
Diesel	125	10.0	25.0	mg/kg wet	1	125	---	100	76-115%	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 97 %*		*Limits: 50-150 %*			*Dilution: 1x*				
Matrix Spike (9101201-MS1)			Prepared: 10/01/19 12:56		Analyzed: 10/16/19 21:31							
QC Source Sample: SE-29-0-2.0 (A9I0822-02)												
NWTPH-Dx/SG												
Diesel	251	23.3	46.5	mg/kg dry	1	291	ND	86	50-150%	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 90 %*		*Limits: 50-150 %*			*Dilution: 1x*				
Matrix Spike Dup (9101201-MSD1)			Prepared: 10/01/19 12:56		Analyzed: 10/16/19 21:55							
QC Source Sample: SE-29-0-2.0 (A9I0822-02)												
NWTPH-Dx/SG												
Diesel	308	23.0	46.1	mg/kg dry	1	288	ND	107	50-150%	20	50%	
Surr: o-Terphenyl (Surr)			*Recovery: 87 %*		*Limits: 50-150 %*			*Dilution: 1x*				

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Philip Nerenberg, Lab Director

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503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9091374 - EPA 5035A							**Soil**					
Blank (9091374-BLK1)			Prepared: 09/27/19 10:00 Analyzed: 09/27/19 11:48									
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	1.67	3.33	mg/kg wet	50	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 104 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*103 %*	*50-150 %*			*"*					
LCS (9091374-BS2)			Prepared: 09/27/19 10:00 Analyzed: 09/27/19 11:21									
NWTPH-Gx (MS)												
Gasoline Range Organics	24.9	2.50	5.00	mg/kg wet	50	25.0	---	100	80-120%	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 107 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*103 %*	*50-150 %*			*"*					
Duplicate (9091374-DUP1)			Prepared: 09/26/19 20:17 Analyzed: 09/27/19 18:49									V-15
QC Source Sample: Non-SDG (A9I0851-08)												
Gasoline Range Organics	ND	2.93	5.85	mg/kg dry	50	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 109 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*106 %*	*50-150 %*			*"*					

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9091456 - EPA 3546							**Sediment**					
Blank (9091456-BLK1)			Prepared: 09/30/19 13:58		Analyzed: 10/03/19 17:13							**C-07**
EPA 8082A												
Aroclor 1016	ND	4.55	9.09	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1221	ND	4.55	9.09	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1232	ND	4.55	9.09	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1242	ND	4.55	9.09	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1248	ND	4.55	9.09	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1254	ND	4.55	9.09	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1260	ND	4.55	9.09	ug/kg wet	1	---	---	---	---	---	---	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 107 %*		*Limits: 60-125 %*				*Dilution: 1x*			
LCS (9091456-BS1)			Prepared: 09/30/19 13:58		Analyzed: 10/03/19 17:31							**C-07**
EPA 8082A												
Aroclor 1016	178	5.00	10.0	ug/kg wet	1	250	---	71	47-134%	---	---	
Aroclor 1260	221	5.00	10.0	ug/kg wet	1	250	---	88	53-140%	---	---	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 108 %*		*Limits: 60-125 %*				*Dilution: 1x*			
Duplicate (9091456-DUP1)			Prepared: 09/30/19 13:58		Analyzed: 10/03/19 18:24							**C-07**
QC Source Sample: SE-29-0-2.0 (A9I0822-02)												
EPA 8082A												
Aroclor 1016	ND	11.5	23.1	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1221	ND	11.5	23.1	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1232	ND	11.5	23.1	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1242	ND	11.5	23.1	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1248	ND	11.5	23.1	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1254	ND	11.5	23.1	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1260	**109**	11.5	23.1	ug/kg dry	1	---	38.9	---	---	**95**	**30%**	Q-05
Surr: Decachlorobiphenyl (Surr)			*Recovery: 73 %*		*Limits: 60-125 %*				*Dilution: 1x*			
Matrix Spike (9091456-MS1)			Prepared: 09/30/19 13:58		Analyzed: 10/03/19 18:59							**C-07**
QC Source Sample: SE-29-0-2.0 (A9I0822-02)												
EPA 8082A												
Aroclor 1016	389	11.4	22.9	ug/kg dry	1	572	ND	68	47-134%	---	---	
Aroclor 1260	585	11.4	22.9	ug/kg dry	1	572	38.9	95	53-140%	---	---	

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Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9091456 - EPA 3546							**Sediment**					
Matrix Spike (9091456-MS1)			Prepared: 09/30/19 13:58		Analyzed: 10/03/19 18:59							**C-07**
QC Source Sample: SE-29-0-2.0 (A9I0822-02)												
Surr: Decachlorobiphenyl (Surr)			*Recovery: 91 %*	*Limits: 60-125 %*			*Dilution: 1x*					
Matrix Spike (9091456-MS2)			Prepared: 09/30/19 14:01		Analyzed: 10/03/19 18:24							**C-07**
QC Source Sample: Non-SDG (A9I0893-13)												
EPA 8082A												
Aroclor 1016	428	12.1	24.2	ug/kg dry	1	604	ND	71	47-134%	---	---	
Aroclor 1260	482	12.1	24.2	ug/kg dry	1	604	ND	80	53-140%	---	---	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 87 %*	*Limits: 60-125 %*			*Dilution: 1x*					
Matrix Spike Dup (9091456-MSD1)			Prepared: 09/30/19 13:58		Analyzed: 10/03/19 19:34							**C-07**
QC Source Sample: SE-29-0-2.0 (A9I0822-02)												
EPA 8082A												
Aroclor 1016	376	11.5	22.9	ug/kg dry	1	573	ND	66	47-134%	3	30%	
Aroclor 1260	554	11.5	22.9	ug/kg dry	1	573	38.9	90	53-140%	5	30%	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 96 %*	*Limits: 60-125 %*			*Dilution: 1x*					
Matrix Spike Dup (9091456-MSD2)			Prepared: 09/30/19 14:01		Analyzed: 10/03/19 18:59							**C-07**
QC Source Sample: Non-SDG (A9I0893-13)												
Aroclor 1016	353	12.2	24.4	ug/kg dry	1	609	ND	58	47-134%	19	30%	
Aroclor 1260	388	12.2	24.4	ug/kg dry	1	609	ND	64	53-140%	22	30%	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 70 %*	*Limits: 60-125 %*			*Dilution: 1x*					

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Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Blank (9100490-BLK1)			Prepared: 10/01/19 10:34		Analyzed: 10/01/19 21:24							
EPA 8270D												
Acenaphthene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Acenaphthylene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Anthracene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Benz(a)anthracene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Benzo(a)pyrene	ND	0.00188	0.00375	mg/kg wet	1	---	---	---	---	---	---	
Benzo(b)fluoranthene	ND	0.00188	0.00375	mg/kg wet	1	---	---	---	---	---	---	
Benzo(k)fluoranthene	ND	0.00188	0.00375	mg/kg wet	1	---	---	---	---	---	---	
Benzo(g,h,i)perylene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Chrysene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Dibenz(a,h)anthracene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Fluoranthene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Fluorene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Indeno(1,2,3-cd)pyrene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
1-Methylnaphthalene	ND	0.00250	0.00500	mg/kg wet	1	---	---	---	---	---	---	
2-Methylnaphthalene	ND	0.00250	0.00500	mg/kg wet	1	---	---	---	---	---	---	
Naphthalene	ND	0.00250	0.00500	mg/kg wet	1	---	---	---	---	---	---	
Phenanthrene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Pyrene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Carbazole	ND	0.00188	0.00375	mg/kg wet	1	---	---	---	---	---	---	
Dibenzofuran	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
4-Chloro-3-methylphenol	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	
2-Chlorophenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
2,4-Dichlorophenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
2,4-Dimethylphenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
2,4-Dinitrophenol	ND	0.0312	0.0625	mg/kg wet	1	---	---	---	---	---	---	
4,6-Dinitro-2-methylphenol	ND	0.0312	0.0625	mg/kg wet	1	---	---	---	---	---	---	
2-Methylphenol	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
3+4-Methylphenol(s)	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
2-Nitrophenol	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	
4-Nitrophenol	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	
Pentachlorophenol (PCP)	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	
Phenol	ND	0.00250	0.00500	mg/kg wet	1	---	---	---	---	---	---	
2,3,4,6-Tetrachlorophenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Blank (9100490-BLK1)			Prepared: 10/01/19 10:34		Analyzed: 10/01/19 21:24							
2,3,5,6-Tetrachlorophenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
2,4,5-Trichlorophenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
2,4,6-Trichlorophenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Bis(2-ethylhexyl)phthalate	ND	0.0188	0.0375	mg/kg wet	1	---	---	---	---	---	---	
Butyl benzyl phthalate	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Diethylphthalate	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Dimethylphthalate	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Di-n-butylphthalate	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Di-n-octyl phthalate	ND	0.0100	0.0125	mg/kg wet	1	---	---	---	---	---	---	
N-Nitrosodimethylamine	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
N-Nitroso-di-n-propylamine	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
N-Nitrosodiphenylamine	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Bis(2-Chloroethoxy) methane	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Bis(2-Chloroethyl) ether	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
2,2'-Oxybis(1-Chloropropane)	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Hexachlorobenzene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Hexachlorocyclopentadiene	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Hexachloroethane	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
2-Chloronaphthalene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
4-Bromophenyl phenyl ether	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
4-Chlorophenyl phenyl ether	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Aniline	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
4-Chloroaniline	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
2-Nitroaniline	ND	0.0250	0.0500	mg/kg wet	1	---	---	---	---	---	---	
3-Nitroaniline	ND	0.0250	0.0500	mg/kg wet	1	---	---	---	---	---	---	
4-Nitroaniline	ND	0.0250	0.0500	mg/kg wet	1	---	---	---	---	---	---	
Nitrobenzene	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	
2,4-Dinitrotoluene	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	
2,6-Dinitrotoluene	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Blank (9100490-BLK1)			Prepared: 10/01/19 10:34		Analyzed: 10/01/19 21:24							
Benzoic acid	ND	0.157	0.312	mg/kg wet	1	---	---	---	---	---	---	
Benzyl alcohol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Isophorone	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Azobenzene (1,2-DPH)	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Bis(2-Ethylhexyl) adipate	ND	0.0312	0.0625	mg/kg wet	1	---	---	---	---	---	---	
3,3'-Dichlorobenzidine	ND	0.0250	0.0500	mg/kg wet	1	---	---	---	---	---	---	Q-52
1,2-Dinitrobenzene	ND	0.0312	0.0625	mg/kg wet	1	---	---	---	---	---	---	
1,3-Dinitrobenzene	ND	0.0312	0.0625	mg/kg wet	1	---	---	---	---	---	---	
1,4-Dinitrobenzene	ND	0.0312	0.0625	mg/kg wet	1	---	---	---	---	---	---	
Pyridine	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 69 %*		*Limits: 37-122 %*				*Dilution: 1x*			
2-Fluorobiphenyl (Surr)			*57 %*		*44-115 %*				*"*			
Phenol-d6 (Surr)			*70 %*		*33-122 %*				*"*			
p-Terphenyl-d14 (Surr)			*76 %*		*54-127 %*				*"*			
2-Fluorophenol (Surr)			*64 %*		*35-115 %*				*"*			
2,4,6-Tribromophenol (Surr)			*60 %*		*39-132 %*				*"*			
LCS (9100490-BS1)			Prepared: 10/01/19 10:34		Analyzed: 10/01/19 21:59							
EPA 8270D												
Acenaphthene	0.366	0.00532	0.0107	mg/kg wet	4	0.533	---	69	40-122%	---	---	
Acenaphthylene	0.391	0.00532	0.0107	mg/kg wet	4	0.533	---	73	32-132%	---	---	
Anthracene	0.415	0.00532	0.0107	mg/kg wet	4	0.533	---	78	47-123%	---	---	
Benz(a)anthracene	0.424	0.00532	0.0107	mg/kg wet	4	0.533	---	79	49-126%	---	---	
Benzo(a)pyrene	0.438	0.00800	0.0160	mg/kg wet	4	0.533	---	82	45-129%	---	---	
Benzo(b)fluoranthene	0.427	0.00800	0.0160	mg/kg wet	4	0.533	---	80	45-132%	---	---	
Benzo(k)fluoranthene	0.423	0.00800	0.0160	mg/kg wet	4	0.533	---	79	47-132%	---	---	
Benzo(g,h,i)perylene	0.445	0.00532	0.0107	mg/kg wet	4	0.533	---	83	43-134%	---	---	
Chrysene	0.414	0.00532	0.0107	mg/kg wet	4	0.533	---	78	50-124%	---	---	
Dibenz(a,h)anthracene	0.424	0.00532	0.0107	mg/kg wet	4	0.533	---	80	45-134%	---	---	
Fluoranthene	0.456	0.00532	0.0107	mg/kg wet	4	0.533	---	85	50-127%	---	---	
Fluorene	0.384	0.00532	0.0107	mg/kg wet	4	0.533	---	72	43-125%	---	---	
Indeno(1,2,3-cd)pyrene	0.402	0.00532	0.0107	mg/kg wet	4	0.533	---	75	45-133%	---	---	
1-Methylnaphthalene	0.368	0.0107	0.0213	mg/kg wet	4	0.533	---	69	40-120%	---	---	
2-Methylnaphthalene	0.374	0.0107	0.0213	mg/kg wet	4	0.533	---	70	38-122%	---	---	

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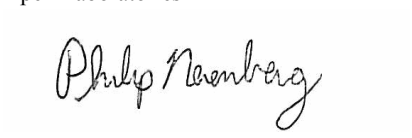

Philip Nerenberg, Lab Director

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6700 S.W. Sandburg Street
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503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
LCS (9100490-BS1)			Prepared: 10/01/19 10:34		Analyzed: 10/01/19 21:59							
Naphthalene	0.359	0.0107	0.0213	mg/kg wet	4	0.533	---	67	35-123%	---	---	
Phenanthrene	0.395	0.00532	0.0107	mg/kg wet	4	0.533	---	74	50-121%	---	---	
Pyrene	0.464	0.00532	0.0107	mg/kg wet	4	0.533	---	87	47-127%	---	---	
Carbazole	0.464	0.00800	0.0160	mg/kg wet	4	0.533	---	87	50-122%	---	---	
Dibenzofuran	0.384	0.00532	0.0107	mg/kg wet	4	0.533	---	72	44-120%	---	---	
4-Chloro-3-methylphenol	0.415	0.0532	0.107	mg/kg wet	4	0.533	---	78	45-122%	---	---	
2-Chlorophenol	0.367	0.0267	0.0532	mg/kg wet	4	0.533	---	69	34-121%	---	---	
2,4-Dichlorophenol	0.384	0.0267	0.0532	mg/kg wet	4	0.533	---	72	40-122%	---	---	
2,4-Dimethylphenol	0.431	0.0267	0.0532	mg/kg wet	4	0.533	---	81	30-127%	---	---	
2,4-Dinitrophenol	0.466	0.133	0.267	mg/kg wet	4	0.533	---	87	5-137%	---	---	
4,6-Dinitro-2-methylphenol	0.517	0.133	0.267	mg/kg wet	4	0.533	---	97	29-132%	---	---	
2-Methylphenol	0.427	0.0133	0.0267	mg/kg wet	4	0.533	---	80	32-122%	---	---	
3+4-Methylphenol(s)	0.434	0.0133	0.0267	mg/kg wet	4	0.533	---	81	34-120%	---	---	
2-Nitrophenol	0.417	0.0532	0.107	mg/kg wet	4	0.533	---	78	36-123%	---	---	
4-Nitrophenol	0.495	0.0532	0.107	mg/kg wet	4	0.533	---	93	30-132%	---	---	
Pentachlorophenol (PCP)	0.434	0.0532	0.107	mg/kg wet	4	0.533	---	81	25-133%	---	---	
Phenol	0.393	0.0107	0.0213	mg/kg wet	4	0.533	---	74	34-120%	---	---	
2,3,4,6-Tetrachlorophenol	0.414	0.0267	0.0532	mg/kg wet	4	0.533	---	78	44-125%	---	---	
2,3,5,6-Tetrachlorophenol	0.429	0.0267	0.0532	mg/kg wet	4	0.533	---	80	40-120%	---	---	
2,4,5-Trichlorophenol	0.416	0.0267	0.0532	mg/kg wet	4	0.533	---	78	41-124%	---	---	
2,4,6-Trichlorophenol	0.405	0.0267	0.0532	mg/kg wet	4	0.533	---	76	39-126%	---	---	
Bis(2-ethylhexyl)phthalate	0.441	0.0800	0.160	mg/kg wet	4	0.533	---	83	51-133%	---	---	
Butyl benzyl phthalate	0.444	0.0267	0.0532	mg/kg wet	4	0.533	---	83	48-132%	---	---	
Diethylphthalate	0.436	0.0267	0.0532	mg/kg wet	4	0.533	---	82	50-124%	---	---	
Dimethylphthalate	0.409	0.0267	0.0532	mg/kg wet	4	0.533	---	77	48-124%	---	---	
Di-n-butylphthalate	0.448	0.0267	0.0532	mg/kg wet	4	0.533	---	84	51-128%	---	---	
Di-n-octyl phthalate	0.457	0.0428	0.0532	mg/kg wet	4	0.533	---	86	44-140%	---	---	
N-Nitrosodimethylamine	0.289	0.0133	0.0267	mg/kg wet	4	0.533	---	54	23-120%	---	---	
N-Nitroso-di-n-propylamine	0.382	0.0133	0.0267	mg/kg wet	4	0.533	---	72	36-120%	---	---	
N-Nitrosodiphenylamine	0.407	0.0133	0.0267	mg/kg wet	4	0.533	---	76	38-127%	---	---	
Bis(2-Chloroethoxy) methane	0.367	0.0133	0.0267	mg/kg wet	4	0.533	---	69	36-121%	---	---	
Bis(2-Chloroethyl) ether	0.316	0.0133	0.0267	mg/kg wet	4	0.533	---	59	31-120%	---	---	Q-41
2,2'-Oxybis(1-Chloropropane)	0.318	0.0133	0.0267	mg/kg wet	4	0.533	---	60	33-131%	---	---	
Hexachlorobenzene	0.403	0.00532	0.0107	mg/kg wet	4	0.533	---	76	44-122%	---	---	

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Philip Nerenberg, Lab Director

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AMENDED REPORT

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
LCS (9100490-BS1)			Prepared: 10/01/19 10:34		Analyzed: 10/01/19 21:59							
Hexachlorobutadiene	0.337	0.0133	0.0267	mg/kg wet	4	0.533	---	63	32-123%	---	---	
Hexachlorocyclopentadiene	0.420	0.0267	0.0532	mg/kg wet	4	0.533	---	79	5-140%	---	---	Q-41
Hexachloroethane	0.323	0.0133	0.0267	mg/kg wet	4	0.533	---	61	28-120%	---	---	
2-Chloronaphthalene	0.379	0.00532	0.0107	mg/kg wet	4	0.533	---	71	41-120%	---	---	
1,2-Dichlorobenzene	0.332	0.0133	0.0267	mg/kg wet	4	0.533	---	62	33-120%	---	---	
1,3-Dichlorobenzene	0.316	0.0133	0.0267	mg/kg wet	4	0.533	---	59	30-120%	---	---	
1,4-Dichlorobenzene	0.321	0.0133	0.0267	mg/kg wet	4	0.533	---	60	31-120%	---	---	
1,2,4-Trichlorobenzene	0.336	0.0133	0.0267	mg/kg wet	4	0.533	---	63	34-120%	---	---	
4-Bromophenyl phenyl ether	0.396	0.0133	0.0267	mg/kg wet	4	0.533	---	74	46-124%	---	---	
4-Chlorophenyl phenyl ether	0.378	0.0133	0.0267	mg/kg wet	4	0.533	---	71	45-121%	---	---	
Aniline	0.327	0.0267	0.0532	mg/kg wet	4	0.533	---	61	7-120%	---	---	
4-Chloroaniline	0.217	0.0133	0.0267	mg/kg wet	4	0.533	---	41	16-120%	---	---	Q-31
2-Nitroaniline	0.414	0.107	0.213	mg/kg wet	4	0.533	---	78	44-127%	---	---	
3-Nitroaniline	0.393	0.107	0.213	mg/kg wet	4	0.533	---	74	33-120%	---	---	
4-Nitroaniline	0.588	0.107	0.213	mg/kg wet	4	0.533	---	110	35-120%	---	---	Q-41
Nitrobenzene	0.375	0.0532	0.107	mg/kg wet	4	0.533	---	70	34-122%	---	---	
2,4-Dinitrotoluene	0.418	0.0532	0.107	mg/kg wet	4	0.533	---	78	48-126%	---	---	
2,6-Dinitrotoluene	0.412	0.0532	0.107	mg/kg wet	4	0.533	---	77	46-124%	---	---	
Benzoic acid	0.659	0.400	0.400	mg/kg wet	4	1.07	---	62	5-140%	---	---	
Benzyl alcohol	0.381	0.0267	0.0532	mg/kg wet	4	0.533	---	71	29-122%	---	---	
Isophorone	0.363	0.0133	0.0267	mg/kg wet	4	0.533	---	68	30-122%	---	---	
Azobenzene (1,2-DPH)	0.359	0.0133	0.0267	mg/kg wet	4	0.533	---	67	39-125%	---	---	
Bis(2-Ethylhexyl) adipate	0.440	0.133	0.267	mg/kg wet	4	0.533	---	83	60-121%	---	---	
3,3'-Dichlorobenzidine	1.32	0.107	0.213	mg/kg wet	4	1.07	---	**124**	**22-121%**	---	---	Q-29, Q-31
1,2-Dinitrobenzene	0.397	0.133	0.267	mg/kg wet	4	0.533	---	75	44-120%	---	---	
1,3-Dinitrobenzene	0.434	0.133	0.267	mg/kg wet	4	0.533	---	81	42-127%	---	---	
1,4-Dinitrobenzene	0.464	0.133	0.267	mg/kg wet	4	0.533	---	87	37-132%	---	---	
Pyridine	0.203	0.0267	0.0532	mg/kg wet	4	0.533	---	38	5-120%	---	---	

Surr: Nitrobenzene-d5 (Surr)	*Recovery: 70 %*	*Limits: 37-122 %*	*Dilution: 4x*
2-Fluorobiphenyl (Surr)	*68 %*	*44-115 %*	*"*
Phenol-d6 (Surr)	*73 %*	*33-122 %*	*"*
p-Terphenyl-d14 (Surr)	*82 %*	*54-127 %*	*"*
2-Fluorophenol (Surr)	*62 %*	*35-115 %*	*"*
2,4,6-Tribromophenol (Surr)	*74 %*	*39-132 %*	*"*

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Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Duplicate (9100490-DUP2)				Prepared: 10/01/19 10:34 Analyzed: 10/02/19 14:15								
QC Source Sample: SE-29-0-2.0 (A9I0822-02RE1)												
EPA 8270D												
Acenaphthene	**0.0710**	0.0306	0.0615	mg/kg dry	10	---	0.135	---	---	**62**	**30%**	Q-04
Acenaphthylene	ND	0.0306	0.0615	mg/kg dry	10	---	ND	---	---	---	30%	
Anthracene	**0.103**	0.0306	0.0615	mg/kg dry	10	---	0.204	---	---	**66**	**30%**	Q-04
Benz(a)anthracene	**0.103**	0.0306	0.0615	mg/kg dry	10	---	0.218	---	---	**71**	**30%**	Q-04
Benzo(a)pyrene	**0.0937**	0.0461	0.0922	mg/kg dry	10	---	0.154	---	---	**48**	**30%**	Q-04
Benzo(b)fluoranthene	**0.100**	0.0461	0.0922	mg/kg dry	10	---	0.180	---	---	**57**	**30%**	Q-04
Benzo(k)fluoranthene	**0.0492**	0.0461	0.0922	mg/kg dry	10	---	0.0758	---	---	**42**	**30%**	Q-04, J
Benzo(g,h,i)perylene	**0.0400**	0.0306	0.0615	mg/kg dry	10	---	0.0680	---	---	**52**	**30%**	Q-04, J
Chrysene	**0.0879**	0.0306	0.0615	mg/kg dry	10	---	0.199	---	---	**78**	**30%**	Q-04
Dibenz(a,h)anthracene	ND	0.0306	0.0615	mg/kg dry	10	---	ND	---	---	---	30%	
Fluoranthene	**0.503**	0.0306	0.0615	mg/kg dry	10	---	1.15	---	---	**78**	**30%**	Q-04
Fluorene	**0.0660**	0.0306	0.0615	mg/kg dry	10	---	0.136	---	---	**69**	**30%**	Q-04
Indeno(1,2,3-cd)pyrene	**0.0339**	0.0306	0.0615	mg/kg dry	10	---	0.0695	---	---	**69**	**30%**	Q-04, J
1-Methylnaphthalene	ND	0.0615	0.123	mg/kg dry	10	---	0.0767	---	---	***	**30%**	Q-04
2-Methylnaphthalene	**0.0696**	0.0615	0.123	mg/kg dry	10	---	0.149	---	---	**72**	**30%**	Q-04, J
Naphthalene	**0.186**	0.0615	0.123	mg/kg dry	10	---	0.491	---	---	**90**	**30%**	Q-04
Phenanthrene	**0.255**	0.0306	0.0615	mg/kg dry	10	---	0.491	---	---	**63**	**30%**	Q-04
Pyrene	**0.347**	0.0306	0.0615	mg/kg dry	10	---	0.823	---	---	**81**	**30%**	Q-04
Carbazole	ND	0.0461	0.0922	mg/kg dry	10	---	0.0536	---	---	***	**30%**	Q-04
Dibenzofuran	**0.0566**	0.0306	0.0615	mg/kg dry	10	---	0.145	---	---	**88**	**30%**	Q-04, J
4-Chloro-3-methylphenol	ND	0.306	0.615	mg/kg dry	10	---	ND	---	---	---	30%	
2-Chlorophenol	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
2,4-Dichlorophenol	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
2,4-Dimethylphenol	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
2,4-Dinitrophenol	ND	0.767	1.54	mg/kg dry	10	---	ND	---	---	---	30%	
4,6-Dinitro-2-methylphenol	ND	0.767	1.54	mg/kg dry	10	---	ND	---	---	---	30%	
2-Methylphenol	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
3+4-Methylphenol(s)	**1.59**	0.0767	0.154	mg/kg dry	10	---	1.60	---	---	0.5	30%	
2-Nitrophenol	ND	0.306	0.615	mg/kg dry	10	---	ND	---	---	---	30%	
4-Nitrophenol	ND	0.306	0.615	mg/kg dry	10	---	ND	---	---	---	30%	
Pentachlorophenol (PCP)	ND	0.306	0.615	mg/kg dry	10	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Duplicate (9100490-DUP2)			Prepared: 10/01/19 10:34		Analyzed: 10/02/19 14:15							
QC Source Sample: SE-29-0-2.0 (A9I0822-02RE1)												
Phenol	**0.199**	0.0615	0.123	mg/kg dry	10	---	0.571	---	---	**97**	**30%**	M-04, Q-04
2,3,4,6-Tetrachlorophenol	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
2,3,5,6-Tetrachlorophenol	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
2,4,5-Trichlorophenol	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
2,4,6-Trichlorophenol	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
Bis(2-ethylhexyl)phthalate	ND	0.461	0.922	mg/kg dry	10	---	ND	---	---	---	30%	
Butyl benzyl phthalate	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
Diethylphthalate	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
Dimethylphthalate	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
Di-n-butylphthalate	ND	0.154	0.306	mg/kg dry	10	---	0.213	---	---	***	**30%**	Q-04
Di-n-octyl phthalate	ND	0.247	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
N-Nitrosodimethylamine	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
N-Nitroso-di-n-propylamine	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
N-Nitrosodiphenylamine	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
Bis(2-Chloroethoxy) methane	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
Bis(2-Chloroethyl) ether	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
2,2'-Oxybis(1-Chloropropane)	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
Hexachlorobenzene	ND	0.0306	0.0615	mg/kg dry	10	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
Hexachlorocyclopentadiene	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
Hexachloroethane	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
2-Chloronaphthalene	ND	0.0306	0.0615	mg/kg dry	10	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
1,3-Dichlorobenzene	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
4-Bromophenyl phenyl ether	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
4-Chlorophenyl phenyl ether	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
Aniline	ND	0.306	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
4-Chloroaniline	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
2-Nitroaniline	ND	0.615	1.23	mg/kg dry	10	---	ND	---	---	---	30%	
3-Nitroaniline	ND	0.615	1.23	mg/kg dry	10	---	ND	---	---	---	30%	
4-Nitroaniline	ND	0.615	1.23	mg/kg dry	10	---	ND	---	---	---	30%	

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Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Duplicate (9100490-DUP2)			Prepared: 10/01/19 10:34 Analyzed: 10/02/19 14:15									
QC Source Sample: SE-29-0-2.0 (A9I0822-02RE1)												
Nitrobenzene	ND	0.306	0.615	mg/kg dry	10	---	ND	---	---	---	30%	
2,4-Dinitrotoluene	ND	0.306	0.615	mg/kg dry	10	---	ND	---	---	---	30%	
2,6-Dinitrotoluene	ND	0.306	0.615	mg/kg dry	10	---	ND	---	---	---	30%	
Benzoic acid	ND	3.85	7.67	mg/kg dry	10	---	ND	---	---	---	30%	
Benzyl alcohol	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
Isophorone	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
Azobenzene (1,2-DPH)	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
Bis(2-Ethylhexyl) adipate	**2.82**	0.767	1.54	mg/kg dry	10	---	2.18	---	---	26	30%	
3,3'-Dichlorobenzidine	ND	0.615	1.23	mg/kg dry	10	---	ND	---	---	---	30%	Q-52
1,2-Dinitrobenzene	ND	0.767	1.54	mg/kg dry	10	---	ND	---	---	---	30%	
1,3-Dinitrobenzene	ND	0.767	1.54	mg/kg dry	10	---	ND	---	---	---	30%	
1,4-Dinitrobenzene	ND	0.767	1.54	mg/kg dry	10	---	ND	---	---	---	30%	
Pyridine	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 71 %*	*Limits: 37-122 %*			*Dilution: 10x*					
2-Fluorobiphenyl (Surr)			*64 %*	*44-115 %*			*"*					
Phenol-d6 (Surr)			*73 %*	*33-122 %*			*"*					
p-Terphenyl-d14 (Surr)			*73 %*	*54-127 %*			*"*					
2-Fluorophenol (Surr)			*71 %*	*35-115 %*			*"*					
2,4,6-Tribromophenol (Surr)			*107 %*	*39-132 %*			*"*					
Matrix Spike (9100490-MS1)			Prepared: 10/01/19 10:34 Analyzed: 10/02/19 14:51									
QC Source Sample: SE-29-0-2.0 (A9I0822-02RE1)												
EPA 8270D												
Acenaphthene	1.24	0.0306	0.0614	mg/kg dry	10	1.23	0.135	90	40-122%	---	---	
Acenaphthylene	1.29	0.0306	0.0614	mg/kg dry	10	1.23	ND	105	32-132%	---	---	
Anthracene	1.33	0.0306	0.0614	mg/kg dry	10	1.23	0.204	92	47-123%	---	---	
Benz(a)anthracene	1.27	0.0306	0.0614	mg/kg dry	10	1.23	0.218	85	49-126%	---	---	
Benzo(a)pyrene	1.31	0.0460	0.0920	mg/kg dry	10	1.23	0.154	94	45-129%	---	---	
Benzo(b)fluoranthene	1.29	0.0460	0.0920	mg/kg dry	10	1.23	0.180	90	45-132%	---	---	
Benzo(k)fluoranthene	1.20	0.0460	0.0920	mg/kg dry	10	1.23	0.0758	91	47-132%	---	---	
Benzo(g,h,i)perylene	1.31	0.0306	0.0614	mg/kg dry	10	1.23	0.0680	101	43-134%	---	---	
Chrysene	1.28	0.0306	0.0614	mg/kg dry	10	1.23	0.199	88	50-124%	---	---	
Dibenz(a,h)anthracene	1.22	0.0306	0.0614	mg/kg dry	10	1.23	ND	100	45-134%	---	---	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
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503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike (9100490-MS1)			Prepared: 10/01/19 10:34		Analyzed: 10/02/19 14:51							
QC Source Sample: SE-29-0-2.0 (A9I0822-02RE1)												
Fluoranthene	1.58	0.0306	0.0614	mg/kg dry	10	1.23	1.15	**35**	**50-127%**	---	---	Q-01
Fluorene	1.30	0.0306	0.0614	mg/kg dry	10	1.23	0.136	95	43-125%	---	---	
Indeno(1,2,3-cd)pyrene	1.14	0.0306	0.0614	mg/kg dry	10	1.23	0.0695	87	45-133%	---	---	
1-Methylnaphthalene	1.25	0.0614	0.123	mg/kg dry	10	1.23	0.0767	96	40-120%	---	---	
2-Methylnaphthalene	1.28	0.0614	0.123	mg/kg dry	10	1.23	0.149	92	38-122%	---	---	
Naphthalene	1.37	0.0614	0.123	mg/kg dry	10	1.23	0.491	71	35-123%	---	---	
Phenanthrene	1.35	0.0306	0.0614	mg/kg dry	10	1.23	0.491	70	50-121%	---	---	
Pyrene	1.49	0.0306	0.0614	mg/kg dry	10	1.23	0.823	55	47-127%	---	---	
Carbazole	1.23	0.0460	0.0920	mg/kg dry	10	1.23	0.0536	96	50-122%	---	---	
Dibenzofuran	1.26	0.0306	0.0614	mg/kg dry	10	1.23	0.145	91	44-120%	---	---	
4-Chloro-3-methylphenol	1.32	0.306	0.614	mg/kg dry	10	1.23	ND	108	45-122%	---	---	
2-Chlorophenol	1.18	0.153	0.306	mg/kg dry	10	1.23	ND	96	34-121%	---	---	
2,4-Dichlorophenol	1.31	0.153	0.306	mg/kg dry	10	1.23	ND	107	40-122%	---	---	
2,4-Dimethylphenol	1.49	0.153	0.306	mg/kg dry	10	1.23	ND	122	30-127%	---	---	
2,4-Dinitrophenol	ND	0.766	1.53	mg/kg dry	10	1.23	ND		**5-137%**	---	---	Q-11, Q-41
4,6-Dinitro-2-methylphenol	0.921	0.766	1.53	mg/kg dry	10	1.23	ND	75	29-132%	---	---	Q-41, J
2-Methylphenol	1.21	0.0766	0.153	mg/kg dry	10	1.23	ND	98	32-122%	---	---	
3+4-Methylphenol(s)	2.87	0.0766	0.153	mg/kg dry	10	1.23	1.60	104	34-120%	---	---	
2-Nitrophenol	1.43	0.306	0.614	mg/kg dry	10	1.23	ND	116	36-123%	---	---	
4-Nitrophenol	1.30	0.306	0.614	mg/kg dry	10	1.23	ND	106	30-132%	---	---	
Pentachlorophenol (PCP)	1.48	0.306	0.614	mg/kg dry	10	1.23	ND	121	25-133%	---	---	
Phenol	1.29	0.0614	0.123	mg/kg dry	10	1.23	0.571	58	34-120%	---	---	
2,3,4,6-Tetrachlorophenol	1.30	0.153	0.306	mg/kg dry	10	1.23	ND	106	44-125%	---	---	
2,3,5,6-Tetrachlorophenol	1.41	0.153	0.306	mg/kg dry	10	1.23	ND	115	40-120%	---	---	
2,4,5-Trichlorophenol	1.36	0.153	0.306	mg/kg dry	10	1.23	ND	111	41-124%	---	---	
2,4,6-Trichlorophenol	1.37	0.153	0.306	mg/kg dry	10	1.23	ND	112	39-126%	---	---	
Bis(2-ethylhexyl)phthalate	1.57	0.460	0.920	mg/kg dry	10	1.23	ND	128	51-133%	---	---	
Butyl benzyl phthalate	1.46	0.153	0.306	mg/kg dry	10	1.23	ND	119	48-132%	---	---	
Diethylphthalate	1.33	0.153	0.306	mg/kg dry	10	1.23	ND	108	50-124%	---	---	
Dimethylphthalate	1.28	0.153	0.306	mg/kg dry	10	1.23	ND	105	48-124%	---	---	
Di-n-butylphthalate	1.41	0.153	0.306	mg/kg dry	10	1.23	0.213	97	51-128%	---	---	
Di-n-octyl phthalate	1.73	0.246	0.306	mg/kg dry	10	1.23	ND	**141**	**44-140%**	---	---	Q-01
N-Nitrosodimethylamine	0.793	0.0766	0.153	mg/kg dry	10	1.23	ND	65	23-120%	---	---	

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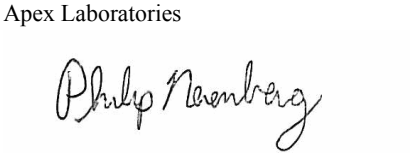

Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike (9100490-MS1)			Prepared: 10/01/19 10:34		Analyzed: 10/02/19 14:51							
QC Source Sample: SE-29-0-2.0 (A9I0822-02RE1)												
N-Nitroso-di-n-propylamine	1.10	0.0766	0.153	mg/kg dry	10	1.23	ND	90	36-120%	---	---	
N-Nitrosodiphenylamine	1.24	0.0766	0.153	mg/kg dry	10	1.23	ND	101	38-127%	---	---	
Bis(2-Chloroethoxy) methane	1.16	0.0766	0.153	mg/kg dry	10	1.23	ND	94	36-121%	---	---	
Bis(2-Chloroethyl) ether	0.923	0.0766	0.153	mg/kg dry	10	1.23	ND	75	31-120%	---	---	
2,2'-Oxybis(1-Chloropropane)	0.929	0.0766	0.153	mg/kg dry	10	1.23	ND	76	33-131%	---	---	
Hexachlorobenzene	1.24	0.0306	0.0614	mg/kg dry	10	1.23	ND	101	44-122%	---	---	
Hexachlorobutadiene	1.19	0.0766	0.153	mg/kg dry	10	1.23	ND	97	32-123%	---	---	
Hexachlorocyclopentadiene	ND	0.153	0.306	mg/kg dry	10	1.23	ND		**5-140%**	---	---	Q-01, Q-41
Hexachloroethane	1.03	0.0766	0.153	mg/kg dry	10	1.23	ND	84	28-120%	---	---	
2-Chloronaphthalene	1.25	0.0306	0.0614	mg/kg dry	10	1.23	ND	102	41-120%	---	---	
1,2-Dichlorobenzene	1.09	0.0766	0.153	mg/kg dry	10	1.23	ND	89	33-120%	---	---	
1,3-Dichlorobenzene	1.06	0.0766	0.153	mg/kg dry	10	1.23	ND	87	30-120%	---	---	
1,4-Dichlorobenzene	1.08	0.0766	0.153	mg/kg dry	10	1.23	ND	88	31-120%	---	---	
1,2,4-Trichlorobenzene	1.13	0.0766	0.153	mg/kg dry	10	1.23	ND	92	34-120%	---	---	
4-Bromophenyl phenyl ether	1.26	0.0766	0.153	mg/kg dry	10	1.23	ND	103	46-124%	---	---	
4-Chlorophenyl phenyl ether	1.22	0.0766	0.153	mg/kg dry	10	1.23	ND	100	45-121%	---	---	
Aniline	1.04	0.690	0.690	mg/kg dry	10	1.23	ND	85	7-120%	---	---	Q-31
4-Chloroaniline	0.438	0.0766	0.153	mg/kg dry	10	1.23	ND	36	16-120%	---	---	Q-31
2-Nitroaniline	1.45	0.614	1.23	mg/kg dry	10	1.23	ND	118	44-127%	---	---	
3-Nitroaniline	ND	0.614	1.23	mg/kg dry	10	1.23	ND		**33-120%**	---	---	Q-01
4-Nitroaniline	1.24	0.614	1.23	mg/kg dry	10	1.23	ND	101	35-120%	---	---	Q-41
Nitrobenzene	1.11	0.306	0.614	mg/kg dry	10	1.23	ND	91	34-122%	---	---	
2,4-Dinitrotoluene	1.24	0.306	0.614	mg/kg dry	10	1.23	ND	101	48-126%	---	---	
2,6-Dinitrotoluene	1.26	0.306	0.614	mg/kg dry	10	1.23	ND	103	46-124%	---	---	
Benzoic acid	ND	3.84	7.66	mg/kg dry	10	2.45	ND		**5-140%**	---	---	Q-11, Q-41
Benzyl alcohol	1.22	0.153	0.306	mg/kg dry	10	1.23	ND	99	29-122%	---	---	
Isophorone	1.14	0.0766	0.153	mg/kg dry	10	1.23	ND	93	30-122%	---	---	
Azobenzene (1,2-DPH)	1.15	0.0766	0.153	mg/kg dry	10	1.23	ND	94	39-125%	---	---	
Bis(2-Ethylhexyl) adipate	2.32	0.766	1.53	mg/kg dry	10	1.23	2.18	**12**	**60-121%**	---	---	Q-03
3,3'-Dichlorobenzidine	ND	0.614	1.23	mg/kg dry	10	2.45	ND		**22-121%**	---	---	Q-01, Q-31
1,2-Dinitrobenzene	1.03	0.766	1.53	mg/kg dry	10	1.23	ND	84	44-120%	---	---	J
1,3-Dinitrobenzene	1.26	0.766	1.53	mg/kg dry	10	1.23	ND	102	42-127%	---	---	J
1,4-Dinitrobenzene	0.975	0.766	1.53	mg/kg dry	10	1.23	ND	79	37-132%	---	---	J

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Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike (9100490-MS1)			Prepared: 10/01/19 10:34		Analyzed: 10/02/19 14:51							
QC Source Sample: SE-29-0-2.0 (A9I0822-02RE1)												
Pyridine	0.610	0.153	0.306	mg/kg dry	10	1.23	ND	50	5-120%	---	---	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 90 %*		*Limits: 37-122 %*		*Dilution: 10x*					
2-Fluorobiphenyl (Surr)			*93 %*		*44-115 %*		*"*					
Phenol-d6 (Surr)			*92 %*		*33-122 %*		*"*					
p-Terphenyl-d14 (Surr)			*101 %*		*54-127 %*		*"*					
2-Fluorophenol (Surr)			*90 %*		*35-115 %*		*"*					
2,4,6-Tribromophenol (Surr)			*110 %*		*39-132 %*		*"*					
Matrix Spike (9100490-MS2)			Prepared: 10/01/19 10:35		Analyzed: 10/02/19 12:28							
QC Source Sample: Non-SDG (A9I0893-13RE1)												
EPA 8270D												
Acenaphthene	1.39	0.0681	0.137	mg/kg dry	20	1.37	ND	102	40-122%	---	---	
Acenaphthylene	1.45	0.0681	0.137	mg/kg dry	20	1.37	ND	106	32-132%	---	---	
Anthracene	1.48	0.0681	0.137	mg/kg dry	20	1.37	ND	109	47-123%	---	---	
Benz(a)anthracene	1.42	0.0681	0.137	mg/kg dry	20	1.37	ND	104	49-126%	---	---	
Benzo(a)pyrene	1.60	0.102	0.205	mg/kg dry	20	1.37	0.167	105	45-129%	---	---	
Benzo(b)fluoranthene	1.48	0.102	0.205	mg/kg dry	20	1.37	0.121	100	45-132%	---	---	
Benzo(k)fluoranthene	1.39	0.102	0.205	mg/kg dry	20	1.37	ND	102	47-132%	---	---	
Benzo(g,h,i)perylene	1.53	0.0681	0.137	mg/kg dry	20	1.37	0.0734	107	43-134%	---	---	
Chrysene	1.43	0.0681	0.137	mg/kg dry	20	1.37	ND	104	50-124%	---	---	
Dibenz(a,h)anthracene	1.36	0.0681	0.137	mg/kg dry	20	1.37	ND	99	45-134%	---	---	
Fluoranthene	1.54	0.0681	0.137	mg/kg dry	20	1.37	0.0761	107	50-127%	---	---	
Fluorene	1.47	0.0681	0.137	mg/kg dry	20	1.37	ND	107	43-125%	---	---	
Indeno(1,2,3-cd)pyrene	1.37	0.0681	0.137	mg/kg dry	20	1.37	ND	100	45-133%	---	---	
1-Methylnaphthalene	1.38	0.137	0.273	mg/kg dry	20	1.37	ND	101	40-120%	---	---	
2-Methylnaphthalene	1.41	0.137	0.273	mg/kg dry	20	1.37	ND	104	38-122%	---	---	
Naphthalene	1.42	0.137	0.273	mg/kg dry	20	1.37	ND	104	35-123%	---	---	
Phenanthrene	1.46	0.0681	0.137	mg/kg dry	20	1.37	ND	107	50-121%	---	---	
Pyrene	1.62	0.0681	0.137	mg/kg dry	20	1.37	0.152	107	47-127%	---	---	
Carbazole	1.36	0.102	0.205	mg/kg dry	20	1.37	ND	99	50-122%	---	---	
Dibenzofuran	1.43	0.0681	0.137	mg/kg dry	20	1.37	ND	105	44-120%	---	---	
4-Chloro-3-methylphenol	1.37	0.681	1.37	mg/kg dry	20	1.37	ND	101	45-122%	---	---	
2-Chlorophenol	1.23	0.341	0.681	mg/kg dry	20	1.37	ND	90	34-121%	---	---	

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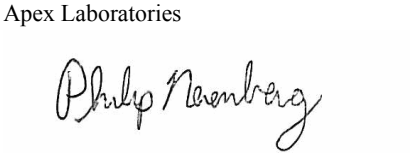

Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike (9100490-MS2)			Prepared: 10/01/19 10:35 Analyzed: 10/02/19 12:28									
QC Source Sample: Non-SDG (A9I0893-13RE1)												
2,4-Dichlorophenol	1.45	0.341	0.681	mg/kg dry	20	1.37	ND	106	40-122%	---	---	
2,4-Dimethylphenol	1.54	0.341	0.681	mg/kg dry	20	1.37	ND	113	30-127%	---	---	
2,4-Dinitrophenol	ND	1.70	3.41	mg/kg dry	20	1.37	ND		**5-137%**	---	---	Q-11, Q-41
4,6-Dinitro-2-methylphenol	1.79	1.70	3.41	mg/kg dry	20	1.37	ND	131	29-132%	---	---	Q-41, J
2-Methylphenol	1.38	0.170	0.341	mg/kg dry	20	1.37	ND	101	32-122%	---	---	
3+4-Methylphenol(s)	1.71	0.170	0.341	mg/kg dry	20	1.37	0.309	102	34-120%	---	---	
2-Nitrophenol	1.86	0.681	1.37	mg/kg dry	20	1.37	ND	**136**	**36-123%**	---	---	Q-11
4-Nitrophenol	1.70	0.681	1.37	mg/kg dry	20	1.37	ND	125	30-132%	---	---	
Pentachlorophenol (PCP)	1.69	0.681	1.37	mg/kg dry	20	1.37	ND	124	25-133%	---	---	
Phenol	1.28	0.137	0.273	mg/kg dry	20	1.37	ND	94	34-120%	---	---	
2,3,4,6-Tetrachlorophenol	1.41	0.341	0.681	mg/kg dry	20	1.37	ND	103	44-125%	---	---	
2,3,5,6-Tetrachlorophenol	1.61	0.341	0.681	mg/kg dry	20	1.37	ND	118	40-120%	---	---	
2,4,5-Trichlorophenol	1.57	0.341	0.681	mg/kg dry	20	1.37	ND	115	41-124%	---	---	
2,4,6-Trichlorophenol	1.57	0.341	0.681	mg/kg dry	20	1.37	ND	115	39-126%	---	---	
Bis(2-ethylhexyl)phthalate	1.56	1.02	2.05	mg/kg dry	20	1.37	ND	114	51-133%	---	---	J
Butyl benzyl phthalate	1.71	0.341	0.681	mg/kg dry	20	1.37	ND	125	48-132%	---	---	
Diethylphthalate	1.49	0.341	0.681	mg/kg dry	20	1.37	ND	109	50-124%	---	---	
Dimethylphthalate	1.45	0.341	0.681	mg/kg dry	20	1.37	ND	106	48-124%	---	---	
Di-n-butylphthalate	1.55	0.341	0.681	mg/kg dry	20	1.37	ND	113	51-128%	---	---	
Di-n-octyl phthalate	2.02	0.548	0.681	mg/kg dry	20	1.37	ND	**148**	**44-140%**	---	---	Q-01
N-Nitrosodimethylamine	0.850	0.170	0.341	mg/kg dry	20	1.37	ND	62	23-120%	---	---	
N-Nitroso-di-n-propylamine	1.18	0.170	0.341	mg/kg dry	20	1.37	ND	86	36-120%	---	---	
N-Nitrosodiphenylamine	1.49	0.170	0.341	mg/kg dry	20	1.37	ND	109	38-127%	---	---	
Bis(2-Chloroethoxy) methane	1.31	0.170	0.341	mg/kg dry	20	1.37	ND	96	36-121%	---	---	
Bis(2-Chloroethyl) ether	0.997	0.170	0.341	mg/kg dry	20	1.37	ND	73	31-120%	---	---	
2,2'-Oxybis(1-Chloropropane)	1.05	0.170	0.341	mg/kg dry	20	1.37	ND	77	33-131%	---	---	
Hexachlorobenzene	1.38	0.0681	0.137	mg/kg dry	20	1.37	ND	101	44-122%	---	---	
Hexachlorobutadiene	1.29	0.170	0.341	mg/kg dry	20	1.37	ND	95	32-123%	---	---	
Hexachlorocyclopentadiene	0.373	0.341	0.681	mg/kg dry	20	1.37	ND	27	5-140%	---	---	Q-41, J
Hexachloroethane	1.13	0.170	0.341	mg/kg dry	20	1.37	ND	83	28-120%	---	---	
2-Chloronaphthalene	1.47	0.0681	0.137	mg/kg dry	20	1.37	ND	107	41-120%	---	---	
1,2-Dichlorobenzene	1.20	0.170	0.341	mg/kg dry	20	1.37	ND	88	33-120%	---	---	
1,3-Dichlorobenzene	1.21	0.170	0.341	mg/kg dry	20	1.37	ND	89	30-120%	---	---	

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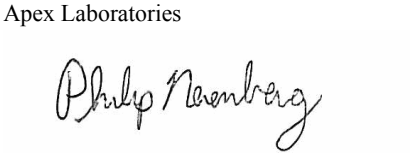

Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike (9100490-MS2)			Prepared: 10/01/19 10:35		Analyzed: 10/02/19 12:28							
QC Source Sample: Non-SDG (A9I0893-13RE1)												
1,4-Dichlorobenzene	1.16	0.170	0.341	mg/kg dry	20	1.37	ND	85	31-120%	---	---	
1,2,4-Trichlorobenzene	1.31	0.170	0.341	mg/kg dry	20	1.37	ND	96	34-120%	---	---	
4-Bromophenyl phenyl ether	1.45	0.170	0.341	mg/kg dry	20	1.37	ND	106	46-124%	---	---	
4-Chlorophenyl phenyl ether	1.48	0.170	0.341	mg/kg dry	20	1.37	ND	108	45-121%	---	---	
Aniline	0.837	0.341	0.681	mg/kg dry	20	1.37	ND	61	7-120%	---	---	Q-31
4-Chloroaniline	0.508	0.170	0.341	mg/kg dry	20	1.37	ND	37	16-120%	---	---	Q-31
2-Nitroaniline	1.60	1.37	2.73	mg/kg dry	20	1.37	ND	117	44-127%	---	---	J
3-Nitroaniline	ND	1.37	2.73	mg/kg dry	20	1.37	ND		**33-120%**	---	---	Q-11
4-Nitroaniline	ND	1.37	2.73	mg/kg dry	20	1.37	ND		**35-120%**	---	---	Q-11, Q-41
Nitrobenzene	1.19	0.681	1.37	mg/kg dry	20	1.37	ND	87	34-122%	---	---	J
2,4-Dinitrotoluene	1.54	0.681	1.37	mg/kg dry	20	1.37	ND	113	48-126%	---	---	
2,6-Dinitrotoluene	1.51	0.681	1.37	mg/kg dry	20	1.37	ND	111	46-124%	---	---	
Benzoic acid	ND	8.55	17.0	mg/kg dry	20	2.73	ND		**5-140%**	---	---	Q-11, Q-41
Benzyl alcohol	1.11	0.341	0.681	mg/kg dry	20	1.37	ND	81	29-122%	---	---	
Isophorone	1.21	0.170	0.341	mg/kg dry	20	1.37	ND	89	30-122%	---	---	
Azobenzene (1,2-DPH)	1.29	0.170	0.341	mg/kg dry	20	1.37	ND	95	39-125%	---	---	
Bis(2-Ethylhexyl) adipate	2.35	1.70	3.41	mg/kg dry	20	1.37	ND	**172**	**60-121%**	---	---	Q-11, J
3,3'-Dichlorobenzidine	2.03	1.37	2.73	mg/kg dry	20	2.73	ND	74	22-121%	---	---	Q-31, J
1,2-Dinitrobenzene	ND	1.70	3.41	mg/kg dry	20	1.37	ND		**44-120%**	---	---	Q-11
1,3-Dinitrobenzene	ND	1.70	3.41	mg/kg dry	20	1.37	ND		**42-127%**	---	---	Q-11
1,4-Dinitrobenzene	ND	1.70	3.41	mg/kg dry	20	1.37	ND		**37-132%**	---	---	Q-11
Pyridine	0.707	0.341	0.681	mg/kg dry	20	1.37	ND	52	5-120%	---	---	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 81 %*		*Limits: 37-122 %*				*Dilution: 20x*			
2-Fluorobiphenyl (Surr)			*53 %*		*44-115 %*				*"*			
Phenol-d6 (Surr)			*81 %*		*33-122 %*				*"*			
p-Terphenyl-d14 (Surr)			*60 %*		*54-127 %*				*"*			
2-Fluorophenol (Surr)			*85 %*		*35-115 %*				*"*			
2,4,6-Tribromophenol (Surr)			*99 %*		*39-132 %*				*"*			
Matrix Spike Dup (9100490-MSD1)			Prepared: 10/01/19 10:34		Analyzed: 10/02/19 15:27							
QC Source Sample: SE-29-0-2.0 (A9I0822-02RE1)												
EPA 8270D												
Acenaphthene	1.28	0.0306	0.0614	mg/kg dry	10	1.23	0.135	94	40-122%	4	30%	

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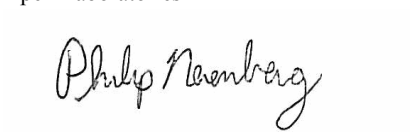

Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike Dup (9100490-MSD1)			Prepared: 10/01/19 10:34 Analyzed: 10/02/19 15:27									
QC Source Sample: SE-29-0-2.0 (A9I0822-02RE1)												
Acenaphthylene	1.32	0.0306	0.0614	mg/kg dry	10	1.23	ND	107	32-132%	2	30%	
Anthracene	1.36	0.0306	0.0614	mg/kg dry	10	1.23	0.204	94	47-123%	2	30%	
Benz(a)anthracene	1.30	0.0306	0.0614	mg/kg dry	10	1.23	0.218	89	49-126%	3	30%	
Benzo(a)pyrene	1.38	0.0460	0.0920	mg/kg dry	10	1.23	0.154	100	45-129%	5	30%	
Benzo(b)fluoranthene	1.32	0.0460	0.0920	mg/kg dry	10	1.23	0.180	93	45-132%	3	30%	
Benzo(k)fluoranthene	1.26	0.0460	0.0920	mg/kg dry	10	1.23	0.0758	97	47-132%	6	30%	
Benzo(g,h,i)perylene	1.40	0.0306	0.0614	mg/kg dry	10	1.23	0.0680	108	43-134%	6	30%	
Chrysene	1.33	0.0306	0.0614	mg/kg dry	10	1.23	0.199	92	50-124%	4	30%	
Dibenz(a,h)anthracene	1.26	0.0306	0.0614	mg/kg dry	10	1.23	ND	103	45-134%	3	30%	
Fluoranthene	1.59	0.0306	0.0614	mg/kg dry	10	1.23	1.15	**35**	**50-127%**	0.2	30%	Q-01
Fluorene	1.34	0.0306	0.0614	mg/kg dry	10	1.23	0.136	98	43-125%	3	30%	
Indeno(1,2,3-cd)pyrene	1.21	0.0306	0.0614	mg/kg dry	10	1.23	0.0695	93	45-133%	6	30%	
1-Methylnaphthalene	1.24	0.0614	0.123	mg/kg dry	10	1.23	0.0767	95	40-120%	0.9	30%	
2-Methylnaphthalene	1.28	0.0614	0.123	mg/kg dry	10	1.23	0.149	93	38-122%	0.5	30%	
Naphthalene	1.38	0.0614	0.123	mg/kg dry	10	1.23	0.491	73	35-123%	1	30%	
Phenanthrene	1.39	0.0306	0.0614	mg/kg dry	10	1.23	0.491	73	50-121%	3	30%	
Pyrene	1.55	0.0306	0.0614	mg/kg dry	10	1.23	0.823	59	47-127%	3	30%	
Carbazole	1.25	0.0460	0.0920	mg/kg dry	10	1.23	0.0536	98	50-122%	2	30%	
Dibenzofuran	1.29	0.0306	0.0614	mg/kg dry	10	1.23	0.145	94	44-120%	2	30%	
4-Chloro-3-methylphenol	1.29	0.306	0.614	mg/kg dry	10	1.23	ND	105	45-122%	3	30%	
2-Chlorophenol	1.12	0.153	0.306	mg/kg dry	10	1.23	ND	92	34-121%	5	30%	
2,4-Dichlorophenol	1.30	0.153	0.306	mg/kg dry	10	1.23	ND	106	40-122%	0.5	30%	
2,4-Dimethylphenol	1.49	0.153	0.306	mg/kg dry	10	1.23	ND	121	30-127%	0.3	30%	
2,4-Dinitrophenol	ND	0.766	1.53	mg/kg dry	10	1.23	ND		**5-137%**		30%	Q-11, Q-41
4,6-Dinitro-2-methylphenol	0.870	0.766	1.53	mg/kg dry	10	1.23	ND	71	29-132%	6	30%	Q-41, J
2-Methylphenol	1.24	0.0766	0.153	mg/kg dry	10	1.23	ND	101	32-122%	3	30%	
3+4-Methylphenol(s)	2.84	0.0766	0.153	mg/kg dry	10	1.23	1.60	101	34-120%	1	30%	
2-Nitrophenol	1.46	0.306	0.614	mg/kg dry	10	1.23	ND	119	36-123%	3	30%	
4-Nitrophenol	1.31	0.306	0.614	mg/kg dry	10	1.23	ND	107	30-132%	0.7	30%	
Pentachlorophenol (PCP)	1.50	0.306	0.614	mg/kg dry	10	1.23	ND	123	25-133%	1	30%	
Phenol	1.25	0.0614	0.123	mg/kg dry	10	1.23	0.571	56	34-120%	3	30%	
2,3,4,6-Tetrachlorophenol	1.31	0.153	0.306	mg/kg dry	10	1.23	ND	107	44-125%	1	30%	
2,3,5,6-Tetrachlorophenol	1.39	0.153	0.306	mg/kg dry	10	1.23	ND	113	40-120%	2	30%	

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Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike Dup (9100490-MSD1)			Prepared: 10/01/19 10:34 Analyzed: 10/02/19 15:27									
QC Source Sample: SE-29-0-2.0 (A9I0822-02RE1)												
2,4,5-Trichlorophenol	1.37	0.153	0.306	mg/kg dry	10	1.23	ND	112	41-124%	0.3	30%	
2,4,6-Trichlorophenol	1.39	0.153	0.306	mg/kg dry	10	1.23	ND	113	39-126%	1	30%	
Bis(2-ethylhexyl)phthalate	1.59	0.460	0.920	mg/kg dry	10	1.23	ND	130	51-133%	1	30%	
Butyl benzyl phthalate	1.58	0.153	0.306	mg/kg dry	10	1.23	ND	129	48-132%	8	30%	
Diethylphthalate	1.35	0.153	0.306	mg/kg dry	10	1.23	ND	110	50-124%	1	30%	
Dimethylphthalate	1.31	0.153	0.306	mg/kg dry	10	1.23	ND	107	48-124%	2	30%	
Di-n-butylphthalate	1.42	0.153	0.306	mg/kg dry	10	1.23	0.213	98	51-128%	0.9	30%	
Di-n-octyl phthalate	1.81	0.246	0.306	mg/kg dry	10	1.23	ND	**148**	**44-140%**	4	30%	Q-01
N-Nitrosodimethylamine	0.752	0.0766	0.153	mg/kg dry	10	1.23	ND	61	23-120%	5	30%	
N-Nitroso-di-n-propylamine	1.06	0.0766	0.153	mg/kg dry	10	1.23	ND	86	36-120%	4	30%	
N-Nitrosodiphenylamine	1.25	0.0766	0.153	mg/kg dry	10	1.23	ND	102	38-127%	0.8	30%	
Bis(2-Chloroethoxy) methane	1.15	0.0766	0.153	mg/kg dry	10	1.23	ND	94	36-121%	0.8	30%	
Bis(2-Chloroethyl) ether	0.886	0.0766	0.153	mg/kg dry	10	1.23	ND	72	31-120%	4	30%	
2,2'-Oxybis(1-Chloropropane)	0.915	0.0766	0.153	mg/kg dry	10	1.23	ND	75	33-131%	1	30%	
Hexachlorobenzene	1.27	0.0306	0.0614	mg/kg dry	10	1.23	ND	103	44-122%	2	30%	
Hexachlorobutadiene	1.19	0.0766	0.153	mg/kg dry	10	1.23	ND	97	32-123%	0.03	30%	
Hexachlorocyclopentadiene	0.373	0.153	0.306	mg/kg dry	10	1.23	ND	30	5-140%	**200**	**30%**	Q-01, Q-41
Hexachloroethane	1.05	0.0766	0.153	mg/kg dry	10	1.23	ND	86	28-120%	2	30%	
2-Chloronaphthalene	1.25	0.0306	0.0614	mg/kg dry	10	1.23	ND	102	41-120%	0.1	30%	
1,2-Dichlorobenzene	1.04	0.0766	0.153	mg/kg dry	10	1.23	ND	85	33-120%	5	30%	
1,3-Dichlorobenzene	1.04	0.0766	0.153	mg/kg dry	10	1.23	ND	85	30-120%	2	30%	
1,4-Dichlorobenzene	1.03	0.0766	0.153	mg/kg dry	10	1.23	ND	84	31-120%	5	30%	
1,2,4-Trichlorobenzene	1.15	0.0766	0.153	mg/kg dry	10	1.23	ND	94	34-120%	1	30%	
4-Bromophenyl phenyl ether	1.28	0.0766	0.153	mg/kg dry	10	1.23	ND	105	46-124%	2	30%	
4-Chlorophenyl phenyl ether	1.25	0.0766	0.153	mg/kg dry	10	1.23	ND	102	45-121%	2	30%	
Aniline	0.813	0.690	0.690	mg/kg dry	10	1.23	ND	66	7-120%	25	30%	Q-31
4-Chloroaniline	0.377	0.0766	0.153	mg/kg dry	10	1.23	ND	31	16-120%	15	30%	Q-31
2-Nitroaniline	1.50	0.614	1.23	mg/kg dry	10	1.23	ND	123	44-127%	3	30%	
3-Nitroaniline	0.655	0.614	1.23	mg/kg dry	10	1.23	ND	53	33-120%	**200**	**30%**	Q-01, J
4-Nitroaniline	1.27	0.614	1.23	mg/kg dry	10	1.23	ND	104	35-120%	3	30%	Q-41
Nitrobenzene	1.04	0.306	0.614	mg/kg dry	10	1.23	ND	85	34-122%	6	30%	
2,4-Dinitrotoluene	1.26	0.306	0.614	mg/kg dry	10	1.23	ND	103	48-126%	2	30%	
2,6-Dinitrotoluene	1.32	0.306	0.614	mg/kg dry	10	1.23	ND	107	46-124%	4	30%	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike Dup (9100490-MSD1)			Prepared: 10/01/19 10:34 Analyzed: 10/02/19 15:27									
QC Source Sample: SE-29-0-2.0 (A9I0822-02RE1)												
Benzoic acid	ND	3.84	7.66	mg/kg dry	10	2.45	ND		**5-140%**		30%	Q-11, Q-41
Benzyl alcohol	1.17	0.153	0.306	mg/kg dry	10	1.23	ND	95	29-122%	4	30%	
Isophorone	1.13	0.0766	0.153	mg/kg dry	10	1.23	ND	93	30-122%	0.8	30%	
Azobenzene (1,2-DPH)	1.17	0.0766	0.153	mg/kg dry	10	1.23	ND	96	39-125%	2	30%	
Bis(2-Ethylhexyl) adipate	5.77	0.766	1.53	mg/kg dry	10	1.23	2.18	**293**	**60-121%**	**85**	**30%**	Q-03
3,3'-Dichlorobenzidine	0.738	0.614	1.23	mg/kg dry	10	2.45	ND	30	22-121%	**200**	**30%**	Q-01, Q-31, J
1,2-Dinitrobenzene	1.03	0.766	1.53	mg/kg dry	10	1.23	ND	84	44-120%	0.1	30%	J
1,3-Dinitrobenzene	1.33	0.766	1.53	mg/kg dry	10	1.23	ND	108	42-127%	5	30%	J
1,4-Dinitrobenzene	1.09	0.766	1.53	mg/kg dry	10	1.23	ND	89	37-132%	11	30%	J
Pyridine	0.588	0.153	0.306	mg/kg dry	10	1.23	ND	48	5-120%	4	30%	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 82 %*	*Limits: 37-122 %*			*Dilution: 10x*					
2-Fluorobiphenyl (Surr)			*85 %*	*44-115 %*			*"*					
Phenol-d6 (Surr)			*87 %*	*33-122 %*			*"*					
p-Terphenyl-d14 (Surr)			*95 %*	*54-127 %*			*"*					
2-Fluorophenol (Surr)			*84 %*	*35-115 %*			*"*					
2,4,6-Tribromophenol (Surr)			*113 %*	*39-132 %*			*"*					
Matrix Spike Dup (9100490-MSD2)			Prepared: 10/01/19 10:35 Analyzed: 10/02/19 13:04									
QC Source Sample: Non-SDG (A9I0893-13RE1)												
Acenaphthene	1.41	0.0676	0.136	mg/kg dry	20	1.35	ND	104	40-122%	1	30%	
Acenaphthylene	1.46	0.0676	0.136	mg/kg dry	20	1.35	ND	107	32-132%	0.3	30%	
Anthracene	1.49	0.0676	0.136	mg/kg dry	20	1.35	ND	110	47-123%	0.1	30%	
Benz(a)anthracene	1.46	0.0676	0.136	mg/kg dry	20	1.35	ND	107	49-126%	2	30%	
Benzo(a)pyrene	1.64	0.102	0.203	mg/kg dry	20	1.35	0.167	109	45-129%	2	30%	
Benzo(b)fluoranthene	1.54	0.102	0.203	mg/kg dry	20	1.35	0.121	105	45-132%	4	30%	
Benzo(k)fluoranthene	1.43	0.102	0.203	mg/kg dry	20	1.35	ND	105	47-132%	2	30%	
Benzo(g,h,i)perylene	1.58	0.0676	0.136	mg/kg dry	20	1.35	0.0734	111	43-134%	3	30%	
Chrysene	1.50	0.0676	0.136	mg/kg dry	20	1.35	ND	111	50-124%	5	30%	
Dibenz(a,h)anthracene	1.48	0.0676	0.136	mg/kg dry	20	1.35	ND	109	45-134%	9	30%	
Fluoranthene	1.56	0.0676	0.136	mg/kg dry	20	1.35	0.0761	110	50-127%	2	30%	
Fluorene	1.43	0.0676	0.136	mg/kg dry	20	1.35	ND	106	43-125%	2	30%	
Indeno(1,2,3-cd)pyrene	1.37	0.0676	0.136	mg/kg dry	20	1.35	ND	101	45-133%	0.1	30%	
1-Methylnaphthalene	1.39	0.136	0.271	mg/kg dry	20	1.35	ND	103	40-120%	1	30%	

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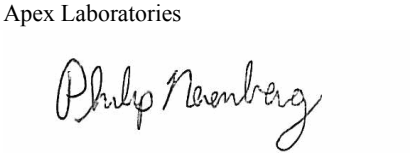

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike Dup (9100490-MSD2)			Prepared: 10/01/19 10:35 Analyzed: 10/02/19 13:04									
QC Source Sample: Non-SDG (A9I0893-13RE1)												
2-Methylnaphthalene	1.40	0.136	0.271	mg/kg dry	20	1.35	ND	103	38-122%	1	30%	
Naphthalene	1.46	0.136	0.271	mg/kg dry	20	1.35	ND	108	35-123%	3	30%	
Phenanthrene	1.49	0.0676	0.136	mg/kg dry	20	1.35	ND	110	50-121%	2	30%	
Pyrene	1.63	0.0676	0.136	mg/kg dry	20	1.35	0.152	109	47-127%	1	30%	
Carbazole	1.40	0.102	0.203	mg/kg dry	20	1.35	ND	104	50-122%	3	30%	
Dibenzofuran	1.38	0.0676	0.136	mg/kg dry	20	1.35	ND	102	44-120%	3	30%	
4-Chloro-3-methylphenol	1.41	0.676	1.36	mg/kg dry	20	1.35	ND	104	45-122%	3	30%	
2-Chlorophenol	1.32	0.339	0.676	mg/kg dry	20	1.35	ND	98	34-121%	8	30%	
2,4-Dichlorophenol	1.47	0.339	0.676	mg/kg dry	20	1.35	ND	109	40-122%	1	30%	
2,4-Dimethylphenol	1.58	0.339	0.676	mg/kg dry	20	1.35	ND	117	30-127%	3	30%	
2,4-Dinitrophenol	ND	1.69	3.39	mg/kg dry	20	1.35	ND		**5-137%**		30%	Q-11, Q-41
4,6-Dinitro-2-methylphenol	1.80	1.69	3.39	mg/kg dry	20	1.35	ND	**133**	**29-132%**	0.8	30%	Q-11, Q-41, J
2-Methylphenol	1.39	0.169	0.339	mg/kg dry	20	1.35	ND	103	32-122%	1	30%	
3+4-Methylphenol(s)	2.11	0.169	0.339	mg/kg dry	20	1.35	0.309	**133**	**34-120%**	21	30%	Q-01
2-Nitrophenol	1.70	0.676	1.36	mg/kg dry	20	1.35	ND	**126**	**36-123%**	9	30%	Q-11
4-Nitrophenol	1.64	0.676	1.36	mg/kg dry	20	1.35	ND	121	30-132%	4	30%	
Pentachlorophenol (PCP)	1.85	0.676	1.36	mg/kg dry	20	1.35	ND	**137**	**25-133%**	9	30%	Q-01
Phenol	1.43	0.136	0.271	mg/kg dry	20	1.35	ND	106	34-120%	12	30%	
2,3,4,6-Tetrachlorophenol	1.53	0.339	0.676	mg/kg dry	20	1.35	ND	113	44-125%	9	30%	
2,3,5,6-Tetrachlorophenol	1.59	0.339	0.676	mg/kg dry	20	1.35	ND	117	40-120%	1	30%	
2,4,5-Trichlorophenol	1.60	0.339	0.676	mg/kg dry	20	1.35	ND	118	41-124%	2	30%	
2,4,6-Trichlorophenol	1.63	0.339	0.676	mg/kg dry	20	1.35	ND	120	39-126%	4	30%	
Bis(2-ethylhexyl)phthalate	1.74	1.02	2.03	mg/kg dry	20	1.35	ND	128	51-133%	11	30%	J
Butyl benzyl phthalate	1.83	0.339	0.676	mg/kg dry	20	1.35	ND	**135**	**48-132%**	7	30%	Q-01
Diethylphthalate	1.48	0.339	0.676	mg/kg dry	20	1.35	ND	109	50-124%	0.8	30%	
Dimethylphthalate	1.44	0.339	0.676	mg/kg dry	20	1.35	ND	106	48-124%	0.7	30%	
Di-n-butylphthalate	1.60	0.339	0.676	mg/kg dry	20	1.35	ND	118	51-128%	3	30%	
Di-n-octyl phthalate	2.15	0.543	0.676	mg/kg dry	20	1.35	ND	**158**	**44-140%**	6	30%	Q-01
N-Nitrosodimethylamine	0.856	0.169	0.339	mg/kg dry	20	1.35	ND	63	23-120%	0.6	30%	
N-Nitroso-di-n-propylamine	1.23	0.169	0.339	mg/kg dry	20	1.35	ND	91	36-120%	4	30%	
N-Nitrosodiphenylamine	1.50	0.169	0.339	mg/kg dry	20	1.35	ND	111	38-127%	0.8	30%	
Bis(2-Chloroethoxy) methane	1.32	0.169	0.339	mg/kg dry	20	1.35	ND	97	36-121%	0.7	30%	
Bis(2-Chloroethyl) ether	1.01	0.169	0.339	mg/kg dry	20	1.35	ND	75	31-120%	1	30%	

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike Dup (9100490-MSD2)			Prepared: 10/01/19 10:35 Analyzed: 10/02/19 13:04									
QC Source Sample: Non-SDG (A9I0893-13RE1)												
2,2'-Oxybis(1-Chloropropane)	1.10	0.169	0.339	mg/kg dry	20	1.35	ND	81	33-131%	5	30%	
Hexachlorobenzene	1.47	0.0676	0.136	mg/kg dry	20	1.35	ND	108	44-122%	6	30%	
Hexachlorobutadiene	1.39	0.169	0.339	mg/kg dry	20	1.35	ND	103	32-123%	8	30%	
Hexachlorocyclopentadiene	ND	0.339	0.676	mg/kg dry	20	1.35	ND		**5-140%**	**200**	**30%**	Q-11, Q-41
Hexachloroethane	1.17	0.169	0.339	mg/kg dry	20	1.35	ND	86	28-120%	3	30%	
2-Chloronaphthalene	1.45	0.0676	0.136	mg/kg dry	20	1.35	ND	107	41-120%	0.8	30%	
1,2-Dichlorobenzene	1.25	0.169	0.339	mg/kg dry	20	1.35	ND	92	33-120%	4	30%	
1,3-Dichlorobenzene	1.25	0.169	0.339	mg/kg dry	20	1.35	ND	92	30-120%	3	30%	
1,4-Dichlorobenzene	1.22	0.169	0.339	mg/kg dry	20	1.35	ND	90	31-120%	5	30%	
1,2,4-Trichlorobenzene	1.35	0.169	0.339	mg/kg dry	20	1.35	ND	100	34-120%	3	30%	
4-Bromophenyl phenyl ether	1.46	0.169	0.339	mg/kg dry	20	1.35	ND	108	46-124%	0.5	30%	
4-Chlorophenyl phenyl ether	1.42	0.169	0.339	mg/kg dry	20	1.35	ND	105	45-121%	4	30%	
Aniline	0.801	0.339	0.676	mg/kg dry	20	1.35	ND	59	7-120%	4	30%	Q-31
4-Chloroaniline	0.583	0.169	0.339	mg/kg dry	20	1.35	ND	43	16-120%	14	30%	Q-31
2-Nitroaniline	1.68	1.36	2.71	mg/kg dry	20	1.35	ND	124	44-127%	5	30%	J
3-Nitroaniline	ND	1.36	2.71	mg/kg dry	20	1.35	ND		**33-120%**		30%	Q-11
4-Nitroaniline	1.44	1.36	2.71	mg/kg dry	20	1.35	ND	107	35-120%	**200**	**30%**	Q-11, Q-41, J
Nitrobenzene	1.23	0.676	1.36	mg/kg dry	20	1.35	ND	91	34-122%	4	30%	J
2,4-Dinitrotoluene	1.49	0.676	1.36	mg/kg dry	20	1.35	ND	110	48-126%	3	30%	
2,6-Dinitrotoluene	1.47	0.676	1.36	mg/kg dry	20	1.35	ND	109	46-124%	3	30%	
Benzoic acid	ND	8.48	16.9	mg/kg dry	20	2.71	ND		**5-140%**		30%	Q-11, Q-41
Benzyl alcohol	1.24	0.339	0.676	mg/kg dry	20	1.35	ND	91	29-122%	11	30%	
Isophorone	1.32	0.169	0.339	mg/kg dry	20	1.35	ND	97	30-122%	9	30%	
Azobenzene (1,2-DPH)	1.31	0.169	0.339	mg/kg dry	20	1.35	ND	97	39-125%	1	30%	
Bis(2-Ethylhexyl) adipate	2.25	1.69	3.39	mg/kg dry	20	1.35	ND	**166**	**60-121%**	4	30%	Q-11, J
3,3'-Dichlorobenzidine	ND	1.36	2.71	mg/kg dry	20	2.71	ND		**22-121%**	**200**	**30%**	Q-01, Q-31
1,2-Dinitrobenzene	ND	1.69	3.39	mg/kg dry	20	1.35	ND		**44-120%**		30%	Q-11
1,3-Dinitrobenzene	ND	1.69	3.39	mg/kg dry	20	1.35	ND		**42-127%**		30%	Q-11
1,4-Dinitrobenzene	ND	1.69	3.39	mg/kg dry	20	1.35	ND		**37-132%**		30%	Q-11
Pyridine	0.598	0.339	0.676	mg/kg dry	20	1.35	ND	44	5-120%	17	30%	J
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 82 %*		*Limits: 37-122 %*			*Dilution: 20x*				
2-Fluorobiphenyl (Surr)			*66 %*		*44-115 %*			*"*				
Phenol-d6 (Surr)			*84 %*		*33-122 %*			*"*				

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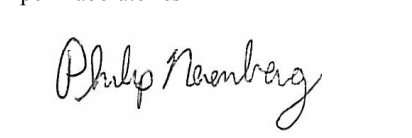

Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546												**Sediment**
Matrix Spike Dup (9100490-MSD2)				Prepared: 10/01/19 10:35 Analyzed: 10/02/19 13:04								
QC Source Sample: Non-SDG (A9I0893-13RE1)												
Surr: p-Terphenyl-d14 (Surr)			*Recovery: 70 %*	*Limits: 54-127 %*	*Dilution: 20x*							
2-Fluorophenol (Surr)			*84 %*	*35-115 %*	*"*							
2,4,6-Tribromophenol (Surr)			*107 %*	*39-132 %*	*"*							

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020A (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100517 - EPA 3051A							**Sediment**					
Blank (9100517-BLK1)			Prepared: 10/01/19 15:50 Analyzed: 10/03/19 00:11									
EPA 6020A												
Arsenic	ND	0.240	0.481	mg/kg wet	5	---	---	---	---	---	---	
Cadmium	ND	0.0481	0.0962	mg/kg wet	5	---	---	---	---	---	---	
Chromium	ND	0.240	0.481	mg/kg wet	5	---	---	---	---	---	---	
Copper	ND	0.481	0.962	mg/kg wet	5	---	---	---	---	---	---	
Lead	ND	0.0481	0.0962	mg/kg wet	5	---	---	---	---	---	---	
Nickel	ND	0.962	1.92	mg/kg wet	5	---	---	---	---	---	---	
Selenium	ND	0.240	0.481	mg/kg wet	5	---	---	---	---	---	---	
Silver	ND	0.0481	0.0962	mg/kg wet	5	---	---	---	---	---	---	
Zinc	ND	0.962	1.92	mg/kg wet	5	---	---	---	---	---	---	
LCS (9100517-BS1)			Prepared: 10/01/19 15:50 Analyzed: 10/03/19 00:24									
EPA 6020A												
Arsenic	24.0	0.250	0.500	mg/kg wet	5	25.0	---	96	80-120%	---	---	
Cadmium	23.9	0.0500	0.100	mg/kg wet	5	25.0	---	96	80-120%	---	---	
Chromium	25.6	0.250	0.500	mg/kg wet	5	25.0	---	102	80-120%	---	---	
Copper	25.7	0.500	1.00	mg/kg wet	5	25.0	---	103	80-120%	---	---	
Lead	25.2	0.0500	0.100	mg/kg wet	5	25.0	---	101	80-120%	---	---	
Nickel	25.6	1.00	2.00	mg/kg wet	5	25.0	---	102	80-120%	---	---	
Selenium	11.6	0.250	0.500	mg/kg wet	5	12.5	---	92	80-120%	---	---	
Silver	13.5	0.0500	0.100	mg/kg wet	5	12.5	---	108	80-120%	---	---	
Zinc	24.4	1.00	2.00	mg/kg wet	5	25.0	---	97	80-120%	---	---	
Matrix Spike (9100517-MS1)			Prepared: 10/01/19 15:50 Analyzed: 10/03/19 00:33									
QC Source Sample: SE-29-0-2.0 (A9I0822-02)												
EPA 6020A												
Arsenic	64.4	0.604	1.21	mg/kg dry	5	60.4	7.45	94	75-125%	---	---	
Cadmium	55.6	0.121	0.242	mg/kg dry	5	60.4	0.188	92	75-125%	---	---	
Chromium	95.3	0.604	1.21	mg/kg dry	5	60.4	35.1	100	75-125%	---	---	
Copper	173	1.21	2.42	mg/kg dry	5	60.4	92.5	**133**	**75-125%**	---	---	Q-03
Lead	218	0.121	0.242	mg/kg dry	5	60.4	16.2	**334**	**75-125%**	---	---	Q-03
Nickel	97.1	2.42	4.83	mg/kg dry	5	60.4	33.8	105	75-125%	---	---	
Selenium	28.5	0.604	1.21	mg/kg dry	5	30.2	0.644	92	75-125%	---	---	
Silver	30.9	0.121	0.242	mg/kg dry	5	30.2	ND	102	75-125%	---	---	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020A (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100517 - EPA 3051A							**Sediment**					
Matrix Spike (9100517-MS1)			Prepared: 10/01/19 15:50		Analyzed: 10/03/19 00:33							
QC Source Sample: SE-29-0-2.0 (A9I0822-02)												
Zinc	132	2.42	4.83	mg/kg dry	5	60.4	84.6	79	75-125%	---	---	
Matrix Spike Dup (9100517-MSD1)			Prepared: 10/01/19 15:50		Analyzed: 10/03/19 00:37							
QC Source Sample: SE-29-0-2.0 (A9I0822-02)												
EPA 6020A												
Arsenic	60.0	0.570	1.14	mg/kg dry	5	57.0	7.45	92	75-125%	7	40%	
Cadmium	53.5	0.114	0.228	mg/kg dry	5	57.0	0.188	94	75-125%	4	40%	
Chromium	89.9	0.570	1.14	mg/kg dry	5	57.0	35.1	96	75-125%	6	40%	
Copper	156	1.14	2.28	mg/kg dry	5	57.0	92.5	112	75-125%	10	40%	
Lead	81.6	0.114	0.228	mg/kg dry	5	57.0	16.2	115	75-125%	**91**	**40%**	Q-03
Nickel	90.9	2.28	4.56	mg/kg dry	5	57.0	33.8	100	75-125%	7	40%	
Selenium	27.6	0.570	1.14	mg/kg dry	5	28.5	0.644	95	75-125%	3	40%	
Silver	29.2	0.114	0.228	mg/kg dry	5	28.5	ND	102	75-125%	6	40%	
Zinc	140	2.28	4.56	mg/kg dry	5	57.0	84.6	97	75-125%	5	40%	

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AMENDED REPORT

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Ammonia by Plumb Extraction, Gas Diffusion and Colorimetric Detection

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9091360 - Plumb 1981 Ammonia (Acidified KCl Leach)							**Soil**					
Blank (9091360-BLK1)			Prepared: 09/27/19 06:49		Analyzed: 09/27/19 14:19							
Plumb/SM 4500-NH3 G												
Ammonia as N	ND	0.100	0.100	mg/kg wet	1	---	---	---	---	---	---	
LCS (9091360-BS1)			Prepared: 09/27/19 06:49		Analyzed: 09/27/19 14:22							
Plumb/SM 4500-NH3 G												
Ammonia as N	9.66	0.100	0.100	mg/kg wet	1	10.0	---	97	80-120%	---	---	
Matrix Spike (9091360-MS2)			Prepared: 09/27/19 06:49		Analyzed: 09/27/19 15:28							
QC Source Sample: SE-29-0-2.0 (A9I0822-02)												
Plumb/SM 4500-NH3 G												
Ammonia as N	20.6	0.222	0.222	mg/kg dry	1	22.2	5.11	**70**	**75-125%**	---	---	Q-01, Q-16
Matrix Spike Dup (9091360-MSD2)			Prepared: 09/27/19 06:49		Analyzed: 09/27/19 15:30							
QC Source Sample: SE-29-0-2.0 (A9I0822-02)												
Plumb/SM 4500-NH3 G												
Ammonia as N	24.1	0.226	0.226	mg/kg dry	1	22.6	5.11	84	75-125%	16	20%	Q-16

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AMENDED REPORT

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALITY CONTROL (QC) SAMPLE RESULTS

Demand Parameters

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9091362 - PSEP-5310B TOC							**Sediment**					
Blank (9091362-BLK1)			Prepared: 09/27/19 07:38		Analyzed: 10/07/19 08:37							
EPA 9060Amod												
Total Organic Carbon	ND	200	200	mg/kg	1	---	---	---	---	---	---	
LCS (9091362-BS1)			Prepared: 09/27/19 07:38		Analyzed: 10/07/19 09:15							
EPA 9060Amod												
Total Organic Carbon	9700			mg/kg	1	10000	---	97	90-110%	---	---	
Duplicate (9091362-DUP1)			Prepared: 09/27/19 07:38		Analyzed: 10/07/19 11:57							
QC Source Sample: SE-29-0-2.0 (A9I0822-02)												
EPA 9060Amod												
Total Organic Carbon	**110000**	200	200	mg/kg	1	---	99000	---	---	9	20%	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Solid and Moisture Determinations

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9091443 - Total Solids (SM2540G/PSEP)							**Sediment**					
Duplicate (9091443-DUP1)			Prepared: 09/30/19 10:56 Analyzed: 10/01/19 13:08									
QC Source Sample: SE-29-0-2.0 (A9I0822-02)												
PSEP 1986												
Total Solids	**48.6**	1.00	1.00	%	1	---	42.9	---	---	12	20%	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Solid and Moisture Determinations

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9091474 - Total Volatile Solids (non-aq)							**Solid**					
Duplicate (9091474-DUP1)			Prepared: 09/30/19 17:28		Analyzed: 10/02/19 15:31							
QC Source Sample: SE-29-0-2.0 (A9I0822-02)												
SM 2540 G												
Total Volatile Solids	**20.6**	1.00	1.00	%	1	---	27.4	---	---	**28**	**10%**	Q-04

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QUALITY CONTROL (QC) SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9091443 - Total Solids (SM2540G/PSEP)							**Sediment**					
Duplicate (9091443-DUP1)			Prepared: 09/30/19 10:56		Analyzed: 10/01/19 13:08							
QC Source Sample: SE-29-0-2.0 (A9I0822-02)												
EPA 8000C												
% Solids	**48.6**	1.00	1.00	%	1	---	42.9	---	---	**12**	**10%**	Q-04

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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QUALITY CONTROL (QC) SAMPLE RESULTS

Metals and Metallic Compounds

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch BHI0876 - SMM EPA 7471B							**Solid**					
Blank (BHI0876-BLK1)			Prepared: 09/30/19 08:22		Analyzed: 10/01/19 14:54							
EPA 7471B												
Mercury	ND	0.00525	0.0250	mg/kg wet	1	---	---	---	---	---	---	U
LCS (BHI0876-BS1)			Prepared: 09/30/19 08:22		Analyzed: 10/01/19 14:56							
EPA 7471B												
Mercury	0.480	0.00525	0.0250	mg/kg wet	1	0.50000	---	96.0	80-120%	---	---	
Duplicate (BHI0876-DUP1)			Prepared: 09/30/19 08:22		Analyzed: 10/01/19 15:01							
QC Source Sample: A9I0822-02 (A9I0822-02)												
EPA 7471B												
Mercury	**0.101**	0.00984	0.0469	mg/kg dry	1	---	0.107	---	---	5.57	20%	
Matrix Spike (BHI0876-MS1)			Prepared: 09/30/19 08:22		Analyzed: 10/01/19 15:03							
QC Source Sample: A9I0822-02 (A9I0822-02)												
EPA 7471B												
Mercury	0.681	0.00972	0.0463	mg/kg dry	1	0.46296	0.107	124	75-125%	---	---	
Matrix Spike Dup (BHI0876-MSD1)			Prepared: 09/30/19 08:22		Analyzed: 10/01/19 15:05							
QC Source Sample: A9I0822-02 (A9I0822-02)												
EPA 7471B												
Mercury	0.692	0.00972	0.0463	mg/kg dry	1	0.46296	0.107	**126**	**75-125%**	1.61	20%	
Post Spike (BHI0876-PS1)			Prepared: 09/30/19 08:22		Analyzed: 10/01/19 16:02							
QC Source Sample: A9I0822-02 (A9I0822-02)												
EPA 7471B												
Mercury	0.00143			mg/L	1	0.0010000	0.107	121	0-200%		---	
Reference (BHI0876-SRM1)			Prepared: 09/30/19 08:22		Analyzed: 10/01/19 15:07							
EPA 7471B												
Mercury	12.6	0.0525	0.250	mg/kg wet	10	13.300		94.4	68-131.6%	---	---	D

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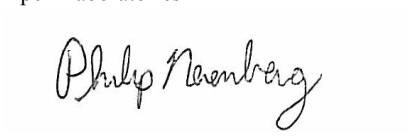

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Analytical Resources, Inc.

QUALITY CONTROL (QC) SAMPLE RESULTS

Metals and Metallic Compounds

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch BHI0876 - SMM EPA 7471B							**Solid**					

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QUALITY CONTROL (QC) SAMPLE RESULTS

Wet Chemistry

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch BHI0874 - No Prep Wet Chem							**Solid**					
Blank (BHI0874-BLK1)			Prepared: 09/30/19 00:59		Analyzed: 09/30/19 01:32							
PSEP 1986												
Total Solids, Sulfide	ND	0.04	0.04	%	1	---	---	---	---	---	---	U
Duplicate (BHI0874-DUP3)			Prepared: 09/30/19 00:59		Analyzed: 09/30/19 01:32							
QC Source Sample: A9I0822-02 (A9I0822-02)												
PSEP 1986												
Total Solids, Sulfide	**41.80**	0.04	0.04	%	1	---	40.27	---	---	3.74	20%	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Wet Chemistry

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch BHI0893 - EPA 9030B							**Solid**					
Blank (BHI0893-BLK1)			Prepared: 09/30/19 12:08		Analyzed: 10/03/19 15:28							
SM 4500-S2 D-00												
Sulfide	ND	1.00	1.00	mg/kg wet	1	---	---	---	---	---	---	U
LCS (BHI0893-BS1)			Prepared: 09/30/19 12:08		Analyzed: 10/03/19 15:28							
SM 4500-S2 D-00												
Sulfide	141	10.0	10.0	mg/kg wet	10	165.79	---	84.9	75-125%	---	---	D
Duplicate (BHI0893-DUP1)			Prepared: 09/30/19 12:08		Analyzed: 10/03/19 15:30							
QC Source Sample: A9I0822-02 (A9I0822-02)												
SM 4500-S2 D-00												
Sulfide	**1470**	116	116	mg/kg dry	50	---	1510	---	---	3.24	20%	D
Matrix Spike (BHI0893-MS1)			Prepared: 09/30/19 12:08		Analyzed: 10/03/19 15:31							
QC Source Sample: A9I0822-02 (A9I0822-02)												
SM 4500-S2 D-00												
Sulfide	2040	121	121	mg/kg dry	50	400.90	1510	**132**	**75-125%**	---	---	HC, D
Matrix Spike Dup (BHI0893-MSD2)			Prepared: 09/30/19 12:08		Analyzed: 10/03/19 16:08							
QC Source Sample: A9I0822-02 (A9I0822-02)												
SM 4500-S2 D-00												
Sulfide	1950	121	121	mg/kg dry	50	401.76	1510	108	75-125%	12.6	200%	D

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SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Acid/Silica Gel Cleanup

Prep: EPA 3546 w/SG+Acid (NWTPH)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9101201							
A9I0822-02	Sediment	NWTPH-Dx/SG	09/24/19 08:50	10/01/19 12:56	10.02g/5mL	10g/5mL	1.00

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Prep: EPA 5035A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9091374							
A9I0822-02	Sediment	NWTPH-Gx (MS)	09/24/19 08:50	09/24/19 08:50	4.69g/5mL	5g/5mL	1.07

Polychlorinated Biphenyls by EPA 8082A

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9091456							
A9I0822-02	Sediment	EPA 8082A	09/24/19 08:50	09/30/19 13:58	10.05g/5mL	10g/5mL	1.00

Semivolatile Organic Compounds by EPA 8270D

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9100490							
A9I0822-02RE1	Sediment	EPA 8270D	09/24/19 08:50	10/01/19 10:34	15.24g/2mL	15g/2mL	0.98

Total Metals by EPA 6020A (ICPMS)

Prep: EPA 3051A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9100517							
A9I0822-02	Sediment	EPA 6020A	09/24/19 08:50	10/01/19 15:50	0.503g/50mL	0.5g/50mL	0.99

Ammonia by Plumb Extraction, Gas Diffusion and Colorimetric Detection

Prep: Plumb 1981 Ammonia (Acidified KCl Leach)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9091360							

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SAMPLE PREPARATION INFORMATION

Ammonia by Plumb Extraction, Gas Diffusion and Colorimetric Detection

Prep: Plumb 1981 Ammonia (Acidified KCl Leach)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A9I0822-01RE1	Sediment	Plumb/SM 4500-NH3 G	09/23/19 14:00	09/27/19 06:49	10.233g/50mL	10g/50mL	0.98
A9I0822-02RE1	Sediment	Plumb/SM 4500-NH3 G	09/24/19 08:50	09/27/19 06:49	10.4904g/50mL	10g/50mL	0.95
A9I0822-03RE1	Sediment	Plumb/SM 4500-NH3 G	09/24/19 10:00	09/27/19 06:49	10.0427g/50mL	10g/50mL	1.00
A9I0822-05RE1	Sediment	Plumb/SM 4500-NH3 G	09/24/19 14:45	09/27/19 06:49	10.3173g/50mL	10g/50mL	0.97

Demand Parameters

Prep: PSEP-5310B TOC

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9091362							
A9I0822-01	Sediment	EPA 9060Amod	09/23/19 14:00	09/27/19 07:38			NA
A9I0822-02	Sediment	EPA 9060Amod	09/24/19 08:50	09/27/19 07:38			NA
A9I0822-03	Sediment	EPA 9060Amod	09/24/19 10:00	09/27/19 07:38			NA
A9I0822-05	Sediment	EPA 9060Amod	09/24/19 14:45	09/27/19 07:38			NA

Solid and Moisture Determinations

Prep: Total Solids (SM2540G/PSEP)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9091443							
A9I0822-01	Sediment	PSEP 1986	09/23/19 14:00	09/30/19 10:56			NA
A9I0822-02	Sediment	PSEP 1986	09/24/19 08:50	09/30/19 10:56			NA
A9I0822-03	Sediment	PSEP 1986	09/24/19 10:00	09/30/19 10:56			NA
A9I0822-05	Sediment	PSEP 1986	09/24/19 14:45	09/30/19 10:56			NA

Prep: Total Volatile Solids (non-aq)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9091474							
A9I0822-01	Sediment	SM 2540 G	09/23/19 14:00	09/30/19 17:28			NA
A9I0822-02	Sediment	SM 2540 G	09/24/19 08:50	09/30/19 17:28			NA
A9I0822-03	Sediment	SM 2540 G	09/24/19 10:00	09/30/19 17:28			NA
A9I0822-05	Sediment	SM 2540 G	09/24/19 14:45	09/30/19 17:28			NA

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SAMPLE PREPARATION INFORMATION

Grain Size by ASTM D 422m/PSET Parameters

Prep: ASTM D 421

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9100739							
A9I0822-02	Sediment	D422mod	09/24/19 08:50	10/07/19 11:04			NA

Percent Dry Weight

Prep: Total Solids (SM2540G/PSEP)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9091443							
A9I0822-01	Sediment	EPA 8000C	09/23/19 14:00	09/30/19 10:56			NA
A9I0822-02	Sediment	EPA 8000C	09/24/19 08:50	09/30/19 10:56			NA
A9I0822-03	Sediment	EPA 8000C	09/24/19 10:00	09/30/19 10:56			NA
A9I0822-05	Sediment	EPA 8000C	09/24/19 14:45	09/30/19 10:56			NA

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SAMPLE PREPARATION INFORMATION

Metals and Metallic Compounds

Prep: SMM EPA 7471B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: BHI0876							
A9I0822-02	Sediment	EPA 7471B	09/24/19 08:50	09/30/19 08:22	0.245g/50mL	0.2g/50mL	0.82

Wet Chemistry

Prep: EPA 9030B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: BHI0893							
A9I0822-01	Sediment	SM 4500-S2 D-00	09/23/19 14:00	09/30/19 12:08	5.567g/100mL	5g/100mL	0.90
A9I0822-02	Sediment	SM 4500-S2 D-00	09/24/19 08:50	09/30/19 12:08	5.054g/100mL	5g/100mL	0.99
A9I0822-03	Sediment	SM 4500-S2 D-00	09/24/19 10:00	09/30/19 12:08	5.32g/100mL	5g/100mL	0.94
A9I0822-05	Sediment	SM 4500-S2 D-00	09/24/19 14:45	09/30/19 12:08	5.056g/100mL	5g/100mL	0.99

Prep: No Prep Wet Chem

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: BHI0874							
A9I0822-01	Sediment	PSEP 1986	09/23/19 14:00	09/30/19 00:59	5g/5g	5g/5g	1.00
A9I0822-02	Sediment	PSEP 1986	09/24/19 08:50	09/30/19 00:59	5g/5g	5g/5g	1.00
A9I0822-03	Sediment	PSEP 1986	09/24/19 10:00	09/30/19 00:59	5g/5g	5g/5g	1.00
A9I0822-05	Sediment	PSEP 1986	09/24/19 14:45	09/30/19 00:59	5g/5g	5g/5g	1.00

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

C-07	Extract has undergone Sulfuric Acid Cleanup by EPA 3665A, Sulfur Cleanup by EPA 3660B, and Florisil Cleanup by EPA 3620B in order to minimize matrix interference.
F-03	The result for this hydrocarbon range is elevated due to the presence of individual analyte peaks in the quantitation range that are not representative of the fuel pattern reported.
GS-01	See detailed Particle Size Analysis results, accumulation curves, and Case Narratives at the end of this report.
J	Estimated Result. Result detected below the lowest point of the calibration curve, but above the specified MDL.
M-04	Due to matrix interference, this analyte cannot be accurately quantified. The reported result may contain a high bias.
Q-01	Spike recovery and/or RPD is outside acceptance limits.
Q-03	Spike recovery and/or RPD is outside control limits due to the high concentration of analyte present in the sample.
Q-04	Spike recovery and/or RPD is outside control limits due to a non-homogeneous sample matrix.
Q-05	Analyses are not controlled on RPD values from sample and duplicate concentrations that are below 5 times the reporting level.
Q-11	Spike recovery cannot be accurately quantified due to sample dilution required for high analyte concentration and/or matrix interference.
Q-16	Reanalysis of an original Batch QC sample.
Q-29	Recovery for Lab Control Spike (LCS) is above the upper control limit. Data may be biased high.
Q-31	Estimated Results. Recovery of Continuing Calibration Verification sample below lower control limit for this analyte. Results are likely biased low.
Q-41	Estimated Results. Recovery of Continuing Calibration Verification sample above upper control limit for this analyte. Results are likely biased high.
Q-42	Matrix Spike and/or Duplicate analysis was performed on this sample. % Recovery or RPD for this analyte is outside laboratory control limits. (Refer to the QC Section of Analytical Report.)
Q-52	Due to erratic or low blank spike recoveries, results for this analyte are considered Estimated Values.
V-15	Sample aliquot was subsampled from the sample container. The subsampled aliquot was preserved in the laboratory within 48 hours of sampling.

Analytical Resources, Inc.

D	The reported value is from a dilution
HC	The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).

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REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

LABORATORY ACCREDITATION INFORMATION

TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories



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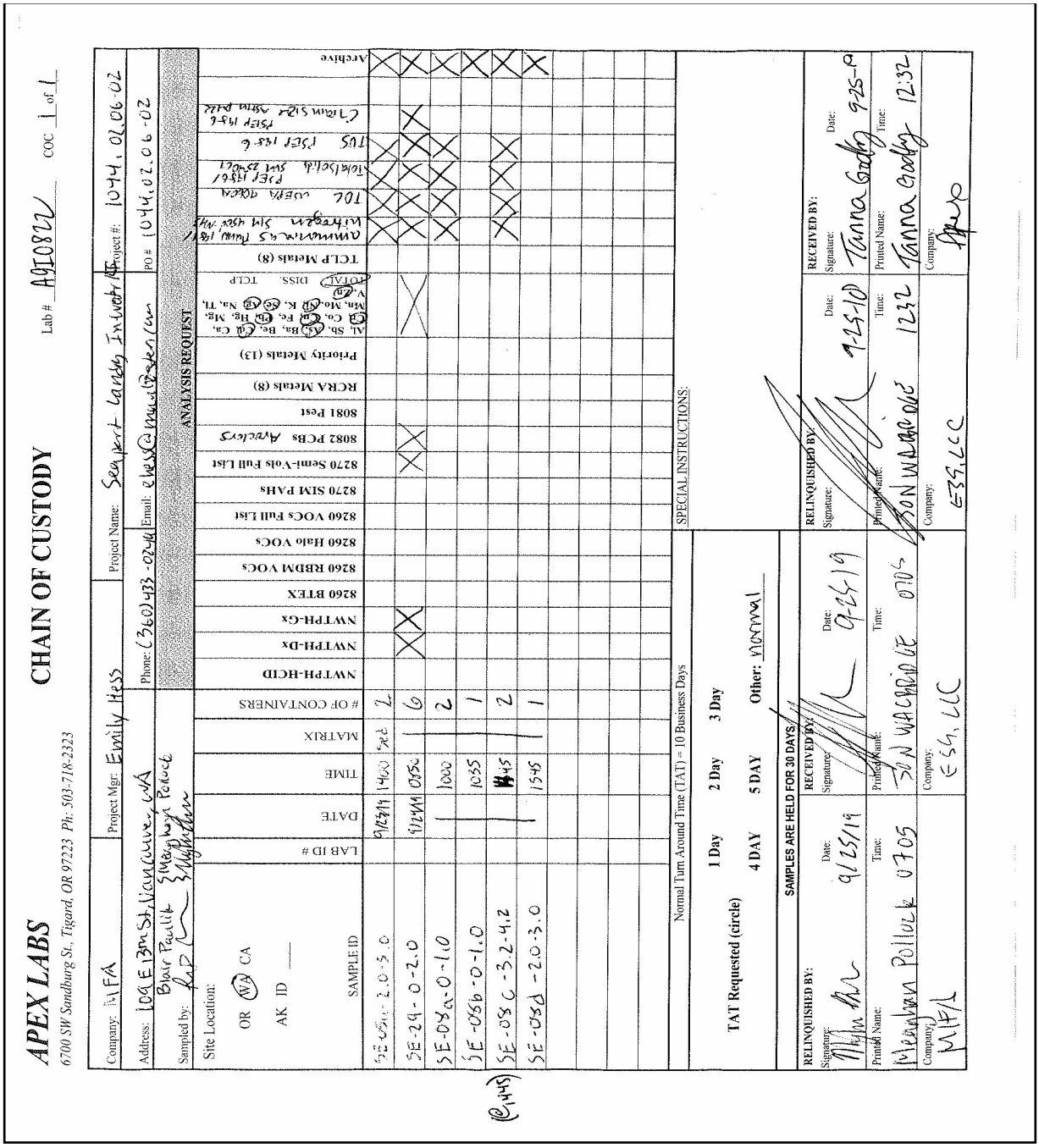

APEX LABS — CHAIN OF CUSTODY

6700 SW Sandburg St, Tigard, OR 97223 Ph: 503-718-2323

Lab # A9I0822 COC 1 of 1

Company: MFA | Project Mgr: Emily Hess | Project Name: Seaport Landing Investment | Project #: 1044.02.06-02

Address: 109 E 13th St, Vancouver, WA | Phone: (360) 433-0246 | Email: ehess@mauldfosteralongi.com | PO # 1044.02.06-02

Sampled by: Blair Paulik, Meagan Petrick, Kyle Mahan

Site Location: OR (WA) CA AK ID ____

ANALYSIS REQUESTED

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs Aroclors	8081 Pest	RCRA Metals (8)	Priority Metals (13)	Al, Sb, As, Ba, Be, Ca, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn	TCLP Metals (8)	Archive
SE-[illegible] 2.0-3.0		9/24/19	1400	Soil	2																
SE-29-0-2.0		9/24/19	0950		6			X						X					X		
SE-084-0-1.0			1000		2														X		
SE-056-0-1.0			1035		1														X		
SE-056-3.2-4.2			1045		2														X		
SE-056-2.0-3.0			1545		1														X		

(@1445)

Normal Turn Around Time (TAT) = 10 Business Days

SPECIAL INSTRUCTIONS:

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: Montana

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature:	Signature:	Signature:	Signature:
Date: 9/25/19	Date: 09-25-19	Date: 9-25-19	Date: 9-25-19
Time:	Time:	Time: 1232	Time: 12:32
Printed Name: Meagan Petrick	Printed Name: Jon Wadding	Printed Name: Jon Wadding	Printed Name: Tanna Godby
Company: MFA	Company: ESS, LLC	Company: ESS, LLC	Company: Apex

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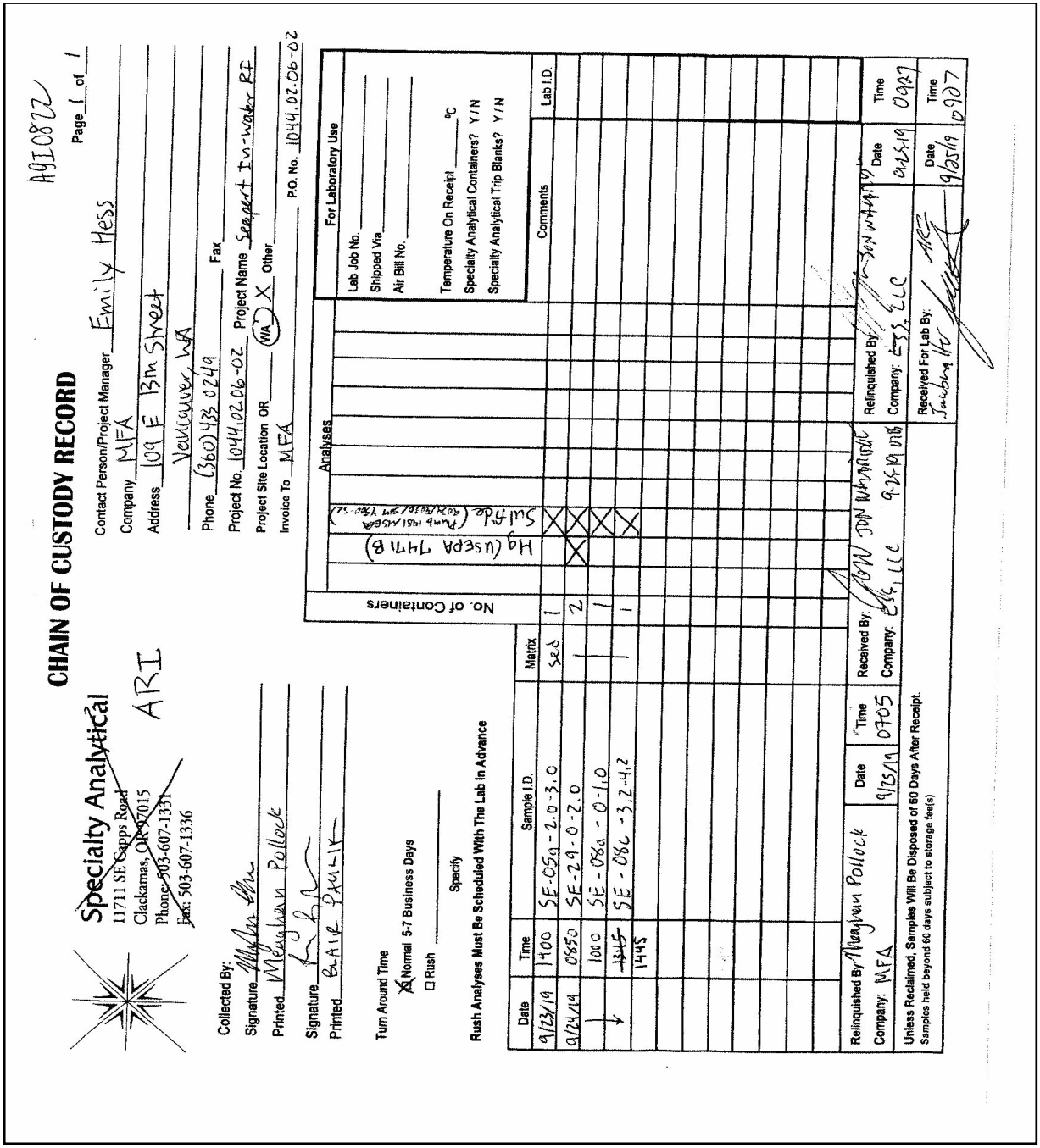

A9I0822

Page 1 of 1

CHAIN OF CUSTODY RECORD

Specialty Analytical
11711 SE Capps Road
Clackamas, OR 97015
Phone: 503-607-1331
Fax: 503-607-1336

ARI

Contact Person/Project Manager: Emily Hess
Company: MFA
Address: 109 E 13th Street
Vancouver, WA
Phone: (360) 433 0249 Fax
Project No: 1044.02.06-02 Project Name: Seaport Tidelands RI
Project Site Location OR WA X Other
Invoice To: MFA P.O. No.: 1044.02.06-02

Collected By:
Signature: Meaghan Pollock
Printed: Meaghan Pollock
Signature: Blair Paulik
Printed: Blair Paulik

Turn Around Time
X Normal 5-7 Business Days
☐ Rush ____ Specify
Rush Analyses Must Be Scheduled With The Lab In Advance

Date	Time	Sample I.D.	Matrix	No. of Containers	Hg (USEPA 7471B)	Sulfide (Pub. 1681/ASTM 1780-97)
9/23/19	1400	SE-05a-2.0-3.0	Sed	1		X
9/24/19	0850	SE-29-0-2.0		2	X	
	1000	SE-08a-0-1.0		1		X
↓	~~1345~~	SE-08b-3.2-4.2		1		X
	1445					

Analyses

For Laboratory Use
Lab Job No.
Shipped Via
Air Bill No.
Temperature On Receipt ____ °C
Specialty Analytical Containers? Y/N
Specialty Analytical Trip Blanks? Y/N

Comments

Lab I.D.

Relinquished By: Meaghan Pollock Date 9/25/19 Time 0705
Company: MFA
Received By: Company: ESS, LLC Date 9-25-19 Time 0705
Relinquished By: Company: ESS, LLC Date 9/25/19 Time 0927
Received For Lab By: Date 9/25/19 Time 0927

Unless Reclaimed, Samples Will Be Disposed of 60 Days After Receipt.
Samples held beyond 60 days subject to storage fee(s)

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0822 - 01 09 20 1609**

APEX LABS COOLER RECEIPT FORM

Client: MFA Landys 9/25/19 Element WO#: A9I0822

Project/Project #: Seaport Landys ~~Int~~ MAS 9-25-19 In-water / 1044.02.06-02

Delivery Info:

Date/time received: 9-25-19 @ 12:32 By: MAS

Delivered by: Apex____Client X MAS 9-25-19 ESS X FedEx____UPS____Swift___Senvoy ___SDS___Other_____

Cooler Inspection Date/time inspected: 9-25-19 @ 12:32 By: MAS

Chain of Custody included? Yes X No ___ Custody seals? Yes_____ No X

Signed/dated by client? Yes X No ___

Signed/dated by Apex? Yes X No ___

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	5.0						
Received on ice? (Y/N)	Y						
Temp. blanks? (Y/N)	N						
Ice type: (Gel/Real/Other)	Real						
Condition:	good						

Cooler out of temp? (Y/N) Possible reason why:_____

If some coolers are in temp and some out, were green dots applied to out of temperature samples? Yes/No/NA

Out of temperature samples form initiated? Yes/No/NA

Samples Inspection: Date/time inspected: 9/25/19 @ 1614 By: SC

All samples intact? Yes X No ___ Comments:_____

Bottle labels/COCs agree? Yes X No ___ Comments: _____

COC/container discrepancies form initiated? Yes ___ No ___ NA X

Containers/volumes received appropriate for analysis? Yes X No ___ Comments: _____

Do VOA vials have visible headspace? Yes ___ No ___ NA X

Comments_____

Water samples: pH checked: Yes___No___NA X pH appropriate? Yes___No___NA X

Comments: _____

Additional information: Subsampled by: SC
Witnessed by: DG

Labeled by: ST Witness: DG Cooler Inspected by: SC See Project Contact Form: Y

Apex Laboratories

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC

Particle Size Analysis of Soil by ASTM D 422

Sample ID:	A9I0822-02		Client Sample ID:	SE-29-0-2.0		Batch Number:	9100739
Data Entered by:	SJL	Date:	10/14/19	Data Reviewed by:	JW	Date:	10/16/19
Sample Description:	Gravelly SILT with some Sand and Clay			Max Particle Size:	Gravel		
Particle Shape:	N/A			Hardness	N/A		

Whole Sample	Tare	Air Dry + Tare	Air Dry	Moisture	Dry Wt.
	11.865	252.547	240.68	8.29	222.3

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Wt. Retained	% Retained	% Passing
4	4.75	6.106	67.723	61.62	61.62	27.7	72.3
10	2.00	6.087	16.409	10.32	71.94	4.6	67.6
Pan		5.882	163.490	157.61	229.55	65.0	

Hygroscopic Moisture Correction

	Hygroscopic Correction Factor	Oven Sample	Pan No.	Tare	Air Dry + Tare	Oven Dry + Tare	Moisture
	0.9234		I822-02	1.316	20.448	18.983	8.29

Hydrometer Analysis

Start Date/Time	10/7/2019	11:04	Dispersing Agent	$NaPO_3$
Air Dry Sample Wt. for Hydrometer Test (g)	53.808		G_s Correction Factor (α)	1.000
Percent Passing No.10 Sieve	67.6		Specific Gravity (G_s)	2.65
Dry Weight of Soil Tested (g)	49.69		Corrected Dry Weight of Soil Tested (g) (W)	73.47

Elapsed Time (min)	Hydrometer Reading	Temperature (°C)	Corrected Hydrometer Reading [R]	% Finer of Hydrometer Sample	L	K	Particle Diameter (mm)	Percent Passing
1	34	19.8	27.71	37.7	10.5	0.01365	0.044	25.51
2	31	19.8	24.71	33.6	11.1	0.01365	0.032	22.75
4	26.5	19.8	20.21	27.5	11.7	0.01365	0.023	18.61
8	23.5	19.8	17.21	23.4	12.2	0.01365	0.017	15.85
15	20.5	19.9	14.25	19.4	12.7	0.01365	0.013	13.11
30	17.5	19.9	11.25	15.3	13.2	0.01365	0.009	10.35
60	15.5	19.8	9.21	12.5	13.5	0.01365	0.006	8.48
90	14.5	19.7	8.18	11.1	13.7	0.01365	0.005	7.53
120	13.5	19.7	7.18	9.8	13.8	0.01365	0.005	6.61
240	12	19.8	5.71	7.8	14.2	0.01365	0.003	5.26
360	11	19.5	4.61	6.3	14.3	0.01365	0.003	4.25
1440	9.5	19.2	3.01	4.1	14.5	0.01382	0.001	2.77

Sieve Analysis of Portion Finer Than No. 10 Sieve

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Retained	% Retained	% Passing
20	0.850	1.319	4.456	3.14	81.13	4.3	63.4
40	0.425	1.331	4.853	3.52	91.44	4.8	58.6
60	0.250	1.319	4.578	3.26	100.99	4.4	54.1
100	0.150	1.325	3.940	2.62	108.65	3.6	50.6
140	0.105	1.338	3.576	2.24	115.20	3.0	47.5
200	0.075	1.312	4.376	3.06	124.18	4.2	43.4
230	0.063	1.329	3.202	1.87	129.67	2.5	40.8
			Sum	19.71	230 Minus	29.98	

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Sample ID: SE-29-0-2.0 (A9I0822-02)

Grain Size Analysis Summary from Sieving and Hydrometer Testing		Particle Size (mm)	Percent Finer	Total Percent of Sample
Gravel				*32.37*
Retained on No. 4 sieve		4.75	72.28	27.72
Gravel, passing No. 4 sieve and retained on No. 10 sieve		2.00	67.63	4.64
Sand				*26.83*
Coarse sand, passing No.10 sieve and retained on No. 20 sieve		0.8500	63.36	4.27
Medium sand, passing No.20 sieve and retained on No. 40 sieve		0.4250	58.57	4.79
Medium sand, passing No.40 sieve and retained on No. 60 sieve		0.2500	54.13	4.44
Medium sand, passing No. 60 sieve and retained on No.100 sieve		0.1500	50.57	3.56
Fine sand, passing No. 100 sieve and retained on No.140 sieve		0.1060	47.53	3.05
Fine sand passing No. 140 sieve and retained on No. 200 sieve		0.0750	43.36	4.17
Fine sand, passing No. 200 sieve and retained on No. 230 sieve		0.0630	40.81	2.55
Silt and Clay (Measurements in the Clay fraction are noted)				*40.81*
Hydrometer Test		0.0442	25.51	15.29
Hydrometer Test		0.0322	22.75	2.76
Hydrometer Test		0.0233	18.61	4.14
Hydrometer Test		0.0169	15.85	2.76
Hydrometer Test		0.0126	13.11	2.73
Hydrometer Test		0.0091	10.35	2.76
Hydrometer Test		0.0065	8.48	1.87
Hydrometer Test		0.0053	7.53	0.95
Hydrometer Test	Clay	0.0046	6.61	0.92
Hydrometer Test	Clay	0.0033	5.26	1.35
Hydrometer Test	Clay	0.0027	4.25	1.01
Hydrometer Test	Clay	0.0014	2.77	1.47

Grain Size Summary	Percent of Total Sample
Gravel	32.4
Sand	26.8
Coarse sand	4.3
Medium sand	12.8
Fine sand	9.8
Silt	33.3
Clay	7.5

Case Narrative for Sample ID: SE-29-0-2.0 (A9I0822-02)

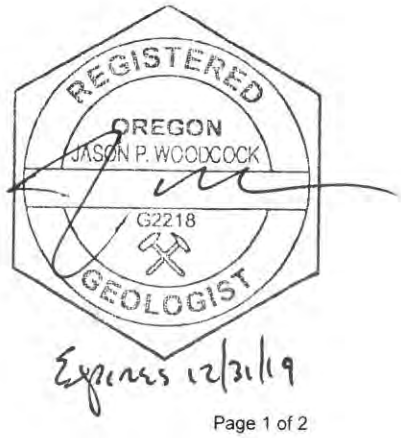
This data is not to be used for engineering purposes.

No difficulty dispersing the fraction passing the No. 10 sieve.

Dispersion device used: Commercial drink mixer operating at least 10,000 rpm for one minute.

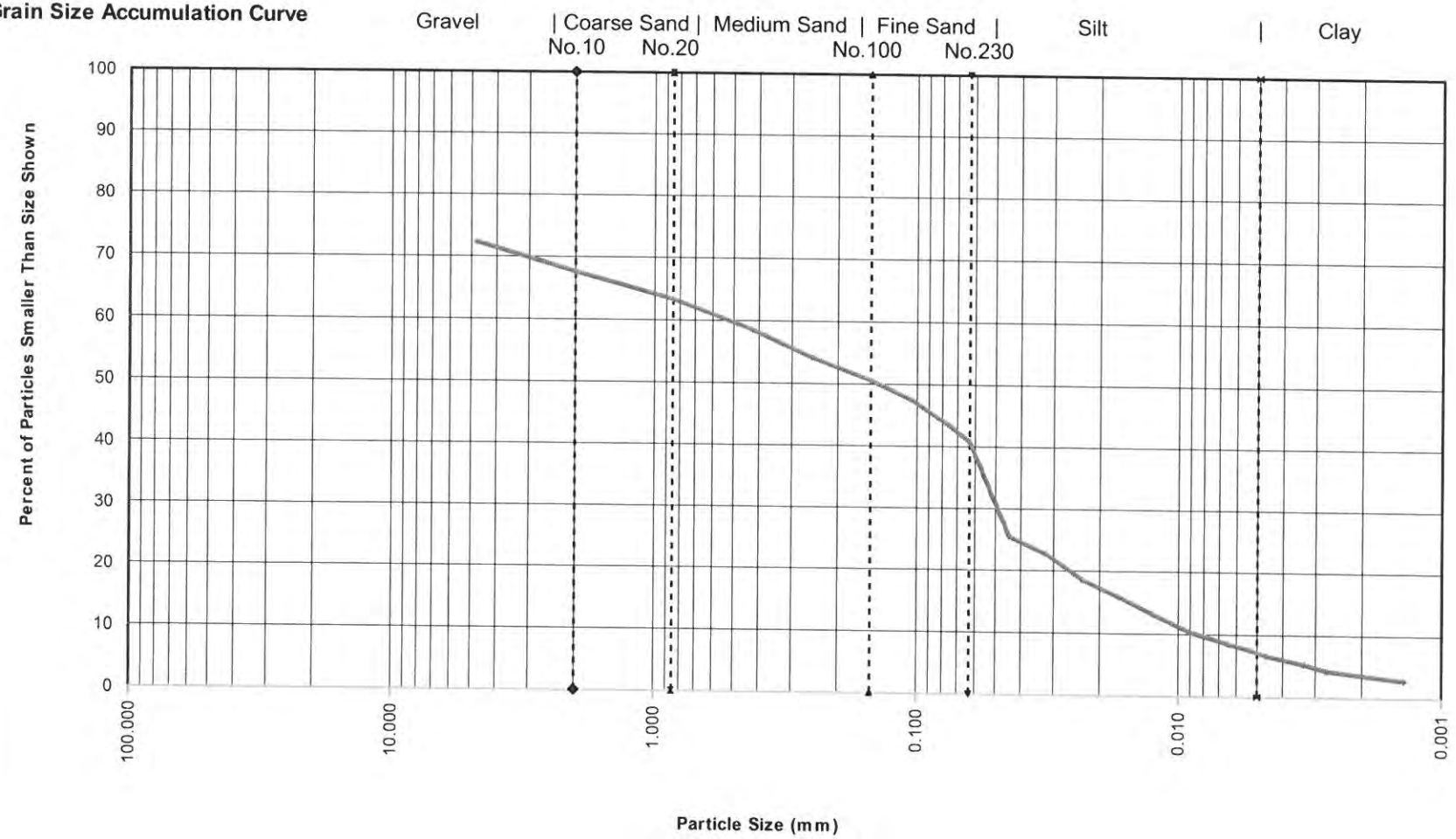
The assumed specific gravity used in the calculations was 2.65.

+4 through +100 fractions consist almost entirely of organic material.



Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Grain Size Accumulation Curve



Sample ID:	SE-29-0-2.0 (A9I0822-02)			
Specific Gravity	MAXIMUM PARTICLE SIZE	GRAVEL & SAND		SOIL DESCRIPTION
		PARTICLE SHAPE	HARDNESS	
2.65	Gravel	N/A	N/A	Gravelly SILT with some Sand and Clay

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Thursday, January 9, 2020

Emily Hess
Maul Foster & Alongi, INC.
2001 NW 19th Ave, STE 200
Portland, OR 97209

RE: A9I0893 - Seaport Tidelands - 1044.02.06-02

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A9I0893, which was received by the laboratory on 9/27/2019 at 12:10:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: pnerenberg@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1	1.3 degC	Cooler #2	1.7 degC
Cooler #3	1.1 degC	Cooler #4	0.5 degC

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

Apex Laboratories



Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SE-01A-1.0-2.0	A9I0893-01	Sediment	09/25/19 08:10	09/27/19 12:10
SE-03A-0-1.0	A9I0893-05	Sediment	09/25/19 11:20	09/27/19 12:10
SE-06A-0.5-1.5	A9I0893-07	Sediment	09/25/19 14:15	09/27/19 12:10
SE-20-0-0.33	A9I0893-08	Sediment	09/25/19 18:15	09/27/19 12:10
SE-07A-0-1.0	A9I0893-09	Sediment	09/26/19 08:15	09/27/19 12:10
SE-02A-2.5-3.5	A9I0893-11	Sediment	09/26/19 11:50	09/27/19 12:10
SE-10-2.0-3.7	A9I0893-13	Sediment	09/26/19 13:50	09/27/19 12:10
SE-30-2.5-4.5	A9I0893-14	Sediment	09/26/19 15:40	09/27/19 12:10
Rinsate Blank	A9I0893-18	Water	09/26/19 18:40	09/27/19 12:10
SE-20-0-0.33 (Water)	A9I0893-19	Water	09/25/19 18:15	09/27/19 12:10
SE-20-0-0.33--Air Dried	A9I0893-20	Sediment	09/25/19 18:15	09/27/19 12:10
SE-10-2.0-3.7---Air Dried	A9I0893-21	Sediment	09/26/19 13:50	09/27/19 12:10
SE-30-2.5-4.5---Air Dried	A9I0893-22	Sediment	09/26/19 15:40	09/27/19 12:10

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

ANALYTICAL CASE NARRATIVE

Work Order: A9I0893

Amended Report Revision 1:

This report supersedes all previous reports.

Due to client request, 1-methylnaphthalene was added to the SVOC analyte list after the previous report version had been completed.

Philip Nerenberg
Lab Director
1/9/20

Apex Laboratories, LLC
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AMENDED REPORT

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Acid/Silica Gel Cleanup

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-20-0-0.33 (A9I0893-08)				**Matrix: Sediment**		**Batch: 9101200**		
Diesel	ND	26.7	53.4	mg/kg dry	1	10/16/19 23:29	NWTPH-Dx/SG	
Oil	**610**	53.4	107	mg/kg dry	1	10/16/19 23:29	NWTPH-Dx/SG	
Surrogate: o-Terphenyl (Surr)		*Recovery: 95 %*		*Limits: 50-150 %*	*1*	*10/16/19 23:29*	*NWTPH-Dx/SG*	
SE-10-2.0-3.7 (A9I0893-13)				**Matrix: Sediment**		**Batch: 9101200**		
Diesel	ND	25.8	51.6	mg/kg dry	1	10/17/19 00:17	NWTPH-Dx/SG	
Oil	**898**	51.6	103	mg/kg dry	1	10/17/19 00:17	NWTPH-Dx/SG	
Surrogate: o-Terphenyl (Surr)		*Recovery: 93 %*		*Limits: 50-150 %*	*1*	*10/17/19 00:17*	*NWTPH-Dx/SG*	
SE-30-2.5-4.5 (A9I0893-14)				**Matrix: Sediment**		**Batch: 9101200**		
Diesel	ND	20.6	41.3	mg/kg dry	1	10/17/19 01:27	NWTPH-Dx/SG	
Oil	**393**	41.3	82.5	mg/kg dry	1	10/17/19 01:27	NWTPH-Dx/SG	
Surrogate: o-Terphenyl (Surr)		*Recovery: 92 %*		*Limits: 50-150 %*	*1*	*10/17/19 01:27*	*NWTPH-Dx/SG*	
Rinsate Blank (A9I0893-18)				**Matrix: Water**		**Batch: 9101263**		
Diesel	ND	0.222	0.222	mg/L	1	10/18/19 02:24	NWTPH-Dx/SG	
Oil	ND	0.222	0.444	mg/L	1	10/18/19 02:24	NWTPH-Dx/SG	
Surrogate: o-Terphenyl (Surr)		*Recovery: 100 %*		*Limits: 50-150 %*	*1*	*10/18/19 02:24*	*NWTPH-Dx/SG*	

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-20-0-0.33 (A9I0893-08)				**Matrix: Sediment**		**Batch: 9091416**		
Gasoline Range Organics	ND	13.4	26.8	mg/kg dry	50	09/28/19 18:56	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 103 %*	*Limits: 50-150 %*		*1*	*09/28/19 18:56*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*101 %*	*50-150 %*	*1*	*09/28/19 18:56*	*NWTPH-Gx (MS)*	
SE-10-2.0-3.7 (A9I0893-13)				**Matrix: Sediment**		**Batch: 9091416**		
Gasoline Range Organics	ND	11.8	23.6	mg/kg dry	50	09/28/19 19:50	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 106 %*	*Limits: 50-150 %*		*1*	*09/28/19 19:50*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*102 %*	*50-150 %*	*1*	*09/28/19 19:50*	*NWTPH-Gx (MS)*	
SE-30-2.5-4.5 (A9I0893-14)				**Matrix: Sediment**		**Batch: 9091416**		
Gasoline Range Organics	ND	7.95	15.9	mg/kg dry	50	09/28/19 20:17	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 104 %*	*Limits: 50-150 %*		*1*	*09/28/19 20:17*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*102 %*	*50-150 %*	*1*	*09/28/19 20:17*	*NWTPH-Gx (MS)*	
Rinsate Blank (A9I0893-18)				**Matrix: Water**		**Batch: 9091419**		
Gasoline Range Organics	ND	0.0500	0.100	mg/L	1	09/29/19 01:32	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 83 %*	*Limits: 50-150 %*		*1*	*09/29/19 01:32*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*107 %*	*50-150 %*	*1*	*09/29/19 01:32*	*NWTPH-Gx (MS)*	

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Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

ANALYTICAL SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Rinsate Blank (A9I0893-18)				**Matrix: Water**		**Batch: 9091465**		**C-07**
Aroclor 1016	ND	0.0562	0.112	ug/L	1	10/01/19 13:53	EPA 8082A	
Aroclor 1221	ND	0.0562	0.112	ug/L	1	10/01/19 13:53	EPA 8082A	
Aroclor 1232	ND	0.0562	0.112	ug/L	1	10/01/19 13:53	EPA 8082A	
Aroclor 1242	ND	0.0562	0.112	ug/L	1	10/01/19 13:53	EPA 8082A	
Aroclor 1248	ND	0.0562	0.112	ug/L	1	10/01/19 13:53	EPA 8082A	
Aroclor 1254	ND	0.0562	0.112	ug/L	1	10/01/19 13:53	EPA 8082A	
Aroclor 1260	ND	0.0562	0.112	ug/L	1	10/01/19 13:53	EPA 8082A	
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 53 %*		*Limits: 40-135 %*	*1*	*10/01/19 13:53*	*EPA 8082A*	
SE-20-0-0.33--Air Dried (A9I0893-20)				**Matrix: Sediment**		**Batch: 9101592**		**C-07**
Aroclor 1016	ND	2.12	4.24	ug/kg dry	1	10/28/19 09:59	EPA 8082A	
Aroclor 1221	ND	2.12	4.24	ug/kg dry	1	10/28/19 09:59	EPA 8082A	
Aroclor 1232	ND	2.12	4.24	ug/kg dry	1	10/28/19 09:59	EPA 8082A	
Aroclor 1242	ND	2.12	4.24	ug/kg dry	1	10/28/19 09:59	EPA 8082A	
Aroclor 1248	ND	2.12	4.24	ug/kg dry	1	10/28/19 09:59	EPA 8082A	
Aroclor 1254	**2.38**	2.12	4.24	ug/kg dry	1	10/28/19 09:59	EPA 8082A	**J**
Aroclor 1260	**2.31**	2.12	4.24	ug/kg dry	1	10/28/19 09:59	EPA 8082A	**J**
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 75 %*		*Limits: 60-125 %*	*1*	*10/28/19 09:59*	*EPA 8082A*	
SE-10-2.0-3.7---Air Dried (A9I0893-21)				**Matrix: Sediment**		**Batch: 9101592**		**C-07**
Aroclor 1016	ND	2.15	4.29	ug/kg dry	1	10/28/19 11:10	EPA 8082A	
Aroclor 1221	ND	2.15	4.29	ug/kg dry	1	10/28/19 11:10	EPA 8082A	
Aroclor 1232	ND	2.15	4.29	ug/kg dry	1	10/28/19 11:10	EPA 8082A	
Aroclor 1242	ND	2.15	4.29	ug/kg dry	1	10/28/19 11:10	EPA 8082A	
Aroclor 1248	ND	2.15	4.29	ug/kg dry	1	10/28/19 11:10	EPA 8082A	
Aroclor 1254	**5.86**	2.15	4.29	ug/kg dry	1	10/28/19 11:10	EPA 8082A	**P-10**
Aroclor 1260	**7.17**	2.15	4.29	ug/kg dry	1	10/28/19 11:10	EPA 8082A	**P-10**
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 62 %*		*Limits: 60-125 %*	*1*	*10/28/19 11:10*	*EPA 8082A*	
SE-30-2.5-4.5---Air Dried (A9I0893-22)				**Matrix: Sediment**		**Batch: 9101592**		**C-07**
Aroclor 1016	ND	7.24	7.24	ug/kg dry	1	10/28/19 12:56	EPA 8082A	R-02
Aroclor 1221	ND	4.13	4.13	ug/kg dry	1	10/28/19 12:56	EPA 8082A	
Aroclor 1232	ND	17.6	17.6	ug/kg dry	1	10/28/19 12:56	EPA 8082A	R-02

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Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

ANALYTICAL SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-30-2.5-4.5---Air Dried (A9I0893-22)				**Matrix: Sediment**		**Batch: 9101592**		**C-07**
Aroclor 1242	ND	10.3	10.3	ug/kg dry	1	10/28/19 12:56	EPA 8082A	R-02
Aroclor 1248	ND	13.4	13.4	ug/kg dry	1	10/28/19 12:56	EPA 8082A	R-02
Aroclor 1254	ND	11.4	11.4	ug/kg dry	1	10/28/19 12:56	EPA 8082A	R-02
Aroclor 1260	**14.4**	2.07	4.13	ug/kg dry	1	10/28/19 12:56	EPA 8082A	
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 78 %*		*Limits: 60-125 %*	*1*	*10/28/19 12:56*	*EPA 8082A*	

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-20-0-0.33 (A9I0893-08RE1)				**Matrix: Sediment**		**Batch: 9100490**		**R-04**
Acenaphthene	ND	0.0143	0.0287	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Acenaphthylene	ND	0.0143	0.0287	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Anthracene	ND	0.0143	0.0287	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Benz(a)anthracene	ND	0.0143	0.0287	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Benzo(a)pyrene	ND	0.0215	0.0430	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Benzo(b)fluoranthene	ND	0.0215	0.0430	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Benzo(k)fluoranthene	ND	0.0215	0.0430	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Benzo(g,h,i)perylene	ND	0.0143	0.0287	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Chrysene	ND	0.0143	0.0287	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Dibenz(a,h)anthracene	ND	0.0143	0.0287	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Fluoranthene	**0.0169**	0.0143	0.0287	mg/kg dry	4	10/02/19 12:07	EPA 8270D	**J**
Fluorene	ND	0.0143	0.0287	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Indeno(1,2,3-cd)pyrene	ND	0.0143	0.0287	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
1-Methylnaphthalene	ND	0.0287	0.0574	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
2-Methylnaphthalene	ND	0.0287	0.0574	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Naphthalene	ND	0.0287	0.0574	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Phenanthrene	ND	0.0143	0.0287	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Pyrene	**0.0174**	0.0143	0.0287	mg/kg dry	4	10/02/19 12:07	EPA 8270D	**J**
Dibenzofuran	ND	0.0143	0.0287	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
2,4-Dimethylphenol	ND	0.0718	0.143	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
2-Methylphenol	ND	0.0358	0.0718	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
3+4-Methylphenol(s)	**0.0432**	0.0358	0.0718	mg/kg dry	4	10/02/19 12:07	EPA 8270D	**J**
Pentachlorophenol (PCP)	ND	0.143	0.287	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Phenol	ND	0.0287	0.0574	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Bis(2-ethylhexyl)phthalate	ND	0.215	0.430	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Butyl benzyl phthalate	ND	0.0718	0.143	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Diethylphthalate	ND	0.0718	0.143	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Dimethylphthalate	ND	0.0718	0.143	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Di-n-butylphthalate	ND	0.0718	0.143	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Di-n-octyl phthalate	ND	0.115	0.143	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
N-Nitrosodiphenylamine	ND	0.0358	0.0718	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Hexachlorobenzene	ND	0.0143	0.0287	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Hexachlorobutadiene	ND	0.0358	0.0718	mg/kg dry	4	10/02/19 12:07	EPA 8270D	

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-20-0-0.33 (A9I0893-08RE1)				**Matrix: Sediment**		**Batch: 9100490**		**R-04**
Hexachlorocyclopentadiene	ND	0.0718	0.143	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
1,2-Dichlorobenzene	ND	0.0358	0.0718	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
1,4-Dichlorobenzene	ND	0.0358	0.0718	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
1,2,4-Trichlorobenzene	ND	0.0358	0.0718	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Benzoic acid	ND	1.80	3.58	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Benzyl alcohol	ND	0.0718	0.143	mg/kg dry	4	10/02/19 12:07	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*63 %*	*Limits: 37-122 %*	*4*	*10/02/19 12:07*	*EPA 8270D*	
2-Fluorobiphenyl (Surr)			*65 %*	*44-115 %*	*4*	*10/02/19 12:07*	*EPA 8270D*	
Phenol-d6 (Surr)			*60 %*	*33-122 %*	*4*	*10/02/19 12:07*	*EPA 8270D*	
p-Terphenyl-d14 (Surr)			*69 %*	*54-127 %*	*4*	*10/02/19 12:07*	*EPA 8270D*	
2-Fluorophenol (Surr)			*55 %*	*35-115 %*	*4*	*10/02/19 12:07*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*101 %*	*39-132 %*	*4*	*10/02/19 12:07*	*EPA 8270D*	
SE-10-2.0-3.7 (A9I0893-13RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Acenaphthene	ND	0.0681	0.137	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Acenaphthylene	ND	0.0681	0.137	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Anthracene	ND	0.0681	0.137	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Benz(a)anthracene	ND	0.0681	0.137	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Benzo(a)pyrene	**0.167**	0.102	0.205	mg/kg dry	20	10/02/19 11:51	EPA 8270D	**J**
Benzo(b)fluoranthene	**0.121**	0.102	0.205	mg/kg dry	20	10/02/19 11:51	EPA 8270D	**J**
Benzo(k)fluoranthene	ND	0.102	0.205	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Benzo(g,h,i)perylene	**0.0734**	0.0681	0.137	mg/kg dry	20	10/02/19 11:51	EPA 8270D	**J**
Chrysene	ND	0.0681	0.137	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Dibenz(a,h)anthracene	ND	0.0681	0.137	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Fluoranthene	**0.0761**	0.0681	0.137	mg/kg dry	20	10/02/19 11:51	EPA 8270D	**J**
Fluorene	ND	0.0681	0.137	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Indeno(1,2,3-cd)pyrene	ND	0.0681	0.137	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
1-Methylnaphthalene	ND	0.137	0.273	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
2-Methylnaphthalene	ND	0.137	0.273	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Naphthalene	ND	0.137	0.273	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Phenanthrene	ND	0.0681	0.137	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Pyrene	**0.152**	0.0681	0.137	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Dibenzofuran	ND	0.0681	0.137	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
2,4-Dimethylphenol	ND	0.341	0.681	mg/kg dry	20	10/02/19 11:51	EPA 8270D	

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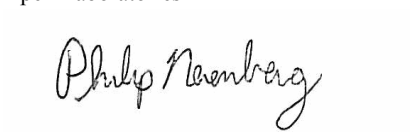

Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-10-2.0-3.7 (A9I0893-13RE1)				**Matrix: Sediment**		**Batch: 9100490**		
2-Methylphenol	ND	0.170	0.341	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
3+4-Methylphenol(s)	**0.309**	0.170	0.341	mg/kg dry	20	10/02/19 11:51	EPA 8270D	**J**
Pentachlorophenol (PCP)	ND	0.681	1.37	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Phenol	ND	0.137	0.273	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Bis(2-ethylhexyl)phthalate	ND	1.02	2.05	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Butyl benzyl phthalate	ND	0.341	0.681	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Diethylphthalate	ND	0.341	0.681	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Dimethylphthalate	ND	0.341	0.681	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Di-n-butylphthalate	ND	0.341	0.681	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Di-n-octyl phthalate	ND	0.548	0.681	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
N-Nitrosodiphenylamine	ND	0.170	0.341	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Hexachlorobenzene	ND	0.0681	0.137	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Hexachlorobutadiene	ND	0.170	0.341	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Hexachlorocyclopentadiene	ND	0.341	0.681	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
1,2-Dichlorobenzene	ND	0.170	0.341	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
1,4-Dichlorobenzene	ND	0.170	0.341	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
1,2,4-Trichlorobenzene	ND	0.170	0.341	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Benzoic acid	ND	8.55	17.0	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Benzyl alcohol	ND	0.341	0.681	mg/kg dry	20	10/02/19 11:51	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*77 %*	*Limits: 37-122 %*	*20*	*10/02/19 11:51*	*EPA 8270D*	
2-Fluorobiphenyl (Surr)			*61 %*	*44-115 %*	*20*	*10/02/19 11:51*	*EPA 8270D*	
Phenol-d6 (Surr)			*71 %*	*33-122 %*	*20*	*10/02/19 11:51*	*EPA 8270D*	
p-Terphenyl-d14 (Surr)			*67 %*	*54-127 %*	*20*	*10/02/19 11:51*	*EPA 8270D*	
2-Fluorophenol (Surr)			*70 %*	*35-115 %*	*20*	*10/02/19 11:51*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*97 %*	*39-132 %*	*20*	*10/02/19 11:51*	*EPA 8270D*	
SE-30-2.5-4.5 (A9I0893-14RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Acenaphthene	**0.148**	0.0275	0.0552	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Acenaphthylene	ND	0.0275	0.0552	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Anthracene	**0.0368**	0.0275	0.0552	mg/kg dry	10	10/02/19 12:42	EPA 8270D	**J**
Benz(a)anthracene	**0.0537**	0.0275	0.0552	mg/kg dry	10	10/02/19 12:42	EPA 8270D	**J**
Benzo(a)pyrene	**0.0438**	0.0413	0.0826	mg/kg dry	10	10/02/19 12:42	EPA 8270D	**J**
Benzo(b)fluoranthene	ND	0.0413	0.0826	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Benzo(k)fluoranthene	ND	0.0413	0.0826	mg/kg dry	10	10/02/19 12:42	EPA 8270D	

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Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-30-2.5-4.5 (A9I0893-14RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Benzo(g,h,i)perylene	ND	0.0275	0.0552	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Chrysene	**0.0604**	0.0275	0.0552	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Dibenz(a,h)anthracene	ND	0.0275	0.0552	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Fluoranthene	**0.198**	0.0275	0.0552	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Fluorene	**0.0618**	0.0275	0.0552	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Indeno(1,2,3-cd)pyrene	ND	0.0275	0.0552	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
1-Methylnaphthalene	ND	0.0552	0.110	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
2-Methylnaphthalene	ND	0.0552	0.110	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Naphthalene	ND	0.0552	0.110	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Phenanthrene	**0.148**	0.0275	0.0552	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Pyrene	**0.168**	0.0275	0.0552	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Dibenzofuran	**0.0356**	0.0275	0.0552	mg/kg dry	10	10/02/19 12:42	EPA 8270D	J
2,4-Dimethylphenol	ND	0.138	0.275	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
2-Methylphenol	ND	0.0688	0.138	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
3+4-Methylphenol(s)	**0.164**	0.0688	0.138	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Pentachlorophenol (PCP)	ND	0.275	0.552	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Phenol	**0.0647**	0.0552	0.110	mg/kg dry	10	10/02/19 12:42	EPA 8270D	J
Bis(2-ethylhexyl)phthalate	ND	0.413	0.826	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Butyl benzyl phthalate	ND	0.138	0.275	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Diethylphthalate	ND	0.138	0.275	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Dimethylphthalate	ND	0.138	0.275	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Di-n-butylphthalate	ND	0.138	0.275	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Di-n-octyl phthalate	ND	0.221	0.275	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
N-Nitrosodiphenylamine	ND	0.0688	0.138	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Hexachlorobenzene	ND	0.0275	0.0552	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Hexachlorobutadiene	ND	0.0688	0.138	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Hexachlorocyclopentadiene	ND	0.138	0.275	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
1,2-Dichlorobenzene	ND	0.0688	0.138	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
1,4-Dichlorobenzene	ND	0.0688	0.138	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
1,2,4-Trichlorobenzene	ND	0.0688	0.138	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Benzoic acid	ND	3.45	6.88	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Benzyl alcohol	ND	0.138	0.275	mg/kg dry	10	10/02/19 12:42	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery: 62 %*		*Limits: 37-122 %*	*10*	*10/02/19 12:42*	*EPA 8270D*	

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-30-2.5-4.5 (A9I0893-14RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Surrogate: 2-Fluorobiphenyl (Surr)			*Recovery: 62 %*	*Limits: 44-115 %*	*10*	*10/02/19 12:42*	*EPA 8270D*	
Phenol-d6 (Surr)			*59 %*	*33-122 %*	*10*	*10/02/19 12:42*	*EPA 8270D*	
p-Terphenyl-d14 (Surr)			*67 %*	*54-127 %*	*10*	*10/02/19 12:42*	*EPA 8270D*	
2-Fluorophenol (Surr)			*54 %*	*35-115 %*	*10*	*10/02/19 12:42*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*102 %*	*39-132 %*	*10*	*10/02/19 12:42*	*EPA 8270D*	
Rinsate Blank (A9I0893-18RE1)				**Matrix: Water**		**Batch: 9100614**		
Acenaphthene	ND	0.0595	0.0595	ug/L	1	10/03/19 20:13	EPA 8270D	R-02
Acenaphthylene	ND	0.0119	0.0238	ug/L	1	10/03/19 20:13	EPA 8270D	
Anthracene	ND	0.0119	0.0238	ug/L	1	10/03/19 20:13	EPA 8270D	
Benz(a)anthracene	ND	0.0119	0.0238	ug/L	1	10/03/19 20:13	EPA 8270D	
Benzo(a)pyrene	ND	0.0179	0.0357	ug/L	1	10/03/19 20:13	EPA 8270D	
Benzo(b)fluoranthene	ND	0.0179	0.0357	ug/L	1	10/03/19 20:13	EPA 8270D	
Benzo(k)fluoranthene	ND	0.0179	0.0357	ug/L	1	10/03/19 20:13	EPA 8270D	
Benzo(g,h,i)perylene	ND	0.0119	0.0238	ug/L	1	10/03/19 20:13	EPA 8270D	
Chrysene	ND	0.0119	0.0238	ug/L	1	10/03/19 20:13	EPA 8270D	
Dibenz(a,h)anthracene	ND	0.0119	0.0238	ug/L	1	10/03/19 20:13	EPA 8270D	
Fluoranthene	ND	0.0119	0.0238	ug/L	1	10/03/19 20:13	EPA 8270D	
Fluorene	ND	0.0119	0.0238	ug/L	1	10/03/19 20:13	EPA 8270D	
Indeno(1,2,3-cd)pyrene	ND	0.0119	0.0238	ug/L	1	10/03/19 20:13	EPA 8270D	
1-Methylnaphthalene	ND	0.0238	0.0476	ug/L	1	10/03/19 20:13	EPA 8270D	
2-Methylnaphthalene	ND	0.0238	0.0476	ug/L	1	10/03/19 20:13	EPA 8270D	
Naphthalene	**0.0597**	0.0238	0.0476	ug/L	1	10/03/19 20:13	EPA 8270D	**B-02**
Phenanthrene	**0.0163**	0.0119	0.0238	ug/L	1	10/03/19 20:13	EPA 8270D	**J**
Pyrene	ND	0.0119	0.0238	ug/L	1	10/03/19 20:13	EPA 8270D	
Carbazole	ND	0.0179	0.0357	ug/L	1	10/03/19 20:13	EPA 8270D	
Dibenzofuran	ND	0.0119	0.0238	ug/L	1	10/03/19 20:13	EPA 8270D	
4-Chloro-3-methylphenol	ND	0.119	0.238	ug/L	1	10/03/19 20:13	EPA 8270D	
2-Chlorophenol	ND	0.0595	0.119	ug/L	1	10/03/19 20:13	EPA 8270D	
2,4-Dichlorophenol	ND	0.0595	0.119	ug/L	1	10/03/19 20:13	EPA 8270D	
2,4-Dimethylphenol	ND	0.0595	0.119	ug/L	1	10/03/19 20:13	EPA 8270D	
2,4-Dinitrophenol	ND	0.298	0.595	ug/L	1	10/03/19 20:13	EPA 8270D	
4,6-Dinitro-2-methylphenol	ND	0.298	0.595	ug/L	1	10/03/19 20:13	EPA 8270D	
2-Methylphenol	ND	0.0298	0.0595	ug/L	1	10/03/19 20:13	EPA 8270D	

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Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Rinsate Blank (A9I0893-18RE1)				**Matrix: Water**		**Batch: 9100614**		
3+4-Methylphenol(s)	ND	0.0298	0.0595	ug/L	1	10/03/19 20:13	EPA 8270D	
2-Nitrophenol	ND	0.119	0.238	ug/L	1	10/03/19 20:13	EPA 8270D	
4-Nitrophenol	ND	0.238	0.238	ug/L	1	10/03/19 20:13	EPA 8270D	
Pentachlorophenol (PCP)	ND	0.119	0.238	ug/L	1	10/03/19 20:13	EPA 8270D	
Phenol	ND	0.238	0.476	ug/L	1	10/03/19 20:13	EPA 8270D	
2,3,4,6-Tetrachlorophenol	ND	0.0595	0.119	ug/L	1	10/03/19 20:13	EPA 8270D	
2,3,5,6-Tetrachlorophenol	ND	0.0595	0.119	ug/L	1	10/03/19 20:13	EPA 8270D	
2,4,5-Trichlorophenol	ND	0.0595	0.119	ug/L	1	10/03/19 20:13	EPA 8270D	
2,4,6-Trichlorophenol	ND	0.0595	0.119	ug/L	1	10/03/19 20:13	EPA 8270D	
Bis(2-ethylhexyl)phthalate	ND	0.238	0.476	ug/L	1	10/03/19 20:13	EPA 8270D	
Butyl benzyl phthalate	ND	0.238	0.476	ug/L	1	10/03/19 20:13	EPA 8270D	
Diethylphthalate	ND	0.238	0.476	ug/L	1	10/03/19 20:13	EPA 8270D	
Dimethylphthalate	ND	0.238	0.476	ug/L	1	10/03/19 20:13	EPA 8270D	
Di-n-butylphthalate	ND	0.238	0.476	ug/L	1	10/03/19 20:13	EPA 8270D	
Di-n-octyl phthalate	ND	0.238	0.476	ug/L	1	10/03/19 20:13	EPA 8270D	
N-Nitrosodimethylamine	ND	0.0298	0.0595	ug/L	1	10/03/19 20:13	EPA 8270D	
N-Nitroso-di-n-propylamine	ND	0.0298	0.0595	ug/L	1	10/03/19 20:13	EPA 8270D	
N-Nitrosodiphenylamine	ND	0.0298	0.0595	ug/L	1	10/03/19 20:13	EPA 8270D	
Bis(2-Chloroethoxy) methane	ND	0.0298	0.0595	ug/L	1	10/03/19 20:13	EPA 8270D	
Bis(2-Chloroethyl) ether	ND	0.0298	0.0595	ug/L	1	10/03/19 20:13	EPA 8270D	
2,2'-Oxybis(1-Chloropropane)	ND	0.0298	0.0595	ug/L	1	10/03/19 20:13	EPA 8270D	
Hexachlorobenzene	ND	0.0119	0.0238	ug/L	1	10/03/19 20:13	EPA 8270D	
Hexachlorobutadiene	ND	0.0298	0.0595	ug/L	1	10/03/19 20:13	EPA 8270D	
Hexachlorocyclopentadiene	ND	0.0595	0.119	ug/L	1	10/03/19 20:13	EPA 8270D	
Hexachloroethane	ND	0.0298	0.0595	ug/L	1	10/03/19 20:13	EPA 8270D	
2-Chloronaphthalene	ND	0.0119	0.0238	ug/L	1	10/03/19 20:13	EPA 8270D	
1,2-Dichlorobenzene	ND	0.0298	0.0595	ug/L	1	10/03/19 20:13	EPA 8270D	
1,3-Dichlorobenzene	ND	0.0298	0.0595	ug/L	1	10/03/19 20:13	EPA 8270D	
1,4-Dichlorobenzene	ND	0.0298	0.0595	ug/L	1	10/03/19 20:13	EPA 8270D	
1,2,4-Trichlorobenzene	ND	0.0298	0.0595	ug/L	1	10/03/19 20:13	EPA 8270D	
4-Bromophenyl phenyl ether	ND	0.0298	0.0595	ug/L	1	10/03/19 20:13	EPA 8270D	
4-Chlorophenyl phenyl ether	ND	0.0298	0.0595	ug/L	1	10/03/19 20:13	EPA 8270D	
Aniline	ND	0.0595	0.119	ug/L	1	10/03/19 20:13	EPA 8270D	

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503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Rinsate Blank (A9I0893-18RE1)				**Matrix: Water**		**Batch: 9100614**		
4-Chloroaniline	ND	0.0298	0.0595	ug/L	1	10/03/19 20:13	EPA 8270D	
2-Nitroaniline	ND	0.238	0.476	ug/L	1	10/03/19 20:13	EPA 8270D	
3-Nitroaniline	ND	0.238	0.476	ug/L	1	10/03/19 20:13	EPA 8270D	
4-Nitroaniline	ND	0.238	0.476	ug/L	1	10/03/19 20:13	EPA 8270D	
Nitrobenzene	ND	0.119	0.238	ug/L	1	10/03/19 20:13	EPA 8270D	
2,4-Dinitrotoluene	ND	0.119	0.238	ug/L	1	10/03/19 20:13	EPA 8270D	
2,6-Dinitrotoluene	ND	0.119	0.238	ug/L	1	10/03/19 20:13	EPA 8270D	
Benzoic acid	ND	1.49	2.98	ug/L	1	10/03/19 20:13	EPA 8270D	
Benzyl alcohol	ND	0.119	0.238	ug/L	1	10/03/19 20:13	EPA 8270D	
Isophorone	ND	0.0298	0.0595	ug/L	1	10/03/19 20:13	EPA 8270D	
Azobenzene (1,2-DPH)	ND	0.536	0.536	ug/L	1	10/03/19 20:13	EPA 8270D	R-02
Bis(2-Ethylhexyl) adipate	ND	0.298	0.595	ug/L	1	10/03/19 20:13	EPA 8270D	
3,3'-Dichlorobenzidine	ND	0.595	1.19	ug/L	1	10/03/19 20:13	EPA 8270D	Q-52
1,2-Dinitrobenzene	ND	0.298	0.595	ug/L	1	10/03/19 20:13	EPA 8270D	
1,3-Dinitrobenzene	ND	0.298	0.595	ug/L	1	10/03/19 20:13	EPA 8270D	
1,4-Dinitrobenzene	ND	0.298	0.595	ug/L	1	10/03/19 20:13	EPA 8270D	
Pyridine	ND	0.119	0.238	ug/L	1	10/03/19 20:13	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*44 %*	*Limits:* *44-120 %*	*1*	*10/03/19 20:13*	*EPA 8270D*	
2-Fluorobiphenyl (Surr)			*37 %*	*44-120 %*	*1*	*10/03/19 20:13*	*EPA 8270D*	*S-06*
Phenol-d6 (Surr)			*18 %*	*10-120 %*	*1*	*10/03/19 20:13*	*EPA 8270D*	
p-Terphenyl-d14 (Surr)			*63 %*	*50-133 %*	*1*	*10/03/19 20:13*	*EPA 8270D*	
2-Fluorophenol (Surr)			*25 %*	*19-120 %*	*1*	*10/03/19 20:13*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*52 %*	*43-140 %*	*1*	*10/03/19 20:13*	*EPA 8270D*	

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020A (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-20-0-0.33 (A9I0893-08)				**Matrix: Sediment**				
Batch: 9100629								
Arsenic	**7.96**	0.670	1.34	mg/kg dry	5	10/07/19 20:20	EPA 6020A	
Cadmium	**0.239**	0.134	0.268	mg/kg dry	5	10/07/19 20:20	EPA 6020A	**J**
Chromium	**32.9**	0.670	1.34	mg/kg dry	5	10/07/19 20:20	EPA 6020A	
Copper	**64.6**	0.670	1.34	mg/kg dry	5	10/07/19 20:20	EPA 6020A	
Lead	**11.7**	0.134	0.268	mg/kg dry	5	10/07/19 20:20	EPA 6020A	
Nickel	**25.4**	1.34	2.68	mg/kg dry	5	10/07/19 20:20	EPA 6020A	
Selenium	**0.941**	0.670	1.34	mg/kg dry	5	10/07/19 20:20	EPA 6020A	**J**
Silver	**0.144**	0.134	0.268	mg/kg dry	5	10/07/19 20:20	EPA 6020A	**J**
Zinc	**142**	2.68	5.36	mg/kg dry	5	10/07/19 20:20	EPA 6020A	
SE-10-2.0-3.7 (A9I0893-13)				**Matrix: Sediment**				
Batch: 9100629								
Arsenic	**5.47**	0.640	1.28	mg/kg dry	5	10/07/19 20:24	EPA 6020A	
Cadmium	**0.595**	0.128	0.256	mg/kg dry	5	10/07/19 20:24	EPA 6020A	
Chromium	**25.2**	0.640	1.28	mg/kg dry	5	10/07/19 20:24	EPA 6020A	
Copper	**56.1**	0.640	1.28	mg/kg dry	5	10/07/19 20:24	EPA 6020A	
Lead	**24.0**	0.128	0.256	mg/kg dry	5	10/07/19 20:24	EPA 6020A	
Nickel	**25.1**	1.28	2.56	mg/kg dry	5	10/07/19 20:24	EPA 6020A	
Selenium	**0.667**	0.640	1.28	mg/kg dry	5	10/07/19 20:24	EPA 6020A	**J**
Silver	**0.138**	0.128	0.256	mg/kg dry	5	10/07/19 20:24	EPA 6020A	**J**
Zinc	**71.9**	2.56	5.12	mg/kg dry	5	10/07/19 20:24	EPA 6020A	
SE-30-2.5-4.5 (A9I0893-14)				**Matrix: Sediment**				
Batch: 9100629								
Arsenic	**7.52**	0.538	1.08	mg/kg dry	5	10/07/19 20:38	EPA 6020A	
Cadmium	**0.246**	0.108	0.215	mg/kg dry	5	10/07/19 20:38	EPA 6020A	
Chromium	**41.4**	0.538	1.08	mg/kg dry	5	10/07/19 20:38	EPA 6020A	
Copper	**66.0**	0.538	1.08	mg/kg dry	5	10/07/19 20:38	EPA 6020A	
Lead	**14.9**	0.108	0.215	mg/kg dry	5	10/07/19 20:38	EPA 6020A	
Nickel	**27.7**	1.08	2.15	mg/kg dry	5	10/07/19 20:38	EPA 6020A	
Selenium	**0.993**	0.538	1.08	mg/kg dry	5	10/07/19 20:38	EPA 6020A	**J**
Silver	**0.260**	0.108	0.215	mg/kg dry	5	10/07/19 20:38	EPA 6020A	
Zinc	**98.3**	2.15	4.30	mg/kg dry	5	10/07/19 20:38	EPA 6020A	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020A (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Rinsate Blank (A9I0893-18)				**Matrix: Water**				
Batch: 9100588								
Lead	ND	0.100	0.200	ug/L	1	10/03/19 18:58	EPA 6020A	
Rinsate Blank (A9I0893-18RE1)				**Matrix: Water**				
Batch: 9100588								
Arsenic	ND	0.500	1.00	ug/L	1	10/05/19 16:33	EPA 6020A	
Cadmium	ND	0.0400	0.200	ug/L	1	10/05/19 16:33	EPA 6020A	
Chromium	ND	0.500	1.00	ug/L	1	10/05/19 16:33	EPA 6020A	
Copper	ND	0.500	1.00	ug/L	1	10/05/19 16:33	EPA 6020A	
Nickel	ND	0.500	1.00	ug/L	1	10/05/19 16:33	EPA 6020A	
Selenium	ND	0.500	1.00	ug/L	1	10/05/19 16:33	EPA 6020A	
Silver	ND	0.100	0.200	ug/L	1	10/05/19 16:33	EPA 6020A	
Zinc	ND	2.00	4.00	ug/L	1	10/05/19 16:33	EPA 6020A	

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ANALYTICAL SAMPLE RESULTS

Ammonia by Gas Diffusion and Colorimetric Detection

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Rinsate Blank (A9I0893-18)				**Matrix: Water**		**Batch: 9100540**		
Ammonia as N	ND	0.0200	0.0200	mg/L	1	10/02/19 15:15	SM 4500-NH3 G	

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

ANALYTICAL SAMPLE RESULTS

Ammonia by Plumb Extraction, Gas Diffusion and Colorimetric Detection

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-01A-1.0-2.0 (A9I0893-01)				**Matrix: Sediment**		**Batch: 9101224**		
Ammonia as N	**290**	3.82	3.82	mg/kg dry	20	10/17/19 14:21	Plumb/SM 4500-NH3 G	**H-06**
SE-03A-0-1.0 (A9I0893-05)				**Matrix: Sediment**		**Batch: 9101224**		
Ammonia as N	**168**	2.12	2.12	mg/kg dry	10	10/17/19 14:22	Plumb/SM 4500-NH3 G	**H-06**
SE-06A-0.5-1.5 (A9I0893-07)				**Matrix: Sediment**		**Batch: 9101224**		
Ammonia as N	**408**	1.72	1.72	mg/kg dry	10	10/17/19 14:34	Plumb/SM 4500-NH3 G	**H-06**
SE-20-0-0.33 (A9I0893-08)				**Matrix: Sediment**		**Batch: 9100459**		
Ammonia as N	**3.90**	0.252	0.252	mg/kg dry	1	10/02/19 14:06	Plumb/SM 4500-NH3 G	
SE-07A-0-1.0 (A9I0893-09RE1)				**Matrix: Sediment**		**Batch: 9101224**		
Ammonia as N	**7.73**	0.282	0.282	mg/kg dry	1	10/17/19 15:45	Plumb/SM 4500-NH3 G	**H-06**
SE-02A-2.5-3.5 (A9I0893-11)				**Matrix: Sediment**		**Batch: 9101224**		
Ammonia as N	**230**	1.75	1.75	mg/kg dry	10	10/17/19 14:37	Plumb/SM 4500-NH3 G	**H-06**
SE-10-2.0-3.7 (A9I0893-13)				**Matrix: Sediment**		**Batch: 9100459**		
Ammonia as N	**5.37**	0.249	0.249	mg/kg dry	1	10/02/19 14:08	Plumb/SM 4500-NH3 G	
SE-30-2.5-4.5 (A9I0893-14)				**Matrix: Sediment**		**Batch: 9100459**		
Ammonia as N	**112**	2.00	2.00	mg/kg dry	10	10/02/19 14:21	Plumb/SM 4500-NH3 G	

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

ANALYTICAL SAMPLE RESULTS

Demand Parameters

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-01A-1.0-2.0 (A9I0893-01RE1)				**Matrix: Sediment**				
Batch: 9101222								
Total Organic Carbon	**44000**	200	200	mg/kg	1	10/23/19 12:14	EPA 9060Amod	
SE-03A-0-1.0 (A9I0893-05)				**Matrix: Sediment**				
Batch: 9101222								
Total Organic Carbon	**23000**	200	200	mg/kg	1	10/23/19 00:35	EPA 9060Amod	
SE-06A-0.5-1.5 (A9I0893-07)				**Matrix: Sediment**				
Batch: 9101222								
Total Organic Carbon	**32000**	200	200	mg/kg	1	10/23/19 00:46	EPA 9060Amod	
SE-20-0-0.33 (A9I0893-08)				**Matrix: Sediment**				
Batch: 9100512								
Total Organic Carbon	**66000**	200	200	mg/kg	1	10/08/19 09:18	EPA 9060Amod	
SE-07A-0-1.0 (A9I0893-09)				**Matrix: Sediment**				
Batch: 9101222								
Total Organic Carbon	**63000**	200	200	mg/kg	1	10/23/19 01:19	EPA 9060Amod	
SE-02A-2.5-3.5 (A9I0893-11)				**Matrix: Sediment**				
Batch: 9101222								
Total Organic Carbon	**33000**	200	200	mg/kg	1	10/23/19 01:30	EPA 9060Amod	
SE-10-2.0-3.7 (A9I0893-13)				**Matrix: Sediment**				
Batch: 9100512								
Total Organic Carbon	**79000**	200	200	mg/kg	1	10/08/19 10:00	EPA 9060Amod	
SE-30-2.5-4.5 (A9I0893-14)				**Matrix: Sediment**				
Batch: 9100512								
Total Organic Carbon	**51000**	200	200	mg/kg	1	10/08/19 13:14	EPA 9060Amod	

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

ANALYTICAL SAMPLE RESULTS

Total Organic Carbon (Non-Purgeable) by Persulfate Oxidation by Standard Method 5310C

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Rinsate Blank (A9I0893-18)				**Matrix: Water**		**Batch: 9091432**		
Total Organic Carbon	**1.66**	1.00	1.00	mg/L	1	10/01/19 14:44	SM 5310 C	

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Portland, OR 97209	Project Manager: Emily Hess	A9I0893 - 01 09 20 1624

ANALYTICAL SAMPLE RESULTS

Solid and Moisture Determinations

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-01A-1.0-2.0 (A9I0893-01)				**Matrix: Sediment**				
Batch: 9101195								
Total Solids	**51.9**	1.00	1.00	%	1	10/17/19 03:40	PSEP 1986	
Batch: 9101266								
Total Volatile Solids	**11.9**	1.00	1.00	%	1	10/17/19 17:08	SM 2540 G	**H-06**
SE-03A-0-1.0 (A9I0893-05)				**Matrix: Sediment**				
Batch: 9101195								
Total Solids	**45.6**	1.00	1.00	%	1	10/17/19 03:40	PSEP 1986	
Batch: 9101266								
Total Volatile Solids	**8.11**	1.00	1.00	%	1	10/17/19 17:08	SM 2540 G	**H-06**
SE-06A-0.5-1.5 (A9I0893-07)				**Matrix: Sediment**				
Batch: 9101195								
Total Solids	**55.6**	1.00	1.00	%	1	10/17/19 03:40	PSEP 1986	
Batch: 9101266								
Total Volatile Solids	**9.92**	1.00	1.00	%	1	10/17/19 17:08	SM 2540 G	**H-06**
SE-20-0-0.33 (A9I0893-08)				**Matrix: Sediment**				
Batch: 9091443								
Total Solids	**36.8**	1.00	1.00	%	1	10/01/19 13:08	PSEP 1986	
Batch: 9091474								
Total Volatile Solids	**12.7**	1.00	1.00	%	1	10/02/19 15:31	SM 2540 G	
SE-07A-0-1.0 (A9I0893-09)				**Matrix: Sediment**				
Batch: 9101195								
Total Solids	**34.0**	1.00	1.00	%	1	10/17/19 03:40	PSEP 1986	
Batch: 9101266								
Total Volatile Solids	**20.7**	1.00	1.00	%	1	10/17/19 17:08	SM 2540 G	**H-06**
SE-02A-2.5-3.5 (A9I0893-11)				**Matrix: Sediment**				
Batch: 9101195								
Total Solids	**55.5**	1.00	1.00	%	1	10/17/19 03:40	PSEP 1986	
Batch: 9101266								
Total Volatile Solids	**7.94**	1.00	1.00	%	1	10/17/19 17:08	SM 2540 G	**H-06**
SE-10-2.0-3.7 (A9I0893-13)				**Matrix: Sediment**				

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

ANALYTICAL SAMPLE RESULTS

Solid and Moisture Determinations

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-10-2.0-3.7 (A9I0893-13)				**Matrix: Sediment**				
Batch: 9091443								
Total Solids	**38.3**	1.00	1.00	%	1	10/01/19 13:08	PSEP 1986	
Batch: 9091474								
Total Volatile Solids	**30.1**	1.00	1.00	%	1	10/02/19 15:31	SM 2540 G	
SE-30-2.5-4.5 (A9I0893-14)				**Matrix: Sediment**				
Batch: 9091443								
Total Solids	**47.6**	1.00	1.00	%	1	10/01/19 13:08	PSEP 1986	
Batch: 9091474								
Total Volatile Solids	**14.7**	1.00	1.00	%	1	10/02/19 15:31	SM 2540 G	

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

ANALYTICAL SAMPLE RESULTS

Grain Size by ASTM D 422m/PSET Parameters

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-20-0-0.33 (A9I0893-08)				**Matrix: Sediment**		**Batch: 9100739**		
Gravel (>2.00mm)	**5.18**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 4.75 mm sieve (#4)	**4.59**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 2.00 mm sieve (#10)	**0.59**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Sand (0.063mm - 2.00mm)	**9.74**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.85 mm sieve (#20)	**0.37**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.425 mm sieve (#40)	**1.75**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.250 mm sieve (#60)	**1.92**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.150 mm sieve (#100)	**2.19**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.106 mm sieve (#140)	**1.36**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.075 mm sieve (#200)	**1.53**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.063 mm sieve (#230)	**0.62**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Silt (0.005mm < 0.063mm)	**58.5**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Clay (< 0.005 mm)	**26.6**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
SE-10-2.0-3.7 (A9I0893-13)				**Matrix: Sediment**		**Batch: 9100739**		
Gravel (>2.00mm)	**15.5**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 4.75 mm sieve (#4)	**10.7**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 2.00 mm sieve (#10)	**4.75**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Sand (0.063mm - 2.00mm)	**29.4**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.85 mm sieve (#20)	**5.66**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.425 mm sieve (#40)	**7.63**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.250 mm sieve (#60)	**6.44**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.150 mm sieve (#100)	**3.41**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.106 mm sieve (#140)	**2.20**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.075 mm sieve (#200)	**2.54**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.063 mm sieve (#230)	**1.48**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Silt (0.005mm < 0.063mm)	**39.5**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

ANALYTICAL SAMPLE RESULTS

Grain Size by ASTM D 422m/PSET Parameters

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-10-2.0-3.7 (A9I0893-13)				**Matrix: Sediment**		**Batch: 9100739**		
Clay (< 0.005 mm)	**15.7**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
SE-30-2.5-4.5 (A9I0893-14)				**Matrix: Sediment**		**Batch: 9100739**		
Gravel (>2.00mm)	**5.79**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 4.75 mm sieve (#4)	**4.12**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 2.00 mm sieve (#10)	**1.67**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Sand (0.063mm - 2.00mm)	**11.4**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.85 mm sieve (#20)	**1.34**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.425 mm sieve (#40)	**2.04**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.250 mm sieve (#60)	**1.48**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.150 mm sieve (#100)	**1.55**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.106 mm sieve (#140)	**1.26**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.075 mm sieve (#200)	**2.19**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Percent Retained 0.063 mm sieve (#230)	**1.55**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Silt (0.005mm < 0.063mm)	**56.2**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**
Clay (< 0.005 mm)	**26.6**	0.01	0.01	% of Total	1	10/14/19 13:41	D422mod	**GS-01**

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

ANALYTICAL SAMPLE RESULTS

Percent Dry Weight

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-01A-1.0-2.0 (A9I0893-01)				**Matrix: Sediment**		**Batch: 9101195**		
% Solids	**51.9**	1.00	1.00	%	1	10/17/19 03:40	EPA 8000C	
SE-03A-0-1.0 (A9I0893-05)				**Matrix: Sediment**		**Batch: 9101195**		
% Solids	**45.6**	1.00	1.00	%	1	10/17/19 03:40	EPA 8000C	
SE-06A-0.5-1.5 (A9I0893-07)				**Matrix: Sediment**		**Batch: 9101195**		
% Solids	**55.6**	1.00	1.00	%	1	10/17/19 03:40	EPA 8000C	
SE-20-0-0.33 (A9I0893-08)				**Matrix: Sediment**		**Batch: 9091443**		
% Solids	**36.8**	1.00	1.00	%	1	10/01/19 13:08	EPA 8000C	
SE-07A-0-1.0 (A9I0893-09)				**Matrix: Sediment**		**Batch: 9101195**		
% Solids	**34.0**	1.00	1.00	%	1	10/17/19 03:40	EPA 8000C	
SE-02A-2.5-3.5 (A9I0893-11)				**Matrix: Sediment**		**Batch: 9101195**		
% Solids	**55.5**	1.00	1.00	%	1	10/17/19 03:40	EPA 8000C	
SE-10-2.0-3.7 (A9I0893-13)				**Matrix: Sediment**		**Batch: 9091443**		
% Solids	**38.3**	1.00	1.00	%	1	10/01/19 13:08	EPA 8000C	
SE-30-2.5-4.5 (A9I0893-14)				**Matrix: Sediment**		**Batch: 9091443**		
% Solids	**47.6**	1.00	1.00	%	1	10/01/19 13:08	EPA 8000C	
SE-20-0-0.33--Air Dried (A9I0893-20)				**Matrix: Sediment**		**Batch: 9101585**		
% Solids	**91.8**	1.00	1.00	%	1	10/28/19 07:41	EPA 8000C	
SE-10-2.0-3.7---Air Dried (A9I0893-21)				**Matrix: Sediment**		**Batch: 9101585**		
% Solids	**91.3**	1.00	1.00	%	1	10/28/19 07:41	EPA 8000C	
SE-30-2.5-4.5---Air Dried (A9I0893-22)				**Matrix: Sediment**		**Batch: 9101585**		
% Solids	**92.6**	1.00	1.00	%	1	10/28/19 07:41	EPA 8000C	

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

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ANALYTICAL SAMPLE RESULTS (Subcontracted)

Metals and Metallic Compounds

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-20-0-0.33 (A9I0893-08)				**Matrix: Sediment**			**Batch: BHJ0281**	
Batch: BHJ0281								
Mercury	**0.0690**	0.0136	0.0648	mg/kg dry	1	10/10/19 16:03	EPA 7471B	
SE-07A-0-1.0 (A9I0893-09)				**Matrix: Sediment**			**Batch: BHJ0281**	
Batch: BHJ0281								
Mercury	**0.226**	0.0129	0.0613	mg/kg dry	1	10/10/19 16:10	EPA 7471B	
SE-02A-2.5-3.5 (A9I0893-11)				**Matrix: Sediment**			**Batch: BHJ0281**	
Batch: BHJ0281								
Mercury	**0.103**	0.00901	0.0429	mg/kg dry	1	10/10/19 16:13	EPA 7471B	
SE-10-2.0-3.7 (A9I0893-13)				**Matrix: Sediment**			**Batch: BHJ0281**	
Batch: BHJ0281								
Mercury	**0.129**	0.0110	0.0524	mg/kg dry	1	10/10/19 15:45	EPA 7471B	
SE-30-2.5-4.5 (A9I0893-14)				**Matrix: Sediment**			**Batch: BHJ0281**	
Batch: BHJ0281								
Mercury	**0.0865**	0.00799	0.0380	mg/kg dry	1	10/10/19 16:15	EPA 7471B	
Rinsate Blank (A9I0893-18)				**Matrix: Water**			**Batch: BHJ0100**	
Batch: BHJ0100								
Mercury	ND	0.000013	0.000100	mg/L	1	10/04/19 11:36	EPA 7470A	U

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Analytical Resources, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

TCLP Metals and Metallic Compounds

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-10-2.0-3.7 (A9I0893-13)				**Matrix: Sediment**			**Batch: BHJ0442**	
Batch: BHJ0442								
Lead	ND	0.0065	0.100	mg/L	5	10/16/19 16:45	EPA 6010C	U
Batch: BHJ0444								
Mercury	ND	0.000007	0.000100	mg/L	1	10/17/19 12:01	EPA 7470A	U
SE-30-2.5-4.5 (A9I0893-14)				**Matrix: Sediment**			**Batch: BHJ0442**	
Batch: BHJ0442								
Lead	ND	0.0065	0.100	mg/L	5	10/16/19 16:40	EPA 6010C	U
Batch: BHJ0444								
Mercury	ND	0.000007	0.000100	mg/L	1	10/17/19 12:10	EPA 7470A	U

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ANALYTICAL SAMPLE RESULTS (Subcontracted)

Wet Chemistry

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-01A-1.0-2.0 (A9I0893-01)				**Matrix: Sediment**		**Batch: BHJ0036**		
Batch: BHJ0036								
Total Solids, Sulfide	**47.15**	0.04	0.04	%	1	10/01/19 23:14	PSEP 1986	
Batch: BHJ0054								
Sulfide	**865**	105	105	mg/kg dry	50	10/03/19 15:51	SM 4500-S2 D-00	**D**
SE-03A-0-1.0 (A9I0893-05)				**Matrix: Sediment**		**Batch: BHJ0036**		
Batch: BHJ0036								
Total Solids, Sulfide	**43.08**	0.04	0.04	%	1	10/01/19 23:14	PSEP 1986	
Batch: BHJ0054								
Sulfide	**856**	46.1	46.1	mg/kg dry	20	10/03/19 15:51	SM 4500-S2 D-00	**D**
SE-20-0-0.33 (A9I0893-08)				**Matrix: Sediment**		**Batch: BHJ0036**		
Batch: BHJ0036								
Total Solids, Sulfide	**34.44**	0.04	0.04	%	1	10/01/19 23:14	PSEP 1986	
Batch: BHJ0054								
Sulfide	ND	2.70	2.70	mg/kg dry	1	10/03/19 15:51	SM 4500-S2 D-00	U
SE-07A-0-1.0 (A9I0893-09)				**Matrix: Sediment**		**Batch: BHJ0036**		
Batch: BHJ0036								
Total Solids, Sulfide	**33.63**	0.04	0.04	%	1	10/01/19 23:14	PSEP 1986	
Batch: BHJ0054								
Sulfide	**639**	56.3	56.3	mg/kg dry	20	10/03/19 15:52	SM 4500-S2 D-00	**D**
SE-02A-2.5-3.5 (A9I0893-11)				**Matrix: Sediment**		**Batch: BHJ0036**		
Batch: BHJ0036								
Total Solids, Sulfide	**51.29**	0.04	0.04	%	1	10/01/19 23:14	PSEP 1986	
Batch: BHJ0054								
Sulfide	**977**	91.6	91.6	mg/kg dry	50	10/03/19 15:54	SM 4500-S2 D-00	**D**
SE-10-2.0-3.7 (A9I0893-13)				**Matrix: Sediment**		**Batch: BHJ0036**		
Batch: BHJ0036								
Total Solids, Sulfide	**33.04**	0.04	0.04	%	1	10/01/19 23:14	PSEP 1986	
Batch: BHJ0054								
Sulfide	**228**	59.4	59.4	mg/kg dry	20	10/03/19 15:54	SM 4500-S2 D-00	**D**

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

Analytical Resources, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

Wet Chemistry

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-30-2.5-4.5 (A9I0893-14)				**Matrix: Sediment**		**Batch: BHJ0036**		
Batch: BHJ0036								
Total Solids, Sulfide	**43.84**	0.04	0.04	%	1	10/01/19 23:14	PSEP 1986	
Batch: BHJ0054								
Sulfide	**492**	42.6	42.6	mg/kg dry	20	10/03/19 15:54	SM 4500-S2 D-00	**D**
Rinsate Blank (A9I0893-18)				**Matrix: Water**		**Batch: BHJ0097**		
Batch: BHJ0097								
Sulfide	ND	0.050	0.050	mg/L	1	10/03/19 13:47	SM 4500-S2 D-00	U
SE-20-0-0.33 (Water) (A9I0893-19)				**Matrix: Water**		**Batch: BHJ0145**		
Batch: BHJ0145								
Sulfide	**0.059**	0.050	0.050	mg/L	1	10/04/19 14:56	SM 4500-S2 D-00	**H**

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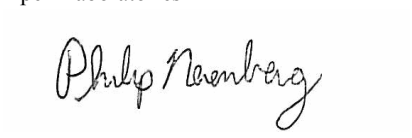

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QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Acid/Silica Gel Cleanup

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9101200 - EPA 3546 w/SG+Acid (NWTPH)							**Sediment**					
Blank (9101200-BLK1)			Prepared: 10/03/19 13:22		Analyzed: 10/16/19 22:42							
NWTPH-Dx/SG												
Diesel	ND	9.09	25.0	mg/kg wet	1	---	---	---	---	---	---	
Oil	ND	18.2	50.0	mg/kg wet	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 93 %*		*Limits: 50-150 %*		*Dilution: 1x*					
LCS (9101200-BS1)			Prepared: 10/03/19 13:22		Analyzed: 10/16/19 23:05							
NWTPH-Dx/SG												
Diesel	112	10.0	25.0	mg/kg wet	1	125	---	90	76-115%	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 96 %*		*Limits: 50-150 %*		*Dilution: 1x*					
Duplicate (9101200-DUP1)			Prepared: 10/03/19 13:22		Analyzed: 10/16/19 23:53							
QC Source Sample: SE-20-0-0.33 (A9I0893-08)												
NWTPH-Dx/SG												
Diesel	ND	26.6	53.2	mg/kg dry	1	---	ND	---	---	---	30%	
Oil	**786**	53.2	106	mg/kg dry	1	---	610	---	---	25	30%	
Surr: o-Terphenyl (Surr)			*Recovery: 86 %*		*Limits: 50-150 %*		*Dilution: 1x*					
Duplicate (9101200-DUP2)			Prepared: 10/03/19 13:22		Analyzed: 10/17/19 08:59							
QC Source Sample: Non-SDG (A9J0006-25)												
Diesel	ND	26.0	52.0	mg/kg dry	1	---	ND	---	---	---	30%	
Oil	**86.0**	52.0	104	mg/kg dry	1	---	72.2	---	---	17	30%	J
Surr: o-Terphenyl (Surr)			*Recovery: 95 %*		*Limits: 50-150 %*		*Dilution: 1x*					
Matrix Spike (9101200-MS1)			Prepared: 10/03/19 13:22		Analyzed: 10/17/19 00:41							
QC Source Sample: SE-10-2.0-3.7 (A9I0893-13)												
NWTPH-Dx/SG												
Diesel	447	25.7	51.5	mg/kg dry	1	322	ND	139	50-150%	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 96 %*		*Limits: 50-150 %*		*Dilution: 1x*					
Matrix Spike Dup (9101200-MSD1)			Prepared: 10/03/19 13:22		Analyzed: 10/17/19 01:04							
QC Source Sample: SE-10-2.0-3.7 (A9I0893-13)												
NWTPH-Dx/SG												

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QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Acid/Silica Gel Cleanup

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9101200 - EPA 3546 w/SG+Acid (NWTPH)							**Sediment**					
Matrix Spike Dup (9101200-MSD1)				Prepared: 10/03/19 13:22		Analyzed: 10/17/19 01:04						
QC Source Sample: SE-10-2.0-3.7 (A9I0893-13)												
Diesel	376	25.8	51.5	mg/kg dry	1	322	ND	117	50-150%	17	50%	
Surr: o-Terphenyl (Surr)			*Recovery: 91 %*	*Limits: 50-150 %*			*Dilution: 1x*					

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Acid/Silica Gel Cleanup

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9101263 - EPA 3510C (Fuels/Acid Ext.) w/Silica Gel + Acid									Water			
Blank (9101263-BLK2)			Prepared: 10/01/19 11:15		Analyzed: 10/18/19 07:34							
NWTPH-Dx/SG												
Diesel	ND	0.0909	0.182	mg/L	1	---	---	---	---	---	---	
Oil	ND	0.182	0.364	mg/L	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 107 %*		*Limits: 50-150 %*			*Dilution: 1x*				
LCS (9101263-BS1)			Prepared: 10/01/19 11:15		Analyzed: 10/18/19 01:39							
NWTPH-Dx/SG												
Diesel	0.990	0.100	0.200	mg/L	1	1.25	---	79	58-115%	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 96 %*		*Limits: 50-150 %*			*Dilution: 1x*				
LCS Dup (9101263-BSD1)			Prepared: 10/01/19 11:15		Analyzed: 10/18/19 02:01							**Q-19**
NWTPH-Dx/SG												
Diesel	1.19	0.100	0.200	mg/L	1	1.25	---	96	58-115%	19	20%	
Surr: o-Terphenyl (Surr)			*Recovery: 115 %*		*Limits: 50-150 %*			*Dilution: 1x*				

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Philip Nerenberg, Lab Director

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503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9091416 - EPA 5035A							**Soil**					
Blank (9091416-BLK1)				Prepared: 09/28/19 10:30 Analyzed: 09/28/19 12:42								
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	1.67	3.33	mg/kg wet	50	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 99 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*100 %*	*50-150 %*			*"*					
LCS (9091416-BS2)				Prepared: 09/28/19 10:30 Analyzed: 09/28/19 12:15								
NWTPH-Gx (MS)												
Gasoline Range Organics	27.4	2.50	5.00	mg/kg wet	50	25.0	---	109	80-120%	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 100 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*99 %*	*50-150 %*			*"*					
Duplicate (9091416-DUP1)				Prepared: 09/27/19 08:15 Analyzed: 09/28/19 13:35								
QC Source Sample: Non-SDG (A9I0881-01)												
Gasoline Range Organics	ND	4.24	8.48	mg/kg dry	50	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 102 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*101 %*	*50-150 %*			*"*					
Duplicate (9091416-DUP2)				Prepared: 09/25/19 18:15 Analyzed: 09/28/19 19:23								
QC Source Sample: SE-20-0-0.33 (A9I0893-08)												
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	15.4	30.8	mg/kg dry	50	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 105 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*102 %*	*50-150 %*			*"*					

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9091419 - EPA 5030B									Water			
Blank (9091419-BLK1)			Prepared: 09/28/19 17:54		Analyzed: 09/28/19 20:27							
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	0.0500	0.100	mg/L	1	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 87 %*		*Limits: 50-150 %*				*Dilution: 1x*			
1,4-Difluorobenzene (Sur)			*111 %*		*50-150 %*				*"*			
LCS (9091419-BS2)			Prepared: 09/28/19 17:54		Analyzed: 09/28/19 20:00							
NWTPH-Gx (MS)												
Gasoline Range Organics	0.432	0.0500	0.100	mg/L	1	0.500	---	86	80-120%	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 88 %*		*Limits: 50-150 %*				*Dilution: 1x*			
1,4-Difluorobenzene (Sur)			*103 %*		*50-150 %*				*"*			
Duplicate (9091419-DUP1)			Prepared: 09/28/19 20:41		Analyzed: 09/29/19 04:39							
QC Source Sample: Non-SDG (A9I0862-03)												
Gasoline Range Organics	**3.93**	2.50	5.00	mg/L	50	---	3.72	---	---	6	30%	J
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 88 %*		*Limits: 50-150 %*				*Dilution: 1x*			
1,4-Difluorobenzene (Sur)			*110 %*		*50-150 %*				*"*			
Duplicate (9091419-DUP2)			Prepared: 09/28/19 20:41		Analyzed: 09/29/19 05:32							
QC Source Sample: Non-SDG (A9I0862-04)												
Gasoline Range Organics	**5.70**	2.50	5.00	mg/L	50	---	5.75	---	---	1	30%	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 82 %*		*Limits: 50-150 %*				*Dilution: 1x*			
1,4-Difluorobenzene (Sur)			*105 %*		*50-150 %*				*"*			

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9091456 - EPA 3546							**Sediment**					
Blank (9091456-BLK1)			Prepared: 09/30/19 13:58		Analyzed: 10/03/19 17:13							**C-07**
EPA 8082A												
Aroclor 1016	ND	4.55	9.09	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1221	ND	4.55	9.09	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1232	ND	4.55	9.09	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1242	ND	4.55	9.09	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1248	ND	4.55	9.09	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1254	ND	4.55	9.09	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1260	ND	4.55	9.09	ug/kg wet	1	---	---	---	---	---	---	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 107 %*		*Limits: 60-125 %*			*Dilution: 1x*				
LCS (9091456-BS1)			Prepared: 09/30/19 13:58		Analyzed: 10/03/19 17:31							**C-07**
EPA 8082A												
Aroclor 1016	178	5.00	10.0	ug/kg wet	1	250	---	71	47-134%	---	---	
Aroclor 1260	221	5.00	10.0	ug/kg wet	1	250	---	88	53-140%	---	---	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 108 %*		*Limits: 60-125 %*			*Dilution: 1x*				
Duplicate (9091456-DUP1)			Prepared: 09/30/19 13:58		Analyzed: 10/03/19 18:24							**C-07**
QC Source Sample: Non-SDG (A9I0822-02)												
Aroclor 1016	ND	11.5	23.1	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1221	ND	11.5	23.1	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1232	ND	11.5	23.1	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1242	ND	11.5	23.1	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1248	ND	11.5	23.1	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1254	ND	11.5	23.1	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1260	**109**	11.5	23.1	ug/kg dry	1	---	38.9	---	---	**95**	**30%**	Q-05
Surr: Decachlorobiphenyl (Surr)			*Recovery: 73 %*		*Limits: 60-125 %*			*Dilution: 1x*				
Matrix Spike (9091456-MS1)			Prepared: 09/30/19 13:58		Analyzed: 10/03/19 18:59							**C-07**
QC Source Sample: Non-SDG (A9I0822-02)												
EPA 8082A												
Aroclor 1016	389	11.4	22.9	ug/kg dry	1	572	ND	68	47-134%	---	---	
Aroclor 1260	585	11.4	22.9	ug/kg dry	1	572	38.9	95	53-140%	---	---	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 91 %*		*Limits: 60-125 %*			*Dilution: 1x*				

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9091456 - EPA 3546							**Sediment**					
Matrix Spike (9091456-MS2)			Prepared: 09/30/19 14:01		Analyzed: 10/03/19 18:24							**C-07**
QC Source Sample: SE-10-2.0-3.7 (A9I0893-13)												
EPA 8082A												
Aroclor 1016	428	12.1	24.2	ug/kg dry	1	604	ND	71	47-134%	---	---	
Aroclor 1260	482	12.1	24.2	ug/kg dry	1	604	ND	80	53-140%	---	---	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 87 %*		*Limits: 60-125 %*		*Dilution: 1x*					
Matrix Spike Dup (9091456-MSD1)			Prepared: 09/30/19 13:58		Analyzed: 10/03/19 19:34							**C-07**
QC Source Sample: Non-SDG (A9I0822-02)												
Aroclor 1016	376	11.5	22.9	ug/kg dry	1	573	ND	66	47-134%	3	30%	
Aroclor 1260	554	11.5	22.9	ug/kg dry	1	573	38.9	90	53-140%	5	30%	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 96 %*		*Limits: 60-125 %*		*Dilution: 1x*					
Matrix Spike Dup (9091456-MSD2)			Prepared: 09/30/19 14:01		Analyzed: 10/03/19 18:59							**C-07**
QC Source Sample: SE-10-2.0-3.7 (A9I0893-13)												
EPA 8082A												
Aroclor 1016	353	12.2	24.4	ug/kg dry	1	609	ND	58	47-134%	19	30%	
Aroclor 1260	388	12.2	24.4	ug/kg dry	1	609	ND	64	53-140%	22	30%	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 70 %*		*Limits: 60-125 %*		*Dilution: 1x*					

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QUALITY CONTROL (QC) SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9091465 - EPA 3510C (Neutral pH)							**Water**					
Blank (9091465-BLK1)			Prepared: 09/30/19 15:11		Analyzed: 10/01/19 12:25							**C-07**
EPA 8082A												
Aroclor 1016	ND	0.0455	0.0909	ug/L	1	---	---	---	---	---	---	
Aroclor 1221	ND	0.0455	0.0909	ug/L	1	---	---	---	---	---	---	
Aroclor 1232	ND	0.0455	0.0909	ug/L	1	---	---	---	---	---	---	
Aroclor 1242	ND	0.0455	0.0909	ug/L	1	---	---	---	---	---	---	
Aroclor 1248	ND	0.0455	0.0909	ug/L	1	---	---	---	---	---	---	
Aroclor 1254	ND	0.0455	0.0909	ug/L	1	---	---	---	---	---	---	
Aroclor 1260	ND	0.0455	0.0909	ug/L	1	---	---	---	---	---	---	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 70 %*		*Limits: 40-135 %*				*Dilution: 1x*			
LCS (9091465-BS1)			Prepared: 09/30/19 15:11		Analyzed: 10/01/19 12:43							**C-07**
EPA 8082A												
Aroclor 1016	1.24	0.0500	0.100	ug/L	1	2.50	---	50	46-129%	---	---	
Aroclor 1260	1.59	0.0500	0.100	ug/L	1	2.50	---	64	45-134%	---	---	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 68 %*		*Limits: 40-135 %*				*Dilution: 1x*			
LCS Dup (9091465-BSD1)			Prepared: 09/30/19 15:11		Analyzed: 10/01/19 13:01							**C-07, Q-19**
EPA 8082A												
Aroclor 1016	1.34	0.0500	0.100	ug/L	1	2.50	---	54	46-129%	7	30%	
Aroclor 1260	1.75	0.0500	0.100	ug/L	1	2.50	---	70	45-134%	9	30%	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 74 %*		*Limits: 40-135 %*				*Dilution: 1x*			

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9101592 - EPA 3546							**Sediment**					
Blank (9101592-BLK1)			Prepared: 10/25/19 10:03		Analyzed: 10/28/19 09:24							**C-07**
EPA 8082A												
Aroclor 1016	ND	1.82	3.64	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1221	ND	1.82	3.64	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1232	ND	1.82	3.64	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1242	ND	1.82	3.64	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1248	ND	1.82	3.64	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1254	ND	1.82	3.64	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1260	ND	1.82	3.64	ug/kg wet	1	---	---	---	---	---	---	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 90 %*		*Limits: 60-125 %*			*Dilution: 1x*				
LCS (9101592-BS1)			Prepared: 10/25/19 10:03		Analyzed: 10/28/19 09:42							**C-07**
EPA 8082A												
Aroclor 1016	166	2.00	4.00	ug/kg wet	1	250	---	66	47-134%	---	---	
Aroclor 1260	203	2.00	4.00	ug/kg wet	1	250	---	81	53-140%	---	---	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 97 %*		*Limits: 60-125 %*			*Dilution: 1x*				
Duplicate (9101592-DUP1)			Prepared: 10/25/19 10:03		Analyzed: 10/28/19 10:35							**C-07**
QC Source Sample: SE-20-0-0.33--Air Dried (A9I0893-20)												
EPA 8082A												
Aroclor 1016	ND	2.10	4.21	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1221	ND	2.10	4.21	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1232	ND	2.10	4.21	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1242	ND	2.10	4.21	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1248	ND	2.10	4.21	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1254	**2.25**	2.10	4.21	ug/kg dry	1	---	2.38	---	---	6	30%	J
Aroclor 1260	**2.12**	2.10	4.21	ug/kg dry	1	---	2.31	---	---	9	30%	J
Surr: Decachlorobiphenyl (Surr)			*Recovery: 77 %*		*Limits: 60-125 %*			*Dilution: 1x*				
Duplicate (9101592-DUP2)			Prepared: 10/25/19 14:47		Analyzed: 10/28/19 10:34							**C-07**
QC Source Sample: Non-SDG (A9J0670-02)												
Aroclor 1016	ND	4.78	9.56	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1221	ND	4.78	9.56	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1232	ND	4.78	9.56	ug/kg dry	1	---	ND	---	---	---	30%	

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9101592 - EPA 3546							**Sediment**					
Duplicate (9101592-DUP2)			Prepared: 10/25/19 14:47		Analyzed: 10/28/19 10:34							**C-07**
QC Source Sample: Non-SDG (A9J0670-02)												
Aroclor 1242	**26.1**	4.78	9.56	ug/kg dry	1	---	28.0	---	---	7	30%	P-10
Aroclor 1248	ND	4.78	9.56	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1254	**33.4**	4.78	9.56	ug/kg dry	1	---	36.5	---	---	9	30%	P-10
Aroclor 1260	**18.8**	4.78	9.56	ug/kg dry	1	---	20.0	---	---	6	30%	P-10
Surr: Decachlorobiphenyl (Surr)			*Recovery: 78 %*		*Limits: 60-125 %*			*Dilution: 1x*				
Matrix Spike (9101592-MS1)			Prepared: 10/25/19 10:03		Analyzed: 10/28/19 11:45							**C-07**
QC Source Sample: SE-10-2.0-3.7---Air Dried (A9I0893-21)												
EPA 8082A												
Aroclor 1016	150	2.12	4.24	ug/kg dry	1	265	ND	56	47-134%	---	---	
Aroclor 1260	178	2.12	4.24	ug/kg dry	1	265	7.17	64	53-140%	---	---	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 66 %*		*Limits: 60-125 %*			*Dilution: 1x*				
Matrix Spike Dup (9101592-MSD1)			Prepared: 10/25/19 10:03		Analyzed: 10/28/19 12:20							**C-07**
QC Source Sample: SE-10-2.0-3.7---Air Dried (A9I0893-21)												
EPA 8082A												
Aroclor 1016	133	2.15	4.30	ug/kg dry	1	269	ND	50	47-134%	12	30%	
Aroclor 1260	165	2.15	4.30	ug/kg dry	1	269	7.17	59	53-140%	8	30%	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 64 %*		*Limits: 60-125 %*			*Dilution: 1x*				

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100456 - EPA 3510C (Acid/Base Neutral)							**Water**					
Blank (9100456-BLK1)			Prepared: 10/01/19 06:34		Analyzed: 10/01/19 14:52							
EPA 8270D												
2,3,4,6- & 2,3,4,5-Tetrachlorophenol(s)	ND	0.0909	0.182	ug/L	1	---	---	---	---	---	---	A-01
Acenaphthene	**0.0572**	0.00909	0.0182	ug/L	1	---	---	---	---	---	---	B
Acenaphthylene	ND	0.00909	0.0182	ug/L	1	---	---	---	---	---	---	
Anthracene	ND	0.00909	0.0182	ug/L	1	---	---	---	---	---	---	
Benz(a)anthracene	ND	0.00909	0.0182	ug/L	1	---	---	---	---	---	---	
Benzo(a)pyrene	ND	0.0136	0.0273	ug/L	1	---	---	---	---	---	---	
Benzo(b)fluoranthene	ND	0.0136	0.0273	ug/L	1	---	---	---	---	---	---	
Benzo(k)fluoranthene	ND	0.0136	0.0273	ug/L	1	---	---	---	---	---	---	
Benzo(g,h,i)perylene	ND	0.00909	0.0182	ug/L	1	---	---	---	---	---	---	
Chrysene	ND	0.00909	0.0182	ug/L	1	---	---	---	---	---	---	
Dibenz(a,h)anthracene	ND	0.00909	0.0182	ug/L	1	---	---	---	---	---	---	
Fluoranthene	ND	0.00909	0.0182	ug/L	1	---	---	---	---	---	---	
Fluorene	**0.0148**	0.00909	0.0182	ug/L	1	---	---	---	---	---	---	B-02, J
Indeno(1,2,3-cd)pyrene	ND	0.00909	0.0182	ug/L	1	---	---	---	---	---	---	
1-Methylnaphthalene	**0.0609**	0.0182	0.0364	ug/L	1	---	---	---	---	---	---	B
2-Methylnaphthalene	ND	0.0182	0.0364	ug/L	1	---	---	---	---	---	---	
Naphthalene	**0.0206**	0.0182	0.0364	ug/L	1	---	---	---	---	---	---	B-02, J
Phenanthrene	ND	0.00909	0.0182	ug/L	1	---	---	---	---	---	---	
Pyrene	ND	0.00909	0.0182	ug/L	1	---	---	---	---	---	---	
Carbazole	ND	0.0136	0.0273	ug/L	1	---	---	---	---	---	---	
Dibenzofuran	**0.0156**	0.00909	0.0182	ug/L	1	---	---	---	---	---	---	B-02, J
4-Chloro-3-methylphenol	ND	0.0909	0.182	ug/L	1	---	---	---	---	---	---	
2-Chlorophenol	ND	0.0455	0.0909	ug/L	1	---	---	---	---	---	---	
2,4-Dichlorophenol	ND	0.0455	0.0909	ug/L	1	---	---	---	---	---	---	
2,4-Dimethylphenol	ND	0.0455	0.0909	ug/L	1	---	---	---	---	---	---	
2,4-Dinitrophenol	ND	0.227	0.455	ug/L	1	---	---	---	---	---	---	
4,6-Dinitro-2-methylphenol	ND	0.227	0.455	ug/L	1	---	---	---	---	---	---	
2-Methylphenol	ND	0.0227	0.0455	ug/L	1	---	---	---	---	---	---	
3+4-Methylphenol(s)	ND	0.0227	0.0455	ug/L	1	---	---	---	---	---	---	
2-Nitrophenol	ND	0.0909	0.182	ug/L	1	---	---	---	---	---	---	
4-Nitrophenol	ND	0.0909	0.182	ug/L	1	---	---	---	---	---	---	
Pentachlorophenol (PCP)	ND	0.0909	0.182	ug/L	1	---	---	---	---	---	---	
Phenol	ND	0.182	0.364	ug/L	1	---	---	---	---	---	---	

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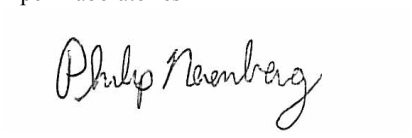

Philip Nerenberg, Lab Director

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AMENDED REPORT

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100456 - EPA 3510C (Acid/Base Neutral)							**Water**					
Blank (9100456-BLK1)			Prepared: 10/01/19 06:34		Analyzed: 10/01/19 14:52							
2,3,5,6-Tetrachlorophenol	ND	0.0455	0.0909	ug/L	1	---	---	---	---	---	---	
2,4,5-Trichlorophenol	ND	0.0455	0.0909	ug/L	1	---	---	---	---	---	---	
2,4,6-Trichlorophenol	ND	0.0455	0.0909	ug/L	1	---	---	---	---	---	---	
Bis(2-ethylhexyl)phthalate	ND	0.182	0.364	ug/L	1	---	---	---	---	---	---	
Butyl benzyl phthalate	ND	0.182	0.364	ug/L	1	---	---	---	---	---	---	
Diethylphthalate	ND	0.182	0.364	ug/L	1	---	---	---	---	---	---	
Dimethylphthalate	ND	0.182	0.364	ug/L	1	---	---	---	---	---	---	
Di-n-butylphthalate	ND	0.182	0.364	ug/L	1	---	---	---	---	---	---	
Di-n-octyl phthalate	ND	0.182	0.364	ug/L	1	---	---	---	---	---	---	
N-Nitrosodimethylamine	ND	0.0227	0.0455	ug/L	1	---	---	---	---	---	---	
N-Nitroso-di-n-propylamine	ND	0.0227	0.0455	ug/L	1	---	---	---	---	---	---	
N-Nitrosodiphenylamine	ND	0.0227	0.0455	ug/L	1	---	---	---	---	---	---	
Bis(2-Chloroethoxy) methane	ND	0.0227	0.0455	ug/L	1	---	---	---	---	---	---	
Bis(2-Chloroethyl) ether	ND	0.0227	0.0455	ug/L	1	---	---	---	---	---	---	
2,2'-Oxybis(1-Chloropropane)	ND	0.0227	0.0455	ug/L	1	---	---	---	---	---	---	
Hexachlorobenzene	ND	0.00909	0.0182	ug/L	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	0.0227	0.0455	ug/L	1	---	---	---	---	---	---	
Hexachlorocyclopentadiene	ND	0.0455	0.0909	ug/L	1	---	---	---	---	---	---	
Hexachloroethane	ND	0.0227	0.0455	ug/L	1	---	---	---	---	---	---	
2-Chloronaphthalene	ND	0.00909	0.0182	ug/L	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	0.0227	0.0455	ug/L	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	0.0227	0.0455	ug/L	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	0.0227	0.0455	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	0.0227	0.0455	ug/L	1	---	---	---	---	---	---	
4-Bromophenyl phenyl ether	ND	0.0227	0.0455	ug/L	1	---	---	---	---	---	---	
4-Chlorophenyl phenyl ether	ND	0.0227	0.0455	ug/L	1	---	---	---	---	---	---	
Aniline	ND	0.0455	0.0909	ug/L	1	---	---	---	---	---	---	
4-Chloroaniline	ND	0.0227	0.0455	ug/L	1	---	---	---	---	---	---	
2-Nitroaniline	ND	0.182	0.364	ug/L	1	---	---	---	---	---	---	
3-Nitroaniline	ND	0.182	0.364	ug/L	1	---	---	---	---	---	---	
4-Nitroaniline	ND	0.182	0.364	ug/L	1	---	---	---	---	---	---	
Nitrobenzene	ND	0.0909	0.182	ug/L	1	---	---	---	---	---	---	
2,4-Dinitrotoluene	ND	0.0909	0.182	ug/L	1	---	---	---	---	---	---	
2,6-Dinitrotoluene	ND	0.0909	0.182	ug/L	1	---	---	---	---	---	---	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100456 - EPA 3510C (Acid/Base Neutral)							**Water**					
Blank (9100456-BLK1)			Prepared: 10/01/19 06:34 Analyzed: 10/01/19 14:52									
Benzoic acid	ND	1.14	2.27	ug/L	1	---	---	---	---	---	---	
Benzyl alcohol	ND	0.0909	0.182	ug/L	1	---	---	---	---	---	---	
Isophorone	ND	0.0227	0.0455	ug/L	1	---	---	---	---	---	---	
Azobenzene (1,2-DPH)	ND	0.0227	0.0455	ug/L	1	---	---	---	---	---	---	
Bis(2-Ethylhexyl) adipate	ND	0.227	0.455	ug/L	1	---	---	---	---	---	---	
3,3'-Dichlorobenzidine	ND	0.455	0.909	ug/L	1	---	---	---	---	---	---	Q-52
1,2-Dinitrobenzene	ND	0.227	0.455	ug/L	1	---	---	---	---	---	---	
1,3-Dinitrobenzene	ND	0.227	0.455	ug/L	1	---	---	---	---	---	---	
1,4-Dinitrobenzene	ND	0.227	0.455	ug/L	1	---	---	---	---	---	---	
Pyridine	ND	0.0909	0.182	ug/L	1	---	---	---	---	---	---	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 67 %*		*Limits: 44-120 %*			*Dilution: 1x*				
2-Fluorobiphenyl (Surr)			*55 %*		*44-120 %*			*"*				
Phenol-d6 (Surr)			*20 %*		*10-120 %*			*"*				
p-Terphenyl-d14 (Surr)			*69 %*		*50-133 %*			*"*				
2-Fluorophenol (Surr)			*36 %*		*19-120 %*			*"*				
2,4,6-Tribromophenol (Surr)			*65 %*		*43-140 %*			*"*				
LCS (9100456-BS1)			Prepared: 10/01/19 06:34 Analyzed: 10/01/19 15:28									
EPA 8270D												
Acenaphthene	3.11	0.0400	0.0800	ug/L	4	4.00	---	78	47-122%	---	---	B
Acenaphthylene	3.24	0.0400	0.0800	ug/L	4	4.00	---	81	41-130%	---	---	
Anthracene	3.34	0.0400	0.0800	ug/L	4	4.00	---	83	57-123%	---	---	
Benz(a)anthracene	3.37	0.0400	0.0800	ug/L	4	4.00	---	84	58-125%	---	---	
Benzo(a)pyrene	3.35	0.0600	0.120	ug/L	4	4.00	---	84	54-128%	---	---	
Benzo(b)fluoranthene	3.39	0.0600	0.120	ug/L	4	4.00	---	85	53-131%	---	---	
Benzo(k)fluoranthene	3.36	0.0600	0.120	ug/L	4	4.00	---	84	57-129%	---	---	
Benzo(g,h,i)perylene	3.59	0.0400	0.0800	ug/L	4	4.00	---	90	50-134%	---	---	
Chrysene	3.44	0.0400	0.0800	ug/L	4	4.00	---	86	59-123%	---	---	
Dibenz(a,h)anthracene	3.43	0.0400	0.0800	ug/L	4	4.00	---	86	51-134%	---	---	
Fluoranthene	3.69	0.0400	0.0800	ug/L	4	4.00	---	92	57-128%	---	---	
Fluorene	3.22	0.0400	0.0800	ug/L	4	4.00	---	80	52-124%	---	---	B-02
Indeno(1,2,3-cd)pyrene	3.22	0.0400	0.0800	ug/L	4	4.00	---	81	52-133%	---	---	
1-Methylnaphthalene	3.03	0.0800	0.160	ug/L	4	4.00	---	76	41-120%	---	---	B
2-Methylnaphthalene	2.96	0.0800	0.160	ug/L	4	4.00	---	74	40-121%	---	---	

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AMENDED REPORT

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100456 - EPA 3510C (Acid/Base Neutral)							**Water**					
LCS (9100456-BS1)			Prepared: 10/01/19 06:34		Analyzed: 10/01/19 15:28							
Naphthalene	2.88	0.0800	0.160	ug/L	4	4.00	---	72	40-121%	---	---	B-02
Phenanthrene	3.19	0.0400	0.0800	ug/L	4	4.00	---	80	59-120%	---	---	
Pyrene	3.79	0.0400	0.0800	ug/L	4	4.00	---	95	57-126%	---	---	
Carbazole	3.47	0.0600	0.120	ug/L	4	4.00	---	87	60-122%	---	---	
Dibenzofuran	3.23	0.0400	0.0800	ug/L	4	4.00	---	81	53-120%	---	---	B-02
4-Chloro-3-methylphenol	3.28	0.400	0.800	ug/L	4	4.00	---	82	52-120%	---	---	
2-Chlorophenol	2.93	0.200	0.400	ug/L	4	4.00	---	73	38-120%	---	---	
2,4-Dichlorophenol	3.22	0.200	0.400	ug/L	4	4.00	---	81	47-121%	---	---	
2,4-Dimethylphenol	3.23	0.200	0.400	ug/L	4	4.00	---	81	31-124%	---	---	
2,4-Dinitrophenol	3.52	1.00	2.00	ug/L	4	4.00	---	88	23-143%	---	---	
4,6-Dinitro-2-methylphenol	3.81	1.00	2.00	ug/L	4	4.00	---	95	44-137%	---	---	
2-Methylphenol	2.78	0.100	0.200	ug/L	4	4.00	---	70	30-120%	---	---	
3+4-Methylphenol(s)	2.55	0.100	0.200	ug/L	4	4.00	---	64	29-120%	---	---	
2-Nitrophenol	3.81	0.400	0.800	ug/L	4	4.00	---	95	47-123%	---	---	
4-Nitrophenol	1.55	0.400	0.800	ug/L	4	4.00	---	39	5-120%	---	---	
Pentachlorophenol (PCP)	3.30	0.400	0.800	ug/L	4	4.00	---	82	35-138%	---	---	
Phenol	1.30	0.800	0.800	ug/L	4	4.00	---	32	5-120%	---	---	
2,3,4,6-Tetrachlorophenol	3.18	0.200	0.400	ug/L	4	4.00	---	79	50-128%	---	---	
2,3,5,6-Tetrachlorophenol	3.31	0.200	0.400	ug/L	4	4.00	---	83	50-121%	---	---	
2,4,5-Trichlorophenol	3.34	0.200	0.400	ug/L	4	4.00	---	83	53-123%	---	---	
2,4,6-Trichlorophenol	3.38	0.200	0.400	ug/L	4	4.00	---	84	50-125%	---	---	
Bis(2-ethylhexyl)phthalate	3.49	0.800	1.60	ug/L	4	4.00	---	87	55-135%	---	---	
Butyl benzyl phthalate	3.40	0.800	1.60	ug/L	4	4.00	---	85	53-134%	---	---	
Diethylphthalate	3.46	0.800	1.60	ug/L	4	4.00	---	87	55-125%	---	---	
Dimethylphthalate	3.34	0.800	1.60	ug/L	4	4.00	---	84	45-127%	---	---	
Di-n-butylphthalate	3.65	0.800	1.60	ug/L	4	4.00	---	91	59-127%	---	---	
Di-n-octyl phthalate	3.31	0.800	1.60	ug/L	4	4.00	---	83	51-140%	---	---	
N-Nitrosodimethylamine	1.78	0.100	0.200	ug/L	4	4.00	---	44	6-120%	---	---	
N-Nitroso-di-n-propylamine	3.17	0.100	0.200	ug/L	4	4.00	---	79	49-120%	---	---	
N-Nitrosodiphenylamine	3.28	0.100	0.200	ug/L	4	4.00	---	82	51-123%	---	---	
Bis(2-Chloroethoxy) methane	3.20	0.100	0.200	ug/L	4	4.00	---	80	48-120%	---	---	
Bis(2-Chloroethyl) ether	2.69	0.100	0.200	ug/L	4	4.00	---	67	43-120%	---	---	Q-41
2,2'-Oxybis(1-Chloropropane)	2.66	0.100	0.200	ug/L	4	4.00	---	67	37-130%	---	---	
Hexachlorobenzene	3.26	0.0400	0.0800	ug/L	4	4.00	---	81	52-125%	---	---	

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Philip Nerenberg, Lab Director

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QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100456 - EPA 3510C (Acid/Base Neutral)							**Water**					
LCS (9100456-BS1)			Prepared: 10/01/19 06:34		Analyzed: 10/01/19 15:28							
Hexachlorobutadiene	2.30	0.100	0.200	ug/L	4	4.00	---	58	22-124%	---	---	
Hexachlorocyclopentadiene	2.97	0.200	0.400	ug/L	4	4.00	---	74	5-127%	---	---	Q-41
Hexachloroethane	2.06	0.100	0.200	ug/L	4	4.00	---	51	21-120%	---	---	
2-Chloronaphthalene	3.11	0.0400	0.0800	ug/L	4	4.00	---	78	40-120%	---	---	
1,2-Dichlorobenzene	2.31	0.100	0.200	ug/L	4	4.00	---	58	32-120%	---	---	
1,3-Dichlorobenzene	2.11	0.100	0.200	ug/L	4	4.00	---	53	28-120%	---	---	
1,4-Dichlorobenzene	2.20	0.100	0.200	ug/L	4	4.00	---	55	29-120%	---	---	
1,2,4-Trichlorobenzene	2.59	0.100	0.200	ug/L	4	4.00	---	65	29-120%	---	---	
4-Bromophenyl phenyl ether	3.21	0.100	0.200	ug/L	4	4.00	---	80	54-124%	---	---	
4-Chlorophenyl phenyl ether	3.16	0.100	0.200	ug/L	4	4.00	---	79	53-121%	---	---	
Aniline	2.76	0.200	0.400	ug/L	4	4.00	---	69	6-120%	---	---	
4-Chloroaniline	1.92	0.100	0.200	ug/L	4	4.00	---	48	33-120%	---	---	Q-31
2-Nitroaniline	3.39	0.800	1.60	ug/L	4	4.00	---	85	54-127%	---	---	
3-Nitroaniline	3.01	0.800	1.60	ug/L	4	4.00	---	75	41-128%	---	---	
4-Nitroaniline	4.31	0.800	1.60	ug/L	4	4.00	---	108	35-120%	---	---	Q-41
Nitrobenzene	3.16	0.400	0.800	ug/L	4	4.00	---	79	45-121%	---	---	
2,4-Dinitrotoluene	3.31	0.400	0.800	ug/L	4	4.00	---	83	57-128%	---	---	
2,6-Dinitrotoluene	3.13	0.400	0.800	ug/L	4	4.00	---	78	57-124%	---	---	
Benzoic acid	4.34	4.00	4.00	ug/L	4	8.00	---	54	5-120%	---	---	
Benzyl alcohol	2.75	0.400	0.800	ug/L	4	4.00	---	69	31-120%	---	---	
Isophorone	3.09	0.100	0.200	ug/L	4	4.00	---	77	42-124%	---	---	
Azobenzene (1,2-DPH)	2.96	0.100	0.200	ug/L	4	4.00	---	74	61-120%	---	---	
Bis(2-Ethylhexyl) adipate	3.39	1.00	2.00	ug/L	4	4.00	---	85	40-125%	---	---	
3,3'-Dichlorobenzidine	7.83	2.00	4.00	ug/L	4	8.00	---	98	27-129%	---	---	Q-31
1,2-Dinitrobenzene	3.08	1.00	2.00	ug/L	4	4.00	---	77	59-120%	---	---	
1,3-Dinitrobenzene	3.49	1.00	2.00	ug/L	4	4.00	---	87	49-128%	---	---	
1,4-Dinitrobenzene	3.77	1.00	2.00	ug/L	4	4.00	---	94	40-120%	---	---	
Pyridine	0.973	0.400	0.800	ug/L	4	4.00	---	24	5-120%	---	---	

Surr: Nitrobenzene-d5 (Surr)	*Recovery: 77 %*	*Limits: 44-120 %*	*Dilution: 4x*	
2-Fluorobiphenyl (Surr)	*71 %*	*44-120 %*	*"*	
Phenol-d6 (Surr)	*26 %*	*10-120 %*	*"*	
p-Terphenyl-d14 (Surr)	*81 %*	*50-133 %*	*"*	
2-Fluorophenol (Surr)	*42 %*	*19-120 %*	*"*	
2,4,6-Tribromophenol (Surr)	*72 %*	*43-140 %*	*"*	

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Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100456 - EPA 3510C (Acid/Base Neutral)							**Water**					
Matrix Spike (9100456-MS2)			Prepared: 10/01/19 06:34		Analyzed: 10/03/19 21:25							
QC Source Sample: Non-SDG (A9I0854-09RE1)												
EPA 8270D												
Acenaphthene	104	0.472	0.943	ug/L	50	3.77	100	106	47-122%	---	---	B
Acenaphthylene	4.46	1.42	1.42	ug/L	50	3.77	ND	118	41-130%	---	---	
Anthracene	8.83	0.472	0.943	ug/L	50	3.77	5.18	97	57-123%	---	---	
Benz(a)anthracene	3.79	0.472	0.943	ug/L	50	3.77	0.499	87	58-125%	---	---	
Benzo(a)pyrene	3.62	0.708	1.42	ug/L	50	3.77	ND	96	54-128%	---	---	
Benzo(b)fluoranthene	3.59	0.708	1.42	ug/L	50	3.77	ND	95	53-131%	---	---	
Benzo(k)fluoranthene	3.38	0.708	1.42	ug/L	50	3.77	ND	90	57-129%	---	---	
Benzo(g,h,i)perylene	3.37	0.472	0.943	ug/L	50	3.77	ND	89	50-134%	---	---	
Chrysene	3.63	0.472	0.943	ug/L	50	3.77	ND	96	59-123%	---	---	
Dibenz(a,h)anthracene	3.27	0.472	0.943	ug/L	50	3.77	ND	87	51-134%	---	---	
Fluoranthene	12.6	0.472	0.943	ug/L	50	3.77	8.21	115	57-128%	---	---	
Fluorene	48.2	0.472	0.943	ug/L	50	3.77	43.9	114	52-124%	---	---	B-02
Indeno(1,2,3-cd)pyrene	3.20	0.472	0.943	ug/L	50	3.77	ND	85	52-133%	---	---	
1-Methylnaphthalene	72.6	0.943	1.89	ug/L	50	3.77	69.6	80	41-120%	---	---	B
2-Methylnaphthalene	6.16	0.943	1.89	ug/L	50	3.77	3.95	59	40-121%	---	---	
Naphthalene	3.11	0.943	1.89	ug/L	50	3.77	ND	82	40-121%	---	---	B-02
Phenanthrene	30.6	0.472	0.943	ug/L	50	3.77	26.8	102	59-120%	---	---	
Pyrene	10.5	0.472	0.943	ug/L	50	3.77	6.24	113	57-126%	---	---	
Carbazole	11.5	0.708	1.42	ug/L	50	3.77	8.11	89	60-122%	---	---	
Dibenzofuran	40.9	0.472	0.943	ug/L	50	3.77	37.1	100	53-120%	---	---	B-02
4-Chloro-3-methylphenol	ND	4.72	9.43	ug/L	50	3.77	ND		**52-120%**	---	---	Q-11
2-Chlorophenol	2.81	2.36	4.72	ug/L	50	3.77	ND	74	38-120%	---	---	J
2,4-Dichlorophenol	4.68	2.36	4.72	ug/L	50	3.77	ND	**124**	**47-121%**	---	---	Q-11, J
2,4-Dimethylphenol	5.29	2.36	4.72	ug/L	50	3.77	ND	**140**	**31-124%**	---	---	Q-11
2,4-Dinitrophenol	13.5	11.8	23.6	ug/L	50	3.77	ND	**359**	**23-143%**	---	---	Q-11, Q-41, J
4,6-Dinitro-2-methylphenol	ND	11.8	23.6	ug/L	50	3.77	ND		**44-137%**	---	---	Q-11, Q-41
2-Methylphenol	2.85	1.18	2.36	ug/L	50	3.77	ND	76	30-120%	---	---	
3+4-Methylphenol(s)	2.34	1.18	2.36	ug/L	50	3.77	ND	62	29-120%	---	---	J
2-Nitrophenol	5.83	4.72	9.43	ug/L	50	3.77	ND	**154**	**47-123%**	---	---	Q-11, J
4-Nitrophenol	5.35	4.72	9.43	ug/L	50	3.77	ND	**142**	**5-120%**	---	---	Q-11, Q-41, J
Pentachlorophenol (PCP)	17.3	4.72	9.43	ug/L	50	3.77	13.6	98	35-138%	---	---	

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Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100456 - EPA 3510C (Acid/Base Neutral)							**Water**					
Matrix Spike (9100456-MS2)			Prepared: 10/01/19 06:34		Analyzed: 10/03/19 21:25							
QC Source Sample: Non-SDG (A9I0854-09RE1)												
Phenol	ND	9.43	18.9	ug/L	50	3.77	ND		**5-120%**	---	---	Q-11
2,3,4,6-Tetrachlorophenol	6.80	2.36	4.72	ug/L	50	3.77	3.92	76	50-128%	---	---	
2,3,5,6-Tetrachlorophenol	7.63	2.36	4.72	ug/L	50	3.77	3.82	101	50-121%	---	---	
2,4,5-Trichlorophenol	4.34	2.36	4.72	ug/L	50	3.77	ND	115	53-123%	---	---	J
2,4,6-Trichlorophenol	4.35	2.36	4.72	ug/L	50	3.77	ND	115	50-125%	---	---	J
Bis(2-ethylhexyl)phthalate	ND	9.43	18.9	ug/L	50	3.77	ND		**55-135%**	---	---	Q-11
Butyl benzyl phthalate	ND	9.43	18.9	ug/L	50	3.77	ND		**53-134%**	---	---	Q-11
Diethylphthalate	ND	9.43	18.9	ug/L	50	3.77	ND		**55-125%**	---	---	Q-11
Dimethylphthalate	ND	9.43	18.9	ug/L	50	3.77	ND		**45-127%**	---	---	Q-11
Di-n-butylphthalate	ND	9.43	18.9	ug/L	50	3.77	ND		**59-127%**	---	---	Q-11
Di-n-octyl phthalate	ND	9.43	18.9	ug/L	50	3.77	ND		**50-140%**	---	---	Q-11
N-Nitrosodimethylamine	1.26	1.18	2.36	ug/L	50	3.77	ND	33	6-120%	---	---	J
N-Nitroso-di-n-propylamine	2.77	1.18	2.36	ug/L	50	3.77	ND	73	49-120%	---	---	
N-Nitrosodiphenylamine	4.65	1.18	2.36	ug/L	50	3.77	ND	123	51-123%	---	---	
Bis(2-Chloroethoxy) methane	3.35	1.18	2.36	ug/L	50	3.77	ND	89	48-120%	---	---	
Bis(2-Chloroethyl) ether	2.54	1.18	2.36	ug/L	50	3.77	ND	67	43-120%	---	---	
2,2'-Oxybis(1-Chloropropane)	2.45	1.18	2.36	ug/L	50	3.77	ND	65	37-130%	---	---	Q-31
Hexachlorobenzene	3.31	0.472	0.943	ug/L	50	3.77	ND	88	52-125%	---	---	
Hexachlorobutadiene	2.23	1.18	2.36	ug/L	50	3.77	ND	59	22-124%	---	---	J
Hexachlorocyclopentadiene	ND	2.36	4.72	ug/L	50	3.77	ND		**5-127%**	---	---	Q-11, Q-41
Hexachloroethane	2.05	1.18	2.36	ug/L	50	3.77	ND	54	21-120%	---	---	J
2-Chloronaphthalene	3.34	0.472	0.943	ug/L	50	3.77	ND	89	40-120%	---	---	
1,2-Dichlorobenzene	2.22	1.18	2.36	ug/L	50	3.77	ND	59	32-120%	---	---	J
1,3-Dichlorobenzene	2.18	1.18	2.36	ug/L	50	3.77	ND	58	28-120%	---	---	J
1,4-Dichlorobenzene	2.21	1.18	2.36	ug/L	50	3.77	ND	58	29-120%	---	---	J
1,2,4-Trichlorobenzene	2.57	1.18	2.36	ug/L	50	3.77	ND	68	29-120%	---	---	
4-Bromophenyl phenyl ether	3.30	1.18	2.36	ug/L	50	3.77	ND	88	54-124%	---	---	
4-Chlorophenyl phenyl ether	3.31	1.18	2.36	ug/L	50	3.77	ND	88	53-121%	---	---	
Aniline	ND	2.36	4.72	ug/L	50	3.77	ND		**6-120%**	---	---	Q-11, Q-31
4-Chloroaniline	2.65	1.18	2.36	ug/L	50	3.77	ND	70	33-120%	---	---	Q-31
2-Nitroaniline	ND	9.43	18.9	ug/L	50	3.77	ND		**54-127%**	---	---	Q-11
3-Nitroaniline	ND	9.43	18.9	ug/L	50	3.77	ND		**41-128%**	---	---	Q-11
4-Nitroaniline	ND	9.43	18.9	ug/L	50	3.77	ND		**35-120%**	---	---	Q-11, Q-41

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Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100456 - EPA 3510C (Acid/Base Neutral)							**Water**					
Matrix Spike (9100456-MS2)			Prepared: 10/01/19 06:34 Analyzed: 10/03/19 21:25									
QC Source Sample: Non-SDG (A9I0854-09RE1)												
Nitrobenzene	ND	4.72	9.43	ug/L	50	3.77	ND		**45-121%**	---	---	Q-11
2,4-Dinitrotoluene	5.22	4.72	9.43	ug/L	50	3.77	ND	**138**	**57-128%**	---	---	Q-11, J
2,6-Dinitrotoluene	ND	4.72	9.43	ug/L	50	3.77	ND		**57-124%**	---	---	Q-11
Benzoic acid	ND	59.0	118	ug/L	50	7.55	ND		**5-120%**	---	---	Q-11, Q-41
Benzyl alcohol	ND	4.72	9.43	ug/L	50	3.77	ND		**31-120%**	---	---	Q-11
Isophorone	3.02	1.18	2.36	ug/L	50	3.77	ND	80	42-124%	---	---	
Azobenzene (1,2-DPH)	2.98	1.18	2.36	ug/L	50	3.77	ND	79	61-120%	---	---	
Bis(2-Ethylhexyl) adipate	ND	11.8	23.6	ug/L	50	3.77	ND		**40-125%**	---	---	Q-11
3,3'-Dichlorobenzidine	ND	23.6	47.2	ug/L	50	7.55	ND		**27-129%**	---	---	Q-11, Q-31
1,2-Dinitrobenzene	ND	11.8	23.6	ug/L	50	3.77	ND		**59-120%**	---	---	Q-11
1,3-Dinitrobenzene	ND	11.8	23.6	ug/L	50	3.77	ND		**49-128%**	---	---	Q-11
1,4-Dinitrobenzene	ND	11.8	23.6	ug/L	50	3.77	ND		**40-120%**	---	---	Q-11, Q-41
Pyridine	ND	4.72	9.43	ug/L	50	3.77	ND		**5-120%**	---	---	Q-11
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 74 %*		*Limits: 44-120 %*		*Dilution: 50x*					
2-Fluorobiphenyl (Surr)			*83 %*		*44-120 %*		*"*					
Phenol-d6 (Surr)			*23 %*		*10-120 %*		*"*					
p-Terphenyl-d14 (Surr)			*70 %*		*50-133 %*		*"*					
2-Fluorophenol (Surr)			*34 %*		*19-120 %*		*"*					
2,4,6-Tribromophenol (Surr)			*108 %*		*43-140 %*		*"*					
Matrix Spike Dup (9100456-MSD2)			Prepared: 10/01/19 06:34 Analyzed: 10/03/19 22:01									
QC Source Sample: Non-SDG (A9I0854-09RE1)												
Acenaphthene	103	0.467	0.935	ug/L	50	3.74	100	62	47-122%	2	30%	B
Acenaphthylene	4.45	0.467	0.935	ug/L	50	3.74	ND	87	41-130%	0.2	30%	
Anthracene	8.68	0.467	0.935	ug/L	50	3.74	5.18	94	57-123%	2	30%	
Benz(a)anthracene	3.73	0.467	0.935	ug/L	50	3.74	0.499	86	58-125%	2	30%	
Benzo(a)pyrene	3.48	0.701	1.40	ug/L	50	3.74	ND	93	54-128%	4	30%	
Benzo(b)fluoranthene	3.54	0.701	1.40	ug/L	50	3.74	ND	95	53-131%	2	30%	
Benzo(k)fluoranthene	3.35	0.701	1.40	ug/L	50	3.74	ND	90	57-129%	1	30%	
Benzo(g,h,i)perylene	3.24	0.467	0.935	ug/L	50	3.74	ND	87	50-134%	4	30%	
Chrysene	3.61	0.467	0.935	ug/L	50	3.74	ND	97	59-123%	0.5	30%	
Dibenz(a,h)anthracene	3.19	0.467	0.935	ug/L	50	3.74	ND	85	51-134%	3	30%	
Fluoranthene	12.4	0.467	0.935	ug/L	50	3.74	8.21	113	57-128%	0.8	30%	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100456 - EPA 3510C (Acid/Base Neutral)							**Water**					
Matrix Spike Dup (9100456-MSD2)			Prepared: 10/01/19 06:34		Analyzed: 10/03/19 22:01							
QC Source Sample: Non-SDG (A9I0854-09RE1)												
Fluorene	45.9	0.467	0.935	ug/L	50	3.74	43.9	52	52-124%	5	30%	B-02
Indeno(1,2,3-cd)pyrene	3.19	0.467	0.935	ug/L	50	3.74	ND	85	52-133%	0.5	30%	
1-Methylnaphthalene	69.5	0.935	1.87	ug/L	50	3.74	69.6	**-2**	**41-120%**	4	30%	B, Q-03
2-Methylnaphthalene	4.65	0.935	1.87	ug/L	50	3.74	3.95	**19**	**40-121%**	28	30%	Q-03
Naphthalene	3.39	0.935	1.87	ug/L	50	3.74	ND	91	40-121%	9	30%	B-02
Phenanthrene	30.1	0.467	0.935	ug/L	50	3.74	26.8	89	59-120%	2	30%	
Pyrene	10.3	0.467	0.935	ug/L	50	3.74	6.24	110	57-126%	2	30%	
Carbazole	11.3	0.701	1.40	ug/L	50	3.74	8.11	87	60-122%	1	30%	
Dibenzofuran	39.3	0.467	0.935	ug/L	50	3.74	37.1	58	53-120%	4	30%	B-02
4-Chloro-3-methylphenol	ND	4.67	9.35	ug/L	50	3.74	ND		**52-120%**		30%	Q-11
2-Chlorophenol	2.70	2.34	4.67	ug/L	50	3.74	ND	72	38-120%	4	30%	J
2,4-Dichlorophenol	4.46	2.34	4.67	ug/L	50	3.74	ND	119	47-121%	5	30%	J
2,4-Dimethylphenol	5.09	2.34	4.67	ug/L	50	3.74	ND	**136**	**31-124%**	4	30%	Q-11
2,4-Dinitrophenol	13.2	11.7	23.4	ug/L	50	3.74	ND	**353**	**23-143%**	3	30%	Q-11, Q-41, J
4,6-Dinitro-2-methylphenol	ND	11.7	23.4	ug/L	50	3.74	ND		**44-137%**		30%	Q-11, Q-41
2-Methylphenol	3.02	1.17	2.34	ug/L	50	3.74	ND	81	30-120%	6	30%	
3+4-Methylphenol(s)	2.32	1.17	2.34	ug/L	50	3.74	ND	62	29-120%	0.9	30%	J
2-Nitrophenol	ND	4.67	9.35	ug/L	50	3.74	ND		**47-123%**	**200**	**30%**	Q-11
4-Nitrophenol	ND	4.67	9.35	ug/L	50	3.74	ND		**5-120%**	**200**	**30%**	Q-11, Q-41
Pentachlorophenol (PCP)	16.7	4.67	9.35	ug/L	50	3.74	13.6	84	35-138%	3	30%	
Phenol	ND	9.35	18.7	ug/L	50	3.74	ND		**5-120%**		30%	Q-11
2,3,4,6-Tetrachlorophenol	6.64	2.34	4.67	ug/L	50	3.74	3.92	73	50-128%	2	30%	
2,3,5,6-Tetrachlorophenol	7.12	2.34	4.67	ug/L	50	3.74	3.82	88	50-121%	7	30%	
2,4,5-Trichlorophenol	4.19	2.34	4.67	ug/L	50	3.74	ND	112	53-123%	4	30%	J
2,4,6-Trichlorophenol	4.30	2.34	4.67	ug/L	50	3.74	ND	115	50-125%	1	30%	J
Bis(2-ethylhexyl)phthalate	ND	9.35	18.7	ug/L	50	3.74	ND		**55-135%**		30%	Q-11
Butyl benzyl phthalate	ND	9.35	18.7	ug/L	50	3.74	ND		**53-134%**		30%	Q-11
Diethylphthalate	ND	9.35	18.7	ug/L	50	3.74	ND		**55-125%**		30%	Q-11
Dimethylphthalate	ND	9.35	18.7	ug/L	50	3.74	ND		**45-127%**		30%	Q-11
Di-n-butylphthalate	ND	9.35	18.7	ug/L	50	3.74	ND		**59-127%**		30%	Q-11
Di-n-octyl phthalate	ND	9.35	18.7	ug/L	50	3.74	ND		**50-140%**		30%	Q-11
N-Nitrosodimethylamine	ND	1.17	2.34	ug/L	50	3.74	ND		**6-120%**	**200**	**30%**	Q-01
N-Nitroso-di-n-propylamine	2.64	1.17	2.34	ug/L	50	3.74	ND	71	49-120%	5	30%	

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Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100456 - EPA 3510C (Acid/Base Neutral)							**Water**					
Matrix Spike Dup (9100456-MSD2)			Prepared: 10/01/19 06:34		Analyzed: 10/03/19 22:01							
QC Source Sample: Non-SDG (A9I0854-09RE1)												
N-Nitrosodiphenylamine	4.64	1.17	2.34	ug/L	50	3.74	ND	**124**	**51-123%**	0.3	30%	Q-01
Bis(2-Chloroethoxy) methane	3.15	1.17	2.34	ug/L	50	3.74	ND	84	48-120%	6	30%	
Bis(2-Chloroethyl) ether	2.47	1.17	2.34	ug/L	50	3.74	ND	66	43-120%	3	30%	
2,2'-Oxybis(1-Chloropropane)	2.22	1.17	2.34	ug/L	50	3.74	ND	59	37-130%	10	30%	Q-31, J
Hexachlorobenzene	3.57	0.467	0.935	ug/L	50	3.74	ND	95	52-125%	8	30%	
Hexachlorobutadiene	2.22	1.17	2.34	ug/L	50	3.74	ND	59	22-124%	0.09	30%	J
Hexachlorocyclopentadiene	ND	2.34	4.67	ug/L	50	3.74	ND		**5-127%**		30%	Q-11, Q-41
Hexachloroethane	1.90	1.17	2.34	ug/L	50	3.74	ND	51	21-120%	8	30%	J
2-Chloronaphthalene	3.18	0.467	0.935	ug/L	50	3.74	ND	85	40-120%	5	30%	
1,2-Dichlorobenzene	2.15	1.17	2.34	ug/L	50	3.74	ND	57	32-120%	4	30%	J
1,3-Dichlorobenzene	2.02	1.17	2.34	ug/L	50	3.74	ND	54	28-120%	8	30%	J
1,4-Dichlorobenzene	2.10	1.17	2.34	ug/L	50	3.74	ND	56	29-120%	5	30%	J
1,2,4-Trichlorobenzene	2.55	1.17	2.34	ug/L	50	3.74	ND	68	29-120%	0.9	30%	
4-Bromophenyl phenyl ether	3.24	1.17	2.34	ug/L	50	3.74	ND	87	54-124%	2	30%	
4-Chlorophenyl phenyl ether	3.12	1.17	2.34	ug/L	50	3.74	ND	84	53-121%	6	30%	
Aniline	ND	2.34	4.67	ug/L	50	3.74	ND		**6-120%**		30%	Q-11, Q-31
4-Chloroaniline	2.37	1.17	2.34	ug/L	50	3.74	ND	63	33-120%	11	30%	Q-31
2-Nitroaniline	ND	9.35	18.7	ug/L	50	3.74	ND		**54-127%**		30%	Q-11
3-Nitroaniline	ND	9.35	18.7	ug/L	50	3.74	ND		**41-128%**		30%	Q-11
4-Nitroaniline	ND	9.35	18.7	ug/L	50	3.74	ND		**35-120%**		30%	Q-11, Q-41
Nitrobenzene	ND	4.67	9.35	ug/L	50	3.74	ND		**45-121%**		30%	Q-11
2,4-Dinitrotoluene	4.82	4.67	9.35	ug/L	50	3.74	ND	**129**	**57-128%**	8	30%	Q-11, J
2,6-Dinitrotoluene	ND	4.67	9.35	ug/L	50	3.74	ND		**57-124%**		30%	Q-11
Benzoic acid	ND	58.4	117	ug/L	50	7.48	ND		**5-120%**		30%	Q-11, Q-41
Benzyl alcohol	ND	4.67	9.35	ug/L	50	3.74	ND		**31-120%**		30%	Q-11
Isophorone	2.90	1.17	2.34	ug/L	50	3.74	ND	78	42-124%	4	30%	
Azobenzene (1,2-DPH)	2.87	1.17	2.34	ug/L	50	3.74	ND	77	61-120%	4	30%	
Bis(2-Ethylhexyl) adipate	ND	11.7	23.4	ug/L	50	3.74	ND		**40-125%**		30%	Q-11
3,3'-Dichlorobenzidine	ND	23.4	46.7	ug/L	50	7.48	ND		**27-129%**		30%	Q-11, Q-31
1,2-Dinitrobenzene	ND	11.7	23.4	ug/L	50	3.74	ND		**59-120%**		30%	Q-11
1,3-Dinitrobenzene	ND	11.7	23.4	ug/L	50	3.74	ND		**49-128%**		30%	Q-11
1,4-Dinitrobenzene	ND	11.7	23.4	ug/L	50	3.74	ND		**40-120%**		30%	Q-11, Q-41
Pyridine	ND	4.67	9.35	ug/L	50	3.74	ND		**5-120%**		30%	Q-11

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Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100456 - EPA 3510C (Acid/Base Neutral)												**Water**
Matrix Spike Dup (9100456-MSD2)					Prepared: 10/01/19 06:34		Analyzed: 10/03/19 22:01					
QC Source Sample: Non-SDG (A9I0854-09RE1)												
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 67 %*		*Limits: 44-120 %*		*Dilution: 50x*					
2-Fluorobiphenyl (Surr)			*77 %*		*44-120 %*		*"*					
Phenol-d6 (Surr)			*22 %*		*10-120 %*		*"*					
p-Terphenyl-d14 (Surr)			*70 %*		*50-133 %*		*"*					
2-Fluorophenol (Surr)			*31 %*		*19-120 %*		*"*					
2,4,6-Tribromophenol (Surr)			*96 %*		*43-140 %*		*"*					

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Blank (9100490-BLK1)			Prepared: 10/01/19 10:34		Analyzed: 10/01/19 21:24							
EPA 8270D												
Acenaphthene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Acenaphthylene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Anthracene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Benz(a)anthracene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Benzo(a)pyrene	ND	0.00188	0.00375	mg/kg wet	1	---	---	---	---	---	---	
Benzo(b)fluoranthene	ND	0.00188	0.00375	mg/kg wet	1	---	---	---	---	---	---	
Benzo(k)fluoranthene	ND	0.00188	0.00375	mg/kg wet	1	---	---	---	---	---	---	
Benzo(g,h,i)perylene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Chrysene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Dibenz(a,h)anthracene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Fluoranthene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Fluorene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Indeno(1,2,3-cd)pyrene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
1-Methylnaphthalene	ND	0.00250	0.00500	mg/kg wet	1	---	---	---	---	---	---	
2-Methylnaphthalene	ND	0.00250	0.00500	mg/kg wet	1	---	---	---	---	---	---	
Naphthalene	ND	0.00250	0.00500	mg/kg wet	1	---	---	---	---	---	---	
Phenanthrene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Pyrene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Carbazole	ND	0.00188	0.00375	mg/kg wet	1	---	---	---	---	---	---	
Dibenzofuran	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
4-Chloro-3-methylphenol	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	
2-Chlorophenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
2,4-Dichlorophenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
2,4-Dimethylphenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
2,4-Dinitrophenol	ND	0.0312	0.0625	mg/kg wet	1	---	---	---	---	---	---	
4,6-Dinitro-2-methylphenol	ND	0.0312	0.0625	mg/kg wet	1	---	---	---	---	---	---	
2-Methylphenol	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
3+4-Methylphenol(s)	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
2-Nitrophenol	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	
4-Nitrophenol	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	
Pentachlorophenol (PCP)	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	
Phenol	ND	0.00250	0.00500	mg/kg wet	1	---	---	---	---	---	---	
2,3,4,6-Tetrachlorophenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	

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Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Blank (9100490-BLK1)			Prepared: 10/01/19 10:34		Analyzed: 10/01/19 21:24							
2,3,5,6-Tetrachlorophenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
2,4,5-Trichlorophenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
2,4,6-Trichlorophenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Bis(2-ethylhexyl)phthalate	ND	0.0188	0.0375	mg/kg wet	1	---	---	---	---	---	---	
Butyl benzyl phthalate	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Diethylphthalate	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Dimethylphthalate	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Di-n-butylphthalate	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Di-n-octyl phthalate	ND	0.0100	0.0125	mg/kg wet	1	---	---	---	---	---	---	
N-Nitrosodimethylamine	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
N-Nitroso-di-n-propylamine	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
N-Nitrosodiphenylamine	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Bis(2-Chloroethoxy) methane	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Bis(2-Chloroethyl) ether	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
2,2'-Oxybis(1-Chloropropane)	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Hexachlorobenzene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Hexachlorocyclopentadiene	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Hexachloroethane	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
2-Chloronaphthalene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
4-Bromophenyl phenyl ether	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
4-Chlorophenyl phenyl ether	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Aniline	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
4-Chloroaniline	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
2-Nitroaniline	ND	0.0250	0.0500	mg/kg wet	1	---	---	---	---	---	---	
3-Nitroaniline	ND	0.0250	0.0500	mg/kg wet	1	---	---	---	---	---	---	
4-Nitroaniline	ND	0.0250	0.0500	mg/kg wet	1	---	---	---	---	---	---	
Nitrobenzene	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	
2,4-Dinitrotoluene	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	
2,6-Dinitrotoluene	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Blank (9100490-BLK1)			Prepared: 10/01/19 10:34		Analyzed: 10/01/19 21:24							
Benzoic acid	ND	0.157	0.312	mg/kg wet	1	---	---	---	---	---	---	
Benzyl alcohol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Isophorone	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Azobenzene (1,2-DPH)	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Bis(2-Ethylhexyl) adipate	ND	0.0312	0.0625	mg/kg wet	1	---	---	---	---	---	---	
3,3'-Dichlorobenzidine	ND	0.0250	0.0500	mg/kg wet	1	---	---	---	---	---	---	Q-52
1,2-Dinitrobenzene	ND	0.0312	0.0625	mg/kg wet	1	---	---	---	---	---	---	
1,3-Dinitrobenzene	ND	0.0312	0.0625	mg/kg wet	1	---	---	---	---	---	---	
1,4-Dinitrobenzene	ND	0.0312	0.0625	mg/kg wet	1	---	---	---	---	---	---	
Pyridine	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 69 %*		*Limits: 37-122 %*				*Dilution: 1x*			
2-Fluorobiphenyl (Surr)			*57 %*		*44-115 %*				*"*			
Phenol-d6 (Surr)			*70 %*		*33-122 %*				*"*			
p-Terphenyl-d14 (Surr)			*76 %*		*54-127 %*				*"*			
2-Fluorophenol (Surr)			*64 %*		*35-115 %*				*"*			
2,4,6-Tribromophenol (Surr)			*60 %*		*39-132 %*				*"*			
LCS (9100490-BS1)			Prepared: 10/01/19 10:34		Analyzed: 10/01/19 21:59							
EPA 8270D												
Acenaphthene	0.366	0.00532	0.0107	mg/kg wet	4	0.533	---	69	40-122%	---	---	
Acenaphthylene	0.391	0.00532	0.0107	mg/kg wet	4	0.533	---	73	32-132%	---	---	
Anthracene	0.415	0.00532	0.0107	mg/kg wet	4	0.533	---	78	47-123%	---	---	
Benz(a)anthracene	0.424	0.00532	0.0107	mg/kg wet	4	0.533	---	79	49-126%	---	---	
Benzo(a)pyrene	0.438	0.00800	0.0160	mg/kg wet	4	0.533	---	82	45-129%	---	---	
Benzo(b)fluoranthene	0.427	0.00800	0.0160	mg/kg wet	4	0.533	---	80	45-132%	---	---	
Benzo(k)fluoranthene	0.423	0.00800	0.0160	mg/kg wet	4	0.533	---	79	47-132%	---	---	
Benzo(g,h,i)perylene	0.445	0.00532	0.0107	mg/kg wet	4	0.533	---	83	43-134%	---	---	
Chrysene	0.414	0.00532	0.0107	mg/kg wet	4	0.533	---	78	50-124%	---	---	
Dibenz(a,h)anthracene	0.424	0.00532	0.0107	mg/kg wet	4	0.533	---	80	45-134%	---	---	
Fluoranthene	0.456	0.00532	0.0107	mg/kg wet	4	0.533	---	85	50-127%	---	---	
Fluorene	0.384	0.00532	0.0107	mg/kg wet	4	0.533	---	72	43-125%	---	---	
Indeno(1,2,3-cd)pyrene	0.402	0.00532	0.0107	mg/kg wet	4	0.533	---	75	45-133%	---	---	
1-Methylnaphthalene	0.368	0.0107	0.0213	mg/kg wet	4	0.533	---	69	40-120%	---	---	
2-Methylnaphthalene	0.374	0.0107	0.0213	mg/kg wet	4	0.533	---	70	38-122%	---	---	

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Philip Nerenberg, Lab Director

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6700 S.W. Sandburg Street
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503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
LCS (9100490-BS1)			Prepared: 10/01/19 10:34		Analyzed: 10/01/19 21:59							
Naphthalene	0.359	0.0107	0.0213	mg/kg wet	4	0.533	---	67	35-123%	---	---	
Phenanthrene	0.395	0.00532	0.0107	mg/kg wet	4	0.533	---	74	50-121%	---	---	
Pyrene	0.464	0.00532	0.0107	mg/kg wet	4	0.533	---	87	47-127%	---	---	
Carbazole	0.464	0.00800	0.0160	mg/kg wet	4	0.533	---	87	50-122%	---	---	
Dibenzofuran	0.384	0.00532	0.0107	mg/kg wet	4	0.533	---	72	44-120%	---	---	
4-Chloro-3-methylphenol	0.415	0.0532	0.107	mg/kg wet	4	0.533	---	78	45-122%	---	---	
2-Chlorophenol	0.367	0.0267	0.0532	mg/kg wet	4	0.533	---	69	34-121%	---	---	
2,4-Dichlorophenol	0.384	0.0267	0.0532	mg/kg wet	4	0.533	---	72	40-122%	---	---	
2,4-Dimethylphenol	0.431	0.0267	0.0532	mg/kg wet	4	0.533	---	81	30-127%	---	---	
2,4-Dinitrophenol	0.466	0.133	0.267	mg/kg wet	4	0.533	---	87	5-137%	---	---	
4,6-Dinitro-2-methylphenol	0.517	0.133	0.267	mg/kg wet	4	0.533	---	97	29-132%	---	---	
2-Methylphenol	0.427	0.0133	0.0267	mg/kg wet	4	0.533	---	80	32-122%	---	---	
3+4-Methylphenol(s)	0.434	0.0133	0.0267	mg/kg wet	4	0.533	---	81	34-120%	---	---	
2-Nitrophenol	0.417	0.0532	0.107	mg/kg wet	4	0.533	---	78	36-123%	---	---	
4-Nitrophenol	0.495	0.0532	0.107	mg/kg wet	4	0.533	---	93	30-132%	---	---	
Pentachlorophenol (PCP)	0.434	0.0532	0.107	mg/kg wet	4	0.533	---	81	25-133%	---	---	
Phenol	0.393	0.0107	0.0213	mg/kg wet	4	0.533	---	74	34-120%	---	---	
2,3,4,6-Tetrachlorophenol	0.414	0.0267	0.0532	mg/kg wet	4	0.533	---	78	44-125%	---	---	
2,3,5,6-Tetrachlorophenol	0.429	0.0267	0.0532	mg/kg wet	4	0.533	---	80	40-120%	---	---	
2,4,5-Trichlorophenol	0.416	0.0267	0.0532	mg/kg wet	4	0.533	---	78	41-124%	---	---	
2,4,6-Trichlorophenol	0.405	0.0267	0.0532	mg/kg wet	4	0.533	---	76	39-126%	---	---	
Bis(2-ethylhexyl)phthalate	0.441	0.0800	0.160	mg/kg wet	4	0.533	---	83	51-133%	---	---	
Butyl benzyl phthalate	0.444	0.0267	0.0532	mg/kg wet	4	0.533	---	83	48-132%	---	---	
Diethylphthalate	0.436	0.0267	0.0532	mg/kg wet	4	0.533	---	82	50-124%	---	---	
Dimethylphthalate	0.409	0.0267	0.0532	mg/kg wet	4	0.533	---	77	48-124%	---	---	
Di-n-butylphthalate	0.448	0.0267	0.0532	mg/kg wet	4	0.533	---	84	51-128%	---	---	
Di-n-octyl phthalate	0.457	0.0428	0.0532	mg/kg wet	4	0.533	---	86	44-140%	---	---	
N-Nitrosodimethylamine	0.289	0.0133	0.0267	mg/kg wet	4	0.533	---	54	23-120%	---	---	
N-Nitroso-di-n-propylamine	0.382	0.0133	0.0267	mg/kg wet	4	0.533	---	72	36-120%	---	---	
N-Nitrosodiphenylamine	0.407	0.0133	0.0267	mg/kg wet	4	0.533	---	76	38-127%	---	---	
Bis(2-Chloroethoxy) methane	0.367	0.0133	0.0267	mg/kg wet	4	0.533	---	69	36-121%	---	---	
Bis(2-Chloroethyl) ether	0.316	0.0133	0.0267	mg/kg wet	4	0.533	---	59	31-120%	---	---	Q-41
2,2'-Oxybis(1-Chloropropane)	0.318	0.0133	0.0267	mg/kg wet	4	0.533	---	60	33-131%	---	---	
Hexachlorobenzene	0.403	0.00532	0.0107	mg/kg wet	4	0.533	---	76	44-122%	---	---	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
LCS (9100490-BS1)			Prepared: 10/01/19 10:34		Analyzed: 10/01/19 21:59							
Hexachlorobutadiene	0.337	0.0133	0.0267	mg/kg wet	4	0.533	---	63	32-123%	---	---	
Hexachlorocyclopentadiene	0.420	0.0267	0.0532	mg/kg wet	4	0.533	---	79	5-140%	---	---	Q-41
Hexachloroethane	0.323	0.0133	0.0267	mg/kg wet	4	0.533	---	61	28-120%	---	---	
2-Chloronaphthalene	0.379	0.00532	0.0107	mg/kg wet	4	0.533	---	71	41-120%	---	---	
1,2-Dichlorobenzene	0.332	0.0133	0.0267	mg/kg wet	4	0.533	---	62	33-120%	---	---	
1,3-Dichlorobenzene	0.316	0.0133	0.0267	mg/kg wet	4	0.533	---	59	30-120%	---	---	
1,4-Dichlorobenzene	0.321	0.0133	0.0267	mg/kg wet	4	0.533	---	60	31-120%	---	---	
1,2,4-Trichlorobenzene	0.336	0.0133	0.0267	mg/kg wet	4	0.533	---	63	34-120%	---	---	
4-Bromophenyl phenyl ether	0.396	0.0133	0.0267	mg/kg wet	4	0.533	---	74	46-124%	---	---	
4-Chlorophenyl phenyl ether	0.378	0.0133	0.0267	mg/kg wet	4	0.533	---	71	45-121%	---	---	
Aniline	0.327	0.0267	0.0532	mg/kg wet	4	0.533	---	61	7-120%	---	---	
4-Chloroaniline	0.217	0.0133	0.0267	mg/kg wet	4	0.533	---	41	16-120%	---	---	Q-31
2-Nitroaniline	0.414	0.107	0.213	mg/kg wet	4	0.533	---	78	44-127%	---	---	
3-Nitroaniline	0.393	0.107	0.213	mg/kg wet	4	0.533	---	74	33-120%	---	---	
4-Nitroaniline	0.588	0.107	0.213	mg/kg wet	4	0.533	---	110	35-120%	---	---	Q-41
Nitrobenzene	0.375	0.0532	0.107	mg/kg wet	4	0.533	---	70	34-122%	---	---	
2,4-Dinitrotoluene	0.418	0.0532	0.107	mg/kg wet	4	0.533	---	78	48-126%	---	---	
2,6-Dinitrotoluene	0.412	0.0532	0.107	mg/kg wet	4	0.533	---	77	46-124%	---	---	
Benzoic acid	0.659	0.400	0.400	mg/kg wet	4	1.07	---	62	5-140%	---	---	
Benzyl alcohol	0.381	0.0267	0.0532	mg/kg wet	4	0.533	---	71	29-122%	---	---	
Isophorone	0.363	0.0133	0.0267	mg/kg wet	4	0.533	---	68	30-122%	---	---	
Azobenzene (1,2-DPH)	0.359	0.0133	0.0267	mg/kg wet	4	0.533	---	67	39-125%	---	---	
Bis(2-Ethylhexyl) adipate	0.440	0.133	0.267	mg/kg wet	4	0.533	---	83	60-121%	---	---	
3,3'-Dichlorobenzidine	1.32	0.107	0.213	mg/kg wet	4	1.07	---	**124**	**22-121%**	---	---	Q-29, Q-31
1,2-Dinitrobenzene	0.397	0.133	0.267	mg/kg wet	4	0.533	---	75	44-120%	---	---	
1,3-Dinitrobenzene	0.434	0.133	0.267	mg/kg wet	4	0.533	---	81	42-127%	---	---	
1,4-Dinitrobenzene	0.464	0.133	0.267	mg/kg wet	4	0.533	---	87	37-132%	---	---	
Pyridine	0.203	0.0267	0.0532	mg/kg wet	4	0.533	---	38	5-120%	---	---	

Surr: Nitrobenzene-d5 (Surr)	*Recovery: 70 %*	*Limits: 37-122 %*	*Dilution: 4x*
2-Fluorobiphenyl (Surr)	*68 %*	*44-115 %*	*"*
Phenol-d6 (Surr)	*73 %*	*33-122 %*	*"*
p-Terphenyl-d14 (Surr)	*82 %*	*54-127 %*	*"*
2-Fluorophenol (Surr)	*62 %*	*35-115 %*	*"*
2,4,6-Tribromophenol (Surr)	*74 %*	*39-132 %*	*"*

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Duplicate (9100490-DUP2)			Prepared: 10/01/19 10:34		Analyzed: 10/02/19 14:15							
QC Source Sample: Non-SDG (A9I0822-02RE1)												
Acenaphthene	**0.0710**	0.0306	0.0615	mg/kg dry	10	---	0.135	---	---	**62**	**30%**	Q-04
Acenaphthylene	ND	0.0306	0.0615	mg/kg dry	10	---	ND	---	---	---	30%	
Anthracene	**0.103**	0.0306	0.0615	mg/kg dry	10	---	0.204	---	---	**66**	**30%**	Q-04
Benz(a)anthracene	**0.103**	0.0306	0.0615	mg/kg dry	10	---	0.218	---	---	**71**	**30%**	Q-04
Benzo(a)pyrene	**0.0937**	0.0461	0.0922	mg/kg dry	10	---	0.154	---	---	**48**	**30%**	Q-04
Benzo(b)fluoranthene	**0.100**	0.0461	0.0922	mg/kg dry	10	---	0.180	---	---	**57**	**30%**	Q-04
Benzo(k)fluoranthene	**0.0492**	0.0461	0.0922	mg/kg dry	10	---	0.0758	---	---	**42**	**30%**	Q-04, J
Benzo(g,h,i)perylene	**0.0400**	0.0306	0.0615	mg/kg dry	10	---	0.0680	---	---	**52**	**30%**	Q-04, J
Chrysene	**0.0879**	0.0306	0.0615	mg/kg dry	10	---	0.199	---	---	**78**	**30%**	Q-04
Dibenz(a,h)anthracene	ND	0.0306	0.0615	mg/kg dry	10	---	ND	---	---	---	30%	
Fluoranthene	**0.503**	0.0306	0.0615	mg/kg dry	10	---	1.15	---	---	**78**	**30%**	Q-04
Fluorene	**0.0660**	0.0306	0.0615	mg/kg dry	10	---	0.136	---	---	**69**	**30%**	Q-04
Indeno(1,2,3-cd)pyrene	**0.0339**	0.0306	0.0615	mg/kg dry	10	---	0.0695	---	---	**69**	**30%**	Q-04, J
1-Methylnaphthalene	ND	0.0615	0.123	mg/kg dry	10	---	0.0767	---	---	***	**30%**	Q-04
2-Methylnaphthalene	**0.0696**	0.0615	0.123	mg/kg dry	10	---	0.149	---	---	**72**	**30%**	Q-04, J
Naphthalene	**0.186**	0.0615	0.123	mg/kg dry	10	---	0.491	---	---	**90**	**30%**	Q-04
Phenanthrene	**0.255**	0.0306	0.0615	mg/kg dry	10	---	0.491	---	---	**63**	**30%**	Q-04
Pyrene	**0.347**	0.0306	0.0615	mg/kg dry	10	---	0.823	---	---	**81**	**30%**	Q-04
Carbazole	ND	0.0461	0.0922	mg/kg dry	10	---	0.0536	---	---	***	**30%**	Q-04
Dibenzofuran	**0.0566**	0.0306	0.0615	mg/kg dry	10	---	0.145	---	---	**88**	**30%**	Q-04, J
4-Chloro-3-methylphenol	ND	0.306	0.615	mg/kg dry	10	---	ND	---	---	---	30%	
2-Chlorophenol	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
2,4-Dichlorophenol	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
2,4-Dimethylphenol	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
2,4-Dinitrophenol	ND	0.767	1.54	mg/kg dry	10	---	ND	---	---	---	30%	
4,6-Dinitro-2-methylphenol	ND	0.767	1.54	mg/kg dry	10	---	ND	---	---	---	30%	
2-Methylphenol	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
3+4-Methylphenol(s)	**1.59**	0.0767	0.154	mg/kg dry	10	---	1.60	---	---	0.5	30%	
2-Nitrophenol	ND	0.306	0.615	mg/kg dry	10	---	ND	---	---	---	30%	
4-Nitrophenol	ND	0.306	0.615	mg/kg dry	10	---	ND	---	---	---	30%	
Pentachlorophenol (PCP)	ND	0.306	0.615	mg/kg dry	10	---	ND	---	---	---	30%	
Phenol	**0.199**	0.0615	0.123	mg/kg dry	10	---	0.571	---	---	**97**	**30%**	M-04, Q-04

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Duplicate (9100490-DUP2)			Prepared: 10/01/19 10:34		Analyzed: 10/02/19 14:15							
QC Source Sample: Non-SDG (A9I0822-02RE1)												
2,3,4,6-Tetrachlorophenol	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
2,3,5,6-Tetrachlorophenol	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
2,4,5-Trichlorophenol	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
2,4,6-Trichlorophenol	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
Bis(2-ethylhexyl)phthalate	ND	0.461	0.922	mg/kg dry	10	---	ND	---	---	---	30%	
Butyl benzyl phthalate	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
Diethylphthalate	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
Dimethylphthalate	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
Di-n-butylphthalate	ND	0.154	0.306	mg/kg dry	10	---	0.213	---	---	***	**30%**	Q-04
Di-n-octyl phthalate	ND	0.247	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
N-Nitrosodimethylamine	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
N-Nitroso-di-n-propylamine	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
N-Nitrosodiphenylamine	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
Bis(2-Chloroethoxy) methane	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
Bis(2-Chloroethyl) ether	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
2,2'-Oxybis(1-Chloropropane)	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
Hexachlorobenzene	ND	0.0306	0.0615	mg/kg dry	10	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
Hexachlorocyclopentadiene	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
Hexachloroethane	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
2-Chloronaphthalene	ND	0.0306	0.0615	mg/kg dry	10	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
1,3-Dichlorobenzene	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
4-Bromophenyl phenyl ether	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
4-Chlorophenyl phenyl ether	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
Aniline	ND	0.306	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
4-Chloroaniline	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
2-Nitroaniline	ND	0.615	1.23	mg/kg dry	10	---	ND	---	---	---	30%	
3-Nitroaniline	ND	0.615	1.23	mg/kg dry	10	---	ND	---	---	---	30%	
4-Nitroaniline	ND	0.615	1.23	mg/kg dry	10	---	ND	---	---	---	30%	
Nitrobenzene	ND	0.306	0.615	mg/kg dry	10	---	ND	---	---	---	30%	

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Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Duplicate (9100490-DUP2)			Prepared: 10/01/19 10:34		Analyzed: 10/02/19 14:15							
QC Source Sample: Non-SDG (A9I0822-02RE1)												
2,4-Dinitrotoluene	ND	0.306	0.615	mg/kg dry	10	---	ND	---	---	---	30%	
2,6-Dinitrotoluene	ND	0.306	0.615	mg/kg dry	10	---	ND	---	---	---	30%	
Benzoic acid	ND	3.85	7.67	mg/kg dry	10	---	ND	---	---	---	30%	
Benzyl alcohol	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
Isophorone	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
Azobenzene (1,2-DPH)	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
Bis(2-Ethylhexyl) adipate	**2.82**	0.767	1.54	mg/kg dry	10	---	2.18	---	---	26	30%	
3,3'-Dichlorobenzidine	ND	0.615	1.23	mg/kg dry	10	---	ND	---	---	---	30%	Q-52
1,2-Dinitrobenzene	ND	0.767	1.54	mg/kg dry	10	---	ND	---	---	---	30%	
1,3-Dinitrobenzene	ND	0.767	1.54	mg/kg dry	10	---	ND	---	---	---	30%	
1,4-Dinitrobenzene	ND	0.767	1.54	mg/kg dry	10	---	ND	---	---	---	30%	
Pyridine	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 71 %*		*Limits: 37-122 %*		*Dilution: 10x*					
2-Fluorobiphenyl (Surr)			*64 %*		*44-115 %*		*"*					
Phenol-d6 (Surr)			*73 %*		*33-122 %*		*"*					
p-Terphenyl-d14 (Surr)			*73 %*		*54-127 %*		*"*					
2-Fluorophenol (Surr)			*71 %*		*35-115 %*		*"*					
2,4,6-Tribromophenol (Surr)			*107 %*		*39-132 %*		*"*					
Matrix Spike (9100490-MS1)			Prepared: 10/01/19 10:34		Analyzed: 10/02/19 14:51							
QC Source Sample: Non-SDG (A9I0822-02RE1)												
EPA 8270D												
Acenaphthene	1.24	0.0306	0.0614	mg/kg dry	10	1.23	0.135	90	40-122%	---	---	
Acenaphthylene	1.29	0.0306	0.0614	mg/kg dry	10	1.23	ND	105	32-132%	---	---	
Anthracene	1.33	0.0306	0.0614	mg/kg dry	10	1.23	0.204	92	47-123%	---	---	
Benz(a)anthracene	1.27	0.0306	0.0614	mg/kg dry	10	1.23	0.218	85	49-126%	---	---	
Benzo(a)pyrene	1.31	0.0460	0.0920	mg/kg dry	10	1.23	0.154	94	45-129%	---	---	
Benzo(b)fluoranthene	1.29	0.0460	0.0920	mg/kg dry	10	1.23	0.180	90	45-132%	---	---	
Benzo(k)fluoranthene	1.20	0.0460	0.0920	mg/kg dry	10	1.23	0.0758	91	47-132%	---	---	
Benzo(g,h,i)perylene	1.31	0.0306	0.0614	mg/kg dry	10	1.23	0.0680	101	43-134%	---	---	
Chrysene	1.28	0.0306	0.0614	mg/kg dry	10	1.23	0.199	88	50-124%	---	---	
Dibenz(a,h)anthracene	1.22	0.0306	0.0614	mg/kg dry	10	1.23	ND	100	45-134%	---	---	
Fluoranthene	1.58	0.0306	0.0614	mg/kg dry	10	1.23	1.15	**35**	**50-127%**	---	---	Q-01

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Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike (9100490-MS1)			Prepared: 10/01/19 10:34		Analyzed: 10/02/19 14:51							
QC Source Sample: Non-SDG (A9I0822-02RE1)												
Fluorene	1.30	0.0306	0.0614	mg/kg dry	10	1.23	0.136	95	43-125%	---	---	
Indeno(1,2,3-cd)pyrene	1.14	0.0306	0.0614	mg/kg dry	10	1.23	0.0695	87	45-133%	---	---	
1-Methylnaphthalene	1.25	0.0614	0.123	mg/kg dry	10	1.23	0.0767	96	40-120%	---	---	
2-Methylnaphthalene	1.28	0.0614	0.123	mg/kg dry	10	1.23	0.149	92	38-122%	---	---	
Naphthalene	1.37	0.0614	0.123	mg/kg dry	10	1.23	0.491	71	35-123%	---	---	
Phenanthrene	1.35	0.0306	0.0614	mg/kg dry	10	1.23	0.491	70	50-121%	---	---	
Pyrene	1.49	0.0306	0.0614	mg/kg dry	10	1.23	0.823	55	47-127%	---	---	
Carbazole	1.23	0.0460	0.0920	mg/kg dry	10	1.23	0.0536	96	50-122%	---	---	
Dibenzofuran	1.26	0.0306	0.0614	mg/kg dry	10	1.23	0.145	91	44-120%	---	---	
4-Chloro-3-methylphenol	1.32	0.306	0.614	mg/kg dry	10	1.23	ND	108	45-122%	---	---	
2-Chlorophenol	1.18	0.153	0.306	mg/kg dry	10	1.23	ND	96	34-121%	---	---	
2,4-Dichlorophenol	1.31	0.153	0.306	mg/kg dry	10	1.23	ND	107	40-122%	---	---	
2,4-Dimethylphenol	1.49	0.153	0.306	mg/kg dry	10	1.23	ND	122	30-127%	---	---	
2,4-Dinitrophenol	ND	0.766	1.53	mg/kg dry	10	1.23	ND		**5-137%**	---	---	Q-11, Q-41
4,6-Dinitro-2-methylphenol	0.921	0.766	1.53	mg/kg dry	10	1.23	ND	75	29-132%	---	---	Q-41, J
2-Methylphenol	1.21	0.0766	0.153	mg/kg dry	10	1.23	ND	98	32-122%	---	---	
3+4-Methylphenol(s)	2.87	0.0766	0.153	mg/kg dry	10	1.23	1.60	104	34-120%	---	---	
2-Nitrophenol	1.43	0.306	0.614	mg/kg dry	10	1.23	ND	116	36-123%	---	---	
4-Nitrophenol	1.30	0.306	0.614	mg/kg dry	10	1.23	ND	106	30-132%	---	---	
Pentachlorophenol (PCP)	1.48	0.306	0.614	mg/kg dry	10	1.23	ND	121	25-133%	---	---	
Phenol	1.29	0.0614	0.123	mg/kg dry	10	1.23	0.571	58	34-120%	---	---	
2,3,4,6-Tetrachlorophenol	1.30	0.153	0.306	mg/kg dry	10	1.23	ND	106	44-125%	---	---	
2,3,5,6-Tetrachlorophenol	1.41	0.153	0.306	mg/kg dry	10	1.23	ND	115	40-120%	---	---	
2,4,5-Trichlorophenol	1.36	0.153	0.306	mg/kg dry	10	1.23	ND	111	41-124%	---	---	
2,4,6-Trichlorophenol	1.37	0.153	0.306	mg/kg dry	10	1.23	ND	112	39-126%	---	---	
Bis(2-ethylhexyl)phthalate	1.57	0.460	0.920	mg/kg dry	10	1.23	ND	128	51-133%	---	---	
Butyl benzyl phthalate	1.46	0.153	0.306	mg/kg dry	10	1.23	ND	119	48-132%	---	---	
Diethylphthalate	1.33	0.153	0.306	mg/kg dry	10	1.23	ND	108	50-124%	---	---	
Dimethylphthalate	1.28	0.153	0.306	mg/kg dry	10	1.23	ND	105	48-124%	---	---	
Di-n-butylphthalate	1.41	0.153	0.306	mg/kg dry	10	1.23	0.213	97	51-128%	---	---	
Di-n-octyl phthalate	1.73	0.246	0.306	mg/kg dry	10	1.23	ND	**141**	**44-140%**	---	---	Q-01
N-Nitrosodimethylamine	0.793	0.0766	0.153	mg/kg dry	10	1.23	ND	65	23-120%	---	---	
N-Nitroso-di-n-propylamine	1.10	0.0766	0.153	mg/kg dry	10	1.23	ND	90	36-120%	---	---	

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Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike (9100490-MS1)			Prepared: 10/01/19 10:34		Analyzed: 10/02/19 14:51							
QC Source Sample: Non-SDG (A9I0822-02RE1)												
N-Nitrosodiphenylamine	1.24	0.0766	0.153	mg/kg dry	10	1.23	ND	101	38-127%	---	---	
Bis(2-Chloroethoxy) methane	1.16	0.0766	0.153	mg/kg dry	10	1.23	ND	94	36-121%	---	---	
Bis(2-Chloroethyl) ether	0.923	0.0766	0.153	mg/kg dry	10	1.23	ND	75	31-120%	---	---	
2,2'-Oxybis(1-Chloropropane)	0.929	0.0766	0.153	mg/kg dry	10	1.23	ND	76	33-131%	---	---	
Hexachlorobenzene	1.24	0.0306	0.0614	mg/kg dry	10	1.23	ND	101	44-122%	---	---	
Hexachlorobutadiene	1.19	0.0766	0.153	mg/kg dry	10	1.23	ND	97	32-123%	---	---	
Hexachlorocyclopentadiene	ND	0.153	0.306	mg/kg dry	10	1.23	ND		**5-140%**	---	---	Q-01, Q-41
Hexachloroethane	1.03	0.0766	0.153	mg/kg dry	10	1.23	ND	84	28-120%	---	---	
2-Chloronaphthalene	1.25	0.0306	0.0614	mg/kg dry	10	1.23	ND	102	41-120%	---	---	
1,2-Dichlorobenzene	1.09	0.0766	0.153	mg/kg dry	10	1.23	ND	89	33-120%	---	---	
1,3-Dichlorobenzene	1.06	0.0766	0.153	mg/kg dry	10	1.23	ND	87	30-120%	---	---	
1,4-Dichlorobenzene	1.08	0.0766	0.153	mg/kg dry	10	1.23	ND	88	31-120%	---	---	
1,2,4-Trichlorobenzene	1.13	0.0766	0.153	mg/kg dry	10	1.23	ND	92	34-120%	---	---	
4-Bromophenyl phenyl ether	1.26	0.0766	0.153	mg/kg dry	10	1.23	ND	103	46-124%	---	---	
4-Chlorophenyl phenyl ether	1.22	0.0766	0.153	mg/kg dry	10	1.23	ND	100	45-121%	---	---	
Aniline	1.04	0.690	0.690	mg/kg dry	10	1.23	ND	85	7-120%	---	---	Q-31
4-Chloroaniline	0.438	0.0766	0.153	mg/kg dry	10	1.23	ND	36	16-120%	---	---	Q-31
2-Nitroaniline	1.45	0.614	1.23	mg/kg dry	10	1.23	ND	118	44-127%	---	---	
3-Nitroaniline	ND	0.614	1.23	mg/kg dry	10	1.23	ND		**33-120%**	---	---	Q-01
4-Nitroaniline	1.24	0.614	1.23	mg/kg dry	10	1.23	ND	101	35-120%	---	---	Q-41
Nitrobenzene	1.11	0.306	0.614	mg/kg dry	10	1.23	ND	91	34-122%	---	---	
2,4-Dinitrotoluene	1.24	0.306	0.614	mg/kg dry	10	1.23	ND	101	48-126%	---	---	
2,6-Dinitrotoluene	1.26	0.306	0.614	mg/kg dry	10	1.23	ND	103	46-124%	---	---	
Benzoic acid	ND	3.84	7.66	mg/kg dry	10	2.45	ND		**5-140%**	---	---	Q-11, Q-41
Benzyl alcohol	1.22	0.153	0.306	mg/kg dry	10	1.23	ND	99	29-122%	---	---	
Isophorone	1.14	0.0766	0.153	mg/kg dry	10	1.23	ND	93	30-122%	---	---	
Azobenzene (1,2-DPH)	1.15	0.0766	0.153	mg/kg dry	10	1.23	ND	94	39-125%	---	---	
Bis(2-Ethylhexyl) adipate	2.32	0.766	1.53	mg/kg dry	10	1.23	2.18	**12**	**60-121%**	---	---	Q-03
3,3'-Dichlorobenzidine	ND	0.614	1.23	mg/kg dry	10	2.45	ND		**22-121%**	---	---	Q-01, Q-31
1,2-Dinitrobenzene	1.03	0.766	1.53	mg/kg dry	10	1.23	ND	84	44-120%	---	---	J
1,3-Dinitrobenzene	1.26	0.766	1.53	mg/kg dry	10	1.23	ND	102	42-127%	---	---	J
1,4-Dinitrobenzene	0.975	0.766	1.53	mg/kg dry	10	1.23	ND	79	37-132%	---	---	J
Pyridine	0.610	0.153	0.306	mg/kg dry	10	1.23	ND	50	5-120%	---	---	

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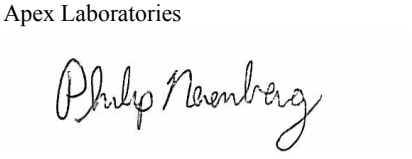

Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike (9100490-MS1)			Prepared: 10/01/19 10:34 Analyzed: 10/02/19 14:51									
QC Source Sample: Non-SDG (A9I0822-02RE1)												
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 90 %*		*Limits: 37-122 %*		*Dilution: 10x*					
2-Fluorobiphenyl (Surr)			*93 %*		*44-115 %*		*"*					
Phenol-d6 (Surr)			*92 %*		*33-122 %*		*"*					
p-Terphenyl-d14 (Surr)			*101 %*		*54-127 %*		*"*					
2-Fluorophenol (Surr)			*90 %*		*35-115 %*		*"*					
2,4,6-Tribromophenol (Surr)			*110 %*		*39-132 %*		*"*					
Matrix Spike (9100490-MS2)			Prepared: 10/01/19 10:35 Analyzed: 10/02/19 12:28									
QC Source Sample: SE-10-2.0-3.7 (A9I0893-13RE1)												
EPA 8270D												
Acenaphthene	1.39	0.0681	0.137	mg/kg dry	20	1.37	ND	102	40-122%	---	---	
Acenaphthylene	1.45	0.0681	0.137	mg/kg dry	20	1.37	ND	106	32-132%	---	---	
Anthracene	1.48	0.0681	0.137	mg/kg dry	20	1.37	ND	109	47-123%	---	---	
Benz(a)anthracene	1.42	0.0681	0.137	mg/kg dry	20	1.37	ND	104	49-126%	---	---	
Benzo(a)pyrene	1.60	0.102	0.205	mg/kg dry	20	1.37	0.167	105	45-129%	---	---	
Benzo(b)fluoranthene	1.48	0.102	0.205	mg/kg dry	20	1.37	0.121	100	45-132%	---	---	
Benzo(k)fluoranthene	1.39	0.102	0.205	mg/kg dry	20	1.37	ND	102	47-132%	---	---	
Benzo(g,h,i)perylene	1.53	0.0681	0.137	mg/kg dry	20	1.37	0.0734	107	43-134%	---	---	
Chrysene	1.43	0.0681	0.137	mg/kg dry	20	1.37	ND	104	50-124%	---	---	
Dibenz(a,h)anthracene	1.36	0.0681	0.137	mg/kg dry	20	1.37	ND	99	45-134%	---	---	
Fluoranthene	1.54	0.0681	0.137	mg/kg dry	20	1.37	0.0761	107	50-127%	---	---	
Fluorene	1.47	0.0681	0.137	mg/kg dry	20	1.37	ND	107	43-125%	---	---	
Indeno(1,2,3-cd)pyrene	1.37	0.0681	0.137	mg/kg dry	20	1.37	ND	100	45-133%	---	---	
1-Methylnaphthalene	1.38	0.137	0.273	mg/kg dry	20	1.37	ND	101	40-120%	---	---	
2-Methylnaphthalene	1.41	0.137	0.273	mg/kg dry	20	1.37	ND	104	38-122%	---	---	
Naphthalene	1.42	0.137	0.273	mg/kg dry	20	1.37	ND	104	35-123%	---	---	
Phenanthrene	1.46	0.0681	0.137	mg/kg dry	20	1.37	ND	107	50-121%	---	---	
Pyrene	1.62	0.0681	0.137	mg/kg dry	20	1.37	0.152	107	47-127%	---	---	
Carbazole	1.36	0.102	0.205	mg/kg dry	20	1.37	ND	99	50-122%	---	---	
Dibenzofuran	1.43	0.0681	0.137	mg/kg dry	20	1.37	ND	105	44-120%	---	---	
4-Chloro-3-methylphenol	1.37	0.681	1.37	mg/kg dry	20	1.37	ND	101	45-122%	---	---	
2-Chlorophenol	1.23	0.341	0.681	mg/kg dry	20	1.37	ND	90	34-121%	---	---	
2,4-Dichlorophenol	1.45	0.341	0.681	mg/kg dry	20	1.37	ND	106	40-122%	---	---	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike (9100490-MS2)			Prepared: 10/01/19 10:35		Analyzed: 10/02/19 12:28							
QC Source Sample: SE-10-2.0-3.7 (A9I0893-13RE1)												
2,4-Dimethylphenol	1.54	0.341	0.681	mg/kg dry	20	1.37	ND	113	30-127%	---	---	
2,4-Dinitrophenol	ND	1.70	3.41	mg/kg dry	20	1.37	ND		**5-137%**	---	---	Q-11, Q-41
4,6-Dinitro-2-methylphenol	1.79	1.70	3.41	mg/kg dry	20	1.37	ND	131	29-132%	---	---	Q-41, J
2-Methylphenol	1.38	0.170	0.341	mg/kg dry	20	1.37	ND	101	32-122%	---	---	
3+4-Methylphenol(s)	1.71	0.170	0.341	mg/kg dry	20	1.37	0.309	102	34-120%	---	---	
2-Nitrophenol	1.86	0.681	1.37	mg/kg dry	20	1.37	ND	**136**	**36-123%**	---	---	Q-11
4-Nitrophenol	1.70	0.681	1.37	mg/kg dry	20	1.37	ND	125	30-132%	---	---	
Pentachlorophenol (PCP)	1.69	0.681	1.37	mg/kg dry	20	1.37	ND	124	25-133%	---	---	
Phenol	1.28	0.137	0.273	mg/kg dry	20	1.37	ND	94	34-120%	---	---	
2,3,4,6-Tetrachlorophenol	1.41	0.341	0.681	mg/kg dry	20	1.37	ND	103	44-125%	---	---	
2,3,5,6-Tetrachlorophenol	1.61	0.341	0.681	mg/kg dry	20	1.37	ND	118	40-120%	---	---	
2,4,5-Trichlorophenol	1.57	0.341	0.681	mg/kg dry	20	1.37	ND	115	41-124%	---	---	
2,4,6-Trichlorophenol	1.57	0.341	0.681	mg/kg dry	20	1.37	ND	115	39-126%	---	---	
Bis(2-ethylhexyl)phthalate	1.56	1.02	2.05	mg/kg dry	20	1.37	ND	114	51-133%	---	---	J
Butyl benzyl phthalate	1.71	0.341	0.681	mg/kg dry	20	1.37	ND	125	48-132%	---	---	
Diethylphthalate	1.49	0.341	0.681	mg/kg dry	20	1.37	ND	109	50-124%	---	---	
Dimethylphthalate	1.45	0.341	0.681	mg/kg dry	20	1.37	ND	106	48-124%	---	---	
Di-n-butylphthalate	1.55	0.341	0.681	mg/kg dry	20	1.37	ND	113	51-128%	---	---	
Di-n-octyl phthalate	2.02	0.548	0.681	mg/kg dry	20	1.37	ND	**148**	**44-140%**	---	---	Q-01
N-Nitrosodimethylamine	0.850	0.170	0.341	mg/kg dry	20	1.37	ND	62	23-120%	---	---	
N-Nitroso-di-n-propylamine	1.18	0.170	0.341	mg/kg dry	20	1.37	ND	86	36-120%	---	---	
N-Nitrosodiphenylamine	1.49	0.170	0.341	mg/kg dry	20	1.37	ND	109	38-127%	---	---	
Bis(2-Chloroethoxy) methane	1.31	0.170	0.341	mg/kg dry	20	1.37	ND	96	36-121%	---	---	
Bis(2-Chloroethyl) ether	0.997	0.170	0.341	mg/kg dry	20	1.37	ND	73	31-120%	---	---	
2,2'-Oxybis(1-Chloropropane)	1.05	0.170	0.341	mg/kg dry	20	1.37	ND	77	33-131%	---	---	
Hexachlorobenzene	1.38	0.0681	0.137	mg/kg dry	20	1.37	ND	101	44-122%	---	---	
Hexachlorobutadiene	1.29	0.170	0.341	mg/kg dry	20	1.37	ND	95	32-123%	---	---	
Hexachlorocyclopentadiene	0.373	0.341	0.681	mg/kg dry	20	1.37	ND	27	5-140%	---	---	Q-41, J
Hexachloroethane	1.13	0.170	0.341	mg/kg dry	20	1.37	ND	83	28-120%	---	---	
2-Chloronaphthalene	1.47	0.0681	0.137	mg/kg dry	20	1.37	ND	107	41-120%	---	---	
1,2-Dichlorobenzene	1.20	0.170	0.341	mg/kg dry	20	1.37	ND	88	33-120%	---	---	
1,3-Dichlorobenzene	1.21	0.170	0.341	mg/kg dry	20	1.37	ND	89	30-120%	---	---	
1,4-Dichlorobenzene	1.16	0.170	0.341	mg/kg dry	20	1.37	ND	85	31-120%	---	---	

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Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike (9100490-MS2)			Prepared: 10/01/19 10:35		Analyzed: 10/02/19 12:28							
QC Source Sample: SE-10-2.0-3.7 (A9I0893-13RE1)												
1,2,4-Trichlorobenzene	1.31	0.170	0.341	mg/kg dry	20	1.37	ND	96	34-120%	---	---	
4-Bromophenyl phenyl ether	1.45	0.170	0.341	mg/kg dry	20	1.37	ND	106	46-124%	---	---	
4-Chlorophenyl phenyl ether	1.48	0.170	0.341	mg/kg dry	20	1.37	ND	108	45-121%	---	---	
Aniline	0.837	0.341	0.681	mg/kg dry	20	1.37	ND	61	7-120%	---	---	Q-31
4-Chloroaniline	0.508	0.170	0.341	mg/kg dry	20	1.37	ND	37	16-120%	---	---	Q-31
2-Nitroaniline	1.60	1.37	2.73	mg/kg dry	20	1.37	ND	117	44-127%	---	---	J
3-Nitroaniline	ND	1.37	2.73	mg/kg dry	20	1.37	ND		**33-120%**	---	---	Q-11
4-Nitroaniline	ND	1.37	2.73	mg/kg dry	20	1.37	ND		**35-120%**	---	---	Q-11, Q-41
Nitrobenzene	1.19	0.681	1.37	mg/kg dry	20	1.37	ND	87	34-122%	---	---	J
2,4-Dinitrotoluene	1.54	0.681	1.37	mg/kg dry	20	1.37	ND	113	48-126%	---	---	
2,6-Dinitrotoluene	1.51	0.681	1.37	mg/kg dry	20	1.37	ND	111	46-124%	---	---	
Benzoic acid	ND	8.55	17.0	mg/kg dry	20	2.73	ND		**5-140%**	---	---	Q-41, Q-11
Benzyl alcohol	1.11	0.341	0.681	mg/kg dry	20	1.37	ND	81	29-122%	---	---	
Isophorone	1.21	0.170	0.341	mg/kg dry	20	1.37	ND	89	30-122%	---	---	
Azobenzene (1,2-DPH)	1.29	0.170	0.341	mg/kg dry	20	1.37	ND	95	39-125%	---	---	
Bis(2-Ethylhexyl) adipate	2.35	1.70	3.41	mg/kg dry	20	1.37	ND	**172**	**60-121%**	---	---	Q-11, J
3,3'-Dichlorobenzidine	2.03	1.37	2.73	mg/kg dry	20	2.73	ND	74	22-121%	---	---	Q-31, J
1,2-Dinitrobenzene	ND	1.70	3.41	mg/kg dry	20	1.37	ND		**44-120%**	---	---	Q-11
1,3-Dinitrobenzene	ND	1.70	3.41	mg/kg dry	20	1.37	ND		**42-127%**	---	---	Q-11
1,4-Dinitrobenzene	ND	1.70	3.41	mg/kg dry	20	1.37	ND		**37-132%**	---	---	Q-11
Pyridine	0.707	0.341	0.681	mg/kg dry	20	1.37	ND	52	5-120%	---	---	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 81 %*		*Limits: 37-122 %*				*Dilution: 20x*			
2-Fluorobiphenyl (Surr)			*53 %*		*44-115 %*				*"*			
Phenol-d6 (Surr)			*81 %*		*33-122 %*				*"*			
p-Terphenyl-d14 (Surr)			*60 %*		*54-127 %*				*"*			
2-Fluorophenol (Surr)			*85 %*		*35-115 %*				*"*			
2,4,6-Tribromophenol (Surr)			*99 %*		*39-132 %*				*"*			
Matrix Spike Dup (9100490-MSD1)			Prepared: 10/01/19 10:34		Analyzed: 10/02/19 15:27							
QC Source Sample: Non-SDG (A9I0822-02RE1)												
Acenaphthene	1.28	0.0306	0.0614	mg/kg dry	10	1.23	0.135	94	40-122%	4	30%	
Acenaphthylene	1.32	0.0306	0.0614	mg/kg dry	10	1.23	ND	107	32-132%	2	30%	
Anthracene	1.36	0.0306	0.0614	mg/kg dry	10	1.23	0.204	94	47-123%	2	30%	

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Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike Dup (9100490-MSD1)			Prepared: 10/01/19 10:34 Analyzed: 10/02/19 15:27									
QC Source Sample: Non-SDG (A9I0822-02RE1)												
Benz(a)anthracene	1.30	0.0306	0.0614	mg/kg dry	10	1.23	0.218	89	49-126%	3	30%	
Benzo(a)pyrene	1.38	0.0460	0.0920	mg/kg dry	10	1.23	0.154	100	45-129%	5	30%	
Benzo(b)fluoranthene	1.32	0.0460	0.0920	mg/kg dry	10	1.23	0.180	93	45-132%	3	30%	
Benzo(k)fluoranthene	1.26	0.0460	0.0920	mg/kg dry	10	1.23	0.0758	97	47-132%	6	30%	
Benzo(g,h,i)perylene	1.40	0.0306	0.0614	mg/kg dry	10	1.23	0.0680	108	43-134%	6	30%	
Chrysene	1.33	0.0306	0.0614	mg/kg dry	10	1.23	0.199	92	50-124%	4	30%	
Dibenz(a,h)anthracene	1.26	0.0306	0.0614	mg/kg dry	10	1.23	ND	103	45-134%	3	30%	
Fluoranthene	1.59	0.0306	0.0614	mg/kg dry	10	1.23	1.15	**35**	**50-127%**	0.2	30%	Q-01
Fluorene	1.34	0.0306	0.0614	mg/kg dry	10	1.23	0.136	98	43-125%	3	30%	
Indeno(1,2,3-cd)pyrene	1.21	0.0306	0.0614	mg/kg dry	10	1.23	0.0695	93	45-133%	6	30%	
1-Methylnaphthalene	1.24	0.0614	0.123	mg/kg dry	10	1.23	0.0767	95	40-120%	0.9	30%	
2-Methylnaphthalene	1.28	0.0614	0.123	mg/kg dry	10	1.23	0.149	93	38-122%	0.5	30%	
Naphthalene	1.38	0.0614	0.123	mg/kg dry	10	1.23	0.491	73	35-123%	1	30%	
Phenanthrene	1.39	0.0306	0.0614	mg/kg dry	10	1.23	0.491	73	50-121%	3	30%	
Pyrene	1.55	0.0306	0.0614	mg/kg dry	10	1.23	0.823	59	47-127%	3	30%	
Carbazole	1.25	0.0460	0.0920	mg/kg dry	10	1.23	0.0536	98	50-122%	2	30%	
Dibenzofuran	1.29	0.0306	0.0614	mg/kg dry	10	1.23	0.145	94	44-120%	2	30%	
4-Chloro-3-methylphenol	1.29	0.306	0.614	mg/kg dry	10	1.23	ND	105	45-122%	3	30%	
2-Chlorophenol	1.12	0.153	0.306	mg/kg dry	10	1.23	ND	92	34-121%	5	30%	
2,4-Dichlorophenol	1.30	0.153	0.306	mg/kg dry	10	1.23	ND	106	40-122%	0.5	30%	
2,4-Dimethylphenol	1.49	0.153	0.306	mg/kg dry	10	1.23	ND	121	30-127%	0.3	30%	
2,4-Dinitrophenol	ND	0.766	1.53	mg/kg dry	10	1.23	ND		**5-137%**		30%	Q-11, Q-41
4,6-Dinitro-2-methylphenol	0.870	0.766	1.53	mg/kg dry	10	1.23	ND	71	29-132%	6	30%	Q-41, J
2-Methylphenol	1.24	0.0766	0.153	mg/kg dry	10	1.23	ND	101	32-122%	3	30%	
3+4-Methylphenol(s)	2.84	0.0766	0.153	mg/kg dry	10	1.23	1.60	101	34-120%	1	30%	
2-Nitrophenol	1.46	0.306	0.614	mg/kg dry	10	1.23	ND	119	36-123%	3	30%	
4-Nitrophenol	1.31	0.306	0.614	mg/kg dry	10	1.23	ND	107	30-132%	0.7	30%	
Pentachlorophenol (PCP)	1.50	0.306	0.614	mg/kg dry	10	1.23	ND	123	25-133%	1	30%	
Phenol	1.25	0.0614	0.123	mg/kg dry	10	1.23	0.571	56	34-120%	3	30%	
2,3,4,6-Tetrachlorophenol	1.31	0.153	0.306	mg/kg dry	10	1.23	ND	107	44-125%	1	30%	
2,3,5,6-Tetrachlorophenol	1.39	0.153	0.306	mg/kg dry	10	1.23	ND	113	40-120%	2	30%	
2,4,5-Trichlorophenol	1.37	0.153	0.306	mg/kg dry	10	1.23	ND	112	41-124%	0.3	30%	
2,4,6-Trichlorophenol	1.39	0.153	0.306	mg/kg dry	10	1.23	ND	113	39-126%	1	30%	

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Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike Dup (9100490-MSD1)			Prepared: 10/01/19 10:34 Analyzed: 10/02/19 15:27									
QC Source Sample: Non-SDG (A9I0822-02RE1)												
Bis(2-ethylhexyl)phthalate	1.59	0.460	0.920	mg/kg dry	10	1.23	ND	130	51-133%	1	30%	
Butyl benzyl phthalate	1.58	0.153	0.306	mg/kg dry	10	1.23	ND	129	48-132%	8	30%	
Diethylphthalate	1.35	0.153	0.306	mg/kg dry	10	1.23	ND	110	50-124%	1	30%	
Dimethylphthalate	1.31	0.153	0.306	mg/kg dry	10	1.23	ND	107	48-124%	2	30%	
Di-n-butylphthalate	1.42	0.153	0.306	mg/kg dry	10	1.23	0.213	98	51-128%	0.9	30%	
Di-n-octyl phthalate	1.81	0.246	0.306	mg/kg dry	10	1.23	ND	**148**	**44-140%**	4	30%	Q-01
N-Nitrosodimethylamine	0.752	0.0766	0.153	mg/kg dry	10	1.23	ND	61	23-120%	5	30%	
N-Nitroso-di-n-propylamine	1.06	0.0766	0.153	mg/kg dry	10	1.23	ND	86	36-120%	4	30%	
N-Nitrosodiphenylamine	1.25	0.0766	0.153	mg/kg dry	10	1.23	ND	102	38-127%	0.8	30%	
Bis(2-Chloroethoxy) methane	1.15	0.0766	0.153	mg/kg dry	10	1.23	ND	94	36-121%	0.8	30%	
Bis(2-Chloroethyl) ether	0.886	0.0766	0.153	mg/kg dry	10	1.23	ND	72	31-120%	4	30%	
2,2'-Oxybis(1-Chloropropane)	0.915	0.0766	0.153	mg/kg dry	10	1.23	ND	75	33-131%	1	30%	
Hexachlorobenzene	1.27	0.0306	0.0614	mg/kg dry	10	1.23	ND	103	44-122%	2	30%	
Hexachlorobutadiene	1.19	0.0766	0.153	mg/kg dry	10	1.23	ND	97	32-123%	0.03	30%	
Hexachlorocyclopentadiene	0.373	0.153	0.306	mg/kg dry	10	1.23	ND	30	5-140%	**200**	**30%**	Q-01, Q-41
Hexachloroethane	1.05	0.0766	0.153	mg/kg dry	10	1.23	ND	86	28-120%	2	30%	
2-Chloronaphthalene	1.25	0.0306	0.0614	mg/kg dry	10	1.23	ND	102	41-120%	0.1	30%	
1,2-Dichlorobenzene	1.04	0.0766	0.153	mg/kg dry	10	1.23	ND	85	33-120%	5	30%	
1,3-Dichlorobenzene	1.04	0.0766	0.153	mg/kg dry	10	1.23	ND	85	30-120%	2	30%	
1,4-Dichlorobenzene	1.03	0.0766	0.153	mg/kg dry	10	1.23	ND	84	31-120%	5	30%	
1,2,4-Trichlorobenzene	1.15	0.0766	0.153	mg/kg dry	10	1.23	ND	94	34-120%	1	30%	
4-Bromophenyl phenyl ether	1.28	0.0766	0.153	mg/kg dry	10	1.23	ND	105	46-124%	2	30%	
4-Chlorophenyl phenyl ether	1.25	0.0766	0.153	mg/kg dry	10	1.23	ND	102	45-121%	2	30%	
Aniline	0.813	0.690	0.690	mg/kg dry	10	1.23	ND	66	7-120%	25	30%	Q-31
4-Chloroaniline	0.377	0.0766	0.153	mg/kg dry	10	1.23	ND	31	16-120%	15	30%	Q-31
2-Nitroaniline	1.50	0.614	1.23	mg/kg dry	10	1.23	ND	123	44-127%	3	30%	
3-Nitroaniline	0.655	0.614	1.23	mg/kg dry	10	1.23	ND	53	33-120%	**200**	**30%**	Q-01, J
4-Nitroaniline	1.27	0.614	1.23	mg/kg dry	10	1.23	ND	104	35-120%	3	30%	Q-41
Nitrobenzene	1.04	0.306	0.614	mg/kg dry	10	1.23	ND	85	34-122%	6	30%	
2,4-Dinitrotoluene	1.26	0.306	0.614	mg/kg dry	10	1.23	ND	103	48-126%	2	30%	
2,6-Dinitrotoluene	1.32	0.306	0.614	mg/kg dry	10	1.23	ND	107	46-124%	4	30%	
Benzoic acid	ND	3.84	7.66	mg/kg dry	10	2.45	ND		**5-140%**		30%	Q-11, Q-41
Benzyl alcohol	1.17	0.153	0.306	mg/kg dry	10	1.23	ND	95	29-122%	4	30%	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike Dup (9100490-MSD1)			Prepared: 10/01/19 10:34 Analyzed: 10/02/19 15:27									
QC Source Sample: Non-SDG (A9I0822-02RE1)												
Isophorone	1.13	0.0766	0.153	mg/kg dry	10	1.23	ND	93	30-122%	0.8	30%	
Azobenzene (1,2-DPH)	1.17	0.0766	0.153	mg/kg dry	10	1.23	ND	96	39-125%	2	30%	
Bis(2-Ethylhexyl) adipate	5.77	0.766	1.53	mg/kg dry	10	1.23	2.18	**293**	**60-121%**	**85**	**30%**	Q-03
3,3'-Dichlorobenzidine	0.738	0.614	1.23	mg/kg dry	10	2.45	ND	30	22-121%	**200**	**30%**	Q-01, Q-31, J
1,2-Dinitrobenzene	1.03	0.766	1.53	mg/kg dry	10	1.23	ND	84	44-120%	0.1	30%	J
1,3-Dinitrobenzene	1.33	0.766	1.53	mg/kg dry	10	1.23	ND	108	42-127%	5	30%	J
1,4-Dinitrobenzene	1.09	0.766	1.53	mg/kg dry	10	1.23	ND	89	37-132%	11	30%	J
Pyridine	0.588	0.153	0.306	mg/kg dry	10	1.23	ND	48	5-120%	4	30%	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 82 %*		*Limits: 37-122 %*		*Dilution: 10x*					
2-Fluorobiphenyl (Surr)			*85 %*		*44-115 %*		*"*					
Phenol-d6 (Surr)			*87 %*		*33-122 %*		*"*					
p-Terphenyl-d14 (Surr)			*95 %*		*54-127 %*		*"*					
2-Fluorophenol (Surr)			*84 %*		*35-115 %*		*"*					
2,4,6-Tribromophenol (Surr)			*113 %*		*39-132 %*		*"*					
Matrix Spike Dup (9100490-MSD2)			Prepared: 10/01/19 10:35 Analyzed: 10/02/19 13:04									
QC Source Sample: SE-10-2.0-3.7 (A9I0893-13RE1)												
EPA 8270D												
Acenaphthene	1.41	0.0676	0.136	mg/kg dry	20	1.35	ND	104	40-122%	1	30%	
Acenaphthylene	1.46	0.0676	0.136	mg/kg dry	20	1.35	ND	107	32-132%	0.3	30%	
Anthracene	1.49	0.0676	0.136	mg/kg dry	20	1.35	ND	110	47-123%	0.1	30%	
Benz(a)anthracene	1.46	0.0676	0.136	mg/kg dry	20	1.35	ND	107	49-126%	2	30%	
Benzo(a)pyrene	1.64	0.102	0.203	mg/kg dry	20	1.35	0.167	109	45-129%	2	30%	
Benzo(b)fluoranthene	1.54	0.102	0.203	mg/kg dry	20	1.35	0.121	105	45-132%	4	30%	
Benzo(k)fluoranthene	1.43	0.102	0.203	mg/kg dry	20	1.35	ND	105	47-132%	2	30%	
Benzo(g,h,i)perylene	1.58	0.0676	0.136	mg/kg dry	20	1.35	0.0734	111	43-134%	3	30%	
Chrysene	1.50	0.0676	0.136	mg/kg dry	20	1.35	ND	111	50-124%	5	30%	
Dibenz(a,h)anthracene	1.48	0.0676	0.136	mg/kg dry	20	1.35	ND	109	45-134%	9	30%	
Fluoranthene	1.56	0.0676	0.136	mg/kg dry	20	1.35	0.0761	110	50-127%	2	30%	
Fluorene	1.43	0.0676	0.136	mg/kg dry	20	1.35	ND	106	43-125%	2	30%	
Indeno(1,2,3-cd)pyrene	1.37	0.0676	0.136	mg/kg dry	20	1.35	ND	101	45-133%	0.1	30%	
1-Methylnaphthalene	1.39	0.136	0.271	mg/kg dry	20	1.35	ND	103	40-120%	1	30%	
2-Methylnaphthalene	1.40	0.136	0.271	mg/kg dry	20	1.35	ND	103	38-122%	1	30%	

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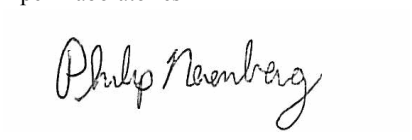

Philip Nerenberg, Lab Director

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike Dup (9100490-MSD2)			Prepared: 10/01/19 10:35 Analyzed: 10/02/19 13:04									
QC Source Sample: SE-10-2.0-3.7 (A9I0893-13RE1)												
Naphthalene	1.46	0.136	0.271	mg/kg dry	20	1.35	ND	108	35-123%	3	30%	
Phenanthrene	1.49	0.0676	0.136	mg/kg dry	20	1.35	ND	110	50-121%	2	30%	
Pyrene	1.63	0.0676	0.136	mg/kg dry	20	1.35	0.152	109	47-127%	1	30%	
Carbazole	1.40	0.102	0.203	mg/kg dry	20	1.35	ND	104	50-122%	3	30%	
Dibenzofuran	1.38	0.0676	0.136	mg/kg dry	20	1.35	ND	102	44-120%	3	30%	
4-Chloro-3-methylphenol	1.41	0.676	1.36	mg/kg dry	20	1.35	ND	104	45-122%	3	30%	
2-Chlorophenol	1.32	0.339	0.676	mg/kg dry	20	1.35	ND	98	34-121%	8	30%	
2,4-Dichlorophenol	1.47	0.339	0.676	mg/kg dry	20	1.35	ND	109	40-122%	1	30%	
2,4-Dimethylphenol	1.58	0.339	0.676	mg/kg dry	20	1.35	ND	117	30-127%	3	30%	
2,4-Dinitrophenol	ND	1.69	3.39	mg/kg dry	20	1.35	ND		**5-137%**		30%	Q-11, Q-41
4,6-Dinitro-2-methylphenol	1.80	1.69	3.39	mg/kg dry	20	1.35	ND	**133**	**29-132%**	0.8	30%	Q-11, Q-41, J
2-Methylphenol	1.39	0.169	0.339	mg/kg dry	20	1.35	ND	103	32-122%	1	30%	
3+4-Methylphenol(s)	2.11	0.169	0.339	mg/kg dry	20	1.35	0.309	**133**	**34-120%**	21	30%	Q-01
2-Nitrophenol	1.70	0.676	1.36	mg/kg dry	20	1.35	ND	**126**	**36-123%**	9	30%	Q-11
4-Nitrophenol	1.64	0.676	1.36	mg/kg dry	20	1.35	ND	121	30-132%	4	30%	
Pentachlorophenol (PCP)	1.85	0.676	1.36	mg/kg dry	20	1.35	ND	**137**	**25-133%**	9	30%	Q-01
Phenol	1.43	0.136	0.271	mg/kg dry	20	1.35	ND	106	34-120%	12	30%	
2,3,4,6-Tetrachlorophenol	1.53	0.339	0.676	mg/kg dry	20	1.35	ND	113	44-125%	9	30%	
2,3,5,6-Tetrachlorophenol	1.59	0.339	0.676	mg/kg dry	20	1.35	ND	117	40-120%	1	30%	
2,4,5-Trichlorophenol	1.60	0.339	0.676	mg/kg dry	20	1.35	ND	118	41-124%	2	30%	
2,4,6-Trichlorophenol	1.63	0.339	0.676	mg/kg dry	20	1.35	ND	120	39-126%	4	30%	
Bis(2-ethylhexyl)phthalate	1.74	1.02	2.03	mg/kg dry	20	1.35	ND	128	51-133%	11	30%	J
Butyl benzyl phthalate	1.83	0.339	0.676	mg/kg dry	20	1.35	ND	**135**	**48-132%**	7	30%	Q-01
Diethylphthalate	1.48	0.339	0.676	mg/kg dry	20	1.35	ND	109	50-124%	0.8	30%	
Dimethylphthalate	1.44	0.339	0.676	mg/kg dry	20	1.35	ND	106	48-124%	0.7	30%	
Di-n-butylphthalate	1.60	0.339	0.676	mg/kg dry	20	1.35	ND	118	51-128%	3	30%	
Di-n-octyl phthalate	2.15	0.543	0.676	mg/kg dry	20	1.35	ND	**158**	**44-140%**	6	30%	Q-01
N-Nitrosodimethylamine	0.856	0.169	0.339	mg/kg dry	20	1.35	ND	63	23-120%	0.6	30%	
N-Nitroso-di-n-propylamine	1.23	0.169	0.339	mg/kg dry	20	1.35	ND	91	36-120%	4	30%	
N-Nitrosodiphenylamine	1.50	0.169	0.339	mg/kg dry	20	1.35	ND	111	38-127%	0.8	30%	
Bis(2-Chloroethoxy) methane	1.32	0.169	0.339	mg/kg dry	20	1.35	ND	97	36-121%	0.7	30%	
Bis(2-Chloroethyl) ether	1.01	0.169	0.339	mg/kg dry	20	1.35	ND	75	31-120%	1	30%	
2,2'-Oxybis(1-Chloropropane)	1.10	0.169	0.339	mg/kg dry	20	1.35	ND	81	33-131%	5	30%	

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike Dup (9100490-MSD2)			Prepared: 10/01/19 10:35 Analyzed: 10/02/19 13:04									
QC Source Sample: SE-10-2.0-3.7 (A9I0893-13RE1)												
Hexachlorobenzene	1.47	0.0676	0.136	mg/kg dry	20	1.35	ND	108	44-122%	6	30%	
Hexachlorobutadiene	1.39	0.169	0.339	mg/kg dry	20	1.35	ND	103	32-123%	8	30%	
Hexachlorocyclopentadiene	ND	0.339	0.676	mg/kg dry	20	1.35	ND		**5-140%**	**200**	**30%**	Q-11, Q-41
Hexachloroethane	1.17	0.169	0.339	mg/kg dry	20	1.35	ND	86	28-120%	3	30%	
2-Chloronaphthalene	1.45	0.0676	0.136	mg/kg dry	20	1.35	ND	107	41-120%	0.8	30%	
1,2-Dichlorobenzene	1.25	0.169	0.339	mg/kg dry	20	1.35	ND	92	33-120%	4	30%	
1,3-Dichlorobenzene	1.25	0.169	0.339	mg/kg dry	20	1.35	ND	92	30-120%	3	30%	
1,4-Dichlorobenzene	1.22	0.169	0.339	mg/kg dry	20	1.35	ND	90	31-120%	5	30%	
1,2,4-Trichlorobenzene	1.35	0.169	0.339	mg/kg dry	20	1.35	ND	100	34-120%	3	30%	
4-Bromophenyl phenyl ether	1.46	0.169	0.339	mg/kg dry	20	1.35	ND	108	46-124%	0.5	30%	
4-Chlorophenyl phenyl ether	1.42	0.169	0.339	mg/kg dry	20	1.35	ND	105	45-121%	4	30%	
Aniline	0.801	0.339	0.676	mg/kg dry	20	1.35	ND	59	7-120%	4	30%	Q-31
4-Chloroaniline	0.583	0.169	0.339	mg/kg dry	20	1.35	ND	43	16-120%	14	30%	Q-31
2-Nitroaniline	1.68	1.36	2.71	mg/kg dry	20	1.35	ND	124	44-127%	5	30%	J
3-Nitroaniline	ND	1.36	2.71	mg/kg dry	20	1.35	ND		**33-120%**		30%	Q-11
4-Nitroaniline	1.44	1.36	2.71	mg/kg dry	20	1.35	ND	107	35-120%	**200**	**30%**	Q-11, Q-41, J
Nitrobenzene	1.23	0.676	1.36	mg/kg dry	20	1.35	ND	91	34-122%	4	30%	J
2,4-Dinitrotoluene	1.49	0.676	1.36	mg/kg dry	20	1.35	ND	110	48-126%	3	30%	
2,6-Dinitrotoluene	1.47	0.676	1.36	mg/kg dry	20	1.35	ND	109	46-124%	3	30%	
Benzoic acid	ND	8.48	16.9	mg/kg dry	20	2.71	ND		**5-140%**		30%	Q-11, Q-41
Benzyl alcohol	1.24	0.339	0.676	mg/kg dry	20	1.35	ND	91	29-122%	11	30%	
Isophorone	1.32	0.169	0.339	mg/kg dry	20	1.35	ND	97	30-122%	9	30%	
Azobenzene (1,2-DPH)	1.31	0.169	0.339	mg/kg dry	20	1.35	ND	97	39-125%	1	30%	
Bis(2-Ethylhexyl) adipate	2.25	1.69	3.39	mg/kg dry	20	1.35	ND	**166**	**60-121%**	4	30%	Q-11, J
3,3'-Dichlorobenzidine	ND	1.36	2.71	mg/kg dry	20	2.71	ND		**22-121%**	**200**	**30%**	Q-31, Q-01
1,2-Dinitrobenzene	ND	1.69	3.39	mg/kg dry	20	1.35	ND		**44-120%**		30%	Q-11
1,3-Dinitrobenzene	ND	1.69	3.39	mg/kg dry	20	1.35	ND		**42-127%**		30%	Q-11
1,4-Dinitrobenzene	ND	1.69	3.39	mg/kg dry	20	1.35	ND		**37-132%**		30%	Q-11
Pyridine	0.598	0.339	0.676	mg/kg dry	20	1.35	ND	44	5-120%	17	30%	J
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 82 %*		*Limits: 37-122 %*			*Dilution: 20x*				
2-Fluorobiphenyl (Surr)			*66 %*		*44-115 %*			*"*				
Phenol-d6 (Surr)			*84 %*		*33-122 %*			*"*				
p-Terphenyl-d14 (Surr)			*70 %*		*54-127 %*			*"*				

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Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike Dup (9100490-MSD2)				Prepared: 10/01/19 10:35 Analyzed: 10/02/19 13:04								
QC Source Sample: SE-10-2.0-3.7 (A9I0893-13RE1)												
Surr: 2-Fluorophenol (Surr)			*Recovery: 84 %*	*Limits: 35-115 %*			*Dilution: 20x*					
2,4,6-Tribromophenol (Surr)			*107 %*	*39-132 %*			*"*					

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100614 - EPA 3510C (Acid/Base Neutral)							**Water**					
Blank (9100614-BLK1)			Prepared: 10/03/19 11:14 Analyzed: 10/03/19 18:24									
EPA 8270D												
Acenaphthene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Acenaphthylene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Anthracene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Benz(a)anthracene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Benzo(a)pyrene	ND	0.0150	0.0300	ug/L	1	---	---	---	---	---	---	
Benzo(b)fluoranthene	ND	0.0150	0.0300	ug/L	1	---	---	---	---	---	---	
Benzo(k)fluoranthene	ND	0.0150	0.0300	ug/L	1	---	---	---	---	---	---	
Benzo(g,h,i)perylene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Chrysene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Dibenz(a,h)anthracene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Fluoranthene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Fluorene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Indeno(1,2,3-cd)pyrene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1-Methylnaphthalene	ND	0.0200	0.0400	ug/L	1	---	---	---	---	---	---	
2-Methylnaphthalene	ND	0.0200	0.0400	ug/L	1	---	---	---	---	---	---	
Naphthalene	**0.0216**	0.0200	0.0400	ug/L	1	---	---	---	---	---	---	B-02, J
Phenanthrene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Pyrene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Carbazole	ND	0.0150	0.0300	ug/L	1	---	---	---	---	---	---	
Dibenzofuran	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
4-Chloro-3-methylphenol	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
2-Chlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
2,4-Dichlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
2,4-Dimethylphenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
2,4-Dinitrophenol	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
4,6-Dinitro-2-methylphenol	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
2-Methylphenol	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
3+4-Methylphenol(s)	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
2-Nitrophenol	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
4-Nitrophenol	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Pentachlorophenol (PCP)	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Phenol	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
2,3,4,6-Tetrachlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100614 - EPA 3510C (Acid/Base Neutral)							**Water**					
Blank (9100614-BLK1)			Prepared: 10/03/19 11:14 Analyzed: 10/03/19 18:24									
2,3,5,6-Tetrachlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
2,4,5-Trichlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
2,4,6-Trichlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
Bis(2-ethylhexyl)phthalate	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Butyl benzyl phthalate	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Diethylphthalate	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Dimethylphthalate	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Di-n-butylphthalate	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Di-n-octyl phthalate	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
N-Nitrosodimethylamine	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
N-Nitroso-di-n-propylamine	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
N-Nitrosodiphenylamine	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
Bis(2-Chloroethoxy) methane	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
Bis(2-Chloroethyl) ether	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
2,2'-Oxybis(1-Chloropropane)	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
Hexachlorobenzene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
Hexachlorocyclopentadiene	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
Hexachloroethane	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
2-Chloronaphthalene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
4-Bromophenyl phenyl ether	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
4-Chlorophenyl phenyl ether	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
Aniline	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
4-Chloroaniline	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
2-Nitroaniline	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
3-Nitroaniline	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
4-Nitroaniline	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Nitrobenzene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
2,4-Dinitrotoluene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
2,6-Dinitrotoluene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100614 - EPA 3510C (Acid/Base Neutral)							**Water**					
Blank (9100614-BLK1)			Prepared: 10/03/19 11:14 Analyzed: 10/03/19 18:24									
Benzoic acid	ND	1.25	2.50	ug/L	1	---	---	---	---	---	---	
Benzyl alcohol	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Isophorone	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
Azobenzene (1,2-DPH)	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
Bis(2-Ethylhexyl) adipate	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
3,3'-Dichlorobenzidine	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	Q-52
1,2-Dinitrobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dinitrobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,4-Dinitrobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Pyridine	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 55 %*		*Limits: 44-120 %*			*Dilution: 1x*				
2-Fluorobiphenyl (Surr)			*49 %*		*44-120 %*			*"*				
Phenol-d6 (Surr)			*20 %*		*10-120 %*			*"*				
p-Terphenyl-d14 (Surr)			*64 %*		*50-133 %*			*"*				
2-Fluorophenol (Surr)			*32 %*		*19-120 %*			*"*				
2,4,6-Tribromophenol (Surr)			*66 %*		*43-140 %*			*"*				
LCS (9100614-BS1)			Prepared: 10/03/19 11:14 Analyzed: 10/03/19 19:00									
EPA 8270D												
Acenaphthene	2.50	0.0400	0.0800	ug/L	4	4.00	---	62	47-122%	---	---	
Acenaphthylene	2.65	0.0400	0.0800	ug/L	4	4.00	---	66	41-130%	---	---	
Anthracene	2.99	0.0400	0.0800	ug/L	4	4.00	---	75	57-123%	---	---	
Benz(a)anthracene	3.10	0.0400	0.0800	ug/L	4	4.00	---	78	58-125%	---	---	
Benzo(a)pyrene	3.16	0.0600	0.120	ug/L	4	4.00	---	79	54-128%	---	---	
Benzo(b)fluoranthene	3.21	0.0600	0.120	ug/L	4	4.00	---	80	53-131%	---	---	
Benzo(k)fluoranthene	3.07	0.0600	0.120	ug/L	4	4.00	---	77	57-129%	---	---	
Benzo(g,h,i)perylene	3.32	0.0400	0.0800	ug/L	4	4.00	---	83	50-134%	---	---	
Chrysene	3.04	0.0400	0.0800	ug/L	4	4.00	---	76	59-123%	---	---	
Dibenz(a,h)anthracene	3.13	0.0400	0.0800	ug/L	4	4.00	---	78	51-134%	---	---	
Fluoranthene	3.36	0.0400	0.0800	ug/L	4	4.00	---	84	57-128%	---	---	
Fluorene	2.82	0.0400	0.0800	ug/L	4	4.00	---	71	52-124%	---	---	
Indeno(1,2,3-cd)pyrene	2.99	0.0400	0.0800	ug/L	4	4.00	---	75	52-133%	---	---	
1-Methylnaphthalene	2.16	0.0800	0.160	ug/L	4	4.00	---	54	41-120%	---	---	
2-Methylnaphthalene	2.18	0.0800	0.160	ug/L	4	4.00	---	54	40-121%	---	---	

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Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100614 - EPA 3510C (Acid/Base Neutral)							**Water**					
LCS (9100614-BS1)			Prepared: 10/03/19 11:14 Analyzed: 10/03/19 19:00									
Naphthalene	2.13	0.0800	0.160	ug/L	4	4.00	---	53	40-121%	---	---	B-02
Phenanthrene	2.89	0.0400	0.0800	ug/L	4	4.00	---	72	59-120%	---	---	
Pyrene	3.34	0.0400	0.0800	ug/L	4	4.00	---	84	57-126%	---	---	
Carbazole	3.07	0.0600	0.120	ug/L	4	4.00	---	77	60-122%	---	---	
Dibenzofuran	2.75	0.0400	0.0800	ug/L	4	4.00	---	69	53-120%	---	---	
4-Chloro-3-methylphenol	3.01	0.400	0.800	ug/L	4	4.00	---	75	52-120%	---	---	
2-Chlorophenol	2.35	0.200	0.400	ug/L	4	4.00	---	59	38-120%	---	---	
2,4-Dichlorophenol	2.91	0.200	0.400	ug/L	4	4.00	---	73	47-121%	---	---	
2,4-Dimethylphenol	2.75	0.200	0.400	ug/L	4	4.00	---	69	31-124%	---	---	
2,4-Dinitrophenol	3.65	1.00	2.00	ug/L	4	4.00	---	91	23-143%	---	---	Q-41
4,6-Dinitro-2-methylphenol	4.01	1.00	2.00	ug/L	4	4.00	---	100	44-137%	---	---	Q-41
2-Methylphenol	2.32	0.100	0.200	ug/L	4	4.00	---	58	30-120%	---	---	
3+4-Methylphenol(s)	2.23	0.100	0.200	ug/L	4	4.00	---	56	29-120%	---	---	
2-Nitrophenol	3.37	0.400	0.800	ug/L	4	4.00	---	84	47-123%	---	---	
4-Nitrophenol	1.70	0.400	0.800	ug/L	4	4.00	---	43	5-120%	---	---	Q-41
Pentachlorophenol (PCP)	3.07	0.400	0.800	ug/L	4	4.00	---	77	35-138%	---	---	
Phenol	1.03	0.800	0.800	ug/L	4	4.00	---	26	5-120%	---	---	
2,3,4,6-Tetrachlorophenol	3.12	0.200	0.400	ug/L	4	4.00	---	78	50-128%	---	---	
2,3,5,6-Tetrachlorophenol	3.27	0.200	0.400	ug/L	4	4.00	---	82	50-121%	---	---	
2,4,5-Trichlorophenol	3.11	0.200	0.400	ug/L	4	4.00	---	78	53-123%	---	---	
2,4,6-Trichlorophenol	3.08	0.200	0.400	ug/L	4	4.00	---	77	50-125%	---	---	
Bis(2-ethylhexyl)phthalate	3.44	0.800	1.60	ug/L	4	4.00	---	86	55-135%	---	---	
Butyl benzyl phthalate	3.43	0.800	1.60	ug/L	4	4.00	---	86	53-134%	---	---	
Diethylphthalate	3.30	0.800	1.60	ug/L	4	4.00	---	82	55-125%	---	---	
Dimethylphthalate	3.13	0.800	1.60	ug/L	4	4.00	---	78	45-127%	---	---	
Di-n-butylphthalate	3.42	0.800	1.60	ug/L	4	4.00	---	86	59-127%	---	---	
Di-n-octyl phthalate	3.65	0.800	1.60	ug/L	4	4.00	---	91	51-140%	---	---	
N-Nitrosodimethylamine	1.22	0.100	0.200	ug/L	4	4.00	---	30	6-120%	---	---	
N-Nitroso-di-n-propylamine	2.46	0.100	0.200	ug/L	4	4.00	---	62	49-120%	---	---	
N-Nitrosodiphenylamine	2.97	0.100	0.200	ug/L	4	4.00	---	74	51-123%	---	---	
Bis(2-Chloroethoxy) methane	2.74	0.100	0.200	ug/L	4	4.00	---	69	48-120%	---	---	
Bis(2-Chloroethyl) ether	2.02	0.100	0.200	ug/L	4	4.00	---	51	43-120%	---	---	
2,2'-Oxybis(1-Chloropropane)	1.88	0.100	0.200	ug/L	4	4.00	---	47	37-130%	---	---	Q-31
Hexachlorobenzene	2.88	0.0400	0.0800	ug/L	4	4.00	---	72	52-125%	---	---	

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Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100614 - EPA 3510C (Acid/Base Neutral)							**Water**					
LCS (9100614-BS1)			Prepared: 10/03/19 11:14		Analyzed: 10/03/19 19:00							
Hexachlorobutadiene	1.50	0.100	0.200	ug/L	4	4.00	---	37	22-124%	---	---	
Hexachlorocyclopentadiene	1.49	0.200	0.400	ug/L	4	4.00	---	37	5-127%	---	---	Q-41
Hexachloroethane	1.37	0.100	0.200	ug/L	4	4.00	---	34	21-120%	---	---	
2-Chloronaphthalene	2.32	0.0400	0.0800	ug/L	4	4.00	---	58	40-120%	---	---	
1,2-Dichlorobenzene	1.49	0.100	0.200	ug/L	4	4.00	---	37	32-120%	---	---	
1,3-Dichlorobenzene	1.39	0.100	0.200	ug/L	4	4.00	---	35	28-120%	---	---	
1,4-Dichlorobenzene	1.42	0.100	0.200	ug/L	4	4.00	---	35	29-120%	---	---	
1,2,4-Trichlorobenzene	1.74	0.100	0.200	ug/L	4	4.00	---	44	29-120%	---	---	
4-Bromophenyl phenyl ether	2.90	0.100	0.200	ug/L	4	4.00	---	72	54-124%	---	---	
4-Chlorophenyl phenyl ether	2.82	0.100	0.200	ug/L	4	4.00	---	71	53-121%	---	---	
Aniline	1.57	0.200	0.400	ug/L	4	4.00	---	39	6-120%	---	---	Q-31
4-Chloroaniline	1.56	0.100	0.200	ug/L	4	4.00	---	39	33-120%	---	---	Q-31
2-Nitroaniline	3.31	0.800	1.60	ug/L	4	4.00	---	83	54-127%	---	---	
3-Nitroaniline	2.95	0.800	1.60	ug/L	4	4.00	---	74	41-128%	---	---	
4-Nitroaniline	4.43	0.800	1.60	ug/L	4	4.00	---	111	35-120%	---	---	Q-41
Nitrobenzene	2.39	0.400	0.800	ug/L	4	4.00	---	60	45-121%	---	---	
2,4-Dinitrotoluene	3.18	0.400	0.800	ug/L	4	4.00	---	80	57-128%	---	---	
2,6-Dinitrotoluene	3.02	0.400	0.800	ug/L	4	4.00	---	76	57-124%	---	---	
Benzoic acid	4.84	4.00	4.00	ug/L	4	8.00	---	60	5-120%	---	---	Q-41
Benzyl alcohol	2.37	0.400	0.800	ug/L	4	4.00	---	59	31-120%	---	---	
Isophorone	2.71	0.100	0.200	ug/L	4	4.00	---	68	42-124%	---	---	
Azobenzene (1,2-DPH)	2.58	0.100	0.200	ug/L	4	4.00	---	64	61-120%	---	---	
Bis(2-Ethylhexyl) adipate	3.42	1.00	2.00	ug/L	4	4.00	---	85	40-125%	---	---	
3,3'-Dichlorobenzidine	7.59	2.00	4.00	ug/L	4	8.00	---	95	27-129%	---	---	Q-31
1,2-Dinitrobenzene	2.97	1.00	2.00	ug/L	4	4.00	---	74	59-120%	---	---	
1,3-Dinitrobenzene	3.39	1.00	2.00	ug/L	4	4.00	---	85	49-128%	---	---	
1,4-Dinitrobenzene	3.66	1.00	2.00	ug/L	4	4.00	---	92	40-120%	---	---	Q-41
Pyridine	0.661	0.400	0.400	ug/L	4	4.00	---	17	5-120%	---	---	

Surr: Nitrobenzene-d5 (Surr)	*Recovery: 64 %*	*Limits: 44-120 %*	*Dilution: 4x*	
2-Fluorobiphenyl (Surr)	*62 %*	*44-120 %*	*"*	
Phenol-d6 (Surr)	*23 %*	*10-120 %*	*"*	
p-Terphenyl-d14 (Surr)	*80 %*	*50-133 %*	*"*	
2-Fluorophenol (Surr)	*36 %*	*19-120 %*	*"*	
2,4,6-Tribromophenol (Surr)	*80 %*	*43-140 %*	*"*	

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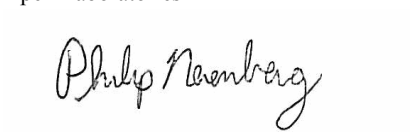

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
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QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100614 - EPA 3510C (Acid/Base Neutral)							**Water**					
LCS Dup (9100614-BSD1)			Prepared: 10/03/19 11:14		Analyzed: 10/03/19 19:37							**Q-19**
EPA 8270D												
Acenaphthene	2.63	0.0400	0.0800	ug/L	4	4.00	---	66	47-122%	5	30%	
Acenaphthylene	2.82	0.0400	0.0800	ug/L	4	4.00	---	70	41-130%	6	30%	
Anthracene	3.06	0.0400	0.0800	ug/L	4	4.00	---	76	57-123%	2	30%	
Benz(a)anthracene	3.22	0.0400	0.0800	ug/L	4	4.00	---	81	58-125%	4	30%	
Benzo(a)pyrene	3.23	0.0600	0.120	ug/L	4	4.00	---	81	54-128%	2	30%	
Benzo(b)fluoranthene	3.26	0.0600	0.120	ug/L	4	4.00	---	82	53-131%	2	30%	
Benzo(k)fluoranthene	3.19	0.0600	0.120	ug/L	4	4.00	---	80	57-129%	4	30%	
Benzo(g,h,i)perylene	3.30	0.0400	0.0800	ug/L	4	4.00	---	83	50-134%	0.5	30%	
Chrysene	3.17	0.0400	0.0800	ug/L	4	4.00	---	79	59-123%	4	30%	
Dibenz(a,h)anthracene	3.21	0.0400	0.0800	ug/L	4	4.00	---	80	51-134%	2	30%	
Fluoranthene	3.39	0.0400	0.0800	ug/L	4	4.00	---	85	57-128%	0.9	30%	
Fluorene	2.89	0.0400	0.0800	ug/L	4	4.00	---	72	52-124%	2	30%	
Indeno(1,2,3-cd)pyrene	3.01	0.0400	0.0800	ug/L	4	4.00	---	75	52-133%	0.4	30%	
1-Methylnaphthalene	2.38	0.0800	0.160	ug/L	4	4.00	---	60	41-120%	10	30%	
2-Methylnaphthalene	2.46	0.0800	0.160	ug/L	4	4.00	---	61	40-121%	12	30%	
Naphthalene	2.39	0.0800	0.160	ug/L	4	4.00	---	60	40-121%	11	30%	B-02
Phenanthrene	2.89	0.0400	0.0800	ug/L	4	4.00	---	72	59-120%	0.03	30%	
Pyrene	3.43	0.0400	0.0800	ug/L	4	4.00	---	86	57-126%	2	30%	
Carbazole	3.18	0.0600	0.120	ug/L	4	4.00	---	80	60-122%	3	30%	
Dibenzofuran	2.90	0.0400	0.0800	ug/L	4	4.00	---	73	53-120%	5	30%	
4-Chloro-3-methylphenol	3.05	0.400	0.800	ug/L	4	4.00	---	76	52-120%	1	30%	
2-Chlorophenol	2.47	0.200	0.400	ug/L	4	4.00	---	62	38-120%	5	30%	
2,4-Dichlorophenol	3.03	0.200	0.400	ug/L	4	4.00	---	76	47-121%	4	30%	
2,4-Dimethylphenol	2.92	0.200	0.400	ug/L	4	4.00	---	73	31-124%	6	30%	
2,4-Dinitrophenol	3.82	1.00	2.00	ug/L	4	4.00	---	96	23-143%	5	30%	Q-41
4,6-Dinitro-2-methylphenol	4.09	1.00	2.00	ug/L	4	4.00	---	102	44-137%	2	30%	Q-41
2-Methylphenol	2.40	0.100	0.200	ug/L	4	4.00	---	60	30-120%	3	30%	
3+4-Methylphenol(s)	2.23	0.100	0.200	ug/L	4	4.00	---	56	29-120%	0.2	30%	
2-Nitrophenol	3.59	0.400	0.800	ug/L	4	4.00	---	90	47-123%	6	30%	
4-Nitrophenol	1.63	0.400	0.800	ug/L	4	4.00	---	41	5-120%	5	30%	Q-41
Pentachlorophenol (PCP)	3.12	0.400	0.800	ug/L	4	4.00	---	78	35-138%	1	30%	
Phenol	1.05	0.800	0.800	ug/L	4	4.00	---	26	5-120%	2	30%	
2,3,4,6-Tetrachlorophenol	3.16	0.200	0.400	ug/L	4	4.00	---	79	50-128%	1	30%	

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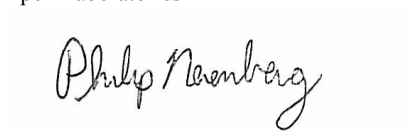

Philip Nerenberg, Lab Director

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Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100614 - EPA 3510C (Acid/Base Neutral)							**Water**					
LCS Dup (9100614-BSD1)			Prepared: 10/03/19 11:14		Analyzed: 10/03/19 19:37							**Q-19**
2,3,5,6-Tetrachlorophenol	3.36	0.200	0.400	ug/L	4	4.00	---	84	50-121%	3	30%	
2,4,5-Trichlorophenol	3.27	0.200	0.400	ug/L	4	4.00	---	82	53-123%	5	30%	
2,4,6-Trichlorophenol	3.22	0.200	0.400	ug/L	4	4.00	---	81	50-125%	5	30%	
Bis(2-ethylhexyl)phthalate	3.47	0.800	1.60	ug/L	4	4.00	---	87	55-135%	0.8	30%	
Butyl benzyl phthalate	3.43	0.800	1.60	ug/L	4	4.00	---	86	53-134%	0.02	30%	
Diethylphthalate	3.33	0.800	1.60	ug/L	4	4.00	---	83	55-125%	0.9	30%	
Dimethylphthalate	3.20	0.800	1.60	ug/L	4	4.00	---	80	45-127%	2	30%	
Di-n-butylphthalate	3.48	0.800	1.60	ug/L	4	4.00	---	87	59-127%	2	30%	
Di-n-octyl phthalate	3.60	0.800	1.60	ug/L	4	4.00	---	90	51-140%	1	30%	
N-Nitrosodimethylamine	1.27	0.100	0.200	ug/L	4	4.00	---	32	6-120%	4	30%	
N-Nitroso-di-n-propylamine	2.63	0.100	0.200	ug/L	4	4.00	---	66	49-120%	6	30%	
N-Nitrosodiphenylamine	3.04	0.100	0.200	ug/L	4	4.00	---	76	51-123%	2	30%	
Bis(2-Chloroethoxy) methane	2.87	0.100	0.200	ug/L	4	4.00	---	72	48-120%	5	30%	
Bis(2-Chloroethyl) ether	2.21	0.100	0.200	ug/L	4	4.00	---	55	43-120%	9	30%	
2,2'-Oxybis(1-Chloropropane)	2.00	0.100	0.200	ug/L	4	4.00	---	50	37-130%	6	30%	Q-31
Hexachlorobenzene	2.85	0.0400	0.0800	ug/L	4	4.00	---	71	52-125%	1	30%	
Hexachlorobutadiene	1.85	0.100	0.200	ug/L	4	4.00	---	46	22-124%	21	30%	
Hexachlorocyclopentadiene	2.04	0.200	0.400	ug/L	4	4.00	---	51	5-127%	**31**	**30%**	Q-24, Q-41
Hexachloroethane	1.79	0.100	0.200	ug/L	4	4.00	---	45	21-120%	26	30%	
2-Chloronaphthalene	2.61	0.0400	0.0800	ug/L	4	4.00	---	65	40-120%	12	30%	
1,2-Dichlorobenzene	1.85	0.100	0.200	ug/L	4	4.00	---	46	32-120%	21	30%	
1,3-Dichlorobenzene	1.75	0.100	0.200	ug/L	4	4.00	---	44	28-120%	23	30%	
1,4-Dichlorobenzene	1.80	0.100	0.200	ug/L	4	4.00	---	45	29-120%	24	30%	
1,2,4-Trichlorobenzene	2.08	0.100	0.200	ug/L	4	4.00	---	52	29-120%	18	30%	
4-Bromophenyl phenyl ether	2.97	0.100	0.200	ug/L	4	4.00	---	74	54-124%	3	30%	
4-Chlorophenyl phenyl ether	2.86	0.100	0.200	ug/L	4	4.00	---	72	53-121%	1	30%	
Aniline	1.85	0.200	0.400	ug/L	4	4.00	---	46	6-120%	17	30%	Q-31
4-Chloroaniline	1.50	0.100	0.200	ug/L	4	4.00	---	38	33-120%	4	30%	Q-31
2-Nitroaniline	3.49	0.800	1.60	ug/L	4	4.00	---	87	54-127%	5	30%	
3-Nitroaniline	2.96	0.800	1.60	ug/L	4	4.00	---	74	41-128%	0.5	30%	
4-Nitroaniline	4.49	0.800	1.60	ug/L	4	4.00	---	112	35-120%	1	30%	Q-41
Nitrobenzene	2.60	0.400	0.800	ug/L	4	4.00	---	65	45-121%	8	30%	
2,4-Dinitrotoluene	3.29	0.400	0.800	ug/L	4	4.00	---	82	57-128%	3	30%	
2,6-Dinitrotoluene	3.13	0.400	0.800	ug/L	4	4.00	---	78	57-124%	4	30%	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
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503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100614 - EPA 3510C (Acid/Base Neutral)							**Water**					
LCS Dup (9100614-BSD1)			Prepared: 10/03/19 11:14		Analyzed: 10/03/19 19:37							**Q-19**
Benzoic acid	4.94	4.00	4.00	ug/L	4	8.00	---	62	5-120%	2	30%	Q-41
Benzyl alcohol	2.42	0.400	0.800	ug/L	4	4.00	---	61	31-120%	2	30%	
Isophorone	2.80	0.100	0.200	ug/L	4	4.00	---	70	42-124%	4	30%	
Azobenzene (1,2-DPH)	2.63	0.100	0.200	ug/L	4	4.00	---	66	61-120%	2	30%	
Bis(2-Ethylhexyl) adipate	3.36	1.00	2.00	ug/L	4	4.00	---	84	40-125%	2	30%	
3,3'-Dichlorobenzidine	7.44	2.00	4.00	ug/L	4	8.00	---	93	27-129%	2	30%	Q-31
1,2-Dinitrobenzene	3.13	1.00	2.00	ug/L	4	4.00	---	78	59-120%	5	30%	
1,3-Dinitrobenzene	3.50	1.00	2.00	ug/L	4	4.00	---	87	49-128%	3	30%	
1,4-Dinitrobenzene	3.82	1.00	2.00	ug/L	4	4.00	---	95	40-120%	4	30%	Q-41
Pyridine	0.778	0.400	0.400	ug/L	4	4.00	---	19	5-120%	16	30%	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 67 %*		*Limits: 44-120 %*				*Dilution: 4x*			
2-Fluorobiphenyl (Surr)			*66 %*		*44-120 %*				*"*			
Phenol-d6 (Surr)			*23 %*		*10-120 %*				*"*			
p-Terphenyl-d14 (Surr)			*79 %*		*50-133 %*				*"*			
2-Fluorophenol (Surr)			*34 %*		*19-120 %*				*"*			
2,4,6-Tribromophenol (Surr)			*77 %*		*43-140 %*				*"*			

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020A (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100588 - EPA 3015A							**Water**					
Blank (9100588-BLK1)			Prepared: 10/03/19 08:36		Analyzed: 10/03/19 18:53							
EPA 6020A												
Lead	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Blank (9100588-BLK2)			Prepared: 10/03/19 08:36		Analyzed: 10/05/19 16:23							
EPA 6020A												
Arsenic	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	Q-16
Cadmium	ND	0.0400	0.200	ug/L	1	---	---	---	---	---	---	Q-16
Chromium	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	Q-16
Copper	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	Q-16
Nickel	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	Q-16
Selenium	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	Q-16
Silver	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	Q-16
Zinc	ND	2.00	4.00	ug/L	1	---	---	---	---	---	---	Q-16
LCS (9100588-BS1)			Prepared: 10/03/19 08:36		Analyzed: 10/03/19 18:48							
EPA 6020A												
Lead	56.4	0.100	0.200	ug/L	1	55.6	---	101	80-120%	---	---	
LCS (9100588-BS2)			Prepared: 10/03/19 08:36		Analyzed: 10/05/19 16:28							
EPA 6020A												
Arsenic	54.3	0.500	1.00	ug/L	1	55.6	---	98	80-120%	---	---	Q-16
Cadmium	54.5	0.0400	0.200	ug/L	1	55.6	---	98	80-120%	---	---	Q-16
Chromium	55.1	0.500	1.00	ug/L	1	55.6	---	99	80-120%	---	---	Q-16
Copper	57.9	0.500	1.00	ug/L	1	55.6	---	104	80-120%	---	---	Q-16
Nickel	59.9	0.500	1.00	ug/L	1	55.6	---	108	80-120%	---	---	Q-16
Selenium	26.7	0.500	1.00	ug/L	1	27.8	---	96	80-120%	---	---	Q-16
Silver	29.4	0.100	0.200	ug/L	1	27.8	---	106	80-120%	---	---	Q-16
Zinc	57.6	2.00	4.00	ug/L	1	55.6	---	104	80-120%	---	---	Q-16
Duplicate (9100588-DUP1)			Prepared: 10/03/19 08:36		Analyzed: 10/03/19 19:16							
QC Source Sample: Non-SDG (A9I0928-04)												
Lead	**1.10**	0.100	0.200	ug/L	1	---	1.06	---	---	3	20%	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020A (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100588 - EPA 3015A							**Water**					
Duplicate (9100588-DUP2)			Prepared: 10/03/19 08:36		Analyzed: 10/05/19 16:51							
QC Source Sample: Non-SDG (A9I0928-04RE1)												
Arsenic	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	20%	Q-16
Cadmium	**0.291**	0.0400	0.200	ug/L	1	---	0.303	---	---	4	20%	Q-16
Chromium	**3.17**	0.500	1.00	ug/L	1	---	3.16	---	---	0.5	20%	Q-16
Copper	**2.49**	0.500	1.00	ug/L	1	---	2.52	---	---	1	20%	Q-16
Nickel	**3.84**	0.500	1.00	ug/L	1	---	3.96	---	---	3	20%	Q-16
Silver	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	20%	Q-16
Zinc	**7.06**	2.00	4.00	ug/L	1	---	7.02	---	---	0.6	20%	Q-16
Duplicate (9100588-DUP3)			Prepared: 10/03/19 08:36		Analyzed: 10/07/19 16:37							
QC Source Sample: Non-SDG (A9I0928-04RE2)												
Selenium	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	20%	Q-16
Matrix Spike (9100588-MS1)			Prepared: 10/03/19 08:36		Analyzed: 10/03/19 19:31							
QC Source Sample: Non-SDG (A9I0928-04)												
EPA 6020A												
Lead	58.3	0.100	0.200	ug/L	1	55.6	1.06	103	75-125%	---	---	
Matrix Spike (9100588-MS2)			Prepared: 10/03/19 08:36		Analyzed: 10/03/19 20:55							
QC Source Sample: Non-SDG (A9J0092-01)												
EPA 6020A												
Lead	64.1	0.500	1.00	ug/L	5	55.6	ND	115	75-125%	---	---	
Matrix Spike (9100588-MS3)			Prepared: 10/03/19 08:36		Analyzed: 10/05/19 16:56							
QC Source Sample: Non-SDG (A9I0928-04RE1)												
EPA 6020A												
Arsenic	53.3	0.500	1.00	ug/L	1	55.6	ND	96	75-125%	---	---	Q-16
Cadmium	55.9	0.0400	0.200	ug/L	1	55.6	0.303	100	75-125%	---	---	Q-16
Chromium	57.9	0.500	1.00	ug/L	1	55.6	3.16	99	75-125%	---	---	Q-16
Copper	59.4	0.500	1.00	ug/L	1	55.6	2.52	102	75-125%	---	---	Q-16
Nickel	61.6	0.500	1.00	ug/L	1	55.6	3.96	104	75-125%	---	---	Q-16
Silver	29.3	0.100	0.200	ug/L	1	27.8	ND	106	75-125%	---	---	Q-16

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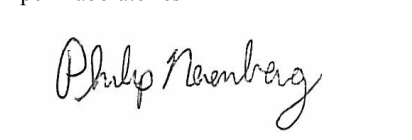

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020A (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100588 - EPA 3015A							**Water**					
Matrix Spike (9100588-MS3)			Prepared: 10/03/19 08:36		Analyzed: 10/05/19 16:56							
QC Source Sample: Non-SDG (A9I0928-04RE1)												
Zinc	63.4	2.00	4.00	ug/L	1	55.6	7.02	101	75-125%	---	---	Q-16
Matrix Spike (9100588-MS4)			Prepared: 10/03/19 08:36		Analyzed: 10/05/19 17:44							
QC Source Sample: Non-SDG (A9J0092-01RE1)												
EPA 6020A												
Arsenic	77.6	2.50	5.00	ug/L	5	55.6	20.9	102	75-125%	---	---	Q-16
Cadmium	59.2	0.200	1.00	ug/L	5	55.6	ND	107	75-125%	---	---	Q-16
Chromium	56.9	2.50	5.00	ug/L	5	55.6	ND	102	75-125%	---	---	Q-16
Copper	80.5	2.50	5.00	ug/L	5	55.6	19.7	109	75-125%	---	---	Q-16
Nickel	61.5	2.50	5.00	ug/L	5	55.6	ND	111	75-125%	---	---	Q-16
Selenium	27.7	2.50	5.00	ug/L	5	27.8	ND	100	75-125%	---	---	Q-16
Silver	30.5	0.500	1.00	ug/L	5	27.8	ND	110	75-125%	---	---	Q-16
Zinc	63.6	10.0	20.0	ug/L	5	55.6	ND	115	75-125%	---	---	Q-16
Matrix Spike (9100588-MS5)			Prepared: 10/03/19 08:36		Analyzed: 10/07/19 19:38							
QC Source Sample: Non-SDG (A9I0928-04RE2)												
EPA 6020A												
Selenium	26.1	0.500	1.00	ug/L	1	27.8	ND	94	75-125%	---	---	Q-16

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020A (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100629 - EPA 3051A							**Sediment**					
Blank (9100629-BLK1)			Prepared: 10/03/19 14:31		Analyzed: 10/07/19 20:11							
EPA 6020A												
Arsenic	ND	0.240	0.481	mg/kg wet	5	---	---	---	---	---	---	
Cadmium	ND	0.0481	0.0962	mg/kg wet	5	---	---	---	---	---	---	
Chromium	ND	0.240	0.481	mg/kg wet	5	---	---	---	---	---	---	
Copper	ND	0.240	0.481	mg/kg wet	5	---	---	---	---	---	---	
Lead	ND	0.0481	0.0962	mg/kg wet	5	---	---	---	---	---	---	
Nickel	ND	0.481	0.962	mg/kg wet	5	---	---	---	---	---	---	
Selenium	ND	0.240	0.481	mg/kg wet	5	---	---	---	---	---	---	
Silver	ND	0.0481	0.0962	mg/kg wet	5	---	---	---	---	---	---	
Zinc	ND	0.962	1.92	mg/kg wet	5	---	---	---	---	---	---	
LCS (9100629-BS1)			Prepared: 10/03/19 14:31		Analyzed: 10/07/19 20:15							
EPA 6020A												
Arsenic	23.8	0.250	0.500	mg/kg wet	5	25.0	---	95	80-120%	---	---	
Cadmium	24.8	0.0500	0.100	mg/kg wet	5	25.0	---	99	80-120%	---	---	
Chromium	26.2	0.250	0.500	mg/kg wet	5	25.0	---	105	80-120%	---	---	
Copper	26.7	0.250	0.500	mg/kg wet	5	25.0	---	107	80-120%	---	---	
Lead	26.9	0.0500	0.100	mg/kg wet	5	25.0	---	108	80-120%	---	---	
Nickel	26.6	0.500	1.00	mg/kg wet	5	25.0	---	106	80-120%	---	---	
Selenium	11.7	0.250	0.500	mg/kg wet	5	12.5	---	94	80-120%	---	---	
Silver	13.9	0.0500	0.100	mg/kg wet	5	12.5	---	111	80-120%	---	---	
Zinc	25.3	1.00	2.00	mg/kg wet	5	25.0	---	101	80-120%	---	---	
Matrix Spike (9100629-MS1)			Prepared: 10/03/19 14:31		Analyzed: 10/07/19 20:29							
QC Source Sample: SE-10-2.0-3.7 (A9I0893-13)												
EPA 6020A												
Arsenic	63.5	0.637	1.27	mg/kg dry	5	63.7	5.47	91	75-125%	---	---	
Cadmium	60.6	0.127	0.255	mg/kg dry	5	63.7	0.595	94	75-125%	---	---	
Chromium	92.5	0.637	1.27	mg/kg dry	5	63.7	25.2	106	75-125%	---	---	
Copper	150	0.637	1.27	mg/kg dry	5	63.7	56.1	**148**	**75-125%**	---	---	Q-04
Lead	89.2	0.127	0.255	mg/kg dry	5	63.7	24.0	102	75-125%	---	---	
Nickel	92.3	1.27	2.55	mg/kg dry	5	63.7	25.1	105	75-125%	---	---	
Selenium	29.9	0.637	1.27	mg/kg dry	5	31.8	0.667	92	75-125%	---	---	
Silver	33.1	0.127	0.255	mg/kg dry	5	31.8	0.138	104	75-125%	---	---	

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AMENDED REPORT

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020A (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100629 - EPA 3051A							**Sediment**					
Matrix Spike (9100629-MS1)			Prepared: 10/03/19 14:31		Analyzed: 10/07/19 20:29							
QC Source Sample: SE-10-2.0-3.7 (A9I0893-13)												
Zinc	135	2.55	5.09	mg/kg dry	5	63.7	71.9	99	75-125%	---	---	
Matrix Spike Dup (9100629-MSD1)			Prepared: 10/03/19 14:31		Analyzed: 10/07/19 20:33							
QC Source Sample: SE-10-2.0-3.7 (A9I0893-13)												
EPA 6020A												
Arsenic	68.0	0.649	1.30	mg/kg dry	5	64.9	5.47	96	75-125%	7	40%	
Cadmium	65.5	0.130	0.260	mg/kg dry	5	64.9	0.595	100	75-125%	8	40%	
Chromium	95.0	0.649	1.30	mg/kg dry	5	64.9	25.2	108	75-125%	3	40%	
Copper	124	0.649	1.30	mg/kg dry	5	64.9	56.1	105	75-125%	19	40%	
Lead	102	0.130	0.260	mg/kg dry	5	64.9	24.0	119	75-125%	13	40%	
Nickel	90.8	1.30	2.60	mg/kg dry	5	64.9	25.1	101	75-125%	2	40%	
Selenium	32.3	0.649	1.30	mg/kg dry	5	32.5	0.667	98	75-125%	8	40%	
Silver	36.2	0.130	0.260	mg/kg dry	5	32.5	0.138	111	75-125%	9	40%	
Zinc	146	2.60	5.19	mg/kg dry	5	64.9	71.9	113	75-125%	8	40%	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Ammonia by Gas Diffusion and Colorimetric Detection

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100540 - Method Prep: Aq							**Water**					
Blank (9100540-BLK1)			Prepared: 10/02/19 09:57		Analyzed: 10/02/19 13:48							
SM 4500-NH3 G												
Ammonia as N	ND	0.0200	0.0200	mg/L	1	---	---	---	---	---	---	
LCS (9100540-BS1)			Prepared: 10/02/19 09:57		Analyzed: 10/02/19 13:50							
SM 4500-NH3 G												
Ammonia as N	2.01	0.0200	0.0200	mg/L	1	2.00	---	101	90-110%	---	---	
Matrix Spike (9100540-MS1)			Prepared: 10/02/19 09:57		Analyzed: 10/02/19 15:17							
QC Source Sample: Rinsate Blank (A9I0893-18)												
SM 4500-NH3 G												
Ammonia as N	2.54	0.0250	0.0250	mg/L	1	2.50	ND	101	90-110%	---	---	
Matrix Spike Dup (9100540-MSD1)			Prepared: 10/02/19 09:57		Analyzed: 10/02/19 15:18							
QC Source Sample: Rinsate Blank (A9I0893-18)												
SM 4500-NH3 G												
Ammonia as N	2.55	0.0250	0.0250	mg/L	1	2.50	ND	102	90-110%	0.7	10%	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Ammonia by Plumb Extraction, Gas Diffusion and Colorimetric Detection

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100459 - Plumb 1981 Ammonia (Acidified KCl Leach)							**Soil**					
Blank (9100459-BLK1)			Prepared: 10/01/19 07:19		Analyzed: 10/02/19 13:53							
Plumb/SM 4500-NH3 G												
Ammonia as N	ND	0.100	0.100	mg/kg wet	1	---	---	---	---	---	---	
LCS (9100459-BS1)			Prepared: 10/01/19 07:19		Analyzed: 10/02/19 13:54							
Plumb/SM 4500-NH3 G												
Ammonia as N	10.5	0.100	0.100	mg/kg wet	1	10.0	---	105	80-120%	---	---	
Matrix Spike (9100459-MS1)			Prepared: 10/01/19 07:19		Analyzed: 10/02/19 14:18							
QC Source Sample: SE-10-2.0-3.7 (A9I0893-13)												
Plumb/SM 4500-NH3 G												
Ammonia as N	24.8	0.260	0.260	mg/kg dry	1	26.0	5.37	**74**	**75-125%**	---	---	Q-04
Matrix Spike Dup (9100459-MSD1)			Prepared: 10/01/19 07:19		Analyzed: 10/02/19 14:20							
QC Source Sample: SE-10-2.0-3.7 (A9I0893-13)												
Plumb/SM 4500-NH3 G												
Ammonia as N	23.5	0.256	0.256	mg/kg dry	1	25.6	5.37	**71**	**75-125%**	5	20%	Q-04

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QUALITY CONTROL (QC) SAMPLE RESULTS

Ammonia by Plumb Extraction, Gas Diffusion and Colorimetric Detection

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9101224 - Plumb 1981 Ammonia (Acidified KCl Leach)							**Soil**					
Blank (9101224-BLK1)			Prepared: 10/17/19 08:53		Analyzed: 10/17/19 14:07							
Plumb/SM 4500-NH3 G												
Ammonia as N	ND	0.100	0.100	mg/kg wet	1	---	---	---	---	---	---	
LCS (9101224-BS1)			Prepared: 10/17/19 08:53		Analyzed: 10/17/19 14:09							
Plumb/SM 4500-NH3 G												
Ammonia as N	10.8	0.100	0.100	mg/kg wet	1	10.0	---	108	80-120%	---	---	
Matrix Spike (9101224-MS1)			Prepared: 10/17/19 08:53		Analyzed: 10/17/19 14:24							
QC Source Sample: SE-03A-0-1.0 (A9I0893-05)												
Plumb/SM 4500-NH3 G												
Ammonia as N	189	2.14	2.14	mg/kg dry	10	21.4	168	95	75-125%	---	---	H-06
Matrix Spike Dup (9101224-MSD1)			Prepared: 10/17/19 08:53		Analyzed: 10/17/19 14:25							
QC Source Sample: SE-03A-0-1.0 (A9I0893-05)												
Plumb/SM 4500-NH3 G												
Ammonia as N	187	2.11	2.11	mg/kg dry	10	21.1	168	90	75-125%	0.7	20%	H-06

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QUALITY CONTROL (QC) SAMPLE RESULTS

Demand Parameters

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100512 - PSEP-5310B TOC							**Sediment**					
Blank (9100512-BLK1)			Prepared: 10/01/19 08:13		Analyzed: 10/08/19 08:35							
EPA 9060Amod												
Total Organic Carbon	ND	200	200	mg/kg	1	---	---	---	---	---	---	
LCS (9100512-BS1)			Prepared: 10/01/19 08:13		Analyzed: 10/08/19 08:50							
EPA 9060Amod												
Total Organic Carbon	10000			mg/kg	1	10000	---	104	90-110%	---	---	
Duplicate (9100512-DUP1)			Prepared: 10/01/19 08:13		Analyzed: 10/08/19 11:06							
QC Source Sample: SE-10-2.0-3.7 (A9I0893-13)												
EPA 9060Amod												
Total Organic Carbon	**62000**	200	200	mg/kg	1	---	79000	---	---	**23**	**20%**	Q-04

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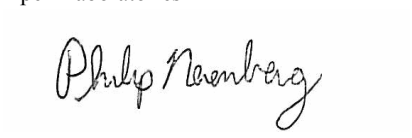

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QUALITY CONTROL (QC) SAMPLE RESULTS

Demand Parameters

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9101222 - PSEP-5310B TOC							**Sediment**					
Blank (9101222-BLK1)			Prepared: 10/17/19 08:57		Analyzed: 10/22/19 23:52							
EPA 9060Amod												
Total Organic Carbon	ND	200	200	mg/kg	1	---	---	---	---	---	---	
LCS (9101222-BS1)			Prepared: 10/17/19 08:57		Analyzed: 10/23/19 00:02							
EPA 9060Amod												
Total Organic Carbon	9900			mg/kg	1	10000	---	99	90-110%	---	---	
Duplicate (9101222-DUP2)			Prepared: 10/17/19 08:57		Analyzed: 10/23/19 01:52							
QC Source Sample: Non-SDG (A9J0277-01)												
Total Organic Carbon	**8100**	200	200	mg/kg	1	---	8800	---	---	8	20%	
Duplicate (9101222-DUP3)			Prepared: 10/17/19 08:57		Analyzed: 10/23/19 02:02							
QC Source Sample: Non-SDG (A9J0277-01)												
Total Organic Carbon	**8800**	200	200	mg/kg	1	---	8800	---	---	0.5	20%	
Duplicate (9101222-DUP4)			Prepared: 10/17/19 08:57		Analyzed: 10/23/19 12:25							
QC Source Sample: SE-01A-1.0-2.0 (A9I0893-01RE1)												
EPA 9060Amod												
Total Organic Carbon	**43000**	200	200	mg/kg	1	---	44000	---	---	2	20%	Q-16

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QUALITY CONTROL (QC) SAMPLE RESULTS

Total Organic Carbon (Non-Purgeable) by Persulfate Oxidation by Standard Method 5310C

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9091432 - Method Prep: Aq							**Water**					
Blank (9091432-BLK1)			Prepared: 09/30/19 09:22		Analyzed: 10/01/19 06:30							
SM 5310 C												
Total Organic Carbon	ND	1.00	1.00	mg/L	1	---	---	---	---	---	---	
LCS (9091432-BS1)			Prepared: 09/30/19 09:22		Analyzed: 10/01/19 07:00							
SM 5310 C												
Total Organic Carbon	9.73	1.00	1.00	mg/L	1	10.0	---	97	85-115%	---	---	
Duplicate (9091432-DUP1)			Prepared: 09/30/19 09:22		Analyzed: 10/01/19 07:59							
QC Source Sample: Non-SDG (A9I0814-01)												
Total Organic Carbon	**1.72**	1.00	1.00	mg/L	1	---	1.70	---	---	0.6	10%	
Matrix Spike (9091432-MS1)			Prepared: 09/30/19 09:22		Analyzed: 10/01/19 08:28							
QC Source Sample: Non-SDG (A9I0814-01)												
SM 5310 C												
Total Organic Carbon	11.5	1.01	1.01	mg/L	1	10.0	1.70	98	85-115%	---	---	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Solid and Moisture Determinations

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9091443 - Total Solids (SM2540G/PSEP)							**Sediment**					
Duplicate (9091443-DUP1)			Prepared: 09/30/19 10:56		Analyzed: 10/01/19 13:08							
QC Source Sample: Non-SDG (A9I0822-02)												
Total Solids	**48.6**	1.00	1.00	%	1	---	42.9	---	---	12	20%	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Solid and Moisture Determinations

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9091474 - Total Volatile Solids (non-aq)							**Solid**					
Duplicate (9091474-DUP1)			Prepared: 09/30/19 17:28		Analyzed: 10/02/19 15:31							
QC Source Sample: Non-SDG (A9I0822-02)												
Total Volatile Solids	**20.6**	1.00	1.00	%	1	---	27.4	---	---	**28**	**10%**	Q-04

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QUALITY CONTROL (QC) SAMPLE RESULTS

Solid and Moisture Determinations

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9101195 - Total Solids (SM2540G/PSEP)							**Sediment**					
Duplicate (9101195-DUP1)			Prepared: 10/16/19 15:47		Analyzed: 10/17/19 03:40							
QC Source Sample: SE-01A-1.0-2.0 (A9I0893-01)												
PSEP 1986												
Total Solids	**51.8**	1.00	1.00	%	1	---	51.9	---	---	0.2	20%	
Duplicate (9101195-DUP2)			Prepared: 10/16/19 15:47		Analyzed: 10/17/19 03:40							
QC Source Sample: Non-SDG (A9J0371-17)												
Total Solids	**54.1**	1.00	1.00	%	1	---	54.0	---	---	0.2	20%	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Solid and Moisture Determinations

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9101266 - Total Volatile Solids (non-aq)							**Solid**					
Duplicate (9101266-DUP1)			Prepared: 10/17/19 13:32		Analyzed: 10/17/19 17:08							
QC Source Sample: SE-01A-1.0-2.0 (A9I0893-01)												
SM 2540 G												
Total Volatile Solids	**11.1**	1.00	1.00	%	1	---	11.9	---	---	6	10%	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9091443 - Total Solids (SM2540G/PSEP)							**Sediment**					
Duplicate (9091443-DUP1)			Prepared: 09/30/19 10:56		Analyzed: 10/01/19 13:08							
QC Source Sample: Non-SDG (A9I0822-02)												
% Solids	**48.6**	1.00	1.00	%	1	---	42.9	---	---	**12**	**10%**	Q-04

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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QUALITY CONTROL (QC) SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9101195 - Total Solids (SM2540G/PSEP)							**Sediment**					
Duplicate (9101195-DUP1)			Prepared: 10/16/19 15:47		Analyzed: 10/17/19 03:40							
QC Source Sample: SE-01A-1.0-2.0 (A9I0893-01)												
EPA 8000C												
% Solids	**51.8**	1.00	1.00	%	1	---	51.9	---	---	0.2	10%	
Duplicate (9101195-DUP2)			Prepared: 10/16/19 15:47		Analyzed: 10/17/19 03:40							
QC Source Sample: Non-SDG (A9J0371-17)												
% Solids	**54.1**	1.00	1.00	%	1	---	54.0	---	---	0.2	10%	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9101585 - Total Solids (Dry Weight)							Soil					
Duplicate (9101585-DUP1)			Prepared: 10/25/19 08:44		Analyzed: 10/28/19 07:41							
QC Source Sample: SE-30-2.5-4.5---Air Dried (A9I0893-22)												
EPA 8000C												
% Solids	**92.7**	1.00	1.00	%	1	---	92.6	---	---	0.09	10%	
Duplicate (9101585-DUP2)			Prepared: 10/25/19 08:44		Analyzed: 10/28/19 07:41							
QC Source Sample: Non-SDG (A9J0894-01)												
% Solids	**71.6**	1.00	1.00	%	1	---	72.1	---	---	0.8	10%	
Duplicate (9101585-DUP3)			Prepared: 10/25/19 08:44		Analyzed: 10/28/19 07:41							
QC Source Sample: Non-SDG (A9J0896-01)												
% Solids	**91.2**	1.00	1.00	%	1	---	91.7	---	---	0.5	10%	
Duplicate (9101585-DUP4)			Prepared: 10/25/19 08:44		Analyzed: 10/28/19 07:41							
QC Source Sample: Non-SDG (A9J0922-01)												
% Solids	**78.0**	1.00	1.00	%	1	---	79.1	---	---	2	10%	
Duplicate (9101585-DUP5)			Prepared: 10/25/19 17:55		Analyzed: 10/28/19 07:41							
QC Source Sample: Non-SDG (A9J0958-01)												
% Solids	**85.0**	1.00	1.00	%	1	---	85.7	---	---	0.8	10%	
Duplicate (9101585-DUP6)			Prepared: 10/25/19 17:55		Analyzed: 10/28/19 07:41							
QC Source Sample: Non-SDG (A9J0964-02)												
% Solids	**80.5**	1.00	1.00	%	1	---	80.2	---	---	0.3	10%	

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

Analytical Resources, Inc.

QUALITY CONTROL (QC) SAMPLE RESULTS

Metals and Metallic Compounds

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch BHJ0100 - TWM EPA 7470A							**Water**					
Blank (BHJ0100-BLK1)			Prepared: 10/03/19 10:48		Analyzed: 10/04/19 11:17							
EPA 7470A												
Mercury	ND	0.000013	0.000100	mg/L	1	---	---	---	---	---	---	U
LCS (BHJ0100-BS1)			Prepared: 10/03/19 10:48		Analyzed: 10/04/19 11:19							
EPA 7470A												
Mercury	0.00216	0.000013	0.000100	mg/L	1	0.0020000	---	108	80-120%	---	---	

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AMENDED REPORT

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

Analytical Resources, Inc.

QUALITY CONTROL (QC) SAMPLE RESULTS

Metals and Metallic Compounds

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch BHJ0281 - SMM EPA 7471B							**Solid**					
Blank (BHJ0281-BLK1)			Prepared: 10/09/19 15:55		Analyzed: 10/10/19 15:36							
EPA 7471B												
Mercury	ND	0.00525	0.0250	mg/kg wet	1	---	---	---	---	---	---	U
LCS (BHJ0281-BS1)			Prepared: 10/09/19 15:55		Analyzed: 10/10/19 15:43							
EPA 7471B												
Mercury	0.468	0.00525	0.0250	mg/kg wet	1	0.50000	---	93.7	80-120%	---	---	
Duplicate (BHJ0281-DUP1)			Prepared: 10/09/19 15:55		Analyzed: 10/10/19 15:47							
QC Source Sample: A9I0893-13 (A9I0893-13)												
EPA 7471B												
Mercury	**0.135**	0.0110	0.0526	mg/kg dry	1	---	0.129	---	---	4.92	20%	
Matrix Spike (BHJ0281-MS1)			Prepared: 10/09/19 15:55		Analyzed: 10/10/19 15:50							
QC Source Sample: A9I0893-13 (A9I0893-13)												
EPA 7471B												
Mercury	0.852	0.0109	0.0520	mg/kg dry	1	0.52003	0.129	**139**	**75-125%**	---	---	*
Matrix Spike Dup (BHJ0281-MSD1)			Prepared: 10/09/19 15:55		Analyzed: 10/10/19 15:52							
QC Source Sample: A9I0893-13 (A9I0893-13)												
EPA 7471B												
Mercury	0.775	0.0111	0.0530	mg/kg dry	1	0.53023	0.129	122	75-125%	9.49	20%	

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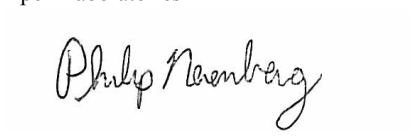

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

Analytical Resources, Inc.

QUALITY CONTROL (QC) SAMPLE RESULTS

TCLP Metals and Metallic Compounds

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch BHJ0442 - LEN Digestion of EPA 1311 Elutriate							**Solid**					
Blank (BHJ0442-BLK1)			Prepared: 10/15/19 08:09		Analyzed: 10/16/19 16:28							
EPA 6010C												
Lead	ND	0.0065	0.100	mg/L	5	---	---	---	---	---	---	U
Duplicate (BHJ0442-DUP1)			Prepared: 10/15/19 08:09		Analyzed: 10/16/19 16:50							
QC Source Sample: A9I0893-13 (A9I0893-13)												
EPA 6010C												
Lead	ND	0.0065	0.100	mg/L	5	---	ND	---	---	---	20%	U
Matrix Spike (BHJ0442-MS1)			Prepared: 10/15/19 08:09		Analyzed: 10/16/19 16:55							
QC Source Sample: A9I0893-13 (A9I0893-13)												
EPA 6010C												
Lead	3.95	0.0065	0.100	mg/L	5	4.0000	ND	98.6	75-125%	---	---	
Matrix Spike Dup (BHJ0442-MSD1)			Prepared: 10/15/19 08:09		Analyzed: 10/16/19 17:00							
QC Source Sample: A9I0893-13 (A9I0893-13)												
EPA 6010C												
Lead	3.61	0.0065	0.100	mg/L	5	4.0000	ND	90.3	75-125%	8.77	20%	

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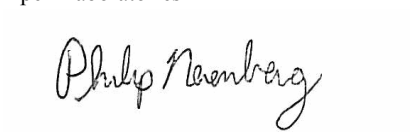

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Analytical Resources, Inc.

QUALITY CONTROL (QC) SAMPLE RESULTS

TCLP Metals and Metallic Compounds

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch BHJ0444 - LEM 7470A Digestion of EPA 1311 Elutriate for Hg							**Solid**					
Blank (BHJ0444-BLK1)			Prepared: 10/15/19 08:13		Analyzed: 10/17/19 11:58							
EPA 7470A												
Mercury	ND	0.000007	0.000100	mg/L	1	---	---	---	---	---	---	U
Duplicate (BHJ0444-DUP1)			Prepared: 10/15/19 08:13		Analyzed: 10/17/19 12:03							
QC Source Sample: A9I0893-13 (A9I0893-13)												
EPA 7470A												
Mercury	ND	0.000007	0.000100	mg/L	1	---	ND	---	---	---	20%	U
Matrix Spike (BHJ0444-MS1)			Prepared: 10/15/19 08:13		Analyzed: 10/17/19 12:05							
QC Source Sample: A9I0893-13 (A9I0893-13)												
EPA 7470A												
Mercury	0.00113	0.000007	0.000100	mg/L	1	0.0010000	ND	113	75-125%	---	---	
Matrix Spike Dup (BHJ0444-MSD1)			Prepared: 10/15/19 08:13		Analyzed: 10/17/19 12:07							
QC Source Sample: A9I0893-13 (A9I0893-13)												
EPA 7470A												
Mercury	0.00116	0.000007	0.000100	mg/L	1	0.0010000	ND	116	75-125%	3.07	20%	

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Analytical Resources, Inc.

QUALITY CONTROL (QC) SAMPLE RESULTS

Wet Chemistry

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch BHJ0036 - No Prep Wet Chem							**Solid**					
Blank (BHJ0036-BLK1)			Prepared: 10/01/19 21:48		Analyzed: 10/01/19 23:14							
PSEP 1986												
Total Solids, Sulfide	ND	0.04	0.04	%	1	---	---	---	---	---	---	U
Duplicate (BHJ0036-DUP1)			Prepared: 10/01/19 21:48		Analyzed: 10/01/19 23:14							
QC Source Sample: A9I0893-13 (A9I0893-13)												
PSEP 1986												
Total Solids, Sulfide	**32.82**	0.04	0.04	%	1	---	33.04	---	---	0.682	20%	

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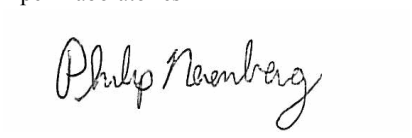

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QUALITY CONTROL (QC) SAMPLE RESULTS

Wet Chemistry

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch BHJ0054 - EPA 9030B							**Solid**					
Blank (BHJ0054-BLK1)			Prepared: 10/02/19 11:07		Analyzed: 10/03/19 15:34							
SM 4500-S2 D-00												
Sulfide	ND	1.00	1.00	mg/kg wet	1	---	---	---	---	---	---	U
LCS (BHJ0054-BS1)			Prepared: 10/02/19 11:07		Analyzed: 10/03/19 15:49							
SM 4500-S2 D-00												
Sulfide	148	10.0	10.0	mg/kg wet	10	175.20	---	84.4	75-125%	---	---	D
Duplicate (BHJ0054-DUP1)			Prepared: 10/02/19 11:07		Analyzed: 10/03/19 15:55							
QC Source Sample: A9I0893-13 (A9I0893-13)												
SM 4500-S2 D-00												
Sulfide	**318**	57.2	57.2	mg/kg dry	20	---	228	---	---	**32.8**	**20%**	*, D
Duplicate (BHJ0054-DUP2)			Prepared: 10/02/19 11:07		Analyzed: 10/04/19 15:28							
QC Source Sample: A9I0893-13 (A9I0893-13)												
SM 4500-S2 D-00												
Sulfide	**267**	57.2	57.2	mg/kg dry	20	---	228	---	---	15.8	20%	D
Matrix Spike (BHJ0054-MS1)			Prepared: 10/02/19 11:07		Analyzed: 10/03/19 15:55							
QC Source Sample: A9I0893-13 (A9I0893-13)												
SM 4500-S2 D-00												
Sulfide	581	55.0	55.0	mg/kg dry	20	481.65	228	**73.2**	**75-125%**	---	---	*, D
Matrix Spike Dup (BHJ0054-MSD1)			Prepared: 10/02/19 11:07		Analyzed: 10/03/19 15:58							
QC Source Sample: A9I0893-13 (A9I0893-13)												
SM 4500-S2 D-00												
Sulfide	322	50.8	50.8	mg/kg dry	20	444.58	228	**21.0**	**75-125%**	57.4	200%	*, D

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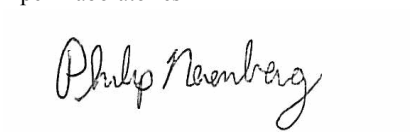

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QUALITY CONTROL (QC) SAMPLE RESULTS

Wet Chemistry

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch BHJ0097 - No Prep Wet Chem							**Water**					
Blank (BHJ0097-BLK1)			Prepared: 10/03/19 10:17		Analyzed: 10/03/19 13:46							
SM 4500-S2 D-00												
Sulfide	ND	0.050	0.050	mg/L	1	---	---	---	---	---	---	U
LCS (BHJ0097-BS1)			Prepared: 10/03/19 10:17		Analyzed: 10/03/19 13:46							
SM 4500-S2 D-00												
Sulfide	0.521	0.050	0.050	mg/L	1	0.49756	---	105	75-125%	---	---	
Duplicate (BHJ0097-DUP1)			Prepared: 10/03/19 10:17		Analyzed: 10/03/19 13:47							
QC Source Sample: A9I0893-18 (A9I0893-18)												
SM 4500-S2 D-00												
Sulfide	ND	0.050	0.050	mg/L	1	---	ND	---	---	---	20%	U
Matrix Spike (BHJ0097-MS1)			Prepared: 10/03/19 10:17		Analyzed: 10/03/19 13:47							
QC Source Sample: A9I0893-18 (A9I0893-18)												
SM 4500-S2 D-00												
Sulfide	0.491	0.050	0.050	mg/L	1	0.49756	ND	98.7	75-125%	---	---	

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Analytical Resources, Inc.

QUALITY CONTROL (QC) SAMPLE RESULTS

Wet Chemistry

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch BHJ0145 - No Prep Wet Chem							**Water**					
Blank (BHJ0145-BLK1)			Prepared: 10/04/19 13:20		Analyzed: 10/04/19 14:49							
SM 4500-S2 D-00												
Sulfide	ND	0.050	0.050	mg/L	1	---	---	---	---	---	---	U
LCS (BHJ0145-BS1)			Prepared: 10/04/19 13:20		Analyzed: 10/04/19 14:49							
SM 4500-S2 D-00												
Sulfide	0.509	0.050	0.050	mg/L	1	0.50250	---	101	75-125%	---	---	
Matrix Spike (BHJ0145-MS7)			Prepared: 10/04/19 13:20		Analyzed: 10/04/19 14:56							
QC Source Sample: A9I0893-19 (A9I0893-19)												
SM 4500-S2 D-00												
Sulfide	0.345	0.050	0.050	mg/L	1	0.50250	0.059	**56.9**	**75-125%**	---	---	*, H

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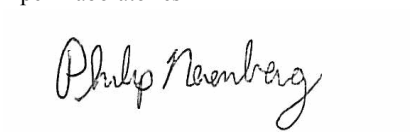

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SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Acid/Silica Gel Cleanup

Prep: EPA 3510C (Fuels/Acid Ext.) w/Silica Gel + Acid

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9101263							
A9I0893-18	Water	NWTPH-Dx/SG	09/26/19 18:40	10/01/19 15:39	900mL/5mL	1000mL/5mL	1.11

Prep: EPA 3546 w/SG+Acid (NWTPH)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9101200							
A9I0893-08	Sediment	NWTPH-Dx/SG	09/25/19 18:15	10/03/19 13:22	10.18g/5mL	10g/5mL	0.98
A9I0893-13	Sediment	NWTPH-Dx/SG	09/26/19 13:50	10/03/19 13:22	10.12g/5mL	10g/5mL	0.99
A9I0893-14	Sediment	NWTPH-Dx/SG	09/26/19 15:40	10/03/19 13:22	10.17g/5mL	10g/5mL	0.98

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Prep: EPA 5030B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9091419							
A9I0893-18	Water	NWTPH-Gx (MS)	09/26/19 18:40	09/28/19 20:41	5mL/5mL	5mL/5mL	1.00

Prep: EPA 5035A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9091416							
A9I0893-08	Sediment	NWTPH-Gx (MS)	09/25/19 18:15	09/25/19 18:15	3.73g/5mL	5g/5mL	1.34
A9I0893-13	Sediment	NWTPH-Gx (MS)	09/26/19 13:50	09/26/19 13:50	4.2g/5mL	5g/5mL	1.19
A9I0893-14	Sediment	NWTPH-Gx (MS)	09/26/19 15:40	09/26/19 15:40	5.04g/5mL	5g/5mL	0.99

Polychlorinated Biphenyls by EPA 8082A

Prep: EPA 3510C (Neutral pH)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9091465							
A9I0893-18	Water	EPA 8082A	09/26/19 18:40	09/30/19 15:11	890mL/5mL	1000mL/5mL	1.12

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9101592							
A9I0893-20	Sediment	EPA 8082A	09/25/19 18:15	10/25/19 10:03	10.28g/2mL	10g/2mL	0.97
A9I0893-21	Sediment	EPA 8082A	09/26/19 13:50	10/25/19 10:03	10.2g/2mL	10g/2mL	0.98

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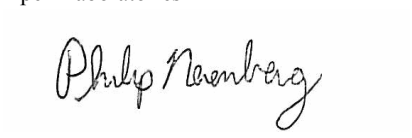

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

SAMPLE PREPARATION INFORMATION

Polychlorinated Biphenyls by EPA 8082A

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A9I0893-22	Sediment	EPA 8082A	09/26/19 15:40	10/25/19 10:03	10.45g/2mL	10g/2mL	0.96

Semivolatile Organic Compounds by EPA 8270D

Prep: EPA 3510C (Acid/Base Neutral)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9100614							
A9I0893-18RE1	Water	EPA 8270D	09/26/19 18:40	10/03/19 11:14	840mL/1mL	1000mL/1mL	1.19

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9100490							
A9I0893-08RE1	Sediment	EPA 8270D	09/25/19 18:15	10/01/19 10:34	15.14g/2mL	15g/2mL	0.99
A9I0893-13RE1	Sediment	EPA 8270D	09/26/19 13:50	10/01/19 10:34	15.31g/2mL	15g/2mL	0.98
A9I0893-14RE1	Sediment	EPA 8270D	09/26/19 15:40	10/01/19 10:34	15.24g/2mL	15g/2mL	0.98

Total Metals by EPA 6020A (ICPMS)

Prep: EPA 3015A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9100588							
A9I0893-18	Water	EPA 6020A	09/26/19 18:40	10/03/19 08:36	45mL/50mL	45mL/50mL	1.00
A9I0893-18RE1	Water	EPA 6020A	09/26/19 18:40	10/03/19 08:36	45mL/50mL	45mL/50mL	1.00

Prep: EPA 3051A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9100629							
A9I0893-08	Sediment	EPA 6020A	09/25/19 18:15	10/03/19 14:31	0.507g/50mL	0.5g/50mL	0.99
A9I0893-13	Sediment	EPA 6020A	09/26/19 13:50	10/03/19 14:31	0.51g/50mL	0.5g/50mL	0.98
A9I0893-14	Sediment	EPA 6020A	09/26/19 15:40	10/03/19 14:31	0.488g/50mL	0.5g/50mL	1.02

Ammonia by Gas Diffusion and Colorimetric Detection

Prep: Method Prep: Aq

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9100540							
A9I0893-18	Water	SM 4500-NH3 G	09/26/19 18:40	10/02/19 09:57	10mL/10mL	10mL/10mL	1.00

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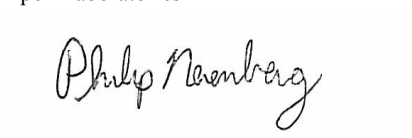

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

SAMPLE PREPARATION INFORMATION

Ammonia by Gas Diffusion and Colorimetric Detection

Prep: Method Prep: Aq

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor

Ammonia by Plumb Extraction, Gas Diffusion and Colorimetric Detection

Prep: Plumb 1981 Ammonia (Acidified KCl Leach)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9100459							
A9I0893-08	Sediment	Plumb/SM 4500-NH3 G	09/25/19 18:15	10/01/19 07:19	10.7943g/50mL	10g/50mL	0.93
A9I0893-13	Sediment	Plumb/SM 4500-NH3 G	09/26/19 13:50	10/01/19 07:19	10.4754g/50mL	10g/50mL	0.96
A9I0893-14	Sediment	Plumb/SM 4500-NH3 G	09/26/19 15:40	10/01/19 07:19	10.5133g/50mL	10g/50mL	0.95
Batch: 9101224							
A9I0893-01	Sediment	Plumb/SM 4500-NH3 G	09/25/19 08:10	10/17/19 08:53	10.0937g/50mL	10g/50mL	0.99
A9I0893-05	Sediment	Plumb/SM 4500-NH3 G	09/25/19 11:20	10/17/19 08:53	10.3432g/50mL	10g/50mL	0.97
A9I0893-07	Sediment	Plumb/SM 4500-NH3 G	09/25/19 14:15	10/17/19 08:53	10.4776g/50mL	10g/50mL	0.95
A9I0893-09RE1	Sediment	Plumb/SM 4500-NH3 G	09/26/19 08:15	10/17/19 08:53	10.445g/50mL	10g/50mL	0.96
A9I0893-11	Sediment	Plumb/SM 4500-NH3 G	09/26/19 11:50	10/17/19 08:53	10.3005g/50mL	10g/50mL	0.97

Demand Parameters

Prep: PSEP-5310B TOC

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9100512							
A9I0893-08	Sediment	EPA 9060Amod	09/25/19 18:15	10/01/19 08:13			NA
A9I0893-13	Sediment	EPA 9060Amod	09/26/19 13:50	10/01/19 08:13			NA
A9I0893-14	Sediment	EPA 9060Amod	09/26/19 15:40	10/01/19 08:13			NA
Batch: 9101222							
A9I0893-01RE1	Sediment	EPA 9060Amod	09/25/19 08:10	10/17/19 08:03			NA
A9I0893-05	Sediment	EPA 9060Amod	09/25/19 11:20	10/17/19 08:57			NA
A9I0893-07	Sediment	EPA 9060Amod	09/25/19 14:15	10/17/19 08:57			NA
A9I0893-09	Sediment	EPA 9060Amod	09/26/19 08:15	10/17/19 08:57			NA
A9I0893-11	Sediment	EPA 9060Amod	09/26/19 11:50	10/17/19 08:57			NA

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Portland, OR 97209	Project Manager: Emily Hess	A9I0893 - 01 09 20 1624

SAMPLE PREPARATION INFORMATION

Demand Parameters

Total Organic Carbon (Non-Purgeable) by Persulfate Oxidation by Standard Method 5310C

Prep: Method Prep: Aq

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9091432							
A9I0893-18	Water	SM 5310 C	09/26/19 18:40	09/30/19 09:22	40mL/40mL	40mL/40mL	1.00

Solid and Moisture Determinations

Prep: Total Solids (SM2540G/PSEP)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9091443							
A9I0893-08	Sediment	PSEP 1986	09/25/19 18:15	09/30/19 10:56			NA
A9I0893-13	Sediment	PSEP 1986	09/26/19 13:50	09/30/19 10:56			NA
A9I0893-14	Sediment	PSEP 1986	09/26/19 15:40	09/30/19 10:56			NA
Batch: 9101195							
A9I0893-01	Sediment	PSEP 1986	09/25/19 08:10	10/16/19 15:47			NA
A9I0893-05	Sediment	PSEP 1986	09/25/19 11:20	10/16/19 15:47			NA
A9I0893-07	Sediment	PSEP 1986	09/25/19 14:15	10/16/19 15:47			NA
A9I0893-09	Sediment	PSEP 1986	09/26/19 08:15	10/16/19 15:47			NA
A9I0893-11	Sediment	PSEP 1986	09/26/19 11:50	10/16/19 15:47			NA

Prep: Total Volatile Solids (non-aq)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9091474							
A9I0893-08	Sediment	SM 2540 G	09/25/19 18:15	09/30/19 17:28			NA
A9I0893-13	Sediment	SM 2540 G	09/26/19 13:50	09/30/19 17:28			NA
A9I0893-14	Sediment	SM 2540 G	09/26/19 15:40	09/30/19 17:28			NA
Batch: 9101266							
A9I0893-01	Sediment	SM 2540 G	09/25/19 08:10	10/16/19 10:12			NA
A9I0893-05	Sediment	SM 2540 G	09/25/19 11:20	10/16/19 10:12			NA
A9I0893-07	Sediment	SM 2540 G	09/25/19 14:15	10/16/19 10:12			NA
A9I0893-09	Sediment	SM 2540 G	09/26/19 08:15	10/16/19 10:12			NA
A9I0893-11	Sediment	SM 2540 G	09/26/19 11:50	10/16/19 10:12			NA

Grain Size by ASTM D 422m/PSET Parameters

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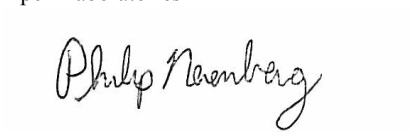

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

SAMPLE PREPARATION INFORMATION

Grain Size by ASTM D 422m/PSET Parameters

Prep: ASTM D 421

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9100739							
A9I0893-08	Sediment	D422mod	09/25/19 18:15	10/09/19 10:31			NA
A9I0893-13	Sediment	D422mod	09/26/19 13:50	10/07/19 11:26			NA
A9I0893-14	Sediment	D422mod	09/26/19 15:40	10/07/19 11:48			NA

Percent Dry Weight

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9101585							
A9I0893-20	Sediment	EPA 8000C	09/25/19 18:15	10/25/19 08:44			NA
A9I0893-21	Sediment	EPA 8000C	09/26/19 13:50	10/25/19 08:44			NA
A9I0893-22	Sediment	EPA 8000C	09/26/19 15:40	10/25/19 08:44			NA

Prep: Total Solids (SM2540G/PSEP)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9091443							
A9I0893-08	Sediment	EPA 8000C	09/25/19 18:15	09/30/19 10:56			NA
A9I0893-13	Sediment	EPA 8000C	09/26/19 13:50	09/30/19 10:56			NA
A9I0893-14	Sediment	EPA 8000C	09/26/19 15:40	09/30/19 10:56			NA
Batch: 9101195							
A9I0893-01	Sediment	EPA 8000C	09/25/19 08:10	10/16/19 15:47			NA
A9I0893-05	Sediment	EPA 8000C	09/25/19 11:20	10/16/19 15:47			NA
A9I0893-07	Sediment	EPA 8000C	09/25/19 14:15	10/16/19 15:47			NA
A9I0893-09	Sediment	EPA 8000C	09/26/19 08:15	10/16/19 15:47			NA
A9I0893-11	Sediment	EPA 8000C	09/26/19 11:50	10/16/19 15:47			NA

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Analytical Resources, Inc.

SAMPLE PREPARATION INFORMATION

Metals and Metallic Compounds

Prep: SMM EPA 7471B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: BHJ0281							
A9I0893-08	Sediment	EPA 7471B	09/25/19 18:15	10/09/19 15:55	0.206g/50mL	0.2g/50mL	0.97
A9I0893-09	Sediment	EPA 7471B	09/26/19 08:15	10/09/19 15:55	0.232g/50mL	0.2g/50mL	0.86
A9I0893-11	Sediment	EPA 7471B	09/26/19 11:50	10/09/19 15:55	0.213g/50mL	0.2g/50mL	0.94
A9I0893-13	Sediment	EPA 7471B	09/26/19 13:50	10/09/19 15:55	0.258g/50mL	0.2g/50mL	0.78
A9I0893-14	Sediment	EPA 7471B	09/26/19 15:40	10/09/19 15:55	0.269g/50mL	0.2g/50mL	0.74

Prep: TWM EPA 7470A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: BHJ0100							
A9I0893-18	Water	EPA 7470A	09/26/19 18:40	10/03/19 10:48	20mL/20mL	20mL/20mL	1.00

TCLP Metals and Metallic Compounds

Prep: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: BHJ0444							
A9I0893-13	Sediment	EPA 7470A	09/26/19 13:50	10/15/19 08:13	20mL/20mL	20mL/20mL	1.00
A9I0893-14	Sediment	EPA 7470A	09/26/19 15:40	10/15/19 08:13	20mL/20mL	20mL/20mL	1.00

Prep: LEN Digestion of EPA 1311 Elutriate

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: BHJ0442							
A9I0893-13	Sediment	EPA 6010C	09/26/19 13:50	10/15/19 08:09	25mL/25mL	25mL/25mL	1.00
A9I0893-14	Sediment	EPA 6010C	09/26/19 15:40	10/15/19 08:09	25mL/25mL	25mL/25mL	1.00

Wet Chemistry

Prep: EPA 9030B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: BHJ0054							
A9I0893-01	Sediment	SM 4500-S2 D-00	09/25/19 08:10	10/02/19 11:07	5.038g/100mL	5g/100mL	0.99
A9I0893-05	Sediment	SM 4500-S2 D-00	09/25/19 11:20	10/02/19 11:07	5.04g/100mL	5g/100mL	0.99
A9I0893-08	Sediment	SM 4500-S2 D-00	09/25/19 18:15	10/02/19 11:07	5.368g/100mL	5g/100mL	0.93
A9I0893-09	Sediment	SM 4500-S2 D-00	09/26/19 08:15	10/02/19 11:07	5.279g/100mL	5g/100mL	0.95

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

Analytical Resources, Inc.

SAMPLE PREPARATION INFORMATION

Wet Chemistry

Prep: EPA 9030B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A9I0893-11	Sediment	SM 4500-S2 D-00	09/26/19 11:50	10/02/19 11:07	5.319g/100mL	5g/100mL	0.94
A9I0893-13	Sediment	SM 4500-S2 D-00	09/26/19 13:50	10/02/19 11:07	5.091g/100mL	5g/100mL	0.98
A9I0893-14	Sediment	SM 4500-S2 D-00	09/26/19 15:40	10/02/19 11:07	5.352g/100mL	5g/100mL	0.93

Prep: No Prep Wet Chem

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: BHJ0036							
A9I0893-01	Sediment	PSEP 1986	09/25/19 08:10	10/01/19 21:48	5g/5g	5g/5g	1.00
A9I0893-05	Sediment	PSEP 1986	09/25/19 11:20	10/01/19 21:48	5g/5g	5g/5g	1.00
A9I0893-08	Sediment	PSEP 1986	09/25/19 18:15	10/01/19 21:48	5g/5g	5g/5g	1.00
A9I0893-09	Sediment	PSEP 1986	09/26/19 08:15	10/01/19 21:48	5g/5g	5g/5g	1.00
A9I0893-11	Sediment	PSEP 1986	09/26/19 11:50	10/01/19 21:48	5g/5g	5g/5g	1.00
A9I0893-13	Sediment	PSEP 1986	09/26/19 13:50	10/01/19 21:48	5g/5g	5g/5g	1.00
A9I0893-14	Sediment	PSEP 1986	09/26/19 15:40	10/01/19 21:48	5g/5g	5g/5g	1.00
Batch: BHJ0097							
A9I0893-18	Water	SM 4500-S2 D-00	09/26/19 18:40	10/03/19 09:18	5mL/5mL	5mL/5mL	1.00
Batch: BHJ0145							
A9I0893-19	Water	SM 4500-S2 D-00	09/25/19 18:15	10/04/19 13:20	5mL/5mL	5mL/5mL	1.00

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

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A-01	Due to coelution of isomers, 2,3,4,6- and 2,3,4,5-Tetrachlorophenol (TCP) are reported as a sum and are Estimated Values. Results are calculated using the response factor of 2,3,4,6-TCP. Batch results accepted based on spike recovery of 2,3,4,6-TCP.
B	Analyte detected in an associated blank at a level above the MRL. (See Notes and Conventions below.)
B-02	Analyte detected in an associated blank at a level between one-half the MRL and the MRL. (See Notes and Conventions below.)
C-07	Extract has undergone Sulfuric Acid Cleanup by EPA 3665A, Sulfur Cleanup by EPA 3660B, and Florisil Cleanup by EPA 3620B in order to minimize matrix interference.
GS-01	See detailed Particle Size Analysis results, accumulation curves, and Case Narratives at the end of this report.
H-06	This sample was received, or the analysis requested, outside the recommended holding time.
J	Estimated Result. Result detected below the lowest point of the calibration curve, but above the specified MDL.
M-04	Due to matrix interference, this analyte cannot be accurately quantified. The reported result may contain a high bias.
P-10	Result estimated due to the presence of multiple PCB Aroclors and/or matrix interference.
Q-01	Spike recovery and/or RPD is outside acceptance limits.
Q-03	Spike recovery and/or RPD is outside control limits due to the high concentration of analyte present in the sample.
Q-04	Spike recovery and/or RPD is outside control limits due to a non-homogeneous sample matrix.
Q-05	Analyses are not controlled on RPD values from sample and duplicate concentrations that are below 5 times the reporting level.
Q-11	Spike recovery cannot be accurately quantified due to sample dilution required for high analyte concentration and/or matrix interference.
Q-16	Reanalysis of an original Batch QC sample.
Q-19	Blank Spike Duplicate (BSD) sample analyzed in place of Matrix Spike/Duplicate samples due to limited sample amount available for analysis.
Q-24	The RPD for this spike and spike duplicate is above established control limits. Recoveries for both the spike and spike duplicate are within control limits.
Q-29	Recovery for Lab Control Spike (LCS) is above the upper control limit. Data may be biased high.
Q-31	Estimated Results. Recovery of Continuing Calibration Verification sample below lower control limit for this analyte. Results are likely biased low.
Q-41	Estimated Results. Recovery of Continuing Calibration Verification sample above upper control limit for this analyte. Results are likely biased high.
Q-52	Due to erratic or low blank spike recoveries, results for this analyte are considered Estimated Values.
R-02	The Reporting Limit for this analyte has been raised to account for interference from coeluting organic compounds present in the sample.
R-04	Reporting levels elevated due to preparation and/or analytical dilution necessary for analysis.
S-06	Surrogate recovery is outside of established control limits.

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Analytical Resources, Inc.

*	Flagged value is not within established control limits.
D	The reported value is from a dilution
H	Hold time violation - Hold time was exceeded.
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).

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REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

Apex Laboratories



Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

LABORATORY ACCREDITATION INFORMATION

TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories



Philip Nerenberg, Lab Director

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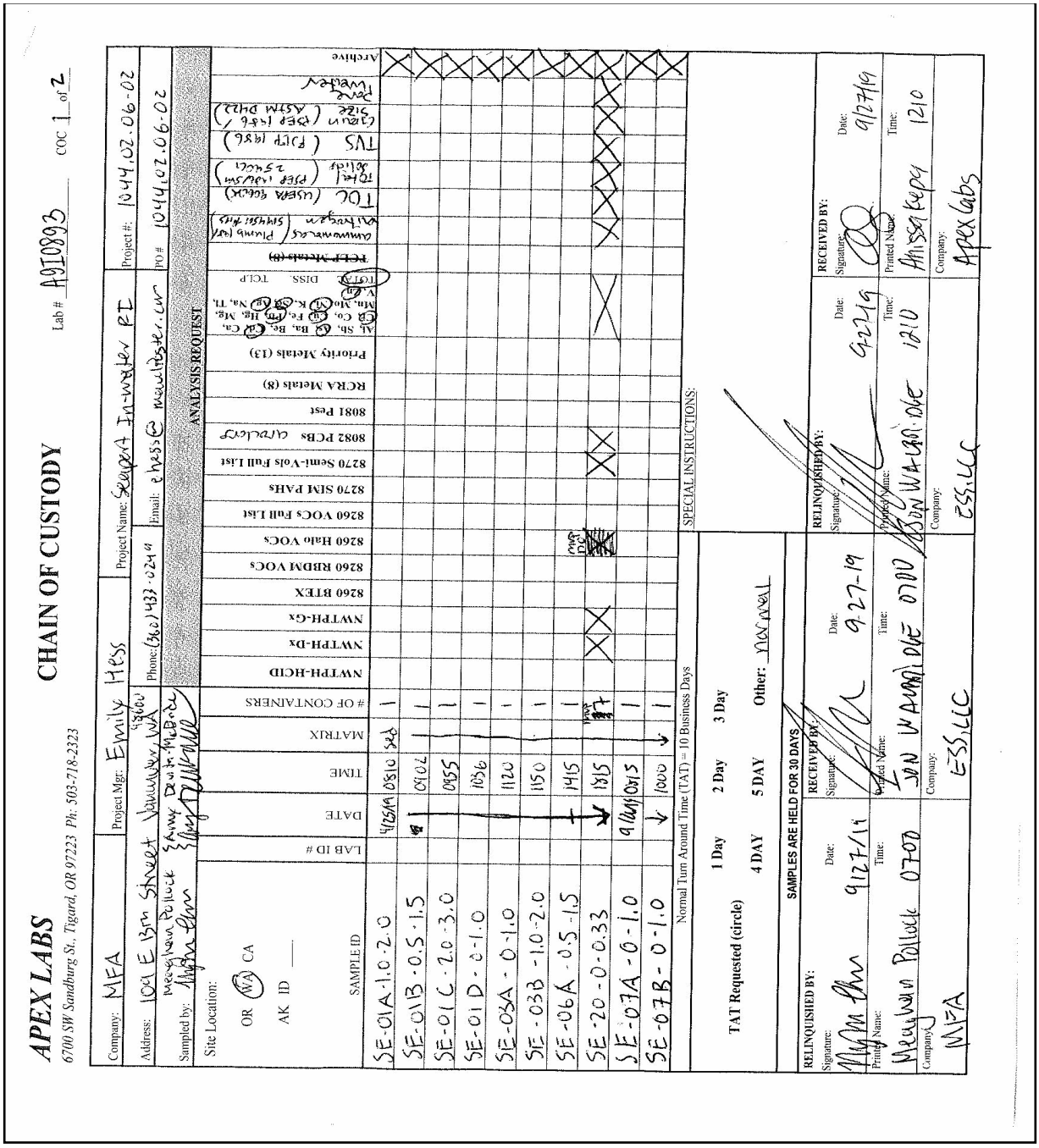

APEX LABS
6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

CHAIN OF CUSTODY

Lab # A9I0893 COC 1 of 2

Company: MFA | Project Mgr: Emily Hess | Project Name: Seaport Investigation RI | Project #: 1044.02.06-02
Address: 1001 E Burnside Street Vancouver, WA 98660 | Phone: (360) 433-0249 | Email: ehess@maulfoster.com | PO # 1044.02.06-02
Sampled by: Meaghan Pollock, Emily Hess, Dawn McBane, Mary Dan

Site Location: OR (WA) CA AK ID ——

ANALYSIS REQUEST

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs aroclors	8081 Pest	RCRA Metals (8)	Priority Metals (13)	Al, Sb, As, Ba, Be, Ca, Co, Cr, Fe, Mg, Mn, Mo, K, Ag, Na, Tl, V, Zn	TCLP DISS	RCRA Metals (8)	Cummulative Volatiles (USEPA 8260C) Naphthalene (USEPA 8270D SIM)	TOC (USEPA 9060A) Total Solids (PSEP 1986)	TVS (PSEP 1986) Grain Size (ASTM D422)	Archive
SE-01A-1.0-2.0		9/25/19	0810	SED	1																				
SE-01B-0.5-1.5		"	0904		1																				
SE-01C-2.0-3.0			0855		1																				
SE-01D-0-1.0			1036		1																				
SE-03A-0-1.0			1120		1																				
SE-03B-1.0-2.0			1150		1																				
SE-06A-0.5-1.5			1415		1																				
SE-20-0-0.33			1815		1		X	X				X			X				X						
SE-07A-0-1.0		9/26/19	0815		1																				
SE-07B-0-1.0			1000		1																				

Normal Turn Around Time (TAT) = 10 Business Days

SPECIAL INSTRUCTIONS:

TAT Requested (circle)
1 Day 2 Day 3 Day
4 DAY 5 DAY Other: NON-STEEL

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: Signature:	Date: 9/27/19	RECEIVED BY: Signature:	Date: 9-27-19	RELINQUISHED BY: Signature:	Date: 9/27/19	RECEIVED BY: Signature:	Date: 9/27/19
Printed Name: Meaghan Pollock	Time: 0700	Printed Name: DAWN MCBANE	Time: 0700	Printed Name: DAWN MCBANE	Time: 1210	Printed Name: Alissa Kepay	Time: 1210
Company: MFA		Company: ESS, LLC		Company: ESS, LLC		Company: APEX Labs	

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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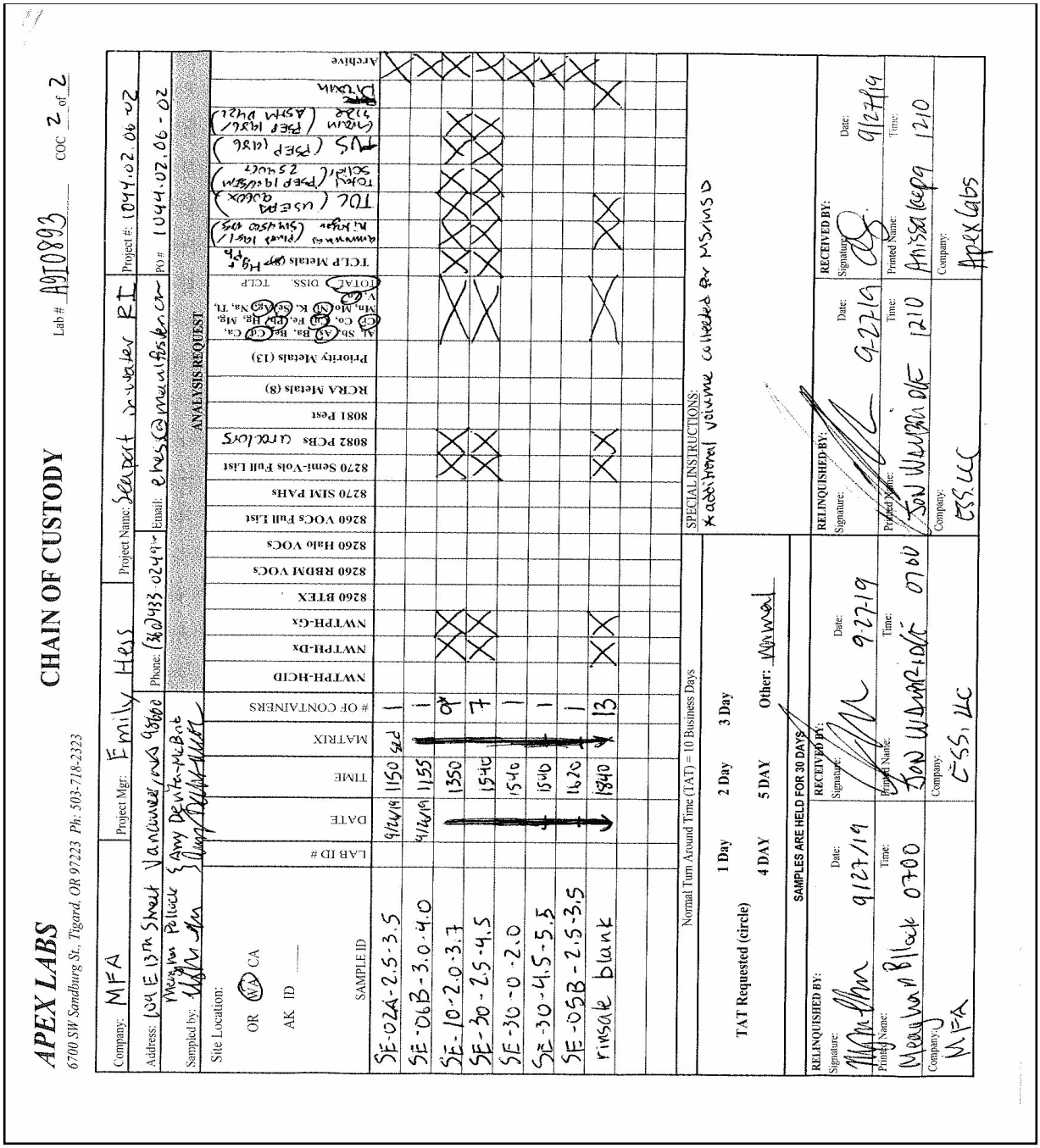
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**



APEX LABS
6700 SW Sandburg St., Tigard, OR 97223 Ph. 503-718-2323

CHAIN OF CUSTODY

Lab # A9I0893 COC 2 of 2

Company: MFA | Project Mgr: Emily Hess | Project Name: Seaport Sediment RI | Project #: 1044.02.06-02
Address: 134 E 13th Street Vancouver WA 98660 | Phone: (360)433-0249 | Email: ehess@mauldfosterlarson.com | PO # 1044.02.06-02
Sampled by: Maryann Pelaez & Amy Dewitt | ANALYSIS REQUEST

Site Location: OR (WA) CA AK ID

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs (Aroclors)	8081 Pest	RCRA Metals (8)	Priority Metals (13)	Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn	TOTAL / DISS / TCLP	TCLP Metals (8RCRA) Hg, Pb	Ammonia as N, Nitrate (Sim 4500 NO3)	TOC (USEPA 9060A)	Total Sulfides (PSEP 1986/Plumb 1981 Modified)	TMS (PSEP 1986)	Grain Size (PSEP 1986/ASTM D422)	Archive
SE-02A-2.5-3.5		9/4/19	1150	Sed	1																					
SE-06B-3.0-4.0		9/4/19	1155		1																					
SE-10-2.0-3.7			1350		9			X						X	X					X		X				
SE-30-2.5-4.5			1540		7			X						X	X					X		X				
SE-30-0-2.0			1540		1																					
SE-30-4.5-5.5			1540		1															X		X				
SE-05B-2.5-3.5			1620		1			X						X	X					X		X				
rinsate blank			1840		13			X						X	X					X		X				

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: 10 Work Days

SPECIAL INSTRUCTIONS:
Additional volume collected for MS/MSD

SAMPLES ARE HELD FOR 30 DAYS

	RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature:				
Date:	9/27/19	9/27/19	9-27-19	9/27/19
Time:	0700	0700	1210	1210
Printed Name:	Maryann Pelaez	Jon Wilhelm	Jon Wilhelm	Anissa Heep
Company:	MFA	ESS, LLC	ESS, LLC	Apex Labs

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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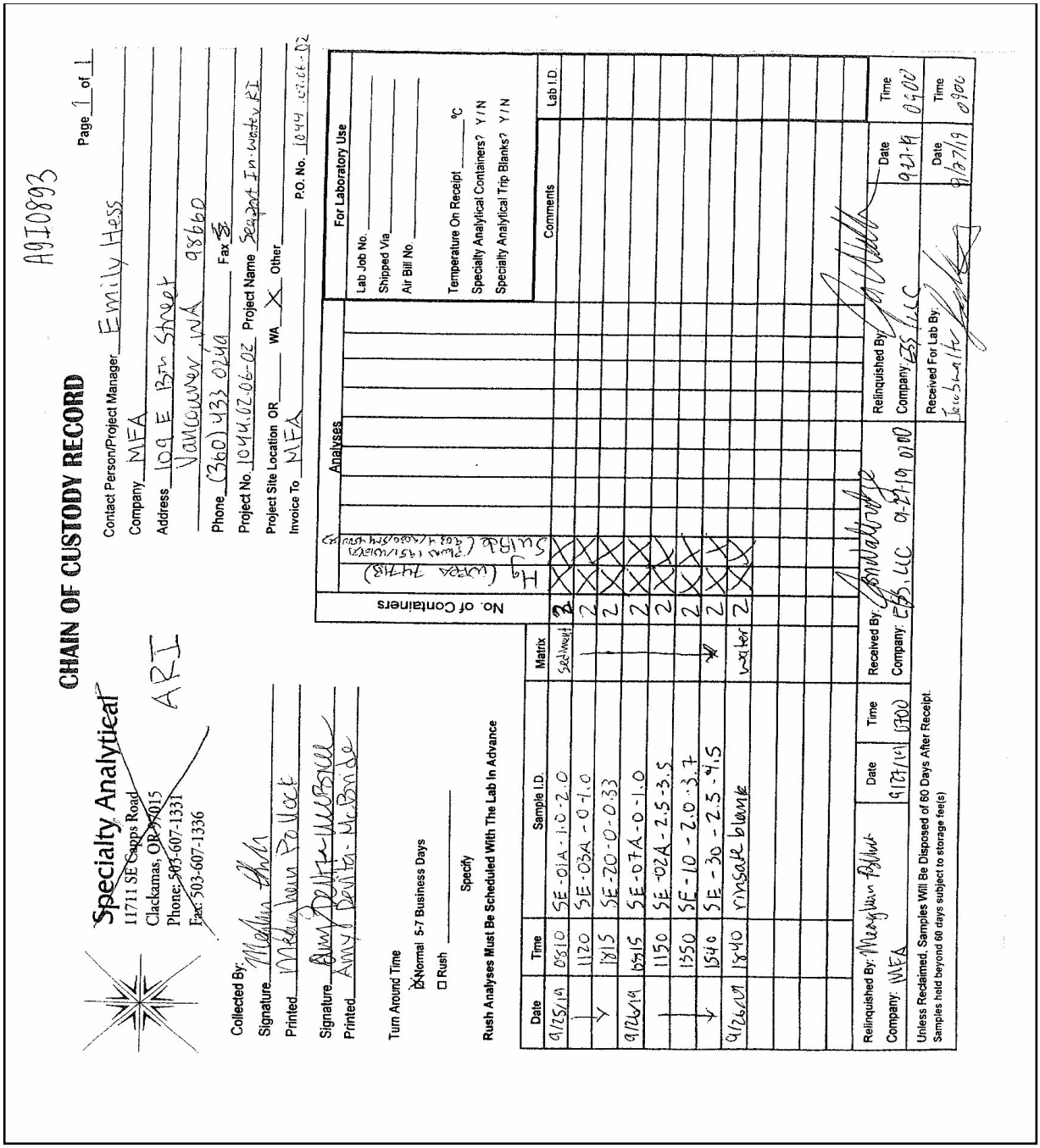

CHAIN OF CUSTODY RECORD — A9I0893 — Page 1 of 1

Specialty Analytical
11711 SE Capps Road
Clackamas, OR 97015
Phone: 503-607-1331
Fax: 503-607-1336

ART

Collected By: Meghan Ahern
Signature: Meghan Ahern
Printed: Meghan Ahern Pollock
Signature: Amy Whitehead
Printed: Amy Whitehead-McBride

Turn Around Time
☒ Normal 5-7 Business Days
☐ Rush ____ Specify
Rush Analyses Must Be Scheduled With The Lab In Advance

Contact Person/Project Manager: Emily Hess
Company: MFA
Address: 109 E 13th Street, Vancouver, WA 98660
Phone: (360) 433-0210 Fax:
Project No. 1044.02.06-02 Project Name: Seaport Tidelands
Project Site Location OR ___ WA X Other ___ P.O. No. 1044.02.06-02
Invoice To MFA

Analyses: Silica (Mega 7473)

For Laboratory Use: Lab Job No. ___ Shipped Via ___ Air Bill No. ___ Temperature On Receipt ___ °C Specialty Analytical Containers? Y/N Specialty Analytical Trip Blanks? Y/N

Date	Time	Sample I.D.	Matrix	No. of Containers	Comments	Lab I.D.
9/25/19	0810	SE-01A-1.0-2.0	Sediment	2		
	1120	SE-03A-0-1.0		2		
	1315	SE-20-0-0.33		2		
9/26/19	0915	SE-07A-0-1.0		2		
	1150	SE-02A-2.5-3.5		2		
	1350	SE-10-2.0-3.7		2		
	1540	SE-30-2.5-4.5		2		
9/26/19	1840	rinsate blank	water	2		

Relinquished By: Meghan Ahern — Date 9/27/19 — Time 0700
Company: MFA
Received By: [signature] — Date 9/27/19 — Time 0700
Company: ESS, LLC
Relinquished By: [signature] — Date 9/27-19 — Time 0700
Company: ESS, LLC
Received For Lab By: [signature] — Date 9/27/19 — Time 0900

Unless Reclaimed, Samples Will Be Disposed of 60 Days After Receipt.
Samples held beyond 60 days subject to storage fee(s)

Apex Laboratories

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Philip Nerenberg

Philip Nerenberg, Lab Director

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

1/2

APEX LABS COOLER RECEIPT FORM

Client: Maul Foster & Alongi - Vancouver Element WO#: A9I0893

Project/Project #: Seaport In-Water RI #1044.02.06-02

Delivery Info:

Date/time received: 9/27/19 @ 1210 By: AKK

Delivered by: Apex____Client____ESS X FedEx____UPS____Swift___Senvoy ___SDS___Other_____

Cooler Inspection Date/time inspected: 9/27/19 @ 1225 By: AKK

Chain of Custody included? Yes X No ___ Custody seals? Yes_____ No X

Signed/dated by client? Yes X No ___

Signed/dated by Apex? Yes X No ___

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	1.3	1.7	1.1	0.5			
Received on ice? (Y/N)	Y	Y	Y	Y			
Temp. blanks? (Y/N)	N	N	N	Y			
Ice type: (Gel/Real/Other)	Real	Real	Real	Real			
Condition:	Good	Good	Good	Good			

Cooler out of temp? (Y/(N)) Possible reason why:

If some coolers are in temp and some out, were green dots applied to out of temperature samples? Yes/No/(NA)

Out of temperature samples form initiated? Yes/No/(NA)

Samples Inspection: Date/time inspected: 9/27/19 @ 1715 By: (SC)

All samples intact? Yes X No ___ Comments:

Bottle labels/COCs agree? Yes ___ No X Comments: See form

COC/container discrepancies form initiated? Yes X No ___ NA ___

Containers/volumes received appropriate for analysis? Yes X No ___ Comments:

Do VOA vials have visible headspace? Yes ___ No X NA ___

Comments

Water samples: pH checked: Yes X No___NA___ pH appropriate? Yes X No___NA___

Comments:

Additional information:

Subsampler: (SC)
Witness: AKK

Labeled by: (SC) Witness: AKK Cooler Inspected by: (SC) See Project Contact Form: Y

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
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Portland, OR 97209	Project Manager: **Emily Hess**	**A9I0893 - 01 09 20 1624**

A9I0893 2/2

WO#

COC/Container Discrepancies

COC Reads	Container Reads/Comments
SE-01A-1.0-2.0, 1 container	2 containers
SE-03A-0-1.0, 1 container	2 containers
SE-04A-0.5-1.5, 1 container	~~received~~ @ 9/27/19 2 containers

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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Apex Laboratories, LLC

Particle Size Analysis of Soil by ASTM D 422

Sample ID:	A9I0893-08		Client Sample ID:	SE-20-0-0.33		Batch Number:	9100739
Data Entered by:	SJL	Date:	10/14/19	Data Reviewed by:	JW	Date:	10/16/19
Sample Description:	Clayey SILT with some Sand and Gravel			Max Particle Size:	Gravel		
Particle Shape:	Angular			Hardness	Hard and Durable		

Whole Sample	Tare	Air Dry + Tare	Air Dry	Moisture	Dry Wt.
	6.063	173.269	167.21	8.87	153.6

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Wt. Retained	% Retained	% Passing
4	4.75	6.386	13.438	7.05	7.05	4.6	95.4
10	2.00	1.318	2.219	0.90	7.95	0.6	94.8
Pan		6.066	165.008	158.94	166.90	94.3	

Hygroscopic Moisture Correction

	Hygroscopic Correction Factor	Oven Sample	Pan No.	Tare	Air Dry + Tare	Oven Dry + Tare	Moisture
	0.9185		I893-08	1.328	21.252	19.629	8.87

Hydrometer Analysis

Start Date/Time	10/9/2019	10:31	Dispersing Agent	$NaPO_3$
Air Dry Sample Wt. for Hydrometer Test (g)	53.536		G_s Correction Factor (α)	1.000
Percent Passing No.10 Sieve	94.8		Specific Gravity (G_s)	2.65
Dry Weight of Soil Tested (g)	49.17		Corrected Dry Weight of Soil Tested (g) (W)	51.86

Elapsed Time (min)	Hydrometer Reading	Temperature (°C)	Corrected Hydrometer Reading [R]	% Finer of Hydrometer Sample	L	K	Particle Diameter (mm)	Percent Passing
1	46	19.2	39.51	76.2	8.6	0.01382	0.041	72.25
2	44	19.2	37.51	72.3	8.9	0.01382	0.029	68.59
4	41	19.3	34.55	66.6	9.4	0.01382	0.021	63.16
8	37	19.4	30.58	59.0	10.1	0.01382	0.016	55.91
15	32.5	19.4	26.08	50.3	10.7	0.01382	0.012	47.68
30	27.5	19.4	21.08	40.6	11.5	0.01382	0.009	38.54
60	23	19.3	16.55	31.9	12.4	0.01382	0.006	30.25
90	21	19.3	14.55	28.0	12.7	0.01382	0.005	26.60
120	19.5	19.2	13.01	25.1	12.9	0.01382	0.005	23.79
240	17.5	19.4	11.08	21.4	13.2	0.01382	0.003	20.26
360	15.5	19.6	9.15	17.6	13.5	0.01365	0.003	16.72
1440	13	18.5	6.28	12.1	14	0.01382	0.001	11.48

Sieve Analysis of Portion Finer Than No. 10 Sieve

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Retained	% Retained	% Passing
20	0.850	1.328	1.519	0.19	8.52	0.4	94.5
40	0.425	1.336	2.241	0.91	11.21	1.7	92.7
60	0.250	1.328	2.326	1.00	14.17	1.9	90.8
100	0.150	1.337	2.472	1.14	17.54	2.2	88.6
140	0.105	1.313	2.019	0.71	19.64	1.4	87.2
200	0.075	1.314	2.106	0.79	21.99	1.5	85.7
230	0.063	1.327	1.651	0.32	22.95	0.6	85.1
			Sum	5.05	230 Minus	44.12	

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Sample ID: SE-20-0-0.33 (A9I0893-08)

Grain Size Analysis Summary from Sieving and Hydrometer Testing		Particle Size (mm)	Percent Finer	Total Percent of Sample
Gravel				*5.18*
Retained on No. 4 sieve		4.75	95.41	4.59
Gravel, passing No. 4 sieve and retained on No. 10 sieve		2.00	94.82	0.59
Sand				*9.74*
Coarse sand, passing No.10 sieve and retained on No. 20 sieve		0.8500	94.45	0.37
Medium sand, passing No.20 sieve and retained on No. 40 sieve		0.4250	92.71	1.75
Medium sand, passing No.40 sieve and retained on No. 60 sieve		0.2500	90.78	1.92
Medium sand, passing No. 60 sieve and retained on No.100 sieve		0.1500	88.6	2.19
Fine sand, passing No. 100 sieve and retained on No.140 sieve		0.1060	87.23	1.36
Fine sand passing No. 140 sieve and retained on No. 200 sieve		0.0750	85.71	1.53
Fine sand, passing No. 200 sieve and retained on No. 230 sieve		0.0630	85.08	0.62
Silt and Clay (Measurements in the Clay fraction are noted)				*85.08*
Hydrometer Test		0.0405	72.25	12.84
Hydrometer Test		0.0292	68.59	3.66
Hydrometer Test		0.0212	63.16	5.42
Hydrometer Test		0.0155	55.91	7.25
Hydrometer Test		0.0117	47.68	8.23
Hydrometer Test		0.0086	38.54	9.14
Hydrometer Test		0.0063	30.25	8.29
Hydrometer Test		0.0052	26.6	3.66
Hydrometer Test	Clay	0.0045	23.79	2.8
Hydrometer Test	Clay	0.0032	20.26	3.53
Hydrometer Test	Clay	0.0026	16.72	3.53
Hydrometer Test	Clay	0.0014	11.48	5.24

Grain Size Summary	Percent of Total Sample
Gravel	5.2
Sand	9.7
Coarse sand	0.4
Medium sand	5.9
Fine sand	3.5
Silt	58.5
Clay	26.6

Case Narrative for Sample ID: SE-20-0-0.33 (A9I0893-08)

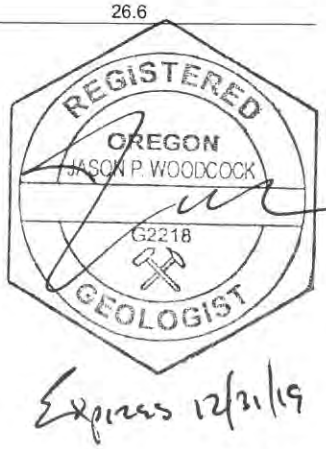
This data is not to be used for engineering purposes.

No difficulty dispersing the fraction passing the No. 10 sieve.

Dispersion device used: Commercial drink mixer operating at least 10,000 rpm for one minute.

The assumed specific gravity used in the calculations was 2.65.

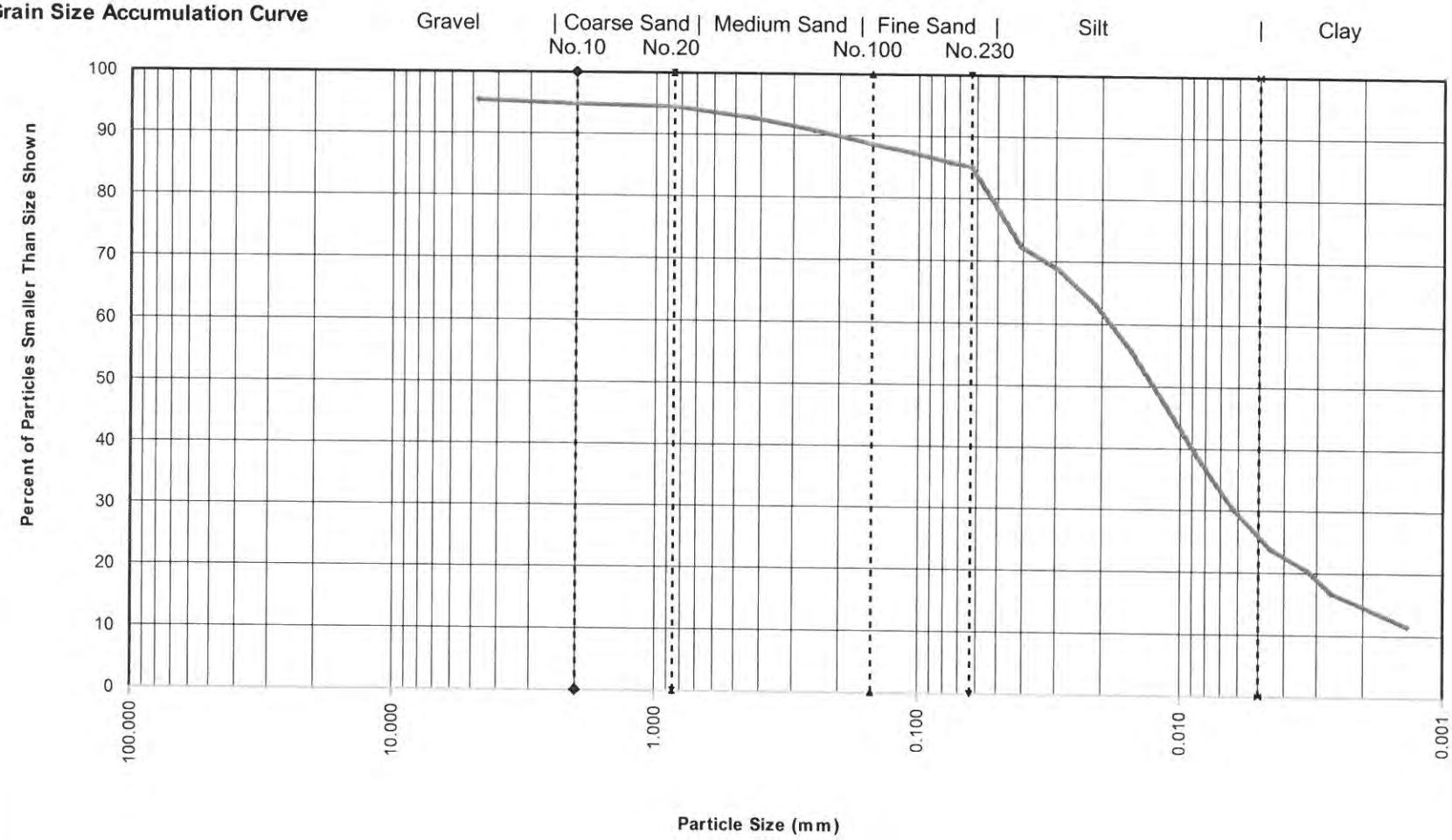
Organic material present in +10 through +100 fractions.



Expires 12/31/19

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Grain Size Accumulation Curve



Sample ID:	SE-20-0-0.33 (A9I0893-08)			
Specific Gravity	MAXIMUM PARTICLE SIZE	GRAVEL & SAND		SOIL DESCRIPTION
		PARTICLE SHAPE	HARDNESS	
2.65	Gravel	Angular	Hard and Durable	Clayey SILT with some Sand and Gravel

Apex Laboratories, LLC

Particle Size Analysis of Soil by ASTM D 422

Sample ID:	A9I0893-13		Client Sample ID:	SE-10-2.0-3.7		Batch Number:	9100739
Data Entered by:	SJL	Date:	10/14/19	Data Reviewed by:	JW	Date:	10/16/19
Sample Description:	Clayey SILT with some Sand and Gravel			Max Particle Size:	Gravel		
Particle Shape:	N/A			Hardness	N/A		

Whole Sample	Tare	Air Dry + Tare	Air Dry	Moisture	Dry Wt.
	5.881	160.481	154.60	11.72	138.4

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Wt. Retained	% Retained	% Passing
4	4.75	6.071	20.914	14.84	14.84	10.7	89.3
10	2.00	6.048	12.623	6.58	21.42	4.8	84.5
Pan		5.882	132.781	126.90	148.32	81.0	

Hygroscopic Moisture Correction

	Hygroscopic Correction Factor	Oven Sample	Pan No.	Tare	Air Dry + Tare	Oven Dry + Tare	Moisture
	0.8951		I893-13	1.309	20.044	18.079	11.72

Hydrometer Analysis

Start Date/Time	10/7/2019	11:26	Dispersing Agent	$NaPO_3$
Air Dry Sample Wt. for Hydrometer Test (g)	52.105		G_s Correction Factor (α)	1.000
Percent Passing No.10 Sieve	84.5		Specific Gravity (G_s)	2.65
Dry Weight of Soil Tested (g)	46.64		Corrected Dry Weight of Soil Tested (g) (W)	55.18

Elapsed Time (min)	Hydrometer Reading	Temperature (°C)	Corrected Hydrometer Reading [R]	% Finer of Hydrometer Sample	L	K	Particle Diameter (mm)	Percent Passing
1	36	20.2	29.85	54.1	10.2	0.01365	0.044	45.72
2	33.5	20.2	27.35	49.6	10.5	0.01365	0.031	41.89
4	30.5	20.1	24.31	44.1	11.1	0.01365	0.023	37.24
8	28.5	20.3	22.38	40.6	11.4	0.01365	0.016	34.28
15	24	20.3	17.88	32.4	12.2	0.01365	0.012	27.39
30	20.5	20.3	14.38	26.1	12.7	0.01365	0.009	22.03
60	17.5	20.1	11.31	20.5	13.2	0.01365	0.006	17.33
90	16.5	19.9	10.25	18.6	13.3	0.01365	0.005	15.70
120	15.5	19.9	9.25	16.8	13.5	0.01365	0.005	14.16
240	14.5	19.7	8.18	14.8	13.7	0.01365	0.003	12.53
360	13	19.5	6.61	12.0	14	0.01365	0.003	10.13
1440	11	19.2	4.51	8.2	14.3	0.01382	0.001	6.91

Sieve Analysis of Portion Finer Than No. 10 Sieve

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Retained	% Retained	% Passing
20	0.850	1.314	4.435	3.12	29.02	5.7	78.9
40	0.425	1.317	5.527	4.21	39.27	7.6	71.2
60	0.250	1.330	4.885	3.56	47.93	6.4	64.8
100	0.150	1.310	3.191	1.88	52.51	3.4	61.4
140	0.105	1.329	2.545	1.22	55.47	2.2	59.2
200	0.075	1.316	2.718	1.40	58.89	2.5	56.6
230	0.063	1.307	2.121	0.81	60.87	1.5	55.2
			Sum	16.20	230 Minus	30.44	

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Sample ID: SE-10-2.0-3.7 (A9I0893-13)

Grain Size Analysis Summary from Sieving and Hydrometer Testing		Particle Size (mm)	Percent Finer	Total Percent of Sample
Gravel				*15.48*
Retained on No. 4 sieve		4.75	89.27	10.73
Gravel, passing No. 4 sieve and retained on No. 10 sieve		2.00	84.52	4.75
Sand				*29.36*
Coarse sand, passing No.10 sieve and retained on No. 20 sieve		0.8500	78.87	5.66
Medium sand, passing No.20 sieve and retained on No. 40 sieve		0.4250	71.24	7.63
Medium sand, passing No.40 sieve and retained on No. 60 sieve		0.2500	64.79	6.44
Medium sand, passing No. 60 sieve and retained on No.100 sieve		0.1500	61.39	3.41
Fine sand, passing No. 100 sieve and retained on No.140 sieve		0.1060	59.18	2.2
Fine sand passing No. 140 sieve and retained on No. 200 sieve		0.0750	56.64	2.54
Fine sand, passing No. 200 sieve and retained on No. 230 sieve		0.0630	55.17	1.48
Silt and Clay (Measurements in the Clay fraction are noted)				*55.17*
Hydrometer Test		0.0436	45.72	9.45
Hydrometer Test		0.0313	41.89	3.83
Hydrometer Test		0.0227	37.24	4.65
Hydrometer Test		0.0163	34.28	2.96
Hydrometer Test		0.0123	27.39	6.89
Hydrometer Test		0.0089	22.03	5.36
Hydrometer Test		0.0064	17.33	4.7
Hydrometer Test		0.0052	15.7	1.63
Hydrometer Test	Clay	0.0046	14.16	1.53
Hydrometer Test	Clay	0.0033	12.53	1.63
Hydrometer Test	Clay	0.0027	10.13	2.4
Hydrometer Test	Clay	0.0014	6.91	3.22

Grain Size Summary	Percent of Total Sample
Gravel	15.5
Sand	29.4
Coarse sand	5.7
Medium sand	17.5
Fine sand	6.2
Silt	39.5
Clay	15.7

Case Narrative for Sample ID: SE-10-2.0-3.7 (A9I0893-13)

This data is not to be used for engineering purposes.

No difficulty dispersing the fraction passing the No. 10 sieve.

Dispersion device used: Commercial drink mixer operating at least 10,000 rpm for one minute.

The assumed specific gravity used in the calculations was 2.65.

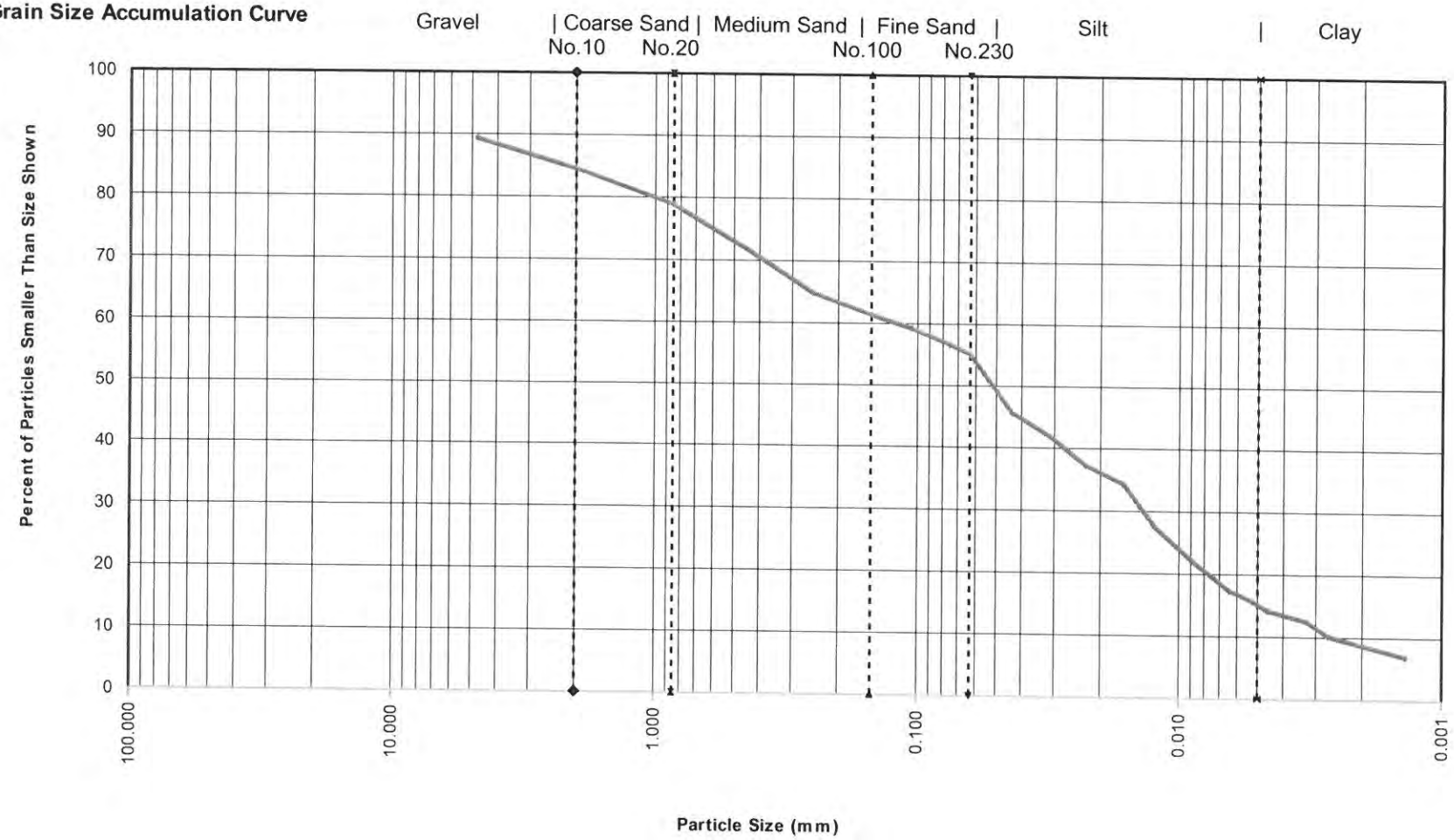
+4 through +100 fractions consist almost entirely of organic material.



Expires 12/31/19

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Grain Size Accumulation Curve



Sample ID:	SE-10-2.0-3.7 (A9I0893-13)			
Specific Gravity	MAXIMUM PARTICLE SIZE	GRAVEL & SAND		SOIL DESCRIPTION
		PARTICLE SHAPE	HARDNESS	
2.65	Gravel	N/A	N/A	Clayey SILT with some Sand and Gravel

Apex Laboratories, LLC

Particle Size Analysis of Soil by ASTM D 422

Sample ID:	A9I0893-14		Client Sample ID:	SE-30-2.5-4.5		Batch Number:	9100739
Data Entered by:	SJL	Date:	10/14/19	Data Reviewed by:	JW	Date:	10/16/19
Sample Description:	Clayey SILT with trace Sand and Gravel			Max Particle Size:	Gravel		
Particle Shape:	Sub-angular to Sub-rounded			Hardness	Weathered to Friable		

Whole Sample	Tare	Air Dry + Tare	Air Dry	Moisture	Dry Wt.
	6.284	270.067	263.78	9.40	241.1

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Wt. Retained	% Retained	% Passing
4	4.75	6.384	16.322	9.94	9.94	4.1	95.9
10	2.00	6.395	10.418	4.02	13.96	1.7	94.2
Pan		6.285	254.029	247.74	261.71	93.1	

Hygroscopic Moisture Correction

	Hygroscopic Correction Factor	Oven Sample	Pan No.	Tare	Air Dry + Tare	Oven Dry + Tare	Moisture
	0.9141		I893-14	1.342	21.171	19.467	9.40

Hydrometer Analysis

Start Date/Time	10/7/2019	11:48	Dispersing Agent	$NaPO_3$
Air Dry Sample Wt. for Hydrometer Test (g)	53.785		G_s Correction Factor (α)	1.000
Percent Passing No.10 Sieve	94.2		Specific Gravity (G_s)	2.65
Dry Weight of Soil Tested (g)	49.16		Corrected Dry Weight of Soil Tested (g) (W)	52.18

Elapsed Time (min)	Hydrometer Reading	Temperature (°C)	Corrected Hydrometer Reading [R]	% Finer of Hydrometer Sample	L	K	Particle Diameter (mm)	Percent Passing
1	46	20	39.78	76.2	8.6	0.01365	0.040	71.82
2	42.5	20	36.28	69.5	9.1	0.01365	0.029	65.50
4	38.5	20.1	32.31	61.9	9.7	0.01365	0.021	58.34
8	33.5	20.2	27.35	52.4	10.5	0.01365	0.016	49.37
15	29.5	20.2	23.35	44.7	11.2	0.01365	0.012	42.15
30	25.5	20.1	19.31	37.0	11.9	0.01365	0.009	34.87
60	23	19.9	16.75	32.1	12.4	0.01365	0.006	30.23
90	21	19.8	14.71	28.2	12.7	0.01365	0.005	26.56
120	19.5	19.8	13.21	25.3	12.9	0.01365	0.004	23.85
240	17.5	19.7	11.18	21.4	13.2	0.01365	0.003	20.18
360	16.5	19.5	10.11	19.4	13.3	0.01365	0.003	18.26
1440	13	19.3	6.55	12.5	14	0.01382	0.001	11.82

Sieve Analysis of Portion Finer Than No. 10 Sieve

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Retained	% Retained	% Passing
20	0.850	1.313	2.010	0.70	17.17	1.3	92.9
40	0.425	1.341	2.404	1.06	22.07	2.0	90.8
60	0.250	1.318	2.091	0.77	25.63	1.5	89.4
100	0.150	1.325	2.132	0.81	29.35	1.5	87.8
140	0.105	1.333	1.991	0.66	32.38	1.3	86.5
200	0.075	1.307	2.450	1.14	37.64	2.2	84.4
230	0.063	1.333	2.140	0.81	41.36	1.5	82.8
		Sum		5.95	230 Minus	43.21	

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Sample ID: SE-30-2.5-4.5 (A9I0893-14)

Grain Size Analysis Summary from Sieving and Hydrometer Testing		Particle Size (mm)	Percent Finer	Total Percent of Sample
Gravel				*5.79*
Retained on No. 4 sieve		4.75	95.88	4.12
Gravel, passing No. 4 sieve and retained on No. 10 sieve		2.00	94.21	1.67
Sand				*11.4*
Coarse sand, passing No.10 sieve and retained on No. 20 sieve		0.8500	92.87	1.34
Medium sand, passing No.20 sieve and retained on No. 40 sieve		0.4250	90.84	2.04
Medium sand, passing No.40 sieve and retained on No. 60 sieve		0.2500	89.36	1.48
Medium sand, passing No. 60 sieve and retained on No.100 sieve		0.1500	87.81	1.55
Fine sand, passing No. 100 sieve and retained on No.140 sieve		0.1060	86.55	1.26
Fine sand passing No. 140 sieve and retained on No. 200 sieve		0.0750	84.36	2.19
Fine sand, passing No. 200 sieve and retained on No. 230 sieve		0.0630	82.81	1.55
Silt and Clay (Measurements in the Clay fraction are noted)				*82.81*
Hydrometer Test		0.0400	71.82	11
Hydrometer Test		0.0291	65.5	6.32
Hydrometer Test		0.0213	58.34	7.16
Hydrometer Test		0.0156	49.37	8.97
Hydrometer Test		0.0118	42.15	7.22
Hydrometer Test		0.0086	34.87	7.28
Hydrometer Test		0.0062	30.23	4.63
Hydrometer Test		0.0051	26.56	3.67
Hydrometer Test	Clay	0.0045	23.85	2.71
Hydrometer Test	Clay	0.0032	20.18	3.67
Hydrometer Test	Clay	0.0026	18.26	1.93
Hydrometer Test	Clay	0.0014	11.82	6.44

Grain Size Summary	Percent of Total Sample
Gravel	5.8
Sand	11.4
Coarse sand	1.3
Medium sand	5.1
Fine sand	5.0
Silt	56.2
Clay	26.6

Case Narrative for Sample ID: SE-30-2.5-4.5 (A9I0893-14)

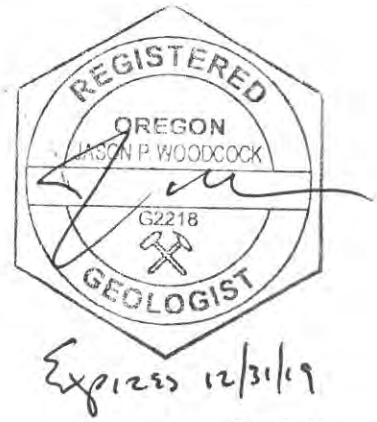
This data is not to be used for engineering purposes.

No difficulty dispersing the fraction passing the No. 10 sieve.

Dispersion device used: Commercial drink mixer operating at least 10,000 rpm for one minute.

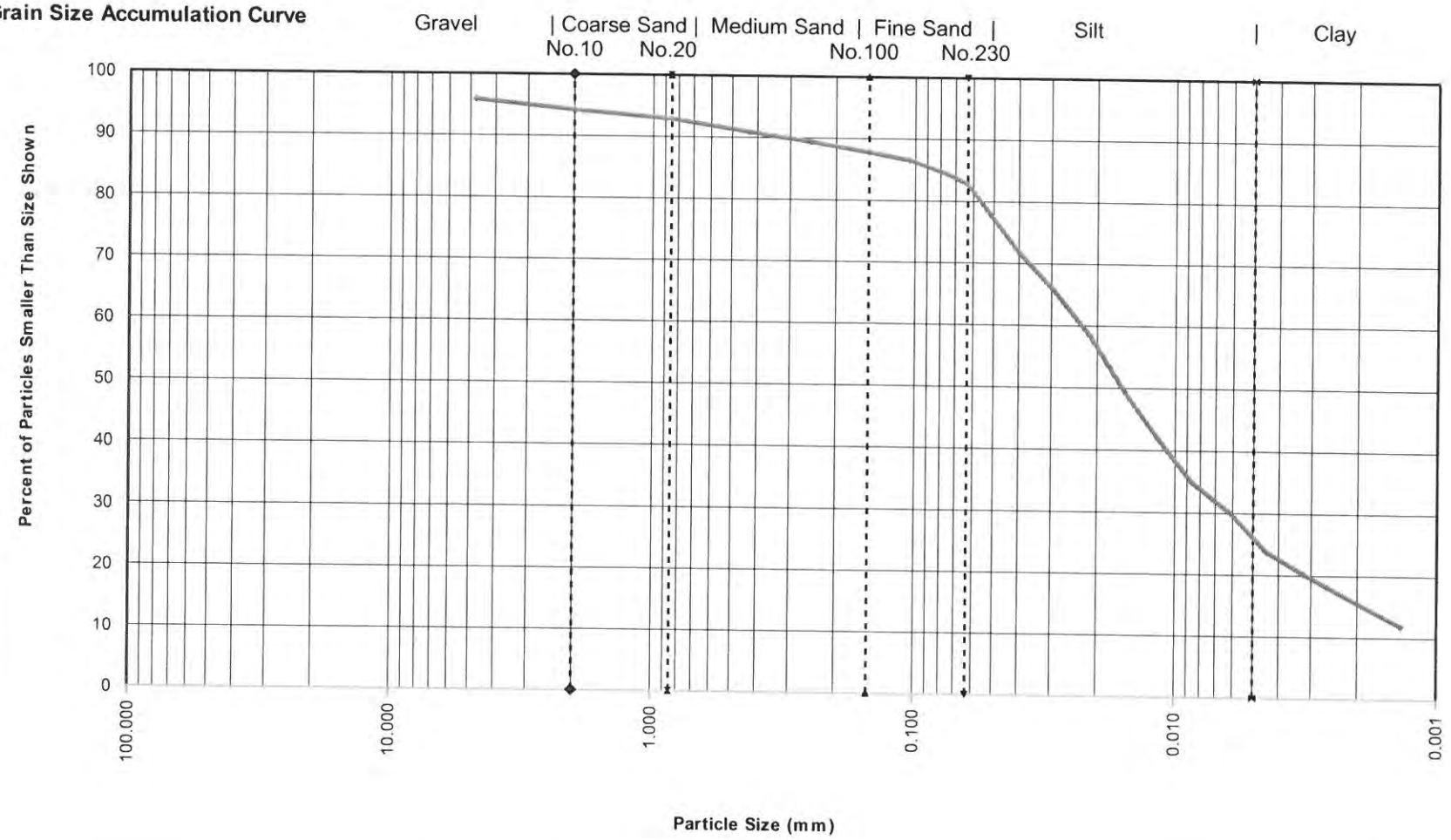
The assumed specific gravity used in the calculations was 2.65.

+4 through +100 fractions consist of abundant organic material.



Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Grain Size Accumulation Curve



Sample ID:	SE-30-2.5-4.5 (A9I0893-14)			
Specific Gravity	MAXIMUM PARTICLE SIZE	GRAVEL & SAND		SOIL DESCRIPTION
		PARTICLE SHAPE	HARDNESS	
2.65	Gravel	Sub-angular to Sub-rounded	Weathered to Friable	Clayey SILT with trace Sand and Gravel

CFA | Cape Fear Analytical LLC
an affiliate of The GEL Group INC

3306 Kitty Hawk Road, Suite 120 Wilmington, NC 28405
P 910.795.0421
www.capefearanalytical.com

October 22, 2019

Mr. Philip Nerenberg
Apex Laboratories
6700 SW Sandburg Street
Portland, Oregon 97223

Re: DXN & PCB Subcontract
Work Order: 15579
SDG: A9I0893

Dear Mr. Nerenberg:

Cape Fear Analytical LLC (CFA) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on October 01, 2019. This original data report has been prepared and reviewed in accordance with CFA's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at 910-795-0421.

Sincerely,

Cynde Larkins

Cynde Larkins
Project Manager

Enclosures

problem solved

SUBCONTRACT ORDER

Apex Laboratories

A9I0893

9/30/19

SENDING LABORATORY:

Apex Laboratories
6700 S.W. Sandburg Street
Tigard, OR 97223
Phone: (503) 718-2323
Fax: (503) 336-0745
Project Manager: Philip Nerenberg

RECEIVING LABORATORY:

Cape Fear Analytical, LLC
3306 Kitty Hawk Rd Suite 120
Wilmington, NC 28405
Phone :(910) 795-0421
Fax: -

CFA WO#15579

Sample Name: Rinsate Blank **Water** **Sampled: 09/26/19 18:40** (A9I0893-18)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	10/10/19 17:00	03/24/20 18:40	Cape Fear
Containers Supplied:			
(L)1 L Amber Glass - Non Preserved			
(M)1 L Amber Glass - Non Preserved			

Standard TAT

temp = 3.8°C

Released By	Date	Received By	Date
	9/30/19	Fed Ex (Shipper)	
Fed Ex (Shipper)			
Released By	Date	Received By	Date
			10/1/19 @ 1008

SAMPLE RECEIPT CHECKLIST

Cape Fear Analytical

Client: Apex	Work Order: 15579
Shipping Company: Fed Ex	Date/Time Received: 10/1/19 10:08

Suspected Hazard Information	Yes	NA	No
Shipped as DOT Hazardous?			✓
Samples identified as Foreign Soil?			✓

DOE Site Sample Packages	Yes	NA	No*
Screened <0.5 mR/hr?		✓	
Samples < 2x background?		✓	

* Notify RSO of any responses in this column immediately.

Air Sample Receipt Specifics	Yes	NA	No
Air sample in shipment?			✓

Air Witness: _____

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: seals broken damaged container leaking container other(describe)
2	Custody seal/s present on cooler?			✓	Seal intact? Yes No
3	Chain of Custody documents included with shipment?	✓			
4	Samples requiring cold preservation within 0-6°C?	✓			Preservation Method: ice bags blue ice dry ice none other (describe) Temperature Blank present: (Yes) No 4.1-0.3=3.8°
5	Aqueous samples found to have visible solids?			✓	Sample IDs, containers affected:
5	Samples requiring chemical preservation at proper pH?	✓			Sample IDs, containers affected and pH observed: pH=8 If preservative added, Lot#:
7	Samples requiring preservation have no residual chlorine?	✓			Sample IDs, containers affected: If preservative added, Lot#:
8	Samples received within holding time?	✓			Sample IDs, tests affected:
9	Sample IDs on COC match IDs on containers?	✓			Sample IDs, containers affected:
10	Date & time of COC match date & time on containers?	✓			Sample IDs, containers affected:
11	Number of containers received match number indicated on COC?	✓			List type and number of containers / Sample IDs, containers affected: Received 2-1L NM amber
12	COC form is properly signed in relinquished/received sections?	✓			

Comments:

Checklist performed by: Initials: _____ Date: 10/1/19

CF-UD-F-7

High Resolution Dioxins and Furans Analysis

Case Narrative

HDOX Case Narrative
Apex Laboratories (APEX)
SDG A9I0893
Work Order 15579

Method/Analysis Information

Product:	**Dioxins/Furans by EPA Method 1613B in Liquids**
Analytical Method:	EPA Method 1613B
Extraction Method:	SW846 3520C
Analytical Batch Number:	42013
Clean Up Batch Number:	42009
Extraction Batch Number:	42008

Sample Analysis

Sample 15579001 was received at 3.8°C. The following samples were analyzed using the analytical protocol as established in EPA Method 1613B:

Sample ID	Client ID
12025039	Method Blank (MB)
12025040	Laboratory Control Sample (LCS)
12025041	Laboratory Control Sample Duplicate (LCSD)
15579001	Rinsate Blank

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by Cape Fear Analytical LLC (CFA) as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with CF-OA-E-002 REV# 15.

Raw data reports are processed and reviewed by the analyst using the TargetLynx software package.

Calibration Information

Initial Calibration

All initial calibration requirements have been met for this sample delivery group (SDG).

Continuing Calibration Verification (CCV) Requirements

All associated calibration verification standard(s) (CCV) met the acceptance criteria.

Quality Control (QC) Information

Certification Statement
The test results presented in this document are certified to meet all requirements of the 2009 TNI Standard.

Method Blank (MB) Statement
The MB(s) analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries
All surrogate recoveries were within the established acceptance criteria for this SDG.

Laboratory Control Sample (LCS) Recovery
The LCS spike recoveries met the acceptance limits.

Laboratory Control Sample Duplicate (LCSD) Recovery
The LCSD spike recoveries met the acceptance limits.

LCS/LCSD Relative Percent Difference (RPD) Statement
The RPD(s) between the LCS and LCSD met the acceptance limits.

QC Sample Designation
A matrix spike and matrix spike duplicate analysis was not required for this SDG.

Technical Information

Holding Time Specifications
CFA assigns holding times based on the associated methodology, which assigns the date and time from sample collection. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

Preparation/Analytical Method Verification
All procedures were performed as stated in the SOP.

Sample Dilutions
The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis
Re-extractions or re-analyses were not required in this SDG.

Miscellaneous Information

Nonconformance (NCR) Documentation
A NCR was not required for this SDG.

Manual Integrations
Certain standards and QC samples required manual integrations to correctly position the baseline as set in the calibration standard injections. Where manual integrations were performed, copies of all manual integration peak profiles are included in the raw data section of this fraction. Manual integrations were required for data files in this SDG.

System Configuration
This analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
HRP763_1	Primary Dioxin Analysis	Dioxin Analysis	DB-5MS	60m x 0.25mm, 0.25um

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted: Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Sample Data Summary

Cape Fear Analytical, LLC

3306 Kitty Hawk Road Suite 120, Wilmington, NC 28405 - (910) 795-0421 - www.capefearanalytical.com

Qualifier Definition Report
for

APEX001 Apex Laboratories

Client SDG: A9I0893 CFA Work Order: 15579

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria

** Analyte is a surrogate compound

B The target analyte was detected in the associated blank.

J Value is estimated

K Estimated Maximum Possible Concentration

U Analyte was analyzed for, but not detected above the specified detection limit.

DL Indicates that sample is diluted.

RA Indicates that sample is re-analyzed without re-extraction.

RE Indicates that sample is re-extracted.

Review/Validation

Cape Fear Analytical requires all analytical data to be verified by a qualified data reviewer.

The following data validator verified the information presented in this case narrative:

Signature:  **Name: Heather Patterson**

Date: 22 OCT 2019 **Title: Group Leader**

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	**A9I0893**	**Client:**	**APEX001**	**Project:**	**APEX00319**
Lab Sample ID:	**15579001**	**Date Collected:**	**09/26/2019 18:40**	**Matrix:**	**WATER**
Client Sample:	**1613B Water**	**Date Received:**	**10/01/2019 10:08**		
Client ID:	**Rinsate Blank**			**Prep Basis:**	**As Received**
Batch ID:	**42013**	**Method:**	**EPA Method 1613B**		
Run Date:	**10/16/2019 18:34**	**Analyst:**	**MLS**	**Instrument:**	**HRP763**
Data File:	**b15oct19b_3-7**			**Dilution:**	**1**
Prep Batch:	**42008**	**Prep Method:**	**SW846 3520C**		
Prep Date:	**09-OCT-19**	**Prep Aliquot:**	**899 mL**		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	2.29	pg/L	2.29	11.1
40321-76-4	1,2,3,7,8-PeCDD	U	1.33	pg/L	1.33	55.6
39227-28-6	1,2,3,4,7,8-HxCDD	U	1.82	pg/L	1.82	55.6
57653-85-7	1,2,3,6,7,8-HxCDD	U	1.66	pg/L	1.66	55.6
19408-74-3	1,2,3,7,8,9-HxCDD	U	1.79	pg/L	1.79	55.6
35822-46-9	1,2,3,4,6,7,8-HpCDD	BJK	3.78	pg/L	3.29	55.6
3268-87-9	1,2,3,4,6,7,8,9-OCDD	BJ	82.6	pg/L	8.90	111
51207-31-9	2,3,7,8-TCDF	U	1.81	pg/L	1.81	11.1
57117-41-6	1,2,3,7,8-PeCDF	U	1.17	pg/L	1.17	55.6
57117-31-4	2,3,4,7,8-PeCDF	U	1.01	pg/L	1.01	55.6
70648-26-9	1,2,3,4,7,8-HxCDF	U	0.977	pg/L	0.977	55.6
57117-44-9	1,2,3,6,7,8-HxCDF	U	0.937	pg/L	0.937	55.6
60851-34-5	2,3,4,6,7,8-HxCDF	U	0.963	pg/L	0.963	55.6
72918-21-9	1,2,3,7,8,9-HxCDF	U	1.45	pg/L	1.45	55.6
67562-39-4	1,2,3,4,6,7,8-HpCDF	BJ	1.40	pg/L	1.36	55.6
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	2.08	pg/L	2.08	55.6
39001-02-0	1,2,3,4,6,7,8,9-OCDF	BJ	7.32	pg/L	6.18	111
41903-57-5	Total TeCDD	U	2.29	pg/L	2.29	11.1
36088-22-9	Total PeCDD	U	1.33	pg/L	1.33	55.6
34465-46-8	Total HxCDD	U	1.66	pg/L	1.66	55.6
37871-00-4	Total HpCDD	BJK	3.78	pg/L	3.29	55.6
30402-14-3	Total TeCDF	U	1.81	pg/L	1.81	11.1
30402-15-4	Total PeCDF	U	1.01	pg/L	1.01	55.6
55684-94-1	Total HxCDF	U	0.937	pg/L	0.937	55.6
38998-75-3	Total HpCDF	BJ	3.09	pg/L	1.36	55.6
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		0.0788	pg/L		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		2.64	pg/L		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1820	2220	pg/L	81.7	(25%-164%)
13C-1,2,3,7,8-PeCDD		2060	2220	pg/L	92.7	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		1710	2220	pg/L	76.9	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		1900	2220	pg/L	85.4	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		2080	2220	pg/L	93.7	(23%-140%)
13C-OCDD		3800	4450	pg/L	85.5	(17%-157%)
13C-2,3,7,8-TCDF		1710	2220	pg/L	77.0	(24%-169%)
13C-1,2,3,7,8-PeCDF		1980	2220	pg/L	89.1	(24%-185%)
13C-2,3,4,7,8-PeCDF		2020	2220	pg/L	90.9	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		1670	2220	pg/L	75.2	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		1780	2220	pg/L	79.8	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		1770	2220	pg/L	79.8	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		1760	2220	pg/L	79.0	(29%-147%)

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	**A9I0893**	**Client:**	**APEX001**	**Project:**	**APEX00319**
Lab Sample ID:	**15579001**	**Date Collected:**	**09/26/2019 18:40**	**Matrix:**	**WATER**
Client Sample:	**1613B Water**	**Date Received:**	**10/01/2019 10:08**		
Client ID:	**Rinsate Blank**			**Prep Basis:**	**As Received**
Batch ID:	**42013**	**Method:**	**EPA Method 1613B**		
Run Date:	**10/16/2019 18:34**	**Analyst:**	**MLS**	**Instrument:**	**HRP763**
Data File:	**b15oct19b_3-7**			**Dilution:**	**1**
Prep Batch:	**42008**	**Prep Method:**	**SW846 3520C**		
Prep Date:	**09-OCT-19**	**Prep Aliquot:**	**899 mL**		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-1,2,3,4,6,7,8-HpCDF		1890	2220	pg/L	85.1	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF		2010	2220	pg/L	90.5	(26%-138%)
37Cl-2,3,7,8-TCDD		204	222	pg/L	91.7	(35%-197%)

Comments:

B **The target analyte was detected in the associated blank.**
J **Value is estimated**
K **Estimated Maximum Possible Concentration**
U **Analyte was analyzed for, but not detected above the specified detection limit.**

Quality Control Summary

Hi-Res Dioxins/Furans
Surrogate Recovery Report

SDG Number: A9I0893

Matrix Type: LIQUID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
12025040	LCS for batch 42008	13C-2,3,7,8-TCDD		82.1	(20%-175%)
		13C-1,2,3,7,8-PeCDD		93.7	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		74.9	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		84.0	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		88.1	(22%-166%)
		13C-OCDD		69.9	(13%-199%)
		13C-2,3,7,8-TCDF		76.9	(22%-152%)
		13C-1,2,3,7,8-PeCDF		94.5	(21%-192%)
		13C-2,3,4,7,8-PeCDF		93.1	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		80.2	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		87.4	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		85.3	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		84.4	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		90.0	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		91.8	(20%-186%)
		37Cl-2,3,7,8-TCDD		86.9	(31%-191%)
12025041	LCSD for batch 42008	13C-2,3,7,8-TCDD		82.0	(20%-175%)
		13C-1,2,3,7,8-PeCDD		93.1	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		77.0	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		89.1	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		88.1	(22%-166%)
		13C-OCDD		69.2	(13%-199%)
		13C-2,3,7,8-TCDF		79.5	(22%-152%)
		13C-1,2,3,7,8-PeCDF		96.0	(21%-192%)
		13C-2,3,4,7,8-PeCDF		95.7	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		82.7	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		91.5	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		89.7	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		84.8	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		91.9	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		89.8	(20%-186%)
		37Cl-2,3,7,8-TCDD		85.5	(31%-191%)
12025039	MB for batch 42008	13C-2,3,7,8-TCDD		79.3	(25%-164%)
		13C-1,2,3,7,8-PeCDD		93.0	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		75.5	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		79.1	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		84.8	(23%-140%)
		13C-OCDD		68.2	(17%-157%)
		13C-2,3,7,8-TCDF		76.5	(24%-169%)
		13C-1,2,3,7,8-PeCDF		93.7	(24%-185%)
		13C-2,3,4,7,8-PeCDF		92.6	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		76.8	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		81.8	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		82.9	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		82.9	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		84.7	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		88.2	(26%-138%)
		37Cl-2,3,7,8-TCDD		91.3	(35%-197%)
15579001	Rinsate Blank	13C-2,3,7,8-TCDD		81.7	(25%-164%)

Hi-Res Dioxins/Furans
Surrogate Recovery Report

SDG Number: A9I0893

Matrix Type: LIQUID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
15579001	Rinsate Blank	13C-1,2,3,7,8-PeCDD		92.7	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		76.9	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		85.4	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		93.7	(23%-140%)
		13C-OCDD		85.5	(17%-157%)
		13C-2,3,7,8-TCDF		77.0	(24%-169%)
		13C-1,2,3,7,8-PeCDF		89.1	(24%-185%)
		13C-2,3,4,7,8-PeCDF		90.9	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		75.2	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		79.8	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		79.8	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		79.0	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		85.1	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		90.5	(26%-138%)
		37Cl-2,3,7,8-TCDD		91.7	(35%-197%)

* Recovery outside Acceptance Limits
# Column to be used to flag recovery values
D Sample Diluted

Hi-Res Dioxins/Furans

Quality Control Summary
Spike Recovery Report

SDG Number: A9I0893 **Sample Type:** Laboratory Control Sample

Client ID: LCS for batch 42008 **Matrix:** WATER

Lab Sample ID: 12025040

Instrument: HRP763 **Analysis Date:** 10/13/2019 02:52 **Dilution:** 1

Analyst: MLS **Prep Batch ID:** 42008

Batch ID: 42013

CAS No.		Parmname	Amount Added pg/L	Spike Conc. pg/L	Recovery %	Acceptance Limits
1746-01-6	LCS	2,3,7,8-TCDD	200	193	96.4	67-158
40321-76-4	LCS	1,2,3,7,8-PeCDD	1000	1140	114	70-142
39227-28-6	LCS	1,2,3,4,7,8-HxCDD	1000	1180	118	70-164
57653-85-7	LCS	1,2,3,6,7,8-HxCDD	1000	1180	118	74-134
19408-74-3	LCS	1,2,3,7,8,9-HxCDD	1000	1250	125	64-162
35822-46-9	LCS	1,2,3,4,6,7,8-HpCDD	1000	1160	116	70-140
3268-87-9	LCS	1,2,3,4,6,7,8,9-OCDD	2000	2320	116	78-144
51207-31-9	LCS	2,3,7,8-TCDF	200	236	118	75-158
57117-41-6	LCS	1,2,3,7,8-PeCDF	1000	1180	118	80-134
57117-31-4	LCS	2,3,4,7,8-PeCDF	1000	1210	121	68-160
70648-26-9	LCS	1,2,3,4,7,8-HxCDF	1000	1150	115	72-134
57117-44-9	LCS	1,2,3,6,7,8-HxCDF	1000	1220	122	84-130
60851-34-5	LCS	2,3,4,6,7,8-HxCDF	1000	1190	119	70-156
72918-21-9	LCS	1,2,3,7,8,9-HxCDF	1000	1160	116	78-130
67562-39-4	LCS	1,2,3,4,6,7,8-HpCDF	1000	1190	119	82-122
55673-89-7	LCS	1,2,3,4,7,8,9-HpCDF	1000	1200	120	78-138
39001-02-0	LCS	1,2,3,4,6,7,8,9-OCDF	2000	2520	126	63-170

Hi-Res Dioxins/Furans

Quality Control Summary
Spike Recovery Report

SDG Number: A9I0893 **Sample Type:** Laboratory Control Sample Duplicate

Client ID: LCSD for batch 42008 **Matrix:** WATER

Lab Sample ID: 12025041

Instrument: HRP763 **Analysis Date:** 10/13/2019 03:39 **Dilution:** 1

Analyst: MLS **Prep Batch ID:** 42008

Batch ID: 42013

CAS No.		Parmname	Amount Added pg/L	Spike Conc. pg/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
1746-01-6	LCSD	2,3,7,8-TCDD	200	191	95.5	67-158	0.949	0-20
40321-76-4	LCSD	1,2,3,7,8-PeCDD	1000	1160	116	70-142	1.20	0-20
39227-28-6	LCSD	1,2,3,4,7,8-HxCDD	1000	1150	115	70-164	2.81	0-20
57653-85-7	LCSD	1,2,3,6,7,8-HxCDD	1000	1140	114	74-134	3.09	0-20
19408-74-3	LCSD	1,2,3,7,8,9-HxCDD	1000	1220	122	64-162	2.10	0-20
35822-46-9	LCSD	1,2,3,4,6,7,8-HpCDD	1000	1080	108	70-140	6.92	0-20
3268-87-9	LCSD	1,2,3,4,6,7,8,9-OCDD	2000	2380	119	78-144	2.38	0-20
51207-31-9	LCSD	2,3,7,8-TCDF	200	230	115	75-158	2.68	0-20
57117-41-6	LCSD	1,2,3,7,8-PeCDF	1000	1160	116	80-134	2.00	0-20
57117-31-4	LCSD	2,3,4,7,8-PeCDF	1000	1170	117	68-160	3.51	0-20
70648-26-9	LCSD	1,2,3,4,7,8-HxCDF	1000	1150	115	72-134	0.191	0-20
57117-44-9	LCSD	1,2,3,6,7,8-HxCDF	1000	1190	119	84-130	2.50	0-20
60851-34-5	LCSD	2,3,4,6,7,8-HxCDF	1000	1150	115	70-156	3.44	0-20
72918-21-9	LCSD	1,2,3,7,8,9-HxCDF	1000	1220	122	78-130	4.69	0-20
67562-39-4	LCSD	1,2,3,4,6,7,8-HpCDF	1000	1200	120	82-122	0.488	0-20
55673-89-7	LCSD	1,2,3,4,7,8,9-HpCDF	1000	1190	119	78-138	0.586	0-20
39001-02-0	LCSD	1,2,3,4,6,7,8,9-OCDF	2000	2530	126	63-170	0.229	0-20

Method Blank Summary

SDG Number:	**A9I0893**	**Client:**	**APEX001**	**Matrix:**	**WATER**
Client ID:	**MB for batch 42008**	**Instrument ID:**	**HRP763**	**Data File:**	**b10oct19a_8-3**
Lab Sample ID:	**12025039**	**Prep Date:**	**09-OCT-19**	**Analyzed:**	**10/13/19 04:27**
Column:					

This method blank applies to the following samples and quality control samples:

	Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01	LCS for batch 42008	12025040	b10oct19a_8-1	10/13/19	0252
02	LCSD for batch 42008	12025041	b10oct19a_8-2	10/13/19	0339
03	Rinsate Blank	15579001	b15oct19b_3-7	10/16/19	1834

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	**A9I0893**	**Client:**	**APEX001**	**Project:**	**APEX00319**
Lab Sample ID:	**12025039**			**Matrix:**	**WATER**
Client Sample:	**QC for batch 42008**				
Client ID:	**MB for batch 42008**			**Prep Basis:**	**As Received**
Batch ID:	**42013**	**Method:**	**EPA Method 1613B**		
Run Date:	**10/13/2019 04:27**	**Analyst:**	**MLS**	**Instrument:**	**HRP763**
Data File:	**b10oct19a_8-3**			**Dilution:**	**1**
Prep Batch:	**42008**	**Prep Method:**	**SW846 3520C**		
Prep Date:	**09-OCT-19**	**Prep Aliquot:**	**1000 mL**		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	0.754	pg/L	0.754	10.0
40321-76-4	1,2,3,7,8-PeCDD	J	1.18	pg/L	0.906	50.0
39227-28-6	1,2,3,4,7,8-HxCDD	J	1.90	pg/L	1.02	50.0
57653-85-7	1,2,3,6,7,8-HxCDD	JK	1.34	pg/L	0.892	50.0
19408-74-3	1,2,3,7,8,9-HxCDD	J	1.76	pg/L	0.978	50.0
35822-46-9	1,2,3,4,6,7,8-HpCDD	J	2.44	pg/L	1.32	50.0
3268-87-9	1,2,3,4,6,7,8,9-OCDD	JK	8.42	pg/L	2.80	100
51207-31-9	2,3,7,8-TCDF	U	0.628	pg/L	0.628	10.0
57117-41-6	1,2,3,7,8-PeCDF	JK	1.88	pg/L	0.828	50.0
57117-31-4	2,3,4,7,8-PeCDF	U	0.706	pg/L	0.706	50.0
70648-26-9	1,2,3,4,7,8-HxCDF	J	1.56	pg/L	0.798	50.0
57117-44-9	1,2,3,6,7,8-HxCDF	JK	1.42	pg/L	0.738	50.0
60851-34-5	2,3,4,6,7,8-HxCDF	J	1.78	pg/L	0.800	50.0
72918-21-9	1,2,3,7,8,9-HxCDF	J	1.96	pg/L	1.21	50.0
67562-39-4	1,2,3,4,6,7,8-HpCDF	J	1.98	pg/L	0.796	50.0
55673-89-7	1,2,3,4,7,8,9-HpCDF	J	2.02	pg/L	1.26	50.0
39001-02-0	1,2,3,4,6,7,8,9-OCDF	J	4.28	pg/L	2.44	100
41903-57-5	Total TeCDD	U	0.754	pg/L	0.754	10.0
36088-22-9	Total PeCDD	J	1.18	pg/L	0.906	50.0
34465-46-8	Total HxCDD	JK	5.00	pg/L	0.892	50.0
37871-00-4	Total HpCDD	J	2.44	pg/L	1.32	50.0
30402-14-3	Total TeCDF	U	0.628	pg/L	0.628	10.0
30402-15-4	Total PeCDF	JK	1.88	pg/L	0.506	50.0
55684-94-1	Total HxCDF	JK	6.72	pg/L	0.738	50.0
38998-75-3	Total HpCDF	J	4.00	pg/L	0.796	50.0
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		2.48	pg/L		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		2.99	pg/L		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1590	2000	pg/L	79.3	(25%-164%)
13C-1,2,3,7,8-PeCDD		1860	2000	pg/L	93.0	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		1510	2000	pg/L	75.5	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		1580	2000	pg/L	79.1	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		1700	2000	pg/L	84.8	(23%-140%)
13C-OCDD		2730	4000	pg/L	68.2	(17%-157%)
13C-2,3,7,8-TCDF		1530	2000	pg/L	76.5	(24%-169%)
13C-1,2,3,7,8-PeCDF		1870	2000	pg/L	93.7	(24%-185%)
13C-2,3,4,7,8-PeCDF		1850	2000	pg/L	92.6	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		1540	2000	pg/L	76.8	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		1640	2000	pg/L	81.8	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		1660	2000	pg/L	82.9	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		1660	2000	pg/L	82.9	(29%-147%)

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	**A9I0893**	**Client:**	**APEX001**	**Project:**	**APEX00319**
Lab Sample ID:	**12025039**			**Matrix:**	**WATER**
Client Sample:	**QC for batch 42008**				
Client ID:	**MB for batch 42008**			**Prep Basis:**	**As Received**
Batch ID:	**42013**	**Method:**	**EPA Method 1613B**		
Run Date:	**10/13/2019 04:27**	**Analyst:**	**MLS**	**Instrument:**	**HRP763**
Data File:	**b10oct19a_8-3**			**Dilution:**	**1**
Prep Batch:	**42008**	**Prep Method:**	**SW846 3520C**		
Prep Date:	**09-OCT-19**	**Prep Aliquot:**	**1000 mL**		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-1,2,3,4,6,7,8-HpCDF		1690	2000	pg/L	84.7	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF		1760	2000	pg/L	88.2	(26%-138%)
37Cl-2,3,7,8-TCDD		183	200	pg/L	91.3	(35%-197%)

Comments:

J **Value is estimated**

K **Estimated Maximum Possible Concentration**

U **Analyte was analyzed for, but not detected above the specified detection limit.**

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	**A9I0893**	**Client:**	**APEX001**	**Project:**	**APEX00319**
Lab Sample ID:	**12025040**			**Matrix:**	**WATER**
Client Sample:	**QC for batch 42008**				
Client ID:	**LCS for batch 42008**			**Prep Basis:**	**As Received**
Batch ID:	**42013**	**Method:**	**EPA Method 1613B**		
Run Date:	**10/13/2019 02:52**	**Analyst:**	**MLS**	**Instrument:**	**HRP763**
Data File:	**b10oct19a_8-1**			**Dilution:**	**1**
Prep Batch:	**42008**	**Prep Method:**	**SW846 3520C**		
Prep Date:	**09-OCT-19**	**Prep Aliquot:**	**1000 mL**		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		193	pg/L	1.60	10.0
40321-76-4	1,2,3,7,8-PeCDD		1140	pg/L	2.88	50.0
39227-28-6	1,2,3,4,7,8-HxCDD		1180	pg/L	7.36	50.0
57653-85-7	1,2,3,6,7,8-HxCDD		1180	pg/L	6.76	50.0
19408-74-3	1,2,3,7,8,9-HxCDD		1250	pg/L	7.26	50.0
35822-46-9	1,2,3,4,6,7,8-HpCDD		1160	pg/L	13.4	50.0
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2320	pg/L	33.0	100
51207-31-9	2,3,7,8-TCDF		236	pg/L	1.57	10.0
57117-41-6	1,2,3,7,8-PeCDF		1180	pg/L	3.74	50.0
57117-31-4	2,3,4,7,8-PeCDF		1210	pg/L	3.10	50.0
70648-26-9	1,2,3,4,7,8-HxCDF		1150	pg/L	6.72	50.0
57117-44-9	1,2,3,6,7,8-HxCDF		1220	pg/L	6.84	50.0
60851-34-5	2,3,4,6,7,8-HxCDF		1190	pg/L	7.20	50.0
72918-21-9	1,2,3,7,8,9-HxCDF		1160	pg/L	11.2	50.0
67562-39-4	1,2,3,4,6,7,8-HpCDF		1190	pg/L	7.66	50.0
55673-89-7	1,2,3,4,7,8,9-HpCDF		1200	pg/L	11.2	50.0
39001-02-0	1,2,3,4,6,7,8,9-OCDF		2520	pg/L	22.4	100

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1640	2000	pg/L	82.1	(20%-175%)
13C-1,2,3,7,8-PeCDD		1870	2000	pg/L	93.7	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		1500	2000	pg/L	74.9	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		1680	2000	pg/L	84.0	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		1760	2000	pg/L	88.1	(22%-166%)
13C-OCDD		2800	4000	pg/L	69.9	(13%-199%)
13C-2,3,7,8-TCDF		1540	2000	pg/L	76.9	(22%-152%)
13C-1,2,3,7,8-PeCDF		1890	2000	pg/L	94.5	(21%-192%)
13C-2,3,4,7,8-PeCDF		1860	2000	pg/L	93.1	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		1600	2000	pg/L	80.2	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		1750	2000	pg/L	87.4	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		1710	2000	pg/L	85.3	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		1690	2000	pg/L	84.4	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		1800	2000	pg/L	90.0	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		1840	2000	pg/L	91.8	(20%-186%)
37Cl-2,3,7,8-TCDD		174	200	pg/L	86.9	(31%-191%)

Comments:

U Analyte was analyzed for, but not detected above the specified detection limit.

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	**A9I0893**	**Client:**	**APEX001**	**Project:**	**APEX00319**
Lab Sample ID:	**12025041**			**Matrix:**	**WATER**
Client Sample:	**QC for batch 42008**				
Client ID:	**LCSD for batch 42008**			**Prep Basis:**	**As Received**
Batch ID:	**42013**	**Method:**	**EPA Method 1613B**		
Run Date:	**10/13/2019 03:39**	**Analyst:**	**MLS**	**Instrument:**	**HRP763**
Data File:	**b10oct19a_8-2**			**Dilution:**	**1**
Prep Batch:	**42008**	**Prep Method:**	**SW846 3520C**		
Prep Date:	**09-OCT-19**	**Prep Aliquot:**	**1000 mL**		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		191	pg/L	1.68	10.0
40321-76-4	1,2,3,7,8-PeCDD		1160	pg/L	3.66	50.0
39227-28-6	1,2,3,4,7,8-HxCDD		1150	pg/L	8.62	50.0
57653-85-7	1,2,3,6,7,8-HxCDD		1140	pg/L	8.12	50.0
19408-74-3	1,2,3,7,8,9-HxCDD		1220	pg/L	8.62	50.0
35822-46-9	1,2,3,4,6,7,8-HpCDD		1080	pg/L	15.8	50.0
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2380	pg/L	33.8	100
51207-31-9	2,3,7,8-TCDF		230	pg/L	1.64	10.0
57117-41-6	1,2,3,7,8-PeCDF		1160	pg/L	5.08	50.0
57117-31-4	2,3,4,7,8-PeCDF		1170	pg/L	4.40	50.0
70648-26-9	1,2,3,4,7,8-HxCDF		1150	pg/L	7.44	50.0
57117-44-9	1,2,3,6,7,8-HxCDF		1190	pg/L	7.32	50.0
60851-34-5	2,3,4,6,7,8-HxCDF		1150	pg/L	7.64	50.0
72918-21-9	1,2,3,7,8,9-HxCDF		1220	pg/L	12.5	50.0
67562-39-4	1,2,3,4,6,7,8-HpCDF		1200	pg/L	8.36	50.0
55673-89-7	1,2,3,4,7,8,9-HpCDF		1190	pg/L	13.2	50.0
39001-02-0	1,2,3,4,6,7,8,9-OCDF		2530	pg/L	21.4	100

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1640	2000	pg/L	82.0	(20%-175%)
13C-1,2,3,7,8-PeCDD		1860	2000	pg/L	93.1	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		1540	2000	pg/L	77.0	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		1780	2000	pg/L	89.1	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		1760	2000	pg/L	88.1	(22%-166%)
13C-OCDD		2770	4000	pg/L	69.2	(13%-199%)
13C-2,3,7,8-TCDF		1590	2000	pg/L	79.5	(22%-152%)
13C-1,2,3,7,8-PeCDF		1920	2000	pg/L	96.0	(21%-192%)
13C-2,3,4,7,8-PeCDF		1910	2000	pg/L	95.7	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		1650	2000	pg/L	82.7	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		1830	2000	pg/L	91.5	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		1790	2000	pg/L	89.7	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		1700	2000	pg/L	84.8	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		1840	2000	pg/L	91.9	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		1800	2000	pg/L	89.8	(20%-186%)
37Cl-2,3,7,8-TCDD		171	200	pg/L	85.5	(31%-191%)

Comments:

U Analyte was analyzed for, but not detected above the specified detection limit.

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Thursday, January 9, 2020

Emily Hess
Maul Foster & Alongi, INC.
2001 NW 19th Ave, STE 200
Portland, OR 97209

RE: A9J0006 - Seaport Tidelands - 1044.02.06-02

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A9J0006, which was received by the laboratory on 9/30/2019 at 12:10:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: pnerenberg@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1	2.3 degC	Cooler #2	3.0 degC
Cooler #3	1.6 degC	Cooler #4	4.8 degC
Cooler #5	1.9 degC	Cooler #6	5.5 degC
Cooler #7	1.3 degC	Cooler #8	1.8 degC

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

Apex Laboratories



Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SE-24-0-0.33	A9J0006-01	Sediment	09/27/19 13:13	09/30/19 12:10
SE-24-0-0.33 (Porewater)	A9J0006-02	Water	09/27/19 13:13	09/30/19 12:10
SE-14-0-0.33	A9J0006-03	Sediment	09/27/19 14:02	09/30/19 12:10
SE-14-0-0.33 (Porewater)	A9J0006-04	Water	09/27/19 13:13	09/30/19 12:10
SE-23-0-0.33	A9J0006-05	Sediment	09/27/19 10:23	09/30/19 12:10
SE-17-0-0.33	A9J0006-06	Sediment	09/27/19 09:47	09/30/19 12:10
SE-15-0-0.33	A9J0006-07	Sediment	09/27/19 11:44	09/30/19 12:10
SE-21-0-0.33	A9J0006-08	Sediment	09/27/19 15:07	09/30/19 12:10
SE-25-0-0.33	A9J0006-13	Sediment	09/27/19 18:15	09/30/19 12:10
SE-28-0-0.33	A9J0006-14	Sediment	09/27/19 18:40	09/30/19 12:10
SE-28-0-0.33 (Porewater)	A9J0006-15	Water	09/27/19 18:40	09/30/19 12:10
SE-26-0-0.33	A9J0006-16	Sediment	09/27/19 17:25	09/30/19 12:10
SE-26-0-0.33 (Porewater)	A9J0006-17	Water	09/27/19 17:25	09/30/19 12:10
SE-18-0-0.33	A9J0006-18	Sediment	09/27/19 11:54	09/30/19 12:10
SE-18-0-0.33 (Porewater)	A9J0006-19	Water	09/27/19 11:54	09/30/19 12:10
SE-31-0-0.33	A9J0006-20	Sediment	09/27/19 12:10	09/30/19 12:10
SE-16-0-0.33	A9J0006-21	Sediment	09/27/19 09:00	09/30/19 12:10
SE-19-0-0.33	A9J0006-22	Sediment	09/27/19 08:30	09/30/19 12:10
SE-22-0-0.33	A9J0006-23	Sediment	09/27/19 19:30	09/30/19 12:10
SE-27-0-0.33	A9J0006-24	Sediment	09/27/19 14:35	09/30/19 12:10
SE-27-0-0.33-Dup	A9J0006-25	Sediment	09/27/19 14:35	09/30/19 12:10
SE-16-0-0.33 (Porewater)	A9J0006-26	Water	09/27/19 09:00	09/30/19 12:10
SE-17-0-0.33---Air Dried	A9J0006-27	Sediment	09/27/19 09:47	09/30/19 12:10
SE-18-0-0.33---Air Dried	A9J0006-28	Sediment	09/27/19 11:54	09/30/19 12:10
SE-16-0-0.33---Air Dried	A9J0006-29	Sediment	09/27/19 09:00	09/30/19 12:10
SE-22-0-0.33---Air Dried	A9J0006-30	Sediment	09/27/19 19:30	09/30/19 12:10
SE-27-0-0.33---Air Dried	A9J0006-31	Sediment	09/27/19 14:35	09/30/19 12:10
SE-27-0-0.33-Dup---Air Dried	A9J0006-32	Sediment	09/27/19 14:35	09/30/19 12:10

Apex Laboratories



Philip Nerenberg, Lab Director

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Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL CASE NARRATIVE

Work Order: A9J0006

Amended Report Revision 1:

This report supersedes all previous reports.

Due to client request, 1-methylnaphthalene was added to the SVOC analyte list after the previous report version had been completed.

Philip Nerenberg
Lab Director
1/9/20

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Acid/Silica Gel Cleanup

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-24-0-0.33 (A9J0006-01)				**Matrix: Sediment**		**Batch: 9101200**		
Diesel	ND	28.1	56.2	mg/kg dry	1	10/17/19 01:51	NWTPH-Dx/SG	
Oil	**559**	56.2	112	mg/kg dry	1	10/17/19 01:51	NWTPH-Dx/SG	
Surrogate: o-Terphenyl (Surr)		*Recovery: 91 %*		*Limits: 50-150 %*	*1*	*10/17/19 01:51*	*NWTPH-Dx/SG*	
SE-14-0-0.33 (A9J0006-03)				**Matrix: Sediment**		**Batch: 9101200**		
Diesel	ND	27.3	54.7	mg/kg dry	1	10/17/19 02:15	NWTPH-Dx/SG	
Oil	**384**	54.7	109	mg/kg dry	1	10/17/19 02:15	NWTPH-Dx/SG	
Surrogate: o-Terphenyl (Surr)		*Recovery: 93 %*		*Limits: 50-150 %*	*1*	*10/17/19 02:15*	*NWTPH-Dx/SG*	
SE-23-0-0.33 (A9J0006-05)				**Matrix: Sediment**		**Batch: 9101200**		
Diesel	ND	21.2	42.5	mg/kg dry	1	10/17/19 04:15	NWTPH-Dx/SG	
Oil	**73.8**	42.5	85.0	mg/kg dry	1	10/17/19 04:15	NWTPH-Dx/SG	**Ja**
Surrogate: o-Terphenyl (Surr)		*Recovery: 93 %*		*Limits: 50-150 %*	*1*	*10/17/19 04:15*	*NWTPH-Dx/SG*	
SE-17-0-0.33 (A9J0006-06)				**Matrix: Sediment**		**Batch: 9101200**		
Diesel	ND	22.4	44.9	mg/kg dry	1	10/17/19 04:39	NWTPH-Dx/SG	
Oil	ND	44.9	89.8	mg/kg dry	1	10/17/19 04:39	NWTPH-Dx/SG	
Surrogate: o-Terphenyl (Surr)		*Recovery: 89 %*		*Limits: 50-150 %*	*1*	*10/17/19 04:39*	*NWTPH-Dx/SG*	
SE-15-0-0.33 (A9J0006-07)				**Matrix: Sediment**		**Batch: 9101200**		
Diesel	ND	22.5	45.1	mg/kg dry	1	10/17/19 05:02	NWTPH-Dx/SG	
Oil	**374**	45.1	90.2	mg/kg dry	1	10/17/19 05:02	NWTPH-Dx/SG	
Surrogate: o-Terphenyl (Surr)		*Recovery: 95 %*		*Limits: 50-150 %*	*1*	*10/17/19 05:02*	*NWTPH-Dx/SG*	
SE-21-0-0.33 (A9J0006-08)				**Matrix: Sediment**		**Batch: 9101200**		
Diesel	**23.2**	16.5	33.1	mg/kg dry	1	10/17/19 05:26	NWTPH-Dx/SG	**Ja**
Oil	ND	33.1	66.1	mg/kg dry	1	10/17/19 05:26	NWTPH-Dx/SG	
Surrogate: o-Terphenyl (Surr)		*Recovery: 93 %*		*Limits: 50-150 %*	*1*	*10/17/19 05:26*	*NWTPH-Dx/SG*	
SE-25-0-0.33 (A9J0006-13)				**Matrix: Sediment**		**Batch: 9101200**		
Diesel	ND	24.1	48.3	mg/kg dry	1	10/17/19 05:49	NWTPH-Dx/SG	
Oil	**2080**	48.3	96.5	mg/kg dry	1	10/17/19 05:49	NWTPH-Dx/SG	
Surrogate: o-Terphenyl (Surr)		*Recovery: 91 %*		*Limits: 50-150 %*	*1*	*10/17/19 05:49*	*NWTPH-Dx/SG*	

Apex Laboratories



Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Acid/Silica Gel Cleanup

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-26-0-0.33 (A9J0006-16)				**Matrix: Sediment**		**Batch: 9101200**		
Diesel	ND	23.4	46.8	mg/kg dry	1	10/17/19 06:12	NWTPH-Dx/SG	
Oil	**842**	46.8	93.6	mg/kg dry	1	10/17/19 06:12	NWTPH-Dx/SG	
Surrogate: o-Terphenyl (Surr)		*Recovery: 89 %*		*Limits: 50-150 %*	*1*	*10/17/19 06:12*	*NWTPH-Dx/SG*	
SE-18-0-0.33 (A9J0006-18)				**Matrix: Sediment**		**Batch: 9101200**		
Diesel	ND	21.5	43.0	mg/kg dry	1	10/17/19 06:35	NWTPH-Dx/SG	
Oil	ND	43.0	86.0	mg/kg dry	1	10/17/19 06:35	NWTPH-Dx/SG	
Surrogate: o-Terphenyl (Surr)		*Recovery: 91 %*		*Limits: 50-150 %*	*1*	*10/17/19 06:35*	*NWTPH-Dx/SG*	
SE-31-0-0.33 (A9J0006-20)				**Matrix: Sediment**		**Batch: 9101200**		
Diesel	ND	20.4	40.8	mg/kg dry	1	10/17/19 06:59	NWTPH-Dx/SG	
Oil	**58.5**	40.8	81.5	mg/kg dry	1	10/17/19 06:59	NWTPH-Dx/SG	**Ja**
Surrogate: o-Terphenyl (Surr)		*Recovery: 92 %*		*Limits: 50-150 %*	*1*	*10/17/19 06:59*	*NWTPH-Dx/SG*	
SE-16-0-0.33 (A9J0006-21)				**Matrix: Sediment**		**Batch: 9101200**		
Diesel	**18.5**	18.4	36.8	mg/kg dry	1	10/17/19 07:23	NWTPH-Dx/SG	**Ja**
Oil	ND	36.8	73.6	mg/kg dry	1	10/17/19 07:23	NWTPH-Dx/SG	
Surrogate: o-Terphenyl (Surr)		*Recovery: 94 %*		*Limits: 50-150 %*	*1*	*10/17/19 07:23*	*NWTPH-Dx/SG*	
SE-22-0-0.33 (A9J0006-23)				**Matrix: Sediment**		**Batch: 9101200**		
Diesel	ND	29.9	59.8	mg/kg dry	1	10/17/19 07:47	NWTPH-Dx/SG	
Oil	**130**	59.8	120	mg/kg dry	1	10/17/19 07:47	NWTPH-Dx/SG	
Surrogate: o-Terphenyl (Surr)		*Recovery: 94 %*		*Limits: 50-150 %*	*1*	*10/17/19 07:47*	*NWTPH-Dx/SG*	
SE-27-0-0.33 (A9J0006-24)				**Matrix: Sediment**		**Batch: 9101200**		
Diesel	ND	24.2	48.3	mg/kg dry	1	10/17/19 08:11	NWTPH-Dx/SG	
Oil	**89.6**	48.3	96.7	mg/kg dry	1	10/17/19 08:11	NWTPH-Dx/SG	**Ja**
Surrogate: o-Terphenyl (Surr)		*Recovery: 88 %*		*Limits: 50-150 %*	*1*	*10/17/19 08:11*	*NWTPH-Dx/SG*	
SE-27-0-0.33-Dup (A9J0006-25)				**Matrix: Sediment**		**Batch: 9101200**		
Diesel	ND	25.9	51.8	mg/kg dry	1	10/17/19 08:35	NWTPH-Dx/SG	
Oil	**72.2**	51.8	104	mg/kg dry	1	10/17/19 08:35	NWTPH-Dx/SG	**Ja**
Surrogate: o-Terphenyl (Surr)		*Recovery: 92 %*		*Limits: 50-150 %*	*1*	*10/17/19 08:35*	*NWTPH-Dx/SG*	

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Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-24-0-0.33 (A9J0006-01)				**Matrix: Sediment**		**Batch: 9100478**		
Gasoline Range Organics	ND	27.9	27.9	mg/kg dry	50	10/01/19 17:04	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 102 %*	*Limits: 50-150 %*		*1*	*10/01/19 17:04*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)		*89 %*	*50-150 %*		*1*	*10/01/19 17:04*	*NWTPH-Gx (MS)*	
SE-14-0-0.33 (A9J0006-03)				**Matrix: Sediment**		**Batch: 9100546**		
Gasoline Range Organics	ND	12.8	25.6	mg/kg dry	50	10/02/19 15:41	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 108 %*	*Limits: 50-150 %*		*1*	*10/02/19 15:41*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)		*101 %*	*50-150 %*		*1*	*10/02/19 15:41*	*NWTPH-Gx (MS)*	
SE-23-0-0.33 (A9J0006-05)				**Matrix: Sediment**		**Batch: 9100546**		
Gasoline Range Organics	ND	9.01	18.0	mg/kg dry	50	10/02/19 16:08	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 110 %*	*Limits: 50-150 %*		*1*	*10/02/19 16:08*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)		*101 %*	*50-150 %*		*1*	*10/02/19 16:08*	*NWTPH-Gx (MS)*	
SE-17-0-0.33 (A9J0006-06)				**Matrix: Sediment**		**Batch: 9100546**		
Gasoline Range Organics	ND	13.3	26.7	mg/kg dry	50	10/02/19 16:35	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 114 %*	*Limits: 50-150 %*		*1*	*10/02/19 16:35*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)		*104 %*	*50-150 %*		*1*	*10/02/19 16:35*	*NWTPH-Gx (MS)*	
SE-15-0-0.33 (A9J0006-07)				**Matrix: Sediment**		**Batch: 9100478**		
Gasoline Range Organics	ND	10.0	20.1	mg/kg dry	50	10/01/19 18:53	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 90 %*	*Limits: 50-150 %*		*1*	*10/01/19 18:53*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)		*87 %*	*50-150 %*		*1*	*10/01/19 18:53*	*NWTPH-Gx (MS)*	
SE-21-0-0.33 (A9J0006-08)				**Matrix: Sediment**		**Batch: 9100478**		
Gasoline Range Organics	ND	6.71	13.4	mg/kg dry	50	10/01/19 19:20	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 92 %*	*Limits: 50-150 %*		*1*	*10/01/19 19:20*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)		*88 %*	*50-150 %*		*1*	*10/01/19 19:20*	*NWTPH-Gx (MS)*	
SE-25-0-0.33 (A9J0006-13)				**Matrix: Sediment**		**Batch: 9100478**		
Gasoline Range Organics	ND	10.1	20.2	mg/kg dry	50	10/01/19 19:47	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 88 %*	*Limits: 50-150 %*		*1*	*10/01/19 19:47*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)		*89 %*	*50-150 %*		*1*	*10/01/19 19:47*	*NWTPH-Gx (MS)*	
SE-26-0-0.33 (A9J0006-16)				**Matrix: Sediment**		**Batch: 9100478**		

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-26-0-0.33 (A9J0006-16)				**Matrix: Sediment**		**Batch: 9100478**		
Gasoline Range Organics	ND	9.64	19.3	mg/kg dry	50	10/01/19 21:09	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 92 %*	*Limits: 50-150 %*		*1*	*10/01/19 21:09*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*89 %*	*50-150 %*	*1*	*10/01/19 21:09*	*NWTPH-Gx (MS)*	
SE-18-0-0.33 (A9J0006-18)				**Matrix: Sediment**		**Batch: 9100478**		
Gasoline Range Organics	ND	9.11	18.2	mg/kg dry	50	10/01/19 21:36	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 94 %*	*Limits: 50-150 %*		*1*	*10/01/19 21:36*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*91 %*	*50-150 %*	*1*	*10/01/19 21:36*	*NWTPH-Gx (MS)*	
SE-31-0-0.33 (A9J0006-20)				**Matrix: Sediment**		**Batch: 9100509**		
Gasoline Range Organics	ND	7.73	15.5	mg/kg dry	50	10/01/19 17:28	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 111 %*	*Limits: 50-150 %*		*1*	*10/01/19 17:28*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*94 %*	*50-150 %*	*1*	*10/01/19 17:28*	*NWTPH-Gx (MS)*	
SE-16-0-0.33 (A9J0006-21)				**Matrix: Sediment**		**Batch: 9100509**		
Gasoline Range Organics	ND	8.42	16.8	mg/kg dry	50	10/01/19 17:55	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 106 %*	*Limits: 50-150 %*		*1*	*10/01/19 17:55*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*94 %*	*50-150 %*	*1*	*10/01/19 17:55*	*NWTPH-Gx (MS)*	
SE-22-0-0.33 (A9J0006-23)				**Matrix: Sediment**		**Batch: 9100509**		
Gasoline Range Organics	ND	16.0	32.0	mg/kg dry	50	10/01/19 18:22	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 110 %*	*Limits: 50-150 %*		*1*	*10/01/19 18:22*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*94 %*	*50-150 %*	*1*	*10/01/19 18:22*	*NWTPH-Gx (MS)*	
SE-27-0-0.33 (A9J0006-24)				**Matrix: Sediment**		**Batch: 9100509**		
Gasoline Range Organics	ND	11.5	22.9	mg/kg dry	50	10/01/19 19:17	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 114 %*	*Limits: 50-150 %*		*1*	*10/01/19 19:17*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*95 %*	*50-150 %*	*1*	*10/01/19 19:17*	*NWTPH-Gx (MS)*	
SE-27-0-0.33-Dup (A9J0006-25)				**Matrix: Sediment**		**Batch: 9100509**		
Gasoline Range Organics	ND	13.0	26.0	mg/kg dry	50	10/01/19 19:44	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 113 %*	*Limits: 50-150 %*		*1*	*10/01/19 19:44*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*95 %*	*50-150 %*	*1*	*10/01/19 19:44*	*NWTPH-Gx (MS)*	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-24-0-0.33 (A9J0006-01)				**Matrix: Sediment**		**Batch: 9100667**		**C-07**
Aroclor 1016	ND	5.60	11.2	ug/kg dry	1	10/07/19 12:32	EPA 8082A	
Aroclor 1221	ND	5.60	11.2	ug/kg dry	1	10/07/19 12:32	EPA 8082A	
Aroclor 1232	ND	5.60	11.2	ug/kg dry	1	10/07/19 12:32	EPA 8082A	
Aroclor 1242	ND	5.60	11.2	ug/kg dry	1	10/07/19 12:32	EPA 8082A	
Aroclor 1248	ND	5.60	11.2	ug/kg dry	1	10/07/19 12:32	EPA 8082A	
Aroclor 1254	ND	5.60	11.2	ug/kg dry	1	10/07/19 12:32	EPA 8082A	
Aroclor 1260	**42.4**	5.60	11.2	ug/kg dry	1	10/07/19 12:32	EPA 8082A	
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 65 %*		*Limits: 60-125 %*	*1*	*10/07/19 12:32*	*EPA 8082A*	
SE-14-0-0.33 (A9J0006-03)				**Matrix: Sediment**		**Batch: 9100667**		**C-07**
Aroclor 1016	ND	5.75	11.5	ug/kg dry	1	10/07/19 13:52	EPA 8082A	
Aroclor 1221	ND	5.75	11.5	ug/kg dry	1	10/07/19 13:52	EPA 8082A	
Aroclor 1232	ND	5.75	11.5	ug/kg dry	1	10/07/19 13:52	EPA 8082A	
Aroclor 1242	ND	5.75	11.5	ug/kg dry	1	10/07/19 13:52	EPA 8082A	
Aroclor 1248	ND	5.75	11.5	ug/kg dry	1	10/07/19 13:52	EPA 8082A	
Aroclor 1254	ND	5.75	11.5	ug/kg dry	1	10/07/19 13:52	EPA 8082A	
Aroclor 1260	**8.41**	5.75	11.5	ug/kg dry	1	10/07/19 13:52	EPA 8082A	**Ja**
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 59 %*		*Limits: 60-125 %*	*1*	*10/07/19 13:52*	*EPA 8082A*	*S-06*
SE-23-0-0.33 (A9J0006-05)				**Matrix: Sediment**		**Batch: 9100667**		**C-07**
Aroclor 1016	ND	4.39	8.79	ug/kg dry	1	10/07/19 14:28	EPA 8082A	
Aroclor 1221	ND	4.39	8.79	ug/kg dry	1	10/07/19 14:28	EPA 8082A	
Aroclor 1232	ND	4.39	8.79	ug/kg dry	1	10/07/19 14:28	EPA 8082A	
Aroclor 1242	ND	4.39	8.79	ug/kg dry	1	10/07/19 14:28	EPA 8082A	
Aroclor 1248	ND	4.39	8.79	ug/kg dry	1	10/07/19 14:28	EPA 8082A	
Aroclor 1254	**8.09**	4.39	8.79	ug/kg dry	1	10/07/19 14:28	EPA 8082A	**Ja**
Aroclor 1260	ND	4.39	8.79	ug/kg dry	1	10/07/19 14:28	EPA 8082A	
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 79 %*		*Limits: 60-125 %*	*1*	*10/07/19 14:28*	*EPA 8082A*	
SE-15-0-0.33 (A9J0006-07)				**Matrix: Sediment**		**Batch: 9100667**		**C-07**
Aroclor 1016	ND	4.57	9.14	ug/kg dry	1	10/07/19 15:39	EPA 8082A	
Aroclor 1221	ND	4.57	9.14	ug/kg dry	1	10/07/19 15:39	EPA 8082A	
Aroclor 1232	ND	4.57	9.14	ug/kg dry	1	10/07/19 15:39	EPA 8082A	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-15-0-0.33 (A9J0006-07)				**Matrix: Sediment**		**Batch: 9100667**		**C-07**
Aroclor 1242	ND	4.57	9.14	ug/kg dry	1	10/07/19 15:39	EPA 8082A	
Aroclor 1248	ND	4.57	9.14	ug/kg dry	1	10/07/19 15:39	EPA 8082A	
Aroclor 1254	ND	4.57	9.14	ug/kg dry	1	10/07/19 15:39	EPA 8082A	
Aroclor 1260	ND	4.57	9.14	ug/kg dry	1	10/07/19 15:39	EPA 8082A	
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 64 %*		*Limits: 60-125 %*	*1*	*10/07/19 15:39*	*EPA 8082A*	
SE-21-0-0.33 (A9J0006-08)				**Matrix: Sediment**		**Batch: 9100667**		**C-07**
Aroclor 1016	ND	3.36	6.73	ug/kg dry	1	10/07/19 16:14	EPA 8082A	
Aroclor 1221	ND	3.36	6.73	ug/kg dry	1	10/07/19 16:14	EPA 8082A	
Aroclor 1232	ND	3.36	6.73	ug/kg dry	1	10/07/19 16:14	EPA 8082A	
Aroclor 1242	ND	3.36	6.73	ug/kg dry	1	10/07/19 16:14	EPA 8082A	
Aroclor 1248	ND	3.36	6.73	ug/kg dry	1	10/07/19 16:14	EPA 8082A	
Aroclor 1254	ND	3.36	6.73	ug/kg dry	1	10/07/19 16:14	EPA 8082A	
Aroclor 1260	**4.16**	3.36	6.73	ug/kg dry	1	10/07/19 16:14	EPA 8082A	**Ja**
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 68 %*		*Limits: 60-125 %*	*1*	*10/07/19 16:14*	*EPA 8082A*	
SE-25-0-0.33 (A9J0006-13)				**Matrix: Sediment**		**Batch: 9100667**		**C-07**
Aroclor 1016	ND	4.56	9.12	ug/kg dry	1	10/07/19 16:50	EPA 8082A	
Aroclor 1221	ND	4.56	9.12	ug/kg dry	1	10/07/19 16:50	EPA 8082A	
Aroclor 1232	ND	4.56	9.12	ug/kg dry	1	10/07/19 16:50	EPA 8082A	
Aroclor 1242	ND	4.56	9.12	ug/kg dry	1	10/07/19 16:50	EPA 8082A	
Aroclor 1248	ND	4.56	9.12	ug/kg dry	1	10/07/19 16:50	EPA 8082A	
Aroclor 1254	ND	4.56	9.12	ug/kg dry	1	10/07/19 16:50	EPA 8082A	
Aroclor 1260	**17.6**	4.56	9.12	ug/kg dry	1	10/07/19 16:50	EPA 8082A	
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 84 %*		*Limits: 60-125 %*	*1*	*10/07/19 16:50*	*EPA 8082A*	
SE-26-0-0.33 (A9J0006-16)				**Matrix: Sediment**		**Batch: 9100667**		**C-07**
Aroclor 1016	ND	4.42	8.85	ug/kg dry	1	10/07/19 12:50	EPA 8082A	
Aroclor 1221	ND	4.42	8.85	ug/kg dry	1	10/07/19 12:50	EPA 8082A	
Aroclor 1232	ND	4.42	8.85	ug/kg dry	1	10/07/19 12:50	EPA 8082A	
Aroclor 1242	ND	4.42	8.85	ug/kg dry	1	10/07/19 12:50	EPA 8082A	
Aroclor 1248	ND	4.42	8.85	ug/kg dry	1	10/07/19 12:50	EPA 8082A	
Aroclor 1254	ND	4.42	8.85	ug/kg dry	1	10/07/19 12:50	EPA 8082A	

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AMENDED REPORT

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-26-0-0.33 (A9J0006-16)				**Matrix: Sediment**		**Batch: 9100667**		C-07
Aroclor 1260	**15.5**	4.42	8.85	ug/kg dry	1	10/07/19 12:50	EPA 8082A	
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 84 %*		*Limits: 60-125 %*	*1*	*10/07/19 12:50*	*EPA 8082A*	
SE-31-0-0.33 (A9J0006-20)				**Matrix: Sediment**		**Batch: 9100667**		C-07
Aroclor 1016	ND	3.96	7.93	ug/kg dry	1	10/07/19 14:10	EPA 8082A	
Aroclor 1221	ND	3.96	7.93	ug/kg dry	1	10/07/19 14:10	EPA 8082A	
Aroclor 1232	ND	3.96	7.93	ug/kg dry	1	10/07/19 14:10	EPA 8082A	
Aroclor 1242	ND	3.96	7.93	ug/kg dry	1	10/07/19 14:10	EPA 8082A	
Aroclor 1248	ND	3.96	7.93	ug/kg dry	1	10/07/19 14:10	EPA 8082A	
Aroclor 1254	ND	3.96	7.93	ug/kg dry	1	10/07/19 14:10	EPA 8082A	
Aroclor 1260	ND	3.96	7.93	ug/kg dry	1	10/07/19 14:10	EPA 8082A	
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 61 %*		*Limits: 60-125 %*	*1*	*10/07/19 14:10*	*EPA 8082A*	
SE-17-0-0.33---Air Dried (A9J0006-27)				**Matrix: Sediment**		**Batch: 9101592**		C-07
Aroclor 1016	ND	2.07	4.14	ug/kg dry	1	10/28/19 09:24	EPA 8082A	
Aroclor 1221	ND	2.07	4.14	ug/kg dry	1	10/28/19 09:24	EPA 8082A	
Aroclor 1232	ND	2.07	4.14	ug/kg dry	1	10/28/19 09:24	EPA 8082A	
Aroclor 1242	ND	2.07	4.14	ug/kg dry	1	10/28/19 09:24	EPA 8082A	
Aroclor 1248	ND	2.07	4.14	ug/kg dry	1	10/28/19 09:24	EPA 8082A	
Aroclor 1254	ND	4.14	4.14	ug/kg dry	1	10/28/19 09:24	EPA 8082A	
Aroclor 1260	ND	4.14	4.14	ug/kg dry	1	10/28/19 09:24	EPA 8082A	
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 103 %*		*Limits: 60-125 %*	*1*	*10/28/19 09:24*	*EPA 8082A*	
SE-18-0-0.33---Air Dried (A9J0006-28)				**Matrix: Sediment**		**Batch: 9101592**		C-07
Aroclor 1016	ND	2.03	4.06	ug/kg dry	1	10/28/19 09:59	EPA 8082A	
Aroclor 1221	ND	2.03	4.06	ug/kg dry	1	10/28/19 09:59	EPA 8082A	
Aroclor 1232	ND	2.03	4.06	ug/kg dry	1	10/28/19 09:59	EPA 8082A	
Aroclor 1242	ND	2.03	4.06	ug/kg dry	1	10/28/19 09:59	EPA 8082A	
Aroclor 1248	ND	2.03	4.06	ug/kg dry	1	10/28/19 09:59	EPA 8082A	
Aroclor 1254	ND	2.03	4.06	ug/kg dry	1	10/28/19 09:59	EPA 8082A	
Aroclor 1260	ND	2.03	4.06	ug/kg dry	1	10/28/19 09:59	EPA 8082A	
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 95 %*		*Limits: 60-125 %*	*1*	*10/28/19 09:59*	*EPA 8082A*	

Apex Laboratories



Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-16-0-0.33---Air Dried (A9J0006-29)				**Matrix: Sediment**		**Batch: 9101592**		**C-07**
Aroclor 1016	ND	2.02	4.05	ug/kg dry	1	10/28/19 10:35	EPA 8082A	
Aroclor 1221	ND	2.02	4.05	ug/kg dry	1	10/28/19 10:35	EPA 8082A	
Aroclor 1232	ND	2.02	4.05	ug/kg dry	1	10/28/19 10:35	EPA 8082A	
Aroclor 1242	ND	2.02	4.05	ug/kg dry	1	10/28/19 10:35	EPA 8082A	
Aroclor 1248	ND	2.02	4.05	ug/kg dry	1	10/28/19 10:35	EPA 8082A	
Aroclor 1254	ND	2.02	4.05	ug/kg dry	1	10/28/19 10:35	EPA 8082A	
Aroclor 1260	ND	2.02	4.05	ug/kg dry	1	10/28/19 10:35	EPA 8082A	
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 103 %*		*Limits: 60-125 %*	*1*	*10/28/19 10:35*	*EPA 8082A*	
SE-22-0-0.33---Air Dried (A9J0006-30)				**Matrix: Sediment**		**Batch: 9101592**		**C-07**
Aroclor 1016	ND	2.04	4.09	ug/kg dry	1	10/28/19 11:10	EPA 8082A	
Aroclor 1221	ND	2.04	4.09	ug/kg dry	1	10/28/19 11:10	EPA 8082A	
Aroclor 1232	ND	2.04	4.09	ug/kg dry	1	10/28/19 11:10	EPA 8082A	
Aroclor 1242	ND	2.04	4.09	ug/kg dry	1	10/28/19 11:10	EPA 8082A	
Aroclor 1248	ND	2.04	4.09	ug/kg dry	1	10/28/19 11:10	EPA 8082A	
Aroclor 1254	**3.74**	2.04	4.09	ug/kg dry	1	10/28/19 11:10	EPA 8082A	**Ja**
Aroclor 1260	**4.43**	2.04	4.09	ug/kg dry	1	10/28/19 11:10	EPA 8082A	**P-10**
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 90 %*		*Limits: 60-125 %*	*1*	*10/28/19 11:10*	*EPA 8082A*	
SE-27-0-0.33---Air Dried (A9J0006-31)				**Matrix: Sediment**		**Batch: 9101592**		**C-07**
Aroclor 1016	ND	2.07	4.15	ug/kg dry	1	10/28/19 11:45	EPA 8082A	
Aroclor 1221	ND	2.07	4.15	ug/kg dry	1	10/28/19 11:45	EPA 8082A	
Aroclor 1232	ND	2.07	4.15	ug/kg dry	1	10/28/19 11:45	EPA 8082A	
Aroclor 1242	ND	2.07	4.15	ug/kg dry	1	10/28/19 11:45	EPA 8082A	
Aroclor 1248	ND	2.07	4.15	ug/kg dry	1	10/28/19 11:45	EPA 8082A	
Aroclor 1254	ND	2.07	4.15	ug/kg dry	1	10/28/19 11:45	EPA 8082A	
Aroclor 1260	**9.53**	2.07	4.15	ug/kg dry	1	10/28/19 11:45	EPA 8082A	
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 101 %*		*Limits: 60-125 %*	*1*	*10/28/19 11:45*	*EPA 8082A*	
SE-27-0-0.33-Dup---Air Dried (A9J0006-32)				**Matrix: Sediment**		**Batch: 9101592**		**C-07**
Aroclor 1016	ND	1.92	3.85	ug/kg dry	1	10/28/19 12:20	EPA 8082A	
Aroclor 1221	ND	1.92	3.85	ug/kg dry	1	10/28/19 12:20	EPA 8082A	
Aroclor 1232	ND	1.92	3.85	ug/kg dry	1	10/28/19 12:20	EPA 8082A	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-27-0-0.33-Dup---Air Dried (A9J0006-32)				**Matrix: Sediment**		**Batch: 9101592**		**C-07**
Aroclor 1242	ND	1.92	3.85	ug/kg dry	1	10/28/19 12:20	EPA 8082A	
Aroclor 1248	ND	1.92	3.85	ug/kg dry	1	10/28/19 12:20	EPA 8082A	
Aroclor 1254	ND	1.92	3.85	ug/kg dry	1	10/28/19 12:20	EPA 8082A	
Aroclor 1260	**9.05**	1.92	3.85	ug/kg dry	1	10/28/19 12:20	EPA 8082A	
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 94 %*		*Limits: 60-125 %*	*1*	*10/28/19 12:20*	*EPA 8082A*	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-24-0-0.33 (A9J0006-01RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Acenaphthene	**0.0293**	0.0148	0.0296	mg/kg dry	4	10/02/19 13:16	EPA 8270D	**Ja**
Acenaphthylene	ND	0.0148	0.0296	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
Anthracene	**0.0226**	0.0148	0.0296	mg/kg dry	4	10/02/19 13:16	EPA 8270D	**Ja**
Benz(a)anthracene	**0.0412**	0.0148	0.0296	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
Benzo(a)pyrene	**0.0318**	0.0222	0.0444	mg/kg dry	4	10/02/19 13:16	EPA 8270D	**Ja**
Benzo(b)fluoranthene	**0.0286**	0.0222	0.0444	mg/kg dry	4	10/02/19 13:16	EPA 8270D	**Ja**
Benzo(k)fluoranthene	ND	0.0222	0.0444	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
Benzo(g,h,i)perylene	ND	0.0148	0.0296	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
Chrysene	**0.0334**	0.0148	0.0296	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
Dibenz(a,h)anthracene	ND	0.0148	0.0296	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
Fluoranthene	**0.123**	0.0148	0.0296	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
Fluorene	**0.0242**	0.0148	0.0296	mg/kg dry	4	10/02/19 13:16	EPA 8270D	**Ja**
Indeno(1,2,3-cd)pyrene	ND	0.0148	0.0296	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
1-Methylnaphthalene	ND	0.0296	0.0592	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
2-Methylnaphthalene	ND	0.0296	0.0592	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
Naphthalene	**0.0698**	0.0296	0.0592	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
Phenanthrene	**0.0768**	0.0148	0.0296	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
Pyrene	**0.113**	0.0148	0.0296	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
Dibenzofuran	**0.0211**	0.0148	0.0296	mg/kg dry	4	10/02/19 13:16	EPA 8270D	**Ja**
2,4-Dimethylphenol	ND	0.0740	0.148	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
2-Methylphenol	ND	0.0370	0.0740	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
3+4-Methylphenol(s)	**0.137**	0.0370	0.0740	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
Pentachlorophenol (PCP)	ND	0.148	0.296	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
Phenol	**0.0889**	0.0296	0.0592	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
Bis(2-ethylhexyl)phthalate	ND	0.222	0.444	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
Butyl benzyl phthalate	ND	0.0740	0.148	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
Diethylphthalate	ND	0.0740	0.148	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
Dimethylphthalate	ND	0.0740	0.148	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
Di-n-butylphthalate	ND	0.0740	0.148	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
Di-n-octyl phthalate	ND	0.119	0.148	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
N-Nitrosodiphenylamine	ND	0.0370	0.0740	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
Hexachlorobenzene	ND	0.0148	0.0296	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
Hexachlorobutadiene	ND	0.0370	0.0740	mg/kg dry	4	10/02/19 13:16	EPA 8270D	

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Philip Nerenberg, Lab Director

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503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-24-0-0.33 (A9J0006-01RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Hexachlorocyclopentadiene	ND	0.0740	0.148	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
1,2-Dichlorobenzene	ND	0.0370	0.0740	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
1,4-Dichlorobenzene	ND	0.0370	0.0740	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
1,2,4-Trichlorobenzene	ND	0.0370	0.0740	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
Benzoic acid	ND	1.85	3.70	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
Benzyl alcohol	ND	0.0740	0.148	mg/kg dry	4	10/02/19 13:16	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*60 %*	*Limits: 37-122 %*	*4*	*10/02/19 13:16*	*EPA 8270D*	
2-Fluorobiphenyl (Surr)			*64 %*	*44-115 %*	*4*	*10/02/19 13:16*	*EPA 8270D*	
Phenol-d6 (Surr)			*56 %*	*33-122 %*	*4*	*10/02/19 13:16*	*EPA 8270D*	
p-Terphenyl-d14 (Surr)			*63 %*	*54-127 %*	*4*	*10/02/19 13:16*	*EPA 8270D*	
2-Fluorophenol (Surr)			*53 %*	*35-115 %*	*4*	*10/02/19 13:16*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*104 %*	*39-132 %*	*4*	*10/02/19 13:16*	*EPA 8270D*	
SE-14-0-0.33 (A9J0006-03RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Acenaphthene	**0.0154**	0.0151	0.0303	mg/kg dry	4	10/02/19 14:25	EPA 8270D	**Ja**
Acenaphthylene	ND	0.0151	0.0303	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Anthracene	ND	0.0151	0.0303	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Benz(a)anthracene	ND	0.0303	0.0303	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Benzo(a)pyrene	ND	0.0227	0.0454	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Benzo(b)fluoranthene	ND	0.0227	0.0454	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Benzo(k)fluoranthene	ND	0.0227	0.0454	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Benzo(g,h,i)perylene	ND	0.0151	0.0303	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Chrysene	**0.0166**	0.0151	0.0303	mg/kg dry	4	10/02/19 14:25	EPA 8270D	**Ja**
Dibenz(a,h)anthracene	ND	0.0151	0.0303	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Fluoranthene	**0.0211**	0.0151	0.0303	mg/kg dry	4	10/02/19 14:25	EPA 8270D	**Ja**
Fluorene	ND	0.0151	0.0303	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Indeno(1,2,3-cd)pyrene	ND	0.0151	0.0303	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
1-Methylnaphthalene	ND	0.0303	0.0605	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
2-Methylnaphthalene	ND	0.0303	0.0605	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Naphthalene	ND	0.0303	0.0605	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Phenanthrene	**0.0398**	0.0151	0.0303	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Pyrene	**0.0158**	0.0151	0.0303	mg/kg dry	4	10/02/19 14:25	EPA 8270D	**Ja**
Dibenzofuran	ND	0.0151	0.0303	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
2,4-Dimethylphenol	ND	0.0757	0.151	mg/kg dry	4	10/02/19 14:25	EPA 8270D	

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Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
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503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: Seaport Tidelands	
2001 NW 19th Ave, STE 200	Project Number: 1044.02.06-02	Report ID:
Portland, OR 97209	Project Manager: Emily Hess	A9J0006 - 01 09 20 1630

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-14-0-0.33 (A9J0006-03RE1)				**Matrix: Sediment**		**Batch: 9100490**		
2-Methylphenol	ND	0.0378	0.0757	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
3+4-Methylphenol(s)	ND	0.0378	0.0757	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Pentachlorophenol (PCP)	ND	0.151	0.303	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Phenol	**0.0715**	0.0303	0.0605	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Bis(2-ethylhexyl)phthalate	ND	0.227	0.454	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Butyl benzyl phthalate	ND	0.0757	0.151	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Diethylphthalate	ND	0.0757	0.151	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Dimethylphthalate	ND	0.0757	0.151	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Di-n-butylphthalate	ND	0.0757	0.151	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Di-n-octyl phthalate	ND	0.121	0.151	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
N-Nitrosodiphenylamine	ND	0.0378	0.0757	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Hexachlorobenzene	ND	0.0151	0.0303	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Hexachlorobutadiene	ND	0.0378	0.0757	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Hexachlorocyclopentadiene	ND	0.0757	0.151	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
1,2-Dichlorobenzene	ND	0.0378	0.0757	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
1,4-Dichlorobenzene	ND	0.0378	0.0757	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
1,2,4-Trichlorobenzene	ND	0.0378	0.0757	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Benzoic acid	ND	1.90	3.78	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Benzyl alcohol	ND	0.0757	0.151	mg/kg dry	4	10/02/19 14:25	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*77 %*	*Limits: 37-122 %*	*4*	*10/02/19 14:25*	*EPA 8270D*	
2-Fluorobiphenyl (Surr)			*80 %*	*44-115 %*	*4*	*10/02/19 14:25*	*EPA 8270D*	
Phenol-d6 (Surr)			*74 %*	*33-122 %*	*4*	*10/02/19 14:25*	*EPA 8270D*	
p-Terphenyl-d14 (Surr)			*74 %*	*54-127 %*	*4*	*10/02/19 14:25*	*EPA 8270D*	
2-Fluorophenol (Surr)			*69 %*	*35-115 %*	*4*	*10/02/19 14:25*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*107 %*	*39-132 %*	*4*	*10/02/19 14:25*	*EPA 8270D*	
SE-23-0-0.33 (A9J0006-05RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Acenaphthene	ND	0.0284	0.0570	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Acenaphthylene	**0.0376**	0.0284	0.0570	mg/kg dry	10	10/02/19 17:50	EPA 8270D	**Ja**
Anthracene	**0.0458**	0.0284	0.0570	mg/kg dry	10	10/02/19 17:50	EPA 8270D	**Ja**
Benz(a)anthracene	**0.164**	0.0284	0.0570	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Benzo(a)pyrene	**0.163**	0.0427	0.0854	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Benzo(b)fluoranthene	**0.153**	0.0427	0.0854	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Benzo(k)fluoranthene	**0.0681**	0.0427	0.0854	mg/kg dry	10	10/02/19 17:50	EPA 8270D	**Ja**

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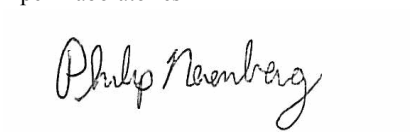

Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-23-0-0.33 (A9J0006-05RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Benzo(g,h,i)perylene	**0.0778**	0.0284	0.0570	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Chrysene	**0.153**	0.0284	0.0570	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Dibenz(a,h)anthracene	ND	0.0284	0.0570	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Fluoranthene	**0.285**	0.0284	0.0570	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Fluorene	ND	0.0284	0.0570	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Indeno(1,2,3-cd)pyrene	**0.0807**	0.0284	0.0570	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
1-Methylnaphthalene	ND	0.0570	0.114	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
2-Methylnaphthalene	ND	0.0570	0.114	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Naphthalene	ND	0.0570	0.114	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Phenanthrene	**0.213**	0.0284	0.0570	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Pyrene	**0.305**	0.0284	0.0570	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Dibenzofuran	ND	0.0284	0.0570	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
2,4-Dimethylphenol	ND	0.142	0.284	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
2-Methylphenol	ND	0.0711	0.142	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
3+4-Methylphenol(s)	ND	0.0711	0.142	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Pentachlorophenol (PCP)	ND	0.284	0.570	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Phenol	ND	0.0570	0.114	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Bis(2-ethylhexyl)phthalate	ND	0.427	0.854	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Butyl benzyl phthalate	ND	0.142	0.284	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Diethylphthalate	ND	0.142	0.284	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Dimethylphthalate	ND	0.142	0.284	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Di-n-butylphthalate	ND	0.142	0.284	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Di-n-octyl phthalate	ND	0.228	0.284	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
N-Nitrosodiphenylamine	ND	0.0711	0.142	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Hexachlorobenzene	ND	0.0284	0.0570	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Hexachlorobutadiene	ND	0.0711	0.142	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Hexachlorocyclopentadiene	ND	0.142	0.284	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
1,2-Dichlorobenzene	ND	0.0711	0.142	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
1,4-Dichlorobenzene	ND	0.0711	0.142	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
1,2,4-Trichlorobenzene	ND	0.0711	0.142	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Benzoic acid	ND	3.56	7.11	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Benzyl alcohol	ND	0.142	0.284	mg/kg dry	10	10/02/19 17:50	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery: 50 %*	*Limits: 37-122 %*		*10*	*10/02/19 17:50*	*EPA 8270D*	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-23-0-0.33 (A9J0006-05RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Surrogate: 2-Fluorobiphenyl (Surr)			*Recovery: 59 %*	*Limits: 44-115 %*	*10*	*10/02/19 17:50*	*EPA 8270D*	
Phenol-d6 (Surr)			*47 %*	*33-122 %*	*10*	*10/02/19 17:50*	*EPA 8270D*	
p-Terphenyl-d14 (Surr)			*68 %*	*54-127 %*	*10*	*10/02/19 17:50*	*EPA 8270D*	
2-Fluorophenol (Surr)			*48 %*	*35-115 %*	*10*	*10/02/19 17:50*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*106 %*	*39-132 %*	*10*	*10/02/19 17:50*	*EPA 8270D*	
SE-17-0-0.33 (A9J0006-06RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Acenaphthene	**0.126**	0.0118	0.0236	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Acenaphthylene	**0.0229**	0.0118	0.0236	mg/kg dry	4	10/02/19 17:16	EPA 8270D	**Ja**
Anthracene	**0.121**	0.0118	0.0236	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Benz(a)anthracene	**0.0665**	0.0118	0.0236	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Benzo(a)pyrene	**0.0387**	0.0177	0.0354	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Benzo(b)fluoranthene	**0.0339**	0.0177	0.0354	mg/kg dry	4	10/02/19 17:16	EPA 8270D	**Ja**
Benzo(k)fluoranthene	ND	0.0177	0.0354	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Benzo(g,h,i)perylene	ND	0.0118	0.0236	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Chrysene	**0.0703**	0.0118	0.0236	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Dibenz(a,h)anthracene	ND	0.0118	0.0236	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Fluoranthene	**0.335**	0.0118	0.0236	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Fluorene	**0.0875**	0.0118	0.0236	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Indeno(1,2,3-cd)pyrene	ND	0.0118	0.0236	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
1-Methylnaphthalene	**0.0706**	0.0236	0.0471	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
2-Methylnaphthalene	**0.0337**	0.0236	0.0471	mg/kg dry	4	10/02/19 17:16	EPA 8270D	**Ja**
Naphthalene	**0.0770**	0.0236	0.0471	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Phenanthrene	**0.575**	0.0118	0.0236	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Pyrene	**0.401**	0.0118	0.0236	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Dibenzofuran	**0.0187**	0.0118	0.0236	mg/kg dry	4	10/02/19 17:16	EPA 8270D	**Ja**
2,4-Dimethylphenol	ND	0.0590	0.118	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
2-Methylphenol	ND	0.0295	0.0590	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
3+4-Methylphenol(s)	ND	0.0295	0.0590	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Pentachlorophenol (PCP)	ND	0.118	0.236	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Phenol	ND	0.0236	0.0471	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Bis(2-ethylhexyl)phthalate	ND	0.177	0.354	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Butyl benzyl phthalate	ND	0.0590	0.118	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Diethylphthalate	ND	0.0590	0.118	mg/kg dry	4	10/02/19 17:16	EPA 8270D	

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Philip Nerenberg, Lab Director

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6700 S.W. Sandburg Street
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503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-17-0-0.33 (A9J0006-06RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Dimethylphthalate	ND	0.0590	0.118	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Di-n-butylphthalate	ND	0.0590	0.118	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Di-n-octyl phthalate	ND	0.0946	0.118	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
N-Nitrosodiphenylamine	ND	0.0295	0.0590	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Hexachlorobenzene	ND	0.0118	0.0236	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Hexachlorobutadiene	ND	0.0295	0.0590	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Hexachlorocyclopentadiene	ND	0.0590	0.118	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
1,2-Dichlorobenzene	ND	0.0295	0.0590	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
1,4-Dichlorobenzene	ND	0.0295	0.0590	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
1,2,4-Trichlorobenzene	ND	0.0295	0.0590	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Benzoic acid	ND	1.48	2.95	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Benzyl alcohol	ND	0.0590	0.118	mg/kg dry	4	10/02/19 17:16	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*62 %*	*Limits: 37-122 %*	*4*	*10/02/19 17:16*	*EPA 8270D*	
2-Fluorobiphenyl (Surr)			*71 %*	*44-115 %*	*4*	*10/02/19 17:16*	*EPA 8270D*	
Phenol-d6 (Surr)			*61 %*	*33-122 %*	*4*	*10/02/19 17:16*	*EPA 8270D*	
p-Terphenyl-d14 (Surr)			*75 %*	*54-127 %*	*4*	*10/02/19 17:16*	*EPA 8270D*	
2-Fluorophenol (Surr)			*57 %*	*35-115 %*	*4*	*10/02/19 17:16*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*96 %*	*39-132 %*	*4*	*10/02/19 17:16*	*EPA 8270D*	
SE-15-0-0.33 (A9J0006-07RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Acenaphthene	**0.0487**	0.0120	0.0242	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Acenaphthylene	ND	0.0120	0.0242	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Anthracene	**0.0208**	0.0120	0.0242	mg/kg dry	4	10/02/19 20:49	EPA 8270D	**Ja**
Benz(a)anthracene	**0.0612**	0.0120	0.0242	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Benzo(a)pyrene	**0.0458**	0.0181	0.0362	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Benzo(b)fluoranthene	**0.0907**	0.0181	0.0362	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Benzo(k)fluoranthene	**0.0365**	0.0181	0.0362	mg/kg dry	4	10/02/19 20:49	EPA 8270D	**M-05**
Benzo(g,h,i)perylene	**0.0183**	0.0120	0.0242	mg/kg dry	4	10/02/19 20:49	EPA 8270D	**Ja**
Chrysene	**0.0719**	0.0120	0.0242	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Dibenz(a,h)anthracene	ND	0.0120	0.0242	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Fluoranthene	**0.250**	0.0120	0.0242	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Fluorene	ND	0.0120	0.0242	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Indeno(1,2,3-cd)pyrene	**0.0207**	0.0120	0.0242	mg/kg dry	4	10/02/19 20:49	EPA 8270D	**Ja**
1-Methylnaphthalene	ND	0.0242	0.0483	mg/kg dry	4	10/02/19 20:49	EPA 8270D	

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Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-15-0-0.33 (A9J0006-07RE1)				**Matrix: Sediment**		**Batch: 9100490**		
2-Methylnaphthalene	ND	0.0242	0.0483	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Naphthalene	ND	0.0242	0.0483	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Phenanthrene	**0.0243**	0.0120	0.0242	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Pyrene	**0.210**	0.0120	0.0242	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Dibenzofuran	**0.0145**	0.0120	0.0242	mg/kg dry	4	10/02/19 20:49	EPA 8270D	**Ja**
2,4-Dimethylphenol	ND	0.0604	0.120	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
2-Methylphenol	ND	0.0302	0.0604	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
3+4-Methylphenol(s)	**0.157**	0.0302	0.0604	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Pentachlorophenol (PCP)	ND	0.120	0.242	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Phenol	**0.0583**	0.0242	0.0483	mg/kg dry	4	10/02/19 20:49	EPA 8270D	**M-04**
Bis(2-ethylhexyl)phthalate	ND	0.181	0.362	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Butyl benzyl phthalate	ND	0.0604	0.120	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Diethylphthalate	ND	0.0604	0.120	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Dimethylphthalate	ND	0.0604	0.120	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Di-n-butylphthalate	ND	0.0604	0.120	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Di-n-octyl phthalate	ND	0.0969	0.120	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
N-Nitrosodiphenylamine	ND	0.0302	0.0604	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Hexachlorobenzene	ND	0.0120	0.0242	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Hexachlorobutadiene	ND	0.0302	0.0604	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Hexachlorocyclopentadiene	ND	0.0604	0.120	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
1,2-Dichlorobenzene	ND	0.0302	0.0604	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
1,4-Dichlorobenzene	ND	0.0302	0.0604	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
1,2,4-Trichlorobenzene	ND	0.0302	0.0604	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Benzoic acid	ND	1.51	3.02	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Benzyl alcohol	ND	0.0604	0.120	mg/kg dry	4	10/02/19 20:49	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*69 %*	*Limits: 37-122 %*	*4*	*10/02/19 20:49*	*EPA 8270D*	
2-Fluorobiphenyl (Surr)			*77 %*	*44-115 %*	*4*	*10/02/19 20:49*	*EPA 8270D*	
Phenol-d6 (Surr)			*73 %*	*33-122 %*	*4*	*10/02/19 20:49*	*EPA 8270D*	
p-Terphenyl-d14 (Surr)			*87 %*	*54-127 %*	*4*	*10/02/19 20:49*	*EPA 8270D*	
2-Fluorophenol (Surr)			*75 %*	*35-115 %*	*4*	*10/02/19 20:49*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*95 %*	*39-132 %*	*4*	*10/02/19 20:49*	*EPA 8270D*	
SE-21-0-0.33 (A9J0006-08RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Acenaphthene	ND	0.00885	0.0178	mg/kg dry	4	10/02/19 18:25	EPA 8270D	

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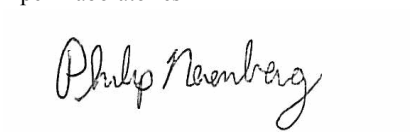

Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-21-0-0.33 (A9J0006-08RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Acenaphthylene	**0.0145**	0.00885	0.0178	mg/kg dry	4	10/02/19 18:25	EPA 8270D	**Ja**
Anthracene	ND	0.00885	0.0178	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Benz(a)anthracene	ND	0.00885	0.0178	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Benzo(a)pyrene	ND	0.0133	0.0266	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Benzo(b)fluoranthene	ND	0.0133	0.0266	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Benzo(k)fluoranthene	ND	0.0133	0.0266	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Benzo(g,h,i)perylene	ND	0.00885	0.0178	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Chrysene	ND	0.00885	0.0178	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Dibenz(a,h)anthracene	ND	0.00885	0.0178	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Fluoranthene	**0.0181**	0.00885	0.0178	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Fluorene	ND	0.00885	0.0178	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Indeno(1,2,3-cd)pyrene	ND	0.00885	0.0178	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
1-Methylnaphthalene	ND	0.0178	0.0355	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
2-Methylnaphthalene	ND	0.0178	0.0355	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Naphthalene	**0.0492**	0.0178	0.0355	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Phenanthrene	**0.0195**	0.00885	0.0178	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Pyrene	**0.0177**	0.00885	0.0178	mg/kg dry	4	10/02/19 18:25	EPA 8270D	**Ja**
Dibenzofuran	ND	0.00885	0.0178	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
2,4-Dimethylphenol	ND	0.0444	0.0885	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
2-Methylphenol	ND	0.0222	0.0444	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
3+4-Methylphenol(s)	**0.100**	0.0222	0.0444	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Pentachlorophenol (PCP)	ND	0.0885	0.178	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Phenol	**0.0281**	0.0178	0.0355	mg/kg dry	4	10/02/19 18:25	EPA 8270D	**Ja**
Bis(2-ethylhexyl)phthalate	ND	0.133	0.266	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Butyl benzyl phthalate	ND	0.0444	0.0885	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Diethylphthalate	ND	0.0444	0.0885	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Dimethylphthalate	ND	0.0444	0.0885	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Di-n-butylphthalate	ND	0.0444	0.0885	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Di-n-octyl phthalate	ND	0.0712	0.0885	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
N-Nitrosodiphenylamine	ND	0.0222	0.0444	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Hexachlorobenzene	ND	0.00885	0.0178	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Hexachlorobutadiene	ND	0.0222	0.0444	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Hexachlorocyclopentadiene	ND	0.0444	0.0885	mg/kg dry	4	10/02/19 18:25	EPA 8270D	

Apex Laboratories



Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-21-0-0.33 (A9J0006-08RE1)				**Matrix: Sediment**		**Batch: 9100490**		
1,2-Dichlorobenzene	ND	0.0222	0.0444	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
1,4-Dichlorobenzene	ND	0.0222	0.0444	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
1,2,4-Trichlorobenzene	ND	0.0222	0.0444	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Benzoic acid	ND	1.11	2.22	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Benzyl alcohol	ND	0.0444	0.0885	mg/kg dry	4	10/02/19 18:25	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*65 %*	*Limits: 37-122 %*	*4*	*10/02/19 18:25*	*EPA 8270D*	
2-Fluorobiphenyl (Surr)			*70 %*	*44-115 %*	*4*	*10/02/19 18:25*	*EPA 8270D*	
Phenol-d6 (Surr)			*66 %*	*33-122 %*	*4*	*10/02/19 18:25*	*EPA 8270D*	
p-Terphenyl-d14 (Surr)			*52 %*	*54-127 %*	*4*	*10/02/19 18:25*	*EPA 8270D*	*S-06*
2-Fluorophenol (Surr)			*63 %*	*35-115 %*	*4*	*10/02/19 18:25*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*100 %*	*39-132 %*	*4*	*10/02/19 18:25*	*EPA 8270D*	
SE-25-0-0.33 (A9J0006-13RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Acenaphthene	ND	0.0647	0.130	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Acenaphthylene	ND	0.0647	0.130	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Anthracene	ND	0.0647	0.130	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Benz(a)anthracene	**0.0890**	0.0647	0.130	mg/kg dry	20	10/02/19 21:25	EPA 8270D	**Ja**
Benzo(a)pyrene	**0.111**	0.0974	0.195	mg/kg dry	20	10/02/19 21:25	EPA 8270D	**Ja**
Benzo(b)fluoranthene	**0.137**	0.0974	0.195	mg/kg dry	20	10/02/19 21:25	EPA 8270D	**Ja**
Benzo(k)fluoranthene	ND	0.0974	0.195	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Benzo(g,h,i)perylene	ND	0.0647	0.130	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Chrysene	ND	0.0647	0.130	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Dibenz(a,h)anthracene	ND	0.0647	0.130	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Fluoranthene	**0.204**	0.0647	0.130	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Fluorene	ND	0.0647	0.130	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Indeno(1,2,3-cd)pyrene	ND	0.0647	0.130	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
1-Methylnaphthalene	ND	0.130	0.259	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
2-Methylnaphthalene	ND	0.130	0.259	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Naphthalene	ND	0.130	0.259	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Phenanthrene	**0.0648**	0.0647	0.130	mg/kg dry	20	10/02/19 21:25	EPA 8270D	**Ja**
Pyrene	**0.184**	0.0647	0.130	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Dibenzofuran	ND	0.0647	0.130	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
2,4-Dimethylphenol	ND	0.325	0.647	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
2-Methylphenol	ND	0.162	0.325	mg/kg dry	20	10/02/19 21:25	EPA 8270D	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-25-0-0.33 (A9J0006-13RE1)				**Matrix: Sediment**		**Batch: 9100490**		
3+4-Methylphenol(s)	ND	0.162	0.325	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Pentachlorophenol (PCP)	ND	0.647	1.30	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Phenol	ND	0.130	0.259	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Bis(2-ethylhexyl)phthalate	ND	0.974	1.95	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Butyl benzyl phthalate	ND	0.325	0.647	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Diethylphthalate	ND	0.325	0.647	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Dimethylphthalate	ND	0.325	0.647	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Di-n-butylphthalate	ND	0.325	0.647	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Di-n-octyl phthalate	ND	0.521	0.647	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
N-Nitrosodiphenylamine	ND	0.162	0.325	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Hexachlorobenzene	ND	0.0647	0.130	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Hexachlorobutadiene	ND	0.162	0.325	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Hexachlorocyclopentadiene	ND	0.325	0.647	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
1,2-Dichlorobenzene	ND	0.162	0.325	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
1,4-Dichlorobenzene	ND	0.162	0.325	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
1,2,4-Trichlorobenzene	ND	0.162	0.325	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Benzoic acid	ND	8.13	16.2	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Benzyl alcohol	ND	0.325	0.647	mg/kg dry	20	10/02/19 21:25	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*74 %*	*Limits: 37-122 %*	*20*	*10/02/19 21:25*	*EPA 8270D*	
2-Fluorobiphenyl (Surr)			*81 %*	*44-115 %*	*20*	*10/02/19 21:25*	*EPA 8270D*	
Phenol-d6 (Surr)			*68 %*	*33-122 %*	*20*	*10/02/19 21:25*	*EPA 8270D*	
p-Terphenyl-d14 (Surr)			*99 %*	*54-127 %*	*20*	*10/02/19 21:25*	*EPA 8270D*	
2-Fluorophenol (Surr)			*67 %*	*35-115 %*	*20*	*10/02/19 21:25*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*105 %*	*39-132 %*	*20*	*10/02/19 21:25*	*EPA 8270D*	
SE-26-0-0.33 (A9J0006-16RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Acenaphthene	**0.0408**	0.0306	0.0614	mg/kg dry	10	10/02/19 22:01	EPA 8270D	**Ja**
Acenaphthylene	ND	0.0306	0.0614	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
Anthracene	ND	0.0306	0.0614	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
Benz(a)anthracene	**0.0458**	0.0306	0.0614	mg/kg dry	10	10/02/19 22:01	EPA 8270D	**Ja**
Benzo(a)pyrene	**0.0665**	0.0460	0.0920	mg/kg dry	10	10/02/19 22:01	EPA 8270D	**Ja**
Benzo(b)fluoranthene	**0.0754**	0.0460	0.0920	mg/kg dry	10	10/02/19 22:01	EPA 8270D	**Ja**
Benzo(k)fluoranthene	ND	0.0460	0.0920	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
Benzo(g,h,i)perylene	ND	0.0306	0.0614	mg/kg dry	10	10/02/19 22:01	EPA 8270D	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-26-0-0.33 (A9J0006-16RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Chrysene	**0.0424**	0.0306	0.0614	mg/kg dry	10	10/02/19 22:01	EPA 8270D	**Ja**
Dibenz(a,h)anthracene	ND	0.0306	0.0614	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
Fluoranthene	**0.109**	0.0306	0.0614	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
Fluorene	**0.0386**	0.0306	0.0614	mg/kg dry	10	10/02/19 22:01	EPA 8270D	**Ja**
Indeno(1,2,3-cd)pyrene	**0.0340**	0.0306	0.0614	mg/kg dry	10	10/02/19 22:01	EPA 8270D	**Ja**
1-Methylnaphthalene	ND	0.0614	0.123	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
2-Methylnaphthalene	ND	0.0614	0.123	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
Naphthalene	**0.0752**	0.0614	0.123	mg/kg dry	10	10/02/19 22:01	EPA 8270D	**Ja**
Phenanthrene	**0.112**	0.0306	0.0614	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
Pyrene	**0.102**	0.0306	0.0614	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
Dibenzofuran	**0.0339**	0.0306	0.0614	mg/kg dry	10	10/02/19 22:01	EPA 8270D	**Ja**
2,4-Dimethylphenol	ND	0.153	0.306	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
2-Methylphenol	ND	0.0766	0.153	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
3+4-Methylphenol(s)	**0.0934**	0.0766	0.153	mg/kg dry	10	10/02/19 22:01	EPA 8270D	**Ja**
Pentachlorophenol (PCP)	ND	0.306	0.614	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
Phenol	**0.0941**	0.0614	0.123	mg/kg dry	10	10/02/19 22:01	EPA 8270D	**Ja**
Bis(2-ethylhexyl)phthalate	ND	0.460	0.920	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
Butyl benzyl phthalate	ND	0.153	0.306	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
Diethylphthalate	ND	0.153	0.306	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
Dimethylphthalate	ND	0.153	0.306	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
Di-n-butylphthalate	ND	0.153	0.306	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
Di-n-octyl phthalate	ND	0.246	0.306	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
N-Nitrosodiphenylamine	ND	0.0766	0.153	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
Hexachlorobenzene	ND	0.0306	0.0614	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
Hexachlorobutadiene	ND	0.0766	0.153	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
Hexachlorocyclopentadiene	ND	0.153	0.306	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
1,2-Dichlorobenzene	ND	0.0766	0.153	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
1,4-Dichlorobenzene	ND	0.0766	0.153	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
1,2,4-Trichlorobenzene	ND	0.0766	0.153	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
Benzoic acid	ND	3.84	7.66	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
Benzyl alcohol	ND	0.153	0.306	mg/kg dry	10	10/02/19 22:01	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*73 %*	*Limits: 37-122 %*	*10*	*10/02/19 22:01*	*EPA 8270D*	
2-Fluorobiphenyl (Surr)			*78 %*	*44-115 %*	*10*	*10/02/19 22:01*	*EPA 8270D*	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
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503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-26-0-0.33 (A9J0006-16RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Surrogate: Phenol-d6 (Surr)		*Recovery:*	*69 %*	*Limits: 33-122 %*	*10*	*10/02/19 22:01*	*EPA 8270D*	
p-Terphenyl-d14 (Surr)			*92 %*	*54-127 %*	*10*	*10/02/19 22:01*	*EPA 8270D*	
2-Fluorophenol (Surr)			*70 %*	*35-115 %*	*10*	*10/02/19 22:01*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*99 %*	*39-132 %*	*10*	*10/02/19 22:01*	*EPA 8270D*	
SE-18-0-0.33 (A9J0006-18RE1)				**Matrix: Sediment**		**Batch: 9100490**		**R-04**
Acenaphthene	ND	0.0114	0.0228	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Acenaphthylene	ND	0.0114	0.0228	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Anthracene	ND	0.0114	0.0228	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Benz(a)anthracene	ND	0.0114	0.0228	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Benzo(a)pyrene	ND	0.0171	0.0342	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Benzo(b)fluoranthene	ND	0.0171	0.0342	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Benzo(k)fluoranthene	ND	0.0171	0.0342	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Benzo(g,h,i)perylene	ND	0.0114	0.0228	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Chrysene	ND	0.0114	0.0228	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Dibenz(a,h)anthracene	ND	0.0114	0.0228	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Fluoranthene	ND	0.0114	0.0228	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Fluorene	ND	0.0114	0.0228	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Indeno(1,2,3-cd)pyrene	ND	0.0114	0.0228	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
1-Methylnaphthalene	ND	0.0228	0.0455	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
2-Methylnaphthalene	ND	0.0228	0.0455	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Naphthalene	ND	0.0228	0.0455	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Phenanthrene	ND	0.0114	0.0228	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Pyrene	ND	0.0114	0.0228	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Dibenzofuran	ND	0.0114	0.0228	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
2,4-Dimethylphenol	ND	0.0570	0.114	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
2-Methylphenol	ND	0.0284	0.0570	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
3+4-Methylphenol(s)	ND	0.0284	0.0570	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Pentachlorophenol (PCP)	ND	0.114	0.228	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Phenol	ND	0.0228	0.0455	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Bis(2-ethylhexyl)phthalate	ND	0.171	0.342	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Butyl benzyl phthalate	ND	0.0570	0.114	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Diethylphthalate	ND	0.0570	0.114	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Dimethylphthalate	ND	0.0570	0.114	mg/kg dry	4	10/02/19 18:59	EPA 8270D	

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Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-18-0-0.33 (A9J0006-18RE1)				**Matrix: Sediment**		**Batch: 9100490**		**R-04**
Di-n-butylphthalate	ND	0.0570	0.114	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Di-n-octyl phthalate	ND	0.0914	0.114	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
N-Nitrosodiphenylamine	ND	0.0284	0.0570	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Hexachlorobenzene	ND	0.0114	0.0228	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Hexachlorobutadiene	ND	0.0284	0.0570	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Hexachlorocyclopentadiene	ND	0.0570	0.114	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
1,2-Dichlorobenzene	ND	0.0284	0.0570	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
1,4-Dichlorobenzene	ND	0.0284	0.0570	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
1,2,4-Trichlorobenzene	ND	0.0284	0.0570	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Benzoic acid	ND	1.43	2.84	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Benzyl alcohol	ND	0.0570	0.114	mg/kg dry	4	10/02/19 18:59	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*61 %*	*Limits: 37-122 %*	*4*	*10/02/19 18:59*	*EPA 8270D*	
2-Fluorobiphenyl (Surr)			*65 %*	*44-115 %*	*4*	*10/02/19 18:59*	*EPA 8270D*	
Phenol-d6 (Surr)			*60 %*	*33-122 %*	*4*	*10/02/19 18:59*	*EPA 8270D*	
p-Terphenyl-d14 (Surr)			*72 %*	*54-127 %*	*4*	*10/02/19 18:59*	*EPA 8270D*	
2-Fluorophenol (Surr)			*59 %*	*35-115 %*	*4*	*10/02/19 18:59*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*91 %*	*39-132 %*	*4*	*10/02/19 18:59*	*EPA 8270D*	
SE-31-0-0.33 (A9J0006-20RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Acenaphthene	**0.0372**	0.0107	0.0215	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Acenaphthylene	**0.0196**	0.0107	0.0215	mg/kg dry	4	10/02/19 19:34	EPA 8270D	**Ja**
Anthracene	ND	0.0107	0.0215	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Benz(a)anthracene	**0.0125**	0.0107	0.0215	mg/kg dry	4	10/02/19 19:34	EPA 8270D	**Ja**
Benzo(a)pyrene	**0.0173**	0.0161	0.0323	mg/kg dry	4	10/02/19 19:34	EPA 8270D	**Ja**
Benzo(b)fluoranthene	ND	0.0161	0.0323	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Benzo(k)fluoranthene	ND	0.0161	0.0323	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Benzo(g,h,i)perylene	ND	0.0107	0.0215	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Chrysene	ND	0.0107	0.0215	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Dibenz(a,h)anthracene	ND	0.0107	0.0215	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Fluoranthene	**0.0280**	0.0107	0.0215	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Fluorene	ND	0.0107	0.0215	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Indeno(1,2,3-cd)pyrene	ND	0.0107	0.0215	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
1-Methylnaphthalene	ND	0.0215	0.0430	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
2-Methylnaphthalene	ND	0.0215	0.0430	mg/kg dry	4	10/02/19 19:34	EPA 8270D	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-31-0-0.33 (A9J0006-20RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Naphthalene	**0.0742**	0.0215	0.0430	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Phenanthrene	**0.0289**	0.0107	0.0215	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Pyrene	**0.0296**	0.0107	0.0215	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Dibenzofuran	ND	0.0107	0.0215	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
2,4-Dimethylphenol	ND	0.0538	0.107	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
2-Methylphenol	ND	0.0269	0.0538	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
3+4-Methylphenol(s)	**0.267**	0.0269	0.0538	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Pentachlorophenol (PCP)	ND	0.107	0.215	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Phenol	**0.0739**	0.0215	0.0430	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Bis(2-ethylhexyl)phthalate	ND	0.161	0.323	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Butyl benzyl phthalate	ND	0.0538	0.107	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Diethylphthalate	ND	0.0538	0.107	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Dimethylphthalate	ND	0.0538	0.107	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Di-n-butylphthalate	ND	0.0538	0.107	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Di-n-octyl phthalate	ND	0.0863	0.107	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
N-Nitrosodiphenylamine	ND	0.0269	0.0538	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Hexachlorobenzene	ND	0.0107	0.0215	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Hexachlorobutadiene	ND	0.0269	0.0538	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Hexachlorocyclopentadiene	ND	0.0538	0.107	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
1,2-Dichlorobenzene	ND	0.0269	0.0538	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
1,4-Dichlorobenzene	ND	0.0269	0.0538	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
1,2,4-Trichlorobenzene	ND	0.0269	0.0538	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Benzoic acid	ND	1.35	2.69	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Benzyl alcohol	ND	0.0538	0.107	mg/kg dry	4	10/02/19 19:34	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*64 %*	*Limits: 37-122 %*	*4*	*10/02/19 19:34*	*EPA 8270D*	
2-Fluorobiphenyl (Surr)			*77 %*	*44-115 %*	*4*	*10/02/19 19:34*	*EPA 8270D*	
Phenol-d6 (Surr)			*65 %*	*33-122 %*	*4*	*10/02/19 19:34*	*EPA 8270D*	
p-Terphenyl-d14 (Surr)			*73 %*	*54-127 %*	*4*	*10/02/19 19:34*	*EPA 8270D*	
2-Fluorophenol (Surr)			*63 %*	*35-115 %*	*4*	*10/02/19 19:34*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*103 %*	*39-132 %*	*4*	*10/02/19 19:34*	*EPA 8270D*	
SE-16-0-0.33 (A9J0006-21RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Acenaphthene	ND	0.00974	0.0195	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Acenaphthylene	ND	0.00974	0.0195	mg/kg dry	4	10/02/19 20:09	EPA 8270D	

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Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-16-0-0.33 (A9J0006-21RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Anthracene	ND	0.00974	0.0195	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Benz(a)anthracene	ND	0.00974	0.0195	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Benzo(a)pyrene	ND	0.0146	0.0293	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Benzo(b)fluoranthene	ND	0.0146	0.0293	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Benzo(k)fluoranthene	ND	0.0146	0.0293	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Benzo(g,h,i)perylene	ND	0.00974	0.0195	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Chrysene	ND	0.00974	0.0195	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Dibenz(a,h)anthracene	ND	0.00974	0.0195	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Fluoranthene	**0.0138**	0.00974	0.0195	mg/kg dry	4	10/02/19 20:09	EPA 8270D	**Ja**
Fluorene	ND	0.00974	0.0195	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Indeno(1,2,3-cd)pyrene	ND	0.00974	0.0195	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
1-Methylnaphthalene	ND	0.0195	0.0390	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
2-Methylnaphthalene	ND	0.0195	0.0390	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Naphthalene	ND	0.0195	0.0390	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Phenanthrene	**0.0136**	0.00974	0.0195	mg/kg dry	4	10/02/19 20:09	EPA 8270D	**Ja**
Pyrene	**0.0130**	0.00974	0.0195	mg/kg dry	4	10/02/19 20:09	EPA 8270D	**Ja**
Dibenzofuran	ND	0.00974	0.0195	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
2,4-Dimethylphenol	ND	0.0488	0.0974	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
2-Methylphenol	ND	0.0244	0.0488	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
3+4-Methylphenol(s)	**0.0284**	0.0244	0.0488	mg/kg dry	4	10/02/19 20:09	EPA 8270D	**Ja**
Pentachlorophenol (PCP)	ND	0.0974	0.195	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Phenol	ND	0.0195	0.0390	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Bis(2-ethylhexyl)phthalate	ND	0.146	0.293	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Butyl benzyl phthalate	ND	0.0488	0.0974	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Diethylphthalate	ND	0.0488	0.0974	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Dimethylphthalate	ND	0.0488	0.0974	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Di-n-butylphthalate	ND	0.0488	0.0974	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Di-n-octyl phthalate	ND	0.0783	0.0974	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
N-Nitrosodiphenylamine	ND	0.0244	0.0488	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Hexachlorobenzene	ND	0.00974	0.0195	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Hexachlorobutadiene	ND	0.0244	0.0488	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Hexachlorocyclopentadiene	ND	0.0488	0.0974	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
1,2-Dichlorobenzene	ND	0.0244	0.0488	mg/kg dry	4	10/02/19 20:09	EPA 8270D	

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Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-16-0-0.33 (A9J0006-21RE1)				**Matrix: Sediment**		**Batch: 9100490**		
1,4-Dichlorobenzene	ND	0.0244	0.0488	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
1,2,4-Trichlorobenzene	ND	0.0244	0.0488	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Benzoic acid	ND	1.22	2.44	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Benzyl alcohol	ND	0.0488	0.0974	mg/kg dry	4	10/02/19 20:09	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*60 %*	*Limits: 37-122 %*	*4*	*10/02/19 20:09*	*EPA 8270D*	
2-Fluorobiphenyl (Surr)			*73 %*	*44-115 %*	*4*	*10/02/19 20:09*	*EPA 8270D*	
Phenol-d6 (Surr)			*60 %*	*33-122 %*	*4*	*10/02/19 20:09*	*EPA 8270D*	
p-Terphenyl-d14 (Surr)			*76 %*	*54-127 %*	*4*	*10/02/19 20:09*	*EPA 8270D*	
2-Fluorophenol (Surr)			*59 %*	*35-115 %*	*4*	*10/02/19 20:09*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*94 %*	*39-132 %*	*4*	*10/02/19 20:09*	*EPA 8270D*	
SE-22-0-0.33 (A9J0006-23RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Acenaphthene	ND	0.0158	0.0317	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Acenaphthylene	ND	0.0158	0.0317	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Anthracene	ND	0.0158	0.0317	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Benz(a)anthracene	ND	0.0158	0.0317	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Benzo(a)pyrene	ND	0.0238	0.0475	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Benzo(b)fluoranthene	ND	0.0238	0.0475	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Benzo(k)fluoranthene	ND	0.0238	0.0475	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Benzo(g,h,i)perylene	ND	0.0158	0.0317	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Chrysene	ND	0.0158	0.0317	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Dibenz(a,h)anthracene	ND	0.0158	0.0317	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Fluoranthene	**0.0318**	0.0158	0.0317	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Fluorene	ND	0.0158	0.0317	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Indeno(1,2,3-cd)pyrene	ND	0.0158	0.0317	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
1-Methylnaphthalene	ND	0.0317	0.0634	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
2-Methylnaphthalene	ND	0.0317	0.0634	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Naphthalene	ND	0.0317	0.0634	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Phenanthrene	ND	0.0158	0.0317	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Pyrene	**0.0264**	0.0158	0.0317	mg/kg dry	4	10/02/19 22:37	EPA 8270D	**Ja**
Dibenzofuran	ND	0.0158	0.0317	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
2,4-Dimethylphenol	ND	0.0793	0.158	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
2-Methylphenol	ND	0.0396	0.0793	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
3+4-Methylphenol(s)	ND	0.0396	0.0793	mg/kg dry	4	10/02/19 22:37	EPA 8270D	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
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Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-22-0-0.33 (A9J0006-23RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Pentachlorophenol (PCP)	ND	0.158	0.317	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Phenol	ND	0.0317	0.0634	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Bis(2-ethylhexyl)phthalate	ND	0.238	0.475	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Butyl benzyl phthalate	ND	0.0793	0.158	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Diethylphthalate	ND	0.0793	0.158	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Dimethylphthalate	ND	0.0793	0.158	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Di-n-butylphthalate	ND	0.0793	0.158	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Di-n-octyl phthalate	ND	0.127	0.158	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
N-Nitrosodiphenylamine	ND	0.0396	0.0793	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Hexachlorobenzene	ND	0.0158	0.0317	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Hexachlorobutadiene	ND	0.0396	0.0793	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Hexachlorocyclopentadiene	ND	0.0793	0.158	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
1,2-Dichlorobenzene	ND	0.0396	0.0793	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
1,4-Dichlorobenzene	ND	0.0396	0.0793	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
1,2,4-Trichlorobenzene	ND	0.0396	0.0793	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Benzoic acid	ND	1.99	3.96	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Benzyl alcohol	ND	0.0793	0.158	mg/kg dry	4	10/02/19 22:37	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*56 %*	*Limits: 37-122 %*	*4*	*10/02/19 22:37*	*EPA 8270D*	
2-Fluorobiphenyl (Surr)			*63 %*	*44-115 %*	*4*	*10/02/19 22:37*	*EPA 8270D*	
Phenol-d6 (Surr)			*63 %*	*33-122 %*	*4*	*10/02/19 22:37*	*EPA 8270D*	
p-Terphenyl-d14 (Surr)			*84 %*	*54-127 %*	*4*	*10/02/19 22:37*	*EPA 8270D*	
2-Fluorophenol (Surr)			*60 %*	*35-115 %*	*4*	*10/02/19 22:37*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*89 %*	*39-132 %*	*4*	*10/02/19 22:37*	*EPA 8270D*	
SE-27-0-0.33 (A9J0006-24RE2)				**Matrix: Sediment**		**Batch: 9100740**		
Acenaphthene	ND	0.0131	0.0262	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
Acenaphthylene	ND	0.0131	0.0262	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
Anthracene	ND	0.0131	0.0262	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
Benz(a)anthracene	**0.0203**	0.0131	0.0262	mg/kg dry	4	10/07/19 18:03	EPA 8270D	**Ja**
Benzo(a)pyrene	**0.0236**	0.0197	0.0393	mg/kg dry	4	10/07/19 18:03	EPA 8270D	**Ja**
Benzo(b)fluoranthene	**0.0208**	0.0197	0.0393	mg/kg dry	4	10/07/19 18:03	EPA 8270D	**Ja**
Benzo(k)fluoranthene	ND	0.0197	0.0393	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
Benzo(g,h,i)perylene	ND	0.0131	0.0262	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
Chrysene	**0.0203**	0.0131	0.0262	mg/kg dry	4	10/07/19 18:03	EPA 8270D	**Ja**

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-27-0-0.33 (A9J0006-24RE2)				**Matrix: Sediment**		**Batch: 9100740**		
Dibenz(a,h)anthracene	ND	0.0131	0.0262	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
Fluoranthene	**0.0363**	0.0131	0.0262	mg/kg dry	4	10/07/19 18:03	EPA 8270D	**Q-42**
Fluorene	ND	0.0131	0.0262	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
Indeno(1,2,3-cd)pyrene	ND	0.0131	0.0262	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
1-Methylnaphthalene	ND	0.0262	0.0524	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
2-Methylnaphthalene	ND	0.0262	0.0524	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
Naphthalene	ND	0.0262	0.0524	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
Phenanthrene	**0.0181**	0.0131	0.0262	mg/kg dry	4	10/07/19 18:03	EPA 8270D	**Ja**
Pyrene	**0.0324**	0.0131	0.0262	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
Dibenzofuran	ND	0.0131	0.0262	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
2,4-Dimethylphenol	ND	0.0656	0.131	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
2-Methylphenol	ND	0.0327	0.0656	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
3+4-Methylphenol(s)	**0.0427**	0.0327	0.0656	mg/kg dry	4	10/07/19 18:03	EPA 8270D	**Ja**
Pentachlorophenol (PCP)	ND	0.131	0.262	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
Phenol	ND	0.0262	0.0524	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
Bis(2-ethylhexyl)phthalate	ND	0.197	0.393	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
Butyl benzyl phthalate	ND	0.0656	0.131	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
Diethylphthalate	ND	0.0656	0.131	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
Dimethylphthalate	ND	0.0656	0.131	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
Di-n-butylphthalate	ND	0.0656	0.131	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
Di-n-octyl phthalate	ND	0.105	0.131	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
N-Nitrosodiphenylamine	ND	0.0327	0.0656	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
Hexachlorobenzene	ND	0.0131	0.0262	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
Hexachlorobutadiene	ND	0.0327	0.0656	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
Hexachlorocyclopentadiene	ND	0.0656	0.131	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
1,2-Dichlorobenzene	ND	0.0327	0.0656	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
1,4-Dichlorobenzene	ND	0.0327	0.0656	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
1,2,4-Trichlorobenzene	ND	0.0327	0.0656	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
Benzoic acid	ND	1.64	3.27	mg/kg dry	4	10/07/19 18:03	EPA 8270D	Q-42
Benzyl alcohol	ND	0.0656	0.131	mg/kg dry	4	10/07/19 18:03	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*67 %*	*Limits: 37-122 %*	*4*	*10/07/19 18:03*	*EPA 8270D*	
2-Fluorobiphenyl (Surr)			*37 %*	*44-115 %*	*4*	*10/07/19 18:03*	*EPA 8270D*	*S-03*
Phenol-d6 (Surr)			*69 %*	*33-122 %*	*4*	*10/07/19 18:03*	*EPA 8270D*	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
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503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-27-0-0.33 (A9J0006-24RE2)				**Matrix: Sediment**		**Batch: 9100740**		
Surrogate: p-Terphenyl-d14 (Surr)		*Recovery:*	*41 %*	*Limits: 54-127 %*	*4*	*10/07/19 18:03*	*EPA 8270D*	*S-03*
2-Fluorophenol (Surr)			*65 %*	*35-115 %*	*4*	*10/07/19 18:03*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*90 %*	*39-132 %*	*4*	*10/07/19 18:03*	*EPA 8270D*	
SE-27-0-0.33-Dup (A9J0006-25RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Acenaphthene	ND	0.0136	0.0272	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Acenaphthylene	ND	0.0136	0.0272	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Anthracene	ND	0.0136	0.0272	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Benz(a)anthracene	ND	0.0136	0.0272	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Benzo(a)pyrene	ND	0.0204	0.0408	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Benzo(b)fluoranthene	ND	0.0204	0.0408	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Benzo(k)fluoranthene	ND	0.0204	0.0408	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Benzo(g,h,i)perylene	ND	0.0136	0.0272	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Chrysene	ND	0.0136	0.0272	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Dibenz(a,h)anthracene	ND	0.0136	0.0272	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Fluoranthene	ND	0.0136	0.0272	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Fluorene	ND	0.0136	0.0272	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Indeno(1,2,3-cd)pyrene	ND	0.0136	0.0272	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
1-Methylnaphthalene	ND	0.0272	0.0543	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
2-Methylnaphthalene	ND	0.0272	0.0543	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Naphthalene	ND	0.0272	0.0543	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Phenanthrene	ND	0.0136	0.0272	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Pyrene	**0.0163**	0.0136	0.0272	mg/kg dry	4	10/03/19 16:39	EPA 8270D	**Ja**
Dibenzofuran	ND	0.0136	0.0272	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
2,4-Dimethylphenol	ND	0.0680	0.136	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
2-Methylphenol	ND	0.0339	0.0680	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
3+4-Methylphenol(s)	**0.0504**	0.0339	0.0680	mg/kg dry	4	10/03/19 16:39	EPA 8270D	**Ja**
Pentachlorophenol (PCP)	ND	0.136	0.272	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Phenol	**0.0608**	0.0272	0.0543	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Bis(2-ethylhexyl)phthalate	ND	0.204	0.408	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Butyl benzyl phthalate	ND	0.0680	0.136	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Diethylphthalate	ND	0.0680	0.136	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Dimethylphthalate	ND	0.0680	0.136	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Di-n-butylphthalate	ND	0.0680	0.136	mg/kg dry	4	10/03/19 16:39	EPA 8270D	

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Philip Nerenberg, Lab Director

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503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-27-0-0.33-Dup (A9J0006-25RE1)				**Matrix: Sediment**		**Batch: 9100490**		
Di-n-octyl phthalate	ND	0.109	0.136	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
N-Nitrosodiphenylamine	ND	0.0339	0.0680	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Hexachlorobenzene	ND	0.0136	0.0272	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Hexachlorobutadiene	ND	0.0339	0.0680	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Hexachlorocyclopentadiene	ND	0.0680	0.136	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
1,2-Dichlorobenzene	ND	0.0339	0.0680	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
1,4-Dichlorobenzene	ND	0.0339	0.0680	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
1,2,4-Trichlorobenzene	ND	0.0339	0.0680	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Benzoic acid	ND	1.70	3.39	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Benzyl alcohol	ND	0.0680	0.136	mg/kg dry	4	10/03/19 16:39	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*61 %*	*Limits: 37-122 %*	*4*	*10/03/19 16:39*	*EPA 8270D*	
2-Fluorobiphenyl (Surr)			*60 %*	*44-115 %*	*4*	*10/03/19 16:39*	*EPA 8270D*	
Phenol-d6 (Surr)			*60 %*	*33-122 %*	*4*	*10/03/19 16:39*	*EPA 8270D*	
p-Terphenyl-d14 (Surr)			*62 %*	*54-127 %*	*4*	*10/03/19 16:39*	*EPA 8270D*	
2-Fluorophenol (Surr)			*60 %*	*35-115 %*	*4*	*10/03/19 16:39*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*94 %*	*39-132 %*	*4*	*10/03/19 16:39*	*EPA 8270D*	

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Philip Nerenberg, Lab Director

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020A (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-24-0-0.33 (A9J0006-01)				**Matrix: Sediment**				
Batch: 9100629								
Arsenic	**8.26**	0.687	1.37	mg/kg dry	5	10/07/19 20:43	EPA 6020A	
Cadmium	**0.216**	0.137	0.275	mg/kg dry	5	10/07/19 20:43	EPA 6020A	**Ja**
Chromium	**40.0**	0.687	1.37	mg/kg dry	5	10/07/19 20:43	EPA 6020A	
Copper	**73.7**	0.687	1.37	mg/kg dry	5	10/07/19 20:43	EPA 6020A	
Lead	**32.9**	0.137	0.275	mg/kg dry	5	10/07/19 20:43	EPA 6020A	
Nickel	**40.2**	1.37	2.75	mg/kg dry	5	10/07/19 20:43	EPA 6020A	
Selenium	**0.797**	0.687	1.37	mg/kg dry	5	10/07/19 20:43	EPA 6020A	**Ja**
Silver	**0.146**	0.137	0.275	mg/kg dry	5	10/07/19 20:43	EPA 6020A	**Ja**
Zinc	**93.0**	2.75	5.50	mg/kg dry	5	10/07/19 20:43	EPA 6020A	
SE-14-0-0.33 (A9J0006-03)				**Matrix: Sediment**				
Batch: 9100629								
Arsenic	**8.63**	0.697	1.39	mg/kg dry	5	10/07/19 20:47	EPA 6020A	
Cadmium	ND	0.139	0.279	mg/kg dry	5	10/07/19 20:47	EPA 6020A	
Chromium	**33.9**	0.697	1.39	mg/kg dry	5	10/07/19 20:47	EPA 6020A	
Copper	**85.5**	0.697	1.39	mg/kg dry	5	10/07/19 20:47	EPA 6020A	
Lead	**47.3**	0.139	0.279	mg/kg dry	5	10/07/19 20:47	EPA 6020A	
Nickel	**27.9**	1.39	2.79	mg/kg dry	5	10/07/19 20:47	EPA 6020A	
Selenium	**0.716**	0.697	1.39	mg/kg dry	5	10/07/19 20:47	EPA 6020A	**Ja**
Silver	ND	0.139	0.279	mg/kg dry	5	10/07/19 20:47	EPA 6020A	
Zinc	**82.2**	2.79	5.57	mg/kg dry	5	10/07/19 20:47	EPA 6020A	
SE-23-0-0.33 (A9J0006-05)				**Matrix: Sediment**				
Batch: 9100629								
Arsenic	**8.51**	0.542	1.08	mg/kg dry	5	10/07/19 20:52	EPA 6020A	
Cadmium	**0.513**	0.108	0.217	mg/kg dry	5	10/07/19 20:52	EPA 6020A	
Chromium	**37.8**	0.542	1.08	mg/kg dry	5	10/07/19 20:52	EPA 6020A	
Copper	**117**	0.542	1.08	mg/kg dry	5	10/07/19 20:52	EPA 6020A	
Lead	**34.9**	0.108	0.217	mg/kg dry	5	10/07/19 20:52	EPA 6020A	
Nickel	**37.5**	1.08	2.17	mg/kg dry	5	10/07/19 20:52	EPA 6020A	
Selenium	**0.798**	0.542	1.08	mg/kg dry	5	10/07/19 20:52	EPA 6020A	**Ja**
Silver	**0.148**	0.108	0.217	mg/kg dry	5	10/07/19 20:52	EPA 6020A	**Ja**
Zinc	**136**	2.17	4.33	mg/kg dry	5	10/07/19 20:52	EPA 6020A	

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Philip Nerenberg, Lab Director

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6700 S.W. Sandburg Street
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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020A (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-17-0-0.33 (A9J0006-06)				**Matrix: Sediment**				
Batch: 9100629								
Arsenic	**7.09**	0.557	1.11	mg/kg dry	5	10/07/19 21:05	EPA 6020A	
Cadmium	**0.151**	0.111	0.223	mg/kg dry	5	10/07/19 21:05	EPA 6020A	**Ja**
Chromium	**36.1**	0.557	1.11	mg/kg dry	5	10/07/19 21:05	EPA 6020A	
Copper	**57.3**	0.557	1.11	mg/kg dry	5	10/07/19 21:05	EPA 6020A	
Lead	**8.21**	0.111	0.223	mg/kg dry	5	10/07/19 21:05	EPA 6020A	
Nickel	**27.2**	1.11	2.23	mg/kg dry	5	10/07/19 21:05	EPA 6020A	
Selenium	**0.867**	0.557	1.11	mg/kg dry	5	10/07/19 21:05	EPA 6020A	**Ja**
Silver	**0.119**	0.111	0.223	mg/kg dry	5	10/07/19 21:05	EPA 6020A	**Ja**
Zinc	**82.1**	2.23	4.45	mg/kg dry	5	10/07/19 21:05	EPA 6020A	
SE-15-0-0.33 (A9J0006-07)				**Matrix: Sediment**				
Batch: 9100629								
Arsenic	**6.20**	0.576	1.15	mg/kg dry	5	10/07/19 21:10	EPA 6020A	
Cadmium	**0.175**	0.115	0.230	mg/kg dry	5	10/07/19 21:10	EPA 6020A	**Ja**
Chromium	**32.0**	0.576	1.15	mg/kg dry	5	10/07/19 21:10	EPA 6020A	
Copper	**49.8**	0.576	1.15	mg/kg dry	5	10/07/19 21:10	EPA 6020A	
Lead	**7.52**	0.115	0.230	mg/kg dry	5	10/07/19 21:10	EPA 6020A	
Nickel	**21.8**	1.15	2.30	mg/kg dry	5	10/07/19 21:10	EPA 6020A	
Selenium	**0.714**	0.576	1.15	mg/kg dry	5	10/07/19 21:10	EPA 6020A	**Ja**
Silver	**0.115**	0.115	0.230	mg/kg dry	5	10/07/19 21:10	EPA 6020A	**Ja**
Zinc	**67.3**	2.30	4.60	mg/kg dry	5	10/07/19 21:10	EPA 6020A	
SE-21-0-0.33 (A9J0006-08)				**Matrix: Sediment**				
Batch: 9100629								
Arsenic	**4.49**	0.421	0.842	mg/kg dry	5	10/07/19 21:15	EPA 6020A	
Cadmium	**0.118**	0.0842	0.168	mg/kg dry	5	10/07/19 21:15	EPA 6020A	**Ja**
Chromium	**29.1**	0.421	0.842	mg/kg dry	5	10/07/19 21:15	EPA 6020A	
Copper	**49.9**	0.421	0.842	mg/kg dry	5	10/07/19 21:15	EPA 6020A	
Lead	**7.20**	0.0842	0.168	mg/kg dry	5	10/07/19 21:15	EPA 6020A	
Nickel	**25.1**	0.842	1.68	mg/kg dry	5	10/07/19 21:15	EPA 6020A	
Selenium	**0.630**	0.421	0.842	mg/kg dry	5	10/07/19 21:15	EPA 6020A	**Ja**
Silver	**0.0854**	0.0842	0.168	mg/kg dry	5	10/07/19 21:15	EPA 6020A	**Ja**

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Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020A (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-21-0-0.33 (A9J0006-08)				**Matrix: Sediment**				
Zinc	**64.0**	1.68	3.37	mg/kg dry	5	10/07/19 21:15	EPA 6020A	
SE-25-0-0.33 (A9J0006-13)				**Matrix: Sediment**				
Batch: 9100629								
Arsenic	**8.84**	0.632	1.26	mg/kg dry	5	10/07/19 21:19	EPA 6020A	
Cadmium	**0.725**	0.126	0.253	mg/kg dry	5	10/07/19 21:19	EPA 6020A	
Chromium	**19.1**	0.632	1.26	mg/kg dry	5	10/07/19 21:19	EPA 6020A	
Copper	**76.8**	0.632	1.26	mg/kg dry	5	10/07/19 21:19	EPA 6020A	**Q-42**
Lead	**37.9**	0.126	0.253	mg/kg dry	5	10/07/19 21:19	EPA 6020A	
Nickel	**25.5**	1.26	2.53	mg/kg dry	5	10/07/19 21:19	EPA 6020A	
Selenium	ND	0.632	1.26	mg/kg dry	5	10/07/19 21:19	EPA 6020A	
Silver	ND	0.126	0.253	mg/kg dry	5	10/07/19 21:19	EPA 6020A	
Zinc	**98.6**	2.53	5.05	mg/kg dry	5	10/07/19 21:19	EPA 6020A	
SE-26-0-0.33 (A9J0006-16)				**Matrix: Sediment**				
Batch: 9100629								
Arsenic	**5.11**	0.593	1.19	mg/kg dry	5	10/07/19 21:24	EPA 6020A	
Cadmium	ND	0.119	0.237	mg/kg dry	5	10/07/19 21:24	EPA 6020A	
Chromium	**25.7**	0.593	1.19	mg/kg dry	5	10/07/19 21:24	EPA 6020A	
Copper	**81.9**	0.593	1.19	mg/kg dry	5	10/07/19 21:24	EPA 6020A	
Lead	**30.4**	0.119	0.237	mg/kg dry	5	10/07/19 21:24	EPA 6020A	
Nickel	**26.0**	1.19	2.37	mg/kg dry	5	10/07/19 21:24	EPA 6020A	
Selenium	ND	0.593	1.19	mg/kg dry	5	10/07/19 21:24	EPA 6020A	
Silver	ND	0.119	0.237	mg/kg dry	5	10/07/19 21:24	EPA 6020A	
Zinc	**76.0**	2.37	4.74	mg/kg dry	5	10/07/19 21:24	EPA 6020A	
SE-18-0-0.33 (A9J0006-18)				**Matrix: Sediment**				
Batch: 9100629								
Arsenic	**5.93**	0.556	1.11	mg/kg dry	5	10/07/19 21:28	EPA 6020A	
Cadmium	**0.169**	0.111	0.222	mg/kg dry	5	10/07/19 21:28	EPA 6020A	**Ja**
Chromium	**34.5**	0.556	1.11	mg/kg dry	5	10/07/19 21:28	EPA 6020A	
Copper	**62.1**	0.556	1.11	mg/kg dry	5	10/07/19 21:28	EPA 6020A	
Lead	**7.28**	0.111	0.222	mg/kg dry	5	10/07/19 21:28	EPA 6020A	
Nickel	**30.1**	1.11	2.22	mg/kg dry	5	10/07/19 21:28	EPA 6020A	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020A (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-18-0-0.33 (A9J0006-18)				**Matrix: Sediment**				
Selenium	**0.860**	0.556	1.11	mg/kg dry	5	10/07/19 21:28	EPA 6020A	**Ja**
Silver	ND	0.111	0.222	mg/kg dry	5	10/07/19 21:28	EPA 6020A	
Zinc	**80.3**	2.22	4.45	mg/kg dry	5	10/07/19 21:28	EPA 6020A	
SE-31-0-0.33 (A9J0006-20)				**Matrix: Sediment**				
Batch: 9100629								
Arsenic	**6.07**	0.523	1.05	mg/kg dry	5	10/07/19 21:33	EPA 6020A	
Cadmium	**0.165**	0.105	0.209	mg/kg dry	5	10/07/19 21:33	EPA 6020A	**Ja**
Chromium	**34.7**	0.523	1.05	mg/kg dry	5	10/07/19 21:33	EPA 6020A	
Copper	**61.4**	0.523	1.05	mg/kg dry	5	10/07/19 21:33	EPA 6020A	
Lead	**7.94**	0.105	0.209	mg/kg dry	5	10/07/19 21:33	EPA 6020A	
Nickel	**30.2**	1.05	2.09	mg/kg dry	5	10/07/19 21:33	EPA 6020A	
Selenium	**0.845**	0.523	1.05	mg/kg dry	5	10/07/19 21:33	EPA 6020A	**Ja**
Silver	**0.111**	0.105	0.209	mg/kg dry	5	10/07/19 21:33	EPA 6020A	**Ja**
Zinc	**74.7**	2.09	4.18	mg/kg dry	5	10/07/19 21:33	EPA 6020A	
SE-16-0-0.33 (A9J0006-21)				**Matrix: Sediment**				
Batch: 9100629								
Arsenic	**4.91**	0.459	0.918	mg/kg dry	5	10/07/19 21:38	EPA 6020A	
Cadmium	**0.143**	0.0918	0.184	mg/kg dry	5	10/07/19 21:38	EPA 6020A	**Ja**
Chromium	**32.2**	0.459	0.918	mg/kg dry	5	10/07/19 21:38	EPA 6020A	
Copper	**52.0**	0.459	0.918	mg/kg dry	5	10/07/19 21:38	EPA 6020A	
Lead	**6.35**	0.0918	0.184	mg/kg dry	5	10/07/19 21:38	EPA 6020A	
Nickel	**26.1**	0.918	1.84	mg/kg dry	5	10/07/19 21:38	EPA 6020A	
Selenium	**0.725**	0.459	0.918	mg/kg dry	5	10/07/19 21:38	EPA 6020A	**Ja**
Silver	ND	0.0918	0.184	mg/kg dry	5	10/07/19 21:38	EPA 6020A	
Zinc	**75.1**	1.84	3.67	mg/kg dry	5	10/07/19 21:38	EPA 6020A	
SE-22-0-0.33 (A9J0006-23)				**Matrix: Sediment**				
Batch: 9100629								
Arsenic	**6.97**	0.736	1.47	mg/kg dry	5	10/07/19 21:42	EPA 6020A	
Cadmium	**0.201**	0.147	0.294	mg/kg dry	5	10/07/19 21:42	EPA 6020A	**Ja**
Chromium	**35.7**	0.736	1.47	mg/kg dry	5	10/07/19 21:42	EPA 6020A	
Copper	**68.6**	0.736	1.47	mg/kg dry	5	10/07/19 21:42	EPA 6020A	

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Philip Nerenberg, Lab Director

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503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020A (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-22-0-0.33 (A9J0006-23)				**Matrix: Sediment**				
Lead	**16.9**	0.147	0.294	mg/kg dry	5	10/07/19 21:42	EPA 6020A	
Nickel	**26.3**	1.47	2.94	mg/kg dry	5	10/07/19 21:42	EPA 6020A	
Selenium	**1.01**	0.736	1.47	mg/kg dry	5	10/07/19 21:42	EPA 6020A	**Ja**
Silver	ND	0.147	0.294	mg/kg dry	5	10/07/19 21:42	EPA 6020A	
Zinc	**136**	2.94	5.88	mg/kg dry	5	10/07/19 21:42	EPA 6020A	
SE-27-0-0.33 (A9J0006-24)				**Matrix: Sediment**				
Batch: 9100629								
Arsenic	**7.49**	0.620	1.24	mg/kg dry	5	10/07/19 21:47	EPA 6020A	
Cadmium	**0.154**	0.124	0.248	mg/kg dry	5	10/07/19 21:47	EPA 6020A	**Ja**
Chromium	**33.8**	0.620	1.24	mg/kg dry	5	10/07/19 21:47	EPA 6020A	
Copper	**62.6**	0.620	1.24	mg/kg dry	5	10/07/19 21:47	EPA 6020A	
Lead	**10.8**	0.124	0.248	mg/kg dry	5	10/07/19 21:47	EPA 6020A	
Nickel	**25.7**	1.24	2.48	mg/kg dry	5	10/07/19 21:47	EPA 6020A	
Selenium	**0.896**	0.620	1.24	mg/kg dry	5	10/07/19 21:47	EPA 6020A	**Ja**
Silver	ND	0.124	0.248	mg/kg dry	5	10/07/19 21:47	EPA 6020A	
Zinc	**80.5**	2.48	4.96	mg/kg dry	5	10/07/19 21:47	EPA 6020A	
SE-27-0-0.33-Dup (A9J0006-25)				**Matrix: Sediment**				
Batch: 9100629								
Arsenic	**7.57**	0.644	1.29	mg/kg dry	5	10/07/19 22:00	EPA 6020A	
Cadmium	**0.188**	0.129	0.258	mg/kg dry	5	10/07/19 22:00	EPA 6020A	**Ja**
Chromium	**35.3**	0.644	1.29	mg/kg dry	5	10/07/19 22:00	EPA 6020A	
Copper	**63.3**	0.644	1.29	mg/kg dry	5	10/07/19 22:00	EPA 6020A	
Lead	**11.6**	0.129	0.258	mg/kg dry	5	10/07/19 22:00	EPA 6020A	
Nickel	**27.4**	1.29	2.58	mg/kg dry	5	10/07/19 22:00	EPA 6020A	
Selenium	**0.987**	0.644	1.29	mg/kg dry	5	10/07/19 22:00	EPA 6020A	**Ja**
Silver	ND	0.129	0.258	mg/kg dry	5	10/07/19 22:00	EPA 6020A	
Zinc	**88.1**	2.58	5.15	mg/kg dry	5	10/07/19 22:00	EPA 6020A	

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AMENDED REPORT

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Ammonia by Plumb Extraction, Gas Diffusion and Colorimetric Detection

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-24-0-0.33 (A9J0006-01)				**Matrix: Sediment**		**Batch: 9100530**		
Ammonia as N	**9.49**	0.279	0.279	mg/kg dry	1	10/02/19 14:32	Plumb/SM 4500-NH3 G	
SE-14-0-0.33 (A9J0006-03)				**Matrix: Sediment**		**Batch: 9100530**		
Ammonia as N	**15.2**	0.283	0.283	mg/kg dry	1	10/02/19 14:44	Plumb/SM 4500-NH3 G	
SE-23-0-0.33 (A9J0006-05)				**Matrix: Sediment**		**Batch: 9100530**		
Ammonia as N	**11.8**	0.212	0.212	mg/kg dry	1	10/02/19 14:45	Plumb/SM 4500-NH3 G	
SE-17-0-0.33 (A9J0006-06)				**Matrix: Sediment**		**Batch: 9100530**		
Ammonia as N	**10.7**	0.223	0.223	mg/kg dry	1	10/02/19 14:47	Plumb/SM 4500-NH3 G	
SE-15-0-0.33 (A9J0006-07)				**Matrix: Sediment**		**Batch: 9100530**		
Ammonia as N	**5.75**	0.229	0.229	mg/kg dry	1	10/02/19 14:48	Plumb/SM 4500-NH3 G	
SE-21-0-0.33 (A9J0006-08)				**Matrix: Sediment**		**Batch: 9100530**		
Ammonia as N	**7.06**	0.165	0.165	mg/kg dry	1	10/02/19 14:50	Plumb/SM 4500-NH3 G	
SE-25-0-0.33 (A9J0006-13)				**Matrix: Sediment**		**Batch: 9100530**		
Ammonia as N	**3.68**	0.235	0.235	mg/kg dry	1	10/02/19 14:51	Plumb/SM 4500-NH3 G	
SE-28-0-0.33 (A9J0006-14)				**Matrix: Sediment**		**Batch: 9100530**		
Ammonia as N	**7.36**	0.264	0.264	mg/kg dry	1	10/02/19 14:53	Plumb/SM 4500-NH3 G	
SE-26-0-0.33 (A9J0006-16)				**Matrix: Sediment**		**Batch: 9100530**		
Ammonia as N	**3.48**	0.224	0.224	mg/kg dry	1	10/02/19 14:54	Plumb/SM 4500-NH3 G	
SE-18-0-0.33 (A9J0006-18)				**Matrix: Sediment**		**Batch: 9100530**		
Ammonia as N	**12.9**	0.211	0.211	mg/kg dry	1	10/02/19 14:56	Plumb/SM 4500-NH3 G	

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AMENDED REPORT

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Ammonia by Plumb Extraction, Gas Diffusion and Colorimetric Detection

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-31-0-0.33 (A9J0006-20)				**Matrix: Sediment**		**Batch: 9100530**		
Ammonia as N	**7.98**	0.199	0.199	mg/kg dry	1	10/02/19 15:05	Plumb/SM 4500-NH3 G	
SE-16-0-0.33 (A9J0006-21)				**Matrix: Sediment**		**Batch: 9100530**		
Ammonia as N	**8.43**	0.188	0.188	mg/kg dry	1	10/02/19 15:06	Plumb/SM 4500-NH3 G	
SE-19-0-0.33 (A9J0006-22)				**Matrix: Sediment**		**Batch: 9100530**		
Ammonia as N	**9.43**	0.232	0.232	mg/kg dry	1	10/02/19 15:08	Plumb/SM 4500-NH3 G	
SE-22-0-0.33 (A9J0006-23)				**Matrix: Sediment**		**Batch: 9100530**		
Ammonia as N	**7.81**	0.295	0.295	mg/kg dry	1	10/02/19 15:09	Plumb/SM 4500-NH3 G	
SE-27-0-0.33 (A9J0006-24)				**Matrix: Sediment**		**Batch: 9100530**		
Ammonia as N	**8.47**	0.242	0.242	mg/kg dry	1	10/02/19 15:11	Plumb/SM 4500-NH3 G	
SE-27-0-0.33-Dup (A9J0006-25)				**Matrix: Sediment**		**Batch: 9100530**		
Ammonia as N	**8.18**	0.253	0.253	mg/kg dry	1	10/02/19 15:12	Plumb/SM 4500-NH3 G	

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AMENDED REPORT

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Demand Parameters

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-24-0-0.33 (A9J0006-01RE1)				**Matrix: Sediment**				
Batch: 9100832								
Total Organic Carbon	**78000**	200	200	mg/kg	1	10/13/19 16:25	EPA 9060Amod	
SE-14-0-0.33 (A9J0006-03)				**Matrix: Sediment**				
Batch: 9100832								
Total Organic Carbon	**55000**	200	200	mg/kg	1	10/11/19 21:13	EPA 9060Amod	
SE-23-0-0.33 (A9J0006-05)				**Matrix: Sediment**				
Batch: 9100832								
Total Organic Carbon	**26000**	200	200	mg/kg	1	10/11/19 21:24	EPA 9060Amod	
SE-17-0-0.33 (A9J0006-06)				**Matrix: Sediment**				
Batch: 9100832								
Total Organic Carbon	**23000**	200	200	mg/kg	1	10/11/19 21:35	EPA 9060Amod	
SE-15-0-0.33 (A9J0006-07)				**Matrix: Sediment**				
Batch: 9100832								
Total Organic Carbon	**47000**	200	200	mg/kg	1	10/11/19 22:07	EPA 9060Amod	
SE-21-0-0.33 (A9J0006-08)				**Matrix: Sediment**				
Batch: 9100832								
Total Organic Carbon	**13000**	200	200	mg/kg	1	10/11/19 22:18	EPA 9060Amod	
SE-25-0-0.33 (A9J0006-13RE1)				**Matrix: Sediment**				
Batch: 9100832								
Total Organic Carbon	**180000**	200	200	mg/kg	1	10/13/19 16:36	EPA 9060Amod	
SE-28-0-0.33 (A9J0006-14)				**Matrix: Sediment**				
Batch: 9100832								
Total Organic Carbon	**55000**	200	200	mg/kg	1	10/11/19 22:40	EPA 9060Amod	
SE-26-0-0.33 (A9J0006-16)				**Matrix: Sediment**				
Batch: 9100833								
Total Organic Carbon	**130000**	200	200	mg/kg	1	10/11/19 09:55	EPA 9060Amod	
SE-18-0-0.33 (A9J0006-18)				**Matrix: Sediment**				
Batch: 9100833								

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Demand Parameters

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-18-0-0.33 (A9J0006-18)				**Matrix: Sediment**				
Total Organic Carbon	**17000**	200	200	mg/kg	1	10/11/19 10:53	EPA 9060Amod	
SE-31-0-0.33 (A9J0006-20)				**Matrix: Sediment**				
Batch: 9100833								
Total Organic Carbon	**21000**	200	200	mg/kg	1	10/11/19 11:23	EPA 9060Amod	
SE-16-0-0.33 (A9J0006-21)				**Matrix: Sediment**				
Batch: 9100833								
Total Organic Carbon	**15000**	200	200	mg/kg	1	10/11/19 12:15	EPA 9060Amod	
SE-19-0-0.33 (A9J0006-22)				**Matrix: Sediment**				
Batch: 9100833								
Total Organic Carbon	**20000**	200	200	mg/kg	1	10/11/19 13:26	EPA 9060Amod	
SE-22-0-0.33 (A9J0006-23)				**Matrix: Sediment**				
Batch: 9100833								
Total Organic Carbon	**38000**	200	200	mg/kg	1	10/11/19 14:10	EPA 9060Amod	
SE-27-0-0.33 (A9J0006-24)				**Matrix: Sediment**				
Batch: 9100833								
Total Organic Carbon	**38000**	200	200	mg/kg	1	10/11/19 14:27	EPA 9060Amod	
SE-27-0-0.33-Dup (A9J0006-25)				**Matrix: Sediment**				
Batch: 9100833								
Total Organic Carbon	**39000**	200	200	mg/kg	1	10/11/19 15:24	EPA 9060Amod	

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AMENDED REPORT

Maul Foster & Alongi, INC.
2001 NW 19th Ave, STE 200
Portland, OR 97209

Project: **Seaport Tidelands**
Project Number: **1044.02.06-02**
Project Manager: **Emily Hess**

Report ID:
A9J0006 - 01 09 20 1630

ANALYTICAL SAMPLE RESULTS

Solid and Moisture Determinations

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-24-0-0.33 (A9J0006-01)				**Matrix: Sediment**				
Batch: 9100520								
Total Solids	**35.5**	1.00	1.00	%	1	10/02/19 12:42	PSEP 1986	
Batch: 9100558								
Total Volatile Solids	**18.9**	1.00	1.00	%	1	10/03/19 10:09	SM 2540 G	
SE-14-0-0.33 (A9J0006-03)				**Matrix: Sediment**				
Batch: 9100520								
Total Solids	**34.8**	1.00	1.00	%	1	10/02/19 12:42	PSEP 1986	
Batch: 9100558								
Total Volatile Solids	**12.5**	1.00	1.00	%	1	10/03/19 10:09	SM 2540 G	
SE-23-0-0.33 (A9J0006-05)				**Matrix: Sediment**				
Batch: 9100520								
Total Solids	**45.4**	1.00	1.00	%	1	10/02/19 12:42	PSEP 1986	
Batch: 9100558								
Total Volatile Solids	**7.18**	1.00	1.00	%	1	10/03/19 10:09	SM 2540 G	
SE-17-0-0.33 (A9J0006-06)				**Matrix: Sediment**				
Batch: 9100520								
Total Solids	**43.3**	1.00	1.00	%	1	10/02/19 12:42	PSEP 1986	
Batch: 9100558								
Total Volatile Solids	**6.80**	1.00	1.00	%	1	10/03/19 10:09	SM 2540 G	
SE-15-0-0.33 (A9J0006-07)				**Matrix: Sediment**				
Batch: 9100520								
Total Solids	**43.4**	1.00	1.00	%	1	10/02/19 12:42	PSEP 1986	
Batch: 9100558								
Total Volatile Solids	**14.4**	1.00	1.00	%	1	10/03/19 10:09	SM 2540 G	
SE-21-0-0.33 (A9J0006-08)				**Matrix: Sediment**				
Batch: 9100520								
Total Solids	**59.4**	1.00	1.00	%	1	10/02/19 12:42	PSEP 1986	
Batch: 9100558								
Total Volatile Solids	**5.02**	1.00	1.00	%	1	10/03/19 10:09	SM 2540 G	
SE-25-0-0.33 (A9J0006-13)				**Matrix: Sediment**				

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503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Solid and Moisture Determinations

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-25-0-0.33 (A9J0006-13)				**Matrix: Sediment**				
Batch: 9100571								
Total Solids	**40.6**	1.00	1.00	%	1	10/03/19 12:11	PSEP 1986	
Batch: 9100621								
Total Volatile Solids	**19.0**	1.00	1.00	%	1	10/03/19 16:24	SM 2540 G	
SE-28-0-0.33 (A9J0006-14)				**Matrix: Sediment**				
Batch: 9100571								
Total Solids	**36.0**	1.00	1.00	%	1	10/03/19 12:11	PSEP 1986	
Batch: 9100621								
Total Volatile Solids	**13.0**	1.00	1.00	%	1	10/03/19 16:24	SM 2540 G	
SE-26-0-0.33 (A9J0006-16)				**Matrix: Sediment**				
Batch: 9100571								
Total Solids	**42.4**	1.00	1.00	%	1	10/03/19 12:11	PSEP 1986	
Batch: 9100621								
Total Volatile Solids	**18.4**	1.00	1.00	%	1	10/03/19 16:24	SM 2540 G	
SE-18-0-0.33 (A9J0006-18)				**Matrix: Sediment**				
Batch: 9100571								
Total Solids	**46.3**	1.00	1.00	%	1	10/03/19 12:11	PSEP 1986	
Batch: 9100621								
Total Volatile Solids	**6.06**	1.00	1.00	%	1	10/03/19 16:24	SM 2540 G	
SE-31-0-0.33 (A9J0006-20)				**Matrix: Sediment**				
Batch: 9100571								
Total Solids	**48.8**	1.00	1.00	%	1	10/03/19 12:11	PSEP 1986	
Batch: 9100621								
Total Volatile Solids	**8.80**	1.00	1.00	%	1	10/03/19 16:24	SM 2540 G	
SE-16-0-0.33 (A9J0006-21)				**Matrix: Sediment**				
Batch: 9100630								
Total Solids	**52.9**	1.00	1.00	%	1	10/07/19 11:30	PSEP 1986	
Batch: 9100742								
Total Volatile Solids	**5.35**	1.00	1.00	%	1	10/07/19 17:15	SM 2540 G	
SE-19-0-0.33 (A9J0006-22)				**Matrix: Sediment**				

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Solid and Moisture Determinations

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-19-0-0.33 (A9J0006-22)				**Matrix: Sediment**				
Batch: 9100630								
Total Solids	**41.5**	1.00	1.00	%	1	10/07/19 11:30	PSEP 1986	
Batch: 9100742								
Total Volatile Solids	**6.95**	1.00	1.00	%	1	10/07/19 17:15	SM 2540 G	
SE-22-0-0.33 (A9J0006-23)				**Matrix: Sediment**				
Batch: 9100630								
Total Solids	**33.4**	1.00	1.00	%	1	10/07/19 11:30	PSEP 1986	
Batch: 9100742								
Total Volatile Solids	**11.6**	1.00	1.00	%	1	10/07/19 17:15	SM 2540 G	
SE-27-0-0.33 (A9J0006-24)				**Matrix: Sediment**				
Batch: 9100630								
Total Solids	**39.4**	1.00	1.00	%	1	10/07/19 11:30	PSEP 1986	
Batch: 9100742								
Total Volatile Solids	**12.1**	1.00	1.00	%	1	10/07/19 17:15	SM 2540 G	
SE-27-0-0.33-Dup (A9J0006-25)				**Matrix: Sediment**				
Batch: 9100630								
Total Solids	**38.3**	1.00	1.00	%	1	10/07/19 11:30	PSEP 1986	
Batch: 9100742								
Total Volatile Solids	**9.96**	1.00	1.00	%	1	10/07/19 17:15	SM 2540 G	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Grain Size by ASTM D 422m/PSET Parameters

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-24-0-0.33 (A9J0006-01)				**Matrix: Sediment**		**Batch: 9100866**		
Gravel (>2.00mm)	**38.2**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 4.75 mm sieve (#4)	**33.9**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 2.00 mm sieve (#10)	**4.29**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Sand (0.063mm - 2.00mm)	**14.3**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.85 mm sieve (#20)	**4.23**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.425 mm sieve (#40)	**4.16**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.250 mm sieve (#60)	**2.43**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.150 mm sieve (#100)	**1.22**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.106 mm sieve (#140)	**0.68**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.075 mm sieve (#200)	**0.89**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.063 mm sieve (#230)	**0.65**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Silt (0.005mm < 0.063mm)	**39.2**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Clay (< 0.005 mm)	**8.30**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
SE-14-0-0.33 (A9J0006-03)				**Matrix: Sediment**		**Batch: 9100866**		
Gravel (>2.00mm)	**22.4**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 4.75 mm sieve (#4)	**12.7**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 2.00 mm sieve (#10)	**9.67**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Sand (0.063mm - 2.00mm)	**27.3**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.85 mm sieve (#20)	**10.4**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.425 mm sieve (#40)	**7.32**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.250 mm sieve (#60)	**4.86**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.150 mm sieve (#100)	**2.62**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.106 mm sieve (#140)	**0.94**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.075 mm sieve (#200)	**0.78**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.063 mm sieve (#230)	**0.34**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Silt (0.005mm < 0.063mm)	**41.2**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Grain Size by ASTM D 422m/PSET Parameters

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-14-0-0.33 (A9J0006-03)				**Matrix: Sediment**		**Batch: 9100866**		
Clay (< 0.005 mm)	**9.20**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
SE-23-0-0.33 (A9J0006-05)				**Matrix: Sediment**		**Batch: 9100866**		
Gravel (>2.00mm)	**7.85**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 4.75 mm sieve (#4)	**3.99**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 2.00 mm sieve (#10)	**3.86**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Sand (0.063mm - 2.00mm)	**38.4**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.85 mm sieve (#20)	**7.19**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.425 mm sieve (#40)	**6.00**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.250 mm sieve (#60)	**5.20**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.150 mm sieve (#100)	**7.44**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.106 mm sieve (#140)	**5.18**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.075 mm sieve (#200)	**5.18**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.063 mm sieve (#230)	**2.19**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Silt (0.005mm < 0.063mm)	**39.2**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Clay (< 0.005 mm)	**14.6**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
SE-17-0-0.33 (A9J0006-06)				**Matrix: Sediment**		**Batch: 9100866**		
Gravel (>2.00mm)	**0.55**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 4.75 mm sieve (#4)	**0.31**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 2.00 mm sieve (#10)	**0.24**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Sand (0.063mm - 2.00mm)	**18.5**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.85 mm sieve (#20)	**0.23**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.425 mm sieve (#40)	**0.74**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.250 mm sieve (#60)	**1.04**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.150 mm sieve (#100)	**4.47**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.106 mm sieve (#140)	**5.24**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.075 mm sieve (#200)	**4.91**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Grain Size by ASTM D 422m/PSET Parameters

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-17-0-0.33 (A9J0006-06)				**Matrix: Sediment**		**Batch: 9100866**		
Percent Retained 0.063 mm sieve (#230)	**1.84**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Silt (0.005mm < 0.063mm)	**56.9**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Clay (< 0.005 mm)	**24.1**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
SE-15-0-0.33 (A9J0006-07)				**Matrix: Sediment**		**Batch: 9100866**		
Gravel (>2.00mm)	**25.4**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 4.75 mm sieve (#4)	**18.1**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 2.00 mm sieve (#10)	**7.24**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Sand (0.063mm - 2.00mm)	**21.0**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.85 mm sieve (#20)	**3.17**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.425 mm sieve (#40)	**2.86**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.250 mm sieve (#60)	**2.51**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.150 mm sieve (#100)	**3.83**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.106 mm sieve (#140)	**3.28**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.075 mm sieve (#200)	**3.69**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Percent Retained 0.063 mm sieve (#230)	**1.64**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Silt (0.005mm < 0.063mm)	**42.4**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
Clay (< 0.005 mm)	**11.2**	0.01	0.01	% of Total	1	10/14/19 14:02	D422mod	**GS-01**
SE-21-0-0.33 (A9J0006-08)				**Matrix: Sediment**		**Batch: 9101058**		
Gravel (>2.00mm)	**6.79**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 4.75 mm sieve (#4)	**3.48**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 2.00 mm sieve (#10)	**3.32**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Sand (0.063mm - 2.00mm)	**46.2**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.85 mm sieve (#20)	**1.48**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.425 mm sieve (#40)	**2.91**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.250 mm sieve (#60)	**9.30**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.150 mm sieve (#100)	**19.3**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Grain Size by ASTM D 422m/PSET Parameters

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-21-0-0.33 (A9J0006-08)				**Matrix: Sediment**		**Batch: 9101058**		
Percent Retained 0.106 mm sieve (#140)	**7.44**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.075 mm sieve (#200)	**4.11**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.063 mm sieve (#230)	**1.60**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Silt (0.005mm < 0.063mm)	**33.5**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Clay (< 0.005 mm)	**13.5**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
SE-25-0-0.33 (A9J0006-13)				**Matrix: Sediment**		**Batch: 9101058**		
Gravel (>2.00mm)	**51.0**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 4.75 mm sieve (#4)	**32.5**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 2.00 mm sieve (#10)	**18.4**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Sand (0.063mm - 2.00mm)	**33.2**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.85 mm sieve (#20)	**10.2**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.425 mm sieve (#40)	**11.6**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.250 mm sieve (#60)	**7.11**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.150 mm sieve (#100)	**2.67**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.106 mm sieve (#140)	**0.83**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.075 mm sieve (#200)	**0.58**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.063 mm sieve (#230)	**0.23**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Silt (0.005mm < 0.063mm)	**12.8**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Clay (< 0.005 mm)	**3.00**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
SE-26-0-0.33 (A9J0006-16)				**Matrix: Sediment**		**Batch: 9101058**		
Gravel (>2.00mm)	**35.0**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 4.75 mm sieve (#4)	**15.6**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 2.00 mm sieve (#10)	**19.4**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Sand (0.063mm - 2.00mm)	**37.2**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.85 mm sieve (#20)	**12.8**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.425 mm sieve (#40)	**12.7**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
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503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Grain Size by ASTM D 422m/PSET Parameters

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-26-0-0.33 (A9J0006-16)				**Matrix: Sediment**		**Batch: 9101058**		
Percent Retained 0.250 mm sieve (#60)	**6.73**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.150 mm sieve (#100)	**2.96**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.106 mm sieve (#140)	**0.94**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.075 mm sieve (#200)	**0.76**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.063 mm sieve (#230)	**0.31**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Silt (0.005mm < 0.063mm)	**20.7**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Clay (< 0.005 mm)	**7.10**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
SE-18-0-0.33 (A9J0006-18)				**Matrix: Sediment**		**Batch: 9101058**		
Gravel (>2.00mm)	**0.02**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 4.75 mm sieve (#4)	ND	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
Percent Retained 2.00 mm sieve (#10)	**0.02**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Sand (0.063mm - 2.00mm)	**38.8**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.85 mm sieve (#20)	**0.10**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.425 mm sieve (#40)	**0.81**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.250 mm sieve (#60)	**4.50**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.150 mm sieve (#100)	**19.3**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.106 mm sieve (#140)	**7.84**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.075 mm sieve (#200)	**4.25**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.063 mm sieve (#230)	**1.93**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Silt (0.005mm < 0.063mm)	**43.8**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Clay (< 0.005 mm)	**17.4**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
SE-31-0-0.33 (A9J0006-20)				**Matrix: Sediment**		**Batch: 9101058**		
Gravel (>2.00mm)	**2.99**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 4.75 mm sieve (#4)	**1.41**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 2.00 mm sieve (#10)	**1.57**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Sand (0.063mm - 2.00mm)	**44.4**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
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503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Grain Size by ASTM D 422m/PSET Parameters

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-31-0-0.33 (A9J0006-20)				**Matrix: Sediment**		**Batch: 9101058**		
Percent Retained 0.85 mm sieve (#20)	**1.24**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.425 mm sieve (#40)	**1.72**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.250 mm sieve (#60)	**4.53**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.150 mm sieve (#100)	**21.4**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.106 mm sieve (#140)	**8.77**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.075 mm sieve (#200)	**5.05**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.063 mm sieve (#230)	**1.76**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Silt (0.005mm < 0.063mm)	**36.6**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Clay (< 0.005 mm)	**15.9**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
SE-16-0-0.33 (A9J0006-21)				**Matrix: Sediment**		**Batch: 9101058**		
Gravel (>2.00mm)	**0.39**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 4.75 mm sieve (#4)	**0.34**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 2.00 mm sieve (#10)	**0.04**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Sand (0.063mm - 2.00mm)	**41.8**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.85 mm sieve (#20)	**0.08**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.425 mm sieve (#40)	**0.59**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.250 mm sieve (#60)	**1.47**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.150 mm sieve (#100)	**13.6**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.106 mm sieve (#140)	**13.2**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.075 mm sieve (#200)	**9.08**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.063 mm sieve (#230)	**3.70**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Silt (0.005mm < 0.063mm)	**42.4**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Clay (< 0.005 mm)	**15.4**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
SE-22-0-0.33 (A9J0006-23)				**Matrix: Sediment**		**Batch: 9101058**		
Gravel (>2.00mm)	**16.8**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 4.75 mm sieve (#4)	**13.6**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**

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Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: Seaport Tidelands	
2001 NW 19th Ave, STE 200	Project Number: 1044.02.06-02	Report ID:
Portland, OR 97209	Project Manager: Emily Hess	A9J0006 - 01 09 20 1630

ANALYTICAL SAMPLE RESULTS

Grain Size by ASTM D 422m/PSET Parameters

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-22-0-0.33 (A9J0006-23)				**Matrix: Sediment**		**Batch: 9101058**		
Percent Retained 2.00 mm sieve (#10)	3.19	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
Sand (0.063mm - 2.00mm)	13.6	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
Percent Retained 0.85 mm sieve (#20)	2.18	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
Percent Retained 0.425 mm sieve (#40)	4.25	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
Percent Retained 0.250 mm sieve (#60)	2.58	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
Percent Retained 0.150 mm sieve (#100)	2.04	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
Percent Retained 0.106 mm sieve (#140)	1.00	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
Percent Retained 0.075 mm sieve (#200)	1.08	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
Percent Retained 0.063 mm sieve (#230)	0.49	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
Silt (0.005mm < 0.063mm)	49.2	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
Clay (< 0.005 mm)	20.4	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
SE-27-0-0.33 (A9J0006-24)				**Matrix: Sediment**		**Batch: 9101058**		
Gravel (>2.00mm)	17.7	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
Percent Retained 4.75 mm sieve (#4)	16.5	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
Percent Retained 2.00 mm sieve (#10)	1.20	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
Sand (0.063mm - 2.00mm)	15.8	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
Percent Retained 0.85 mm sieve (#20)	0.54	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
Percent Retained 0.425 mm sieve (#40)	1.97	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
Percent Retained 0.250 mm sieve (#60)	2.16	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
Percent Retained 0.150 mm sieve (#100)	2.79	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
Percent Retained 0.106 mm sieve (#140)	2.82	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
Percent Retained 0.075 mm sieve (#200)	3.52	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
Percent Retained 0.063 mm sieve (#230)	1.98	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
Silt (0.005mm < 0.063mm)	51.8	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
Clay (< 0.005 mm)	14.7	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	GS-01
SE-27-0-0.33-Dup (A9J0006-25)				**Matrix: Sediment**		**Batch: 9101058**		

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Grain Size by ASTM D 422m/PSET Parameters

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-27-0-0.33-Dup (A9J0006-25)				**Matrix: Sediment**		**Batch: 9101058**		
Gravel (>2.00mm)	**8.57**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 4.75 mm sieve (#4)	**7.58**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 2.00 mm sieve (#10)	**0.99**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Sand (0.063mm - 2.00mm)	**17.3**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.85 mm sieve (#20)	**0.60**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.425 mm sieve (#40)	**2.19**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.250 mm sieve (#60)	**2.31**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.150 mm sieve (#100)	**3.03**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.106 mm sieve (#140)	**3.14**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.075 mm sieve (#200)	**3.93**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Percent Retained 0.063 mm sieve (#230)	**2.08**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Silt (0.005mm < 0.063mm)	**53.0**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**
Clay (< 0.005 mm)	**21.2**	0.01	0.01	% of Total	1	10/21/19 13:59	D422mod	**GS-01**

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Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Percent Dry Weight

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-24-0-0.33 (A9J0006-01)				**Matrix: Sediment**		**Batch: 9100520**		
% Solids	**35.5**	1.00	1.00	%	1	10/02/19 12:42	EPA 8000C	
SE-14-0-0.33 (A9J0006-03)				**Matrix: Sediment**		**Batch: 9100520**		
% Solids	**34.8**	1.00	1.00	%	1	10/02/19 12:42	EPA 8000C	
SE-23-0-0.33 (A9J0006-05)				**Matrix: Sediment**		**Batch: 9100520**		
% Solids	**45.4**	1.00	1.00	%	1	10/02/19 12:42	EPA 8000C	
SE-17-0-0.33 (A9J0006-06)				**Matrix: Sediment**		**Batch: 9100520**		
% Solids	**43.3**	1.00	1.00	%	1	10/02/19 12:42	EPA 8000C	
SE-15-0-0.33 (A9J0006-07)				**Matrix: Sediment**		**Batch: 9100520**		
% Solids	**43.4**	1.00	1.00	%	1	10/02/19 12:42	EPA 8000C	
SE-21-0-0.33 (A9J0006-08)				**Matrix: Sediment**		**Batch: 9100520**		
% Solids	**59.4**	1.00	1.00	%	1	10/02/19 12:42	EPA 8000C	
SE-25-0-0.33 (A9J0006-13)				**Matrix: Sediment**		**Batch: 9100571**		
% Solids	**40.6**	1.00	1.00	%	1	10/03/19 12:11	EPA 8000C	
SE-28-0-0.33 (A9J0006-14)				**Matrix: Sediment**		**Batch: 9100571**		
% Solids	**36.0**	1.00	1.00	%	1	10/03/19 12:11	EPA 8000C	
SE-26-0-0.33 (A9J0006-16)				**Matrix: Sediment**		**Batch: 9100571**		
% Solids	**42.4**	1.00	1.00	%	1	10/03/19 12:11	EPA 8000C	
SE-18-0-0.33 (A9J0006-18)				**Matrix: Sediment**		**Batch: 9100571**		
% Solids	**46.3**	1.00	1.00	%	1	10/03/19 12:11	EPA 8000C	
SE-31-0-0.33 (A9J0006-20)				**Matrix: Sediment**		**Batch: 9100571**		
% Solids	**48.8**	1.00	1.00	%	1	10/03/19 12:11	EPA 8000C	
SE-16-0-0.33 (A9J0006-21)				**Matrix: Sediment**		**Batch: 9100630**		
% Solids	**52.9**	1.00	1.00	%	1	10/07/19 11:30	EPA 8000C	
SE-19-0-0.33 (A9J0006-22)				**Matrix: Sediment**		**Batch: 9100630**		

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

ANALYTICAL SAMPLE RESULTS

Percent Dry Weight

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-19-0-0.33 (A9J0006-22)				**Matrix: Sediment**		**Batch: 9100630**		
% Solids	**41.5**	1.00	1.00	%	1	10/07/19 11:30	EPA 8000C	
SE-22-0-0.33 (A9J0006-23)				**Matrix: Sediment**		**Batch: 9100630**		
% Solids	**33.4**	1.00	1.00	%	1	10/07/19 11:30	EPA 8000C	
SE-27-0-0.33 (A9J0006-24)				**Matrix: Sediment**		**Batch: 9100630**		
% Solids	**39.4**	1.00	1.00	%	1	10/07/19 11:30	EPA 8000C	
SE-27-0-0.33-Dup (A9J0006-25)				**Matrix: Sediment**		**Batch: 9100630**		
% Solids	**38.3**	1.00	1.00	%	1	10/07/19 11:30	EPA 8000C	
SE-17-0-0.33---Air Dried (A9J0006-27)				**Matrix: Sediment**		**Batch: 9101585**		
% Solids	**94.5**	1.00	1.00	%	1	10/28/19 07:41	EPA 8000C	
SE-18-0-0.33---Air Dried (A9J0006-28)				**Matrix: Sediment**		**Batch: 9101585**		
% Solids	**95.7**	1.00	1.00	%	1	10/28/19 07:41	EPA 8000C	
SE-16-0-0.33---Air Dried (A9J0006-29)				**Matrix: Sediment**		**Batch: 9101585**		
% Solids	**96.3**	1.00	1.00	%	1	10/28/19 07:41	EPA 8000C	
SE-22-0-0.33---Air Dried (A9J0006-30)				**Matrix: Sediment**		**Batch: 9101585**		
% Solids	**94.1**	1.00	1.00	%	1	10/28/19 07:41	EPA 8000C	
SE-27-0-0.33---Air Dried (A9J0006-31)				**Matrix: Sediment**		**Batch: 9101585**		
% Solids	**95.1**	1.00	1.00	%	1	10/28/19 07:41	EPA 8000C	
SE-27-0-0.33-Dup---Air Dried (A9J0006-32)				**Matrix: Sediment**		**Batch: 9101585**		
% Solids	**95.1**	1.00	1.00	%	1	10/28/19 07:41	EPA 8000C	

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

Analytical Resources, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

Metals and Metallic Compounds

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-24-0-0.33 (A9J0006-01)				**Matrix: Sediment**		**Batch: BHJ0445**		
Batch: BHJ0445								
Mercury	**0.111**	0.0123	0.0587	mg/kg dry	1	10/15/19 16:27	EPA 7471B	
SE-14-0-0.33 (A9J0006-03)				**Matrix: Sediment**		**Batch: BHJ0445**		
Batch: BHJ0445								
Mercury	**0.0882**	0.0157	0.0747	mg/kg dry	1	10/15/19 16:29	EPA 7471B	
SE-23-0-0.33 (A9J0006-05)				**Matrix: Sediment**		**Batch: BHJ0445**		
Batch: BHJ0445								
Mercury	**0.0928**	0.0101	0.0482	mg/kg dry	1	10/15/19 16:32	EPA 7471B	
SE-17-0-0.33 (A9J0006-06)				**Matrix: Sediment**		**Batch: BHJ0445**		
Batch: BHJ0445								
Mercury	**0.0450**	0.0114	0.0542	mg/kg dry	1	10/15/19 16:34	EPA 7471B	**J**
SE-15-0-0.33 (A9J0006-07)				**Matrix: Sediment**		**Batch: BHJ0445**		
Batch: BHJ0445								
Mercury	**0.0402**	0.00865	0.0412	mg/kg dry	1	10/15/19 16:41	EPA 7471B	**J**
SE-21-0-0.33 (A9J0006-08)				**Matrix: Sediment**		**Batch: BHJ0445**		
Batch: BHJ0445								
Mercury	**0.0385**	0.00970	0.0462	mg/kg dry	1	10/15/19 16:43	EPA 7471B	**J**
SE-25-0-0.33 (A9J0006-13)				**Matrix: Sediment**		**Batch: BHJ0445**		
Batch: BHJ0445								
Mercury	**0.103**	0.0122	0.0583	mg/kg dry	1	10/15/19 16:46	EPA 7471B	
SE-28-0-0.33 (A9J0006-14)				**Matrix: Sediment**		**Batch: BHJ0445**		
Batch: BHJ0445								
Mercury	**0.0827**	0.0112	0.0534	mg/kg dry	1	10/15/19 16:48	EPA 7471B	
SE-26-0-0.33 (A9J0006-16)				**Matrix: Sediment**		**Batch: BHJ0445**		
Batch: BHJ0445								
Mercury	**0.104**	0.00840	0.0400	mg/kg dry	1	10/15/19 16:50	EPA 7471B	

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

Analytical Resources, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

Metals and Metallic Compounds

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-18-0-0.33 (A9J0006-18)				**Matrix: Sediment**		**Batch: BHJ0445**		
Batch: BHJ0445								
Mercury	**0.0386**	0.00958	0.0456	mg/kg dry	1	10/15/19 16:52	EPA 7471B	**J**
SE-31-0-0.33 (A9J0006-20)				**Matrix: Sediment**		**Batch: BHJ0445**		
Batch: BHJ0445								
Mercury	**0.0443**	0.00953	0.0454	mg/kg dry	1	10/15/19 16:55	EPA 7471B	**J**
SE-16-0-0.33 (A9J0006-21)				**Matrix: Sediment**		**Batch: BHJ0445**		
Batch: BHJ0445								
Mercury	**0.0244**	0.00901	0.0429	mg/kg dry	1	10/15/19 16:57	EPA 7471B	**J**
SE-19-0-0.33 (A9J0006-22)				**Matrix: Sediment**		**Batch: BHJ0445**		
Batch: BHJ0445								
Mercury	**0.0379**	0.0119	0.0569	mg/kg dry	1	10/15/19 16:59	EPA 7471B	**J**
SE-22-0-0.33 (A9J0006-23)				**Matrix: Sediment**		**Batch: BHJ0445**		
Batch: BHJ0445								
Mercury	**0.0528**	0.0150	0.0713	mg/kg dry	1	10/15/19 17:02	EPA 7471B	**J**
SE-27-0-0.33 (A9J0006-24)				**Matrix: Sediment**		**Batch: BHJ0445**		
Batch: BHJ0445								
Mercury	**0.0366**	0.0129	0.0617	mg/kg dry	1	10/15/19 17:09	EPA 7471B	**J**
SE-27-0-0.33-Dup (A9J0006-25)				**Matrix: Sediment**		**Batch: BHJ0445**		
Batch: BHJ0445								
Mercury	**0.0593**	0.00941	0.0448	mg/kg dry	1	10/15/19 17:11	EPA 7471B	

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Analytical Resources, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

Wet Chemistry

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-24-0-0.33 (A9J0006-01)				**Matrix: Sediment**			**Batch: BHJ0088**	
Batch: BHJ0088								
Total Solids, Sulfide	**32.53**	0.04	0.04	%	1	10/02/19 23:02	PSEP 1986	
Batch: BHJ0091								
Sulfide	**281**	30.2	30.2	mg/kg dry	10	10/04/19 15:29	SM 4500-S2 D-00	**D**
SE-14-0-0.33 (A9J0006-03)				**Matrix: Sediment**			**Batch: BHJ0088**	
Batch: BHJ0088								
Total Solids, Sulfide	**40.73**	0.04	0.04	%	1	10/02/19 23:02	PSEP 1986	
Batch: BHJ0091								
Sulfide	**409**	23.5	23.5	mg/kg dry	10	10/04/19 15:31	SM 4500-S2 D-00	**D**
SE-23-0-0.33 (A9J0006-05)				**Matrix: Sediment**			**Batch: BHJ0088**	
Batch: BHJ0088								
Total Solids, Sulfide	**43.73**	0.04	0.04	%	1	10/02/19 23:02	PSEP 1986	
Batch: BHJ0091								
Sulfide	**856**	42.9	42.9	mg/kg dry	20	10/04/19 15:32	SM 4500-S2 D-00	**D**
SE-17-0-0.33 (A9J0006-06)				**Matrix: Sediment**			**Batch: BHJ0088**	
Batch: BHJ0088								
Total Solids, Sulfide	**41.21**	0.04	0.04	%	1	10/02/19 23:02	PSEP 1986	
Batch: BHJ0091								
Sulfide	**20.0**	2.40	2.40	mg/kg dry	1	10/04/19 15:32	SM 4500-S2 D-00	
SE-15-0-0.33 (A9J0006-07)				**Matrix: Sediment**			**Batch: BHJ0088**	
Batch: BHJ0088								
Total Solids, Sulfide	**42.19**	0.04	0.04	%	1	10/02/19 23:02	PSEP 1986	
Batch: BHJ0091								
Sulfide	**191**	21.3	21.3	mg/kg dry	10	10/04/19 15:33	SM 4500-S2 D-00	**D**
SE-21-0-0.33 (A9J0006-08)				**Matrix: Sediment**			**Batch: BHJ0088**	
Batch: BHJ0088								
Total Solids, Sulfide	**49.94**	0.04	0.04	%	1	10/02/19 23:02	PSEP 1986	
Batch: BHJ0091								
Sulfide	**359**	19.5	19.5	mg/kg dry	10	10/04/19 15:34	SM 4500-S2 D-00	**D**

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

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ANALYTICAL SAMPLE RESULTS (Subcontracted)

Wet Chemistry

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-25-0-0.33 (A9J0006-13)				**Matrix: Sediment**			**Batch: BHJ0088**	
Batch: BHJ0088								
Total Solids, Sulfide	**38.25**	0.04	0.04	%	1	10/02/19 23:02	PSEP 1986	
Batch: BHJ0091								
Sulfide	**267**	48.6	48.6	mg/kg dry	20	10/04/19 15:34	SM 4500-S2 D-00	**D**
SE-28-0-0.33 (A9J0006-14)				**Matrix: Sediment**			**Batch: BHJ0088**	
Batch: BHJ0088								
Total Solids, Sulfide	**32.33**	0.04	0.04	%	1	10/02/19 23:02	PSEP 1986	
Batch: BHJ0091								
Sulfide	**22.7**	2.91	2.91	mg/kg dry	1	10/04/19 15:34	SM 4500-S2 D-00	
SE-26-0-0.33 (A9J0006-16)				**Matrix: Sediment**			**Batch: BHJ0088**	
Batch: BHJ0088								
Total Solids, Sulfide	**27.04**	0.04	0.04	%	1	10/02/19 23:02	PSEP 1986	
Batch: BHJ0091								
Sulfide	ND	3.21	3.21	mg/kg dry	1	10/04/19 15:35	SM 4500-S2 D-00	U
SE-18-0-0.33 (A9J0006-18)				**Matrix: Sediment**			**Batch: BHJ0088**	
Batch: BHJ0088								
Total Solids, Sulfide	**45.90**	0.04	0.04	%	1	10/02/19 23:02	PSEP 1986	
Batch: BHJ0091								
Sulfide	**691**	40.5	40.5	mg/kg dry	20	10/04/19 15:35	SM 4500-S2 D-00	**D**
SE-31-0-0.33 (A9J0006-20)				**Matrix: Sediment**			**Batch: BHJ0088**	
Batch: BHJ0088								
Total Solids, Sulfide	**44.45**	0.04	0.04	%	1	10/02/19 23:02	PSEP 1986	
Batch: BHJ0124								
Sulfide	**397**	98.2	98.2	mg/kg dry	50	10/04/19 15:36	SM 4500-S2 D-00	**D**
SE-16-0-0.33 (A9J0006-21)				**Matrix: Sediment**			**Batch: BHJ0088**	
Batch: BHJ0088								
Total Solids, Sulfide	**49.51**	0.04	0.04	%	1	10/02/19 23:02	PSEP 1986	
Batch: BHJ0124								

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AMENDED REPORT

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

Analytical Resources, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

Wet Chemistry

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-16-0-0.33 (A9J0006-21)				**Matrix: Sediment**		**Batch: BHJ0124**		
Sulfide	**469**	94.8	94.8	mg/kg dry	50	10/04/19 15:40	SM 4500-S2 D-00	**D**
SE-19-0-0.33 (A9J0006-22)				**Matrix: Sediment**		**Batch: BHJ0088**		
Batch: BHJ0088								
Total Solids, Sulfide	**41.41**	0.04	0.04	%	1	10/02/19 23:02	PSEP 1986	
Batch: BHJ0124								
Sulfide	**924**	120	120	mg/kg dry	50	10/04/19 15:42	SM 4500-S2 D-00	**D**
SE-22-0-0.33 (A9J0006-23)				**Matrix: Sediment**		**Batch: BHJ0088**		
Batch: BHJ0088								
Total Solids, Sulfide	**30.05**	0.04	0.04	%	1	10/02/19 23:02	PSEP 1986	
Batch: BHJ0124								
Sulfide	**937**	149	149	mg/kg dry	50	10/04/19 15:42	SM 4500-S2 D-00	**D**
SE-27-0-0.33 (A9J0006-24)				**Matrix: Sediment**		**Batch: BHJ0088**		
Batch: BHJ0088								
Total Solids, Sulfide	**38.16**	0.04	0.04	%	1	10/02/19 23:02	PSEP 1986	
Batch: BHJ0124								
Sulfide	**394**	127	127	mg/kg dry	50	10/04/19 15:42	SM 4500-S2 D-00	**D**
SE-27-0-0.33-Dup (A9J0006-25)				**Matrix: Sediment**		**Batch: BHJ0088**		
Batch: BHJ0088								
Total Solids, Sulfide	**39.49**	0.04	0.04	%	1	10/02/19 23:02	PSEP 1986	
Batch: BHJ0124								
Sulfide	**396**	48.4	48.4	mg/kg dry	20	10/04/19 15:43	SM 4500-S2 D-00	**D**

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Analytical Resources, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

Wet Chemistry

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-24-0-0.33 (Porewater) (A9J0006-02)				**Matrix: Water**			**Batch: BHJ0145**	
Batch: BHJ0145								
Sulfide	**0.098**	0.050	0.050	mg/L	1	10/04/19 14:50	SM 4500-S2 D-00	
SE-14-0-0.33 (Porewater) (A9J0006-04)				**Matrix: Water**			**Batch: BHJ0145**	
Batch: BHJ0145								
Sulfide	**0.126**	0.050	0.050	mg/L	1	10/04/19 14:52	SM 4500-S2 D-00	
SE-28-0-0.33 (Porewater) (A9J0006-15)				**Matrix: Water**			**Batch: BHJ0145**	
Batch: BHJ0145								
Sulfide	**0.062**	0.050	0.050	mg/L	1	10/04/19 14:52	SM 4500-S2 D-00	
SE-26-0-0.33 (Porewater) (A9J0006-17)				**Matrix: Water**			**Batch: BHJ0145**	
Batch: BHJ0145								
Sulfide	**0.115**	0.050	0.050	mg/L	1	10/04/19 14:54	SM 4500-S2 D-00	
SE-18-0-0.33 (Porewater) (A9J0006-19)				**Matrix: Water**			**Batch: BHJ0145**	
Batch: BHJ0145								
Sulfide	ND	0.050	0.050	mg/L	1	10/04/19 14:55	SM 4500-S2 D-00	U
SE-16-0-0.33 (Porewater) (A9J0006-26)				**Matrix: Water**			**Batch: BHJ0145**	
Batch: BHJ0145								
Sulfide	ND	0.050	0.050	mg/L	1	10/04/19 14:55	SM 4500-S2 D-00	U

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QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Acid/Silica Gel Cleanup

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9101200 - EPA 3546 w/SG+Acid (NWTPH)							**Sediment**					
Blank (9101200-BLK1)			Prepared: 10/03/19 13:22		Analyzed: 10/16/19 22:42							
NWTPH-Dx/SG												
Diesel	ND	9.09	25.0	mg/kg wet	1	---	---	---	---	---	---	
Oil	ND	18.2	50.0	mg/kg wet	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 93 %*		*Limits: 50-150 %*		*Dilution: 1x*					
LCS (9101200-BS1)			Prepared: 10/03/19 13:22		Analyzed: 10/16/19 23:05							
NWTPH-Dx/SG												
Diesel	112	10.0	25.0	mg/kg wet	1	125	---	90	76-115%	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 96 %*		*Limits: 50-150 %*		*Dilution: 1x*					
Duplicate (9101200-DUP1)			Prepared: 10/03/19 13:22		Analyzed: 10/16/19 23:53							
QC Source Sample: Non-SDG (A9I0893-08)												
Diesel	ND	26.6	53.2	mg/kg dry	1	---	ND	---	---	---	30%	
Oil	**786**	53.2	106	mg/kg dry	1	---	610	---	---	25	30%	
Surr: o-Terphenyl (Surr)			*Recovery: 86 %*		*Limits: 50-150 %*		*Dilution: 1x*					
Duplicate (9101200-DUP2)			Prepared: 10/03/19 13:22		Analyzed: 10/17/19 08:59							
QC Source Sample: SE-27-0-0.33-Dup (A9J0006-25)												
Diesel	ND	26.0	52.0	mg/kg dry	1	---	ND	---	---	---	30%	
Oil	**86.0**	52.0	104	mg/kg dry	1	---	72.2	---	---	17	30%	Ja
Surr: o-Terphenyl (Surr)			*Recovery: 95 %*		*Limits: 50-150 %*		*Dilution: 1x*					
Matrix Spike (9101200-MS1)			Prepared: 10/03/19 13:22		Analyzed: 10/17/19 00:41							
QC Source Sample: Non-SDG (A9I0893-13)												
NWTPH-Dx/SG												
Diesel	447	25.7	51.5	mg/kg dry	1	322	ND	139	50-150%	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 96 %*		*Limits: 50-150 %*		*Dilution: 1x*					
Matrix Spike Dup (9101200-MSD1)			Prepared: 10/03/19 13:22		Analyzed: 10/17/19 01:04							
QC Source Sample: Non-SDG (A9I0893-13)												
Diesel	376	25.8	51.5	mg/kg dry	1	322	ND	117	50-150%	17	50%	
Surr: o-Terphenyl (Surr)			*Recovery: 91 %*		*Limits: 50-150 %*		*Dilution: 1x*					

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QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Acid/Silica Gel Cleanup

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9101200 - EPA 3546 w/SG+Acid (NWTPH)							**Sediment**					

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QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100478 - EPA 5035A							Soil					
Blank (9100478-BLK1)			Prepared: 10/01/19 10:00		Analyzed: 10/01/19 11:59							
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	1.67	3.33	mg/kg wet	50	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 96 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*96 %*	*50-150 %*			*"*					
LCS (9100478-BS2)			Prepared: 10/01/19 10:00		Analyzed: 10/01/19 11:32							
NWTPH-Gx (MS)												
Gasoline Range Organics	25.7	2.50	5.00	mg/kg wet	50	25.0	---	103	80-120%	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 98 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*98 %*	*50-150 %*			*"*					
Duplicate (9100478-DUP1)			Prepared: 09/30/19 11:52		Analyzed: 10/01/19 15:15							
QC Source Sample: Non-SDG (A9J0015-01)												
Gasoline Range Organics	ND	2.34	4.68	mg/kg dry	50	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 106 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*101 %*	*50-150 %*			*"*					
Duplicate (9100478-DUP2)			Prepared: 09/27/19 11:54		Analyzed: 10/01/19 22:03							
QC Source Sample: SE-18-0-0.33 (A9J0006-18)												
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	8.90	17.8	mg/kg dry	50	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 97 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*91 %*	*50-150 %*			*"*					

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Philip Nerenberg, Lab Director

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503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100509 - EPA 5035A							**Soil**					
Blank (9100509-BLK1)			Prepared: 10/01/19 15:40 Analyzed: 10/01/19 17:01									
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	1.67	3.33	mg/kg wet	50	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 104 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*92 %*	*50-150 %*			*"*					
LCS (9100509-BS2)			Prepared: 10/01/19 15:40 Analyzed: 10/01/19 16:34									
NWTPH-Gx (MS)												
Gasoline Range Organics	23.0	2.50	5.00	mg/kg wet	50	25.0	---	92	80-120%	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 105 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*96 %*	*50-150 %*			*"*					
Duplicate (9100509-DUP1)			Prepared: 09/27/19 19:30 Analyzed: 10/01/19 18:49									
QC Source Sample: SE-22-0-0.33 (A9J0006-23)												
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	14.8	29.7	mg/kg dry	50	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 110 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*94 %*	*50-150 %*			*"*					
Duplicate (9100509-DUP2)			Prepared: 09/27/19 07:55 Analyzed: 10/02/19 02:30									
QC Source Sample: Non-SDG (A9J0020-07)												
Gasoline Range Organics	**119**	3.65	7.31	mg/kg dry	50	---	166	---	---	**33**	**30%**	Q-04
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 122 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*98 %*	*50-150 %*			*"*					

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100546 - EPA 5035A							Soil					
Blank (9100546-BLK1)			Prepared: 10/02/19 10:42 Analyzed: 10/02/19 12:58									
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	1.67	3.33	mg/kg wet	50	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 97 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*97 %*	*50-150 %*			*"*					
LCS (9100546-BS2)			Prepared: 10/02/19 10:42 Analyzed: 10/02/19 12:30									
NWTPH-Gx (MS)												
Gasoline Range Organics	24.2	2.50	5.00	mg/kg wet	50	25.0	---	97	80-120%	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 98 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*98 %*	*50-150 %*			*"*					
Duplicate (9100546-DUP1)			Prepared: 09/26/19 14:40 Analyzed: 10/02/19 14:46									
QC Source Sample: Non-SDG (A9J0042-03)												
Gasoline Range Organics	ND	3.32	6.65	mg/kg dry	50	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 110 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*101 %*	*50-150 %*			*"*					

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QUALITY CONTROL (QC) SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100667 - EPA 3546							**Sediment**					
Blank (9100667-BLK1)			Prepared: 10/04/19 10:52		Analyzed: 10/07/19 12:14							**C-07**
EPA 8082A												
Aroclor 1016	ND	1.82	3.64	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1221	ND	1.82	3.64	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1232	ND	1.82	3.64	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1242	ND	1.82	3.64	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1248	ND	1.82	3.64	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1254	ND	1.82	3.64	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1260	ND	1.82	3.64	ug/kg wet	1	---	---	---	---	---	---	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 94 %*		*Limits: 60-125 %*			*Dilution: 1x*				
LCS (9100667-BS1)			Prepared: 10/04/19 10:52		Analyzed: 10/07/19 12:32							**C-07**
EPA 8082A												
Aroclor 1016	154	2.00	4.00	ug/kg wet	1	250	---	62	47-134%	---	---	
Aroclor 1260	203	2.00	4.00	ug/kg wet	1	250	---	81	53-140%	---	---	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 97 %*		*Limits: 60-125 %*			*Dilution: 1x*				
Duplicate (9100667-DUP1)			Prepared: 10/04/19 10:52		Analyzed: 10/07/19 13:07							**C-07**
QC Source Sample: SE-24-0-0.33 (A9J0006-01)												
EPA 8082A												
Aroclor 1016	ND	5.62	11.2	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1221	ND	5.62	11.2	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1232	ND	5.62	11.2	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1242	ND	5.62	11.2	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1248	ND	5.62	11.2	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1254	ND	5.62	11.2	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1260	**35.0**	5.62	11.2	ug/kg dry	1	---	42.4	---	---	19	30%	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 84 %*		*Limits: 60-125 %*			*Dilution: 1x*				
Matrix Spike (9100667-MS1)			Prepared: 10/04/19 10:52		Analyzed: 10/07/19 17:08							**C-07**
QC Source Sample: SE-27-0-0.33-Dup (A9J0006-25)												
Aroclor 1016	294	5.07	10.1	ug/kg dry	1	634	ND	**46**	**47-134%**	---	---	Q-01
Aroclor 1260	374	5.07	10.1	ug/kg dry	1	634	ND	59	53-140%	---	---	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 65 %*		*Limits: 60-125 %*			*Dilution: 1x*				

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AMENDED REPORT

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100667 - EPA 3546							**Sediment**					

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QUALITY CONTROL (QC) SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9101592 - EPA 3546							**Sediment**					
Blank (9101592-BLK1)			Prepared: 10/25/19 10:03		Analyzed: 10/28/19 09:24							**C-07**
EPA 8082A												
Aroclor 1016	ND	1.82	3.64	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1221	ND	1.82	3.64	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1232	ND	1.82	3.64	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1242	ND	1.82	3.64	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1248	ND	1.82	3.64	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1254	ND	1.82	3.64	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1260	ND	1.82	3.64	ug/kg wet	1	---	---	---	---	---	---	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 90 %*		*Limits: 60-125 %*				*Dilution: 1x*			
LCS (9101592-BS1)			Prepared: 10/25/19 10:03		Analyzed: 10/28/19 09:42							**C-07**
EPA 8082A												
Aroclor 1016	166	2.00	4.00	ug/kg wet	1	250	---	66	47-134%	---	---	
Aroclor 1260	203	2.00	4.00	ug/kg wet	1	250	---	81	53-140%	---	---	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 97 %*		*Limits: 60-125 %*				*Dilution: 1x*			
Duplicate (9101592-DUP1)			Prepared: 10/25/19 10:03		Analyzed: 10/28/19 10:35							**C-07**
QC Source Sample: Non-SDG (A9I0893-20)												
Aroclor 1016	ND	2.10	4.21	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1221	ND	2.10	4.21	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1232	ND	2.10	4.21	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1242	ND	2.10	4.21	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1248	ND	2.10	4.21	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1254	**2.25**	2.10	4.21	ug/kg dry	1	---	2.38	---	---	6	30%	Ja
Aroclor 1260	**2.12**	2.10	4.21	ug/kg dry	1	---	2.31	---	---	9	30%	Ja
Surr: Decachlorobiphenyl (Surr)			*Recovery: 77 %*		*Limits: 60-125 %*				*Dilution: 1x*			
Duplicate (9101592-DUP2)			Prepared: 10/25/19 14:47		Analyzed: 10/28/19 10:34							**C-07**
QC Source Sample: Non-SDG (A9J0670-02)												
Aroclor 1016	ND	4.78	9.56	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1221	ND	4.78	9.56	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1232	ND	4.78	9.56	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1242	**26.1**	4.78	9.56	ug/kg dry	1	---	28.0	---	---	7	30%	P-10

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QUALITY CONTROL (QC) SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9101592 - EPA 3546							**Sediment**					
Duplicate (9101592-DUP2)			Prepared: 10/25/19 14:47		Analyzed: 10/28/19 10:34							**C-07**
QC Source Sample: Non-SDG (A9J0670-02)												
Aroclor 1248	ND	4.78	9.56	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1254	**33.4**	4.78	9.56	ug/kg dry	1	---	36.5	---	---	9	30%	P-10
Aroclor 1260	**18.8**	4.78	9.56	ug/kg dry	1	---	20.0	---	---	6	30%	P-10
Surr: Decachlorobiphenyl (Surr)			*Recovery: 78 %*		*Limits: 60-125 %*		*Dilution: 1x*					
Matrix Spike (9101592-MS1)			Prepared: 10/25/19 10:03		Analyzed: 10/28/19 11:45							**C-07**
QC Source Sample: Non-SDG (A9I0893-21)												
EPA 8082A												
Aroclor 1016	150	2.12	4.24	ug/kg dry	1	265	ND	56	47-134%	---	---	
Aroclor 1260	178	2.12	4.24	ug/kg dry	1	265	7.17	64	53-140%	---	---	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 66 %*		*Limits: 60-125 %*		*Dilution: 1x*					
Matrix Spike Dup (9101592-MSD1)			Prepared: 10/25/19 10:03		Analyzed: 10/28/19 12:20							**C-07**
QC Source Sample: Non-SDG (A9I0893-21)												
Aroclor 1016	133	2.15	4.30	ug/kg dry	1	269	ND	50	47-134%	12	30%	
Aroclor 1260	165	2.15	4.30	ug/kg dry	1	269	7.17	59	53-140%	8	30%	
Surr: Decachlorobiphenyl (Surr)			*Recovery: 64 %*		*Limits: 60-125 %*		*Dilution: 1x*					

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Blank (9100490-BLK1)			Prepared: 10/01/19 10:34		Analyzed: 10/01/19 21:24							
EPA 8270D												
Acenaphthene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Acenaphthylene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Anthracene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Benz(a)anthracene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Benzo(a)pyrene	ND	0.00188	0.00375	mg/kg wet	1	---	---	---	---	---	---	
Benzo(b)fluoranthene	ND	0.00188	0.00375	mg/kg wet	1	---	---	---	---	---	---	
Benzo(k)fluoranthene	ND	0.00188	0.00375	mg/kg wet	1	---	---	---	---	---	---	
Benzo(g,h,i)perylene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Chrysene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Dibenz(a,h)anthracene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Fluoranthene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Fluorene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Indeno(1,2,3-cd)pyrene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
1-Methylnaphthalene	ND	0.00250	0.00500	mg/kg wet	1	---	---	---	---	---	---	
2-Methylnaphthalene	ND	0.00250	0.00500	mg/kg wet	1	---	---	---	---	---	---	
Naphthalene	ND	0.00250	0.00500	mg/kg wet	1	---	---	---	---	---	---	
Phenanthrene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Pyrene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Carbazole	ND	0.00188	0.00375	mg/kg wet	1	---	---	---	---	---	---	
Dibenzofuran	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
4-Chloro-3-methylphenol	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	
2-Chlorophenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
2,4-Dichlorophenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
2,4-Dimethylphenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
2,4-Dinitrophenol	ND	0.0312	0.0625	mg/kg wet	1	---	---	---	---	---	---	
4,6-Dinitro-2-methylphenol	ND	0.0312	0.0625	mg/kg wet	1	---	---	---	---	---	---	
2-Methylphenol	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
3+4-Methylphenol(s)	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
2-Nitrophenol	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	
4-Nitrophenol	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	
Pentachlorophenol (PCP)	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	
Phenol	ND	0.00250	0.00500	mg/kg wet	1	---	---	---	---	---	---	
2,3,4,6-Tetrachlorophenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Blank (9100490-BLK1)			Prepared: 10/01/19 10:34		Analyzed: 10/01/19 21:24							
2,3,5,6-Tetrachlorophenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
2,4,5-Trichlorophenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
2,4,6-Trichlorophenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Bis(2-ethylhexyl)phthalate	ND	0.0188	0.0375	mg/kg wet	1	---	---	---	---	---	---	
Butyl benzyl phthalate	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Diethylphthalate	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Dimethylphthalate	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Di-n-butylphthalate	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Di-n-octyl phthalate	ND	0.0100	0.0125	mg/kg wet	1	---	---	---	---	---	---	
N-Nitrosodimethylamine	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
N-Nitroso-di-n-propylamine	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
N-Nitrosodiphenylamine	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Bis(2-Chloroethoxy) methane	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Bis(2-Chloroethyl) ether	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
2,2'-Oxybis(1-Chloropropane)	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Hexachlorobenzene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Hexachlorocyclopentadiene	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Hexachloroethane	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
2-Chloronaphthalene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
4-Bromophenyl phenyl ether	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
4-Chlorophenyl phenyl ether	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Aniline	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
4-Chloroaniline	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
2-Nitroaniline	ND	0.0250	0.0500	mg/kg wet	1	---	---	---	---	---	---	
3-Nitroaniline	ND	0.0250	0.0500	mg/kg wet	1	---	---	---	---	---	---	
4-Nitroaniline	ND	0.0250	0.0500	mg/kg wet	1	---	---	---	---	---	---	
Nitrobenzene	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	
2,4-Dinitrotoluene	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	
2,6-Dinitrotoluene	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	

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Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Blank (9100490-BLK1)			Prepared: 10/01/19 10:34		Analyzed: 10/01/19 21:24							
Benzoic acid	ND	0.157	0.312	mg/kg wet	1	---	---	---	---	---	---	
Benzyl alcohol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Isophorone	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Azobenzene (1,2-DPH)	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Bis(2-Ethylhexyl) adipate	ND	0.0312	0.0625	mg/kg wet	1	---	---	---	---	---	---	
3,3'-Dichlorobenzidine	ND	0.0250	0.0500	mg/kg wet	1	---	---	---	---	---	---	Q-52
1,2-Dinitrobenzene	ND	0.0312	0.0625	mg/kg wet	1	---	---	---	---	---	---	
1,3-Dinitrobenzene	ND	0.0312	0.0625	mg/kg wet	1	---	---	---	---	---	---	
1,4-Dinitrobenzene	ND	0.0312	0.0625	mg/kg wet	1	---	---	---	---	---	---	
Pyridine	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 69 %*		*Limits: 37-122 %*				*Dilution: 1x*			
2-Fluorobiphenyl (Surr)			*57 %*		*44-115 %*				*"*			
Phenol-d6 (Surr)			*70 %*		*33-122 %*				*"*			
p-Terphenyl-d14 (Surr)			*76 %*		*54-127 %*				*"*			
2-Fluorophenol (Surr)			*64 %*		*35-115 %*				*"*			
2,4,6-Tribromophenol (Surr)			*60 %*		*39-132 %*				*"*			
LCS (9100490-BS1)			Prepared: 10/01/19 10:34		Analyzed: 10/01/19 21:59							
EPA 8270D												
Acenaphthene	0.366	0.00532	0.0107	mg/kg wet	4	0.533	---	69	40-122%	---	---	
Acenaphthylene	0.391	0.00532	0.0107	mg/kg wet	4	0.533	---	73	32-132%	---	---	
Anthracene	0.415	0.00532	0.0107	mg/kg wet	4	0.533	---	78	47-123%	---	---	
Benz(a)anthracene	0.424	0.00532	0.0107	mg/kg wet	4	0.533	---	79	49-126%	---	---	
Benzo(a)pyrene	0.438	0.00800	0.0160	mg/kg wet	4	0.533	---	82	45-129%	---	---	
Benzo(b)fluoranthene	0.427	0.00800	0.0160	mg/kg wet	4	0.533	---	80	45-132%	---	---	
Benzo(k)fluoranthene	0.423	0.00800	0.0160	mg/kg wet	4	0.533	---	79	47-132%	---	---	
Benzo(g,h,i)perylene	0.445	0.00532	0.0107	mg/kg wet	4	0.533	---	83	43-134%	---	---	
Chrysene	0.414	0.00532	0.0107	mg/kg wet	4	0.533	---	78	50-124%	---	---	
Dibenz(a,h)anthracene	0.424	0.00532	0.0107	mg/kg wet	4	0.533	---	80	45-134%	---	---	
Fluoranthene	0.456	0.00532	0.0107	mg/kg wet	4	0.533	---	85	50-127%	---	---	
Fluorene	0.384	0.00532	0.0107	mg/kg wet	4	0.533	---	72	43-125%	---	---	
Indeno(1,2,3-cd)pyrene	0.402	0.00532	0.0107	mg/kg wet	4	0.533	---	75	45-133%	---	---	
1-Methylnaphthalene	0.368	0.0107	0.0213	mg/kg wet	4	0.533	---	69	40-120%	---	---	
2-Methylnaphthalene	0.374	0.0107	0.0213	mg/kg wet	4	0.533	---	70	38-122%	---	---	

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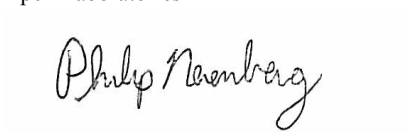

Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
LCS (9100490-BS1)			Prepared: 10/01/19 10:34		Analyzed: 10/01/19 21:59							
Naphthalene	0.359	0.0107	0.0213	mg/kg wet	4	0.533	---	67	35-123%	---	---	
Phenanthrene	0.395	0.00532	0.0107	mg/kg wet	4	0.533	---	74	50-121%	---	---	
Pyrene	0.464	0.00532	0.0107	mg/kg wet	4	0.533	---	87	47-127%	---	---	
Carbazole	0.464	0.00800	0.0160	mg/kg wet	4	0.533	---	87	50-122%	---	---	
Dibenzofuran	0.384	0.00532	0.0107	mg/kg wet	4	0.533	---	72	44-120%	---	---	
4-Chloro-3-methylphenol	0.415	0.0532	0.107	mg/kg wet	4	0.533	---	78	45-122%	---	---	
2-Chlorophenol	0.367	0.0267	0.0532	mg/kg wet	4	0.533	---	69	34-121%	---	---	
2,4-Dichlorophenol	0.384	0.0267	0.0532	mg/kg wet	4	0.533	---	72	40-122%	---	---	
2,4-Dimethylphenol	0.431	0.0267	0.0532	mg/kg wet	4	0.533	---	81	30-127%	---	---	
2,4-Dinitrophenol	0.466	0.133	0.267	mg/kg wet	4	0.533	---	87	5-137%	---	---	
4,6-Dinitro-2-methylphenol	0.517	0.133	0.267	mg/kg wet	4	0.533	---	97	29-132%	---	---	
2-Methylphenol	0.427	0.0133	0.0267	mg/kg wet	4	0.533	---	80	32-122%	---	---	
3+4-Methylphenol(s)	0.434	0.0133	0.0267	mg/kg wet	4	0.533	---	81	34-120%	---	---	
2-Nitrophenol	0.417	0.0532	0.107	mg/kg wet	4	0.533	---	78	36-123%	---	---	
4-Nitrophenol	0.495	0.0532	0.107	mg/kg wet	4	0.533	---	93	30-132%	---	---	
Pentachlorophenol (PCP)	0.434	0.0532	0.107	mg/kg wet	4	0.533	---	81	25-133%	---	---	
Phenol	0.393	0.0107	0.0213	mg/kg wet	4	0.533	---	74	34-120%	---	---	
2,3,4,6-Tetrachlorophenol	0.414	0.0267	0.0532	mg/kg wet	4	0.533	---	78	44-125%	---	---	
2,3,5,6-Tetrachlorophenol	0.429	0.0267	0.0532	mg/kg wet	4	0.533	---	80	40-120%	---	---	
2,4,5-Trichlorophenol	0.416	0.0267	0.0532	mg/kg wet	4	0.533	---	78	41-124%	---	---	
2,4,6-Trichlorophenol	0.405	0.0267	0.0532	mg/kg wet	4	0.533	---	76	39-126%	---	---	
Bis(2-ethylhexyl)phthalate	0.441	0.0800	0.160	mg/kg wet	4	0.533	---	83	51-133%	---	---	
Butyl benzyl phthalate	0.444	0.0267	0.0532	mg/kg wet	4	0.533	---	83	48-132%	---	---	
Diethylphthalate	0.436	0.0267	0.0532	mg/kg wet	4	0.533	---	82	50-124%	---	---	
Dimethylphthalate	0.409	0.0267	0.0532	mg/kg wet	4	0.533	---	77	48-124%	---	---	
Di-n-butylphthalate	0.448	0.0267	0.0532	mg/kg wet	4	0.533	---	84	51-128%	---	---	
Di-n-octyl phthalate	0.457	0.0428	0.0532	mg/kg wet	4	0.533	---	86	44-140%	---	---	
N-Nitrosodimethylamine	0.289	0.0133	0.0267	mg/kg wet	4	0.533	---	54	23-120%	---	---	
N-Nitroso-di-n-propylamine	0.382	0.0133	0.0267	mg/kg wet	4	0.533	---	72	36-120%	---	---	
N-Nitrosodiphenylamine	0.407	0.0133	0.0267	mg/kg wet	4	0.533	---	76	38-127%	---	---	
Bis(2-Chloroethoxy) methane	0.367	0.0133	0.0267	mg/kg wet	4	0.533	---	69	36-121%	---	---	
Bis(2-Chloroethyl) ether	0.316	0.0133	0.0267	mg/kg wet	4	0.533	---	59	31-120%	---	---	Q-41
2,2'-Oxybis(1-Chloropropane)	0.318	0.0133	0.0267	mg/kg wet	4	0.533	---	60	33-131%	---	---	
Hexachlorobenzene	0.403	0.00532	0.0107	mg/kg wet	4	0.533	---	76	44-122%	---	---	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
LCS (9100490-BS1)			Prepared: 10/01/19 10:34		Analyzed: 10/01/19 21:59							
Hexachlorobutadiene	0.337	0.0133	0.0267	mg/kg wet	4	0.533	---	63	32-123%	---	---	
Hexachlorocyclopentadiene	0.420	0.0267	0.0532	mg/kg wet	4	0.533	---	79	5-140%	---	---	Q-41
Hexachloroethane	0.323	0.0133	0.0267	mg/kg wet	4	0.533	---	61	28-120%	---	---	
2-Chloronaphthalene	0.379	0.00532	0.0107	mg/kg wet	4	0.533	---	71	41-120%	---	---	
1,2-Dichlorobenzene	0.332	0.0133	0.0267	mg/kg wet	4	0.533	---	62	33-120%	---	---	
1,3-Dichlorobenzene	0.316	0.0133	0.0267	mg/kg wet	4	0.533	---	59	30-120%	---	---	
1,4-Dichlorobenzene	0.321	0.0133	0.0267	mg/kg wet	4	0.533	---	60	31-120%	---	---	
1,2,4-Trichlorobenzene	0.336	0.0133	0.0267	mg/kg wet	4	0.533	---	63	34-120%	---	---	
4-Bromophenyl phenyl ether	0.396	0.0133	0.0267	mg/kg wet	4	0.533	---	74	46-124%	---	---	
4-Chlorophenyl phenyl ether	0.378	0.0133	0.0267	mg/kg wet	4	0.533	---	71	45-121%	---	---	
Aniline	0.327	0.0267	0.0532	mg/kg wet	4	0.533	---	61	7-120%	---	---	
4-Chloroaniline	0.217	0.0133	0.0267	mg/kg wet	4	0.533	---	41	16-120%	---	---	Q-31
2-Nitroaniline	0.414	0.107	0.213	mg/kg wet	4	0.533	---	78	44-127%	---	---	
3-Nitroaniline	0.393	0.107	0.213	mg/kg wet	4	0.533	---	74	33-120%	---	---	
4-Nitroaniline	0.588	0.107	0.213	mg/kg wet	4	0.533	---	110	35-120%	---	---	Q-41
Nitrobenzene	0.375	0.0532	0.107	mg/kg wet	4	0.533	---	70	34-122%	---	---	
2,4-Dinitrotoluene	0.418	0.0532	0.107	mg/kg wet	4	0.533	---	78	48-126%	---	---	
2,6-Dinitrotoluene	0.412	0.0532	0.107	mg/kg wet	4	0.533	---	77	46-124%	---	---	
Benzoic acid	0.659	0.400	0.400	mg/kg wet	4	1.07	---	62	5-140%	---	---	
Benzyl alcohol	0.381	0.0267	0.0532	mg/kg wet	4	0.533	---	71	29-122%	---	---	
Isophorone	0.363	0.0133	0.0267	mg/kg wet	4	0.533	---	68	30-122%	---	---	
Azobenzene (1,2-DPH)	0.359	0.0133	0.0267	mg/kg wet	4	0.533	---	67	39-125%	---	---	
Bis(2-Ethylhexyl) adipate	0.440	0.133	0.267	mg/kg wet	4	0.533	---	83	60-121%	---	---	
3,3'-Dichlorobenzidine	1.32	0.107	0.213	mg/kg wet	4	1.07	---	**124**	**22-121%**	---	---	Q-29, Q-31
1,2-Dinitrobenzene	0.397	0.133	0.267	mg/kg wet	4	0.533	---	75	44-120%	---	---	
1,3-Dinitrobenzene	0.434	0.133	0.267	mg/kg wet	4	0.533	---	81	42-127%	---	---	
1,4-Dinitrobenzene	0.464	0.133	0.267	mg/kg wet	4	0.533	---	87	37-132%	---	---	
Pyridine	0.203	0.0267	0.0532	mg/kg wet	4	0.533	---	38	5-120%	---	---	

Surr: Nitrobenzene-d5 (Surr)	*Recovery: 70 %*	*Limits: 37-122 %*	*Dilution: 4x*
2-Fluorobiphenyl (Surr)	*68 %*	*44-115 %*	*"*
Phenol-d6 (Surr)	*73 %*	*33-122 %*	*"*
p-Terphenyl-d14 (Surr)	*82 %*	*54-127 %*	*"*
2-Fluorophenol (Surr)	*62 %*	*35-115 %*	*"*
2,4,6-Tribromophenol (Surr)	*74 %*	*39-132 %*	*"*

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Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Duplicate (9100490-DUP2)				Prepared: 10/01/19 10:34		Analyzed: 10/02/19 14:15						
QC Source Sample: Non-SDG (A9I0822-02RE1)												
Acenaphthene	**0.0710**	0.0306	0.0615	mg/kg dry	10	---	0.135	---	---	**62**	**30%**	Q-04
Acenaphthylene	ND	0.0306	0.0615	mg/kg dry	10	---	ND	---	---	---	30%	
Anthracene	**0.103**	0.0306	0.0615	mg/kg dry	10	---	0.204	---	---	**66**	**30%**	Q-04
Benz(a)anthracene	**0.103**	0.0306	0.0615	mg/kg dry	10	---	0.218	---	---	**71**	**30%**	Q-04
Benzo(a)pyrene	**0.0937**	0.0461	0.0922	mg/kg dry	10	---	0.154	---	---	**48**	**30%**	Q-04
Benzo(b)fluoranthene	**0.100**	0.0461	0.0922	mg/kg dry	10	---	0.180	---	---	**57**	**30%**	Q-04
Benzo(k)fluoranthene	**0.0492**	0.0461	0.0922	mg/kg dry	10	---	0.0758	---	---	**42**	**30%**	Q-04, Ja
Benzo(g,h,i)perylene	**0.0400**	0.0306	0.0615	mg/kg dry	10	---	0.0680	---	---	**52**	**30%**	Q-04, Ja
Chrysene	**0.0879**	0.0306	0.0615	mg/kg dry	10	---	0.199	---	---	**78**	**30%**	Q-04
Dibenz(a,h)anthracene	ND	0.0306	0.0615	mg/kg dry	10	---	ND	---	---	---	30%	
Fluoranthene	**0.503**	0.0306	0.0615	mg/kg dry	10	---	1.15	---	---	**78**	**30%**	Q-04
Fluorene	**0.0660**	0.0306	0.0615	mg/kg dry	10	---	0.136	---	---	**69**	**30%**	Q-04
Indeno(1,2,3-cd)pyrene	**0.0339**	0.0306	0.0615	mg/kg dry	10	---	0.0695	---	---	**69**	**30%**	Q-04, Ja
1-Methylnaphthalene	ND	0.0615	0.123	mg/kg dry	10	---	0.0767	---	---	***	**30%**	Q-04
2-Methylnaphthalene	**0.0696**	0.0615	0.123	mg/kg dry	10	---	0.149	---	---	**72**	**30%**	Q-04, Ja
Naphthalene	**0.186**	0.0615	0.123	mg/kg dry	10	---	0.491	---	---	**90**	**30%**	Q-04
Phenanthrene	**0.255**	0.0306	0.0615	mg/kg dry	10	---	0.491	---	---	**63**	**30%**	Q-04
Pyrene	**0.347**	0.0306	0.0615	mg/kg dry	10	---	0.823	---	---	**81**	**30%**	Q-04
Carbazole	ND	0.0461	0.0922	mg/kg dry	10	---	0.0536	---	---	***	**30%**	Q-04
Dibenzofuran	**0.0566**	0.0306	0.0615	mg/kg dry	10	---	0.145	---	---	**88**	**30%**	Q-04, Ja
4-Chloro-3-methylphenol	ND	0.306	0.615	mg/kg dry	10	---	ND	---	---	---	30%	
2-Chlorophenol	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
2,4-Dichlorophenol	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
2,4-Dimethylphenol	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
2,4-Dinitrophenol	ND	0.767	1.54	mg/kg dry	10	---	ND	---	---	---	30%	
4,6-Dinitro-2-methylphenol	ND	0.767	1.54	mg/kg dry	10	---	ND	---	---	---	30%	
2-Methylphenol	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
3+4-Methylphenol(s)	**1.59**	0.0767	0.154	mg/kg dry	10	---	1.60	---	---	0.5	30%	
2-Nitrophenol	ND	0.306	0.615	mg/kg dry	10	---	ND	---	---	---	30%	
4-Nitrophenol	ND	0.306	0.615	mg/kg dry	10	---	ND	---	---	---	30%	
Pentachlorophenol (PCP)	ND	0.306	0.615	mg/kg dry	10	---	ND	---	---	---	30%	
Phenol	**0.199**	0.0615	0.123	mg/kg dry	10	---	0.571	---	---	**97**	**30%**	M-04, Q-04

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Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: Seaport Tidelands	
2001 NW 19th Ave, STE 200	Project Number: 1044.02.06-02	Report ID:
Portland, OR 97209	Project Manager: Emily Hess	A9J0006 - 01 09 20 1630

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Duplicate (9100490-DUP2)			Prepared: 10/01/19 10:34		Analyzed: 10/02/19 14:15							
QC Source Sample: Non-SDG (A9I0822-02RE1)												
2,3,4,6-Tetrachlorophenol	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
2,3,5,6-Tetrachlorophenol	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
2,4,5-Trichlorophenol	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
2,4,6-Trichlorophenol	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
Bis(2-ethylhexyl)phthalate	ND	0.461	0.922	mg/kg dry	10	---	ND	---	---	---	30%	
Butyl benzyl phthalate	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
Diethylphthalate	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
Dimethylphthalate	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
Di-n-butylphthalate	ND	0.154	0.306	mg/kg dry	10	---	0.213	---	---	***	**30%**	Q-04
Di-n-octyl phthalate	ND	0.247	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
N-Nitrosodimethylamine	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
N-Nitroso-di-n-propylamine	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
N-Nitrosodiphenylamine	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
Bis(2-Chloroethoxy) methane	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
Bis(2-Chloroethyl) ether	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
2,2'-Oxybis(1-Chloropropane)	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
Hexachlorobenzene	ND	0.0306	0.0615	mg/kg dry	10	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
Hexachlorocyclopentadiene	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
Hexachloroethane	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
2-Chloronaphthalene	ND	0.0306	0.0615	mg/kg dry	10	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
1,3-Dichlorobenzene	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
4-Bromophenyl phenyl ether	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
4-Chlorophenyl phenyl ether	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
Aniline	ND	0.306	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
4-Chloroaniline	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
2-Nitroaniline	ND	0.615	1.23	mg/kg dry	10	---	ND	---	---	---	30%	
3-Nitroaniline	ND	0.615	1.23	mg/kg dry	10	---	ND	---	---	---	30%	
4-Nitroaniline	ND	0.615	1.23	mg/kg dry	10	---	ND	---	---	---	30%	
Nitrobenzene	ND	0.306	0.615	mg/kg dry	10	---	ND	---	---	---	30%	

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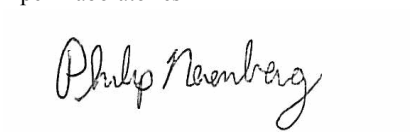

Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Duplicate (9100490-DUP2)			Prepared: 10/01/19 10:34		Analyzed: 10/02/19 14:15							
QC Source Sample: Non-SDG (A9I0822-02RE1)												
2,4-Dinitrotoluene	ND	0.306	0.615	mg/kg dry	10	---	ND	---	---	---	30%	
2,6-Dinitrotoluene	ND	0.306	0.615	mg/kg dry	10	---	ND	---	---	---	30%	
Benzoic acid	ND	3.85	7.67	mg/kg dry	10	---	ND	---	---	---	30%	
Benzyl alcohol	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
Isophorone	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
Azobenzene (1,2-DPH)	ND	0.0767	0.154	mg/kg dry	10	---	ND	---	---	---	30%	
Bis(2-Ethylhexyl) adipate	**2.82**	0.767	1.54	mg/kg dry	10	---	2.18	---	---	26	30%	
3,3'-Dichlorobenzidine	ND	0.615	1.23	mg/kg dry	10	---	ND	---	---	---	30%	Q-52
1,2-Dinitrobenzene	ND	0.767	1.54	mg/kg dry	10	---	ND	---	---	---	30%	
1,3-Dinitrobenzene	ND	0.767	1.54	mg/kg dry	10	---	ND	---	---	---	30%	
1,4-Dinitrobenzene	ND	0.767	1.54	mg/kg dry	10	---	ND	---	---	---	30%	
Pyridine	ND	0.154	0.306	mg/kg dry	10	---	ND	---	---	---	30%	
Surr: Nitrobenzene-d5 (Surr)		*Recovery: 71 %*		*Limits: 37-122 %*			*Dilution: 10x*					
2-Fluorobiphenyl (Surr)		*64 %*		*44-115 %*			*"*					
Phenol-d6 (Surr)		*73 %*		*33-122 %*			*"*					
p-Terphenyl-d14 (Surr)		*73 %*		*54-127 %*			*"*					
2-Fluorophenol (Surr)		*71 %*		*35-115 %*			*"*					
2,4,6-Tribromophenol (Surr)		*107 %*		*39-132 %*			*"*					
Matrix Spike (9100490-MS1)			Prepared: 10/01/19 10:34		Analyzed: 10/02/19 14:51							
QC Source Sample: Non-SDG (A9I0822-02RE1)												
EPA 8270D												
Acenaphthene	1.24	0.0306	0.0614	mg/kg dry	10	1.23	0.135	90	40-122%	---	---	
Acenaphthylene	1.29	0.0306	0.0614	mg/kg dry	10	1.23	ND	105	32-132%	---	---	
Anthracene	1.33	0.0306	0.0614	mg/kg dry	10	1.23	0.204	92	47-123%	---	---	
Benz(a)anthracene	1.27	0.0306	0.0614	mg/kg dry	10	1.23	0.218	85	49-126%	---	---	
Benzo(a)pyrene	1.31	0.0460	0.0920	mg/kg dry	10	1.23	0.154	94	45-129%	---	---	
Benzo(b)fluoranthene	1.29	0.0460	0.0920	mg/kg dry	10	1.23	0.180	90	45-132%	---	---	
Benzo(k)fluoranthene	1.20	0.0460	0.0920	mg/kg dry	10	1.23	0.0758	91	47-132%	---	---	
Benzo(g,h,i)perylene	1.31	0.0306	0.0614	mg/kg dry	10	1.23	0.0680	101	43-134%	---	---	
Chrysene	1.28	0.0306	0.0614	mg/kg dry	10	1.23	0.199	88	50-124%	---	---	
Dibenz(a,h)anthracene	1.22	0.0306	0.0614	mg/kg dry	10	1.23	ND	100	45-134%	---	---	
Fluoranthene	1.58	0.0306	0.0614	mg/kg dry	10	1.23	1.15	**35**	**50-127%**	---	---	Q-01

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Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike (9100490-MS1)			Prepared: 10/01/19 10:34		Analyzed: 10/02/19 14:51							
QC Source Sample: Non-SDG (A9I0822-02RE1)												
Fluorene	1.30	0.0306	0.0614	mg/kg dry	10	1.23	0.136	95	43-125%	---	---	
Indeno(1,2,3-cd)pyrene	1.14	0.0306	0.0614	mg/kg dry	10	1.23	0.0695	87	45-133%	---	---	
1-Methylnaphthalene	1.25	0.0614	0.123	mg/kg dry	10	1.23	0.0767	96	40-120%	---	---	
2-Methylnaphthalene	1.28	0.0614	0.123	mg/kg dry	10	1.23	0.149	92	38-122%	---	---	
Naphthalene	1.37	0.0614	0.123	mg/kg dry	10	1.23	0.491	71	35-123%	---	---	
Phenanthrene	1.35	0.0306	0.0614	mg/kg dry	10	1.23	0.491	70	50-121%	---	---	
Pyrene	1.49	0.0306	0.0614	mg/kg dry	10	1.23	0.823	55	47-127%	---	---	
Carbazole	1.23	0.0460	0.0920	mg/kg dry	10	1.23	0.0536	96	50-122%	---	---	
Dibenzofuran	1.26	0.0306	0.0614	mg/kg dry	10	1.23	0.145	91	44-120%	---	---	
4-Chloro-3-methylphenol	1.32	0.306	0.614	mg/kg dry	10	1.23	ND	108	45-122%	---	---	
2-Chlorophenol	1.18	0.153	0.306	mg/kg dry	10	1.23	ND	96	34-121%	---	---	
2,4-Dichlorophenol	1.31	0.153	0.306	mg/kg dry	10	1.23	ND	107	40-122%	---	---	
2,4-Dimethylphenol	1.49	0.153	0.306	mg/kg dry	10	1.23	ND	122	30-127%	---	---	
2,4-Dinitrophenol	ND	0.766	1.53	mg/kg dry	10	1.23	ND		**5-137%**	---	---	Q-11, Q-41
4,6-Dinitro-2-methylphenol	0.921	0.766	1.53	mg/kg dry	10	1.23	ND	75	29-132%	---	---	Q-41, Ja
2-Methylphenol	1.21	0.0766	0.153	mg/kg dry	10	1.23	ND	98	32-122%	---	---	
3+4-Methylphenol(s)	2.87	0.0766	0.153	mg/kg dry	10	1.23	1.60	104	34-120%	---	---	
2-Nitrophenol	1.43	0.306	0.614	mg/kg dry	10	1.23	ND	116	36-123%	---	---	
4-Nitrophenol	1.30	0.306	0.614	mg/kg dry	10	1.23	ND	106	30-132%	---	---	
Pentachlorophenol (PCP)	1.48	0.306	0.614	mg/kg dry	10	1.23	ND	121	25-133%	---	---	
Phenol	1.29	0.0614	0.123	mg/kg dry	10	1.23	0.571	58	34-120%	---	---	
2,3,4,6-Tetrachlorophenol	1.30	0.153	0.306	mg/kg dry	10	1.23	ND	106	44-125%	---	---	
2,3,5,6-Tetrachlorophenol	1.41	0.153	0.306	mg/kg dry	10	1.23	ND	115	40-120%	---	---	
2,4,5-Trichlorophenol	1.36	0.153	0.306	mg/kg dry	10	1.23	ND	111	41-124%	---	---	
2,4,6-Trichlorophenol	1.37	0.153	0.306	mg/kg dry	10	1.23	ND	112	39-126%	---	---	
Bis(2-ethylhexyl)phthalate	1.57	0.460	0.920	mg/kg dry	10	1.23	ND	128	51-133%	---	---	
Butyl benzyl phthalate	1.46	0.153	0.306	mg/kg dry	10	1.23	ND	119	48-132%	---	---	
Diethylphthalate	1.33	0.153	0.306	mg/kg dry	10	1.23	ND	108	50-124%	---	---	
Dimethylphthalate	1.28	0.153	0.306	mg/kg dry	10	1.23	ND	105	48-124%	---	---	
Di-n-butylphthalate	1.41	0.153	0.306	mg/kg dry	10	1.23	0.213	97	51-128%	---	---	
Di-n-octyl phthalate	1.73	0.246	0.306	mg/kg dry	10	1.23	ND	**141**	**44-140%**	---	---	Q-01
N-Nitrosodimethylamine	0.793	0.0766	0.153	mg/kg dry	10	1.23	ND	65	23-120%	---	---	
N-Nitroso-di-n-propylamine	1.10	0.0766	0.153	mg/kg dry	10	1.23	ND	90	36-120%	---	---	

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Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike (9100490-MS1)			Prepared: 10/01/19 10:34		Analyzed: 10/02/19 14:51							
QC Source Sample: Non-SDG (A9I0822-02RE1)												
N-Nitrosodiphenylamine	1.24	0.0766	0.153	mg/kg dry	10	1.23	ND	101	38-127%	---	---	
Bis(2-Chloroethoxy) methane	1.16	0.0766	0.153	mg/kg dry	10	1.23	ND	94	36-121%	---	---	
Bis(2-Chloroethyl) ether	0.923	0.0766	0.153	mg/kg dry	10	1.23	ND	75	31-120%	---	---	
2,2'-Oxybis(1-Chloropropane)	0.929	0.0766	0.153	mg/kg dry	10	1.23	ND	76	33-131%	---	---	
Hexachlorobenzene	1.24	0.0306	0.0614	mg/kg dry	10	1.23	ND	101	44-122%	---	---	
Hexachlorobutadiene	1.19	0.0766	0.153	mg/kg dry	10	1.23	ND	97	32-123%	---	---	
Hexachlorocyclopentadiene	ND	0.153	0.306	mg/kg dry	10	1.23	ND		**5-140%**	---	---	Q-01, Q-41
Hexachloroethane	1.03	0.0766	0.153	mg/kg dry	10	1.23	ND	84	28-120%	---	---	
2-Chloronaphthalene	1.25	0.0306	0.0614	mg/kg dry	10	1.23	ND	102	41-120%	---	---	
1,2-Dichlorobenzene	1.09	0.0766	0.153	mg/kg dry	10	1.23	ND	89	33-120%	---	---	
1,3-Dichlorobenzene	1.06	0.0766	0.153	mg/kg dry	10	1.23	ND	87	30-120%	---	---	
1,4-Dichlorobenzene	1.08	0.0766	0.153	mg/kg dry	10	1.23	ND	88	31-120%	---	---	
1,2,4-Trichlorobenzene	1.13	0.0766	0.153	mg/kg dry	10	1.23	ND	92	34-120%	---	---	
4-Bromophenyl phenyl ether	1.26	0.0766	0.153	mg/kg dry	10	1.23	ND	103	46-124%	---	---	
4-Chlorophenyl phenyl ether	1.22	0.0766	0.153	mg/kg dry	10	1.23	ND	100	45-121%	---	---	
Aniline	1.04	0.690	0.690	mg/kg dry	10	1.23	ND	85	7-120%	---	---	Q-31
4-Chloroaniline	0.438	0.0766	0.153	mg/kg dry	10	1.23	ND	36	16-120%	---	---	Q-31
2-Nitroaniline	1.45	0.614	1.23	mg/kg dry	10	1.23	ND	118	44-127%	---	---	
3-Nitroaniline	ND	0.614	1.23	mg/kg dry	10	1.23	ND		**33-120%**	---	---	Q-01
4-Nitroaniline	1.24	0.614	1.23	mg/kg dry	10	1.23	ND	101	35-120%	---	---	Q-41
Nitrobenzene	1.11	0.306	0.614	mg/kg dry	10	1.23	ND	91	34-122%	---	---	
2,4-Dinitrotoluene	1.24	0.306	0.614	mg/kg dry	10	1.23	ND	101	48-126%	---	---	
2,6-Dinitrotoluene	1.26	0.306	0.614	mg/kg dry	10	1.23	ND	103	46-124%	---	---	
Benzoic acid	ND	3.84	7.66	mg/kg dry	10	2.45	ND		**5-140%**	---	---	Q-11, Q-41
Benzyl alcohol	1.22	0.153	0.306	mg/kg dry	10	1.23	ND	99	29-122%	---	---	
Isophorone	1.14	0.0766	0.153	mg/kg dry	10	1.23	ND	93	30-122%	---	---	
Azobenzene (1,2-DPH)	1.15	0.0766	0.153	mg/kg dry	10	1.23	ND	94	39-125%	---	---	
Bis(2-Ethylhexyl) adipate	2.32	0.766	1.53	mg/kg dry	10	1.23	2.18	**12**	**60-121%**	---	---	Q-03
3,3'-Dichlorobenzidine	ND	0.614	1.23	mg/kg dry	10	2.45	ND		**22-121%**	---	---	Q-01, Q-31
1,2-Dinitrobenzene	1.03	0.766	1.53	mg/kg dry	10	1.23	ND	84	44-120%	---	---	Ja
1,3-Dinitrobenzene	1.26	0.766	1.53	mg/kg dry	10	1.23	ND	102	42-127%	---	---	Ja
1,4-Dinitrobenzene	0.975	0.766	1.53	mg/kg dry	10	1.23	ND	79	37-132%	---	---	Ja
Pyridine	0.610	0.153	0.306	mg/kg dry	10	1.23	ND	50	5-120%	---	---	

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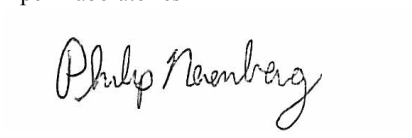

Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike (9100490-MS1)			Prepared: 10/01/19 10:34 Analyzed: 10/02/19 14:51									
QC Source Sample: Non-SDG (A9I0822-02RE1)												
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 90 %*		*Limits: 37-122 %*		*Dilution: 10x*					
2-Fluorobiphenyl (Surr)			*93 %*		*44-115 %*		*"*					
Phenol-d6 (Surr)			*92 %*		*33-122 %*		*"*					
p-Terphenyl-d14 (Surr)			*101 %*		*54-127 %*		*"*					
2-Fluorophenol (Surr)			*90 %*		*35-115 %*		*"*					
2,4,6-Tribromophenol (Surr)			*110 %*		*39-132 %*		*"*					
Matrix Spike (9100490-MS2)			Prepared: 10/01/19 10:35 Analyzed: 10/02/19 12:28									
QC Source Sample: Non-SDG (A9I0893-13RE1)												
EPA 8270D												
Acenaphthene	1.39	0.0681	0.137	mg/kg dry	20	1.37	ND	102	40-122%	---	---	
Acenaphthylene	1.45	0.0681	0.137	mg/kg dry	20	1.37	ND	106	32-132%	---	---	
Anthracene	1.48	0.0681	0.137	mg/kg dry	20	1.37	ND	109	47-123%	---	---	
Benz(a)anthracene	1.42	0.0681	0.137	mg/kg dry	20	1.37	ND	104	49-126%	---	---	
Benzo(a)pyrene	1.60	0.102	0.205	mg/kg dry	20	1.37	0.167	105	45-129%	---	---	
Benzo(b)fluoranthene	1.48	0.102	0.205	mg/kg dry	20	1.37	0.121	100	45-132%	---	---	
Benzo(k)fluoranthene	1.39	0.102	0.205	mg/kg dry	20	1.37	ND	102	47-132%	---	---	
Benzo(g,h,i)perylene	1.53	0.0681	0.137	mg/kg dry	20	1.37	0.0734	107	43-134%	---	---	
Chrysene	1.43	0.0681	0.137	mg/kg dry	20	1.37	ND	104	50-124%	---	---	
Dibenz(a,h)anthracene	1.36	0.0681	0.137	mg/kg dry	20	1.37	ND	99	45-134%	---	---	
Fluoranthene	1.54	0.0681	0.137	mg/kg dry	20	1.37	0.0761	107	50-127%	---	---	
Fluorene	1.47	0.0681	0.137	mg/kg dry	20	1.37	ND	107	43-125%	---	---	
Indeno(1,2,3-cd)pyrene	1.37	0.0681	0.137	mg/kg dry	20	1.37	ND	100	45-133%	---	---	
1-Methylnaphthalene	1.38	0.137	0.273	mg/kg dry	20	1.37	ND	101	40-120%	---	---	
2-Methylnaphthalene	1.41	0.137	0.273	mg/kg dry	20	1.37	ND	104	38-122%	---	---	
Naphthalene	1.42	0.137	0.273	mg/kg dry	20	1.37	ND	104	35-123%	---	---	
Phenanthrene	1.46	0.0681	0.137	mg/kg dry	20	1.37	ND	107	50-121%	---	---	
Pyrene	1.62	0.0681	0.137	mg/kg dry	20	1.37	0.152	107	47-127%	---	---	
Carbazole	1.36	0.102	0.205	mg/kg dry	20	1.37	ND	99	50-122%	---	---	
Dibenzofuran	1.43	0.0681	0.137	mg/kg dry	20	1.37	ND	105	44-120%	---	---	
4-Chloro-3-methylphenol	1.37	0.681	1.37	mg/kg dry	20	1.37	ND	101	45-122%	---	---	
2-Chlorophenol	1.23	0.341	0.681	mg/kg dry	20	1.37	ND	90	34-121%	---	---	
2,4-Dichlorophenol	1.45	0.341	0.681	mg/kg dry	20	1.37	ND	106	40-122%	---	---	

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Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike (9100490-MS2)			Prepared: 10/01/19 10:35 Analyzed: 10/02/19 12:28									
QC Source Sample: Non-SDG (A9I0893-13RE1)												
2,4-Dimethylphenol	1.54	0.341	0.681	mg/kg dry	20	1.37	ND	113	30-127%	---	---	
2,4-Dinitrophenol	ND	1.70	3.41	mg/kg dry	20	1.37	ND		**5-137%**	---	---	Q-11, Q-41
4,6-Dinitro-2-methylphenol	1.79	1.70	3.41	mg/kg dry	20	1.37	ND	131	29-132%	---	---	Q-41, Ja
2-Methylphenol	1.38	0.170	0.341	mg/kg dry	20	1.37	ND	101	32-122%	---	---	
3+4-Methylphenol(s)	1.71	0.170	0.341	mg/kg dry	20	1.37	0.309	102	34-120%	---	---	
2-Nitrophenol	1.86	0.681	1.37	mg/kg dry	20	1.37	ND	**136**	**36-123%**	---	---	Q-11
4-Nitrophenol	1.70	0.681	1.37	mg/kg dry	20	1.37	ND	125	30-132%	---	---	
Pentachlorophenol (PCP)	1.69	0.681	1.37	mg/kg dry	20	1.37	ND	124	25-133%	---	---	
Phenol	1.28	0.137	0.273	mg/kg dry	20	1.37	ND	94	34-120%	---	---	
2,3,4,6-Tetrachlorophenol	1.41	0.341	0.681	mg/kg dry	20	1.37	ND	103	44-125%	---	---	
2,3,5,6-Tetrachlorophenol	1.61	0.341	0.681	mg/kg dry	20	1.37	ND	118	40-120%	---	---	
2,4,5-Trichlorophenol	1.57	0.341	0.681	mg/kg dry	20	1.37	ND	115	41-124%	---	---	
2,4,6-Trichlorophenol	1.57	0.341	0.681	mg/kg dry	20	1.37	ND	115	39-126%	---	---	
Bis(2-ethylhexyl)phthalate	1.56	1.02	2.05	mg/kg dry	20	1.37	ND	114	51-133%	---	---	Ja
Butyl benzyl phthalate	1.71	0.341	0.681	mg/kg dry	20	1.37	ND	125	48-132%	---	---	
Diethylphthalate	1.49	0.341	0.681	mg/kg dry	20	1.37	ND	109	50-124%	---	---	
Dimethylphthalate	1.45	0.341	0.681	mg/kg dry	20	1.37	ND	106	48-124%	---	---	
Di-n-butylphthalate	1.55	0.341	0.681	mg/kg dry	20	1.37	ND	113	51-128%	---	---	
Di-n-octyl phthalate	2.02	0.548	0.681	mg/kg dry	20	1.37	ND	**148**	**44-140%**	---	---	Q-01
N-Nitrosodimethylamine	0.850	0.170	0.341	mg/kg dry	20	1.37	ND	62	23-120%	---	---	
N-Nitroso-di-n-propylamine	1.18	0.170	0.341	mg/kg dry	20	1.37	ND	86	36-120%	---	---	
N-Nitrosodiphenylamine	1.49	0.170	0.341	mg/kg dry	20	1.37	ND	109	38-127%	---	---	
Bis(2-Chloroethoxy) methane	1.31	0.170	0.341	mg/kg dry	20	1.37	ND	96	36-121%	---	---	
Bis(2-Chloroethyl) ether	0.997	0.170	0.341	mg/kg dry	20	1.37	ND	73	31-120%	---	---	
2,2'-Oxybis(1-Chloropropane)	1.05	0.170	0.341	mg/kg dry	20	1.37	ND	77	33-131%	---	---	
Hexachlorobenzene	1.38	0.0681	0.137	mg/kg dry	20	1.37	ND	101	44-122%	---	---	
Hexachlorobutadiene	1.29	0.170	0.341	mg/kg dry	20	1.37	ND	95	32-123%	---	---	
Hexachlorocyclopentadiene	0.373	0.341	0.681	mg/kg dry	20	1.37	ND	27	5-140%	---	---	Q-41, Ja
Hexachloroethane	1.13	0.170	0.341	mg/kg dry	20	1.37	ND	83	28-120%	---	---	
2-Chloronaphthalene	1.47	0.0681	0.137	mg/kg dry	20	1.37	ND	107	41-120%	---	---	
1,2-Dichlorobenzene	1.20	0.170	0.341	mg/kg dry	20	1.37	ND	88	33-120%	---	---	
1,3-Dichlorobenzene	1.21	0.170	0.341	mg/kg dry	20	1.37	ND	89	30-120%	---	---	
1,4-Dichlorobenzene	1.16	0.170	0.341	mg/kg dry	20	1.37	ND	85	31-120%	---	---	

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Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike (9100490-MS2)			Prepared: 10/01/19 10:35 Analyzed: 10/02/19 12:28									
QC Source Sample: Non-SDG (A9I0893-13RE1)												
1,2,4-Trichlorobenzene	1.31	0.170	0.341	mg/kg dry	20	1.37	ND	96	34-120%	---	---	
4-Bromophenyl phenyl ether	1.45	0.170	0.341	mg/kg dry	20	1.37	ND	106	46-124%	---	---	
4-Chlorophenyl phenyl ether	1.48	0.170	0.341	mg/kg dry	20	1.37	ND	108	45-121%	---	---	
Aniline	0.837	0.341	0.681	mg/kg dry	20	1.37	ND	61	7-120%	---	---	Q-31
4-Chloroaniline	0.508	0.170	0.341	mg/kg dry	20	1.37	ND	37	16-120%	---	---	Q-31
2-Nitroaniline	1.60	1.37	2.73	mg/kg dry	20	1.37	ND	117	44-127%	---	---	Ja
3-Nitroaniline	ND	1.37	2.73	mg/kg dry	20	1.37	ND		**33-120%**	---	---	Q-11
4-Nitroaniline	ND	1.37	2.73	mg/kg dry	20	1.37	ND		**35-120%**	---	---	Q-11, Q-41
Nitrobenzene	1.19	0.681	1.37	mg/kg dry	20	1.37	ND	87	34-122%	---	---	Ja
2,4-Dinitrotoluene	1.54	0.681	1.37	mg/kg dry	20	1.37	ND	113	48-126%	---	---	
2,6-Dinitrotoluene	1.51	0.681	1.37	mg/kg dry	20	1.37	ND	111	46-124%	---	---	
Benzoic acid	ND	8.55	17.0	mg/kg dry	20	2.73	ND		**5-140%**	---	---	Q-11, Q-41
Benzyl alcohol	1.11	0.341	0.681	mg/kg dry	20	1.37	ND	81	29-122%	---	---	
Isophorone	1.21	0.170	0.341	mg/kg dry	20	1.37	ND	89	30-122%	---	---	
Azobenzene (1,2-DPH)	1.29	0.170	0.341	mg/kg dry	20	1.37	ND	95	39-125%	---	---	
Bis(2-Ethylhexyl) adipate	2.35	1.70	3.41	mg/kg dry	20	1.37	ND	**172**	**60-121%**	---	---	Q-11, Ja
3,3'-Dichlorobenzidine	2.03	1.37	2.73	mg/kg dry	20	2.73	ND	74	22-121%	---	---	Q-31, Ja
1,2-Dinitrobenzene	ND	1.70	3.41	mg/kg dry	20	1.37	ND		**44-120%**	---	---	Q-11
1,3-Dinitrobenzene	ND	1.70	3.41	mg/kg dry	20	1.37	ND		**42-127%**	---	---	Q-11
1,4-Dinitrobenzene	ND	1.70	3.41	mg/kg dry	20	1.37	ND		**37-132%**	---	---	Q-11
Pyridine	0.707	0.341	0.681	mg/kg dry	20	1.37	ND	52	5-120%	---	---	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 81 %*	*Limits: 37-122 %*			*Dilution: 20x*					
2-Fluorobiphenyl (Surr)			*53 %*	*44-115 %*			*"*					
Phenol-d6 (Surr)			*81 %*	*33-122 %*			*"*					
p-Terphenyl-d14 (Surr)			*60 %*	*54-127 %*			*"*					
2-Fluorophenol (Surr)			*85 %*	*35-115 %*			*"*					
2,4,6-Tribromophenol (Surr)			*99 %*	*39-132 %*			*"*					
Matrix Spike Dup (9100490-MSD1)			Prepared: 10/01/19 10:34 Analyzed: 10/02/19 15:27									
QC Source Sample: Non-SDG (A9I0822-02RE1)												
Acenaphthene	1.28	0.0306	0.0614	mg/kg dry	10	1.23	0.135	94	40-122%	4	30%	
Acenaphthylene	1.32	0.0306	0.0614	mg/kg dry	10	1.23	ND	107	32-132%	2	30%	
Anthracene	1.36	0.0306	0.0614	mg/kg dry	10	1.23	0.204	94	47-123%	2	30%	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: Seaport Tidelands	
2001 NW 19th Ave, STE 200	Project Number: 1044.02.06-02	Report ID:
Portland, OR 97209	Project Manager: Emily Hess	A9J0006 - 01 09 20 1630

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike Dup (9100490-MSD1)			Prepared: 10/01/19 10:34 Analyzed: 10/02/19 15:27									
QC Source Sample: Non-SDG (A9I0822-02RE1)												
Benz(a)anthracene	1.30	0.0306	0.0614	mg/kg dry	10	1.23	0.218	89	49-126%	3	30%	
Benzo(a)pyrene	1.38	0.0460	0.0920	mg/kg dry	10	1.23	0.154	100	45-129%	5	30%	
Benzo(b)fluoranthene	1.32	0.0460	0.0920	mg/kg dry	10	1.23	0.180	93	45-132%	3	30%	
Benzo(k)fluoranthene	1.26	0.0460	0.0920	mg/kg dry	10	1.23	0.0758	97	47-132%	6	30%	
Benzo(g,h,i)perylene	1.40	0.0306	0.0614	mg/kg dry	10	1.23	0.0680	108	43-134%	6	30%	
Chrysene	1.33	0.0306	0.0614	mg/kg dry	10	1.23	0.199	92	50-124%	4	30%	
Dibenz(a,h)anthracene	1.26	0.0306	0.0614	mg/kg dry	10	1.23	ND	103	45-134%	3	30%	
Fluoranthene	1.59	0.0306	0.0614	mg/kg dry	10	1.23	1.15	**35**	**50-127%**	0.2	30%	Q-01
Fluorene	1.34	0.0306	0.0614	mg/kg dry	10	1.23	0.136	98	43-125%	3	30%	
Indeno(1,2,3-cd)pyrene	1.21	0.0306	0.0614	mg/kg dry	10	1.23	0.0695	93	45-133%	6	30%	
1-Methylnaphthalene	1.24	0.0614	0.123	mg/kg dry	10	1.23	0.0767	95	40-120%	0.9	30%	
2-Methylnaphthalene	1.28	0.0614	0.123	mg/kg dry	10	1.23	0.149	93	38-122%	0.5	30%	
Naphthalene	1.38	0.0614	0.123	mg/kg dry	10	1.23	0.491	73	35-123%	1	30%	
Phenanthrene	1.39	0.0306	0.0614	mg/kg dry	10	1.23	0.491	73	50-121%	3	30%	
Pyrene	1.55	0.0306	0.0614	mg/kg dry	10	1.23	0.823	59	47-127%	3	30%	
Carbazole	1.25	0.0460	0.0920	mg/kg dry	10	1.23	0.0536	98	50-122%	2	30%	
Dibenzofuran	1.29	0.0306	0.0614	mg/kg dry	10	1.23	0.145	94	44-120%	2	30%	
4-Chloro-3-methylphenol	1.29	0.306	0.614	mg/kg dry	10	1.23	ND	105	45-122%	3	30%	
2-Chlorophenol	1.12	0.153	0.306	mg/kg dry	10	1.23	ND	92	34-121%	5	30%	
2,4-Dichlorophenol	1.30	0.153	0.306	mg/kg dry	10	1.23	ND	106	40-122%	0.5	30%	
2,4-Dimethylphenol	1.49	0.153	0.306	mg/kg dry	10	1.23	ND	121	30-127%	0.3	30%	
2,4-Dinitrophenol	ND	0.766	1.53	mg/kg dry	10	1.23	ND		**5-137%**		30%	Q-11, Q-41
4,6-Dinitro-2-methylphenol	0.870	0.766	1.53	mg/kg dry	10	1.23	ND	71	29-132%	6	30%	Q-41, Ja
2-Methylphenol	1.24	0.0766	0.153	mg/kg dry	10	1.23	ND	101	32-122%	3	30%	
3+4-Methylphenol(s)	2.84	0.0766	0.153	mg/kg dry	10	1.23	1.60	101	34-120%	1	30%	
2-Nitrophenol	1.46	0.306	0.614	mg/kg dry	10	1.23	ND	119	36-123%	3	30%	
4-Nitrophenol	1.31	0.306	0.614	mg/kg dry	10	1.23	ND	107	30-132%	0.7	30%	
Pentachlorophenol (PCP)	1.50	0.306	0.614	mg/kg dry	10	1.23	ND	123	25-133%	1	30%	
Phenol	1.25	0.0614	0.123	mg/kg dry	10	1.23	0.571	56	34-120%	3	30%	
2,3,4,6-Tetrachlorophenol	1.31	0.153	0.306	mg/kg dry	10	1.23	ND	107	44-125%	1	30%	
2,3,5,6-Tetrachlorophenol	1.39	0.153	0.306	mg/kg dry	10	1.23	ND	113	40-120%	2	30%	
2,4,5-Trichlorophenol	1.37	0.153	0.306	mg/kg dry	10	1.23	ND	112	41-124%	0.3	30%	
2,4,6-Trichlorophenol	1.39	0.153	0.306	mg/kg dry	10	1.23	ND	113	39-126%	1	30%	

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Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike Dup (9100490-MSD1)			Prepared: 10/01/19 10:34 Analyzed: 10/02/19 15:27									
QC Source Sample: Non-SDG (A9I0822-02RE1)												
Bis(2-ethylhexyl)phthalate	1.59	0.460	0.920	mg/kg dry	10	1.23	ND	130	51-133%	1	30%	
Butyl benzyl phthalate	1.58	0.153	0.306	mg/kg dry	10	1.23	ND	129	48-132%	8	30%	
Diethylphthalate	1.35	0.153	0.306	mg/kg dry	10	1.23	ND	110	50-124%	1	30%	
Dimethylphthalate	1.31	0.153	0.306	mg/kg dry	10	1.23	ND	107	48-124%	2	30%	
Di-n-butylphthalate	1.42	0.153	0.306	mg/kg dry	10	1.23	0.213	98	51-128%	0.9	30%	
Di-n-octyl phthalate	1.81	0.246	0.306	mg/kg dry	10	1.23	ND	**148**	**44-140%**	4	30%	Q-01
N-Nitrosodimethylamine	0.752	0.0766	0.153	mg/kg dry	10	1.23	ND	61	23-120%	5	30%	
N-Nitroso-di-n-propylamine	1.06	0.0766	0.153	mg/kg dry	10	1.23	ND	86	36-120%	4	30%	
N-Nitrosodiphenylamine	1.25	0.0766	0.153	mg/kg dry	10	1.23	ND	102	38-127%	0.8	30%	
Bis(2-Chloroethoxy) methane	1.15	0.0766	0.153	mg/kg dry	10	1.23	ND	94	36-121%	0.8	30%	
Bis(2-Chloroethyl) ether	0.886	0.0766	0.153	mg/kg dry	10	1.23	ND	72	31-120%	4	30%	
2,2'-Oxybis(1-Chloropropane)	0.915	0.0766	0.153	mg/kg dry	10	1.23	ND	75	33-131%	1	30%	
Hexachlorobenzene	1.27	0.0306	0.0614	mg/kg dry	10	1.23	ND	103	44-122%	2	30%	
Hexachlorobutadiene	1.19	0.0766	0.153	mg/kg dry	10	1.23	ND	97	32-123%	0.03	30%	
Hexachlorocyclopentadiene	0.373	0.153	0.306	mg/kg dry	10	1.23	ND	30	5-140%	**200**	**30%**	Q-01, Q-41
Hexachloroethane	1.05	0.0766	0.153	mg/kg dry	10	1.23	ND	86	28-120%	2	30%	
2-Chloronaphthalene	1.25	0.0306	0.0614	mg/kg dry	10	1.23	ND	102	41-120%	0.1	30%	
1,2-Dichlorobenzene	1.04	0.0766	0.153	mg/kg dry	10	1.23	ND	85	33-120%	5	30%	
1,3-Dichlorobenzene	1.04	0.0766	0.153	mg/kg dry	10	1.23	ND	85	30-120%	2	30%	
1,4-Dichlorobenzene	1.03	0.0766	0.153	mg/kg dry	10	1.23	ND	84	31-120%	5	30%	
1,2,4-Trichlorobenzene	1.15	0.0766	0.153	mg/kg dry	10	1.23	ND	94	34-120%	1	30%	
4-Bromophenyl phenyl ether	1.28	0.0766	0.153	mg/kg dry	10	1.23	ND	105	46-124%	2	30%	
4-Chlorophenyl phenyl ether	1.25	0.0766	0.153	mg/kg dry	10	1.23	ND	102	45-121%	2	30%	
Aniline	0.813	0.690	0.690	mg/kg dry	10	1.23	ND	66	7-120%	25	30%	Q-31
4-Chloroaniline	0.377	0.0766	0.153	mg/kg dry	10	1.23	ND	31	16-120%	15	30%	Q-31
2-Nitroaniline	1.50	0.614	1.23	mg/kg dry	10	1.23	ND	123	44-127%	3	30%	
3-Nitroaniline	0.655	0.614	1.23	mg/kg dry	10	1.23	ND	53	33-120%	**200**	**30%**	Q-01, Ja
4-Nitroaniline	1.27	0.614	1.23	mg/kg dry	10	1.23	ND	104	35-120%	3	30%	Q-41
Nitrobenzene	1.04	0.306	0.614	mg/kg dry	10	1.23	ND	85	34-122%	6	30%	
2,4-Dinitrotoluene	1.26	0.306	0.614	mg/kg dry	10	1.23	ND	103	48-126%	2	30%	
2,6-Dinitrotoluene	1.32	0.306	0.614	mg/kg dry	10	1.23	ND	107	46-124%	4	30%	
Benzoic acid	ND	3.84	7.66	mg/kg dry	10	2.45	ND		**5-140%**		30%	Q-11, Q-41
Benzyl alcohol	1.17	0.153	0.306	mg/kg dry	10	1.23	ND	95	29-122%	4	30%	

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Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike Dup (9100490-MSD1)			Prepared: 10/01/19 10:34 Analyzed: 10/02/19 15:27									
QC Source Sample: Non-SDG (A9I0822-02RE1)												
Isophorone	1.13	0.0766	0.153	mg/kg dry	10	1.23	ND	93	30-122%	0.8	30%	
Azobenzene (1,2-DPH)	1.17	0.0766	0.153	mg/kg dry	10	1.23	ND	96	39-125%	2	30%	
Bis(2-Ethylhexyl) adipate	5.77	0.766	1.53	mg/kg dry	10	1.23	2.18	**293**	**60-121%**	**85**	**30%**	Q-03
3,3'-Dichlorobenzidine	0.738	0.614	1.23	mg/kg dry	10	2.45	ND	30	22-121%	**200**	**30%**	Q-01, Q-31, Ja
1,2-Dinitrobenzene	1.03	0.766	1.53	mg/kg dry	10	1.23	ND	84	44-120%	0.1	30%	Ja
1,3-Dinitrobenzene	1.33	0.766	1.53	mg/kg dry	10	1.23	ND	108	42-127%	5	30%	Ja
1,4-Dinitrobenzene	1.09	0.766	1.53	mg/kg dry	10	1.23	ND	89	37-132%	11	30%	Ja
Pyridine	0.588	0.153	0.306	mg/kg dry	10	1.23	ND	48	5-120%	4	30%	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 82 %*		*Limits: 37-122 %*		*Dilution: 10x*					
2-Fluorobiphenyl (Surr)			*85 %*		*44-115 %*		*"*					
Phenol-d6 (Surr)			*87 %*		*33-122 %*		*"*					
p-Terphenyl-d14 (Surr)			*95 %*		*54-127 %*		*"*					
2-Fluorophenol (Surr)			*84 %*		*35-115 %*		*"*					
2,4,6-Tribromophenol (Surr)			*113 %*		*39-132 %*		*"*					
Matrix Spike Dup (9100490-MSD2)			Prepared: 10/01/19 10:35 Analyzed: 10/02/19 13:04									
QC Source Sample: Non-SDG (A9I0893-13RE1)												
Acenaphthene	1.41	0.0676	0.136	mg/kg dry	20	1.35	ND	104	40-122%	1	30%	
Acenaphthylene	1.46	0.0676	0.136	mg/kg dry	20	1.35	ND	107	32-132%	0.3	30%	
Anthracene	1.49	0.0676	0.136	mg/kg dry	20	1.35	ND	110	47-123%	0.1	30%	
Benz(a)anthracene	1.46	0.0676	0.136	mg/kg dry	20	1.35	ND	107	49-126%	2	30%	
Benzo(a)pyrene	1.64	0.102	0.203	mg/kg dry	20	1.35	0.167	109	45-129%	2	30%	
Benzo(b)fluoranthene	1.54	0.102	0.203	mg/kg dry	20	1.35	0.121	105	45-132%	4	30%	
Benzo(k)fluoranthene	1.43	0.102	0.203	mg/kg dry	20	1.35	ND	105	47-132%	2	30%	
Benzo(g,h,i)perylene	1.58	0.0676	0.136	mg/kg dry	20	1.35	0.0734	111	43-134%	3	30%	
Chrysene	1.50	0.0676	0.136	mg/kg dry	20	1.35	ND	111	50-124%	5	30%	
Dibenz(a,h)anthracene	1.48	0.0676	0.136	mg/kg dry	20	1.35	ND	109	45-134%	9	30%	
Fluoranthene	1.56	0.0676	0.136	mg/kg dry	20	1.35	0.0761	110	50-127%	2	30%	
Fluorene	1.43	0.0676	0.136	mg/kg dry	20	1.35	ND	106	43-125%	2	30%	
Indeno(1,2,3-cd)pyrene	1.37	0.0676	0.136	mg/kg dry	20	1.35	ND	101	45-133%	0.1	30%	
1-Methylnaphthalene	1.39	0.136	0.271	mg/kg dry	20	1.35	ND	103	40-120%	1	30%	
2-Methylnaphthalene	1.40	0.136	0.271	mg/kg dry	20	1.35	ND	103	38-122%	1	30%	

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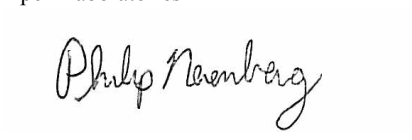

Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike Dup (9100490-MSD2)			Prepared: 10/01/19 10:35 Analyzed: 10/02/19 13:04									
QC Source Sample: Non-SDG (A9I0893-13RE1)												
Naphthalene	1.46	0.136	0.271	mg/kg dry	20	1.35	ND	108	35-123%	3	30%	
Phenanthrene	1.49	0.0676	0.136	mg/kg dry	20	1.35	ND	110	50-121%	2	30%	
Pyrene	1.63	0.0676	0.136	mg/kg dry	20	1.35	0.152	109	47-127%	1	30%	
Carbazole	1.40	0.102	0.203	mg/kg dry	20	1.35	ND	104	50-122%	3	30%	
Dibenzofuran	1.38	0.0676	0.136	mg/kg dry	20	1.35	ND	102	44-120%	3	30%	
4-Chloro-3-methylphenol	1.41	0.676	1.36	mg/kg dry	20	1.35	ND	104	45-122%	3	30%	
2-Chlorophenol	1.32	0.339	0.676	mg/kg dry	20	1.35	ND	98	34-121%	8	30%	
2,4-Dichlorophenol	1.47	0.339	0.676	mg/kg dry	20	1.35	ND	109	40-122%	1	30%	
2,4-Dimethylphenol	1.58	0.339	0.676	mg/kg dry	20	1.35	ND	117	30-127%	3	30%	
2,4-Dinitrophenol	ND	1.69	3.39	mg/kg dry	20	1.35	ND		**5-137%**		30%	Q-11, Q-41
4,6-Dinitro-2-methylphenol	1.80	1.69	3.39	mg/kg dry	20	1.35	ND	**133**	**29-132%**	0.8	30%	Q-11, Q-41, Ja
2-Methylphenol	1.39	0.169	0.339	mg/kg dry	20	1.35	ND	103	32-122%	1	30%	
3+4-Methylphenol(s)	2.11	0.169	0.339	mg/kg dry	20	1.35	0.309	**133**	**34-120%**	21	30%	Q-01
2-Nitrophenol	1.70	0.676	1.36	mg/kg dry	20	1.35	ND	**126**	**36-123%**	9	30%	Q-11
4-Nitrophenol	1.64	0.676	1.36	mg/kg dry	20	1.35	ND	121	30-132%	4	30%	
Pentachlorophenol (PCP)	1.85	0.676	1.36	mg/kg dry	20	1.35	ND	**137**	**25-133%**	9	30%	Q-01
Phenol	1.43	0.136	0.271	mg/kg dry	20	1.35	ND	106	34-120%	12	30%	
2,3,4,6-Tetrachlorophenol	1.53	0.339	0.676	mg/kg dry	20	1.35	ND	113	44-125%	9	30%	
2,3,5,6-Tetrachlorophenol	1.59	0.339	0.676	mg/kg dry	20	1.35	ND	117	40-120%	1	30%	
2,4,5-Trichlorophenol	1.60	0.339	0.676	mg/kg dry	20	1.35	ND	118	41-124%	2	30%	
2,4,6-Trichlorophenol	1.63	0.339	0.676	mg/kg dry	20	1.35	ND	120	39-126%	4	30%	
Bis(2-ethylhexyl)phthalate	1.74	1.02	2.03	mg/kg dry	20	1.35	ND	128	51-133%	11	30%	Ja
Butyl benzyl phthalate	1.83	0.339	0.676	mg/kg dry	20	1.35	ND	**135**	**48-132%**	7	30%	Q-01
Diethylphthalate	1.48	0.339	0.676	mg/kg dry	20	1.35	ND	109	50-124%	0.8	30%	
Dimethylphthalate	1.44	0.339	0.676	mg/kg dry	20	1.35	ND	106	48-124%	0.7	30%	
Di-n-butylphthalate	1.60	0.339	0.676	mg/kg dry	20	1.35	ND	118	51-128%	3	30%	
Di-n-octyl phthalate	2.15	0.543	0.676	mg/kg dry	20	1.35	ND	**158**	**44-140%**	6	30%	Q-01
N-Nitrosodimethylamine	0.856	0.169	0.339	mg/kg dry	20	1.35	ND	63	23-120%	0.6	30%	
N-Nitroso-di-n-propylamine	1.23	0.169	0.339	mg/kg dry	20	1.35	ND	91	36-120%	4	30%	
N-Nitrosodiphenylamine	1.50	0.169	0.339	mg/kg dry	20	1.35	ND	111	38-127%	0.8	30%	
Bis(2-Chloroethoxy) methane	1.32	0.169	0.339	mg/kg dry	20	1.35	ND	97	36-121%	0.7	30%	
Bis(2-Chloroethyl) ether	1.01	0.169	0.339	mg/kg dry	20	1.35	ND	75	31-120%	1	30%	
2,2'-Oxybis(1-Chloropropane)	1.10	0.169	0.339	mg/kg dry	20	1.35	ND	81	33-131%	5	30%	

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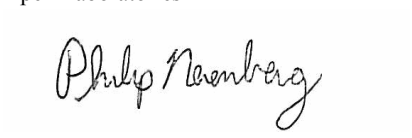

Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546							**Sediment**					
Matrix Spike Dup (9100490-MSD2)			Prepared: 10/01/19 10:35 Analyzed: 10/02/19 13:04									
QC Source Sample: Non-SDG (A9I0893-13RE1)												
Hexachlorobenzene	1.47	0.0676	0.136	mg/kg dry	20	1.35	ND	108	44-122%	6	30%	
Hexachlorobutadiene	1.39	0.169	0.339	mg/kg dry	20	1.35	ND	103	32-123%	8	30%	
Hexachlorocyclopentadiene	ND	0.339	0.676	mg/kg dry	20	1.35	ND		**5-140%**	**200**	**30%**	Q-11, Q-41
Hexachloroethane	1.17	0.169	0.339	mg/kg dry	20	1.35	ND	86	28-120%	3	30%	
2-Chloronaphthalene	1.45	0.0676	0.136	mg/kg dry	20	1.35	ND	107	41-120%	0.8	30%	
1,2-Dichlorobenzene	1.25	0.169	0.339	mg/kg dry	20	1.35	ND	92	33-120%	4	30%	
1,3-Dichlorobenzene	1.25	0.169	0.339	mg/kg dry	20	1.35	ND	92	30-120%	3	30%	
1,4-Dichlorobenzene	1.22	0.169	0.339	mg/kg dry	20	1.35	ND	90	31-120%	5	30%	
1,2,4-Trichlorobenzene	1.35	0.169	0.339	mg/kg dry	20	1.35	ND	100	34-120%	3	30%	
4-Bromophenyl phenyl ether	1.46	0.169	0.339	mg/kg dry	20	1.35	ND	108	46-124%	0.5	30%	
4-Chlorophenyl phenyl ether	1.42	0.169	0.339	mg/kg dry	20	1.35	ND	105	45-121%	4	30%	
Aniline	0.801	0.339	0.676	mg/kg dry	20	1.35	ND	59	7-120%	4	30%	Q-31
4-Chloroaniline	0.583	0.169	0.339	mg/kg dry	20	1.35	ND	43	16-120%	14	30%	Q-31
2-Nitroaniline	1.68	1.36	2.71	mg/kg dry	20	1.35	ND	124	44-127%	5	30%	Ja
3-Nitroaniline	ND	1.36	2.71	mg/kg dry	20	1.35	ND		**33-120%**		30%	Q-11
4-Nitroaniline	1.44	1.36	2.71	mg/kg dry	20	1.35	ND	107	35-120%	**200**	**30%**	Q-11, Q-41, Ja
Nitrobenzene	1.23	0.676	1.36	mg/kg dry	20	1.35	ND	91	34-122%	4	30%	Ja
2,4-Dinitrotoluene	1.49	0.676	1.36	mg/kg dry	20	1.35	ND	110	48-126%	3	30%	
2,6-Dinitrotoluene	1.47	0.676	1.36	mg/kg dry	20	1.35	ND	109	46-124%	3	30%	
Benzoic acid	ND	8.48	16.9	mg/kg dry	20	2.71	ND		**5-140%**		30%	Q-11, Q-41
Benzyl alcohol	1.24	0.339	0.676	mg/kg dry	20	1.35	ND	91	29-122%	11	30%	
Isophorone	1.32	0.169	0.339	mg/kg dry	20	1.35	ND	97	30-122%	9	30%	
Azobenzene (1,2-DPH)	1.31	0.169	0.339	mg/kg dry	20	1.35	ND	97	39-125%	1	30%	
Bis(2-Ethylhexyl) adipate	2.25	1.69	3.39	mg/kg dry	20	1.35	ND	**166**	**60-121%**	4	30%	Q-11, Ja
3,3'-Dichlorobenzidine	ND	1.36	2.71	mg/kg dry	20	2.71	ND		**22-121%**	**200**	**30%**	Q-01, Q-31
1,2-Dinitrobenzene	ND	1.69	3.39	mg/kg dry	20	1.35	ND		**44-120%**		30%	Q-11
1,3-Dinitrobenzene	ND	1.69	3.39	mg/kg dry	20	1.35	ND		**42-127%**		30%	Q-11
1,4-Dinitrobenzene	ND	1.69	3.39	mg/kg dry	20	1.35	ND		**37-132%**		30%	Q-11
Pyridine	0.598	0.339	0.676	mg/kg dry	20	1.35	ND	44	5-120%	17	30%	Ja
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 82 %*		*Limits: 37-122 %*			*Dilution: 20x*				
2-Fluorobiphenyl (Surr)			*66 %*		*44-115 %*			*"*				
Phenol-d6 (Surr)			*84 %*		*33-122 %*			*"*				

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Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100490 - EPA 3546												**Sediment**
Matrix Spike Dup (9100490-MSD2)				Prepared: 10/01/19 10:35 Analyzed: 10/02/19 13:04								
QC Source Sample: Non-SDG (A9I0893-13RE1)												
Surr: p-Terphenyl-d14 (Surr)			*Recovery: 70 %*	*Limits: 54-127 %*	*Dilution: 20x*							
2-Fluorophenol (Surr)			*84 %*	*35-115 %*	*"*							
2,4,6-Tribromophenol (Surr)			*107 %*	*39-132 %*	*"*							

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100740 - EPA 3546							**Sediment**					
Blank (9100740-BLK1)			Prepared: 10/07/19 11:27 Analyzed: 10/07/19 16:55									
EPA 8270D												
Acenaphthene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Acenaphthylene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Anthracene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Benz(a)anthracene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Benzo(a)pyrene	ND	0.00188	0.00375	mg/kg wet	1	---	---	---	---	---	---	
Benzo(b)fluoranthene	ND	0.00188	0.00375	mg/kg wet	1	---	---	---	---	---	---	
Benzo(k)fluoranthene	ND	0.00188	0.00375	mg/kg wet	1	---	---	---	---	---	---	
Benzo(g,h,i)perylene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Chrysene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Dibenz(a,h)anthracene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Fluoranthene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Fluorene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Indeno(1,2,3-cd)pyrene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
1-Methylnaphthalene	ND	0.00250	0.00500	mg/kg wet	1	---	---	---	---	---	---	
2-Methylnaphthalene	ND	0.00250	0.00500	mg/kg wet	1	---	---	---	---	---	---	
Naphthalene	ND	0.00250	0.00500	mg/kg wet	1	---	---	---	---	---	---	
Phenanthrene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Pyrene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Carbazole	ND	0.00188	0.00375	mg/kg wet	1	---	---	---	---	---	---	
Dibenzofuran	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
4-Chloro-3-methylphenol	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	
2-Chlorophenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
2,4-Dichlorophenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
2,4-Dimethylphenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
2,4-Dinitrophenol	ND	0.0312	0.0625	mg/kg wet	1	---	---	---	---	---	---	
4,6-Dinitro-2-methylphenol	ND	0.0312	0.0625	mg/kg wet	1	---	---	---	---	---	---	
2-Methylphenol	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
3+4-Methylphenol(s)	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
2-Nitrophenol	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	
4-Nitrophenol	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	
Pentachlorophenol (PCP)	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	
Phenol	ND	0.00250	0.00500	mg/kg wet	1	---	---	---	---	---	---	
2,3,4,6-Tetrachlorophenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	

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Philip Nerenberg, Lab Director

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100740 - EPA 3546							**Sediment**					
Blank (9100740-BLK1)			Prepared: 10/07/19 11:27 Analyzed: 10/07/19 16:55									
2,3,5,6-Tetrachlorophenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
2,4,5-Trichlorophenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
2,4,6-Trichlorophenol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Bis(2-ethylhexyl)phthalate	ND	0.0188	0.0375	mg/kg wet	1	---	---	---	---	---	---	
Butyl benzyl phthalate	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Diethylphthalate	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Dimethylphthalate	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Di-n-butylphthalate	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Di-n-octyl phthalate	ND	0.0100	0.0125	mg/kg wet	1	---	---	---	---	---	---	
N-Nitrosodimethylamine	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
N-Nitroso-di-n-propylamine	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
N-Nitrosodiphenylamine	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Bis(2-Chloroethoxy) methane	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Bis(2-Chloroethyl) ether	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
2,2'-Oxybis(1-Chloropropane)	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Hexachlorobenzene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Hexachlorocyclopentadiene	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Hexachloroethane	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
2-Chloronaphthalene	ND	0.00125	0.00250	mg/kg wet	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
4-Bromophenyl phenyl ether	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
4-Chlorophenyl phenyl ether	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Aniline	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
4-Chloroaniline	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
2-Nitroaniline	ND	0.0250	0.0500	mg/kg wet	1	---	---	---	---	---	---	
3-Nitroaniline	ND	0.0250	0.0500	mg/kg wet	1	---	---	---	---	---	---	
4-Nitroaniline	ND	0.0250	0.0500	mg/kg wet	1	---	---	---	---	---	---	
Nitrobenzene	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	
2,4-Dinitrotoluene	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	
2,6-Dinitrotoluene	ND	0.0125	0.0250	mg/kg wet	1	---	---	---	---	---	---	

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Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100740 - EPA 3546							**Sediment**					
Blank (9100740-BLK1)			Prepared: 10/07/19 11:27 Analyzed: 10/07/19 16:55									
Benzoic acid	ND	0.157	0.312	mg/kg wet	1	---	---	---	---	---	---	
Benzyl alcohol	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Isophorone	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Azobenzene (1,2-DPH)	ND	0.00312	0.00625	mg/kg wet	1	---	---	---	---	---	---	
Bis(2-Ethylhexyl) adipate	ND	0.0312	0.0625	mg/kg wet	1	---	---	---	---	---	---	
3,3'-Dichlorobenzidine	ND	0.0250	0.0500	mg/kg wet	1	---	---	---	---	---	---	Q-52
1,2-Dinitrobenzene	ND	0.0312	0.0625	mg/kg wet	1	---	---	---	---	---	---	
1,3-Dinitrobenzene	ND	0.0312	0.0625	mg/kg wet	1	---	---	---	---	---	---	
1,4-Dinitrobenzene	ND	0.0312	0.0625	mg/kg wet	1	---	---	---	---	---	---	
Pyridine	ND	0.00625	0.0125	mg/kg wet	1	---	---	---	---	---	---	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 77 %*			*Limits: 37-122 %*			*Dilution: 1x*			
2-Fluorobiphenyl (Surr)			*81 %*			*44-115 %*			*"*			
Phenol-d6 (Surr)			*75 %*			*33-122 %*			*"*			
p-Terphenyl-d14 (Surr)			*95 %*			*54-127 %*			*"*			
2-Fluorophenol (Surr)			*71 %*			*35-115 %*			*"*			
2,4,6-Tribromophenol (Surr)			*90 %*			*39-132 %*			*"*			
LCS (9100740-BS1)			Prepared: 10/07/19 11:27 Analyzed: 10/07/19 17:29									
EPA 8270D												
Acenaphthene	0.507	0.00532	0.0107	mg/kg wet	4	0.533	---	95	40-122%	---	---	
Acenaphthylene	0.522	0.00532	0.0107	mg/kg wet	4	0.533	---	98	32-132%	---	---	
Anthracene	0.531	0.00532	0.0107	mg/kg wet	4	0.533	---	100	47-123%	---	---	
Benz(a)anthracene	0.510	0.00532	0.0107	mg/kg wet	4	0.533	---	96	49-126%	---	---	
Benzo(a)pyrene	0.514	0.00800	0.0160	mg/kg wet	4	0.533	---	96	45-129%	---	---	
Benzo(b)fluoranthene	0.523	0.00800	0.0160	mg/kg wet	4	0.533	---	98	45-132%	---	---	
Benzo(k)fluoranthene	0.537	0.00800	0.0160	mg/kg wet	4	0.533	---	101	47-132%	---	---	
Benzo(g,h,i)perylene	0.517	0.00532	0.0107	mg/kg wet	4	0.533	---	97	43-134%	---	---	
Chrysene	0.509	0.00532	0.0107	mg/kg wet	4	0.533	---	95	50-124%	---	---	
Dibenz(a,h)anthracene	0.511	0.00532	0.0107	mg/kg wet	4	0.533	---	96	45-134%	---	---	
Fluoranthene	0.556	0.00532	0.0107	mg/kg wet	4	0.533	---	104	50-127%	---	---	
Fluorene	0.507	0.00532	0.0107	mg/kg wet	4	0.533	---	95	43-125%	---	---	
Indeno(1,2,3-cd)pyrene	0.481	0.00532	0.0107	mg/kg wet	4	0.533	---	90	45-133%	---	---	
1-Methylnaphthalene	0.486	0.0107	0.0213	mg/kg wet	4	0.533	---	91	40-120%	---	---	
2-Methylnaphthalene	0.494	0.0107	0.0213	mg/kg wet	4	0.533	---	93	38-122%	---	---	

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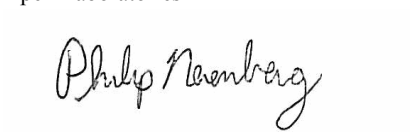

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
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QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100740 - EPA 3546							**Sediment**					
LCS (9100740-BS1)			Prepared: 10/07/19 11:27		Analyzed: 10/07/19 17:29							
Naphthalene	0.494	0.0107	0.0213	mg/kg wet	4	0.533	---	93	35-123%	---	---	
Phenanthrene	0.520	0.00532	0.0107	mg/kg wet	4	0.533	---	98	50-121%	---	---	
Pyrene	0.560	0.00532	0.0107	mg/kg wet	4	0.533	---	105	47-127%	---	---	
Carbazole	0.594	0.00800	0.0160	mg/kg wet	4	0.533	---	111	50-122%	---	---	
Dibenzofuran	0.509	0.00532	0.0107	mg/kg wet	4	0.533	---	95	44-120%	---	---	
4-Chloro-3-methylphenol	0.516	0.0532	0.107	mg/kg wet	4	0.533	---	97	45-122%	---	---	
2-Chlorophenol	0.494	0.0267	0.0532	mg/kg wet	4	0.533	---	93	34-121%	---	---	
2,4-Dichlorophenol	0.527	0.0267	0.0532	mg/kg wet	4	0.533	---	99	40-122%	---	---	
2,4-Dimethylphenol	0.523	0.0267	0.0532	mg/kg wet	4	0.533	---	98	30-127%	---	---	
2,4-Dinitrophenol	0.452	0.133	0.267	mg/kg wet	4	0.533	---	85	5-137%	---	---	
4,6-Dinitro-2-methylphenol	0.567	0.133	0.267	mg/kg wet	4	0.533	---	106	29-132%	---	---	
2-Methylphenol	0.511	0.0133	0.0267	mg/kg wet	4	0.533	---	96	32-122%	---	---	
3+4-Methylphenol(s)	0.495	0.0133	0.0267	mg/kg wet	4	0.533	---	93	34-120%	---	---	
2-Nitrophenol	0.468	0.0532	0.107	mg/kg wet	4	0.533	---	88	36-123%	---	---	
4-Nitrophenol	0.436	0.0532	0.107	mg/kg wet	4	0.533	---	82	30-132%	---	---	
Pentachlorophenol (PCP)	0.434	0.0532	0.107	mg/kg wet	4	0.533	---	81	25-133%	---	---	
Phenol	0.502	0.0107	0.0213	mg/kg wet	4	0.533	---	94	34-120%	---	---	
2,3,4,6-Tetrachlorophenol	0.502	0.0267	0.0532	mg/kg wet	4	0.533	---	94	44-125%	---	---	
2,3,5,6-Tetrachlorophenol	0.488	0.0267	0.0532	mg/kg wet	4	0.533	---	92	40-120%	---	---	
2,4,5-Trichlorophenol	0.515	0.0267	0.0532	mg/kg wet	4	0.533	---	97	41-124%	---	---	
2,4,6-Trichlorophenol	0.506	0.0267	0.0532	mg/kg wet	4	0.533	---	95	39-126%	---	---	
Bis(2-ethylhexyl)phthalate	0.503	0.0800	0.160	mg/kg wet	4	0.533	---	94	51-133%	---	---	
Butyl benzyl phthalate	0.482	0.0267	0.0532	mg/kg wet	4	0.533	---	90	48-132%	---	---	
Diethylphthalate	0.505	0.0267	0.0532	mg/kg wet	4	0.533	---	95	50-124%	---	---	
Dimethylphthalate	0.504	0.0267	0.0532	mg/kg wet	4	0.533	---	95	48-124%	---	---	
Di-n-butylphthalate	0.537	0.0267	0.0532	mg/kg wet	4	0.533	---	101	51-128%	---	---	
Di-n-octyl phthalate	0.479	0.0428	0.0532	mg/kg wet	4	0.533	---	90	44-140%	---	---	
N-Nitrosodimethylamine	0.426	0.0133	0.0267	mg/kg wet	4	0.533	---	80	23-120%	---	---	
N-Nitroso-di-n-propylamine	0.484	0.0133	0.0267	mg/kg wet	4	0.533	---	91	36-120%	---	---	
N-Nitrosodiphenylamine	0.516	0.0133	0.0267	mg/kg wet	4	0.533	---	97	38-127%	---	---	
Bis(2-Chloroethoxy) methane	0.479	0.0133	0.0267	mg/kg wet	4	0.533	---	90	36-121%	---	---	
Bis(2-Chloroethyl) ether	0.416	0.0133	0.0267	mg/kg wet	4	0.533	---	78	31-120%	---	---	
2,2'-Oxybis(1-Chloropropane)	0.444	0.0133	0.0267	mg/kg wet	4	0.533	---	83	33-131%	---	---	
Hexachlorobenzene	0.518	0.00532	0.0107	mg/kg wet	4	0.533	---	97	44-122%	---	---	

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Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100740 - EPA 3546							**Sediment**					
LCS (9100740-BS1)			Prepared: 10/07/19 11:27		Analyzed: 10/07/19 17:29							
Hexachlorobutadiene	0.506	0.0133	0.0267	mg/kg wet	4	0.533	---	95	32-123%	---	---	
Hexachlorocyclopentadiene	0.453	0.0267	0.0532	mg/kg wet	4	0.533	---	85	5-140%	---	---	
Hexachloroethane	0.477	0.0133	0.0267	mg/kg wet	4	0.533	---	89	28-120%	---	---	
2-Chloronaphthalene	0.530	0.00532	0.0107	mg/kg wet	4	0.533	---	99	41-120%	---	---	
1,2-Dichlorobenzene	0.466	0.0133	0.0267	mg/kg wet	4	0.533	---	87	33-120%	---	---	
1,3-Dichlorobenzene	0.471	0.0133	0.0267	mg/kg wet	4	0.533	---	88	30-120%	---	---	
1,4-Dichlorobenzene	0.470	0.0133	0.0267	mg/kg wet	4	0.533	---	88	31-120%	---	---	
1,2,4-Trichlorobenzene	0.491	0.0133	0.0267	mg/kg wet	4	0.533	---	92	34-120%	---	---	
4-Bromophenyl phenyl ether	0.511	0.0133	0.0267	mg/kg wet	4	0.533	---	96	46-124%	---	---	
4-Chlorophenyl phenyl ether	0.485	0.0133	0.0267	mg/kg wet	4	0.533	---	91	45-121%	---	---	
Aniline	0.445	0.0267	0.0532	mg/kg wet	4	0.533	---	83	7-120%	---	---	
4-Chloroaniline	0.372	0.0133	0.0267	mg/kg wet	4	0.533	---	70	16-120%	---	---	Q-31
2-Nitroaniline	0.503	0.107	0.213	mg/kg wet	4	0.533	---	94	44-127%	---	---	
3-Nitroaniline	0.416	0.107	0.213	mg/kg wet	4	0.533	---	78	33-120%	---	---	
4-Nitroaniline	0.541	0.107	0.213	mg/kg wet	4	0.533	---	101	35-120%	---	---	
Nitrobenzene	0.448	0.0532	0.107	mg/kg wet	4	0.533	---	84	34-122%	---	---	
2,4-Dinitrotoluene	0.512	0.0532	0.107	mg/kg wet	4	0.533	---	96	48-126%	---	---	
2,6-Dinitrotoluene	0.507	0.0532	0.107	mg/kg wet	4	0.533	---	95	46-124%	---	---	
Benzoic acid	0.775	0.668	0.668	mg/kg wet	4	1.07	---	73	5-140%	---	---	
Benzyl alcohol	0.484	0.0267	0.0532	mg/kg wet	4	0.533	---	91	29-122%	---	---	
Isophorone	0.473	0.0133	0.0267	mg/kg wet	4	0.533	---	89	30-122%	---	---	
Azobenzene (1,2-DPH)	0.475	0.0133	0.0267	mg/kg wet	4	0.533	---	89	39-125%	---	---	
Bis(2-Ethylhexyl) adipate	0.484	0.133	0.267	mg/kg wet	4	0.533	---	91	60-121%	---	---	
3,3'-Dichlorobenzidine	2.17	0.107	0.213	mg/kg wet	4	1.07	---	**203**	**22-121%**	---	---	Q-29, Q-31
1,2-Dinitrobenzene	0.481	0.133	0.267	mg/kg wet	4	0.533	---	90	44-120%	---	---	
1,3-Dinitrobenzene	0.504	0.133	0.267	mg/kg wet	4	0.533	---	94	42-127%	---	---	
1,4-Dinitrobenzene	0.506	0.133	0.267	mg/kg wet	4	0.533	---	95	37-132%	---	---	
Pyridine	0.363	0.0267	0.0532	mg/kg wet	4	0.533	---	68	5-120%	---	---	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 86 %*		*Limits: 37-122 %*			*Dilution: 4x*				
2-Fluorobiphenyl (Surr)			*100 %*		*44-115 %*			*"*				
Phenol-d6 (Surr)			*91 %*		*33-122 %*			*"*				
p-Terphenyl-d14 (Surr)			*100 %*		*54-127 %*			*"*				
2-Fluorophenol (Surr)			*86 %*		*35-115 %*			*"*				
2,4,6-Tribromophenol (Surr)			*111 %*		*39-132 %*			*"*				

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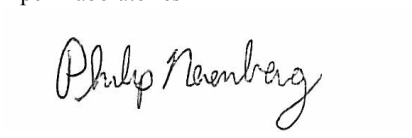

Philip Nerenberg, Lab Director

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6700 S.W. Sandburg Street
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503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100740 - EPA 3546							**Sediment**					
Duplicate (9100740-DUP1)				Prepared: 10/07/19 11:27 Analyzed: 10/07/19 18:38								
QC Source Sample: SE-27-0-0.33 (A9J0006-24RE2)												
EPA 8270D												
Acenaphthene	ND	0.0131	0.0262	mg/kg dry	4	---	ND	---	---	---	30%	
Acenaphthylene	ND	0.0131	0.0262	mg/kg dry	4	---	ND	---	---	---	30%	
Anthracene	ND	0.0131	0.0262	mg/kg dry	4	---	ND	---	---	---	30%	
Benz(a)anthracene	ND	0.0131	0.0262	mg/kg dry	4	---	0.0203	---	---	***	**30%**	Q-05
Benzo(a)pyrene	ND	0.0197	0.0393	mg/kg dry	4	---	0.0236	---	---	***	**30%**	Q-05
Benzo(b)fluoranthene	ND	0.0197	0.0393	mg/kg dry	4	---	0.0208	---	---	***	**30%**	Q-05
Benzo(k)fluoranthene	ND	0.0197	0.0393	mg/kg dry	4	---	ND	---	---	---	30%	
Benzo(g,h,i)perylene	ND	0.0131	0.0262	mg/kg dry	4	---	ND	---	---	---	30%	
Chrysene	ND	0.0131	0.0262	mg/kg dry	4	---	0.0203	---	---	***	**30%**	Q-05
Dibenz(a,h)anthracene	ND	0.0131	0.0262	mg/kg dry	4	---	ND	---	---	---	30%	
Fluoranthene	ND	0.0131	0.0262	mg/kg dry	4	---	0.0363	---	---	***	**30%**	Q-04
Fluorene	ND	0.0131	0.0262	mg/kg dry	4	---	ND	---	---	---	30%	
Indeno(1,2,3-cd)pyrene	ND	0.0131	0.0262	mg/kg dry	4	---	ND	---	---	---	30%	
1-Methylnaphthalene	ND	0.0262	0.0524	mg/kg dry	4	---	ND	---	---	---	30%	
2-Methylnaphthalene	ND	0.0262	0.0524	mg/kg dry	4	---	ND	---	---	---	30%	
Naphthalene	ND	0.0262	0.0524	mg/kg dry	4	---	ND	---	---	---	30%	
Phenanthrene	ND	0.0131	0.0262	mg/kg dry	4	---	0.0181	---	---	***	**30%**	Q-05
Pyrene	ND	0.0131	0.0262	mg/kg dry	4	---	0.0324	---	---	***	**30%**	Q-05
Carbazole	ND	0.0197	0.0393	mg/kg dry	4	---	ND	---	---	---	30%	
Dibenzofuran	ND	0.0131	0.0262	mg/kg dry	4	---	ND	---	---	---	30%	
4-Chloro-3-methylphenol	ND	0.131	0.262	mg/kg dry	4	---	ND	---	---	---	30%	
2-Chlorophenol	ND	0.0656	0.131	mg/kg dry	4	---	ND	---	---	---	30%	
2,4-Dichlorophenol	ND	0.0656	0.131	mg/kg dry	4	---	ND	---	---	---	30%	
2,4-Dimethylphenol	ND	0.0656	0.131	mg/kg dry	4	---	ND	---	---	---	30%	
2,4-Dinitrophenol	ND	0.327	0.656	mg/kg dry	4	---	ND	---	---	---	30%	
4,6-Dinitro-2-methylphenol	ND	0.327	0.656	mg/kg dry	4	---	ND	---	---	---	30%	
2-Methylphenol	ND	0.0327	0.0656	mg/kg dry	4	---	ND	---	---	---	30%	
3+4-Methylphenol(s)	ND	0.0327	0.0656	mg/kg dry	4	---	0.0427	---	---	***	**30%**	Q-05
2-Nitrophenol	ND	0.131	0.262	mg/kg dry	4	---	ND	---	---	---	30%	
4-Nitrophenol	ND	0.131	0.262	mg/kg dry	4	---	ND	---	---	---	30%	
Pentachlorophenol (PCP)	ND	0.131	0.262	mg/kg dry	4	---	ND	---	---	---	30%	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100740 - EPA 3546							**Sediment**					
Duplicate (9100740-DUP1)			Prepared: 10/07/19 11:27 Analyzed: 10/07/19 18:38									
QC Source Sample: SE-27-0-0.33 (A9J0006-24RE2)												
Phenol	ND	0.0262	0.0524	mg/kg dry	4	---	ND	---	---	---	30%	
2,3,4,6-Tetrachlorophenol	ND	0.0656	0.131	mg/kg dry	4	---	ND	---	---	---	30%	
2,3,5,6-Tetrachlorophenol	ND	0.0656	0.131	mg/kg dry	4	---	ND	---	---	---	30%	
2,4,5-Trichlorophenol	ND	0.0656	0.131	mg/kg dry	4	---	ND	---	---	---	30%	
2,4,6-Trichlorophenol	ND	0.0656	0.131	mg/kg dry	4	---	ND	---	---	---	30%	
Bis(2-ethylhexyl)phthalate	ND	0.197	0.393	mg/kg dry	4	---	ND	---	---	---	30%	
Butyl benzyl phthalate	ND	0.0656	0.131	mg/kg dry	4	---	ND	---	---	---	30%	
Diethylphthalate	ND	0.0656	0.131	mg/kg dry	4	---	ND	---	---	---	30%	
Dimethylphthalate	ND	0.0656	0.131	mg/kg dry	4	---	ND	---	---	---	30%	
Di-n-butylphthalate	ND	0.0656	0.131	mg/kg dry	4	---	ND	---	---	---	30%	
Di-n-octyl phthalate	ND	0.105	0.131	mg/kg dry	4	---	ND	---	---	---	30%	
N-Nitrosodimethylamine	ND	0.0327	0.0656	mg/kg dry	4	---	ND	---	---	---	30%	
N-Nitroso-di-n-propylamine	ND	0.0327	0.0656	mg/kg dry	4	---	ND	---	---	---	30%	
N-Nitrosodiphenylamine	ND	0.0327	0.0656	mg/kg dry	4	---	ND	---	---	---	30%	
Bis(2-Chloroethoxy) methane	ND	0.0327	0.0656	mg/kg dry	4	---	ND	---	---	---	30%	
Bis(2-Chloroethyl) ether	ND	0.0327	0.0656	mg/kg dry	4	---	ND	---	---	---	30%	
2,2'-Oxybis(1-Chloropropane)	ND	0.0327	0.0656	mg/kg dry	4	---	ND	---	---	---	30%	
Hexachlorobenzene	ND	0.0131	0.0262	mg/kg dry	4	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	0.0327	0.0656	mg/kg dry	4	---	ND	---	---	---	30%	
Hexachlorocyclopentadiene	ND	0.0656	0.131	mg/kg dry	4	---	ND	---	---	---	30%	
Hexachloroethane	ND	0.0327	0.0656	mg/kg dry	4	---	ND	---	---	---	30%	
2-Chloronaphthalene	ND	0.0131	0.0262	mg/kg dry	4	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	0.0327	0.0656	mg/kg dry	4	---	ND	---	---	---	30%	
1,3-Dichlorobenzene	ND	0.0327	0.0656	mg/kg dry	4	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	0.0327	0.0656	mg/kg dry	4	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	0.0327	0.0656	mg/kg dry	4	---	ND	---	---	---	30%	
4-Bromophenyl phenyl ether	ND	0.0327	0.0656	mg/kg dry	4	---	ND	---	---	---	30%	
4-Chlorophenyl phenyl ether	ND	0.0327	0.0656	mg/kg dry	4	---	ND	---	---	---	30%	
Aniline	ND	0.0656	0.131	mg/kg dry	4	---	ND	---	---	---	30%	
4-Chloroaniline	ND	0.0327	0.0656	mg/kg dry	4	---	ND	---	---	---	30%	
2-Nitroaniline	ND	0.262	0.524	mg/kg dry	4	---	ND	---	---	---	30%	
3-Nitroaniline	ND	0.262	0.524	mg/kg dry	4	---	ND	---	---	---	30%	
4-Nitroaniline	ND	0.262	0.524	mg/kg dry	4	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100740 - EPA 3546							**Sediment**					
Duplicate (9100740-DUP1)			Prepared: 10/07/19 11:27		Analyzed: 10/07/19 18:38							
QC Source Sample: SE-27-0-0.33 (A9J0006-24RE2)												
Nitrobenzene	ND	0.131	0.262	mg/kg dry	4	---	ND	---	---	---	30%	
2,4-Dinitrotoluene	ND	0.131	0.262	mg/kg dry	4	---	ND	---	---	---	30%	
2,6-Dinitrotoluene	ND	0.131	0.262	mg/kg dry	4	---	ND	---	---	---	30%	
Benzoic acid	ND	1.64	3.27	mg/kg dry	4	---	ND	---	---	---	30%	
Benzyl alcohol	ND	0.0656	0.131	mg/kg dry	4	---	ND	---	---	---	30%	
Isophorone	ND	0.0327	0.0656	mg/kg dry	4	---	ND	---	---	---	30%	
Azobenzene (1,2-DPH)	ND	0.0327	0.0656	mg/kg dry	4	---	ND	---	---	---	30%	
Bis(2-Ethylhexyl) adipate	ND	0.327	0.656	mg/kg dry	4	---	ND	---	---	---	30%	
3,3'-Dichlorobenzidine	ND	0.262	0.524	mg/kg dry	4	---	ND	---	---	---	30%	Q-52
1,2-Dinitrobenzene	ND	0.327	0.656	mg/kg dry	4	---	ND	---	---	---	30%	
1,3-Dinitrobenzene	ND	0.327	0.656	mg/kg dry	4	---	ND	---	---	---	30%	
1,4-Dinitrobenzene	ND	0.327	0.656	mg/kg dry	4	---	ND	---	---	---	30%	
Pyridine	ND	0.0656	0.131	mg/kg dry	4	---	ND	---	---	---	30%	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 53 %*		*Limits: 37-122 %*		*Dilution: 4x*					
2-Fluorobiphenyl (Surr)			*23 %*		*44-115 %*		*"*					S-03
Phenol-d6 (Surr)			*59 %*		*33-122 %*		*"*					
p-Terphenyl-d14 (Surr)			*34 %*		*54-127 %*		*"*					S-03
2-Fluorophenol (Surr)			*55 %*		*35-115 %*		*"*					
2,4,6-Tribromophenol (Surr)			*73 %*		*39-132 %*		*"*					
Matrix Spike (9100740-MS1)			Prepared: 10/07/19 11:27		Analyzed: 10/07/19 19:12							
QC Source Sample: SE-27-0-0.33 (A9J0006-24RE2)												
EPA 8270D												
Acenaphthene	1.17	0.0131	0.0263	mg/kg dry	4	1.32	ND	89	40-122%	---	---	
Acenaphthylene	1.19	0.0131	0.0263	mg/kg dry	4	1.32	ND	91	32-132%	---	---	
Anthracene	1.29	0.0131	0.0263	mg/kg dry	4	1.32	ND	98	47-123%	---	---	
Benz(a)anthracene	1.22	0.0131	0.0263	mg/kg dry	4	1.32	0.0203	91	49-126%	---	---	
Benzo(a)pyrene	1.27	0.0197	0.0395	mg/kg dry	4	1.32	0.0236	95	45-129%	---	---	
Benzo(b)fluoranthene	1.27	0.0197	0.0395	mg/kg dry	4	1.32	0.0208	95	45-132%	---	---	
Benzo(k)fluoranthene	1.30	0.0197	0.0395	mg/kg dry	4	1.32	ND	99	47-132%	---	---	
Benzo(g,h,i)perylene	1.28	0.0131	0.0263	mg/kg dry	4	1.32	ND	97	43-134%	---	---	
Chrysene	1.22	0.0131	0.0263	mg/kg dry	4	1.32	0.0203	91	50-124%	---	---	
Dibenz(a,h)anthracene	1.28	0.0131	0.0263	mg/kg dry	4	1.32	ND	97	45-134%	---	---	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: Seaport Tidelands	
2001 NW 19th Ave, STE 200	Project Number: 1044.02.06-02	Report ID:
Portland, OR 97209	Project Manager: Emily Hess	A9J0006 - 01 09 20 1630

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100740 - EPA 3546							**Sediment**					
Matrix Spike (9100740-MS1)			Prepared: 10/07/19 11:27		Analyzed: 10/07/19 19:12							
QC Source Sample: SE-27-0-0.33 (A9J0006-24RE2)												
Fluoranthene	1.28	0.0131	0.0263	mg/kg dry	4	1.32	0.0363	95	50-127%	---	---	
Fluorene	1.24	0.0131	0.0263	mg/kg dry	4	1.32	ND	94	43-125%	---	---	
Indeno(1,2,3-cd)pyrene	1.18	0.0131	0.0263	mg/kg dry	4	1.32	ND	90	45-133%	---	---	
1-Methylnaphthalene	1.05	0.0263	0.0526	mg/kg dry	4	1.32	ND	80	40-120%	---	---	
2-Methylnaphthalene	1.07	0.0263	0.0526	mg/kg dry	4	1.32	ND	81	38-122%	---	---	
Naphthalene	1.03	0.0263	0.0526	mg/kg dry	4	1.32	ND	78	35-123%	---	---	
Phenanthrene	1.26	0.0131	0.0263	mg/kg dry	4	1.32	0.0181	94	50-121%	---	---	
Pyrene	1.32	0.0131	0.0263	mg/kg dry	4	1.32	0.0324	98	47-127%	---	---	
Carbazole	1.48	0.0197	0.0395	mg/kg dry	4	1.32	ND	113	50-122%	---	---	
Dibenzofuran	1.19	0.0131	0.0263	mg/kg dry	4	1.32	ND	91	44-120%	---	---	
4-Chloro-3-methylphenol	1.25	0.131	0.263	mg/kg dry	4	1.32	ND	95	45-122%	---	---	
2-Chlorophenol	1.00	0.0658	0.131	mg/kg dry	4	1.32	ND	76	34-121%	---	---	
2,4-Dichlorophenol	1.18	0.0658	0.131	mg/kg dry	4	1.32	ND	90	40-122%	---	---	
2,4-Dimethylphenol	1.22	0.0658	0.131	mg/kg dry	4	1.32	ND	93	30-127%	---	---	
2,4-Dinitrophenol	ND	0.329	0.658	mg/kg dry	4	1.32	ND		**5-137%**	---	---	Q-01
4,6-Dinitro-2-methylphenol	0.609	0.329	0.329	mg/kg dry	4	1.32	ND	46	29-132%	---	---	
2-Methylphenol	1.14	0.0329	0.0658	mg/kg dry	4	1.32	ND	87	32-122%	---	---	
3+4-Methylphenol(s)	1.14	0.0329	0.0658	mg/kg dry	4	1.32	0.0427	83	34-120%	---	---	
2-Nitrophenol	0.918	0.131	0.263	mg/kg dry	4	1.32	ND	70	36-123%	---	---	
4-Nitrophenol	1.06	0.131	0.263	mg/kg dry	4	1.32	ND	81	30-132%	---	---	
Pentachlorophenol (PCP)	1.16	0.131	0.263	mg/kg dry	4	1.32	ND	88	25-133%	---	---	
Phenol	1.13	0.0263	0.0526	mg/kg dry	4	1.32	ND	86	34-120%	---	---	
2,3,4,6-Tetrachlorophenol	1.32	0.0658	0.131	mg/kg dry	4	1.32	ND	100	44-125%	---	---	
2,3,5,6-Tetrachlorophenol	1.25	0.0658	0.131	mg/kg dry	4	1.32	ND	95	40-120%	---	---	
2,4,5-Trichlorophenol	1.30	0.0658	0.131	mg/kg dry	4	1.32	ND	98	41-124%	---	---	
2,4,6-Trichlorophenol	1.27	0.0658	0.131	mg/kg dry	4	1.32	ND	96	39-126%	---	---	
Bis(2-ethylhexyl)phthalate	1.31	0.197	0.395	mg/kg dry	4	1.32	ND	100	51-133%	---	---	
Butyl benzyl phthalate	1.25	0.0658	0.131	mg/kg dry	4	1.32	ND	95	48-132%	---	---	
Diethylphthalate	1.22	0.0658	0.131	mg/kg dry	4	1.32	ND	93	50-124%	---	---	
Dimethylphthalate	1.23	0.0658	0.131	mg/kg dry	4	1.32	ND	93	48-124%	---	---	
Di-n-butylphthalate	1.32	0.0658	0.131	mg/kg dry	4	1.32	ND	101	51-128%	---	---	
Di-n-octyl phthalate	1.34	0.106	0.131	mg/kg dry	4	1.32	ND	102	44-140%	---	---	
N-Nitrosodimethylamine	0.852	0.0329	0.0658	mg/kg dry	4	1.32	ND	65	23-120%	---	---	

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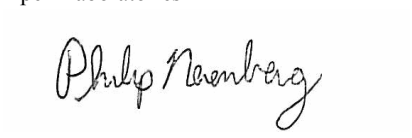

Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100740 - EPA 3546							**Sediment**					
Matrix Spike (9100740-MS1)			Prepared: 10/07/19 11:27		Analyzed: 10/07/19 19:12							
QC Source Sample: SE-27-0-0.33 (A9J0006-24RE2)												
N-Nitroso-di-n-propylamine	1.06	0.0329	0.0658	mg/kg dry	4	1.32	ND	80	36-120%	---	---	
N-Nitrosodiphenylamine	1.20	0.0329	0.0658	mg/kg dry	4	1.32	ND	91	38-127%	---	---	
Bis(2-Chloroethoxy) methane	1.02	0.0329	0.0658	mg/kg dry	4	1.32	ND	77	36-121%	---	---	
Bis(2-Chloroethyl) ether	0.855	0.0329	0.0658	mg/kg dry	4	1.32	ND	65	31-120%	---	---	
2,2'-Oxybis(1-Chloropropane)	0.893	0.0329	0.0658	mg/kg dry	4	1.32	ND	68	33-131%	---	---	
Hexachlorobenzene	1.26	0.0131	0.0263	mg/kg dry	4	1.32	ND	96	44-122%	---	---	
Hexachlorobutadiene	1.00	0.0329	0.0658	mg/kg dry	4	1.32	ND	76	32-123%	---	---	
Hexachlorocyclopentadiene	0.408	0.0658	0.131	mg/kg dry	4	1.32	ND	31	5-140%	---	---	
Hexachloroethane	0.866	0.0329	0.0658	mg/kg dry	4	1.32	ND	66	28-120%	---	---	
2-Chloronaphthalene	1.19	0.0131	0.0263	mg/kg dry	4	1.32	ND	90	41-120%	---	---	
1,2-Dichlorobenzene	0.891	0.0329	0.0658	mg/kg dry	4	1.32	ND	68	33-120%	---	---	
1,3-Dichlorobenzene	0.884	0.0329	0.0658	mg/kg dry	4	1.32	ND	67	30-120%	---	---	
1,4-Dichlorobenzene	0.911	0.0329	0.0658	mg/kg dry	4	1.32	ND	69	31-120%	---	---	
1,2,4-Trichlorobenzene	0.966	0.0329	0.0658	mg/kg dry	4	1.32	ND	73	34-120%	---	---	
4-Bromophenyl phenyl ether	1.28	0.0329	0.0658	mg/kg dry	4	1.32	ND	98	46-124%	---	---	
4-Chlorophenyl phenyl ether	1.17	0.0329	0.0658	mg/kg dry	4	1.32	ND	89	45-121%	---	---	
Aniline	1.00	0.0658	0.131	mg/kg dry	4	1.32	ND	76	7-120%	---	---	
4-Chloroaniline	0.566	0.0329	0.0658	mg/kg dry	4	1.32	ND	43	16-120%	---	---	Q-31
2-Nitroaniline	1.32	0.263	0.526	mg/kg dry	4	1.32	ND	100	44-127%	---	---	
3-Nitroaniline	0.712	0.263	0.526	mg/kg dry	4	1.32	ND	54	33-120%	---	---	
4-Nitroaniline	1.19	0.263	0.526	mg/kg dry	4	1.32	ND	91	35-120%	---	---	
Nitrobenzene	0.966	0.131	0.263	mg/kg dry	4	1.32	ND	73	34-122%	---	---	
2,4-Dinitrotoluene	1.26	0.131	0.263	mg/kg dry	4	1.32	ND	96	48-126%	---	---	
2,6-Dinitrotoluene	1.23	0.131	0.263	mg/kg dry	4	1.32	ND	93	46-124%	---	---	
Benzoic acid	ND	1.65	3.29	mg/kg dry	4	2.63	ND		**5-140%**	---	---	Q-01
Benzyl alcohol	1.08	0.0658	0.131	mg/kg dry	4	1.32	ND	82	29-122%	---	---	
Isophorone	1.05	0.0329	0.0658	mg/kg dry	4	1.32	ND	80	30-122%	---	---	
Azobenzene (1,2-DPH)	1.16	0.0329	0.0658	mg/kg dry	4	1.32	ND	88	39-125%	---	---	
Bis(2-Ethylhexyl) adipate	1.27	0.329	0.658	mg/kg dry	4	1.32	ND	97	60-121%	---	---	
3,3'-Dichlorobenzidine	3.23	0.263	0.526	mg/kg dry	4	2.63	ND	**123**	**22-121%**	---	---	Q-01, Q-31
1,2-Dinitrobenzene	1.06	0.329	0.658	mg/kg dry	4	1.32	ND	80	44-120%	---	---	
1,3-Dinitrobenzene	1.17	0.329	0.658	mg/kg dry	4	1.32	ND	89	42-127%	---	---	
1,4-Dinitrobenzene	1.02	0.329	0.658	mg/kg dry	4	1.32	ND	77	37-132%	---	---	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100740 - EPA 3546							**Sediment**					
Matrix Spike (9100740-MS1)				Prepared: 10/07/19 11:27		Analyzed: 10/07/19 19:12						
QC Source Sample: SE-27-0-0.33 (A9J0006-24RE2)												
Pyridine	0.739	0.0658	0.131	mg/kg dry	4	1.32	ND	56	5-120%	---	---	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 69 %*	*Limits: 37-122 %*			*Dilution: 4x*					
2-Fluorobiphenyl (Surr)			*48 %*	*44-115 %*			*"*					
Phenol-d6 (Surr)			*77 %*	*33-122 %*			*"*					
p-Terphenyl-d14 (Surr)			*42 %*	*54-127 %*			*"*					S-03
2-Fluorophenol (Surr)			*66 %*	*35-115 %*			*"*					
2,4,6-Tribromophenol (Surr)			*98 %*	*39-132 %*			*"*					

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QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020A (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100629 - EPA 3051A							**Sediment**					
Blank (9100629-BLK1)			Prepared: 10/03/19 14:31		Analyzed: 10/07/19 20:11							
EPA 6020A												
Arsenic	ND	0.240	0.481	mg/kg wet	5	---	---	---	---	---	---	
Cadmium	ND	0.0481	0.0962	mg/kg wet	5	---	---	---	---	---	---	
Chromium	ND	0.240	0.481	mg/kg wet	5	---	---	---	---	---	---	
Copper	ND	0.240	0.481	mg/kg wet	5	---	---	---	---	---	---	
Lead	ND	0.0481	0.0962	mg/kg wet	5	---	---	---	---	---	---	
Nickel	ND	0.481	0.962	mg/kg wet	5	---	---	---	---	---	---	
Selenium	ND	0.240	0.481	mg/kg wet	5	---	---	---	---	---	---	
Silver	ND	0.0481	0.0962	mg/kg wet	5	---	---	---	---	---	---	
Zinc	ND	0.962	1.92	mg/kg wet	5	---	---	---	---	---	---	
LCS (9100629-BS1)			Prepared: 10/03/19 14:31		Analyzed: 10/07/19 20:15							
EPA 6020A												
Arsenic	23.8	0.250	0.500	mg/kg wet	5	25.0	---	95	80-120%	---	---	
Cadmium	24.8	0.0500	0.100	mg/kg wet	5	25.0	---	99	80-120%	---	---	
Chromium	26.2	0.250	0.500	mg/kg wet	5	25.0	---	105	80-120%	---	---	
Copper	26.7	0.250	0.500	mg/kg wet	5	25.0	---	107	80-120%	---	---	
Lead	26.9	0.0500	0.100	mg/kg wet	5	25.0	---	108	80-120%	---	---	
Nickel	26.6	0.500	1.00	mg/kg wet	5	25.0	---	106	80-120%	---	---	
Selenium	11.7	0.250	0.500	mg/kg wet	5	12.5	---	94	80-120%	---	---	
Silver	13.9	0.0500	0.100	mg/kg wet	5	12.5	---	111	80-120%	---	---	
Zinc	25.3	1.00	2.00	mg/kg wet	5	25.0	---	101	80-120%	---	---	
Matrix Spike (9100629-MS1)			Prepared: 10/03/19 14:31		Analyzed: 10/07/19 20:29							
QC Source Sample: Non-SDG (A9I0893-13)												
EPA 6020A												
Arsenic	63.5	0.637	1.27	mg/kg dry	5	63.7	5.47	91	75-125%	---	---	
Cadmium	60.6	0.127	0.255	mg/kg dry	5	63.7	0.595	94	75-125%	---	---	
Chromium	92.5	0.637	1.27	mg/kg dry	5	63.7	25.2	106	75-125%	---	---	
Copper	150	0.637	1.27	mg/kg dry	5	63.7	56.1	**148**	**75-125%**	---	---	Q-04
Lead	89.2	0.127	0.255	mg/kg dry	5	63.7	24.0	102	75-125%	---	---	
Nickel	92.3	1.27	2.55	mg/kg dry	5	63.7	25.1	105	75-125%	---	---	
Selenium	29.9	0.637	1.27	mg/kg dry	5	31.8	0.667	92	75-125%	---	---	
Silver	33.1	0.127	0.255	mg/kg dry	5	31.8	0.138	104	75-125%	---	---	

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020A (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100629 - EPA 3051A							**Sediment**					
Matrix Spike (9100629-MS1)			Prepared: 10/03/19 14:31		Analyzed: 10/07/19 20:29							
QC Source Sample: Non-SDG (A9I0893-13)												
Zinc	135	2.55	5.09	mg/kg dry	5	63.7	71.9	99	75-125%	---	---	
Matrix Spike Dup (9100629-MSD1)			Prepared: 10/03/19 14:31		Analyzed: 10/07/19 20:33							
QC Source Sample: Non-SDG (A9I0893-13)												
Arsenic	68.0	0.649	1.30	mg/kg dry	5	64.9	5.47	96	75-125%	7	40%	
Cadmium	65.5	0.130	0.260	mg/kg dry	5	64.9	0.595	100	75-125%	8	40%	
Chromium	95.0	0.649	1.30	mg/kg dry	5	64.9	25.2	108	75-125%	3	40%	
Copper	124	0.649	1.30	mg/kg dry	5	64.9	56.1	105	75-125%	19	40%	
Lead	102	0.130	0.260	mg/kg dry	5	64.9	24.0	119	75-125%	13	40%	
Nickel	90.8	1.30	2.60	mg/kg dry	5	64.9	25.1	101	75-125%	2	40%	
Selenium	32.3	0.649	1.30	mg/kg dry	5	32.5	0.667	98	75-125%	8	40%	
Silver	36.2	0.130	0.260	mg/kg dry	5	32.5	0.138	111	75-125%	9	40%	
Zinc	146	2.60	5.19	mg/kg dry	5	64.9	71.9	113	75-125%	8	40%	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Ammonia by Plumb Extraction, Gas Diffusion and Colorimetric Detection

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100530 - Plumb 1981 Ammonia (Acidified KCl Leach)							Soil					
Blank (9100530-BLK1)			Prepared: 10/02/19 08:28		Analyzed: 10/02/19 14:02							
Plumb/SM 4500-NH3 G												
Ammonia as N	ND	0.100	0.100	mg/kg wet	1	---	---	---	---	---	---	
LCS (9100530-BS1)			Prepared: 10/02/19 08:28		Analyzed: 10/02/19 14:03							
Plumb/SM 4500-NH3 G												
Ammonia as N	10.3	0.100	0.100	mg/kg wet	1	10.0	---	103	80-120%	---	---	
Matrix Spike (9100530-MS1)			Prepared: 10/02/19 08:28		Analyzed: 10/02/19 14:33							
QC Source Sample: SE-24-0-0.33 (A9J0006-01)												
Plumb/SM 4500-NH3 G												
Ammonia as N	33.8	0.271	0.271	mg/kg dry	1	27.1	9.49	90	75-125%	---	---	
Matrix Spike Dup (9100530-MSD1)			Prepared: 10/02/19 08:28		Analyzed: 10/02/19 14:42							
QC Source Sample: SE-24-0-0.33 (A9J0006-01)												
Plumb/SM 4500-NH3 G												
Ammonia as N	33.7	0.270	0.270	mg/kg dry	1	27.0	9.49	90	75-125%	0.5	20%	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Demand Parameters

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100832 - PSEP-5310B TOC							**Sediment**					
Blank (9100832-BLK1)			Prepared: 10/08/19 17:15		Analyzed: 10/11/19 19:58							
EPA 9060Amod												
Total Organic Carbon	ND	200	200	mg/kg	1	---	---	---	---	---	---	
Blank (9100832-BLK2)			Prepared: 10/08/19 17:15		Analyzed: 10/11/19 20:09							
EPA 9060Amod												
Total Organic Carbon	ND	200	200	mg/kg	1	---	---	---	---	---	---	A-01
LCS (9100832-BS1)			Prepared: 10/08/19 17:15		Analyzed: 10/11/19 20:19							
EPA 9060Amod												
Total Organic Carbon	9900			mg/kg	1	10000	---	99	90-110%	---	---	
Duplicate (9100832-DUP1)			Prepared: 10/08/19 17:15		Analyzed: 10/11/19 20:41							
QC Source Sample: Non-SDG (A9I0953-02)												
Total Organic Carbon	**44000**	200	200	mg/kg	1	---	41000	---	---	8	20%	
Duplicate (9100832-DUP2)			Prepared: 10/08/19 17:15		Analyzed: 10/11/19 20:52							
QC Source Sample: Non-SDG (A9I0953-02)												
Total Organic Carbon	**41000**	200	200	mg/kg	1	---	41000	---	---	2	20%	

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Demand Parameters

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100833 - PSEP-5310B TOC							**Sediment**					
Blank (9100833-BLK1)			Prepared: 10/08/19 17:15		Analyzed: 10/11/19 08:48							
EPA 9060Amod												
Total Organic Carbon	ND	200	200	mg/kg	1	---	---	---	---	---	---	
LCS (9100833-BS1)			Prepared: 10/08/19 17:15		Analyzed: 10/11/19 09:15							
EPA 9060Amod												
Total Organic Carbon	10000			mg/kg	1	10000	---	100	90-110%	---	---	
Duplicate (9100833-DUP1)			Prepared: 10/08/19 17:15		Analyzed: 10/11/19 10:27							
QC Source Sample: SE-26-0-0.33 (A9J0006-16)												
EPA 9060Amod												
Total Organic Carbon	**130000**	200	200	mg/kg	1	---	130000	---	---	1	20%	

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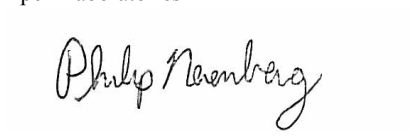

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QUALITY CONTROL (QC) SAMPLE RESULTS

Solid and Moisture Determinations

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100520 - Total Solids (SM2540G/PSEP)							**Sediment**					
Duplicate (9100520-DUP1)			Prepared: 10/01/19 17:33		Analyzed: 10/02/19 12:42							
QC Source Sample: SE-24-0-0.33 (A9J0006-01)												
PSEP 1986												
Total Solids	**45.7**	1.00	1.00	%	1	---	35.5	---	---	**25**	**20%**	Q-04

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QUALITY CONTROL (QC) SAMPLE RESULTS

Solid and Moisture Determinations

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100558 - Total Volatile Solids (non-aq)							**Solid**					
Duplicate (9100558-DUP1)			Prepared: 10/02/19 13:00		Analyzed: 10/03/19 10:09							
QC Source Sample: SE-24-0-0.33 (A9J0006-01)												
SM 2540 G												
Total Volatile Solids	**12.8**	1.00	1.00	%	1	---	18.9	---	---	**38**	**10%**	Q-04

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QUALITY CONTROL (QC) SAMPLE RESULTS

Solid and Moisture Determinations

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100571 - Total Solids (SM2540G/PSEP)							**Sediment**					
Duplicate (9100571-DUP1)			Prepared: 10/02/19 16:19 Analyzed: 10/03/19 12:11									
QC Source Sample: SE-25-0-0.33 (A9J0006-13)												
PSEP 1986												
Total Solids	**29.9**	1.00	1.00	%	1	---	40.6	---	---	**31**	**20%**	Q-04

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALITY CONTROL (QC) SAMPLE RESULTS

Solid and Moisture Determinations

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100621 - Total Volatile Solids (non-aq)							**Solid**					
Duplicate (9100621-DUP1)			Prepared: 10/03/19 12:48		Analyzed: 10/03/19 16:24							
QC Source Sample: SE-25-0-0.33 (A9J0006-13)												
SM 2540 G												
Total Volatile Solids	**20.4**	1.00	1.00	%	1	---	19.0	---	---	7	10%	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Solid and Moisture Determinations

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100630 - Total Solids (SM2540G/PSEP)							**Sediment**					
Duplicate (9100630-DUP1)			Prepared: 10/03/19 14:52		Analyzed: 10/07/19 11:30							
QC Source Sample: SE-22-0-0.33 (A9J0006-23)												
PSEP 1986												
Total Solids	**33.5**	1.00	1.00	%	1	---	33.4	---	---	0.3	20%	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Solid and Moisture Determinations

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100742 - Total Volatile Solids (non-aq)							**Solid**					
Duplicate (9100742-DUP1)			Prepared: 10/03/19 14:52		Analyzed: 10/07/19 17:15							
QC Source Sample: SE-22-0-0.33 (A9J0006-23)												
SM 2540 G												
Total Volatile Solids	**11.0**	1.00	1.00	%	1	---	11.6	---	---	6	10%	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100520 - Total Solids (SM2540G/PSEP)							**Sediment**					
Duplicate (9100520-DUP1)			Prepared: 10/01/19 17:33		Analyzed: 10/02/19 12:42							
QC Source Sample: SE-24-0-0.33 (A9J0006-01)												
EPA 8000C												
% Solids	**45.7**	1.00	1.00	%	1	---	35.5	---	---	**25**	**10%**	Q-04

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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QUALITY CONTROL (QC) SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100571 - Total Solids (SM2540G/PSEP)							**Sediment**					
Duplicate (9100571-DUP1)			Prepared: 10/02/19 16:19		Analyzed: 10/03/19 12:11							
QC Source Sample: SE-25-0-0.33 (A9J0006-13)												
EPA 8000C												
% Solids	**29.9**	1.00	1.00	%	1	---	40.6	---	---	**31**	**10%**	Q-04

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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QUALITY CONTROL (QC) SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9100630 - Total Solids (SM2540G/PSEP)							**Sediment**					
Duplicate (9100630-DUP1)			Prepared: 10/03/19 14:52 Analyzed: 10/07/19 11:30									
QC Source Sample: SE-22-0-0.33 (A9J0006-23)												
EPA 8000C												
% Solids	**33.5**	1.00	1.00	%	1	---	33.4	---	---	0.3	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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QUALITY CONTROL (QC) SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9101585 - Total Solids (Dry Weight)							Soil					
Duplicate (9101585-DUP1)			Prepared: 10/25/19 08:44		Analyzed: 10/28/19 07:41							
QC Source Sample: Non-SDG (A9I0893-22)												
% Solids	**92.7**	1.00	1.00	%	1	---	92.6	---	---	0.09	10%	
Duplicate (9101585-DUP2)			Prepared: 10/25/19 08:44		Analyzed: 10/28/19 07:41							
QC Source Sample: Non-SDG (A9J0894-01)												
% Solids	**71.6**	1.00	1.00	%	1	---	72.1	---	---	0.8	10%	
Duplicate (9101585-DUP3)			Prepared: 10/25/19 08:44		Analyzed: 10/28/19 07:41							
QC Source Sample: Non-SDG (A9J0896-01)												
% Solids	**91.2**	1.00	1.00	%	1	---	91.7	---	---	0.5	10%	
Duplicate (9101585-DUP4)			Prepared: 10/25/19 08:44		Analyzed: 10/28/19 07:41							
QC Source Sample: Non-SDG (A9J0922-01)												
% Solids	**78.0**	1.00	1.00	%	1	---	79.1	---	---	2	10%	
Duplicate (9101585-DUP5)			Prepared: 10/25/19 17:55		Analyzed: 10/28/19 07:41							
QC Source Sample: Non-SDG (A9J0958-01)												
% Solids	**85.0**	1.00	1.00	%	1	---	85.7	---	---	0.8	10%	
Duplicate (9101585-DUP6)			Prepared: 10/25/19 17:55		Analyzed: 10/28/19 07:41							
QC Source Sample: Non-SDG (A9J0964-02)												
% Solids	**80.5**	1.00	1.00	%	1	---	80.2	---	---	0.3	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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QUALITY CONTROL (QC) SAMPLE RESULTS

Metals and Metallic Compounds

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch BHJ0445 - SMM EPA 7471B							**Solid**					
Blank (BHJ0445-BLK1)			Prepared: 10/15/19 08:15		Analyzed: 10/15/19 16:13							
EPA 7471B												
Mercury	ND	0.00525	0.0250	mg/kg wet	1	---	---	---	---	---	---	U
LCS (BHJ0445-BS1)			Prepared: 10/15/19 08:15		Analyzed: 10/15/19 16:16							
EPA 7471B												
Mercury	0.425	0.00525	0.0250	mg/kg wet	1	0.50000	---	85.1	80-120%	---	---	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Wet Chemistry

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch BHJ0088 - No Prep Wet Chem							**Solid**					
Blank (BHJ0088-BLK1)			Prepared: 10/02/19 17:56 Analyzed: 10/02/19 23:02									
PSEP 1986												
Total Solids, Sulfide	ND	0.04	0.04	%	1	---	---	---	---	---	---	U
Duplicate (BHJ0088-DUP1)			Prepared: 10/02/19 17:56 Analyzed: 10/02/19 23:02									
QC Source Sample: A9J0006-01 (A9J0006-01)												
PSEP 1986												
Total Solids, Sulfide	**34.32**	0.04	0.04	%	1	---	32.53	---	---	5.33	20%	

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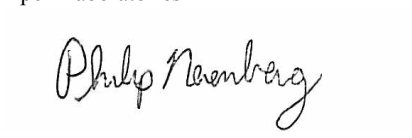

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QUALITY CONTROL (QC) SAMPLE RESULTS

Wet Chemistry

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch BHJ0091 - No Prep Wet Chem							**Solid**					
Blank (BHJ0091-BLK1)			Prepared: 10/03/19 09:16		Analyzed: 10/04/19 15:28							
SM 4500-S2 D-00												
Sulfide	ND	1.00	1.00	mg/kg wet	1	---	---	---	---	---	---	U
LCS (BHJ0091-BS1)			Prepared: 10/03/19 09:16		Analyzed: 10/04/19 15:29							
SM 4500-S2 D-00												
Sulfide	156	10.0	10.0	mg/kg wet	10	169.77	---	91.7	75-125%	---	---	D
Duplicate (BHJ0091-DUP1)			Prepared: 10/03/19 09:16		Analyzed: 10/04/19 15:29							
QC Source Sample: A9J0006-01 (A9J0006-01)												
SM 4500-S2 D-00												
Sulfide	**272**	29.8	29.8	mg/kg dry	10	---	281	---	---	3.18	20%	D
Matrix Spike (BHJ0091-MS1)			Prepared: 10/03/19 09:16		Analyzed: 10/04/19 15:30							
QC Source Sample: A9J0006-01 (A9J0006-01)												
SM 4500-S2 D-00												
Sulfide	820	60.1	60.1	mg/kg dry	20	510.54	281	106	75-125%	---	---	D

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QUALITY CONTROL (QC) SAMPLE RESULTS

Wet Chemistry

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch BHJ0124 - No Prep Wet Chem							**Solid**					
Blank (BHJ0124-BLK1)			Prepared: 10/04/19 08:57		Analyzed: 10/04/19 15:35							
SM 4500-S2 D-00												
Sulfide	ND	1.00	1.00	mg/kg wet	1	---	---	---	---	---	---	U
LCS (BHJ0124-BS1)			Prepared: 10/04/19 08:57		Analyzed: 10/04/19 15:36							
SM 4500-S2 D-00												
Sulfide	159	10.0	10.0	mg/kg wet	10	169.77	---	93.5	75-125%	---	---	D
Duplicate (BHJ0124-DUP1)			Prepared: 10/04/19 08:57		Analyzed: 10/04/19 15:38							
QC Source Sample: A9J0006-20 (A9J0006-20)												
SM 4500-S2 D-00												
Sulfide	**471**	99.0	99.0	mg/kg dry	50	---	397	---	---	17.2	20%	D
Matrix Spike (BHJ0124-MS1)			Prepared: 10/04/19 08:57		Analyzed: 10/04/19 15:40							
QC Source Sample: A9J0006-20 (A9J0006-20)												
SM 4500-S2 D-00												
Sulfide	1270	96.0	96.0	mg/kg dry	50	325.82	397	**268**	**75-125%**	---	---	*, D

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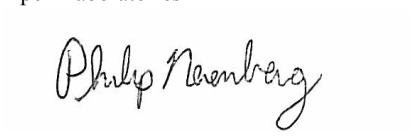

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QUALITY CONTROL (QC) SAMPLE RESULTS

Wet Chemistry

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch BHJ0145 - No Prep Wet Chem							**Water**					
Blank (BHJ0145-BLK1)			Prepared: 10/04/19 13:20		Analyzed: 10/04/19 14:49							
SM 4500-S2 D-00												
Sulfide	ND	0.050	0.050	mg/L	1	---	---	---	---	---	---	U
LCS (BHJ0145-BS1)			Prepared: 10/04/19 13:20		Analyzed: 10/04/19 14:49							
SM 4500-S2 D-00												
Sulfide	0.509	0.050	0.050	mg/L	1	0.50250	---	101	75-125%	---	---	
Duplicate (BHJ0145-DUP1)			Prepared: 10/04/19 13:20		Analyzed: 10/04/19 14:50							
QC Source Sample: A9J0006-02 (A9J0006-02)												
SM 4500-S2 D-00												
Sulfide	**0.101**	0.050	0.050	mg/L	1	---	0.098	---	---	3.02	20%	
Matrix Spike (BHJ0145-MS1)			Prepared: 10/04/19 13:20		Analyzed: 10/04/19 14:50							
QC Source Sample: A9J0006-02 (A9J0006-02)												
SM 4500-S2 D-00												
Sulfide	0.299	0.050	0.050	mg/L	1	0.50250	0.098	**40.0**	**75-125%**	---	---	*
Matrix Spike (BHJ0145-MS2)			Prepared: 10/04/19 13:20		Analyzed: 10/04/19 14:52							
QC Source Sample: A9J0006-04 (A9J0006-04)												
SM 4500-S2 D-00												
Sulfide	0.350	0.050	0.050	mg/L	1	0.50250	0.126	**44.6**	**75-125%**	---	---	*
Matrix Spike (BHJ0145-MS3)			Prepared: 10/04/19 13:20		Analyzed: 10/04/19 14:53							
QC Source Sample: A9J0006-15 (A9J0006-15)												
SM 4500-S2 D-00												
Sulfide	0.383	0.050	0.050	mg/L	1	0.50250	0.062	**63.9**	**75-125%**	---	---	*
Matrix Spike (BHJ0145-MS4)			Prepared: 10/04/19 13:20		Analyzed: 10/04/19 14:54							
QC Source Sample: A9J0006-17 (A9J0006-17)												
SM 4500-S2 D-00												

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QUALITY CONTROL (QC) SAMPLE RESULTS

Wet Chemistry

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch BHJ0145 - No Prep Wet Chem							**Water**					
Matrix Spike (BHJ0145-MS4)			Prepared: 10/04/19 13:20			Analyzed: 10/04/19 14:54						
QC Source Sample: A9J0006-17 (A9J0006-17)												
Sulfide	0.421	0.050	0.050	mg/L	1	0.50250	0.115	**60.9**	**75-125%**	---	---	*
Matrix Spike (BHJ0145-MS5)			Prepared: 10/04/19 13:20			Analyzed: 10/04/19 14:55						
QC Source Sample: A9J0006-19 (A9J0006-19)												
SM 4500-S2 D-00												
Sulfide	0.409	0.050	0.050	mg/L	1	0.50250	ND	81.4	75-125%	---	---	
Matrix Spike (BHJ0145-MS6)			Prepared: 10/04/19 13:20			Analyzed: 10/04/19 14:56						
QC Source Sample: A9J0006-26 (A9J0006-26)												
SM 4500-S2 D-00												
Sulfide	0.418	0.050	0.050	mg/L	1	0.50250	ND	83.2	75-125%	---	---	

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SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Acid/Silica Gel Cleanup

Prep: EPA 3546 w/SG+Acid (NWTPH)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9101200							
A9J0006-01	Sediment	NWTPH-Dx/SG	09/27/19 13:13	10/03/19 13:22	10.01g/5mL	10g/5mL	1.00
A9J0006-03	Sediment	NWTPH-Dx/SG	09/27/19 14:02	10/03/19 13:22	10.52g/5mL	10g/5mL	0.95
A9J0006-05	Sediment	NWTPH-Dx/SG	09/27/19 10:23	10/03/19 13:22	10.36g/5mL	10g/5mL	0.97
A9J0006-06	Sediment	NWTPH-Dx/SG	09/27/19 09:47	10/03/19 13:22	10.3g/5mL	10g/5mL	0.97
A9J0006-07	Sediment	NWTPH-Dx/SG	09/27/19 11:44	10/03/19 13:22	10.21g/5mL	10g/5mL	0.98
A9J0006-08	Sediment	NWTPH-Dx/SG	09/27/19 15:07	10/03/19 13:22	10.18g/5mL	10g/5mL	0.98
A9J0006-13	Sediment	NWTPH-Dx/SG	09/27/19 18:15	10/03/19 13:22	10.2g/5mL	10g/5mL	0.98
A9J0006-16	Sediment	NWTPH-Dx/SG	09/27/19 17:25	10/03/19 13:22	10.08g/5mL	10g/5mL	0.99
A9J0006-18	Sediment	NWTPH-Dx/SG	09/27/19 11:54	10/03/19 13:22	10.04g/5mL	10g/5mL	1.00
A9J0006-20	Sediment	NWTPH-Dx/SG	09/27/19 12:10	10/03/19 13:22	10.05g/5mL	10g/5mL	1.00
A9J0006-21	Sediment	NWTPH-Dx/SG	09/27/19 09:00	10/03/19 13:22	10.28g/5mL	10g/5mL	0.97
A9J0006-23	Sediment	NWTPH-Dx/SG	09/27/19 19:30	10/03/19 13:22	10.02g/5mL	10g/5mL	1.00
A9J0006-24	Sediment	NWTPH-Dx/SG	09/27/19 14:35	10/03/19 13:22	10.49g/5mL	10g/5mL	0.95
A9J0006-25	Sediment	NWTPH-Dx/SG	09/27/19 14:35	10/03/19 13:22	10.09g/5mL	10g/5mL	0.99

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Prep: EPA 5035A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9100478							
A9J0006-01	Sediment	NWTPH-Gx (MS)	09/27/19 13:13	09/27/19 13:13	3.73g/5mL	5g/5mL	1.34
A9J0006-07	Sediment	NWTPH-Gx (MS)	09/27/19 11:44	09/27/19 11:44	4.25g/5mL	5g/5mL	1.18
A9J0006-08	Sediment	NWTPH-Gx (MS)	09/27/19 15:07	09/27/19 15:07	4.21g/5mL	5g/5mL	1.19
A9J0006-13	Sediment	NWTPH-Gx (MS)	09/27/19 18:15	09/27/19 18:15	4.79g/5mL	5g/5mL	1.04
A9J0006-16	Sediment	NWTPH-Gx (MS)	09/27/19 17:25	09/27/19 17:25	4.72g/5mL	5g/5mL	1.06
A9J0006-18	Sediment	NWTPH-Gx (MS)	09/27/19 11:54	09/27/19 11:54	4.34g/5mL	5g/5mL	1.15
Batch: 9100509							
A9J0006-20	Sediment	NWTPH-Gx (MS)	09/27/19 12:10	09/27/19 12:10	5.01g/5mL	5g/5mL	1.00
A9J0006-21	Sediment	NWTPH-Gx (MS)	09/27/19 09:00	09/27/19 09:00	3.82g/5mL	5g/5mL	1.31
A9J0006-23	Sediment	NWTPH-Gx (MS)	09/27/19 19:30	09/27/19 19:30	3.4g/5mL	5g/5mL	1.47
A9J0006-24	Sediment	NWTPH-Gx (MS)	09/27/19 14:35	09/27/19 14:35	4.16g/5mL	5g/5mL	1.20
A9J0006-25	Sediment	NWTPH-Gx (MS)	09/27/19 14:35	09/27/19 14:35	3.65g/5mL	5g/5mL	1.37
Batch: 9100546							
A9J0006-03	Sediment	NWTPH-Gx (MS)	09/27/19 14:02	09/27/19 14:02	4.42g/5mL	5g/5mL	1.13
A9J0006-05	Sediment	NWTPH-Gx (MS)	09/27/19 10:23	09/27/19 10:23	4.58g/5mL	5g/5mL	1.09

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

SAMPLE PREPARATION INFORMATION

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Prep: EPA 5035A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A9J0006-06	Sediment	NWTPH-Gx (MS)	09/27/19 09:47	09/27/19 09:47	2.87g/5mL	5g/5mL	1.74

Polychlorinated Biphenyls by EPA 8082A

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9100667							
A9J0006-01	Sediment	EPA 8082A	09/27/19 13:13	10/04/19 10:52	10.05g/2mL	10g/2mL	1.00
A9J0006-03	Sediment	EPA 8082A	09/27/19 14:02	10/04/19 10:52	10.01g/2mL	10g/2mL	1.00
A9J0006-05	Sediment	EPA 8082A	09/27/19 10:23	10/04/19 10:52	10.02g/2mL	10g/2mL	1.00
A9J0006-07	Sediment	EPA 8082A	09/27/19 11:44	10/04/19 10:52	10.07g/2mL	10g/2mL	0.99
A9J0006-08	Sediment	EPA 8082A	09/27/19 15:07	10/04/19 10:52	10.01g/2mL	10g/2mL	1.00
A9J0006-13	Sediment	EPA 8082A	09/27/19 18:15	10/04/19 10:52	10.8g/2mL	10g/2mL	0.93
A9J0006-16	Sediment	EPA 8082A	09/27/19 17:25	10/04/19 10:52	10.66g/2mL	10g/2mL	0.94
A9J0006-20	Sediment	EPA 8082A	09/27/19 12:10	10/04/19 10:52	10.34g/2mL	10g/2mL	0.97
Batch: 9101592							
A9J0006-27	Sediment	EPA 8082A	09/27/19 09:47	10/25/19 10:03	10.23g/2mL	10g/2mL	0.98
A9J0006-28	Sediment	EPA 8082A	09/27/19 11:54	10/25/19 10:03	10.29g/2mL	10g/2mL	0.97
A9J0006-29	Sediment	EPA 8082A	09/27/19 09:00	10/25/19 10:03	10.26g/2mL	10g/2mL	0.98
A9J0006-30	Sediment	EPA 8082A	09/27/19 19:30	10/25/19 10:03	10.4g/2mL	10g/2mL	0.96
A9J0006-31	Sediment	EPA 8082A	09/27/19 14:35	10/25/19 10:03	10.14g/2mL	10g/2mL	0.99
A9J0006-32	Sediment	EPA 8082A	09/27/19 14:35	10/25/19 10:03	10.93g/2mL	10g/2mL	0.92

Semivolatile Organic Compounds by EPA 8270D

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9100490							
A9J0006-01RE1	Sediment	EPA 8270D	09/27/19 13:13	10/01/19 15:14	15.21g/2mL	15g/2mL	0.99
A9J0006-03RE1	Sediment	EPA 8270D	09/27/19 14:02	10/01/19 15:14	15.2g/2mL	15g/2mL	0.99
A9J0006-05RE1	Sediment	EPA 8270D	09/27/19 10:23	10/01/19 15:14	15.47g/2mL	15g/2mL	0.97
A9J0006-06RE1	Sediment	EPA 8270D	09/27/19 09:47	10/01/19 15:14	15.68g/2mL	15g/2mL	0.96
A9J0006-07RE1	Sediment	EPA 8270D	09/27/19 11:44	10/01/19 15:14	15.25g/2mL	15g/2mL	0.98
A9J0006-08RE1	Sediment	EPA 8270D	09/27/19 15:07	10/01/19 15:14	15.17g/2mL	15g/2mL	0.99
A9J0006-13RE1	Sediment	EPA 8270D	09/27/19 18:15	10/01/19 15:14	15.17g/2mL	15g/2mL	0.99
A9J0006-16RE1	Sediment	EPA 8270D	09/27/19 17:25	10/01/19 15:14	15.38g/2mL	15g/2mL	0.98
A9J0006-18RE1	Sediment	EPA 8270D	09/27/19 11:54	10/01/19 15:14	15.16g/2mL	15g/2mL	0.99

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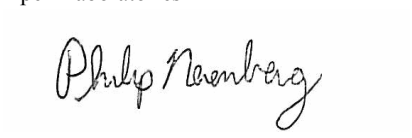

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

SAMPLE PREPARATION INFORMATION

Semivolatile Organic Compounds by EPA 8270D

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A9J0006-20RE1	Sediment	EPA 8270D	09/27/19 12:10	10/01/19 15:14	15.24g/2mL	15g/2mL	0.98
A9J0006-21RE1	Sediment	EPA 8270D	09/27/19 09:00	10/01/19 15:14	15.5g/2mL	15g/2mL	0.97
A9J0006-23RE1	Sediment	EPA 8270D	09/27/19 19:30	10/01/19 15:14	15.12g/2mL	15g/2mL	0.99
A9J0006-25RE1	Sediment	EPA 8270D	09/27/19 14:35	10/01/19 15:14	15.38g/2mL	15g/2mL	0.98
Batch: 9100740							
A9J0006-24RE2	Sediment	EPA 8270D	09/27/19 14:35	10/07/19 11:27	15.48g/2mL	15g/2mL	0.97

Total Metals by EPA 6020A (ICPMS)

Prep: EPA 3051A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9100629							
A9J0006-01	Sediment	EPA 6020A	09/27/19 13:13	10/03/19 14:31	0.512g/50mL	0.5g/50mL	0.98
A9J0006-03	Sediment	EPA 6020A	09/27/19 14:02	10/03/19 14:31	0.516g/50mL	0.5g/50mL	0.97
A9J0006-05	Sediment	EPA 6020A	09/27/19 10:23	10/03/19 14:31	0.508g/50mL	0.5g/50mL	0.98
A9J0006-06	Sediment	EPA 6020A	09/27/19 09:47	10/03/19 14:31	0.519g/50mL	0.5g/50mL	0.96
A9J0006-07	Sediment	EPA 6020A	09/27/19 11:44	10/03/19 14:31	0.5g/50mL	0.5g/50mL	1.00
A9J0006-08	Sediment	EPA 6020A	09/27/19 15:07	10/03/19 14:31	0.5g/50mL	0.5g/50mL	1.00
A9J0006-13	Sediment	EPA 6020A	09/27/19 18:15	10/03/19 14:31	0.487g/50mL	0.5g/50mL	1.03
A9J0006-16	Sediment	EPA 6020A	09/27/19 17:25	10/03/19 14:31	0.497g/50mL	0.5g/50mL	1.01
A9J0006-18	Sediment	EPA 6020A	09/27/19 11:54	10/03/19 14:31	0.485g/50mL	0.5g/50mL	1.03
A9J0006-20	Sediment	EPA 6020A	09/27/19 12:10	10/03/19 14:31	0.49g/50mL	0.5g/50mL	1.02
A9J0006-21	Sediment	EPA 6020A	09/27/19 09:00	10/03/19 14:31	0.515g/50mL	0.5g/50mL	0.97
A9J0006-23	Sediment	EPA 6020A	09/27/19 19:30	10/03/19 14:31	0.509g/50mL	0.5g/50mL	0.98
A9J0006-24	Sediment	EPA 6020A	09/27/19 14:35	10/03/19 14:31	0.511g/50mL	0.5g/50mL	0.98
A9J0006-25	Sediment	EPA 6020A	09/27/19 14:35	10/03/19 14:31	0.507g/50mL	0.5g/50mL	0.99

Ammonia by Plumb Extraction, Gas Diffusion and Colorimetric Detection

Prep: Plumb 1981 Ammonia (Acidified KCl Leach)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9100530							
A9J0006-01	Sediment	Plumb/SM 4500-NH3 G	09/27/19 13:13	10/02/19 08:28	10.0898g/50mL	10g/50mL	0.99
A9J0006-03	Sediment	Plumb/SM 4500-NH3 G	09/27/19 14:02	10/02/19 08:28	10.1504g/50mL	10g/50mL	0.99

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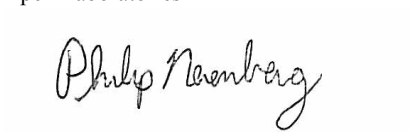

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: Seaport Tidelands	
2001 NW 19th Ave, STE 200	Project Number: 1044.02.06-02	Report ID:
Portland, OR 97209	Project Manager: Emily Hess	A9J0006 - 01 09 20 1630

SAMPLE PREPARATION INFORMATION

Ammonia by Plumb Extraction, Gas Diffusion and Colorimetric Detection

Prep: Plumb 1981 Ammonia (Acidified KCl Leach)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A9J0006-05	Sediment	Plumb/SM 4500-NH3 G	09/27/19 10:23	10/02/19 08:28	10.3745g/50mL	10g/50mL	0.96
A9J0006-06	Sediment	Plumb/SM 4500-NH3 G	09/27/19 09:47	10/02/19 08:28	10.3459g/50mL	10g/50mL	0.97
A9J0006-07	Sediment	Plumb/SM 4500-NH3 G	09/27/19 11:44	10/02/19 08:28	10.0607g/50mL	10g/50mL	0.99
A9J0006-08	Sediment	Plumb/SM 4500-NH3 G	09/27/19 15:07	10/02/19 08:28	10.176g/50mL	10g/50mL	0.98
A9J0006-13	Sediment	Plumb/SM 4500-NH3 G	09/27/19 18:15	10/02/19 08:28	10.4561g/50mL	10g/50mL	0.96
A9J0006-14	Sediment	Plumb/SM 4500-NH3 G	09/27/19 18:40	10/02/19 08:28	10.5203g/50mL	10g/50mL	0.95
A9J0006-16	Sediment	Plumb/SM 4500-NH3 G	09/27/19 17:25	10/02/19 08:28	10.5093g/50mL	10g/50mL	0.95
A9J0006-18	Sediment	Plumb/SM 4500-NH3 G	09/27/19 11:54	10/02/19 08:28	10.2103g/50mL	10g/50mL	0.98
A9J0006-20	Sediment	Plumb/SM 4500-NH3 G	09/27/19 12:10	10/02/19 08:28	10.3042g/50mL	10g/50mL	0.97
A9J0006-21	Sediment	Plumb/SM 4500-NH3 G	09/27/19 09:00	10/02/19 08:28	10.0476g/50mL	10g/50mL	1.00
A9J0006-22	Sediment	Plumb/SM 4500-NH3 G	09/27/19 08:30	10/02/19 08:28	10.4144g/50mL	10g/50mL	0.96
A9J0006-23	Sediment	Plumb/SM 4500-NH3 G	09/27/19 19:30	10/02/19 08:28	10.1604g/50mL	10g/50mL	0.98
A9J0006-24	Sediment	Plumb/SM 4500-NH3 G	09/27/19 14:35	10/02/19 08:28	10.4805g/50mL	10g/50mL	0.95
A9J0006-25	Sediment	Plumb/SM 4500-NH3 G	09/27/19 14:35	10/02/19 08:28	10.3144g/50mL	10g/50mL	0.97

Demand Parameters

Prep: PSEP-5310B TOC

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9100832							
A9J0006-01RE1	Sediment	EPA 9060Amod	09/27/19 13:13	10/08/19 17:15			NA
A9J0006-03	Sediment	EPA 9060Amod	09/27/19 14:02	10/08/19 17:15			NA
A9J0006-05	Sediment	EPA 9060Amod	09/27/19 10:23	10/08/19 17:15			NA
A9J0006-06	Sediment	EPA 9060Amod	09/27/19 09:47	10/08/19 17:15			NA
A9J0006-07	Sediment	EPA 9060Amod	09/27/19 11:44	10/08/19 17:15			NA
A9J0006-08	Sediment	EPA 9060Amod	09/27/19 15:07	10/08/19 17:15			NA

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

SAMPLE PREPARATION INFORMATION

Demand Parameters

Prep: PSEP-5310B TOC

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A9J0006-13RE1	Sediment	EPA 9060Amod	09/27/19 18:15	10/08/19 17:15			NA
A9J0006-14	Sediment	EPA 9060Amod	09/27/19 18:40	10/08/19 17:15			NA
Batch: 9100833							
A9J0006-16	Sediment	EPA 9060Amod	09/27/19 17:25	10/08/19 17:15			NA
A9J0006-18	Sediment	EPA 9060Amod	09/27/19 11:54	10/08/19 17:15			NA
A9J0006-20	Sediment	EPA 9060Amod	09/27/19 12:10	10/08/19 17:15			NA
A9J0006-21	Sediment	EPA 9060Amod	09/27/19 09:00	10/08/19 17:15			NA
A9J0006-22	Sediment	EPA 9060Amod	09/27/19 08:30	10/08/19 17:15			NA
A9J0006-23	Sediment	EPA 9060Amod	09/27/19 19:30	10/08/19 17:15			NA
A9J0006-24	Sediment	EPA 9060Amod	09/27/19 14:35	10/08/19 17:15			NA
A9J0006-25	Sediment	EPA 9060Amod	09/27/19 14:35	10/08/19 17:15			NA

Solid and Moisture Determinations

Prep: Total Solids (SM2540G/PSEP)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9100520							
A9J0006-01	Sediment	PSEP 1986	09/27/19 13:13	10/01/19 17:33			NA
A9J0006-03	Sediment	PSEP 1986	09/27/19 14:02	10/01/19 17:33			NA
A9J0006-05	Sediment	PSEP 1986	09/27/19 10:23	10/01/19 17:33			NA
A9J0006-06	Sediment	PSEP 1986	09/27/19 09:47	10/01/19 17:33			NA
A9J0006-07	Sediment	PSEP 1986	09/27/19 11:44	10/01/19 17:33			NA
A9J0006-08	Sediment	PSEP 1986	09/27/19 15:07	10/01/19 17:33			NA
Batch: 9100571							
A9J0006-13	Sediment	PSEP 1986	09/27/19 18:15	10/02/19 16:19			NA
A9J0006-14	Sediment	PSEP 1986	09/27/19 18:40	10/02/19 16:19			NA
A9J0006-16	Sediment	PSEP 1986	09/27/19 17:25	10/02/19 16:19			NA
A9J0006-18	Sediment	PSEP 1986	09/27/19 11:54	10/02/19 16:19			NA
A9J0006-20	Sediment	PSEP 1986	09/27/19 12:10	10/02/19 16:19			NA
Batch: 9100630							
A9J0006-21	Sediment	PSEP 1986	09/27/19 09:00	10/03/19 14:52			NA
A9J0006-22	Sediment	PSEP 1986	09/27/19 08:30	10/03/19 14:52			NA
A9J0006-23	Sediment	PSEP 1986	09/27/19 19:30	10/03/19 14:52			NA
A9J0006-24	Sediment	PSEP 1986	09/27/19 14:35	10/03/19 14:52			NA
A9J0006-25	Sediment	PSEP 1986	09/27/19 14:35	10/03/19 14:52			NA

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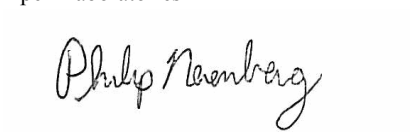

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

SAMPLE PREPARATION INFORMATION

Solid and Moisture Determinations

Prep: Total Volatile Solids (non-aq)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9100558							
A9J0006-01	Sediment	SM 2540 G	09/27/19 13:13	10/02/19 13:00			NA
A9J0006-03	Sediment	SM 2540 G	09/27/19 14:02	10/02/19 13:00			NA
A9J0006-05	Sediment	SM 2540 G	09/27/19 10:23	10/02/19 13:00			NA
A9J0006-06	Sediment	SM 2540 G	09/27/19 09:47	10/02/19 13:00			NA
A9J0006-07	Sediment	SM 2540 G	09/27/19 11:44	10/02/19 13:00			NA
A9J0006-08	Sediment	SM 2540 G	09/27/19 15:07	10/02/19 13:00			NA
Batch: 9100621							
A9J0006-13	Sediment	SM 2540 G	09/27/19 18:15	10/03/19 12:48			NA
A9J0006-14	Sediment	SM 2540 G	09/27/19 18:40	10/03/19 12:48			NA
A9J0006-16	Sediment	SM 2540 G	09/27/19 17:25	10/03/19 12:48			NA
A9J0006-18	Sediment	SM 2540 G	09/27/19 11:54	10/03/19 12:48			NA
A9J0006-20	Sediment	SM 2540 G	09/27/19 12:10	10/03/19 12:48			NA
Batch: 9100742							
A9J0006-21	Sediment	SM 2540 G	09/27/19 09:00	10/03/19 14:52			NA
A9J0006-22	Sediment	SM 2540 G	09/27/19 08:30	10/03/19 14:52			NA
A9J0006-23	Sediment	SM 2540 G	09/27/19 19:30	10/03/19 14:52			NA
A9J0006-24	Sediment	SM 2540 G	09/27/19 14:35	10/03/19 14:52			NA
A9J0006-25	Sediment	SM 2540 G	09/27/19 14:35	10/03/19 14:52			NA

Grain Size by ASTM D 422m/PSET Parameters

Prep: ASTM D 421

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9100866							
A9J0006-01	Sediment	D422mod	09/27/19 13:13	10/09/19 10:53			NA
A9J0006-03	Sediment	D422mod	09/27/19 14:02	10/09/19 11:16			NA
A9J0006-05	Sediment	D422mod	09/27/19 10:23	10/09/19 11:39			NA
A9J0006-06	Sediment	D422mod	09/27/19 09:47	10/09/19 12:00			NA
A9J0006-07	Sediment	D422mod	09/27/19 11:44	10/09/19 12:23			NA
Batch: 9101058							
A9J0006-08	Sediment	D422mod	09/27/19 15:07	10/14/19 09:38			NA
A9J0006-13	Sediment	D422mod	09/27/19 18:15	10/14/19 09:08			NA
A9J0006-16	Sediment	D422mod	09/27/19 17:25	10/14/19 08:48			NA
A9J0006-18	Sediment	D422mod	09/27/19 11:54	10/14/19 09:27			NA
A9J0006-20	Sediment	D422mod	09/27/19 12:10	10/14/19 08:30			NA

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Apex Laboratories, LLC
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503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

SAMPLE PREPARATION INFORMATION

Grain Size by ASTM D 422m/PSET Parameters

Prep: ASTM D 421

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A9J0006-21	Sediment	D422mod	09/27/19 09:00	10/14/19 09:18			NA
A9J0006-23	Sediment	D422mod	09/27/19 19:30	10/14/19 08:57			NA
A9J0006-24	Sediment	D422mod	09/27/19 14:35	10/14/19 08:38			NA
A9J0006-25	Sediment	D422mod	09/27/19 14:35	10/14/19 08:16			NA

Percent Dry Weight

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9101585							
A9J0006-27	Sediment	EPA 8000C	09/27/19 09:47	10/25/19 08:44			NA
A9J0006-28	Sediment	EPA 8000C	09/27/19 11:54	10/25/19 08:44			NA
A9J0006-29	Sediment	EPA 8000C	09/27/19 09:00	10/25/19 08:44			NA
A9J0006-30	Sediment	EPA 8000C	09/27/19 19:30	10/25/19 08:44			NA
A9J0006-31	Sediment	EPA 8000C	09/27/19 14:35	10/25/19 08:44			NA
A9J0006-32	Sediment	EPA 8000C	09/27/19 14:35	10/25/19 08:44			NA

Prep: Total Solids (SM2540G/PSEP)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9100520							
A9J0006-01	Sediment	EPA 8000C	09/27/19 13:13	10/01/19 17:33			NA
A9J0006-03	Sediment	EPA 8000C	09/27/19 14:02	10/01/19 17:33			NA
A9J0006-05	Sediment	EPA 8000C	09/27/19 10:23	10/01/19 17:33			NA
A9J0006-06	Sediment	EPA 8000C	09/27/19 09:47	10/01/19 17:33			NA
A9J0006-07	Sediment	EPA 8000C	09/27/19 11:44	10/01/19 17:33			NA
A9J0006-08	Sediment	EPA 8000C	09/27/19 15:07	10/01/19 17:33			NA
Batch: 9100571							
A9J0006-13	Sediment	EPA 8000C	09/27/19 18:15	10/02/19 16:19			NA
A9J0006-14	Sediment	EPA 8000C	09/27/19 18:40	10/02/19 16:19			NA
A9J0006-16	Sediment	EPA 8000C	09/27/19 17:25	10/02/19 16:19			NA
A9J0006-18	Sediment	EPA 8000C	09/27/19 11:54	10/02/19 16:19			NA
A9J0006-20	Sediment	EPA 8000C	09/27/19 12:10	10/02/19 16:19			NA
Batch: 9100630							
A9J0006-21	Sediment	EPA 8000C	09/27/19 09:00	10/03/19 14:52			NA
A9J0006-22	Sediment	EPA 8000C	09/27/19 08:30	10/03/19 14:52			NA
A9J0006-23	Sediment	EPA 8000C	09/27/19 19:30	10/03/19 14:52			NA

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AMENDED REPORT

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

SAMPLE PREPARATION INFORMATION

Percent Dry Weight

Prep: Total Solids (SM2540G/PSEP)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A9J0006-24	Sediment	EPA 8000C	09/27/19 14:35	10/03/19 14:52			NA
A9J0006-25	Sediment	EPA 8000C	09/27/19 14:35	10/03/19 14:52			NA

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Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

Analytical Resources, Inc.

SAMPLE PREPARATION INFORMATION

Metals and Metallic Compounds

Prep: SMM EPA 7471B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: BHJ0445							
A9J0006-01	Sediment	EPA 7471B	09/27/19 13:13	10/15/19 08:15	0.271g/50mL	0.2g/50mL	0.74
A9J0006-03	Sediment	EPA 7471B	09/27/19 14:02	10/15/19 08:15	0.248g/50mL	0.2g/50mL	0.81
A9J0006-05	Sediment	EPA 7471B	09/27/19 10:23	10/15/19 08:15	0.207g/50mL	0.2g/50mL	0.97
A9J0006-06	Sediment	EPA 7471B	09/27/19 09:47	10/15/19 08:15	0.224g/50mL	0.2g/50mL	0.89
A9J0006-07	Sediment	EPA 7471B	09/27/19 11:44	10/15/19 08:15	0.245g/50mL	0.2g/50mL	0.82
A9J0006-08	Sediment	EPA 7471B	09/27/19 15:07	10/15/19 08:15	0.207g/50mL	0.2g/50mL	0.97
A9J0006-13	Sediment	EPA 7471B	09/27/19 18:15	10/15/19 08:15	0.232g/50mL	0.2g/50mL	0.86
A9J0006-14	Sediment	EPA 7471B	09/27/19 18:40	10/15/19 08:15	0.275g/50mL	0.2g/50mL	0.73
A9J0006-16	Sediment	EPA 7471B	09/27/19 17:25	10/15/19 08:15	0.287g/50mL	0.2g/50mL	0.70
A9J0006-18	Sediment	EPA 7471B	09/27/19 11:54	10/15/19 08:15	0.243g/50mL	0.2g/50mL	0.82
A9J0006-20	Sediment	EPA 7471B	09/27/19 12:10	10/15/19 08:15	0.25g/50mL	0.2g/50mL	0.80
A9J0006-21	Sediment	EPA 7471B	09/27/19 09:00	10/15/19 08:15	0.227g/50mL	0.2g/50mL	0.88
A9J0006-22	Sediment	EPA 7471B	09/27/19 08:30	10/15/19 08:15	0.219g/50mL	0.2g/50mL	0.91
A9J0006-23	Sediment	EPA 7471B	09/27/19 19:30	10/15/19 08:15	0.234g/50mL	0.2g/50mL	0.86
A9J0006-24	Sediment	EPA 7471B	09/27/19 14:35	10/15/19 08:15	0.213g/50mL	0.2g/50mL	0.94
A9J0006-25	Sediment	EPA 7471B	09/27/19 14:35	10/15/19 08:15	0.292g/50mL	0.2g/50mL	0.69

Wet Chemistry

Prep: No Prep Wet Chem

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: BHJ0088							
A9J0006-01	Sediment	PSEP 1986	09/27/19 13:13	10/02/19 17:56	5g/5g	5g/5g	1.00
A9J0006-03	Sediment	PSEP 1986	09/27/19 14:02	10/02/19 17:56	5g/5g	5g/5g	1.00
A9J0006-05	Sediment	PSEP 1986	09/27/19 10:23	10/02/19 17:56	5g/5g	5g/5g	1.00
A9J0006-06	Sediment	PSEP 1986	09/27/19 09:47	10/02/19 17:56	5g/5g	5g/5g	1.00
A9J0006-07	Sediment	PSEP 1986	09/27/19 11:44	10/02/19 17:56	5g/5g	5g/5g	1.00
A9J0006-08	Sediment	PSEP 1986	09/27/19 15:07	10/02/19 17:56	5g/5g	5g/5g	1.00
A9J0006-13	Sediment	PSEP 1986	09/27/19 18:15	10/02/19 17:56	5g/5g	5g/5g	1.00
A9J0006-14	Sediment	PSEP 1986	09/27/19 18:40	10/02/19 17:56	5g/5g	5g/5g	1.00
A9J0006-16	Sediment	PSEP 1986	09/27/19 17:25	10/02/19 17:56	5g/5g	5g/5g	1.00
A9J0006-18	Sediment	PSEP 1986	09/27/19 11:54	10/02/19 17:56	5g/5g	5g/5g	1.00
A9J0006-20	Sediment	PSEP 1986	09/27/19 12:10	10/02/19 17:56	5g/5g	5g/5g	1.00
A9J0006-21	Sediment	PSEP 1986	09/27/19 09:00	10/02/19 17:56	5g/5g	5g/5g	1.00
A9J0006-22	Sediment	PSEP 1986	09/27/19 08:30	10/02/19 17:56	5g/5g	5g/5g	1.00

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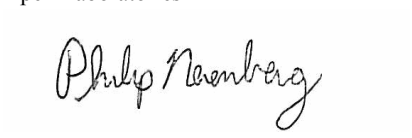

Philip Nerenberg, Lab Director

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EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

Analytical Resources, Inc.

SAMPLE PREPARATION INFORMATION

Wet Chemistry

Prep: No Prep Wet Chem

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A9J0006-23	Sediment	PSEP 1986	09/27/19 19:30	10/02/19 17:56	5g/5g	5g/5g	1.00
A9J0006-24	Sediment	PSEP 1986	09/27/19 14:35	10/02/19 17:56	5g/5g	5g/5g	1.00
A9J0006-25	Sediment	PSEP 1986	09/27/19 14:35	10/02/19 17:56	5g/5g	5g/5g	1.00
Batch: BHJ0091							
A9J0006-01	Sediment	SM 4500-S2 D-00	09/27/19 13:13	10/03/19 09:16	5.093g/100mL	5g/100mL	0.98
A9J0006-03	Sediment	SM 4500-S2 D-00	09/27/19 14:02	10/03/19 09:16	5.226g/100mL	5g/100mL	0.96
A9J0006-05	Sediment	SM 4500-S2 D-00	09/27/19 10:23	10/03/19 09:16	5.327g/100mL	5g/100mL	0.94
A9J0006-06	Sediment	SM 4500-S2 D-00	09/27/19 09:47	10/03/19 09:16	5.064g/100mL	5g/100mL	0.99
A9J0006-07	Sediment	SM 4500-S2 D-00	09/27/19 11:44	10/03/19 09:16	5.556g/100mL	5g/100mL	0.90
A9J0006-08	Sediment	SM 4500-S2 D-00	09/27/19 15:07	10/03/19 09:16	5.143g/100mL	5g/100mL	0.97
A9J0006-13	Sediment	SM 4500-S2 D-00	09/27/19 18:15	10/03/19 09:16	5.376g/100mL	5g/100mL	0.93
A9J0006-14	Sediment	SM 4500-S2 D-00	09/27/19 18:40	10/03/19 09:16	5.318g/100mL	5g/100mL	0.94
A9J0006-16	Sediment	SM 4500-S2 D-00	09/27/19 17:25	10/03/19 09:16	5.768g/100mL	5g/100mL	0.87
A9J0006-18	Sediment	SM 4500-S2 D-00	09/27/19 11:54	10/03/19 09:16	5.384g/100mL	5g/100mL	0.93
Batch: BHJ0124							
A9J0006-20	Sediment	SM 4500-S2 D-00	09/27/19 12:10	10/04/19 08:57	5.729g/100mL	5g/100mL	0.87
A9J0006-21	Sediment	SM 4500-S2 D-00	09/27/19 09:00	10/04/19 08:57	5.324g/100mL	5g/100mL	0.94
A9J0006-22	Sediment	SM 4500-S2 D-00	09/27/19 08:30	10/04/19 08:57	5.019g/100mL	5g/100mL	1.00
A9J0006-23	Sediment	SM 4500-S2 D-00	09/27/19 19:30	10/04/19 08:57	5.591g/100mL	5g/100mL	0.89
A9J0006-24	Sediment	SM 4500-S2 D-00	09/27/19 14:35	10/04/19 08:57	5.149g/100mL	5g/100mL	0.97
A9J0006-25	Sediment	SM 4500-S2 D-00	09/27/19 14:35	10/04/19 08:57	5.232g/100mL	5g/100mL	0.96

Wet Chemistry

Prep: No Prep Wet Chem

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: BHJ0145							
A9J0006-02	Water	SM 4500-S2 D-00	09/27/19 13:13	10/04/19 13:20	5mL/5mL	5mL/5mL	1.00
A9J0006-04	Water	SM 4500-S2 D-00	09/27/19 13:13	10/04/19 13:20	5mL/5mL	5mL/5mL	1.00
A9J0006-15	Water	SM 4500-S2 D-00	09/27/19 18:40	10/04/19 13:20	5mL/5mL	5mL/5mL	1.00
A9J0006-17	Water	SM 4500-S2 D-00	09/27/19 17:25	10/04/19 13:20	5mL/5mL	5mL/5mL	1.00
A9J0006-19	Water	SM 4500-S2 D-00	09/27/19 11:54	10/04/19 13:20	5mL/5mL	5mL/5mL	1.00
A9J0006-26	Water	SM 4500-S2 D-00	09/27/19 09:00	10/04/19 13:20	5mL/5mL	5mL/5mL	1.00

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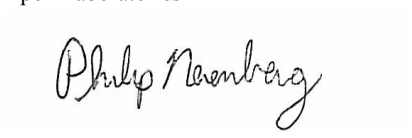

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AMENDED REPORT

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

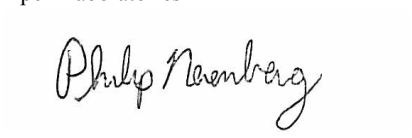
Apex Laboratories

A-01	Puck Mill Grind Blank
C-07	Extract has undergone Sulfuric Acid Cleanup by EPA 3665A, Sulfur Cleanup by EPA 3660B, and Florisil Cleanup by EPA 3620B in order to minimize matrix interference.
GS-01	See detailed Particle Size Analysis results, accumulation curves, and Case Narratives at the end of this report.
Ja	Estimated Result. Result detected below the lowest point of the calibration curve, but above the specified MDL.
M-04	Due to matrix interference, this analyte cannot be accurately quantified. The reported result may contain a high bias.
M-05	Estimated results. Peak separation for structural isomers is insufficient for accurate quantification.
P-10	Result estimated due to the presence of multiple PCB Aroclors and/or matrix interference.
Q-01	Spike recovery and/or RPD is outside acceptance limits.
Q-03	Spike recovery and/or RPD is outside control limits due to the high concentration of analyte present in the sample.
Q-04	Spike recovery and/or RPD is outside control limits due to a non-homogeneous sample matrix.
Q-05	Analyses are not controlled on RPD values from sample and duplicate concentrations that are below 5 times the reporting level.
Q-11	Spike recovery cannot be accurately quantified due to sample dilution required for high analyte concentration and/or matrix interference.
Q-29	Recovery for Lab Control Spike (LCS) is above the upper control limit. Data may be biased high.
Q-31	Estimated Results. Recovery of Continuing Calibration Verification sample below lower control limit for this analyte. Results are likely biased low.
Q-41	Estimated Results. Recovery of Continuing Calibration Verification sample above upper control limit for this analyte. Results are likely biased high.
Q-42	Matrix Spike and/or Duplicate analysis was performed on this sample. % Recovery or RPD for this analyte is outside laboratory control limits. (Refer to the QC Section of Analytical Report.)
Q-52	Due to erratic or low blank spike recoveries, results for this analyte are considered Estimated Values.
R-04	Reporting levels elevated due to preparation and/or analytical dilution necessary for analysis.
S-03	Reextraction and analysis, or analysis of laboratory duplicate, confirms surrogate failure due to sample matrix effect.
S-06	Surrogate recovery is outside of established control limits.

Analytical Resources, Inc.

*****	Flagged value is not within established control limits.
D	The reported value is from a dilution
J	Estimated concentration value detected below the reporting limit.

Apex Laboratories



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Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

U This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).

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REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

Apex Laboratories



Philip Nerenberg, Lab Director

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Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

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Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

LABORATORY ACCREDITATION INFORMATION

TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories



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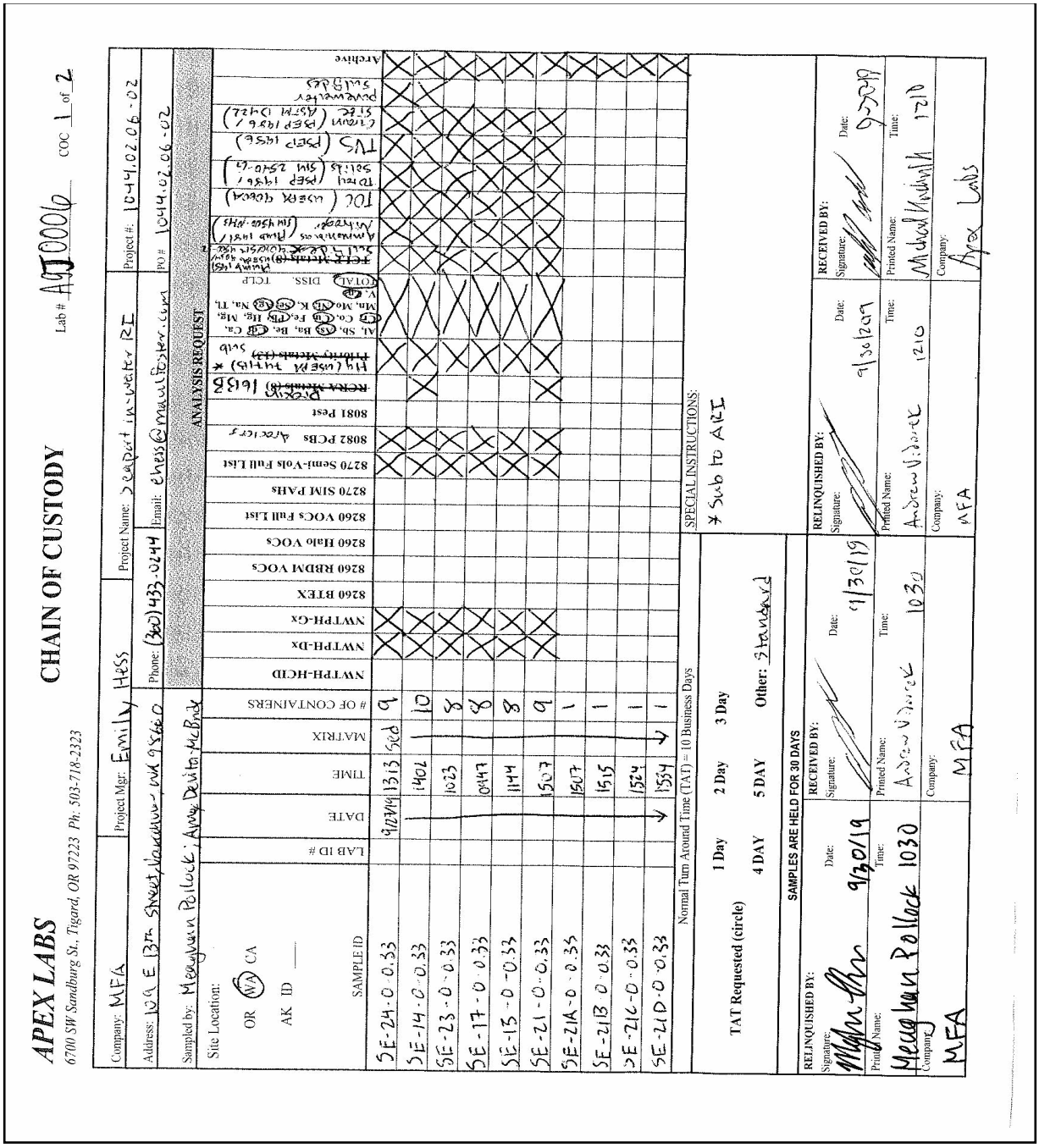
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**



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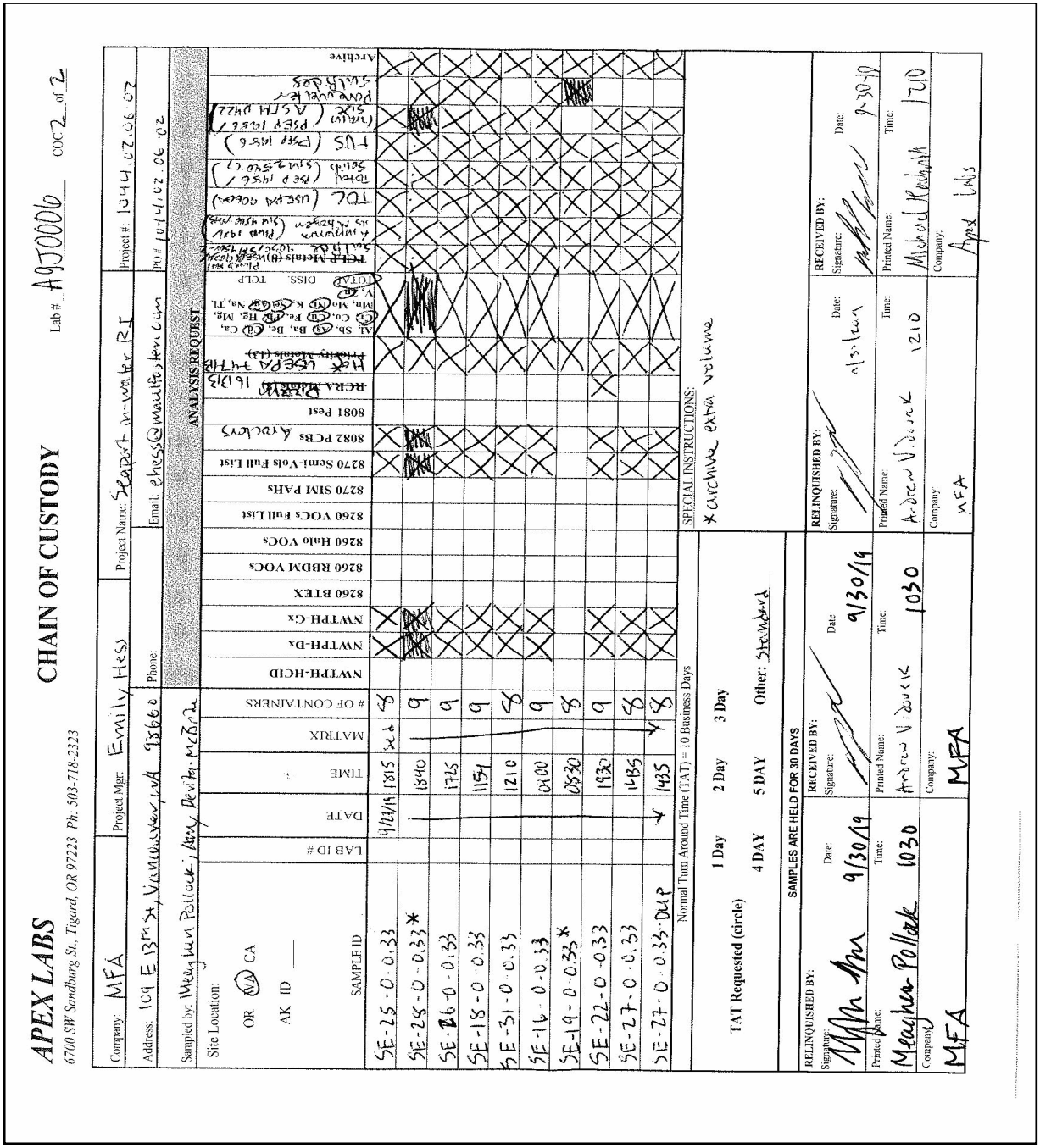

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

1/3

APEX LABS COOLER RECEIPT FORM

Client: MFA Element WO#: A9 J0006

Project/Project #: Seaport in-water RI / 1044.02.06-02

Delivery Info:

Date/time received: 9-30-19 @ 1210 By: MK

Delivered by: Apex X Client ESS FedEx UPS Swift Senvoy SDS Other

Cooler Inspection Date/time inspected: 9-30-19 @ 1330 By: MK

Chain of Custody included? Yes X No Custody seals? Yes No X

Signed/dated by client? Yes X No

Signed/dated by Apex? Yes X No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	2.3	3.0	1.6	4.8	1.9	5.5	1.3
Received on ice? (Y/N)	Y	Y	Y	Y	Y	Y	Y
Temp. blanks? (Y/N)	Y	Y	Y	Y	Y	Y	
Ice type: (Gel/Real/Other)	Real	"	"	"	"	"	"
Condition:	good	"	"	"	"	"	"

Cooler out of temp? (Y/N) Possible reason why:

If some coolers are in temp and some out, were green dots applied to out of temperature samples? Yes/No/NA

Out of temperature samples form initiated? Yes/No/NA

Samples Inspection: Date/time inspected: 10/1/19 @ 1004 By:

All samples intact? Yes X No Comments:

Bottle labels/COCs agree? Yes No X Comments: See form

COC/container discrepancies form initiated? Yes X No NA

Containers/volumes received appropriate for analysis? Yes X No Comments:

Do VOA vials have visible headspace? Yes No NA X

Comments

Water samples: pH checked: Yes No NA X pH appropriate? Yes No NA X

Comments:

Additional information:

Labeled by: Witness: MK Cooler Inspected by: CFH See Project Contact Form: Y

Apex Laboratories

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Philip Nerenberg

Philip Nerenberg, Lab Director

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

2/3

APEX LABS COOLER RECEIPT FORM

Client: MFA Element WO#: A9 J0006

Project/Project #: Seaport in-water RI / 1044.02.06-02

Delivery Info:

Date/time received: 9-30-19 @ 1210 By: MK

Delivered by: Apex X Client ESS FedEx UPS Swift Senvoy SDS Other

Cooler Inspection Date/time inspected: 9-30-19 @ 1330 By: MK

Chain of Custody included? Yes X No Custody seals? Yes No X

Signed/dated by client? Yes X No

Signed/dated by Apex? Yes X No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	1.8						
Received on ice? (Y/N)	Y						
Temp. blanks? (Y/N)	Y						
Ice type: (Gel/Real/Other)	Real	"	"	"	"	"	"
Condition:	good						

MK 9-30

Cooler out of temp? (Y/N) Possible reason why:

If some coolers are in temp and some out, were green dots applied to out of temperature samples? Yes/No/NA

Out of temperature samples form initiated? Yes/No/NA

Samples Inspection: Date/time inspected: 10/1/19 @ 1004 By:

All samples intact? Yes X No Comments:

Bottle labels/COCs agree? Yes No X Comments: See form

COC/container discrepancies form initiated? Yes X No NA

Containers/volumes received appropriate for analysis? Yes X No Comments:

Do VOA vials have visible headspace? Yes No NA X

Comments

Water samples: pH checked: Yes No NA X pH appropriate? Yes No NA X

Comments:

Additional information:

Labeled by: Witness: Cooler Inspected by: See Project Contact Form: Y

AMC CFH

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A9J0006 - 01 09 20 1630**

A9J0006 3/3

COC/Container Discrepancies

COC Reads	Container Reads/Comments
SE-15-0-0.33 T of 1144	T of 1114 on all containers
SE-28-0-0.33	4 oz zinc acetate preserved jar received w/ no label, matched by process of elimination
SE-~~26~~ 04 -0-0.33 10/30/19	3/5 16 oz jars read SE-06-0-0.33 w/ no D

Apex Laboratories

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC

Particle Size Analysis of Soil by ASTM D 422

Sample ID:	A9J0006-01		Client Sample ID:	SE-24-0-0.33		Batch Number:	9100866
Data Entered by:	SJL	Date:	10/14/19	Data Reviewed by:	JW	Date:	10/17/19
Sample Description:	Gravelly SILT with some Clay and trace Sand			Max Particle Size:	Gravel		
Particle Shape:	Sub-angular to Sub-rounded			Hardness	Hard and Durable		

Whole Sample	Tare	Air Dry + Tare	Air Dry	Moisture	Dry Wt.
	11.876	257.487	245.61	8.46	226.5

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Wt. Retained	% Retained	% Passing
4	4.75	6.054	82.823	76.77	76.77	33.9	66.1
10	2.00	6.117	15.839	9.72	86.49	4.3	61.8
Pan		11.884	167.170	155.29	241.78	62.8	

Hygroscopic Moisture Correction

	Hygroscopic Correction Factor	Oven Sample	Pan No.	Tare	Air Dry + Tare	Oven Dry + Tare	Moisture
	0.9220		J00601	1.308	16.956	15.736	8.46

Hydrometer Analysis

Start Date/Time	10/9/2019	10:53	Dispersing Agent	$NaPO_3$
Air Dry Sample Wt. for Hydrometer Test (g)	50.072		G_s Correction Factor (α)	1.000
Percent Passing No.10 Sieve	61.8		Specific Gravity (G_s)	2.65
Dry Weight of Soil Tested (g)	46.17		Corrected Dry Weight of Soil Tested (g) (W)	74.70

Elapsed Time (min)	Hydrometer Reading	Temperature (°C)	Corrected Hydrometer Reading [R]	% Finer of Hydrometer Sample	L	K	Particle Diameter (mm)	Percent Passing
1	41.5	19.5	35.11	47.0	9.2	0.01365	0.041	29.05
2	38.5	19.6	32.15	43.0	9.7	0.01365	0.030	26.60
4	34	19.6	27.65	37.0	10.5	0.01365	0.022	22.88
8	28.5	19.7	22.18	29.7	11.4	0.01365	0.016	18.35
15	26	19.6	19.65	26.3	11.9	0.01365	0.012	16.26
30	21.5	19.6	15.15	20.3	12.5	0.01365	0.009	12.53
60	18.5	19.5	12.11	16.2	13	0.01365	0.006	10.02
90	16.5	19.4	10.08	13.5	13.3	0.01382	0.005	8.34
120	15.5	19.3	9.05	12.1	13.5	0.01382	0.005	7.49
240	14.5	19.4	8.08	10.8	13.7	0.01382	0.003	6.69
360	13.5	19.6	7.15	9.6	13.8	0.01365	0.003	5.91
1440	11.5	18.5	4.78	6.4	14.2	0.01382	0.001	3.95

Sieve Analysis of Portion Finer Than No. 10 Sieve

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Retained	% Retained	% Passing
20	0.850	1.297	4.455	3.16	96.28	4.2	57.6
40	0.425	1.309	4.414	3.11	105.91	4.2	53.4
60	0.250	1.315	3.130	1.82	111.54	2.4	51.0
100	0.150	1.337	2.249	0.91	114.37	1.2	49.8
140	0.105	1.337	1.847	0.51	115.95	0.7	49.1
200	0.075	1.310	1.975	0.67	118.02	0.9	48.2
230	0.063	1.319	1.806	0.49	119.53	0.7	47.5
			Sum	10.65	230 Minus	35.52	

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Sample ID: SE-24-0-0.33 (A9J0006-01)

Grain Size Analysis Summary from Sieving and Hydrometer Testing		Particle Size (mm)	Percent Finer	Total Percent of Sample
Gravel				*38.19*
Retained on No. 4 sieve		4.75	66.1	33.9
Gravel, passing No. 4 sieve and retained on No. 10 sieve		2.00	61.81	4.29
Sand				*14.26*
Coarse sand, passing No.10 sieve and retained on No. 20 sieve		0.8500	57.58	4.23
Medium sand, passing No.20 sieve and retained on No. 40 sieve		0.4250	53.42	4.16
Medium sand, passing No.40 sieve and retained on No. 60 sieve		0.2500	50.99	2.43
Medium sand, passing No. 60 sieve and retained on No.100 sieve		0.1500	49.77	1.22
Fine sand, passing No. 100 sieve and retained on No.140 sieve		0.1060	49.09	0.68
Fine sand passing No. 140 sieve and retained on No. 200 sieve		0.0750	48.2	0.89
Fine sand, passing No. 200 sieve and retained on No. 230 sieve		0.0630	47.55	0.65
Silt and Clay (Measurements in the Clay fraction are noted)				*47.55*
Hydrometer Test		0.0414	29.05	18.49
Hydrometer Test		0.0301	26.6	2.45
Hydrometer Test		0.0221	22.88	3.72
Hydrometer Test		0.0163	18.35	4.52
Hydrometer Test		0.0122	16.26	2.1
Hydrometer Test		0.0088	12.53	3.72
Hydrometer Test		0.0064	10.02	2.51
Hydrometer Test		0.0053	8.34	1.68
Hydrometer Test	Clay	0.0046	7.49	0.86
Hydrometer Test	Clay	0.0033	6.69	0.8
Hydrometer Test	Clay	0.0027	5.91	0.77
Hydrometer Test	Clay	0.0014	3.95	1.96

Grain Size Summary	Percent of Total Sample
Gravel	38.2
Sand	14.3
Coarse sand	4.2
Medium sand	7.8
Fine sand	2.2
Silt	39.2
Clay	8.3

Case Narrative for Sample ID: SE-24-0-0.33 (A9J0006-01)

This data is not to be used for engineering purposes.

No difficulty dispersing the fraction passing the No. 10 sieve.

Dispersion device used: Commercial drink mixer operating at least 10,000 rpm for one minute.

The assumed specific gravity used in the calculations was 2.65.

Abundant organic and possible anthropogenic material present in +4 and +10 fractions.

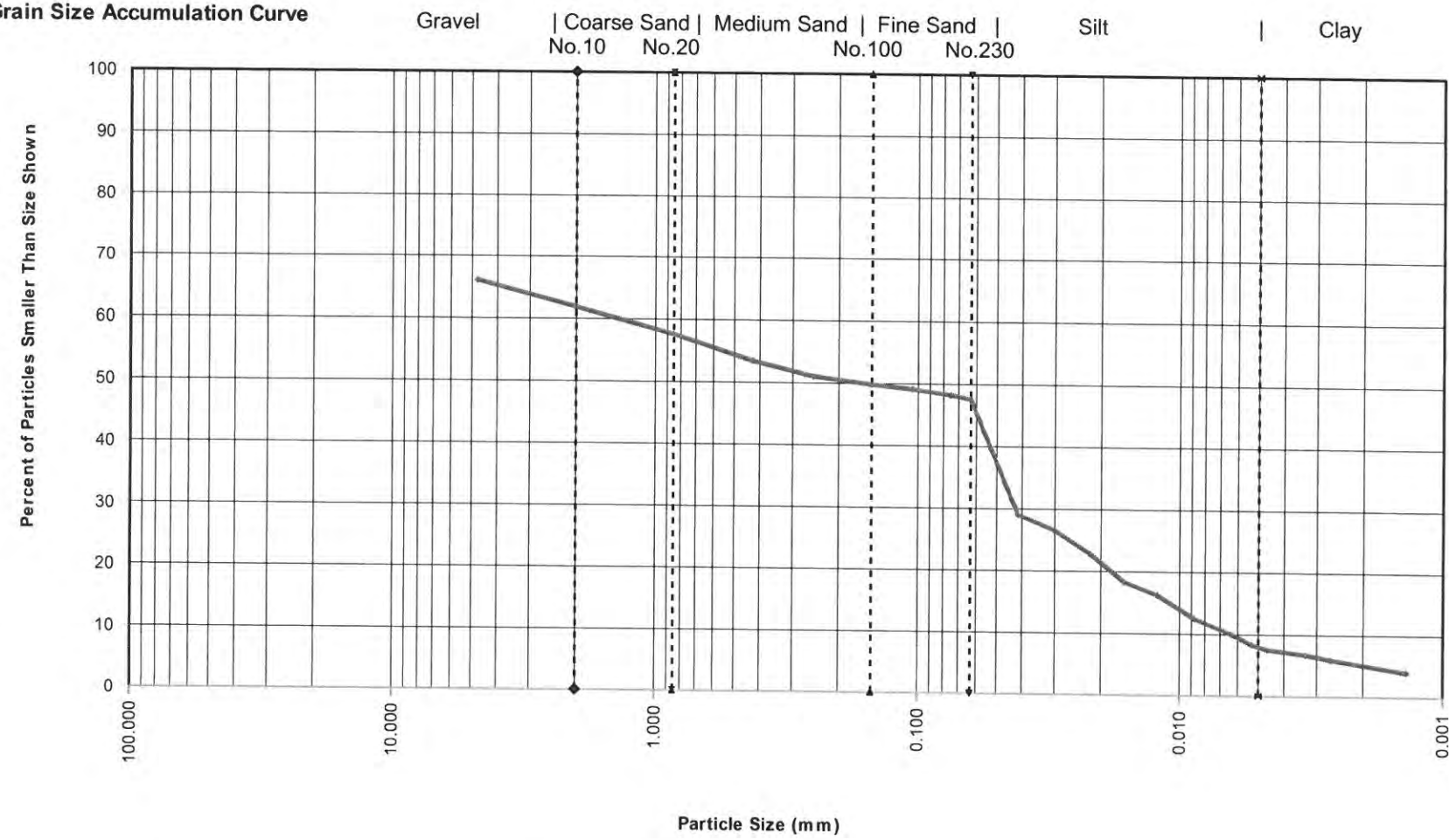
+20 to +100 fractions consist mostly of organic material.



Expires 12/31/19

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Grain Size Accumulation Curve



Sample ID:	SE-24-0-0.33 (A9J0006-01)			
Specific Gravity	MAXIMUM PARTICLE SIZE	GRAVEL & SAND		SOIL DESCRIPTION
		PARTICLE SHAPE	HARDNESS	
2.65	Gravel	Sub-angular to Sub-rounded	Hard and Durable	Gravelly SILT with some Clay and trace Sand

Apex Laboratories, LLC

Particle Size Analysis of Soil by ASTM D 422

Sample ID:	A9J0006-03		Client Sample ID:	SE-14-0-0.33		Batch Number:	9100866
Data Entered by:	SJL	Date:	10/14/19	Data Reviewed by:	JW	Date:	10/17/19
Sample Description:	SILT with some Sand, Gravel, and Clay			Max Particle Size:	Gravel		
Particle Shape:	Sub-angular to Sub-rounded			Hardness	Hard and Durable		

Whole Sample	Tare	Air Dry + Tare	Air Dry	Moisture	Dry Wt.
	12.021	222.441	210.42	7.28	196.1

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Wt. Retained	% Retained	% Passing
4	4.75	6.091	31.048	24.96	24.96	12.7	87.3
10	2.00	1.315	20.272	18.96	43.91	9.7	77.6
Pan		12.026	176.381	164.36	208.27	77.7	

Hygroscopic Moisture Correction

	Hygroscopic Correction Factor	Oven Sample	Pan No.	Tare	Air Dry + Tare	Oven Dry + Tare	Moisture
	0.9321		J006-03	1.324	22.026	20.621	7.28

Hydrometer Analysis

Start Date/Time	10/9/2019	11:16	Dispersing Agent	$NaPO_3$
Air Dry Sample Wt. for Hydrometer Test (g)	53.419		G_s Correction Factor (α)	1.000
Percent Passing No.10 Sieve	77.6		Specific Gravity (G_s)	2.65
Dry Weight of Soil Tested (g)	49.79		Corrected Dry Weight of Soil Tested (g) (W)	64.16

Elapsed Time (min)	Hydrometer Reading	Temperature (°C)	Corrected Hydrometer Reading [R]	% Finer of Hydrometer Sample	L	K	Particle Diameter (mm)	Percent Passing
1	37	19.7	30.68	47.8	10.1	0.01365	0.043	37.11
2	33.5	19.7	27.18	42.4	10.5	0.01365	0.031	32.88
4	29.5	19.5	23.11	36.0	11.2	0.01365	0.023	27.96
8	26.5	19.6	20.15	31.4	11.7	0.01365	0.017	24.37
15	21.5	19.8	15.21	23.7	12.5	0.01365	0.012	18.40
30	17.5	19.7	11.18	17.4	13.2	0.01365	0.009	13.52
60	15	19.5	8.61	13.4	13.7	0.01365	0.007	10.42
90	14	19.4	7.58	11.8	13.8	0.01382	0.005	9.17
120	13	19.5	6.61	10.3	14	0.01365	0.005	8.00
240	12	19.5	5.61	8.7	14.2	0.01365	0.003	6.79
360	11.5	19.5	5.11	8.0	14.2	0.01365	0.003	6.19
1440	10.5	18.6	3.81	5.9	14.3	0.01382	0.001	4.61

Sieve Analysis of Portion Finer Than No. 10 Sieve

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Retained	% Retained	% Passing
20	0.850	1.335	8.016	6.68	64.47	10.4	67.2
40	0.425	1.312	6.011	4.70	78.93	7.3	59.9
60	0.250	1.326	4.442	3.12	88.51	4.9	55.0
100	0.150	1.314	2.998	1.68	93.70	2.6	52.4
140	0.105	1.321	1.922	0.60	95.54	0.9	51.5
200	0.075	1.306	1.804	0.50	97.08	0.8	50.7
230	0.063	1.310	1.529	0.22	97.75	0.3	50.3
			Sum	17.50	230 Minus	32.30	

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Sample ID: SE-14-0-0.33 (A9J0006-03)

Grain Size Analysis Summary from Sieving and Hydrometer Testing		Particle Size (mm)	Percent Finer	Total Percent of Sample
Gravel				*22.39*
Retained on No. 4 sieve		4.75	87.28	12.72
Gravel, passing No. 4 sieve and retained on No. 10 sieve		2.00	77.61	9.67
Sand				*27.27*
Coarse sand, passing No.10 sieve and retained on No. 20 sieve		0.8500	67.2	10.41
Medium sand, passing No.20 sieve and retained on No. 40 sieve		0.4250	59.87	7.32
Medium sand, passing No.40 sieve and retained on No. 60 sieve		0.2500	55.02	4.86
Medium sand, passing No. 60 sieve and retained on No.100 sieve		0.1500	52.39	2.62
Fine sand, passing No. 100 sieve and retained on No.140 sieve		0.1060	51.46	0.94
Fine sand passing No. 140 sieve and retained on No. 200 sieve		0.0750	50.68	0.78
Fine sand, passing No. 200 sieve and retained on No. 230 sieve		0.0630	50.34	0.34
Silt and Clay (Measurements in the Clay fraction are noted)				*50.34*
Hydrometer Test		0.0434	37.11	13.22
Hydrometer Test		0.0313	32.88	4.23
Hydrometer Test		0.0228	27.96	4.92
Hydrometer Test		0.0165	24.37	3.59
Hydrometer Test		0.0125	18.4	5.97
Hydrometer Test		0.0091	13.52	4.88
Hydrometer Test		0.0065	10.42	3.11
Hydrometer Test		0.0054	9.17	1.25
Hydrometer Test	Clay	0.0047	8	1.17
Hydrometer Test	Clay	0.0033	6.79	1.21
Hydrometer Test	Clay	0.0027	6.19	0.6
Hydrometer Test	Clay	0.0014	4.61	1.57

Grain Size Summary	Percent of Total Sample
Gravel	22.4
Sand	27.3
Coarse sand	10.4
Medium sand	14.8
Fine sand	2.1
Silt	41.2
Clay	9.2

Case Narrative for Sample ID: SE-14-0-0.33 (A9J0006-03)

This data is not to be used for engineering purposes.

No difficulty dispersing the fraction passing the No. 10 sieve.

Dispersion device used: Commercial drink mixer operating at least 10,000 rpm for one minute.

The assumed specific gravity used in the calculations was 2.65.

Organic and possible anthropogenic material present in +4 and +10 fractions.

+20 to +100 fractions consist mostly of organic material.



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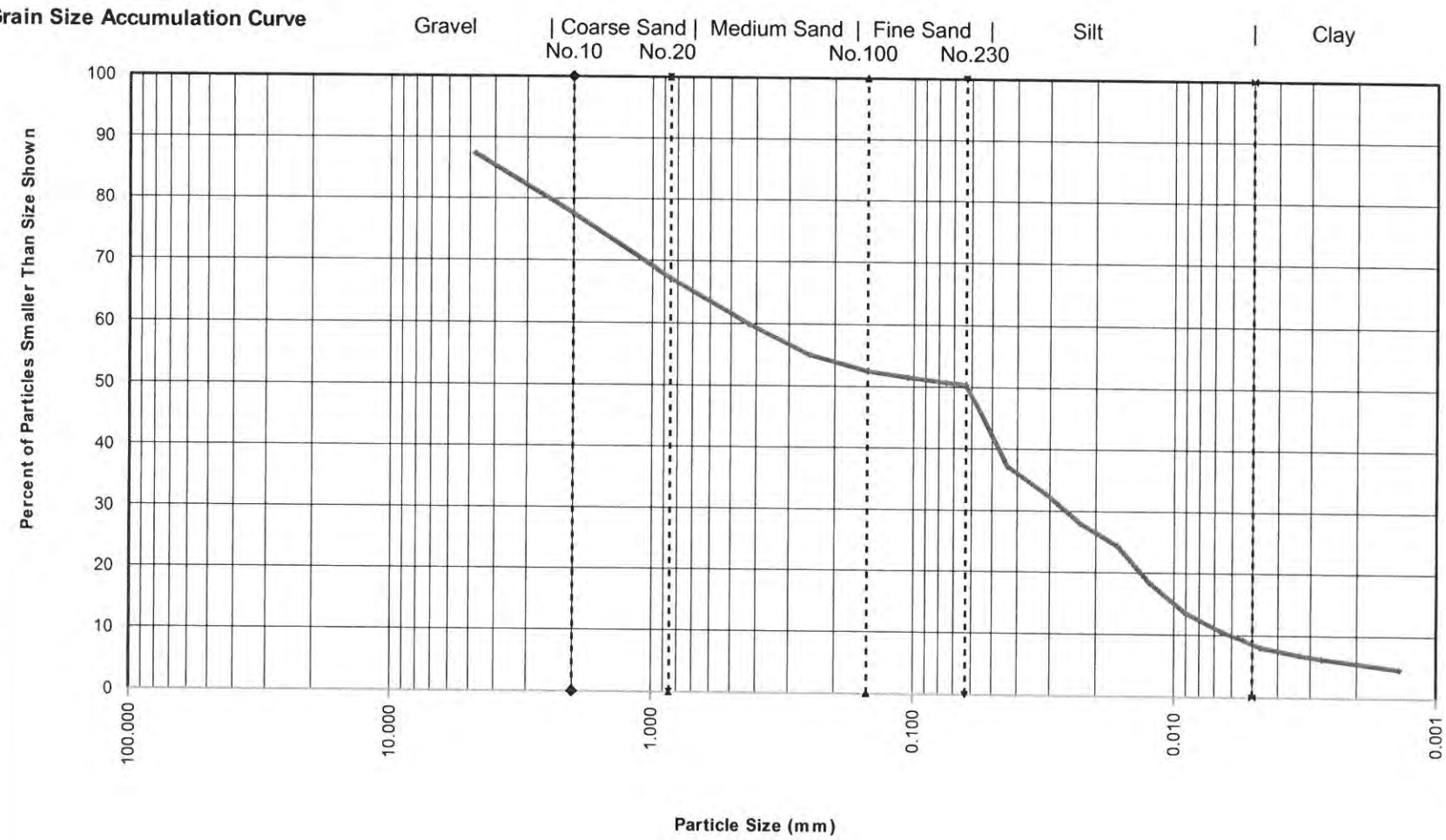
Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Grain Size Accumulation Curve



Sample ID:	SE-14-0-0.33 (A9J0006-03)			
Specific Gravity	MAXIMUM PARTICLE SIZE	GRAVEL & SAND		SOIL DESCRIPTION
		PARTICLE SHAPE	HARDNESS	
2.65	Gravel	Sub-angular to Sub-rounded	Hard and Durable	SILT with some Sand, Gravel, and Clay

Apex Laboratories, LLC

Particle Size Analysis of Soil by ASTM D 422

Sample ID:	A9J0006-05		Client Sample ID:	SE-23-0-0.33		Batch Number:	9100866
Data Entered by:	SJL	Date:	10/14/19	Data Reviewed by:	JW	Date:	10/17/19
Sample Description:	Clayey Sandy SILT with trace Gravel			Max Particle Size:	Gravel		
Particle Shape:	Angular to Sub-rounded			Hardness	Hard and Durable		

Whole Sample	Tare	Air Dry + Tare	Air Dry	Moisture	Dry Wt.
	11.873	333.313	321.44	6.52	301.8

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Wt. Retained	% Retained	% Passing
4	4.75	1.340	13.377	12.04	12.04	4.0	96.0
10	2.00	1.320	12.961	11.64	23.68	3.9	92.2
Pan		11.879	307.975	296.10	319.77	91.7	

Hygroscopic Moisture Correction

	Hygroscopic Correction Factor	Oven Sample	Pan No.	Tare	Air Dry + Tare	Oven Dry + Tare	Moisture
	0.9388		J006-05	1.303	21.078	19.867	6.52

Hydrometer Analysis

Start Date/Time	10/9/2019	11:39	Dispersing Agent	$NaPO_3$
Air Dry Sample Wt. for Hydrometer Test (g)	53.283		G_s Correction Factor (α)	1.000
Percent Passing No.10 Sieve	92.2		Specific Gravity (G_s)	2.65
Dry Weight of Soil Tested (g)	50.02		Corrected Dry Weight of Soil Tested (g) (W)	54.28

Elapsed Time (min)	Hydrometer Reading	Temperature (°C)	Corrected Hydrometer Reading [R]	% Finer of Hydrometer Sample	L	K	Particle Diameter (mm)	Percent Passing
1	35	19.7	30.13	55.5	10.4	0.01365	0.044	51.15
2	31.5	19.7	26.63	49.1	10.9	0.01365	0.032	45.21
4	27.5	19.8	22.66	41.7	11.5	0.01365	0.023	38.46
8	23.5	19.7	18.63	34.3	12.2	0.01365	0.017	31.63
15	20	19.7	15.13	27.9	12.9	0.01365	0.013	25.69
30	17.5	19.7	12.63	23.3	13.2	0.01365	0.009	21.44
60	15	19.6	10.11	18.6	13.7	0.01365	0.007	17.16
90	13.5	19.6	8.61	15.9	13.8	0.01365	0.005	14.61
120	12	19.6	7.11	13.1	14.2	0.01365	0.005	12.06
240	11	19.5	6.08	11.2	14.3	0.01365	0.003	10.32
360	10.5	19.6	5.61	10.3	14.3	0.01365	0.003	9.52
1440	9	18.6	3.85	7.1	14.7	0.01382	0.001	6.54

Sieve Analysis of Portion Finer Than No. 10 Sieve

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Retained	% Retained	% Passing
20	0.850	1.334	5.237	3.90	45.37	7.2	85.0
40	0.425	1.319	4.578	3.26	63.48	6.0	79.0
60	0.250	1.331	4.151	2.82	79.15	5.2	73.8
100	0.150	1.321	5.359	4.04	101.59	7.4	66.3
140	0.105	1.318	4.129	2.81	117.21	5.2	61.1
200	0.075	1.323	4.134	2.81	132.83	5.2	56.0
230	0.063	1.325	2.512	1.19	139.43	2.2	53.8
			Sum	20.83	230 Minus	29.19	

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Sample ID: SE-23-0-0.33 (A9J0006-05)

Grain Size Analysis Summary from Sieving and Hydrometer Testing		Particle Size (mm)	Percent Finer	Total Percent of Sample
Gravel				*7.85*
Retained on No. 4 sieve		4.75	96.01	3.99
Gravel, passing No. 4 sieve and retained on No. 10 sieve		2.00	92.15	3.86
Sand				*38.37*
Coarse sand, passing No.10 sieve and retained on No. 20 sieve		0.8500	84.96	7.19
Medium sand, passing No.20 sieve and retained on No. 40 sieve		0.4250	78.96	6
Medium sand, passing No.40 sieve and retained on No. 60 sieve		0.2500	73.76	5.2
Medium sand, passing No. 60 sieve and retained on No.100 sieve		0.1500	66.32	7.44
Fine sand, passing No. 100 sieve and retained on No.140 sieve		0.1060	61.15	5.18
Fine sand passing No. 140 sieve and retained on No. 200 sieve		0.0750	55.97	5.18
Fine sand, passing No. 200 sieve and retained on No. 230 sieve		0.0630	53.78	2.19
Silt and Clay (Measurements in the Clay fraction are noted)				*53.78*
Hydrometer Test		0.0440	51.15	2.62
Hydrometer Test		0.0319	45.21	5.94
Hydrometer Test		0.0231	38.46	6.75
Hydrometer Test		0.0169	31.63	6.83
Hydrometer Test		0.0127	25.69	5.94
Hydrometer Test		0.0091	21.44	4.24
Hydrometer Test		0.0065	17.16	4.29
Hydrometer Test		0.0053	14.61	2.55
Hydrometer Test	Clay	0.0047	12.06	2.55
Hydrometer Test	Clay	0.0033	10.32	1.74
Hydrometer Test	Clay	0.0027	9.52	0.81
Hydrometer Test	Clay	0.0014	6.54	2.98

Grain Size Summary	Percent of Total Sample
Gravel	7.8
Sand	38.4
Coarse sand	7.2
Medium sand	18.6
Fine sand	12.5
Silt	39.2
Clay	14.6

Case Narrative for Sample ID: SE-23-0-0.33 (A9J0006-05)

This data is not to be used for engineering purposes.

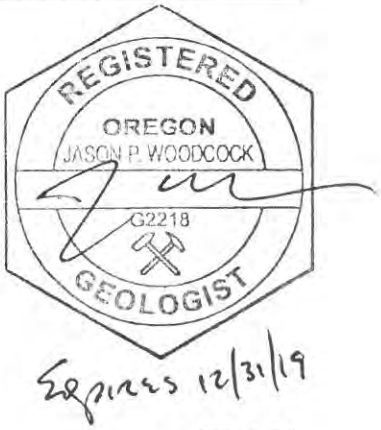
No difficulty dispersing the fraction passing the No. 10 sieve.

Dispersion device used: Commercial drink mixer operating at least 10,000 rpm for one minute.

The assumed specific gravity used in the calculations was 2.65.

Organic and anthropogenic material present in +4 fraction.

Organic material present in +10, +20, and +40 fractions.



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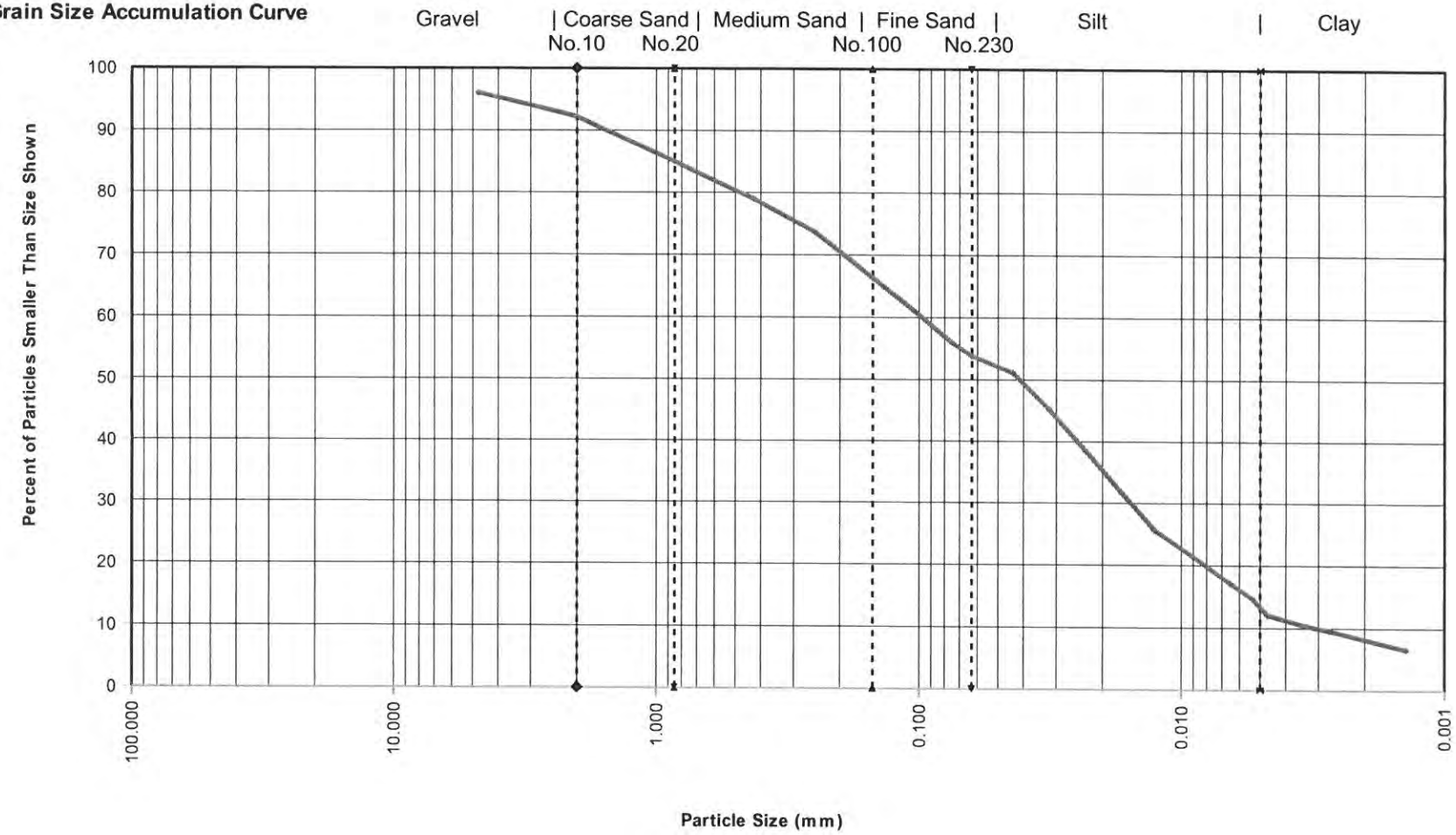
Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Grain Size Accumulation Curve



Sample ID:	SE-23-0-0.33 (A9J0006-05)			
Specific Gravity	MAXIMUM PARTICLE SIZE	GRAVEL & SAND		SOIL DESCRIPTION
		PARTICLE SHAPE	HARDNESS	
2.65	Gravel	Angular to Sub-rounded	Hard and Durable	Clayey Sandy SILT with trace Gravel

Apex Laboratories, LLC

Particle Size Analysis of Soil by ASTM D 422

Sample ID:	A9J0006-06		Client Sample ID:	SE-17-0-0.33		Batch Number:	9100866
Data Entered by:	SJL	Date:	10/14/19	Data Reviewed by:	JW	Date:	10/17/19
Sample Description:	Clayey SILT with some Sand			Max Particle Size:	Gravel		
Particle Shape:	N/A			Hardness	N/A		

Whole Sample	Tare	Air Dry + Tare	Air Dry	Moisture	Dry Wt.
	6.041	255.909	249.87	5.48	236.9

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Wt. Retained	% Retained	% Passing
4	4.75	1.322	2.055	0.73	0.73	0.3	99.7
10	2.00	1.317	1.878	0.56	1.29	0.2	99.5
Pan		6.052	253.779	247.73	249.02	98.8	

Hygroscopic Moisture Correction

	Hygroscopic Correction Factor	Oven Sample	Pan No.	Tare	Air Dry + Tare	Oven Dry + Tare	Moisture
	0.9480		J00606	1.314	28.845	27.414	5.48

Hydrometer Analysis

Start Date/Time	10/9/2019	12:00	Dispersing Agent	$NaPO_3$
Air Dry Sample Wt. for Hydrometer Test (g)	54.648		G_s Correction Factor (α)	1.000
Percent Passing No.10 Sieve	99.5		Specific Gravity (G_s)	2.65
Dry Weight of Soil Tested (g)	51.81		Corrected Dry Weight of Soil Tested (g) (W)	52.09

Elapsed Time (min)	Hydrometer Reading	Temperature (°C)	Corrected Hydrometer Reading [R]	% Finer of Hydrometer Sample	L	K	Particle Diameter (mm)	Percent Passing
1	46	19.3	41.03	78.8	8.6	0.01382	0.041	78.33
2	41.5	19.3	36.53	70.1	9.2	0.01382	0.030	69.74
4	36	19.4	31.05	59.6	10.2	0.01382	0.022	59.29
8	30.5	19.5	25.58	49.1	11.1	0.01365	0.016	48.84
15	26.5	19.5	21.58	41.4	11.7	0.01365	0.012	41.20
30	22.5	19.5	17.58	33.7	12.4	0.01365	0.009	33.56
60	20.5	19.5	15.58	29.9	12.7	0.01365	0.006	29.75
90	17.5	19.6	12.61	24.2	13.2	0.01365	0.005	24.07
120	16	19.6	11.11	21.3	13.5	0.01365	0.005	21.20
240	14.5	19.5	9.58	18.4	13.7	0.01365	0.003	18.29
360	13.5	19.6	8.61	16.5	13.8	0.01365	0.003	16.43
1440	11	18.6	5.85	11.2	14.3	0.01382	0.001	11.17

Sieve Analysis of Portion Finer Than No. 10 Sieve

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Retained	% Retained	% Passing
20	0.850	1.322	1.440	0.12	1.83	0.2	99.2
40	0.425	1.335	1.719	0.38	3.57	0.7	98.5
60	0.250	1.319	1.860	0.54	6.02	1.0	97.5
100	0.150	1.330	3.659	2.33	16.58	4.5	93.0
140	0.105	1.326	4.058	2.73	28.96	5.2	87.7
200	0.075	1.319	3.876	2.56	40.56	4.9	82.8
230	0.063	1.322	2.280	0.96	44.90	1.8	81.0
			Sum	9.62	230 Minus	42.19	

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Sample ID: SE-17-0-0.33 (A9J0006-06)

Grain Size Analysis Summary from Sieving and Hydrometer Testing		Particle Size (mm)	Percent Finer	Total Percent of Sample
Gravel				*0.55*
Retained on No. 4 sieve		4.75	99.69	0.31
Gravel, passing No. 4 sieve and retained on No. 10 sieve		2.00	99.45	0.24
Sand				*18.47*
Coarse sand, passing No.10 sieve and retained on No. 20 sieve		0.8500	99.23	0.23
Medium sand, passing No.20 sieve and retained on No. 40 sieve		0.4250	98.49	0.74
Medium sand, passing No.40 sieve and retained on No. 60 sieve		0.2500	97.45	1.04
Medium sand, passing No. 60 sieve and retained on No.100 sieve		0.1500	92.98	4.47
Fine sand, passing No. 100 sieve and retained on No.140 sieve		0.1060	87.74	5.24
Fine sand passing No. 140 sieve and retained on No. 200 sieve		0.0750	82.83	4.91
Fine sand, passing No. 200 sieve and retained on No. 230 sieve		0.0630	80.99	1.84
Silt and Clay (Measurements in the Clay fraction are noted)				*80.99*
Hydrometer Test		0.0405	78.33	2.66
Hydrometer Test		0.0296	69.74	8.59
Hydrometer Test		0.0221	59.29	10.45
Hydrometer Test		0.0161	48.84	10.45
Hydrometer Test		0.0121	41.2	7.64
Hydrometer Test		0.0088	33.56	7.64
Hydrometer Test		0.0063	29.75	3.82
Hydrometer Test		0.0052	24.07	5.68
Hydrometer Test	Clay	0.0046	21.2	2.86
Hydrometer Test	Clay	0.0033	18.29	2.91
Hydrometer Test	Clay	0.0027	16.43	1.86
Hydrometer Test	Clay	0.0014	11.17	5.26

Grain Size Summary	Percent of Total Sample
Gravel	0.5
Sand	18.5
Coarse sand	0.2
Medium sand	6.2
Fine sand	12.0
Silt	56.9
Clay	24.1

Case Narrative for Sample ID: SE-17-0-0.33 (A9J0006-06)

This data is not to be used for engineering purposes.

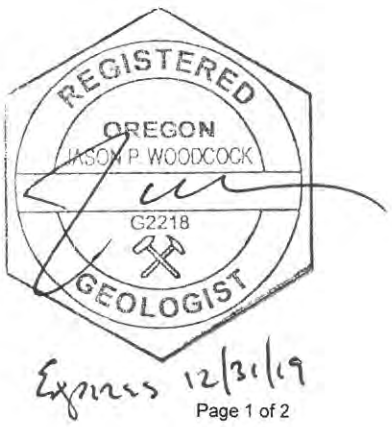
No difficulty dispersing the fraction passing the No. 10 sieve.

Dispersion device used: Commercial drink mixer operating at least 10,000 rpm for one minute.

The assumed specific gravity used in the calculations was 2.65.

+4 fraction consists entirely of organic material.

+10 fraction consists almost entirely of organic material.



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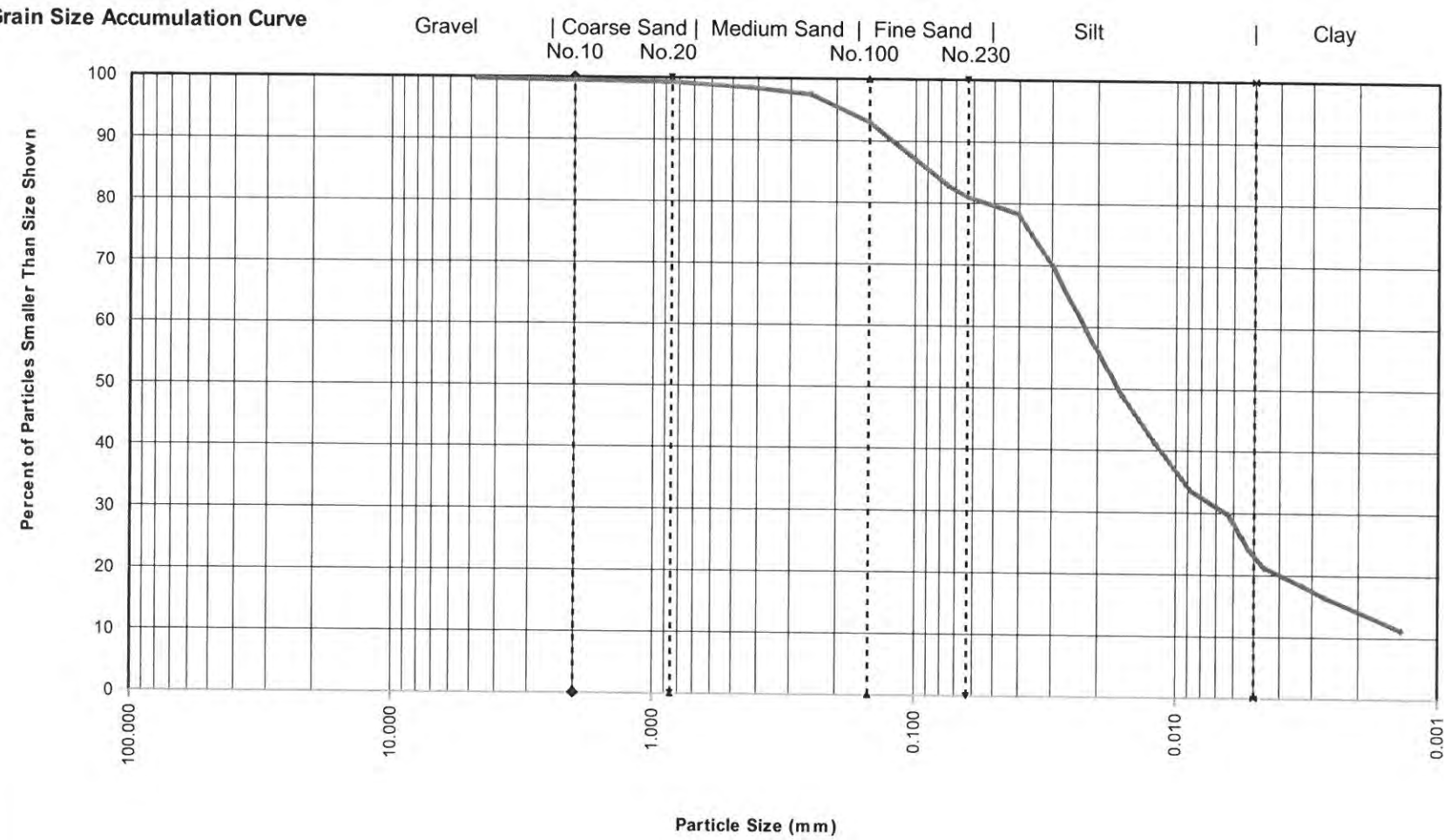
Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Grain Size Accumulation Curve



Sample ID:	SE-17-0-0.33 (A9J0006-06)			
Specific Gravity	MAXIMUM PARTICLE SIZE	GRAVEL & SAND		SOIL DESCRIPTION
		PARTICLE SHAPE	HARDNESS	
2.65	Gravel	N/A	N/A	Clayey SILT with some Sand

Apex Laboratories, LLC

Particle Size Analysis of Soil by ASTM D 422

Sample ID:	A9J0006-07		Client Sample ID:	SE-15-0-0.33		Batch Number:	9100866
Data Entered by:	SJL	Date:	10/14/19	Data Reviewed by:	JW	Date:	10/17/19
Sample Description:	SILT with some Sand, Gravel , and Clay			Max Particle Size:	Gravel		
Particle Shape:	Sub-angular to Sub-rounded			Hardness	Hard and Durable		

Whole Sample	Tare	Air Dry + Tare	Air Dry	Moisture	Dry Wt.
	11.971	302.809	290.84	5.71	275.1

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Wt. Retained	% Retained	% Passing
4	4.75	6.382	56.213	49.83	49.83	18.1	81.9
10	2.00	1.324	21.250	19.93	69.76	7.2	74.6
Pan		11.975	227.911	215.94	285.69	74.0	

Hygroscopic Moisture Correction

	Hygroscopic Correction Factor	Oven Sample	Pan No.	Tare	Air Dry + Tare	Oven Dry + Tare	Moisture
	0.9460		J006-07	1.322	21.502	20.412	5.71

Hydrometer Analysis

Start Date/Time	10/9/2019	12:23	Dispersing Agent	$NaPO_3$
Air Dry Sample Wt. for Hydrometer Test (g)	53.199		G_s Correction Factor (α)	1.000
Percent Passing No.10 Sieve	74.6		Specific Gravity (G_s)	2.65
Dry Weight of Soil Tested (g)	50.33		Corrected Dry Weight of Soil Tested (g) (W)	67.42

Elapsed Time (min)	Hydrometer Reading	Temperature (°C)	Corrected Hydrometer Reading [R]	% Finer of Hydrometer Sample	L	K	Particle Diameter (mm)	Percent Passing
1	40	19.6	35.11	52.1	9.6	0.01365	0.042	38.87
2	36.5	19.6	31.61	46.9	10.1	0.01365	0.031	34.99
4	32.5	19.6	27.61	40.9	10.7	0.01365	0.022	30.56
8	28	19.7	23.13	34.3	11.5	0.01365	0.016	25.61
15	24	19.7	19.13	28.4	12.2	0.01365	0.012	21.18
30	20	19.6	15.11	22.4	12.9	0.01365	0.009	16.72
60	17	19.7	12.13	18.0	13.3	0.01365	0.006	13.43
90	15	19.7	10.13	15.0	13.7	0.01365	0.005	11.22
120	14	19.6	9.11	13.5	13.8	0.01365	0.005	10.08
240	13	19.6	8.11	12.0	14	0.01365	0.003	8.97
360	12	19.5	7.08	10.5	14.2	0.01365	0.003	7.84
1440	10	18.8	4.9	7.3	14.5	0.01382	0.001	5.43

Sieve Analysis of Portion Finer Than No. 10 Sieve

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Retained	% Retained	% Passing
20	0.850	1.310	3.446	2.14	78.43	3.2	71.5
40	0.425	1.323	3.254	1.93	86.27	2.9	68.6
60	0.250	1.337	3.031	1.69	93.14	2.5	66.1
100	0.150	1.318	3.900	2.58	103.62	3.8	62.3
140	0.105	1.319	3.527	2.21	112.58	3.3	59.0
200	0.075	1.316	3.805	2.49	122.69	3.7	55.3
230	0.063	1.332	2.438	1.11	127.18	1.6	53.7
			Sum	14.15	230 Minus	36.18	

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Sample ID: SE-15-0-0.33 (A9J0006-07)

Grain Size Analysis Summary from Sieving and Hydrometer Testing		Particle Size (mm)	Percent Finer	Total Percent of Sample
Gravel				*25.35*
Retained on No. 4 sieve		4.75	81.89	18.11
Gravel, passing No. 4 sieve and retained on No. 10 sieve		2.00	74.65	7.24
Sand				*20.98*
Coarse sand, passing No.10 sieve and retained on No. 20 sieve		0.8500	71.48	3.17
Medium sand, passing No.20 sieve and retained on No. 40 sieve		0.4250	68.61	2.86
Medium sand, passing No.40 sieve and retained on No. 60 sieve		0.2500	66.1	2.51
Medium sand, passing No. 60 sieve and retained on No.100 sieve		0.1500	62.27	3.83
Fine sand, passing No. 100 sieve and retained on No.140 sieve		0.1060	59	3.28
Fine sand passing No. 140 sieve and retained on No. 200 sieve		0.0750	55.3	3.69
Fine sand, passing No. 200 sieve and retained on No. 230 sieve		0.0630	53.66	1.64
Silt and Clay (Measurements in the Clay fraction are noted)				*53.66*
Hydrometer Test		0.0423	38.87	14.8
Hydrometer Test		0.0307	34.99	3.88
Hydrometer Test		0.0223	30.56	4.43
Hydrometer Test		0.0164	25.61	4.95
Hydrometer Test		0.0123	21.18	4.43
Hydrometer Test		0.0090	16.72	4.46
Hydrometer Test		0.0064	13.43	3.29
Hydrometer Test		0.0053	11.22	2.21
Hydrometer Test	Clay	0.0046	10.08	1.14
Hydrometer Test	Clay	0.0033	8.97	1.11
Hydrometer Test	Clay	0.0027	7.84	1.14
Hydrometer Test	Clay	0.0014	5.43	2.41

Grain Size Summary	Percent of Total Sample
Gravel	25.4
Sand	21.0
Coarse sand	3.2
Medium sand	9.2
Fine sand	8.6
Silt	42.4
Clay	11.2

Case Narrative for Sample ID: SE-15-0-0.33 (A9J0006-07)

This data is not to be used for engineering purposes.

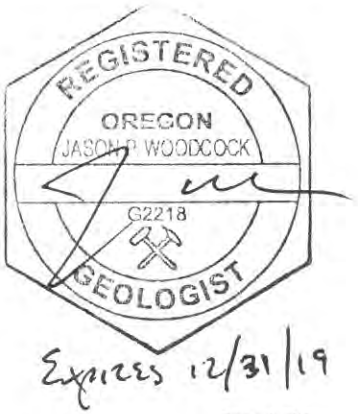
No difficulty dispersing the fraction passing the No. 10 sieve.

Dispersion device used: Commercial drink mixer operating at least 10,000 rpm for one minute.

The assumed specific gravity used in the calculations was 2.65.

Abundant organic material present in +4 and +10 fractions.

+20 to +100 fractions consist mostly of organic material.



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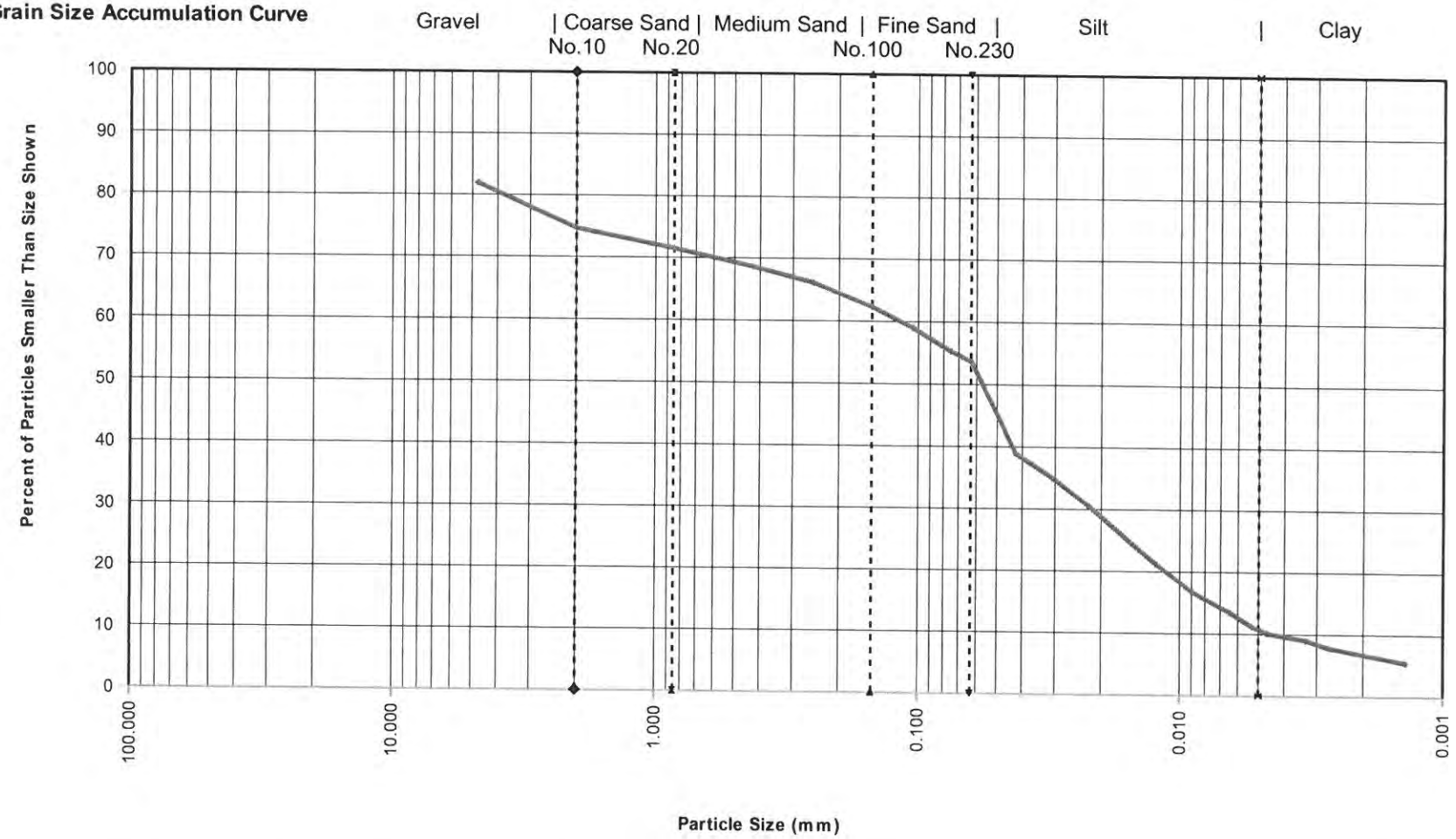
Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Grain Size Accumulation Curve



Sample ID:	SE-15-0-0.33 (A9J0006-07)			
Specific Gravity	MAXIMUM PARTICLE SIZE	GRAVEL & SAND		SOIL DESCRIPTION
		PARTICLE SHAPE	HARDNESS	
2.65	Gravel	Sub-angular to Sub-rounded	Hard and Durable	SILT with some Sand, Gravel , and Clay

Apex Laboratories, LLC

Particle Size Analysis of Soil by ASTM D 422

Sample ID:	A9J0006-08		Client Sample ID:	SE-21-0-0.33		Batch Number:	9101058
Data Entered by:	JSJ	Date:	10/18/19	Data Reviewed by:	JW	Date:	10/23/19
Sample Description:	Clayey Silty SAND with trace Gravel			Max Particle Size:	Gravel		
Particle Shape:	Angular to Sub-rounded			Hardness	Hard and Durable		

Whole Sample	Tare	Air Dry + Tare	Air Dry	Moisture	Dry Wt.
	5.896	302.920	297.02	3.57	286.8

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Wt. Retained	% Retained	% Passing
4	4.75	1.321	11.293	9.97	9.97	3.5	96.5
10	2.00	1.305	10.813	9.51	19.48	3.3	93.2
Pan		5.906	280.435	274.53	294.01	92.3	

Hygroscopic Moisture Correction

	Hygroscopic Correction Factor	Oven Sample	Pan No.	Tare	Air Dry + Tare	Oven Dry + Tare	Moisture
	0.9655		J00608	1.320	21.794	21.088	3.57

Hydrometer Analysis

Start Date/Time	10/14/2019	9:38	Dispersing Agent	$NaPO_3$
Air Dry Sample Wt. for Hydrometer Test (g)	52.427		G_s Correction Factor (α)	1.000
Percent Passing No.10 Sieve	93.2		Specific Gravity (G_s)	2.65
Dry Weight of Soil Tested (g)	50.62		Corrected Dry Weight of Soil Tested (g) (W)	54.31

Elapsed Time (min)	Hydrometer Reading	Temperature (°C)	Corrected Hydrometer Reading [R]	% Finer of Hydrometer Sample	L	K	Particle Diameter (mm)	Percent Passing
1	30	19.9	23.75	43.7	11.2	0.01365	0.046	40.76
2	28	19.9	21.75	40.0	11.5	0.01365	0.033	37.32
4	25.5	19.9	19.25	35.4	11.9	0.01365	0.024	33.03
8	21	19.9	14.75	27.2	12.7	0.01365	0.017	25.31
15	18	20.1	11.81	21.8	13.2	0.01365	0.013	20.28
30	17	20.5	10.95	20.2	13.3	0.01348	0.009	18.79
60	15	20.4	8.91	16.4	13.7	0.01365	0.007	15.30
90	14	20.3	7.88	14.5	13.8	0.01365	0.005	13.52
120	15	20.5	8.26	15.2	13.7	0.01348	0.005	14.18
240	13.5	20.3	6.7	12.3	13.8	0.01365	0.003	11.51
360	13	19.7	6.03	11.1	14	0.01365	0.003	10.35
1440	11.5	18.7	4.25	7.8	14.2	0.01382	0.001	7.29

Sieve Analysis of Portion Finer Than No. 10 Sieve

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Retained	% Retained	% Passing
20	0.850	1.316	2.121	0.81	23.70	1.5	91.7
40	0.425	1.303	2.884	1.58	31.97	2.9	88.8
60	0.250	1.312	6.364	5.05	58.43	9.3	79.5
100	0.150	1.324	11.822	10.50	113.40	19.3	60.2
140	0.105	1.317	5.358	4.04	134.56	7.4	52.7
200	0.075	1.314	3.544	2.23	146.24	4.1	48.6
230	0.063	1.311	2.178	0.87	150.78	1.6	47.0
			Sum	25.07	230 Minus	25.55	

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Sample ID: SE-21-0-0.33 (A9J0006-08)

Grain Size Analysis Summary from Sieving and Hydrometer Testing		Particle Size (mm)	Percent Finer	Total Percent of Sample
Gravel				6.79
Retained on No. 4 sieve		4.75	96.52	3.48
Gravel, passing No. 4 sieve and retained on No. 10 sieve		2.00	93.21	3.32
Sand				46.17
Coarse sand, passing No.10 sieve and retained on No. 20 sieve		0.8500	91.73	1.48
Medium sand, passing No.20 sieve and retained on No. 40 sieve		0.4250	88.81	2.91
Medium sand, passing No.40 sieve and retained on No. 60 sieve		0.2500	79.51	9.3
Medium sand, passing No. 60 sieve and retained on No.100 sieve		0.1500	60.18	19.33
Fine sand, passing No. 100 sieve and retained on No.140 sieve		0.1060	52.74	7.44
Fine sand passing No. 140 sieve and retained on No. 200 sieve		0.0750	48.63	4.11
Fine sand, passing No. 200 sieve and retained on No. 230 sieve		0.0630	47.04	1.6
Silt and Clay (Measurements in the Clay fraction are noted)				47.04
Hydrometer Test		0.0457	40.76	6.28
Hydrometer Test		0.0327	37.32	3.43
Hydrometer Test		0.0235	33.03	4.29
Hydrometer Test		0.0172	25.31	7.72
Hydrometer Test		0.0128	20.28	5.03
Hydrometer Test		0.0090	18.79	1.49
Hydrometer Test		0.0065	15.3	3.49
Hydrometer Test		0.0053	13.52	1.77
Hydrometer Test	Clay	0.0046	14.18	0
Hydrometer Test	Clay	0.0033	11.51	2.02
Hydrometer Test	Clay	0.0027	10.35	1.15
Hydrometer Test	Clay	0.0014	7.29	3.06

Grain Size Summary	Percent of Total Sample
Gravel	6.8
Sand	46.2
Coarse sand	1.5
Medium sand	31.5
Fine sand	13.1
Silt	33.5
Clay	13.5

Case Narrative for Sample ID: SE-21-0-0.33 (A9J0006-08)

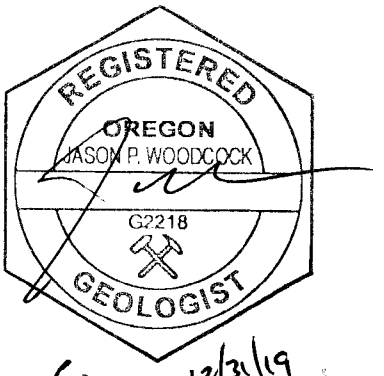
This data is not to be used for engineering purposes.

No difficulty dispersing the fraction passing the No. 10 sieve.

Dispersion device used: Commercial drink mixer operating at least 10,000 rpm for one minute.

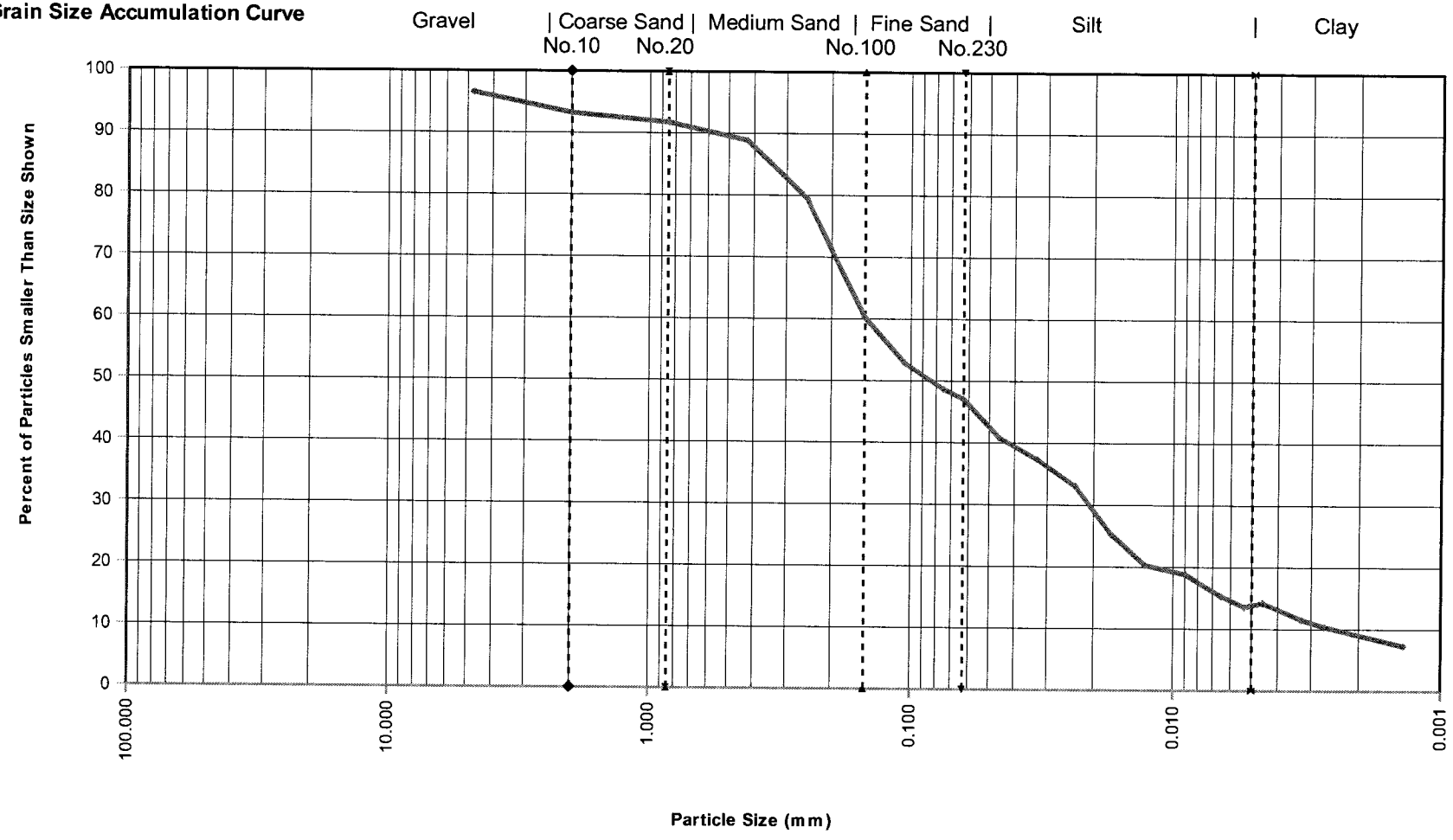
The assumed specific gravity used in the calculations was 2.65.

+4 and +10 fractions contain abundant organic material.



Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Grain Size Accumulation Curve



Sample ID:	SE-21-0-0.33 (A9J0006-08)			
Specific Gravity	MAXIMUM PARTICLE SIZE	GRAVEL & SAND		SOIL DESCRIPTION
		PARTICLE SHAPE	HARDNESS	
2.65	Gravel	Angular to Sub-rounded	Hard and Durable	Clayey Silty SAND with trace Gravel

Apex Laboratories, LLC

Particle Size Analysis of Soil by ASTM D 422

Sample ID:	A9J0006-13		Client Sample ID:	SE-25-0-0.33		Batch Number:	9101058
Data Entered by:	SJL/JSJ	Date:	10/18/19	Data Reviewed by:	JW	Date:	10/23/19
Sample Description:	Silty Sandy GRAVEL with trace Clay			Max Particle Size:	Gravel		
Particle Shape:	Sub-angular to Rounded			Hardness	Hard and Durable		

Whole Sample	Tare	Air Dry + Tare	Air Dry	Moisture	Dry Wt.
	11.971	273.271	261.30	6.75	244.8

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Wt. Retained	% Retained	% Passing
4	4.75	6.090	85.746	79.66	79.66	32.5	67.5
10	2.00	6.093	51.188	45.10	124.75	18.4	49.0
Pan		11.978	144.513	132.54	257.29	50.5	

Hygroscopic Moisture Correction

	Hygroscopic Correction Factor	Oven Sample	Pan No.	Tare	Air Dry + Tare	Oven Dry + Tare	Moisture
	0.9368		J0006013	1.328	21.260	20.000	6.75

Hydrometer Analysis

Start Date/Time	10/14/2019	9:08	Dispersing Agent	$NaPO_3$
Air Dry Sample Wt. for Hydrometer Test (g)	50.397		G_s Correction Factor (α)	1.000
Percent Passing No.10 Sieve	49.0		Specific Gravity (G_s)	2.65
Dry Weight of Soil Tested (g)	47.21		Corrected Dry Weight of Soil Tested (g) (W)	96.28

Elapsed Time (min)	Hydrometer Reading	Temperature (°C)	Corrected Hydrometer Reading [R]	% Finer of Hydrometer Sample	L	K	Particle Diameter (mm)	Percent Passing
1	24	19.7	17.68	18.4	12.2	0.01365	0.048	9.00
2	21.5	19.7	15.18	15.8	12.5	0.01365	0.034	7.73
4	19.5	19.9	13.25	13.8	12.9	0.01365	0.025	6.75
8	17.5	19.9	11.25	11.7	13.2	0.01365	0.018	5.73
15	16	20	9.78	10.2	13.5	0.01365	0.013	4.98
30	13.5	20	7.28	7.6	13.8	0.01365	0.009	3.71
60	12.5	20.4	6.41	6.7	14	0.01365	0.007	3.27
90	12	20.5	5.95	6.2	14.2	0.01348	0.005	3.03
120	11.5	20.5	5.45	5.7	14.2	0.01348	0.005	2.77
240	11.5	20.5	4.76	4.9	14.2	0.01348	0.003	2.42
360	11.5	19.8	4.56	4.7	14.2	0.01365	0.003	2.32
1440	10.5	18.7	3.25	3.4	14.3	0.01382	0.001	1.65

Sieve Analysis of Portion Finer Than No. 10 Sieve

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Retained	% Retained	% Passing
20	0.850	1.312	11.111	9.80	150.52	10.2	38.9
40	0.425	1.305	12.463	11.16	179.86	11.6	27.3
60	0.250	1.318	8.162	6.84	197.86	7.1	20.2
100	0.150	1.325	3.892	2.57	204.61	2.7	17.5
140	0.105	1.291	2.092	0.80	206.72	0.8	16.7
200	0.075	1.322	1.881	0.56	208.19	0.6	16.1
230	0.063	1.304	1.529	0.23	208.78	0.2	15.8
			Sum	31.95	230 Minus	15.26	

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Sample ID: SE-25-0-0.33 (A9J0006-13)

Grain Size Analysis Summary from Sieving and Hydrometer Testing		Particle Size (mm)	Percent Finer	Total Percent of Sample
Gravel				50.96
Retained on No. 4 sieve		4.75	67.46	32.54
Gravel, passing No. 4 sieve and retained on No. 10 sieve		2.00	49.04	18.42
Sand				33.19
Coarse sand, passing No.10 sieve and retained on No. 20 sieve		0.8500	38.86	10.18
Medium sand, passing No.20 sieve and retained on No. 40 sieve		0.4250	27.27	11.59
Medium sand, passing No.40 sieve and retained on No. 60 sieve		0.2500	20.16	7.11
Medium sand, passing No. 60 sieve and retained on No.100 sieve		0.1500	17.49	2.67
Fine sand, passing No. 100 sieve and retained on No.140 sieve		0.1060	16.66	0.83
Fine sand passing No. 140 sieve and retained on No. 200 sieve		0.0750	16.08	0.58
Fine sand, passing No. 200 sieve and retained on No. 230 sieve		0.0630	15.85	0.23
Silt and Clay (Measurements in the Clay fraction are noted)				15.85
Hydrometer Test		0.0477	9	6.84
Hydrometer Test		0.0341	7.73	1.27
Hydrometer Test		0.0245	6.75	0.98
Hydrometer Test		0.0175	5.73	1.02
Hydrometer Test		0.0129	4.98	0.75
Hydrometer Test		0.0093	3.71	1.27
Hydrometer Test		0.0066	3.27	0.44
Hydrometer Test		0.0054	3.03	0.24
Hydrometer Test	Clay	0.0046	2.77	0.25
Hydrometer Test	Clay	0.0033	2.42	0.35
Hydrometer Test	Clay	0.0027	2.32	0.1
Hydrometer Test	Clay	0.0014	1.65	0.67

Grain Size Summary	Percent of Total Sample
Gravel	51.0
Sand	33.2
Coarse sand	10.2
Medium sand	21.4
Fine sand	1.6
Silt	12.8
Clay	3.0

Case Narrative for Sample ID: SE-25-0-0.33 (A9J0006-13)

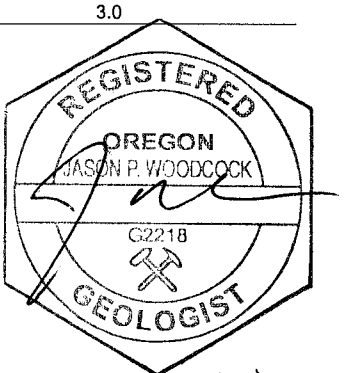
This data is not to be used for engineering purposes.

No difficulty dispersing the fraction passing the No. 10 sieve.

Dispersion device used: Commercial drink mixer operating at least 10,000 rpm for one minute.

The assumed specific gravity used in the calculations was 2.65.

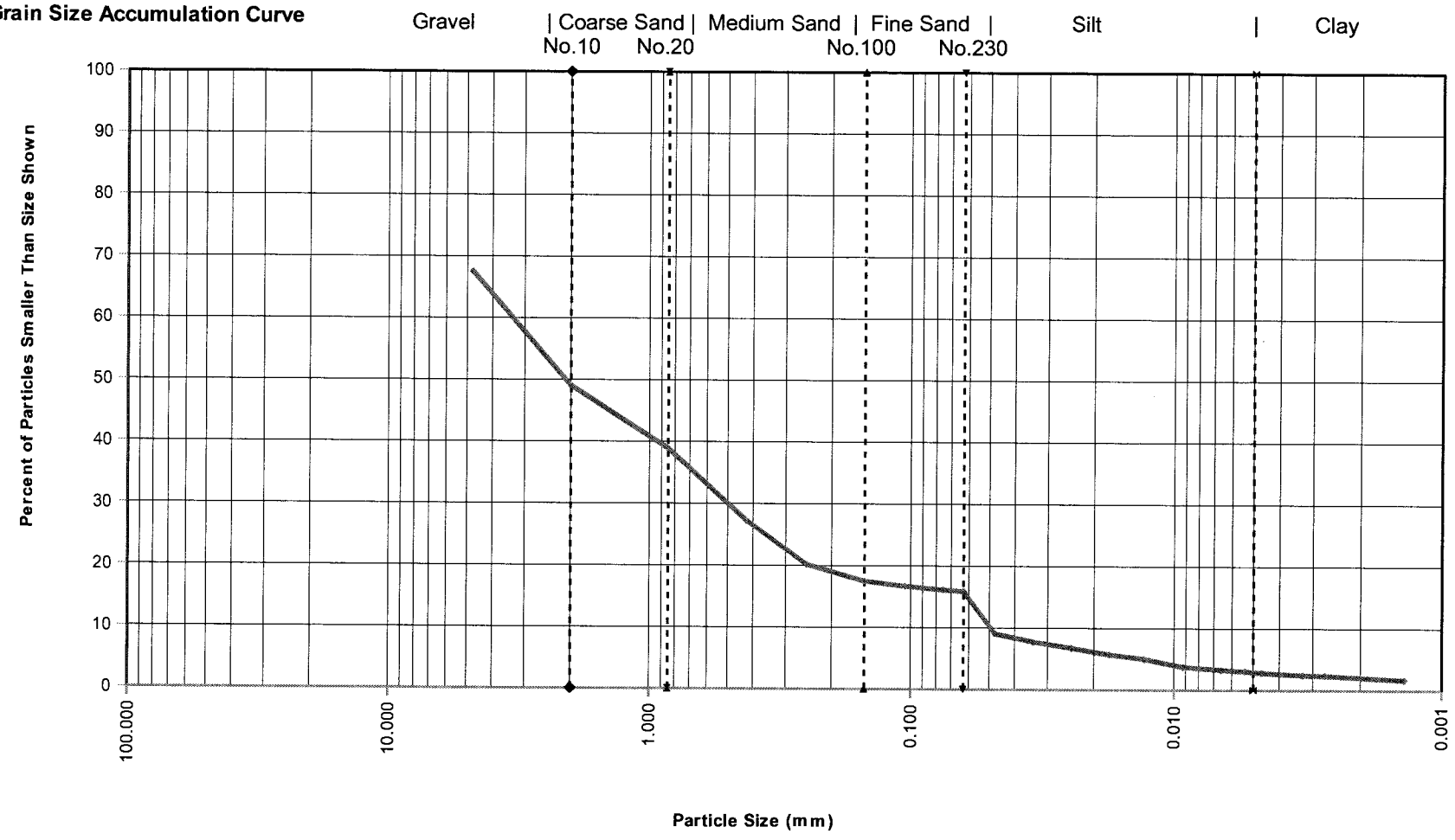
+4 and +10 fractions contain abundant organic material and possible anthropogenic material.



Expires 12/31/19

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Grain Size Accumulation Curve



Sample ID:	SE-25-0-0.33 (A9J0006-13)			
Specific Gravity	MAXIMUM PARTICLE SIZE	GRAVEL & SAND		SOIL DESCRIPTION
		PARTICLE SHAPE	HARDNESS	
2.65	Gravel	Sub-angular to Rounded	Hard and Durable	Silty Sandy GRAVEL with trace Clay

Apex Laboratories, LLC

Particle Size Analysis of Soil by ASTM D 422

Sample ID:	A9J0006-16		Client Sample ID:	SE-26-0-0.33		Batch Number:	9101058
Data Entered by:	JSJ	Date:	10/18/19	Data Reviewed by:	JW	Date:	10/23/19
Sample Description:	Silty Gravelly SAND with some Clay			Max Particle Size:	Gravel		
Particle Shape:	Angular to Rounded			Hardness	Hard and Durable		

Whole Sample	Tare	Air Dry + Tare	Air Dry	Moisture	Dry Wt.
	11.447	220.995	209.55	5.61	198.4

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Wt. Retained	% Retained	% Passing
4	4.75	6.051	37.030	30.98	30.98	15.6	84.4
10	2.00	6.016	44.548	38.53	69.51	19.4	65.0
Pan		11.454	149.024	137.57	207.08	65.4	

Hygroscopic Moisture Correction

	Hygroscopic Correction Factor	Oven Sample	Pan No.	Tare	Air Dry + Tare	Oven Dry + Tare	Moisture
	0.9469		J00616	1.338	19.341	18.385	5.61

Hydrometer Analysis

Start Date/Time	10/14/2019	8:48	Dispersing Agent	$NaPO_3$
Air Dry Sample Wt. for Hydrometer Test (g)	50.087		G_s Correction Factor (α)	1.000
Percent Passing No.10 Sieve	65.0		Specific Gravity (G_s)	2.65
Dry Weight of Soil Tested (g)	47.43		Corrected Dry Weight of Soil Tested (g) (W)	73.00

Elapsed Time (min)	Hydrometer Reading	Temperature (°C)	Corrected Hydrometer Reading [R]	% Finer of Hydrometer Sample	L	K	Particle Diameter (mm)	Percent Passing
1	27	19.9	20.75	28.4	11.7	0.01365	0.047	18.46
2	25	19.9	18.75	25.7	12	0.01365	0.033	16.68
4	23.5	20	17.28	23.7	12.2	0.01365	0.024	15.38
8	21.5	20	15.28	20.9	12.5	0.01365	0.017	13.60
15	19.5	20	13.28	18.2	12.9	0.01365	0.013	11.82
30	16.5	20.3	10.38	14.2	13.3	0.01365	0.009	9.24
60	15	20.5	8.95	12.3	13.7	0.01348	0.006	7.96
90	14	20.6	7.98	10.9	13.8	0.01348	0.005	7.10
120	13	20.6	6.98	9.6	14	0.01348	0.005	6.21
240	14	20.5	7.26	9.9	13.8	0.01348	0.003	6.46
360	13	19.7	6.03	8.3	14	0.01365	0.003	5.37
1440	12	18.7	4.75	6.5	14.2	0.01382	0.001	4.23

Sieve Analysis of Portion Finer Than No. 10 Sieve

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Retained	% Retained	% Passing
20	0.850	1.317	10.647	9.33	95.14	12.8	52.2
40	0.425	1.311	10.580	9.27	120.60	12.7	39.5
60	0.250	1.314	6.227	4.91	134.09	6.7	32.8
100	0.150	1.308	3.470	2.16	140.03	3.0	29.8
140	0.105	1.322	2.009	0.69	141.91	0.9	28.9
200	0.075	1.307	1.864	0.56	143.44	0.8	28.1
230	0.063	1.326	1.551	0.23	144.06	0.3	27.8
			Sum	27.14	230 Minus	20.28	

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Sample ID: SE-26-0-0.33 (A9J0006-16)

Grain Size Analysis Summary from Sieving and Hydrometer Testing		Particle Size (mm)	Percent Finer	Total Percent of Sample
Gravel				35.03
Retained on No. 4 sieve		4.75	84.39	15.61
Gravel, passing No. 4 sieve and retained on No. 10 sieve		2.00	64.97	19.42
Sand				37.18
Coarse sand, passing No.10 sieve and retained on No. 20 sieve		0.8500	52.19	12.78
Medium sand, passing No.20 sieve and retained on No. 40 sieve		0.4250	39.49	12.7
Medium sand, passing No.40 sieve and retained on No. 60 sieve		0.2500	32.76	6.73
Medium sand, passing No. 60 sieve and retained on No.100 sieve		0.1500	29.8	2.96
Fine sand, passing No. 100 sieve and retained on No.140 sieve		0.1060	28.86	0.94
Fine sand passing No. 140 sieve and retained on No. 200 sieve		0.0750	28.09	0.76
Fine sand, passing No. 200 sieve and retained on No. 230 sieve		0.0630	27.79	0.31
Silt and Clay (Measurements in the Clay fraction are noted)				27.79
Hydrometer Test		0.0467	18.46	9.32
Hydrometer Test		0.0334	16.68	1.78
Hydrometer Test		0.0238	15.38	1.31
Hydrometer Test		0.0171	13.6	1.78
Hydrometer Test		0.0127	11.82	1.78
Hydrometer Test		0.0091	9.24	2.58
Hydrometer Test		0.0064	7.96	1.28
Hydrometer Test		0.0053	7.1	0.86
Hydrometer Test	Clay	0.0046	6.21	0.89
Hydrometer Test	Clay	0.0032	6.46	0
Hydrometer Test	Clay	0.0027	5.37	0.84
Hydrometer Test	Clay	0.0014	4.23	1.14

Grain Size Summary	Percent of Total Sample
Gravel	35.0
Sand	37.2
Coarse sand	12.8
Medium sand	22.4
Fine sand	2.0
Silt	20.7
Clay	7.1

Case Narrative for Sample ID: SE-26-0-0.33 (A9J0006-16)

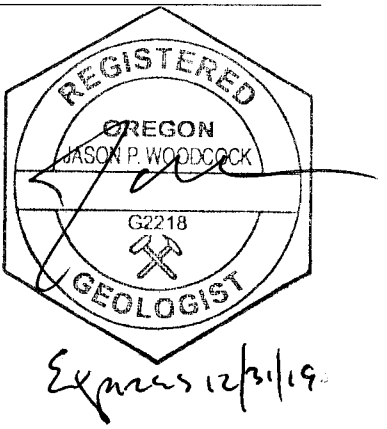
This data is not to be used for engineering purposes.

No difficulty dispersing the fraction passing the No. 10 sieve.

Dispersion device used: Commercial drink mixer operating at least 10,000 rpm for one minute.

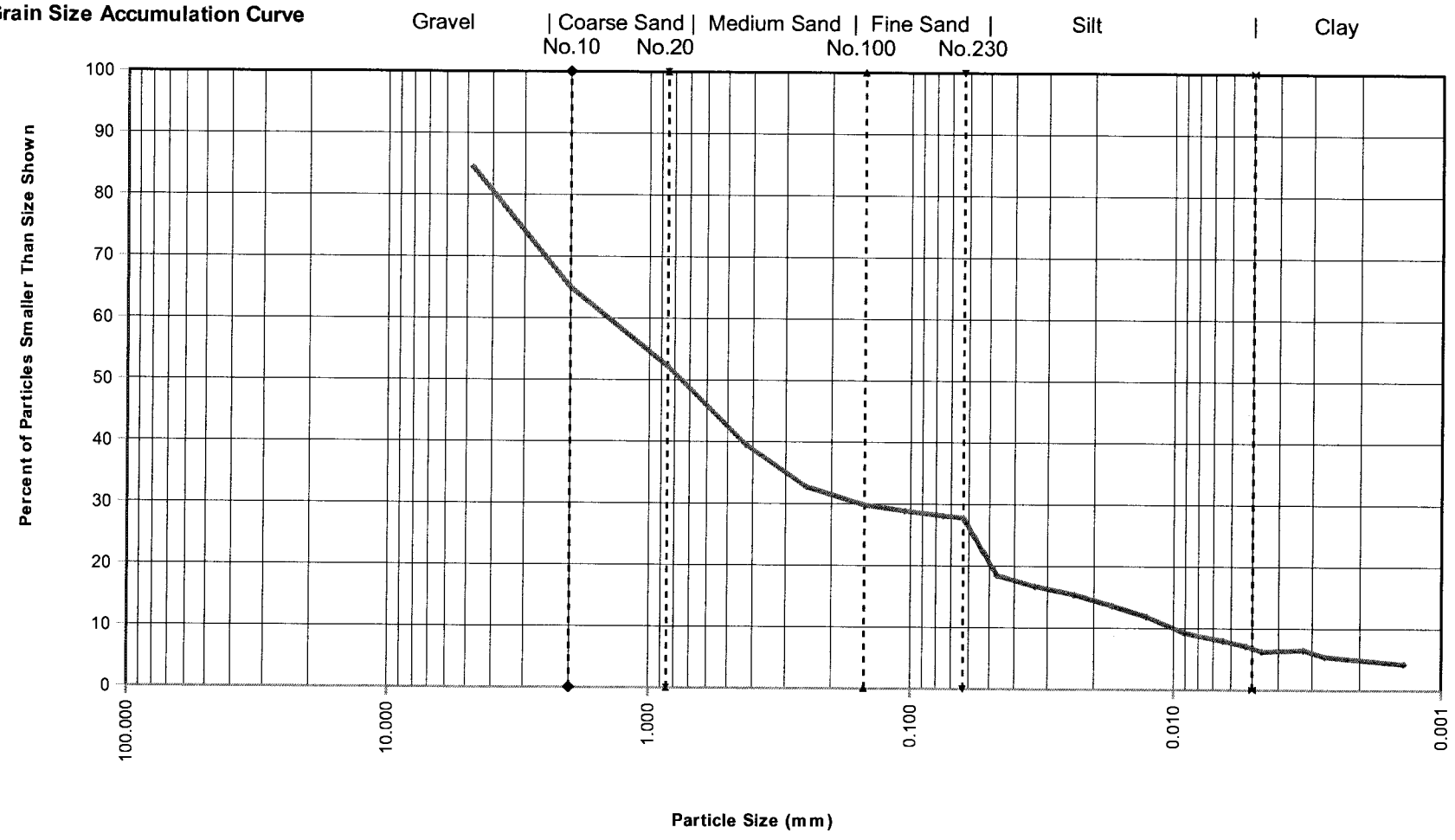
The assumed specific gravity used in the calculations was 2.65.

+4 and +10 fractions contain abundant organic material.



Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Grain Size Accumulation Curve



Sample ID:	SE-26-0-0.33 (A9J0006-16)			
Specific Gravity	MAXIMUM PARTICLE SIZE	GRAVEL & SAND		SOIL DESCRIPTION
		PARTICLE SHAPE	HARDNESS	
2.65	Gravel	Angular to Rounded	Hard and Durable	Silty Gravelly SAND with some Clay

Apex Laboratories, LLC

Particle Size Analysis of Soil by ASTM D 422

Sample ID:	A9J0006-18		Client Sample ID:	SE-18-0-0.33		Batch Number:	9101058
Data Entered by:	JSJ	Date:	10/18/19	Data Reviewed by:	JW	Date:	10/23/19
Sample Description:	Clayey Sandy SILT			Max Particle Size:	Gravel		
Particle Shape:	N/A			Hardness	N/A		

Whole Sample	Tare	Air Dry + Tare	Air Dry	Moisture	Dry Wt.
	5.783	296.336	290.55	4.38	278.4

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Wt. Retained	% Retained	% Passing
4	4.75	0.000	0.000	0.00	0.00	0.0	100.0
10	2.00	1.333	1.401	0.07	0.07	0.0	100.0
Pan		5.786	296.214	290.43	290.50	99.8	

Hygroscopic Moisture Correction

	Hygroscopic Correction Factor	Oven Sample	Pan No.	Tare	Air Dry + Tare	Oven Dry + Tare	Moisture
	0.9581		J00618	1.318	22.082	21.211	4.38

Hydrometer Analysis

Start Date/Time	10/14/2019 9:27	Dispersing Agent	$NaPO_3$
Air Dry Sample Wt. for Hydrometer Test (g)	53.141	G_s Correction Factor (α)	1.000
Percent Passing No.10 Sieve	100.0	Specific Gravity (G_s)	2.65
Dry Weight of Soil Tested (g)	50.91	Corrected Dry Weight of Soil Tested (g) (W)	50.92

Elapsed Time (min)	Hydrometer Reading	Temperature (°C)	Corrected Hydrometer Reading [R]	% Finer of Hydrometer Sample	L	K	Particle Diameter (mm)	Percent Passing
1	34.5	19.7	28.18	55.3	10.4	0.01365	0.044	55.32
2	32	19.7	25.68	50.4	10.9	0.01365	0.032	50.42
4	28.5	19.7	22.18	43.6	11.4	0.01365	0.023	43.54
8	24.5	19.9	18.25	35.8	12	0.01365	0.017	35.82
15	22	19.9	15.75	30.9	12.5	0.01365	0.012	30.91
30	19	20	12.78	25.1	13	0.01365	0.009	25.09
60	16.5	20.3	10.38	20.4	13.3	0.01365	0.006	20.38
90	15	20.3	8.88	17.4	13.7	0.01365	0.005	17.43
120	15	20.3	8.2	16.1	13.7	0.01365	0.005	16.11
240	14	20.4	7.23	14.2	13.8	0.01365	0.003	14.20
360	13.5	19.7	6.53	12.8	13.8	0.01365	0.003	12.82
1440	12	18.7	4.75	9.3	14.2	0.01382	0.001	9.32

Sieve Analysis of Portion Finer Than No. 10 Sieve

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Retained	% Retained	% Passing
20	0.850	1.309	1.359	0.05	0.34	0.1	99.9
40	0.425	1.321	1.734	0.41	2.60	0.8	99.1
60	0.250	1.297	3.588	2.29	15.12	4.5	94.6
100	0.150	1.318	11.157	9.84	68.89	19.3	75.2
140	0.105	1.309	5.300	3.99	90.70	7.8	67.4
200	0.075	1.310	3.473	2.16	102.52	4.2	63.2
230	0.063	1.320	2.304	0.98	107.90	1.9	61.2
			Sum	19.73	230 Minus	31.18	

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Sample ID: SE-18-0-0.33 (A9J0006-18)

Grain Size Analysis Summary from Sieving and Hydrometer Testing		Particle Size (mm)	Percent Finer	Total Percent of Sample
Gravel				*0.02*
Retained on No. 4 sieve		4.75	100	0
Gravel, passing No. 4 sieve and retained on No. 10 sieve		2.00	99.98	0.02
Sand				*38.75*
Coarse sand, passing No.10 sieve and retained on No. 20 sieve		0.8500	99.88	0.1
Medium sand, passing No.20 sieve and retained on No. 40 sieve		0.4250	99.07	0.81
Medium sand, passing No.40 sieve and retained on No. 60 sieve		0.2500	94.57	4.5
Medium sand, passing No. 60 sieve and retained on No.100 sieve		0.1500	75.25	19.32
Fine sand, passing No. 100 sieve and retained on No.140 sieve		0.1060	67.41	7.84
Fine sand passing No. 140 sieve and retained on No. 200 sieve		0.0750	63.16	4.25
Fine sand, passing No. 200 sieve and retained on No. 230 sieve		0.0630	61.23	1.93
Silt and Clay (Measurements in the Clay fraction are noted)				*61.23*
Hydrometer Test		0.0440	55.32	5.91
Hydrometer Test		0.0319	50.42	4.91
Hydrometer Test		0.0230	43.54	6.87
Hydrometer Test		0.0167	35.82	7.72
Hydrometer Test		0.0125	30.91	4.91
Hydrometer Test		0.0090	25.09	5.82
Hydrometer Test		0.0064	20.38	4.71
Hydrometer Test		0.0053	17.43	2.94
Hydrometer Test	Clay	0.0046	16.11	1.33
Hydrometer Test	Clay	0.0033	14.2	1.91
Hydrometer Test	Clay	0.0027	12.82	1.37
Hydrometer Test	Clay	0.0014	9.32	3.5

Grain Size Summary	Percent of Total Sample
Gravel	0.0
Sand	38.7
Coarse sand	0.1
Medium sand	24.6
Fine sand	14.0
Silt	43.8
Clay	17.4

Case Narrative for Sample ID: SE-18-0-0.33 (A9J0006-18)

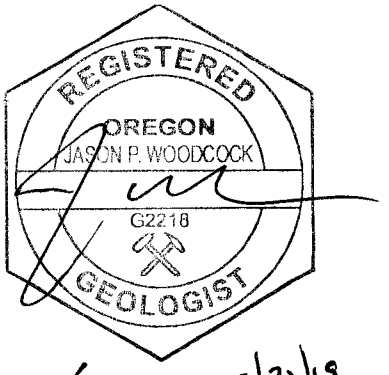
This data is not to be used for engineering purposes.

No difficulty dispersing the fraction passing the No. 10 sieve.

Dispersion device used: Commercial drink mixer operating at least 10,000 rpm for one minute.

The assumed specific gravity used in the calculations was 2.65.

+10 fraction consists entirely of organic material.



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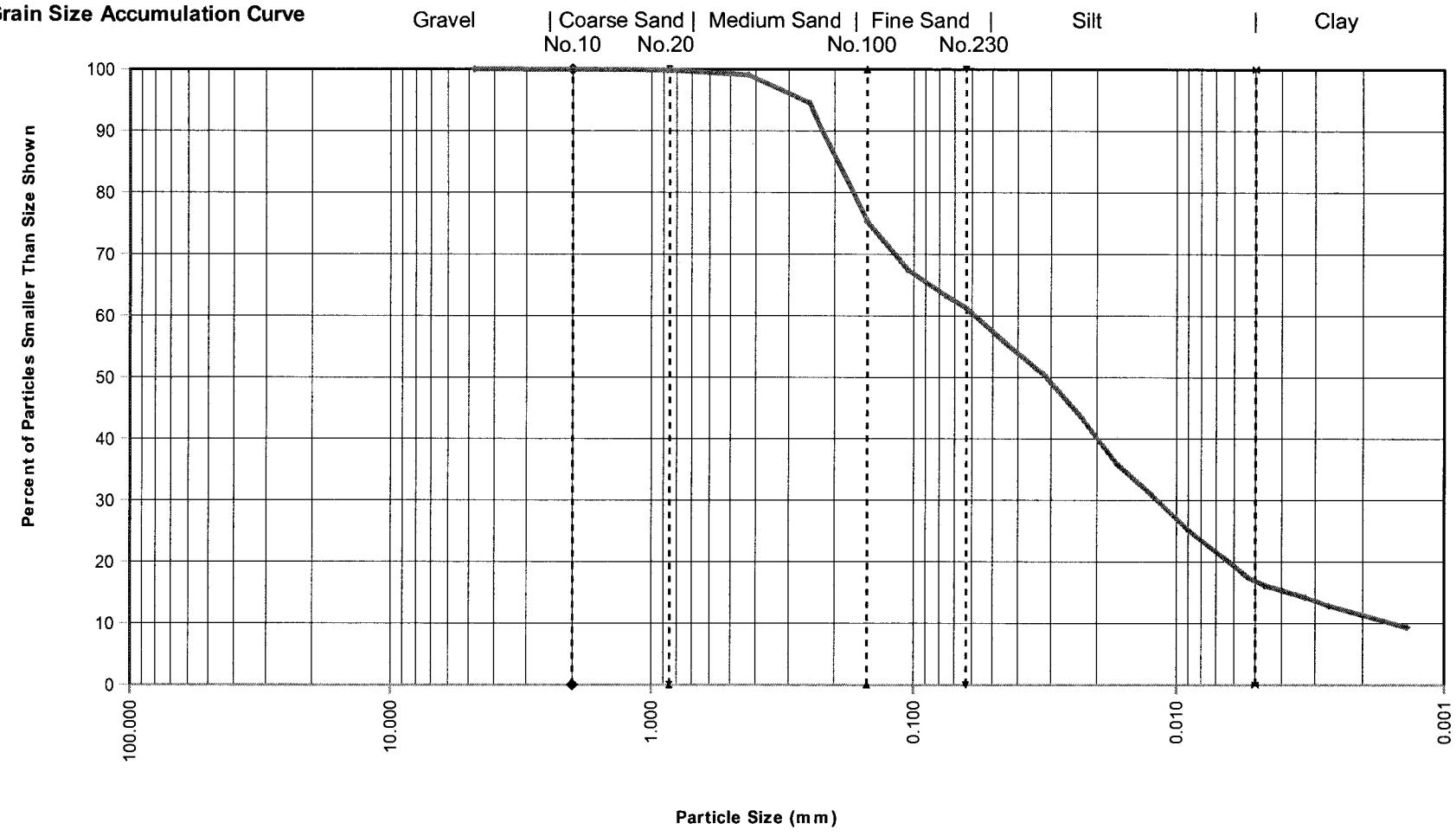
Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Grain Size Accumulation Curve



Sample ID:	SE-18-0-0.33 (A9J0006-18)			
Specific Gravity	MAXIMUM PARTICLE SIZE	GRAVEL & SAND		SOIL DESCRIPTION
		PARTICLE SHAPE	HARDNESS	
2.65	Gravel	N/A	N/A	Clayey Sandy SILT

Apex Laboratories, LLC

Particle Size Analysis of Soil by ASTM D 422

Sample ID:	A9J0006-20		Client Sample ID:	SE-31-0-0.33		Batch Number:	9101058
Data Entered by:	JSJ	Date:	10/21/19	Data Reviewed by:	JW	Date:	10/23/19
Sample Description:	Clayey Silty SAND			Max Particle Size:	Gravel		
Particle Shape:	N/A			Hardness	N/A		

Whole Sample	Tare	Air Dry + Tare	Air Dry	Moisture	Dry Wt.
	11.689	293.444	281.76	3.89	271.2

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Wt. Retained	% Retained	% Passing
4	4.75	1.325	5.162	3.84	3.84	1.4	98.6
10	2.00	1.318	5.586	4.27	8.11	1.6	97.0
Pan		5.851	278.271	272.42	280.53	96.5	

Hygroscopic Moisture Correction

	Hygroscopic Correction Factor	Oven Sample	Pan No.	Tare	Air Dry + Tare	Oven Dry + Tare	Moisture
	0.9626		J00620	1.338	27.055	26.093	3.89

Hydrometer Analysis

Start Date/Time	10/14/2019 8:30	Dispersing Agent	$NaPO_3$
Air Dry Sample Wt. for Hydrometer Test (g)	54.866	G_s Correction Factor (α)	1.000
Percent Passing No.10 Sieve	97.0	Specific Gravity (G_s)	2.65
Dry Weight of Soil Tested (g)	52.81	Corrected Dry Weight of Soil Tested (g) (W)	54.44

Elapsed Time (min)	Hydrometer Reading	Temperature (°C)	Corrected Hydrometer Reading [R]	% Finer of Hydrometer Sample	L	K	Particle Diameter (mm)	Percent Passing
1	33	19.7	26.68	49.0	10.7	0.01365	0.045	47.54
2	31	19.7	24.68	45.3	11.1	0.01365	0.032	43.98
4	28	19.7	21.68	39.8	11.5	0.01365	0.023	38.63
8	24.5	19.7	18.18	33.4	12	0.01365	0.017	32.40
15	24	19.9	17.75	32.6	12.2	0.01365	0.012	31.62
30	19	20.1	12.81	23.5	13	0.01365	0.009	22.83
60	17	20.3	10.88	20.0	13.3	0.01365	0.006	19.39
90	15	20.5	8.95	16.4	13.7	0.01348	0.005	15.94
120	14	20.5	7.95	14.6	13.8	0.01348	0.005	14.16
240	14	20.5	7.26	13.3	13.8	0.01348	0.003	12.94
360	13.5	20.5	6.76	12.4	13.8	0.01348	0.003	12.05
1440	12	18.7	4.75	8.7	14.2	0.01382	0.001	8.46

Sieve Analysis of Portion Finer Than No. 10 Sieve

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Retained	% Retained	% Passing
20	0.850	1.311	1.988	0.68	11.47	1.2	95.8
40	0.425	1.324	2.262	0.94	16.12	1.7	94.0
60	0.250	1.316	3.784	2.47	28.38	4.5	89.5
100	0.150	1.323	12.949	11.63	86.10	21.4	68.2
140	0.105	1.304	6.076	4.77	109.80	8.8	59.4
200	0.075	1.313	4.061	2.75	123.44	5.0	54.3
230	0.063	1.308	2.267	0.96	128.20	1.8	52.6
			Sum	24.19	230 Minus	28.63	

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Sample ID: SE-31-0-0.33 (A9J0006-20)

Grain Size Analysis Summary from Sieving and Hydrometer Testing		Particle Size (mm)	Percent Finer	Total Percent of Sample
Gravel				*2.99*
Retained on No. 4 sieve		4.75	98.59	1.41
Gravel, passing No. 4 sieve and retained on No. 10 sieve		2.00	97.01	1.57
Sand				*44.43*
Coarse sand, passing No.10 sieve and retained on No. 20 sieve		0.8500	95.77	1.24
Medium sand, passing No.20 sieve and retained on No. 40 sieve		0.4250	94.05	1.72
Medium sand, passing No.40 sieve and retained on No. 60 sieve		0.2500	89.51	4.53
Medium sand, passing No. 60 sieve and retained on No.100 sieve		0.1500	68.16	21.36
Fine sand, passing No. 100 sieve and retained on No.140 sieve		0.1060	59.39	8.77
Fine sand passing No. 140 sieve and retained on No. 200 sieve		0.0750	54.34	5.05
Fine sand, passing No. 200 sieve and retained on No. 230 sieve		0.0630	52.58	1.76
Silt and Clay (Measurements in the Clay fraction are noted)				*52.58*
Hydrometer Test		0.0447	47.54	5.04
Hydrometer Test		0.0322	43.98	3.56
Hydrometer Test		0.0231	38.63	5.35
Hydrometer Test		0.0167	32.4	6.24
Hydrometer Test		0.0123	31.62	0.77
Hydrometer Test		0.0090	22.83	8.79
Hydrometer Test		0.0064	19.39	3.44
Hydrometer Test		0.0053	15.94	3.44
Hydrometer Test	Clay	0.0046	14.16	1.78
Hydrometer Test	Clay	0.0032	12.94	1.22
Hydrometer Test	Clay	0.0026	12.05	0.89
Hydrometer Test	Clay	0.0014	8.46	3.59

Grain Size Summary	Percent of Total Sample
Gravel	3.0
Sand	44.4
Coarse sand	1.2
Medium sand	27.6
Fine sand	15.6
Silt	36.6
Clay	15.9

Case Narrative for Sample ID: SE-31-0-0.33 (A9J0006-20)

This data is not to be used for engineering purposes.

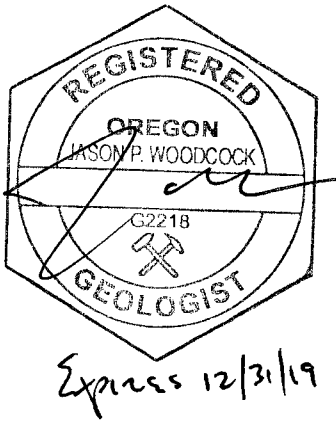
No difficulty dispersing the fraction passing the No. 10 sieve.

Dispersion device used: Commercial drink mixer operating at least 10,000 rpm for one minute.

The assumed specific gravity used in the calculations was 2.65.

+4 fraction consists entirely of organic material.

+10 to +60 fractions consists almost entirely of organic material.



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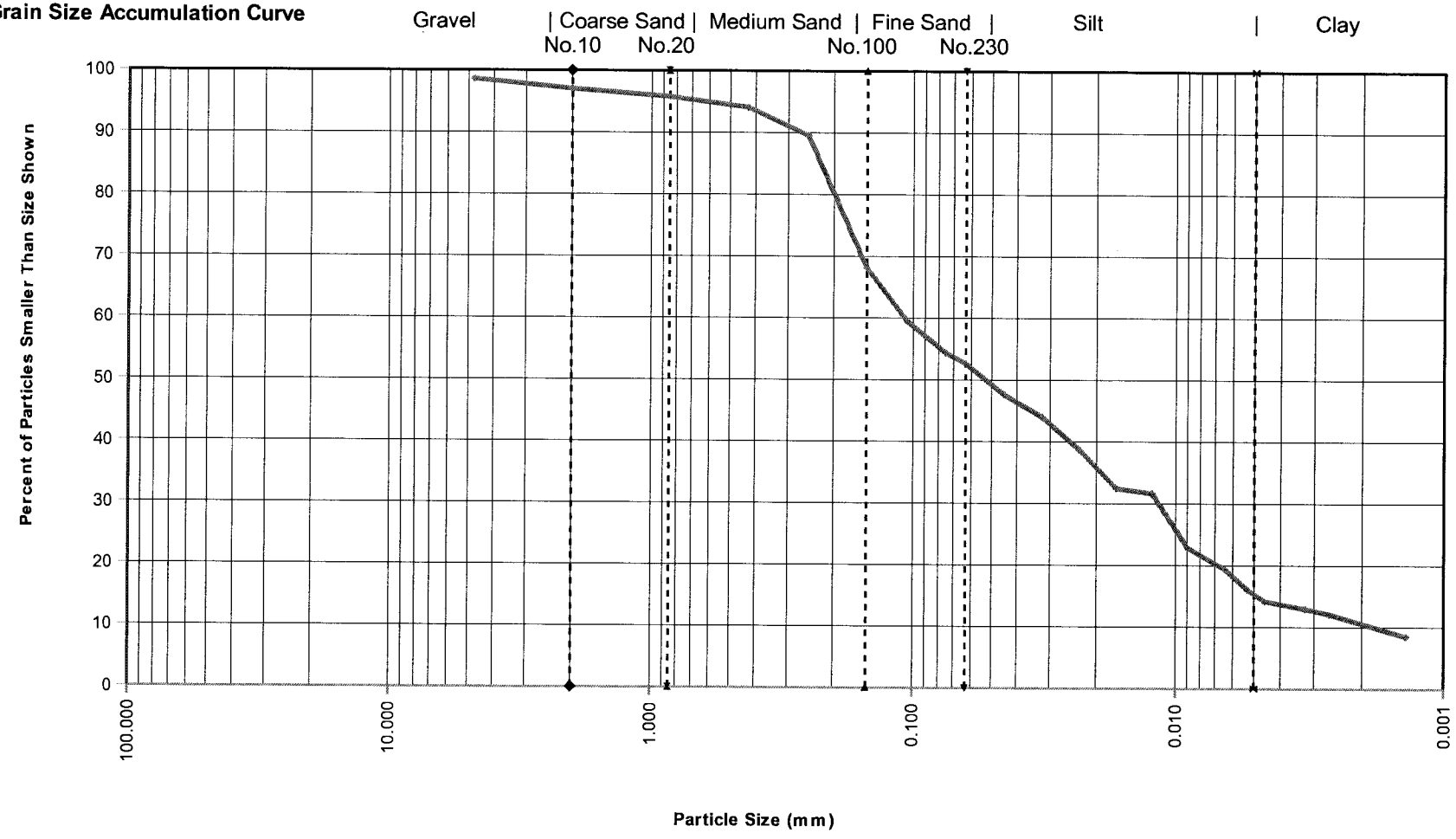
Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Grain Size Accumulation Curve



Sample ID:	SE-31-0-0.33 (A9J0006-20)			
Specific Gravity	MAXIMUM PARTICLE SIZE	GRAVEL & SAND		SOIL DESCRIPTION
		PARTICLE SHAPE	HARDNESS	
2.65	Gravel	N/A	N/A	Clayey Silty SAND

Apex Laboratories, LLC

Particle Size Analysis of Soil by ASTM D 422

Sample ID:	A9J0006-21		Client Sample ID:	SE-16-0-0.33		Batch Number:	9101058
Data Entered by:	JSJ	Date:	10/21/19	Data Reviewed by:	JW	Date:	10/23/19
Sample Description:	Clayey Silty SAND			Max Particle Size:	Gravel		
Particle Shape:	N/A			Hardness	N/A		

Whole Sample	Tare	Air Dry + Tare	Air Dry	Moisture	Dry Wt.
	11.393	359.402	348.01	3.66	335.7

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Wt. Retained	% Retained	% Passing
4	4.75	1.323	2.477	1.15	1.15	0.3	99.7
10	2.00	1.335	1.484	0.15	1.30	0.0	99.6
Pan		11.417	357.013	345.60	346.90	99.2	

Hygroscopic Moisture Correction

	Hygroscopic Correction Factor	Oven Sample	Pan No.	Tare	Air Dry + Tare	Oven Dry + Tare	Moisture
	0.9647		J00621	1.320	20.385	19.712	3.66

Hydrometer Analysis

Start Date/Time	10/14/2019	9:18	Dispersing Agent	$NaPO_3$
Air Dry Sample Wt. for Hydrometer Test (g)	52.778		G_s Correction Factor (α)	1.000
Percent Passing No.10 Sieve	99.6		Specific Gravity (G_s)	2.65
Dry Weight of Soil Tested (g)	50.91		Corrected Dry Weight of Soil Tested (g) (W)	51.11

Elapsed Time (min)	Hydrometer Reading	Temperature (°C)	Corrected Hydrometer Reading [R]	% Finer of Hydrometer Sample	L	K	Particle Diameter (mm)	Percent Passing
1	35	20	30.21	59.1	10.4	0.01365	0.044	58.87
2	28.5	19.9	23.68	46.3	11.4	0.01365	0.033	46.15
4	25	19.9	20.18	39.5	12	0.01365	0.024	39.33
8	22	19.9	17.18	33.6	12.5	0.01365	0.017	33.48
15	20	20	15.21	29.8	12.9	0.01365	0.013	29.64
30	16	20.2	11.26	22.0	13.5	0.01365	0.009	21.94
60	15	20.5	8.95	17.5	13.7	0.01348	0.006	17.44
90	14	20.4	7.91	15.5	13.8	0.01365	0.005	15.42
120	13.5	20.4	7.66	15.0	13.8	0.01365	0.005	14.92
240	12	20.4	6.16	12.0	14.2	0.01365	0.003	12.00
360	11.5	19.7	5.45	10.7	14.2	0.01365	0.003	10.63
1440	10	18.7	3.66	7.2	14.5	0.01382	0.001	7.14

Sieve Analysis of Portion Finer Than No. 10 Sieve

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Retained	% Retained	% Passing
20	0.850	1.317	1.358	0.04	1.57	0.1	99.5
40	0.425	1.315	1.619	0.30	3.56	0.6	98.9
60	0.250	1.326	2.075	0.75	8.47	1.5	97.5
100	0.150	1.312	8.276	6.96	54.07	13.6	83.8
140	0.105	1.307	8.080	6.77	98.42	13.3	70.6
200	0.075	1.304	5.946	4.64	128.81	9.1	61.5
230	0.063	1.308	3.201	1.89	141.21	3.7	57.8
			Sum	21.37	230 Minus	29.55	

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Sample ID: SE-16-0-0.33 (A9J0006-21)

Grain Size Analysis Summary from Sieving and Hydrometer Testing		Particle Size (mm)	Percent Finer	Total Percent of Sample
Gravel				*0.39*
Retained on No. 4 sieve		4.75	99.66	0.34
Gravel, passing No. 4 sieve and retained on No. 10 sieve		2.00	99.61	0.04
Sand				*41.8*
Coarse sand, passing No.10 sieve and retained on No. 20 sieve		0.8500	99.53	0.08
Medium sand, passing No.20 sieve and retained on No. 40 sieve		0.4250	98.94	0.59
Medium sand, passing No.40 sieve and retained on No. 60 sieve		0.2500	97.47	1.47
Medium sand, passing No. 60 sieve and retained on No.100 sieve		0.1500	83.85	13.62
Fine sand, passing No. 100 sieve and retained on No.140 sieve		0.1060	70.6	13.25
Fine sand passing No. 140 sieve and retained on No. 200 sieve		0.0750	61.51	9.08
Fine sand, passing No. 200 sieve and retained on No. 230 sieve		0.0630	57.81	3.7
Silt and Clay (Measurements in the Clay fraction are noted)				*57.81*
Hydrometer Test		0.0440	58.87	0
Hydrometer Test		0.0326	46.15	11.66
Hydrometer Test		0.0236	39.33	6.82
Hydrometer Test		0.0171	33.48	5.85
Hydrometer Test		0.0127	29.64	3.85
Hydrometer Test		0.0092	21.94	7.7
Hydrometer Test		0.0064	17.44	4.5
Hydrometer Test		0.0053	15.42	2.01
Hydrometer Test	Clay	0.0046	14.92	0.5
Hydrometer Test	Clay	0.0033	12	2.92
Hydrometer Test	Clay	0.0027	10.63	1.37
Hydrometer Test	Clay	0.0014	7.14	3.49

Grain Size Summary		Percent of Total Sample
Gravel		0.4
Sand		41.8
Coarse sand		0.1
Medium sand		15.7
Fine sand		26.0
Silt		42.4
Clay		15.4

Case Narrative for Sample ID: SE-16-0-0.33 (A9J0006-21)

This data is not to be used for engineering purposes.

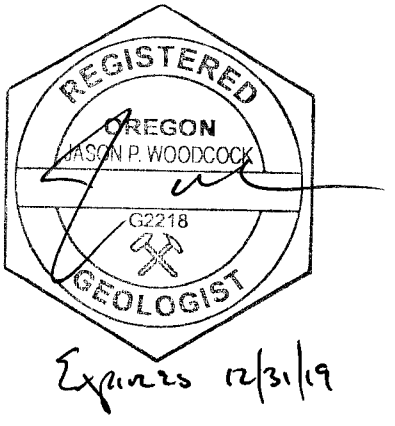
No difficulty dispersing the fraction passing the No. 10 sieve.

Dispersion device used: Commercial drink mixer operating at least 10,000 rpm for one minute.

The assumed specific gravity used in the calculations was 2.65.

+4 and +10 fractions consist entirely of organic material.

+20 to +60 fractions consists almost entirely of organic material.



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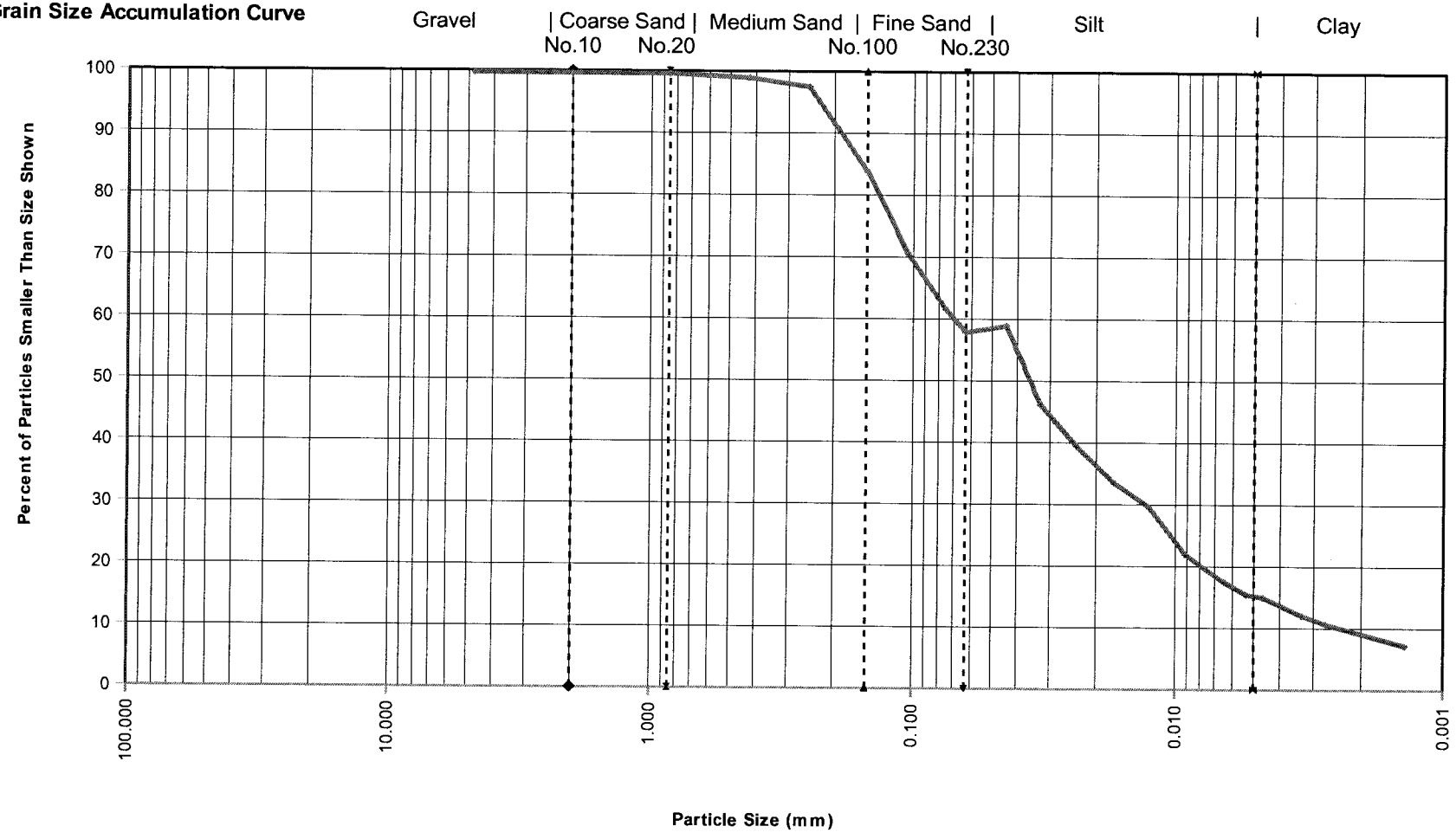
Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Grain Size Accumulation Curve



Sample ID:	SE-16-0-0.33 (A9J0006-21)			
Specific Gravity	MAXIMUM PARTICLE SIZE	GRAVEL & SAND		SOIL DESCRIPTION
		PARTICLE SHAPE	HARDNESS	
2.65	Gravel	N/A	N/A	Clayey Silty SAND

Apex Laboratories, LLC

Particle Size Analysis of Soil by ASTM D 422

Sample ID:	A9J0006-23		Client Sample ID:	SE-22-0-0.33		Batch Number:	9101058
Data Entered by:	JSJ	Date:	10/21/19	Data Reviewed by:	JW	Date:	10/23/19
Sample Description:	Clayey SILT with some Gravel and trace Sand			Max Particle Size:	Gravel		
Particle Shape:	Angular			Hardness	Hard and Durable		

Whole Sample	Tare	Air Dry + Tare	Air Dry	Moisture	Dry Wt.
	5.574	209.761	204.19	6.07	192.5

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Wt. Retained	% Retained	% Passing
4	4.75	6.052	32.190	26.14	26.14	13.6	86.4
10	2.00	1.337	7.482	6.15	32.28	3.2	83.2
Pan		5.577	175.498	169.92	202.20	82.9	

Hygroscopic Moisture Correction

	Hygroscopic Correction Factor	Oven Sample	Pan No.	Tare	Air Dry + Tare	Oven Dry + Tare	Moisture
	0.9428		J00623	1.320	21.781	20.610	6.07

Hydrometer Analysis

Start Date/Time	10/14/2019	8:57	Dispersing Agent	$NaPO_3$
Air Dry Sample Wt. for Hydrometer Test (g)	53.907		G_s Correction Factor (α)	1.000
Percent Passing No.10 Sieve	83.2		Specific Gravity (G_s)	2.65
Dry Weight of Soil Tested (g)	50.82		Corrected Dry Weight of Soil Tested (g) (W)	61.06

Elapsed Time (min)	Hydrometer Reading	Temperature (°C)	Corrected Hydrometer Reading [R]	% Finer of Hydrometer Sample	L	K	Particle Diameter (mm)	Percent Passing
1	47.5	19.9	42.68	69.9	8.3	0.01365	0.039	58.18
2	45	19.8	40.16	65.8	8.8	0.01365	0.029	54.73
4	42	19.8	37.16	60.8	9.2	0.01365	0.021	50.64
8	37.5	19.7	32.63	53.4	9.9	0.01365	0.015	44.48
15	32	19.9	27.18	44.5	10.9	0.01365	0.012	37.05
30	26	20.1	21.23	34.8	11.9	0.01365	0.009	28.94
60	24	20.4	17.91	29.3	12.2	0.01365	0.006	24.42
90	21	20.5	14.95	24.5	12.7	0.01348	0.005	20.37
120	19	20.5	12.95	21.2	13	0.01348	0.004	17.65
240	17	20.5	11.19	18.3	13.3	0.01348	0.003	15.25
360	16	19.9	10.01	16.4	13.5	0.01365	0.003	13.65
1440	13	18.7	6.66	10.9	14	0.01382	0.001	9.08

Sieve Analysis of Portion Finer Than No. 10 Sieve

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Retained	% Retained	% Passing
20	0.850	1.326	2.655	1.33	36.47	2.2	81.1
40	0.425	1.318	3.916	2.60	44.66	4.3	76.8
60	0.250	1.308	2.885	1.58	49.63	2.6	74.2
100	0.150	1.308	2.555	1.25	53.56	2.0	72.2
140	0.105	1.322	1.933	0.61	55.49	1.0	71.2
200	0.075	1.318	1.980	0.66	57.58	1.1	70.1
230	0.063	1.317	1.619	0.30	58.53	0.5	69.6
			Sum	8.33	230 Minus	42.50	

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Sample ID: SE-22-0-0.33 (A9J0006-23)

Grain Size Analysis Summary from Sieving and Hydrometer Testing		Particle Size (mm)	Percent Finer	Total Percent of Sample
Gravel				*16.77*
Retained on No. 4 sieve		4.75	86.42	13.58
Gravel, passing No. 4 sieve and retained on No. 10 sieve		2.00	83.23	3.19
Sand				*13.64*
Coarse sand, passing No.10 sieve and retained on No. 20 sieve		0.8500	81.05	2.18
Medium sand, passing No.20 sieve and retained on No. 40 sieve		0.4250	76.8	4.25
Medium sand, passing No.40 sieve and retained on No. 60 sieve		0.2500	74.22	2.58
Medium sand, passing No. 60 sieve and retained on No.100 sieve		0.1500	72.17	2.04
Fine sand, passing No. 100 sieve and retained on No.140 sieve		0.1060	71.17	1
Fine sand passing No. 140 sieve and retained on No. 200 sieve		0.0750	70.09	1.08
Fine sand, passing No. 200 sieve and retained on No. 230 sieve		0.0630	69.59	0.49
Silt and Clay (Measurements in the Clay fraction are noted)				*69.59*
Hydrometer Test		0.0393	58.18	11.42
Hydrometer Test		0.0286	54.73	3.44
Hydrometer Test		0.0207	50.64	4.09
Hydrometer Test		0.0152	44.48	6.17
Hydrometer Test		0.0116	37.05	7.43
Hydrometer Test		0.0086	28.94	8.11
Hydrometer Test		0.0062	24.42	4.52
Hydrometer Test		0.0051	20.37	4.04
Hydrometer Test	Clay	0.0044	17.65	2.73
Hydrometer Test	Clay	0.0032	15.25	2.4
Hydrometer Test	Clay	0.0026	13.65	1.6
Hydrometer Test	Clay	0.0014	9.08	4.56

Grain Size Summary	Percent of Total Sample
Gravel	16.8
Sand	13.6
Coarse sand	2.2
Medium sand	8.9
Fine sand	2.6
Silt	49.2
Clay	20.4

Case Narrative for Sample ID: SE-22-0-0.33 (A9J0006-23)

This data is not to be used for engineering purposes.

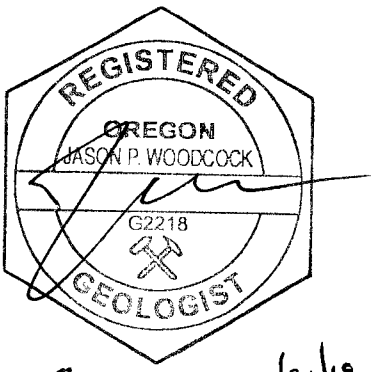
No difficulty dispersing the fraction passing the No. 10 sieve.

Dispersion device used: Commercial drink mixer operating at least 10,000 rpm for one minute.

The assumed specific gravity used in the calculations was 2.65.

+4 and +10 fractions contain abundant organic material.

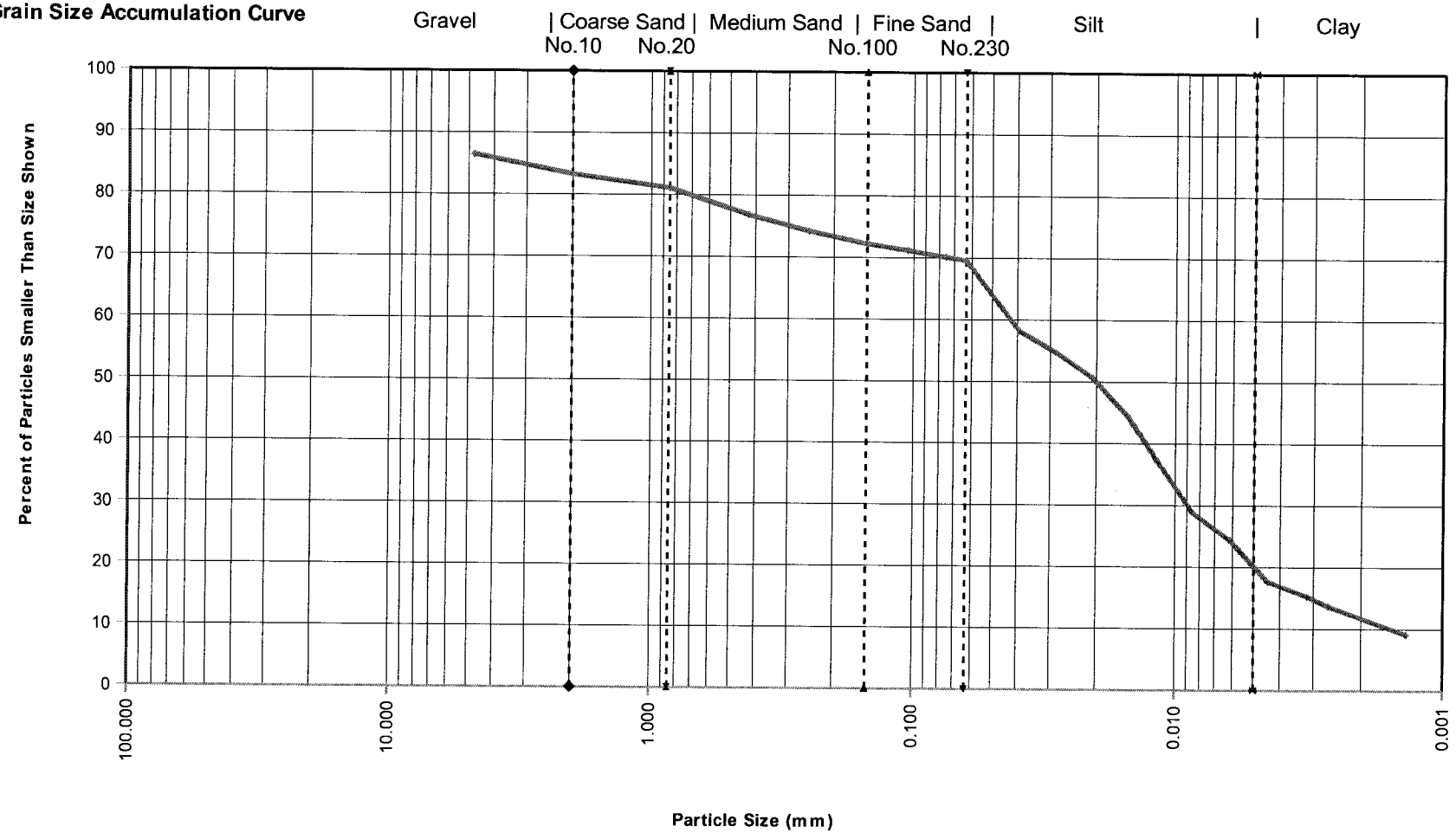
+20 to +200 fractions consist almost entirely of organic material.



Expires 12/31/19

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Grain Size Accumulation Curve



Sample ID:	SE-22-0-0.33 (A9J0006-23)			
Specific Gravity	MAXIMUM PARTICLE SIZE	GRAVEL & SAND		SOIL DESCRIPTION
		PARTICLE SHAPE	HARDNESS	
2.65	Gravel	Angular	Hard and Durable	Clayey SILT with some Gravel and trace Sand

Apex Laboratories, LLC

Particle Size Analysis of Soil by ASTM D 422

Sample ID:	A9J0006-24		Client Sample ID:	SE-27-0-0.33		Batch Number:	9101058
Data Entered by:	JSJ	Date:	10/21/19	Data Reviewed by:	JW	Date:	10/23/19
Sample Description:	Clayey SILT with some Sand and Gravel			Max Particle Size:	Gravel		
Particle Shape:	Angular			Hardness	Hard and Durable		

Whole Sample	Tare	Air Dry + Tare	Air Dry	Moisture	Dry Wt.
	5.516	227.339	221.82	4.82	211.6

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Wt. Retained	% Retained	% Passing
4	4.75	5.986	40.865	34.88	34.88	16.5	83.5
10	2.00	1.330	3.867	2.54	37.42	1.2	82.3
Pan		5.520	186.557	181.04	218.45	81.4	

Hygroscopic Moisture Correction

	Hygroscopic Correction Factor	Oven Sample	Pan No.	Tare	Air Dry + Tare	Oven Dry + Tare	Moisture
	0.9540		J00624	1.323	21.465	20.539	4.82

Hydrometer Analysis

Start Date/Time	10/14/2019	8:38	Dispersing Agent	$NaPO_3$
Air Dry Sample Wt. for Hydrometer Test (g)	53.363		G_s Correction Factor (α)	1.000
Percent Passing No.10 Sieve	82.3		Specific Gravity (G_s)	2.65
Dry Weight of Soil Tested (g)	50.91		Corrected Dry Weight of Soil Tested (g) (W)	61.84

Elapsed Time (min)	Hydrometer Reading	Temperature (°C)	Corrected Hydrometer Reading [R]	% Finer of Hydrometer Sample	L	K	Particle Diameter (mm)	Percent Passing
1	43	19.8	38.16	61.7	9.1	0.01365	0.041	50.79
2	39	19.8	34.16	55.2	9.7	0.01365	0.030	45.46
4	32	19.8	27.16	43.9	10.9	0.01365	0.023	36.15
8	28	20.1	23.23	37.6	11.5	0.01365	0.016	30.92
15	23.5	20	18.71	30.2	12.2	0.01365	0.012	24.90
30	20.5	20.1	15.73	25.4	12.7	0.01365	0.009	20.94
60	18	20.5	13.33	21.6	13.2	0.01348	0.006	17.75
90	17	20.8	11.05	17.9	13.3	0.01348	0.005	14.71
120	17	20.6	10.98	17.8	13.3	0.01348	0.004	14.62
240	15	20.5	9.19	14.9	13.7	0.01348	0.003	12.23
360	14.5	19.9	8.51	13.8	13.7	0.01365	0.003	11.33
1440	12	18.7	5.66	9.2	14.2	0.01382	0.001	7.54

Sieve Analysis of Portion Finer Than No. 10 Sieve

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Retained	% Retained	% Passing
20	0.850	1.300	1.633	0.33	38.55	0.5	81.8
40	0.425	1.314	2.532	1.22	42.68	2.0	79.8
60	0.250	1.309	2.642	1.33	47.20	2.2	77.7
100	0.150	1.324	3.049	1.73	53.05	2.8	74.9
140	0.105	1.324	3.068	1.74	58.97	2.8	72.0
200	0.075	1.317	3.494	2.18	66.35	3.5	68.5
230	0.063	1.315	2.538	1.22	70.50	2.0	66.5
			Sum	9.75	230 Minus	41.16	

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Sample ID: SE-27-0-0.33 (A9J0006-24)

Grain Size Analysis Summary from Sieving and Hydrometer Testing		Particle Size (mm)	Percent Finer	Total Percent of Sample
Gravel				*17.68*
Retained on No. 4 sieve		4.75	83.52	16.48
Gravel, passing No. 4 sieve and retained on No. 10 sieve		2.00	82.32	1.2
Sand				*15.77*
Coarse sand, passing No.10 sieve and retained on No. 20 sieve		0.8500	81.78	0.54
Medium sand, passing No.20 sieve and retained on No. 40 sieve		0.4250	79.81	1.97
Medium sand, passing No.40 sieve and retained on No. 60 sieve		0.2500	77.66	2.16
Medium sand, passing No. 60 sieve and retained on No.100 sieve		0.1500	74.87	2.79
Fine sand, passing No. 100 sieve and retained on No.140 sieve		0.1060	72.05	2.82
Fine sand passing No. 140 sieve and retained on No. 200 sieve		0.0750	68.53	3.52
Fine sand, passing No. 200 sieve and retained on No. 230 sieve		0.0630	66.55	1.98
Silt and Clay (Measurements in the Clay fraction are noted)				*66.55*
Hydrometer Test		0.0412	50.79	15.76
Hydrometer Test		0.0301	45.46	5.32
Hydrometer Test		0.0225	36.15	9.32
Hydrometer Test		0.0164	30.92	5.22
Hydrometer Test		0.0123	24.9	6.02
Hydrometer Test		0.0089	20.94	3.96
Hydrometer Test		0.0063	17.75	3.19
Hydrometer Test		0.0052	14.71	3.04
Hydrometer Test	Clay	0.0045	14.62	0.09
Hydrometer Test	Clay	0.0032	12.23	2.39
Hydrometer Test	Clay	0.0027	11.33	0.9
Hydrometer Test	Clay	0.0014	7.54	3.79

Grain Size Summary	**Percent of Total Sample**
Gravel	17.7
Sand	15.8
Coarse sand	0.5
Medium sand	6.9
Fine sand	8.3
Silt	51.8
Clay	14.7

Case Narrative for Sample ID: SE-27-0-0.33 (A9J0006-24)

This data is not to be used for engineering purposes.

No difficulty dispersing the fraction passing the No. 10 sieve.

Dispersion device used: Commercial drink mixer operating at least 10,000 rpm for one minute.

The assumed specific gravity used in the calculations was 2.65.

+4 and +10 fractions contain abundant organic material.

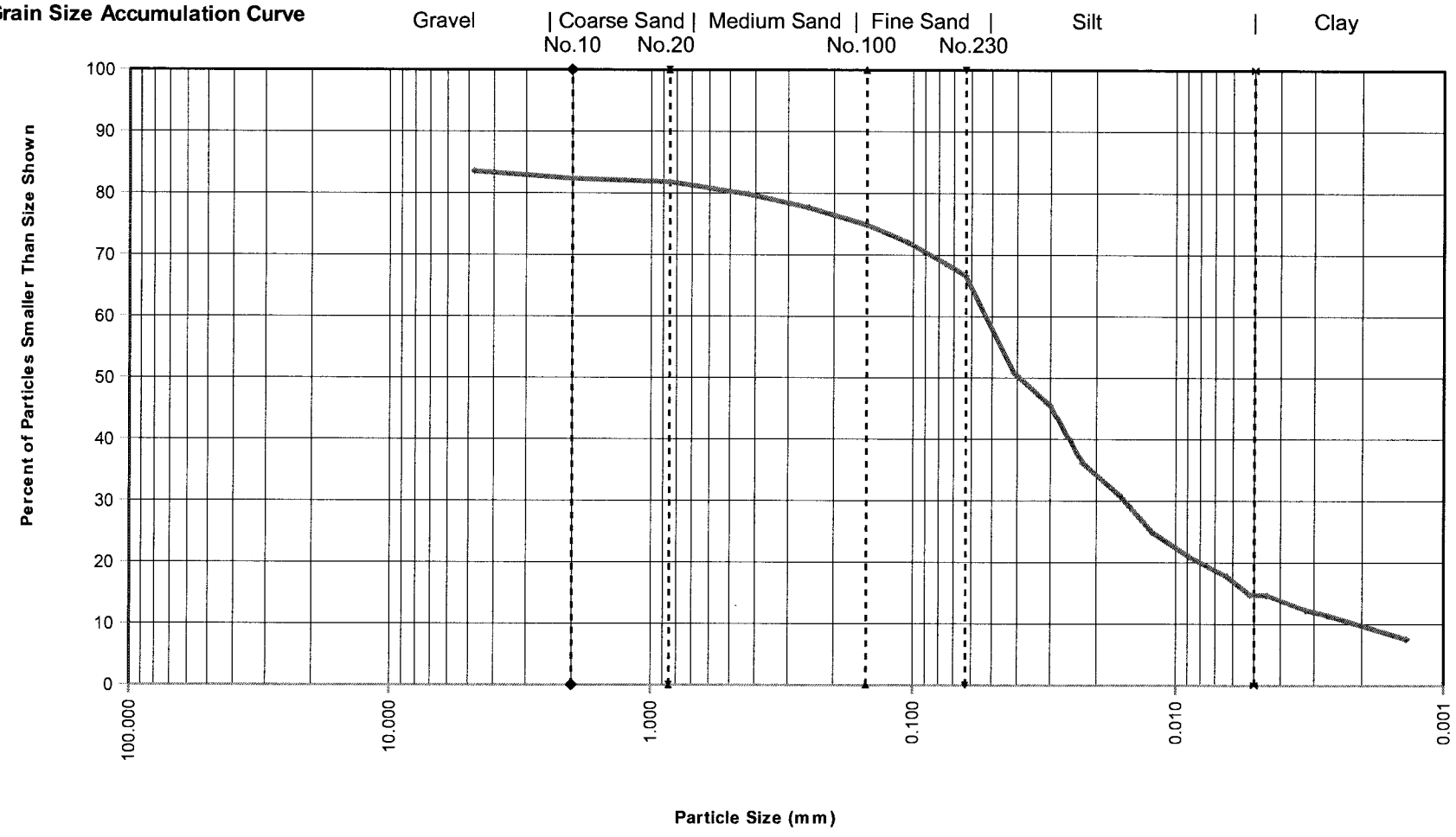
+20 to +60 fractions consist almost entirely of organic material.



Expires 12/31/19

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Grain Size Accumulation Curve



Sample ID:	SE-27-0-0.33 (A9J0006-24)			
Specific Gravity	MAXIMUM PARTICLE SIZE	GRAVEL & SAND		SOIL DESCRIPTION
		PARTICLE SHAPE	HARDNESS	
2.65	Gravel	Angular	Hard and Durable	Clayey SILT with some Sand and Gravel

Apex Laboratories, LLC

Particle Size Analysis of Soil by ASTM D 422

Sample ID:	A9J0006-25		Client Sample ID:	SE-27-0-0.33-Dup		Batch Number:	9101058
Data Entered by:	JSJ	Date:	10/21/19	Data Reviewed by:	JW	Date:	10/23/19
Sample Description:	Clayey SILT with some Sand and trace Gravel			Max Particle Size:	Gravel		
Particle Shape:	Angular to Sub-angular			Hardness	Hard and Durable		

Whole Sample	Tare	Air Dry + Tare	Air Dry	Moisture	Dry Wt.
	5.722	243.335	237.61	4.88	226.6

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Wt. Retained	% Retained	% Passing
4	4.75	6.024	23.192	17.17	17.17	7.6	92.4
10	2.00	1.333	3.573	2.24	19.41	1.0	91.4
Pan		5.746	221.873	216.13	235.54	90.7	

Hygroscopic Moisture Correction

	Hygroscopic Correction Factor	Oven Sample	Pan No.	Tare	Air Dry + Tare	Oven Dry + Tare	Moisture
	0.9535		J00625	1.337	24.111	23.052	4.88

Hydrometer Analysis

Start Date/Time	10/14/2019	8:16	Dispersing Agent	$NaPO_3$
Air Dry Sample Wt. for Hydrometer Test (g)	51.381		G_s Correction Factor (α)	1.000
Percent Passing No.10 Sieve	91.4		Specific Gravity (G_s)	2.65
Dry Weight of Soil Tested (g)	48.99		Corrected Dry Weight of Soil Tested (g) (W)	53.58

Elapsed Time (min)	Hydrometer Reading	Temperature (°C)	Corrected Hydrometer Reading [R]	% Finer of Hydrometer Sample	L	K	Particle Diameter (mm)	Percent Passing
1	45	19.7	40.13	74.9	8.8	0.01365	0.040	68.48
2	41	19.7	36.13	67.4	9.4	0.01365	0.030	61.65
4	35.5	19.7	30.63	57.2	10.2	0.01365	0.022	52.27
8	30	20	25.21	47.0	11.2	0.01365	0.016	43.01
15	25	19.9	20.18	37.7	12	0.01365	0.012	34.44
30	22.5	20.2	17.76	33.1	12.4	0.01365	0.009	30.30
60	19	20.5	14.33	26.7	13	0.01348	0.006	24.46
90	17	20.8	12.41	23.2	13.3	0.01348	0.005	21.17
120	17	20.9	11.08	20.7	13.3	0.01348	0.004	18.91
240	16	20.5	10.19	19.0	13.5	0.01348	0.003	17.38
360	15	20	9.04	16.9	13.7	0.01365	0.003	15.43
1440	13	18.7	6.66	12.4	14	0.01382	0.001	11.37

Sieve Analysis of Portion Finer Than No. 10 Sieve

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Retained	% Retained	% Passing
20	0.850	1.311	1.633	0.32	20.76	0.6	90.8
40	0.425	1.313	2.485	1.17	25.69	2.2	88.6
60	0.250	1.322	2.561	1.24	30.90	2.3	86.3
100	0.150	1.327	2.948	1.62	37.72	3.0	83.3
140	0.105	1.326	3.006	1.68	44.79	3.1	80.2
200	0.075	1.308	3.416	2.11	53.66	3.9	76.2
230	0.063	1.310	2.425	1.12	58.35	2.1	74.2
			Sum	9.26	230 Minus	39.73	

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Sample ID: SE-27-0-0.33-Dup (A9J0006-25)

Grain Size Analysis Summary from Sieving and Hydrometer Testing		Particle Size (mm)	Percent Finer	Total Percent of Sample
Gravel				*8.57*
Retained on No. 4 sieve		4.75	92.42	7.58
Gravel, passing No. 4 sieve and retained on No. 10 sieve		2.00	91.43	0.99
Sand				*17.28*
Coarse sand, passing No.10 sieve and retained on No. 20 sieve		0.8500	90.83	0.6
Medium sand, passing No.20 sieve and retained on No. 40 sieve		0.4250	88.65	2.19
Medium sand, passing No.40 sieve and retained on No. 60 sieve		0.2500	86.33	2.31
Medium sand, passing No. 60 sieve and retained on No.100 sieve		0.1500	83.31	3.03
Fine sand, passing No. 100 sieve and retained on No.140 sieve		0.1060	80.17	3.14
Fine sand passing No. 140 sieve and retained on No. 200 sieve		0.0750	76.24	3.93
Fine sand, passing No. 200 sieve and retained on No. 230 sieve		0.0630	74.16	2.08
Silt and Clay (Measurements in the Clay fraction are noted)				*74.16*
Hydrometer Test		0.0405	68.48	5.68
Hydrometer Test		0.0296	61.65	6.83
Hydrometer Test		0.0218	52.27	9.39
Hydrometer Test		0.0162	43.01	9.26
Hydrometer Test		0.0122	34.44	8.58
Hydrometer Test		0.0088	30.3	4.14
Hydrometer Test		0.0063	24.46	5.84
Hydrometer Test		0.0052	21.17	3.28
Hydrometer Test	Clay	0.0045	18.91	2.27
Hydrometer Test	Clay	0.0032	17.38	1.53
Hydrometer Test	Clay	0.0027	15.43	1.95
Hydrometer Test	Clay	0.0014	11.37	4.06

Grain Size Summary	Percent of Total Sample
Gravel	8.6
Sand	17.3
Coarse sand	0.6
Medium sand	7.5
Fine sand	9.2
Silt	53.0
Clay	21.2

Case Narrative for Sample ID: SE-27-0-0.33-Dup (A9J0006-25)

This data is not to be used for engineering purposes.

No difficulty dispersing the fraction passing the No. 10 sieve.

Dispersion device used: Commercial drink mixer operating at least 10,000 rpm for one minute.

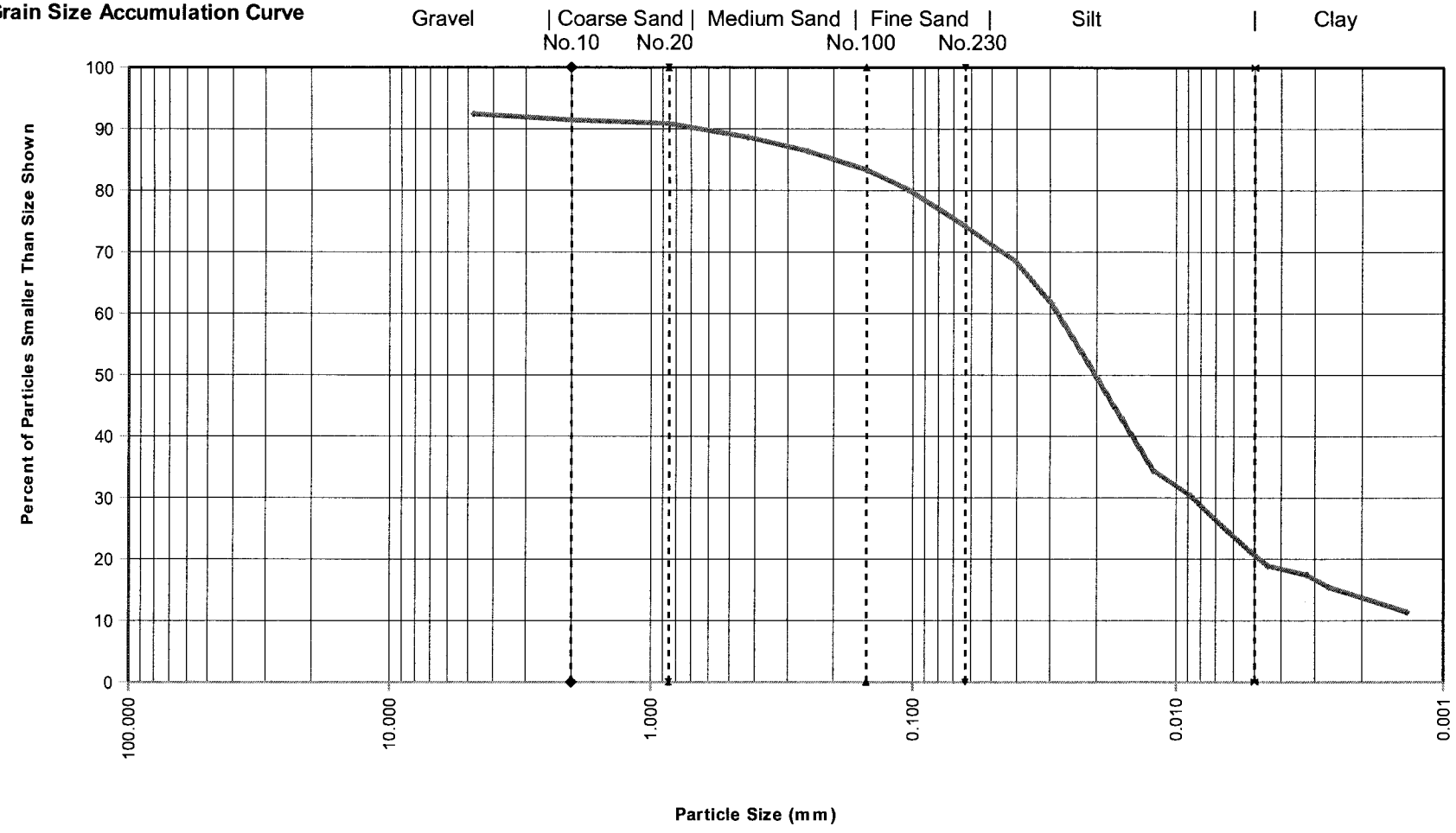
The assumed specific gravity used in the calculations was 2.65.



Expires 12/31/19

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Grain Size Accumulation Curve



Sample ID:	SE-27-0-0.33-Dup (A9J0006-25)			
Specific Gravity	MAXIMUM PARTICLE SIZE	GRAVEL & SAND		SOIL DESCRIPTION
		PARTICLE SHAPE	HARDNESS	
2.65	Gravel	Angular to Sub-angular	Hard and Durable	Clayey SILT with some Sand and trace Gravel

CFA | Cape Fear Analytical LLC
an affiliate of The GEL Group INC

3306 Kitty Hawk Road, Suite 120 Wilmington, NC 28405
P 910.795.0421
www.capefearanalytical.com

November 07, 2019

Mr. Philip Nerenberg
Apex Laboratories
6700 SW Sandburg Street
Portland, Oregon 97223

Re: DXN & PCB Subcontract
Work Order: 15582
SDG: A9J0006

Dear Mr. Nerenberg:

Cape Fear Analytical LLC (CFA) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on October 02, 2019. This original data report has been prepared and reviewed in accordance with CFA's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at 910-795-0421.

Sincerely,

Cynde Larkins

Cynde Larkins
Project Manager

Enclosures

problem solved

SUBCONTRACT ORDER

Apex Laboratories

A9J0006

10/1/19

SENDING LABORATORY:

Apex Laboratories
6700 S.W. Sandburg Street
Tigard, OR 97223
Phone: (503) 718-2323
Fax: (503) 336-0745
Project Manager: Philip Nerenberg

RECEIVING LABORATORY:

Cape Fear Analytical, LLC
3306 Kitty Hawk Rd Suite 120
Wilmington, NC 28405
Phone :(910) 795-0421
Fax: -

CFA WO# 15582

Sample Name: SE-14-0-0.33 **Sedimen** **Sampled: 09/27/19 14:02** (A9J0006-03)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	10/11/19 17:00	03/25/20 14:02	Cape Fear
Containers Supplied: (E)4 oz Glass Jar			

Sample Name: SE-21-0-0.33 **Sedimen** **Sampled: 09/27/19 15:07** (A9J0006-08)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	10/11/19 17:00	03/25/20 15:07	Cape Fear
Containers Supplied: (E)4 oz Glass Jar			

Sample Name: SE-22-0-0.33 **Sedimen** **Sampled: 09/27/19 19:30** (A9J0006-23)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	10/11/19 17:00	03/25/20 19:30	Cape Fear
Containers Supplied: (E)4 oz Glass Jar			

Standard TAT

temp. = 1.9°C

Released By	Date	Received By	Date
	10/1/19 1430	Fed Ex (Shipper)	
Fed Ex (Shipper)	02 OCT 19	Cynde Larkins	02 OCT 19 @ 0945

SAMPLE RECEIPT CHECKLIST

Cape Fear Analytical

Client: APEX	Work Order: 15582
Shipping Company: FedEx	Date/Time Received: 02OCT19 0945

Suspected Hazard Information	Yes	NA	No
Shipped as DOT Hazardous?			✓
Samples identified as Foreign Soil?			✓

DOE Site Sample Packages	Yes	NA	No*
Screened <0.5 mR/hr?		✓	
Samples < 2x background?		✓	

* Notify RSO of any responses in this column immediately.

Air Sample Receipt Specifics	Yes	NA	No
Air sample in shipment?			✓

Air Witness: _____

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: seals broken damaged container leaking container other(describe)
2	Custody seal/s present on cooler?			✓	Seal intact? Yes No
3	Chain of Custody documents included with shipment?	✓			
4	Samples requiring cold preservation within 0-6°C?	✓			Preservation Method: ice bags blue ice dry ice none other (describe) Temperature Blank present: Yes No 2.0°-0.1=1.9°C
5	Aqueous samples found to have visible solids?		✓		Sample IDs, containers affected:
5	Samples requiring chemical preservation at proper pH?		✓		Sample IDs, containers affected and pH observed: If preservative added, Lot#:
7	Samples requiring preservation have no residual chlorine?		✓		Sample IDs, containers affected: If preservative added, Lot#:
8	Samples received within holding time?	✓			Sample IDs, tests affected:
9	Sample IDs on COC match IDs on containers?	✓			Sample IDs, containers affected:
10	Date & time of COC match date & time on containers?	✓			Sample IDs, containers affected:
11	Number of containers received match number indicated on COC?	✓			List type and number of containers / Sample IDs, containers affected: 3 - 4oz clear glass soil jars
12	COC form is properly signed in relinquished/received sections?	✓			

Comments:

Checklist performed by: Initials: CA Date: 02OCT19

CF-UD-F-7

High Resolution Dioxins and Furans Analysis

Case Narrative

HDOX Case Narrative
Apex Laboratories (APEX)
SDG A9J0006
Work Order 15582

Method/Analysis Information

Product:	**Dioxins/Furans by EPA Method 1613B in Solids**
Analytical Method:	EPA Method 1613B
Extraction Method:	SW846 3540C
Analytical Batch Number:	42121
Clean Up Batch Number:	42120
Extraction Batch Number:	42119

Sample Analysis

Samples were received at 1.9°C (15582001, 15582002, 15582003). The following samples were analyzed using the analytical protocol as established in Method 1613B:

Sample ID	Client ID
12025124	Method Blank (MB)
12025125	Laboratory Control Sample (LCS)
12025126	Laboratory Control Sample Duplicate (LCSD)
15582001	SE-14-0-0.33
15582002	SE-21-0-0.33
15582003	SE-22-0-0.33

The samples in this SDG were analyzed on a "dry weight" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by Cape Fear Analytical LLC (CFA) as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with CF-OA-E-002 REV# 15.

Raw data reports are processed and reviewed by the analyst using the TargetLynx software package.

Calibration Information

Initial Calibration

All initial calibration requirements have been met for this sample delivery group (SDG).

Continuing Calibration Verification (CCV) Requirements
All associated calibration verification standard(s) (CCV) met the acceptance criteria.

Quality Control (QC) Information

Certification Statement
The test results presented in this document are certified to meet all requirements of the 2009 TNI Standard.

Method Blank (MB) Statement
The MB(s) analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries
All surrogate recoveries were within the established acceptance criteria for this SDG.

Laboratory Control Sample (LCS) Recovery
The LCS spike recoveries met the acceptance limits.

Laboratory Control Sample Duplicate (LCSD) Recovery
The LCSD spike recoveries met the acceptance limits.

LCS/LCSD Relative Percent Difference (RPD) Statement
The RPD(s) between the LCS and LCSD met the acceptance limits.

QC Sample Designation
A matrix spike and matrix spike duplicate analysis was not required for this SDG.

Technical Information

Holding Time Specifications
CFA assigns holding times based on the associated methodology, which assigns the date and time from sample collection. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

Preparation/Analytical Method Verification
All procedures were performed as stated in the SOP.

Sample Dilutions
The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis
Re-extractions or re-analyses were not required in this SDG.

Miscellaneous Information

Nonconformance (NCR) Documentation
A NCR was not required for this SDG.

Manual Integrations
Certain standards and QC samples required manual integrations to correctly position the baseline as set in the calibration standard injections. Where manual integrations were performed, copies of all manual integration peak profiles are included in the raw data section of this fraction. Manual integrations were required for data files in this SDG.

Sample preparation
No difficulties were encountered during sample preparation.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted: Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Sample Data Summary

Cape Fear Analytical, LLC

3306 Kitty Hawk Road Suite 120, Wilmington, NC 28405 - (910) 795-0421 - www.capefearanalytical.com

Qualifier Definition Report
for

APEX001 Apex Laboratories

Client SDG: A9J0006 CFA Work Order: 15582

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria

** Analyte is a surrogate compound

B The target analyte was detected in the associated blank.

J Value is estimated

K Estimated Maximum Possible Concentration

U Analyte was analyzed for, but not detected above the specified detection limit.

DL Indicates that sample is diluted.
RA Indicates that sample is re-analyzed without re-extraction.
RE Indicates that sample is re-extracted.

Review/Validation

Cape Fear Analytical requires all analytical data to be verified by a qualified data reviewer.

The following data validator verified the information presented in this case narrative:

Signature: Heather Patterson **Name: Heather Patterson**

Date: 07 NOV 2019 **Title: Group Leader**

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	**A9J0006**	**Client:**	**APEX001**	**Project:**	**APEX00319**
Lab Sample ID:	**15582001**	**Date Collected:**	**09/27/2019 14:02**	**Matrix:**	**SOIL**
Client Sample:	**1613B Soil**	**Date Received:**	**10/02/2019 09:45**	**%Moisture:**	**68.6**
Client ID:	**SE-14-0-0.33**			**Prep Basis:**	**Dry Weight**
Batch ID:	**42121**	**Method:**	**EPA Method 1613B**		
Run Date:	**10/31/2019 07:22**	**Analyst:**	**MLL**	**Instrument:**	**HRP763**
Data File:	**b29oct19a_5-4**			**Dilution:**	**1**
Prep Batch:	**42119**	**Prep Method:**	**SW846 3540C**		
Prep Date:	**18-OCT-19**	**Prep Aliquot:**	**25.07 g**		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		1.73	pg/g	0.364	1.27
40321-76-4	1,2,3,7,8-PeCDD	BJK	2.46	pg/g	1.11	6.36
39227-28-6	1,2,3,4,7,8-HxCDD	BJ	5.92	pg/g	1.18	6.36
57653-85-7	1,2,3,6,7,8-HxCDD		10.0	pg/g	1.04	6.36
19408-74-3	1,2,3,7,8,9-HxCDD	BJ	6.08	pg/g	1.14	6.36
35822-46-9	1,2,3,4,6,7,8-HpCDD		263	pg/g	2.21	6.36
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2830	pg/g	4.27	12.7
51207-31-9	2,3,7,8-TCDF		1.78	pg/g	0.504	1.27
57117-41-6	1,2,3,7,8-PeCDF	BJ	1.26	pg/g	0.412	6.36
57117-31-4	2,3,4,7,8-PeCDF	BJ	1.23	pg/g	0.344	6.36
70648-26-9	1,2,3,4,7,8-HxCDF	BJ	2.61	pg/g	0.417	6.36
57117-44-9	1,2,3,6,7,8-HxCDF	BJ	1.66	pg/g	0.405	6.36
60851-34-5	2,3,4,6,7,8-HxCDF	BJ	1.85	pg/g	0.430	6.36
72918-21-9	1,2,3,7,8,9-HxCDF	U	0.641	pg/g	0.641	6.36
67562-39-4	1,2,3,4,6,7,8-HpCDF		52.5	pg/g	0.690	6.36
55673-89-7	1,2,3,4,7,8,9-HpCDF	BJK	2.34	pg/g	1.05	6.36
39001-02-0	1,2,3,4,6,7,8,9-OCDF		116	pg/g	1.66	12.7
41903-57-5	Total TeCDD	JK	14.1	pg/g	0.364	1.27
36088-22-9	Total PeCDD	JK	33.8	pg/g	1.11	6.36
34465-46-8	Total HxCDD	JK	118	pg/g	1.04	6.36
37871-00-4	Total HpCDD	J	836	pg/g	2.21	6.36
30402-14-3	Total TeCDF	JK	14.1	pg/g	0.504	1.27
30402-15-4	Total PeCDF	JK	22.2	pg/g	0.137	6.36
55684-94-1	Total HxCDF	J	64.7	pg/g	0.405	6.36
38998-75-3	Total HpCDF	JK	180	pg/g	0.690	6.36
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		11.7	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		11.7	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		222	254	pg/g	87.2	(25%-164%)
13C-1,2,3,7,8-PeCDD		287	254	pg/g	113	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		212	254	pg/g	83.2	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		223	254	pg/g	87.5	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		244	254	pg/g	95.8	(23%-140%)
13C-OCDD		454	509	pg/g	89.2	(17%-157%)
13C-2,3,7,8-TCDF		233	254	pg/g	91.6	(24%-169%)
13C-1,2,3,7,8-PeCDF		289	254	pg/g	113	(24%-185%)
13C-2,3,4,7,8-PeCDF		287	254	pg/g	113	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		216	254	pg/g	84.9	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		222	254	pg/g	87.1	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		226	254	pg/g	88.8	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		238	254	pg/g	93.3	(29%-147%)

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	**A9J0006**	**Client:**	**APEX001**	**Project:**	**APEX00319**
Lab Sample ID:	**15582001**	**Date Collected:**	**09/27/2019 14:02**	**Matrix:**	**SOIL**
Client Sample:	**1613B Soil**	**Date Received:**	**10/02/2019 09:45**	**%Moisture:**	**68.6**
Client ID:	**SE-14-0-0.33**			**Prep Basis:**	**Dry Weight**
Batch ID:	**42121**	**Method:**	**EPA Method 1613B**		
Run Date:	**10/31/2019 07:22**	**Analyst:**	**MLL**	**Instrument:**	**HRP763**
Data File:	**b29oct19a_5-4**			**Dilution:**	**1**
Prep Batch:	**42119**	**Prep Method:**	**SW846 3540C**		
Prep Date:	**18-OCT-19**	**Prep Aliquot:**	**25.07 g**		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-1,2,3,4,6,7,8-HpCDF		219	254	pg/g	85.9	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF		236	254	pg/g	92.6	(26%-138%)
37Cl-2,3,7,8-TCDD		22.7	25.4	pg/g	89.2	(35%-197%)

Comments:

B **The target analyte was detected in the associated blank.**
J **Value is estimated**
K **Estimated Maximum Possible Concentration**
U **Analyte was analyzed for, but not detected above the specified detection limit.**

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	**A9J0006**	**Client:**	**APEX001**	**Project:**	**APEX00319**
Lab Sample ID:	**15582001**	**Date Collected:**	**09/27/2019 14:02**	**Matrix:**	**SOIL**
Client Sample:	**1613B Soil**	**Date Received:**	**10/02/2019 09:45**	**%Moisture:**	**68.6**
Client ID:	**SE-14-0-0.33**			**Prep Basis:**	**Dry Weight**
Batch ID:	**42121**	**Method:**	**EPA Method 1613B**		
Run Date:	**11/05/2019 13:02**	**Analyst:**	**MLL**	**Instrument:**	**HRP763**
Data File:	**b05nov19c-4**			**Dilution:**	**1**
Prep Batch:	**42119**	**Prep Method:**	**SW846 3540C**		
Prep Date:	**18-OCT-19**	**Prep Aliquot:**	**25.07 g**		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF		1.75	pg/g	0.417	1.27

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

B The target analyte was detected in the associated blank.
J Value is estimated
K Estimated Maximum Possible Concentration
U Analyte was analyzed for, but not detected above the specified detection limit.

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	**A9J0006**	**Client:**	**APEX001**	**Project:**	**APEX00319**
Lab Sample ID:	**15582002**	**Date Collected:**	**09/27/2019 15:07**	**Matrix:**	**SOIL**
Client Sample:	**1613B Soil**	**Date Received:**	**10/02/2019 09:45**	**%Moisture:**	**46.6**
Client ID:	**SE-21-0-0.33**			**Prep Basis:**	**Dry Weight**
Batch ID:	**42121**	**Method:**	**EPA Method 1613B**		
Run Date:	**10/31/2019 08:10**	**Analyst:**	**MLL**	**Instrument:**	**HRP763**
Data File:	**b29oct19a_5-5**			**Dilution:**	**1**
Prep Batch:	**42119**	**Prep Method:**	**SW846 3540C**		
Prep Date:	**18-OCT-19**	**Prep Aliquot:**	**18.81 g**		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	0.341	pg/g	0.341	0.996
40321-76-4	1,2,3,7,8-PeCDD	BJ	0.643	pg/g	0.227	4.98
39227-28-6	1,2,3,4,7,8-HxCDD	U	0.317	pg/g	0.317	4.98
57653-85-7	1,2,3,6,7,8-HxCDD	BJ	0.850	pg/g	0.293	4.98
19408-74-3	1,2,3,7,8,9-HxCDD	BJ	1.14	pg/g	0.315	4.98
35822-46-9	1,2,3,4,6,7,8-HpCDD		19.3	pg/g	0.480	4.98
3268-87-9	1,2,3,4,6,7,8,9-OCDD		177	pg/g	1.31	9.96
51207-31-9	2,3,7,8-TCDF	JK	0.575	pg/g	0.305	0.996
57117-41-6	1,2,3,7,8-PeCDF	U	0.161	pg/g	0.161	4.98
57117-31-4	2,3,4,7,8-PeCDF	BJK	0.315	pg/g	0.144	4.98
70648-26-9	1,2,3,4,7,8-HxCDF	BJK	0.376	pg/g	0.152	4.98
57117-44-9	1,2,3,6,7,8-HxCDF	BJK	0.346	pg/g	0.143	4.98
60851-34-5	2,3,4,6,7,8-HxCDF	BJK	0.414	pg/g	0.144	4.98
72918-21-9	1,2,3,7,8,9-HxCDF	U	0.217	pg/g	0.217	4.98
67562-39-4	1,2,3,4,6,7,8-HpCDF		9.17	pg/g	0.207	4.98
55673-89-7	1,2,3,4,7,8,9-HpCDF	BJ	0.462	pg/g	0.311	4.98
39001-02-0	1,2,3,4,6,7,8,9-OCDF	B	13.4	pg/g	0.647	9.96
41903-57-5	Total TeCDD	JK	0.404	pg/g	0.341	0.996
36088-22-9	Total PeCDD	BJK	3.71	pg/g	0.227	4.98
34465-46-8	Total HxCDD	BJ	11.3	pg/g	0.293	4.98
37871-00-4	Total HpCDD		43.1	pg/g	0.480	4.98
30402-14-3	Total TeCDF	JK	3.19	pg/g	0.305	0.996
30402-15-4	Total PeCDF	BJK	3.70	pg/g	0.122	4.98
55684-94-1	Total HxCDF	BJK	8.49	pg/g	0.143	4.98
38998-75-3	Total HpCDF	J	23.5	pg/g	0.207	4.98
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		1.45	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		1.65	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		165	199	pg/g	82.8	(25%-164%)
13C-1,2,3,7,8-PeCDD		226	199	pg/g	113	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		175	199	pg/g	87.7	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		160	199	pg/g	80.3	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		182	199	pg/g	91.4	(23%-140%)
13C-OCDD		365	398	pg/g	91.7	(17%-157%)
13C-2,3,7,8-TCDF		179	199	pg/g	89.9	(24%-169%)
13C-1,2,3,7,8-PeCDF		223	199	pg/g	112	(24%-185%)
13C-2,3,4,7,8-PeCDF		231	199	pg/g	116	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		174	199	pg/g	87.2	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		162	199	pg/g	81.5	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		172	199	pg/g	86.2	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		184	199	pg/g	92.5	(29%-147%)

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	**A9J0006**	**Client:**	**APEX001**	**Project:**	**APEX00319**
Lab Sample ID:	**15582002**	**Date Collected:**	**09/27/2019 15:07**	**Matrix:**	**SOIL**
Client Sample:	**1613B Soil**	**Date Received:**	**10/02/2019 09:45**	**%Moisture:**	**46.6**
Client ID:	**SE-21-0-0.33**			**Prep Basis:**	**Dry Weight**
Batch ID:	**42121**	**Method:**	**EPA Method 1613B**		
Run Date:	**10/31/2019 08:10**	**Analyst:**	**MLL**	**Instrument:**	**HRP763**
Data File:	**b29oct19a_5-5**			**Dilution:**	**1**
Prep Batch:	**42119**	**Prep Method:**	**SW846 3540C**		
Prep Date:	**18-OCT-19**	**Prep Aliquot:**	**18.81 g**		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-1,2,3,4,6,7,8-HpCDF		172	199	pg/g	86.5	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF		187	199	pg/g	93.8	(26%-138%)
37Cl-2,3,7,8-TCDD		18.4	19.9	pg/g	92.6	(35%-197%)

Comments:

B **The target analyte was detected in the associated blank.**
J **Value is estimated**
K **Estimated Maximum Possible Concentration**
U **Analyte was analyzed for, but not detected above the specified detection limit.**

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	**A9J0006**	**Client:**	**APEX001**	**Project:**	**APEX00319**
Lab Sample ID:	**15582003**	**Date Collected:**	**09/27/2019 19:30**	**Matrix:**	**SOIL**
Client Sample:	**1613B Soil**	**Date Received:**	**10/02/2019 09:45**	**%Moisture:**	**66.9**
Client ID:	**SE-22-0-0.33**			**Prep Basis:**	**Dry Weight**
Batch ID:	**42121**	**Method:**	**EPA Method 1613B**		
Run Date:	**10/31/2019 08:58**	**Analyst:**	**MLL**	**Instrument:**	**HRP763**
Data File:	**b29oct19a_5-6**			**Dilution:**	**1**
Prep Batch:	**42119**	**Prep Method:**	**SW846 3540C**		
Prep Date:	**18-OCT-19**	**Prep Aliquot:**	**25.08 g**		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		1.74	pg/g	0.361	1.20
40321-76-4	1,2,3,7,8-PeCDD	J	4.75	pg/g	0.474	6.02
39227-28-6	1,2,3,4,7,8-HxCDD		8.61	pg/g	0.788	6.02
57653-85-7	1,2,3,6,7,8-HxCDD		19.4	pg/g	0.747	6.02
19408-74-3	1,2,3,7,8,9-HxCDD		14.8	pg/g	0.792	6.02
35822-46-9	1,2,3,4,6,7,8-HpCDD		401	pg/g	2.00	6.02
3268-87-9	1,2,3,4,6,7,8,9-OCDD		3250	pg/g	2.91	12.0
51207-31-9	2,3,7,8-TCDF		1.82	pg/g	0.385	1.20
57117-41-6	1,2,3,7,8-PeCDF	BJ	1.16	pg/g	0.291	6.02
57117-31-4	2,3,4,7,8-PeCDF	BJ	2.15	pg/g	0.267	6.02
70648-26-9	1,2,3,4,7,8-HxCDF	BJ	3.54	pg/g	0.294	6.02
57117-44-9	1,2,3,6,7,8-HxCDF	BJ	2.79	pg/g	0.284	6.02
60851-34-5	2,3,4,6,7,8-HxCDF	BJ	4.24	pg/g	0.287	6.02
72918-21-9	1,2,3,7,8,9-HxCDF	BJ	1.15	pg/g	0.393	6.02
67562-39-4	1,2,3,4,6,7,8-HpCDF		92.5	pg/g	0.631	6.02
55673-89-7	1,2,3,4,7,8,9-HpCDF	BJ	4.41	pg/g	0.922	6.02
39001-02-0	1,2,3,4,6,7,8,9-OCDF		262	pg/g	0.999	12.0
41903-57-5	Total TeCDD	JK	14.1	pg/g	0.361	1.20
36088-22-9	Total PeCDD	JK	29.5	pg/g	0.474	6.02
34465-46-8	Total HxCDD	JK	141	pg/g	0.747	6.02
37871-00-4	Total HpCDD		737	pg/g	2.00	6.02
30402-14-3	Total TeCDF	JK	16.8	pg/g	0.385	1.20
30402-15-4	Total PeCDF	JK	40.4	pg/g	0.122	6.02
55684-94-1	Total HxCDF	J	107	pg/g	0.284	6.02
38998-75-3	Total HpCDF	J	259	pg/g	0.631	6.02
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		18.8	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		18.8	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		194	241	pg/g	80.5	(25%-164%)
13C-1,2,3,7,8-PeCDD		268	241	pg/g	111	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		205	241	pg/g	85.0	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		194	241	pg/g	80.7	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		224	241	pg/g	93.1	(23%-140%)
13C-OCDD		454	482	pg/g	94.2	(17%-157%)
13C-2,3,7,8-TCDF		216	241	pg/g	89.7	(24%-169%)
13C-1,2,3,7,8-PeCDF		259	241	pg/g	107	(24%-185%)
13C-2,3,4,7,8-PeCDF		273	241	pg/g	113	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		204	241	pg/g	84.6	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		191	241	pg/g	79.5	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		202	241	pg/g	84.0	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		224	241	pg/g	93.0	(29%-147%)

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	**A9J0006**	**Client:**	**APEX001**	**Project:**	**APEX00319**
Lab Sample ID:	**15582003**	**Date Collected:**	**09/27/2019 19:30**	**Matrix:**	**SOIL**
Client Sample:	**1613B Soil**	**Date Received:**	**10/02/2019 09:45**	**%Moisture:**	**66.9**
Client ID:	**SE-22-0-0.33**			**Prep Basis:**	**Dry Weight**
Batch ID:	**42121**	**Method:**	**EPA Method 1613B**		
Run Date:	**10/31/2019 08:58**	**Analyst:**	**MLL**	**Instrument:**	**HRP763**
Data File:	**b29oct19a_5-6**			**Dilution:**	**1**
Prep Batch:	**42119**	**Prep Method:**	**SW846 3540C**		
Prep Date:	**18-OCT-19**	**Prep Aliquot:**	**25.08 g**		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-1,2,3,4,6,7,8-HpCDF		207	241	pg/g	86.0	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF		222	241	pg/g	92.3	(26%-138%)
37Cl-2,3,7,8-TCDD		22.3	24.1	pg/g	92.7	(35%-197%)

Comments:

B **The target analyte was detected in the associated blank.**
J **Value is estimated**
K **Estimated Maximum Possible Concentration**
U **Analyte was analyzed for, but not detected above the specified detection limit.**

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	**A9J0006**	**Client:**	**APEX001**	**Project:**	**APEX00319**
Lab Sample ID:	**15582003**	**Date Collected:**	**09/27/2019 19:30**	**Matrix:**	**SOIL**
Client Sample:	**1613B Soil**	**Date Received:**	**10/02/2019 09:45**	**%Moisture:**	**66.9**
Client ID:	**SE-22-0-0.33**			**Prep Basis:**	**Dry Weight**
Batch ID:	**42121**	**Method:**	**EPA Method 1613B**		
Run Date:	**11/05/2019 13:23**	**Analyst:**	**MLL**	**Instrument:**	**HRP763**
Data File:	**b05nov19c-5**			**Dilution:**	**1**
Prep Batch:	**42119**	**Prep Method:**	**SW846 3540C**		
Prep Date:	**18-OCT-19**	**Prep Aliquot:**	**25.08 g**		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF		1.89	pg/g	0.194	1.20

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

B The target analyte was detected in the associated blank.
J Value is estimated
K Estimated Maximum Possible Concentration
U Analyte was analyzed for, but not detected above the specified detection limit.

Quality Control Summary

Hi-Res Dioxins/Furans
Surrogate Recovery Report

SDG Number: A9J0006

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
12025125	LCS for batch 42119	13C-2,3,7,8-TCDD		80.5	(20%-175%)
		13C-1,2,3,7,8-PeCDD		96.2	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		78.4	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		85.3	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		80.3	(22%-166%)
		13C-OCDD		70.9	(13%-199%)
		13C-2,3,7,8-TCDF		88.6	(22%-152%)
		13C-1,2,3,7,8-PeCDF		96.9	(21%-192%)
		13C-2,3,4,7,8-PeCDF		101	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		80.3	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		83.7	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		85.8	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		85.6	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		79.2	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		77.1	(20%-186%)
		37Cl-2,3,7,8-TCDD		90.1	(31%-191%)
12025126	LCSD for batch 42119	13C-2,3,7,8-TCDD		78.9	(20%-175%)
		13C-1,2,3,7,8-PeCDD		97.2	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		78.9	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		84.0	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		80.0	(22%-166%)
		13C-OCDD		73.5	(13%-199%)
		13C-2,3,7,8-TCDF		87.5	(22%-152%)
		13C-1,2,3,7,8-PeCDF		99.0	(21%-192%)
		13C-2,3,4,7,8-PeCDF		99.6	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		82.6	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		85.2	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		87.4	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		84.8	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		80.1	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		77.7	(20%-186%)
		37Cl-2,3,7,8-TCDD		92.7	(31%-191%)
12025124	MB for batch 42119	13C-2,3,7,8-TCDD		78.1	(25%-164%)
		13C-1,2,3,7,8-PeCDD		90.4	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		78.6	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		80.8	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		77.3	(23%-140%)
		13C-OCDD		68.3	(17%-157%)
		13C-2,3,7,8-TCDF		86.1	(24%-169%)
		13C-1,2,3,7,8-PeCDF		90.1	(24%-185%)
		13C-2,3,4,7,8-PeCDF		92.2	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		78.4	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		83.2	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		84.3	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		86.5	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		75.0	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		73.9	(26%-138%)
		37Cl-2,3,7,8-TCDD		92.0	(35%-197%)
15582001	SE-14-0-0.33	13C-2,3,7,8-TCDD		87.2	(25%-164%)

Hi-Res Dioxins/Furans
Surrogate Recovery Report

SDG Number: A9J0006

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
15582001	SE-14-0-0.33	13C-1,2,3,7,8-PeCDD		113	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		83.2	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		87.5	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		95.8	(23%-140%)
		13C-OCDD		89.2	(17%-157%)
		13C-2,3,7,8-TCDF		91.6	(24%-169%)
		13C-1,2,3,7,8-PeCDF		113	(24%-185%)
		13C-2,3,4,7,8-PeCDF		113	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		84.9	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		87.1	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		88.8	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		93.3	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		85.9	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		92.6	(26%-138%)
		37Cl-2,3,7,8-TCDD		89.2	(35%-197%)
15582002	SE-21-0-0.33	13C-2,3,7,8-TCDD		82.8	(25%-164%)
		13C-1,2,3,7,8-PeCDD		113	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		87.7	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		80.3	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		91.4	(23%-140%)
		13C-OCDD		91.7	(17%-157%)
		13C-2,3,7,8-TCDF		89.9	(24%-169%)
		13C-1,2,3,7,8-PeCDF		112	(24%-185%)
		13C-2,3,4,7,8-PeCDF		116	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		87.2	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		81.5	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		86.2	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		92.5	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		86.5	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		93.8	(26%-138%)
		37Cl-2,3,7,8-TCDD		92.6	(35%-197%)
15582003	SE-22-0-0.33	13C-2,3,7,8-TCDD		80.5	(25%-164%)
		13C-1,2,3,7,8-PeCDD		111	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		85.0	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		80.7	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		93.1	(23%-140%)
		13C-OCDD		94.2	(17%-157%)
		13C-2,3,7,8-TCDF		89.7	(24%-169%)
		13C-1,2,3,7,8-PeCDF		107	(24%-185%)
		13C-2,3,4,7,8-PeCDF		113	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		84.6	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		79.5	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		84.0	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		93.0	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		86.0	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		92.3	(26%-138%)
		37Cl-2,3,7,8-TCDD		92.7	(35%-197%)

* Recovery outside Acceptance Limits

Hi-Res Dioxins/Furans

Surrogate Recovery Report

SDG Number: A9J0006

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits

* Recovery outside Acceptance Limits

Column to be used to flag recovery values

D Sample Diluted

Hi-Res Dioxins/Furans

Quality Control Summary
Spike Recovery Report

SDG Number: A9J0006 **Sample Type:** Laboratory Control Sample

Client ID: LCS for batch 42119 **Matrix:** SOLID

Lab Sample ID: 12025125

Instrument: HRP763 **Analysis Date:** 10/31/2019 04:58 **Dilution:** 1

Analyst: MLL **Prep Batch ID:** 42119

Batch ID: 42121

CAS No.		Parmname	Amount Added pg/g	Spike Conc. pg/g	Recovery %	Acceptance Limits
1746-01-6	LCS	2,3,7,8-TCDD	20.0	20.5	102	67-158
40321-76-4	LCS	1,2,3,7,8-PeCDD	100	102	102	70-142
39227-28-6	LCS	1,2,3,4,7,8-HxCDD	100	102	102	70-164
57653-85-7	LCS	1,2,3,6,7,8-HxCDD	100	102	102	76-134
19408-74-3	LCS	1,2,3,7,8,9-HxCDD	100	108	108	64-162
35822-46-9	LCS	1,2,3,4,6,7,8-HpCDD	100	96.0	96	70-140
3268-87-9	LCS	1,2,3,4,6,7,8,9-OCDD	200	189	94.7	78-144
51207-31-9	LCS	2,3,7,8-TCDF	20.0	19.3	96.5	75-158
57117-41-6	LCS	1,2,3,7,8-PeCDF	100	98.7	98.7	80-134
57117-31-4	LCS	2,3,4,7,8-PeCDF	100	96.1	96.1	68-160
70648-26-9	LCS	1,2,3,4,7,8-HxCDF	100	101	101	72-134
57117-44-9	LCS	1,2,3,6,7,8-HxCDF	100	103	103	84-130
60851-34-5	LCS	2,3,4,6,7,8-HxCDF	100	97.1	97.1	70-156
72918-21-9	LCS	1,2,3,7,8,9-HxCDF	100	100	100	78-130
67562-39-4	LCS	1,2,3,4,6,7,8-HpCDF	100	105	105	82-122
55673-89-7	LCS	1,2,3,4,7,8,9-HpCDF	100	104	104	78-138
39001-02-0	LCS	1,2,3,4,6,7,8,9-OCDF	200	213	107	63-170

Hi-Res Dioxins/Furans

Quality Control Summary
Spike Recovery Report

SDG Number: A9J0006 **Sample Type:** Laboratory Control Sample Duplicate

Client ID: LCSD for batch 42119 **Matrix:** SOLID

Lab Sample ID: 12025126

Instrument: HRP763 **Analysis Date:** 10/31/2019 05:46 **Dilution:** 1

Analyst: MLL **Prep Batch ID:** 42119

Batch ID: 42121

CAS No.		Parmname	Amount Added pg/g	Spike Conc. pg/g	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
1746-01-6	LCSD	2,3,7,8-TCDD	20.0	20.2	101	67-158	1.29	0-20
40321-76-4	LCSD	1,2,3,7,8-PeCDD	100	98.9	98.9	70-142	3.45	0-20
39227-28-6	LCSD	1,2,3,4,7,8-HxCDD	100	98.9	98.9	70-164	2.74	0-20
57653-85-7	LCSD	1,2,3,6,7,8-HxCDD	100	99.0	99	76-134	3.47	0-20
19408-74-3	LCSD	1,2,3,7,8,9-HxCDD	100	104	104	64-162	3.67	0-20
35822-46-9	LCSD	1,2,3,4,6,7,8-HpCDD	100	94.8	94.8	70-140	1.32	0-20
3268-87-9	LCSD	1,2,3,4,6,7,8,9-OCDD	200	188	94.1	78-144	0.656	0-20
51207-31-9	LCSD	2,3,7,8-TCDF	20.0	19.6	97.8	75-158	1.30	0-20
57117-41-6	LCSD	1,2,3,7,8-PeCDF	100	94.4	94.4	80-134	4.45	0-20
57117-31-4	LCSD	2,3,4,7,8-PeCDF	100	94.2	94.2	68-160	1.97	0-20
70648-26-9	LCSD	1,2,3,4,7,8-HxCDF	100	95.9	95.9	72-134	4.79	0-20
57117-44-9	LCSD	1,2,3,6,7,8-HxCDF	100	98.0	98	84-130	5.36	0-20
60851-34-5	LCSD	2,3,4,6,7,8-HxCDF	100	95.5	95.5	70-156	1.62	0-20
72918-21-9	LCSD	1,2,3,7,8,9-HxCDF	100	99.4	99.4	78-130	0.802	0-20
67562-39-4	LCSD	1,2,3,4,6,7,8-HpCDF	100	100	100	82-122	4.21	0-20
55673-89-7	LCSD	1,2,3,4,7,8,9-HpCDF	100	103	103	78-138	0.615	0-20
39001-02-0	LCSD	1,2,3,4,6,7,8,9-OCDF	200	199	99.3	63-170	7.12	0-20

Method Blank Summary

SDG Number:	**A9J0006**	**Client:**	**APEX001**	**Matrix:**	**SOLID**
Client ID:	**MB for batch 42119**	**Instrument ID:**	**HRP763**	**Data File:**	**b29oct19a_5-3**
Lab Sample ID:	**12025124**	**Prep Date:**	**18-OCT-19**	**Analyzed:**	**10/31/19 06:34**
Column:					

This method blank applies to the following samples and quality control samples:

	Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01	LCS for batch 42119	12025125	b29oct19a_5-1	10/31/19	0458
02	LCSD for batch 42119	12025126	b29oct19a_5-2	10/31/19	0546
03	SE-14-0-0.33	15582001	b29oct19a_5-4	10/31/19	0722
04	SE-21-0-0.33	15582002	b29oct19a_5-5	10/31/19	0810
05	SE-22-0-0.33	15582003	b29oct19a_5-6	10/31/19	0858
06	SE-14-0-0.33	15582001	b05nov19c-4	11/05/19	1302
07	SE-22-0-0.33	15582003	b05nov19c-5	11/05/19	1323

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	**A9J0006**	**Client:**	**APEX001**	**Project:**	**APEX00319**
Lab Sample ID:	**12025124**			**Matrix:**	**SOLID**
Client Sample:	**QC for batch 42119**				
Client ID:	**MB for batch 42119**			**Prep Basis:**	**As Received**
Batch ID:	**42121**	**Method:**	**EPA Method 1613B**		
Run Date:	**10/31/2019 06:34**	**Analyst:**	**MLL**	**Instrument:**	**HRP763**
Data File:	**b29oct19a_5-3**			**Dilution:**	**1**
Prep Batch:	**42119**	**Prep Method:**	**SW846 3540C**		
Prep Date:	**18-OCT-19**	**Prep Aliquot:**	**10 g**		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	0.338	pg/g	0.338	1.00
40321-76-4	1,2,3,7,8-PeCDD	JK	0.436	pg/g	0.218	5.00
39227-28-6	1,2,3,4,7,8-HxCDD	J	0.598	pg/g	0.408	5.00
57653-85-7	1,2,3,6,7,8-HxCDD	J	0.400	pg/g	0.386	5.00
19408-74-3	1,2,3,7,8,9-HxCDD	J	0.698	pg/g	0.408	5.00
35822-46-9	1,2,3,4,6,7,8-HpCDD	J	0.690	pg/g	0.610	5.00
3268-87-9	1,2,3,4,6,7,8,9-OCDD	JK	1.92	pg/g	0.882	10.0
51207-31-9	2,3,7,8-TCDF	U	0.374	pg/g	0.374	1.00
57117-41-6	1,2,3,7,8-PeCDF	JK	0.458	pg/g	0.302	5.00
57117-31-4	2,3,4,7,8-PeCDF	JK	0.442	pg/g	0.268	5.00
70648-26-9	1,2,3,4,7,8-HxCDF	J	0.610	pg/g	0.312	5.00
57117-44-9	1,2,3,6,7,8-HxCDF	J	0.496	pg/g	0.300	5.00
60851-34-5	2,3,4,6,7,8-HxCDF	JK	0.496	pg/g	0.300	5.00
72918-21-9	1,2,3,7,8,9-HxCDF	J	0.618	pg/g	0.482	5.00
67562-39-4	1,2,3,4,6,7,8-HpCDF	J	0.692	pg/g	0.346	5.00
55673-89-7	1,2,3,4,7,8,9-HpCDF	J	0.790	pg/g	0.536	5.00
39001-02-0	1,2,3,4,6,7,8,9-OCDF	JK	1.58	pg/g	1.09	10.0
41903-57-5	Total TeCDD	U	0.338	pg/g	0.338	1.00
36088-22-9	Total PeCDD	JK	0.436	pg/g	0.218	5.00
34465-46-8	Total HxCDD	J	1.70	pg/g	0.386	5.00
37871-00-4	Total HpCDD	J	0.690	pg/g	0.610	5.00
30402-14-3	Total TeCDF	U	0.374	pg/g	0.374	1.00
30402-15-4	Total PeCDF	JK	0.900	pg/g	0.214	5.00
55684-94-1	Total HxCDF	JK	2.22	pg/g	0.300	5.00
38998-75-3	Total HpCDF	J	1.48	pg/g	0.346	5.00
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		0.997	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		1.18	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		156	200	pg/g	78.1	(25%-164%)
13C-1,2,3,7,8-PeCDD		181	200	pg/g	90.4	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		157	200	pg/g	78.6	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		162	200	pg/g	80.8	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		155	200	pg/g	77.3	(23%-140%)
13C-OCDD		273	400	pg/g	68.3	(17%-157%)
13C-2,3,7,8-TCDF		172	200	pg/g	86.1	(24%-169%)
13C-1,2,3,7,8-PeCDF		180	200	pg/g	90.1	(24%-185%)
13C-2,3,4,7,8-PeCDF		184	200	pg/g	92.2	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		157	200	pg/g	78.4	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		166	200	pg/g	83.2	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		169	200	pg/g	84.3	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		173	200	pg/g	86.5	(29%-147%)

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	**A9J0006**	**Client:**	**APEX001**	**Project:**	**APEX00319**
Lab Sample ID:	**12025124**			**Matrix:**	**SOLID**
Client Sample:	**QC for batch 42119**				
Client ID:	**MB for batch 42119**			**Prep Basis:**	**As Received**
Batch ID:	**42121**	**Method:**	**EPA Method 1613B**		
Run Date:	**10/31/2019 06:34**	**Analyst:**	**MLL**	**Instrument:**	**HRP763**
Data File:	**b29oct19a_5-3**			**Dilution:**	**1**
Prep Batch:	**42119**	**Prep Method:**	**SW846 3540C**		
Prep Date:	**18-OCT-19**	**Prep Aliquot:**	**10 g**		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-1,2,3,4,6,7,8-HpCDF		150	200	pg/g	75.0	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF		148	200	pg/g	73.9	(26%-138%)
37Cl-2,3,7,8-TCDD		18.4	20.0	pg/g	92.0	(35%-197%)

Comments:

J **Value is estimated**

K **Estimated Maximum Possible Concentration**

U **Analyte was analyzed for, but not detected above the specified detection limit.**

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	**A9J0006**	**Client:**	**APEX001**	**Project:**	**APEX00319**
Lab Sample ID:	**12025125**			**Matrix:**	**SOLID**
Client Sample:	**QC for batch 42119**				
Client ID:	**LCS for batch 42119**			**Prep Basis:**	**As Received**
Batch ID:	**42121**	**Method:**	**EPA Method 1613B**		
Run Date:	**10/31/2019 04:58**	**Analyst:**	**MLL**	**Instrument:**	**HRP763**
Data File:	**b29oct19a_5-1**			**Dilution:**	**1**
Prep Batch:	**42119**	**Prep Method:**	**SW846 3540C**		
Prep Date:	**18-OCT-19**	**Prep Aliquot:**	**10 g**		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		20.5	pg/g	0.314	1.00
40321-76-4	1,2,3,7,8-PeCDD		102	pg/g	0.892	5.00
39227-28-6	1,2,3,4,7,8-HxCDD		102	pg/g	1.12	5.00
57653-85-7	1,2,3,6,7,8-HxCDD		102	pg/g	1.00	5.00
19408-74-3	1,2,3,7,8,9-HxCDD		108	pg/g	1.09	5.00
35822-46-9	1,2,3,4,6,7,8-HpCDD		96.0	pg/g	1.20	5.00
3268-87-9	1,2,3,4,6,7,8,9-OCDD		189	pg/g	3.96	10.0
51207-31-9	2,3,7,8-TCDF		19.3	pg/g	0.340	1.00
57117-41-6	1,2,3,7,8-PeCDF		98.7	pg/g	0.590	5.00
57117-31-4	2,3,4,7,8-PeCDF		96.1	pg/g	0.490	5.00
70648-26-9	1,2,3,4,7,8-HxCDF		101	pg/g	0.964	5.00
57117-44-9	1,2,3,6,7,8-HxCDF		103	pg/g	0.946	5.00
60851-34-5	2,3,4,6,7,8-HxCDF		97.1	pg/g	0.942	5.00
72918-21-9	1,2,3,7,8,9-HxCDF		100	pg/g	1.47	5.00
67562-39-4	1,2,3,4,6,7,8-HpCDF		105	pg/g	0.896	5.00
55673-89-7	1,2,3,4,7,8,9-HpCDF		104	pg/g	1.44	5.00
39001-02-0	1,2,3,4,6,7,8,9-OCDF		213	pg/g	2.44	10.0

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		161	200	pg/g	80.5	(20%-175%)
13C-1,2,3,7,8-PeCDD		192	200	pg/g	96.2	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		157	200	pg/g	78.4	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		171	200	pg/g	85.3	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		161	200	pg/g	80.3	(22%-166%)
13C-OCDD		283	400	pg/g	70.9	(13%-199%)
13C-2,3,7,8-TCDF		177	200	pg/g	88.6	(22%-152%)
13C-1,2,3,7,8-PeCDF		194	200	pg/g	96.9	(21%-192%)
13C-2,3,4,7,8-PeCDF		201	200	pg/g	101	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		161	200	pg/g	80.3	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		167	200	pg/g	83.7	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		172	200	pg/g	85.8	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		171	200	pg/g	85.6	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		158	200	pg/g	79.2	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		154	200	pg/g	77.1	(20%-186%)
37Cl-2,3,7,8-TCDD		18.0	20.0	pg/g	90.1	(31%-191%)

Comments:

J Value is estimated

K Estimated Maximum Possible Concentration

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	**A9J0006**	**Client:**	**APEX001**	**Project:**	**APEX00319**
Lab Sample ID:	**12025126**			**Matrix:**	**SOLID**
Client Sample:	**QC for batch 42119**				
Client ID:	**LCSD for batch 42119**			**Prep Basis:**	**As Received**
Batch ID:	**42121**	**Method:**	**EPA Method 1613B**		
Run Date:	**10/31/2019 05:46**	**Analyst:**	**MLL**	**Instrument:**	**HRP763**
Data File:	**b29oct19a_5-2**			**Dilution:**	**1**
Prep Batch:	**42119**	**Prep Method:**	**SW846 3540C**		
Prep Date:	**18-OCT-19**	**Prep Aliquot:**	**10 g**		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		20.2	pg/g	0.195	1.00
40321-76-4	1,2,3,7,8-PeCDD		98.9	pg/g	0.398	5.00
39227-28-6	1,2,3,4,7,8-HxCDD		98.9	pg/g	0.554	5.00
57653-85-7	1,2,3,6,7,8-HxCDD		99.0	pg/g	0.498	5.00
19408-74-3	1,2,3,7,8,9-HxCDD		104	pg/g	0.540	5.00
35822-46-9	1,2,3,4,6,7,8-HpCDD		94.8	pg/g	1.15	5.00
3268-87-9	1,2,3,4,6,7,8,9-OCDD		188	pg/g	2.34	10.0
51207-31-9	2,3,7,8-TCDF		19.6	pg/g	0.250	1.00
57117-41-6	1,2,3,7,8-PeCDF		94.4	pg/g	0.410	5.00
57117-31-4	2,3,4,7,8-PeCDF		94.2	pg/g	0.352	5.00
70648-26-9	1,2,3,4,7,8-HxCDF		95.9	pg/g	0.710	5.00
57117-44-9	1,2,3,6,7,8-HxCDF		98.0	pg/g	0.658	5.00
60851-34-5	2,3,4,6,7,8-HxCDF		95.5	pg/g	0.710	5.00
72918-21-9	1,2,3,7,8,9-HxCDF		99.4	pg/g	1.14	5.00
67562-39-4	1,2,3,4,6,7,8-HpCDF		100	pg/g	0.724	5.00
55673-89-7	1,2,3,4,7,8,9-HpCDF		103	pg/g	1.20	5.00
39001-02-0	1,2,3,4,6,7,8,9-OCDF		199	pg/g	1.90	10.0

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		158	200	pg/g	78.9	(20%-175%)
13C-1,2,3,7,8-PeCDD		194	200	pg/g	97.2	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		158	200	pg/g	78.9	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		168	200	pg/g	84.0	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		160	200	pg/g	80.0	(22%-166%)
13C-OCDD		294	400	pg/g	73.5	(13%-199%)
13C-2,3,7,8-TCDF		175	200	pg/g	87.5	(22%-152%)
13C-1,2,3,7,8-PeCDF		198	200	pg/g	99.0	(21%-192%)
13C-2,3,4,7,8-PeCDF		199	200	pg/g	99.6	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		165	200	pg/g	82.6	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		170	200	pg/g	85.2	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		175	200	pg/g	87.4	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		170	200	pg/g	84.8	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		160	200	pg/g	80.1	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		155	200	pg/g	77.7	(20%-186%)
37Cl-2,3,7,8-TCDD		18.5	20.0	pg/g	92.7	(31%-191%)

Comments:

U Analyte was analyzed for, but not detected above the specified detection limit.

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Monday, April 13, 2020

Emily Hess
Maul Foster & Alongi, INC.
2001 NW 19th Ave, STE 200
Portland, OR 97209

RE: A0D0095 - Seaport Tidelands - 1044.02.06-02

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A0D0095, which was received by the laboratory on 9/27/2019 at 12:10:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: pnerenberg@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1	1.3 degC	Cooler #2	1.7 degC
Cooler #3	1.1 degC	Cooler #4	0.5 degC

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A0D0095 - 04 13 20 1553**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SE-07A-0-1.0	**A0D0095-01**	**Sediment**	**09/26/19 08:15**	**09/27/19 12:10**

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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EPA ID: OR01039

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A0D0095 - 04 13 20 1553**

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Acid/Silica Gel Cleanup

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-07A-0-1.0 (A0D0095-01)				**Matrix: Sediment**		**Batch: 0040289**		**H-08**
Diesel	ND	27.6	55.2	mg/kg dry	1	04/09/20 07:37	NWTPH-Dx/SG	
Oil	**644**	55.2	110	mg/kg dry	1	04/09/20 07:37	NWTPH-Dx/SG	
Surrogate: o-Terphenyl (Surr)		*Recovery: 113 %*		*Limits: 50-150 %*	*1*	*04/09/20 07:37*	*NWTPH-Dx/SG*	

Apex Laboratories



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2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A0D0095 - 04 13 20 1553**

ANALYTICAL SAMPLE RESULTS

Percent Dry Weight

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-07A-0-1.0 (A0D0095-01)				**Matrix: Sediment**		**Batch: 9101195**		
% Solids	**34.0**	---	1.00	%	1	10/17/19 03:40	EPA 8000C	**A-01**

Apex Laboratories

Philip Nerenberg, Lab Director

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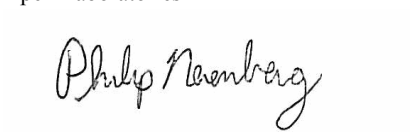
Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A0D0095 - 04 13 20 1553**

QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Acid/Silica Gel Cleanup

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0040289 - EPA 3546 w/SG+Acid (NWTPH)							**Sediment**					
Blank (0040289-BLK1)			Prepared: 04/08/20 13:02		Analyzed: 04/09/20 06:52							
NWTPH-Dx/SG												
Diesel	ND	9.09	25.0	mg/kg wet	1	---	---	---	---	---	---	
Oil	ND	18.2	50.0	mg/kg wet	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)		*Recovery: 118 %*		*Limits: 50-150 %*		*Dilution: 1x*						
LCS (0040289-BS1)			Prepared: 04/08/20 13:02		Analyzed: 04/09/20 07:14							
NWTPH-Dx/SG												
Diesel	128	10.0	25.0	mg/kg wet	1	125	---	103	73-115%	---	---	
Surr: o-Terphenyl (Surr)		*Recovery: 115 %*		*Limits: 50-150 %*		*Dilution: 1x*						
Duplicate (0040289-DUP1)			Prepared: 04/08/20 13:02		Analyzed: 04/09/20 07:59							**H-08**
QC Source Sample: SE-07A-0-1.0 (A0D0095-01)												
NWTPH-Dx/SG												
Diesel	ND	28.0	56.1	mg/kg dry	1	---	ND	---	---	---	30%	
Oil	**726**	56.1	112	mg/kg dry	1	---	644	---	---	12	30%	
Surr: o-Terphenyl (Surr)		*Recovery: 120 %*		*Limits: 50-150 %*		*Dilution: 1x*						

Apex Laboratories



Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A0D0095 - 04 13 20 1553**

QUALITY CONTROL (QC) SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9101195 - Total Solids (SM2540G/PSEP)							**Sediment**					
Duplicate (9101195-DUP1)			Prepared: 10/16/19 15:47		Analyzed: 10/17/19 03:40							
QC Source Sample: Non-SDG (A9I0893-01)												
% Solids	**51.8**	---	1.00	%	1	---	51.9	---	---	0.2	10%	
Duplicate (9101195-DUP2)			Prepared: 10/16/19 15:47		Analyzed: 10/17/19 03:40							
QC Source Sample: Non-SDG (A9J0371-17)												
% Solids	**54.1**	---	1.00	%	1	---	54.0	---	---	0.2	10%	
Duplicate (9101195-DUP3)			Prepared: 10/16/19 15:47		Analyzed: 04/10/20 14:58							
EPA 8000C												
% Solids	ND	---	1.00	%	1	---		---	---		10%	
Duplicate (9101195-DUP4)			Prepared: 10/16/19 15:47		Analyzed: 04/10/20 14:58							
EPA 8000C												
% Solids	ND	---	1.00	%	1	---		---	---		10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A0D0095 - 04 13 20 1553**

SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Acid/Silica Gel Cleanup

Prep: EPA 3546 w/SG+Acid (NWTPH)

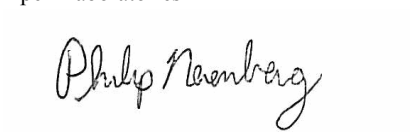
Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 0040289							
A0D0095-01	Sediment	NWTPH-Dx/SG	09/26/19 08:15	04/08/20 13:02	10.66g/5mL	10g/5mL	0.94

Percent Dry Weight

Prep: Total Solids (SM2540G/PSEP)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9101195							
A0D0095-01	Sediment	EPA 8000C	09/26/19 08:15	10/16/19 15:47			NA

Apex Laboratories



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Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A0D0095 - 04 13 20 1553**

QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

A-01	Results from original dry weight analysis used for relogged samples.
H-08	Sample hold time extended by freezing at -18 degrees C. Total time at 4 degrees C was less than the standard hold time.

Apex Laboratories

Philip Nerenberg, Lab Director

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EPA ID: OR01039

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A0D0095 - 04 13 20 1553**

REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

Apex Laboratories



Philip Nerenberg, Lab Director

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Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
2001 NW 19th Ave, STE 200	Project Number: **1044.02.06-02**	**Report ID:**
Portland, OR 97209	Project Manager: **Emily Hess**	**A0D0095 - 04 13 20 1553**

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

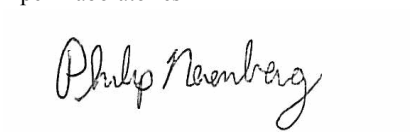
Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

Apex Laboratories



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LABORATORY ACCREDITATION INFORMATION

TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories



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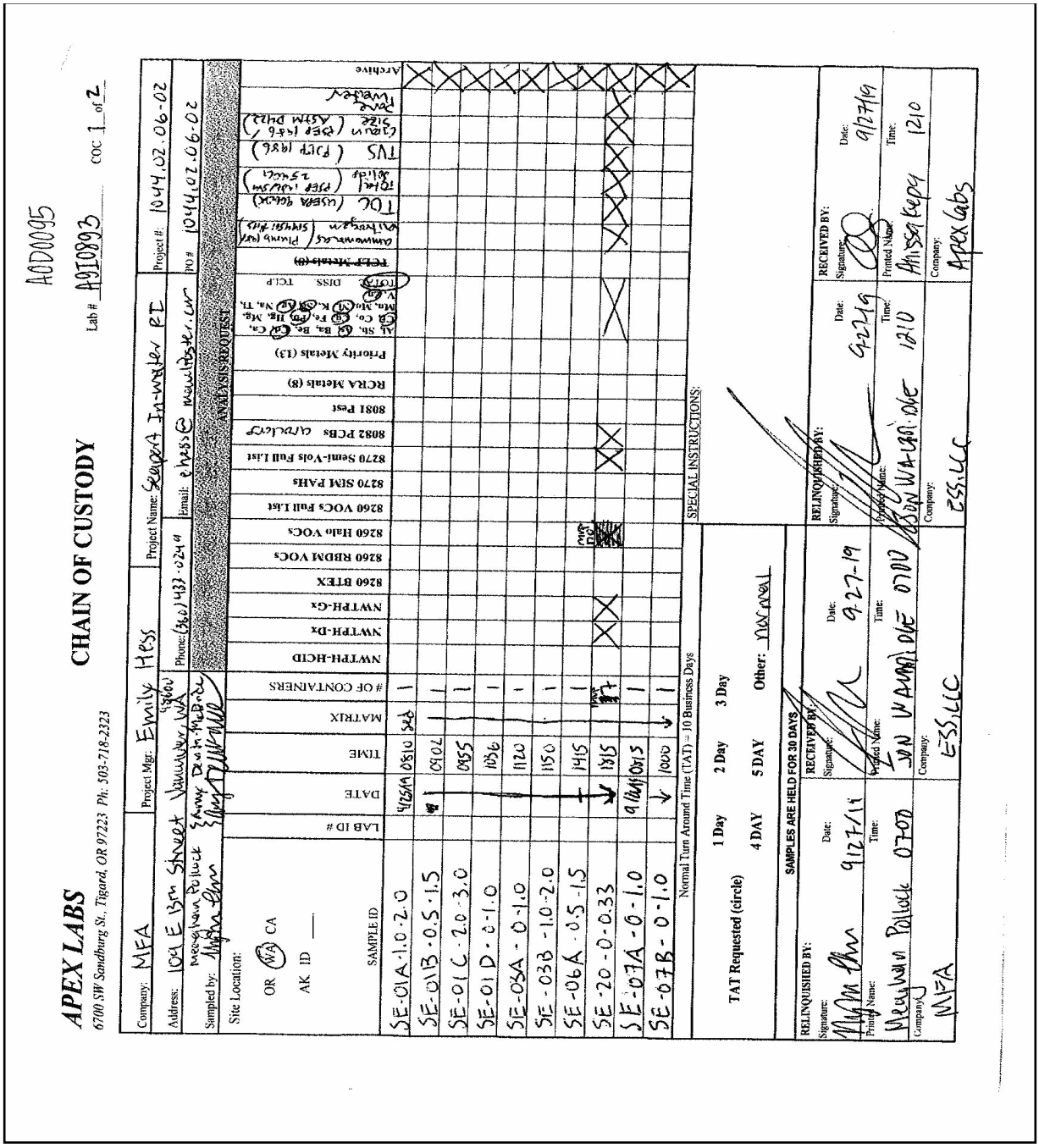

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Philip Nerenberg, Lab Director

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1/2

APEX LABS COOLER RECEIPT FORM

A0D0095

Client: Maul Foster & Alongi - Vancouver Element WO#: A9 10893

Project/Project #: Seaport In-Water RI #1044.02.06-02

Delivery Info:

Date/time received: 9/27/19 @ 1210 By: AKK

Delivered by: Apex___Client___ESS_X_FedEx___UPS___Swift___Senvoy___SDS___Other_____

Cooler Inspection Date/time inspected: 9/27/19 @ 1225 By: AKK

Chain of Custody included? Yes X No ___ Custody seals? Yes_____ No X

Signed/dated by client? Yes X No ___

Signed/dated by Apex? Yes X No ___

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	1.3	1.7	1.1	0.5			
Received on ice? (Y/N)	Y	Y	Y	Y			
Temp. blanks? (Y/N)	N	N	N	Y			
Ice type: (Gel/Real/Other)	Real	Real	Real	Real			
Condition:	Good	Good	Good	Good			

Cooler out of temp? (Y/(N)) Possible reason why:

If some coolers are in temp and some out, were green dots applied to out of temperature samples? Yes/No/(NA)

Out of temperature samples form initiated? Yes/No/(NA)

Samples Inspection: Date/time inspected: 9/27/19 @ 1715 By: (AK)

All samples intact? Yes X No ___ Comments:

Bottle labels/COCs agree? Yes ___ No X Comments: See form

COC/container discrepancies form initiated? Yes X No ___ NA ___

Containers/volumes received appropriate for analysis? Yes X No ___ Comments:

Do VOA vials have visible headspace? Yes ___ No X NA ___

Comments

Water samples: pH checked: Yes X No___NA___ pH appropriate? Yes X No___NA___

Comments:

Additional information:

Subsampler: (AK)
Witness: AKK

Labeled by: (AK) Witness: AKK Cooler Inspected by: (AK) See Project Contact Form: Y

Philip Nerenberg

Philip Nerenberg, Lab Director

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6700 S.W. Sandburg Street
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503-718-2323
ORELAP ID: **OR100062**

Tuesday, August 18, 2020

Emily Hess
Maul Foster & Alongi, INC.
3140 NE Broadway Street
Portland, OR 97232

RE: A0G0628 - Seaport Tidelands - 1044.02.14

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A0G0628, which was received by the laboratory on 7/23/2020 at 9:26:00AM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: pnerenberg@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1	1.1 degC	Cooler #2	3.1 degC

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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6700 S.W. Sandburg Street
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503-718-2323
ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
3140 NE Broadway Street	Project Number: **1044.02.14**	**Report ID:**
Portland, OR 97232	Project Manager: **Emily Hess**	**A0G0628 - 08 18 20 1544**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SE-32---As Received	A0G0628-01	Sediment	07/22/20 09:22	07/23/20 09:26
SE-32---After Processing	A0G0628-02	Water	07/28/20 08:00	07/23/20 09:26
SE-33---As Received	A0G0628-03	Sediment	07/22/20 09:06	07/23/20 09:26
SE-33---After Processing	A0G0628-04	Water	07/27/20 21:00	07/23/20 09:26
SE-34---As Received	A0G0628-05	Sediment	07/22/20 08:56	07/23/20 09:26
SE-34---After Processing	A0G0628-06	Water	07/27/20 21:00	07/23/20 09:26
SE-35---As Received	A0G0628-07	Sediment	07/22/20 08:36	07/23/20 09:26
SE-35---After Processing	A0G0628-08	Water	07/27/20 21:00	07/23/20 09:26
SE-36---As Received	A0G0628-09	Sediment	07/22/20 07:56	07/23/20 09:26
SE-36---After Processing	A0G0628-10	Water	07/27/20 11:00	07/23/20 09:26
SE-37---As Received	A0G0628-11	Sediment	07/22/20 10:02	07/23/20 09:26
SE-37---After Processing	A0G0628-12	Water	07/27/20 14:30	07/23/20 09:26
SE-38---As Received	A0G0628-13	Sediment	07/22/20 10:16	07/23/20 09:26
SE-38---After Processing	A0G0628-14	Water	07/27/20 21:00	07/23/20 09:26
SE-39---As Received	A0G0628-15	Sediment	07/22/20 09:56	07/23/20 09:26
SE-40---As Received	A0G0628-17	Sediment	07/22/20 07:16	07/23/20 09:26
SE-40---After Processing	A0G0628-18	Water	07/27/20 14:30	07/23/20 09:26
SE-41---As Received	A0G0628-19	Sediment	07/22/20 07:26	07/23/20 09:26
SE-41---After Processing	A0G0628-20	Water	07/27/20 14:30	07/23/20 09:26

Apex Laboratories



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ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
3140 NE Broadway Street	Project Number: **1044.02.14**	**Report ID:**
Portland, OR 97232	Project Manager: **Emily Hess**	**A0G0628 - 08 18 20 1544**

ANALYTICAL SAMPLE RESULTS

Ammonia by Plumb Extraction, Gas Diffusion and Colorimetric Detection

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-32---As Received (A0G0628-01)				**Matrix: Sediment**		**Batch: 0070727**		
Ammonia as N	**7.61**	0.209	0.209	mg/kg dry	1	07/24/20 16:23	Plumb/SM 4500-NH3 G	
SE-33---As Received (A0G0628-03)				**Matrix: Sediment**		**Batch: 0070727**		
Ammonia as N	**26.4**	0.175	0.175	mg/kg dry	1	07/24/20 16:27	Plumb/SM 4500-NH3 G	
SE-34---As Received (A0G0628-05)				**Matrix: Sediment**		**Batch: 0070727**		
Ammonia as N	**4.82**	0.184	0.184	mg/kg dry	1	07/24/20 16:29	Plumb/SM 4500-NH3 G	
SE-35---As Received (A0G0628-07)				**Matrix: Sediment**		**Batch: 0070727**		
Ammonia as N	**7.45**	0.198	0.198	mg/kg dry	1	07/24/20 16:30	Plumb/SM 4500-NH3 G	
SE-36---As Received (A0G0628-09)				**Matrix: Sediment**		**Batch: 0070727**		
Ammonia as N	**4.10**	0.199	0.199	mg/kg dry	1	07/24/20 16:32	Plumb/SM 4500-NH3 G	
SE-37---As Received (A0G0628-11)				**Matrix: Sediment**		**Batch: 0070727**		
Ammonia as N	**14.2**	0.213	0.213	mg/kg dry	1	07/24/20 16:33	Plumb/SM 4500-NH3 G	
SE-38---As Received (A0G0628-13)				**Matrix: Sediment**		**Batch: 0070727**		
Ammonia as N	**3.49**	0.193	0.193	mg/kg dry	1	07/24/20 16:35	Plumb/SM 4500-NH3 G	
SE-39---As Received (A0G0628-15)				**Matrix: Sediment**		**Batch: 0070727**		
Ammonia as N	**1.16**	0.374	0.374	mg/kg dry	1	07/24/20 16:36	Plumb/SM 4500-NH3 G	
SE-40---As Received (A0G0628-17)				**Matrix: Sediment**		**Batch: 0070727**		
Ammonia as N	**0.783**	0.124	0.124	mg/kg dry	1	07/24/20 16:45	Plumb/SM 4500-NH3 G	
SE-41---As Received (A0G0628-19)				**Matrix: Sediment**		**Batch: 0070727**		
Ammonia as N	**8.41**	0.226	0.226	mg/kg dry	1	07/24/20 16:47	Plumb/SM 4500-NH3 G	

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Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
3140 NE Broadway Street	Project Number: **1044.02.14**	**Report ID:**
Portland, OR 97232	Project Manager: **Emily Hess**	**A0G0628 - 08 18 20 1544**

ANALYTICAL SAMPLE RESULTS

Demand Parameters

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-32---As Received (A0G0628-01)				**Matrix: Sediment**				
Batch: 0070753								
Total Organic Carbon	**11000**	200	200	mg/kg	1	07/29/20 20:24	EPA 9060Amod	
SE-33---As Received (A0G0628-03)				**Matrix: Sediment**				
Batch: 0070753								
Total Organic Carbon	**12000**	200	200	mg/kg	1	07/29/20 20:57	EPA 9060Amod	
SE-34---As Received (A0G0628-05)				**Matrix: Sediment**				
Batch: 0070753								
Total Organic Carbon	**12000**	200	200	mg/kg	1	07/29/20 21:08	EPA 9060Amod	
SE-35---As Received (A0G0628-07)				**Matrix: Sediment**				
Batch: 0070753								
Total Organic Carbon	**11000**	200	200	mg/kg	1	07/29/20 21:18	EPA 9060Amod	
SE-36---As Received (A0G0628-09)				**Matrix: Sediment**				
Batch: 0070753								
Total Organic Carbon	**11000**	200	200	mg/kg	1	07/29/20 21:29	EPA 9060Amod	
SE-37---As Received (A0G0628-11)				**Matrix: Sediment**				
Batch: 0070753								
Total Organic Carbon	**19000**	200	200	mg/kg	1	07/29/20 21:40	EPA 9060Amod	
SE-38---As Received (A0G0628-13)				**Matrix: Sediment**				
Batch: 0070753								
Total Organic Carbon	**17000**	200	200	mg/kg	1	07/29/20 21:51	EPA 9060Amod	
SE-39---As Received (A0G0628-15RE1)				**Matrix: Sediment**				
Batch: 0070753								
Total Organic Carbon	**39000**	200	200	mg/kg	1	07/30/20 12:34	EPA 9060Amod	
SE-40---As Received (A0G0628-17)				**Matrix: Sediment**				
Batch: 0070753								
Total Organic Carbon	**10000**	200	200	mg/kg	1	07/29/20 22:34	EPA 9060Amod	
SE-41---As Received (A0G0628-19)				**Matrix: Sediment**				
Batch: 0070753								

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3140 NE Broadway Street	Project Number: **1044.02.14**	**Report ID:**
Portland, OR 97232	Project Manager: **Emily Hess**	**A0G0628 - 08 18 20 1544**

ANALYTICAL SAMPLE RESULTS

Demand Parameters

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-41---As Received (A0G0628-19)				**Matrix: Sediment**				
Total Organic Carbon	**18000**	200	200	mg/kg	1	07/29/20 22:45	EPA 9060Amod	

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ANALYTICAL SAMPLE RESULTS

Solid and Moisture Determinations

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-32---As Received (A0G0628-01)				**Matrix: Sediment**				
Batch: 0070801								
Total Solids	**46.4**	1.00	1.00	%	1	07/29/20 15:27	PSEP 1986	
Batch: 0070942								
Total Volatile Solids	**6.56**	1.00	1.00	%	1	08/04/20 18:00	SM 2540 G	**H-06**
SE-33---As Received (A0G0628-03)				**Matrix: Sediment**				
Batch: 0070801								
Total Solids	**54.1**	1.00	1.00	%	1	07/29/20 15:27	PSEP 1986	
Batch: 0070942								
Total Volatile Solids	**6.45**	1.00	1.00	%	1	08/04/20 18:00	SM 2540 G	**H-06**
SE-34---As Received (A0G0628-05)				**Matrix: Sediment**				
Batch: 0070801								
Total Solids	**53.0**	1.00	1.00	%	1	07/29/20 15:27	PSEP 1986	
Batch: 0070942								
Total Volatile Solids	**6.69**	1.00	1.00	%	1	08/04/20 18:00	SM 2540 G	**H-06**
SE-35---As Received (A0G0628-07)				**Matrix: Sediment**				
Batch: 0070801								
Total Solids	**50.0**	1.00	1.00	%	1	07/29/20 15:27	PSEP 1986	
Batch: 0070942								
Total Volatile Solids	**6.68**	1.00	1.00	%	1	08/04/20 18:00	SM 2540 G	**H-06**
SE-36---As Received (A0G0628-09)				**Matrix: Sediment**				
Batch: 0070801								
Total Solids	**49.0**	1.00	1.00	%	1	07/29/20 15:27	PSEP 1986	
Batch: 0070942								
Total Volatile Solids	**6.88**	1.00	1.00	%	1	08/04/20 18:00	SM 2540 G	**H-06**
SE-37---As Received (A0G0628-11)				**Matrix: Sediment**				
Batch: 0070801								
Total Solids	**46.2**	1.00	1.00	%	1	07/29/20 15:27	PSEP 1986	
Batch: 0070942								
Total Volatile Solids	**15.2**	1.00	1.00	%	1	08/04/20 18:00	SM 2540 G	**H-06**
SE-38---As Received (A0G0628-13)				**Matrix: Sediment**				

Apex Laboratories



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3140 NE Broadway Street	Project Number: **1044.02.14**	**Report ID:**
Portland, OR 97232	Project Manager: **Emily Hess**	**A0G0628 - 08 18 20 1544**

ANALYTICAL SAMPLE RESULTS

Solid and Moisture Determinations

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-38---As Received (A0G0628-13)				**Matrix: Sediment**				
Batch: 0070801								
Total Solids	**49.6**	1.00	1.00	%	1	07/29/20 15:27	PSEP 1986	
Batch: 0070942								
Total Volatile Solids	**10.1**	1.00	1.00	%	1	08/04/20 18:00	SM 2540 G	**H-06**
SE-39---As Received (A0G0628-15)				**Matrix: Sediment**				
Batch: 0070801								
Total Solids	**25.5**	1.00	1.00	%	1	07/29/20 15:27	PSEP 1986	
Batch: 0070942								
Total Volatile Solids	**50.1**	1.00	1.00	%	1	08/04/20 18:00	SM 2540 G	**H-06**
SE-40---As Received (A0G0628-17)				**Matrix: Sediment**				
Batch: 0070801								
Total Solids	**77.6**	1.00	1.00	%	1	07/29/20 15:27	PSEP 1986	
Batch: 0070942								
Total Volatile Solids	**2.51**	1.00	1.00	%	1	08/04/20 18:00	SM 2540 G	**H-06**
SE-41---As Received (A0G0628-19)				**Matrix: Sediment**				
Batch: 0070801								
Total Solids	**43.4**	1.00	1.00	%	1	07/29/20 15:27	PSEP 1986	
Batch: 0070942								
Total Volatile Solids	**10.2**	1.00	1.00	%	1	08/04/20 18:00	SM 2540 G	**H-06**

Apex Laboratories



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Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
3140 NE Broadway Street	Project Number: **1044.02.14**	**Report ID:**
Portland, OR 97232	Project Manager: **Emily Hess**	**A0G0628 - 08 18 20 1544**

Analytical Resources, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

Wet Chemistry

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-32---As Received (A0G0628-01)				**Matrix: Sediment**		**Batch: BIG0596**		
Batch: BIG0596								
Total Solids, Sulfide	**44.90**	0.04	0.04	%	1	07/27/20 15:40	PSEP 1986	
Batch: BIG0646								
Sulfide	**337**	22.2	22.2	mg/kg dry	10	08/01/20 13:57	SM 4500-S2 D-00 (PSEP)	**D**
SE-33---As Received (A0G0628-03)				**Matrix: Sediment**		**Batch: BIG0596**		
Batch: BIG0596								
Total Solids, Sulfide	**45.01**	0.04	0.04	%	1	07/27/20 15:40	PSEP 1986	
SE-33---As Received (A0G0628-03RE1)				**Matrix: Sediment**		**Batch: BIG0646**		
Batch: BIG0646								
Sulfide	**473**	44.4	44.4	mg/kg dry	20	08/01/20 14:51	SM 4500-S2 D-00 (PSEP)	**D**
SE-34---As Received (A0G0628-05)				**Matrix: Sediment**		**Batch: BIG0596**		
Batch: BIG0596								
Total Solids, Sulfide	**46.78**	0.04	0.04	%	1	07/27/20 15:40	PSEP 1986	
SE-34---As Received (A0G0628-05RE1)				**Matrix: Sediment**		**Batch: BIG0646**		
Batch: BIG0646								
Sulfide	**921**	106	106	mg/kg dry	50	08/01/20 14:52	SM 4500-S2 D-00 (PSEP)	**D**
SE-35---As Received (A0G0628-07)				**Matrix: Sediment**		**Batch: BIG0596**		
Batch: BIG0596								
Total Solids, Sulfide	**45.19**	0.04	0.04	%	1	07/27/20 15:40	PSEP 1986	
SE-35---As Received (A0G0628-07RE1)				**Matrix: Sediment**		**Batch: BIG0646**		
Batch: BIG0646								
Sulfide	**447**	42.7	42.7	mg/kg dry	20	08/01/20 14:52	SM 4500-S2 D-00 (PSEP)	**D**
SE-36---As Received (A0G0628-09)				**Matrix: Sediment**		**Batch: BIG0596**		
Batch: BIG0596								

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3140 NE Broadway Street	Project Number: **1044.02.14**	**Report ID:**
Portland, OR 97232	Project Manager: **Emily Hess**	**A0G0628 - 08 18 20 1544**

Analytical Resources, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

Wet Chemistry

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-36---As Received (A0G0628-09)				**Matrix: Sediment**		**Batch: BIG0596**		
Total Solids, Sulfide	**44.05**	0.04	0.04	%	1	07/27/20 15:40	PSEP 1986	
SE-36---As Received (A0G0628-09RE1)				**Matrix: Sediment**		**Batch: BIG0646**		
Batch: BIG0646								
Sulfide	**546**	41.4	41.4	mg/kg dry	20	08/01/20 14:52	SM 4500-S2 D-00 (PSEP)	**D**
SE-37---As Received (A0G0628-11)				**Matrix: Sediment**		**Batch: BIG0596**		
Batch: BIG0596								
Total Solids, Sulfide	**41.07**	0.04	0.04	%	1	07/27/20 15:40	PSEP 1986	
Batch: BIG0646								
Sulfide	**204**	23.7	23.7	mg/kg dry	10	08/01/20 14:03	SM 4500-S2 D-00 (PSEP)	**D**
SE-38---As Received (A0G0628-13)				**Matrix: Sediment**		**Batch: BIG0596**		
Batch: BIG0596								
Total Solids, Sulfide	**45.11**	0.04	0.04	%	1	07/27/20 15:40	PSEP 1986	
Batch: BIG0646								
Sulfide	**365**	21.9	21.9	mg/kg dry	10	08/01/20 14:03	SM 4500-S2 D-00 (PSEP)	**D**
SE-39---As Received (A0G0628-15)				**Matrix: Sediment**		**Batch: BIG0596**		
Batch: BIG0596								
Total Solids, Sulfide	**28.17**	0.04	0.04	%	1	07/27/20 15:40	PSEP 1986	
SE-39---As Received (A0G0628-15RE1)				**Matrix: Sediment**		**Batch: BIG0646**		
Batch: BIG0646								
Sulfide	**2110**	161	161	mg/kg dry	50	08/01/20 14:52	SM 4500-S2 D-00 (PSEP)	**D**
SE-40---As Received (A0G0628-17)				**Matrix: Sediment**		**Batch: BIG0596**		
Batch: BIG0596								
Total Solids, Sulfide	**73.65**	0.04	0.04	%	1	07/27/20 15:40	PSEP 1986	
SE-40---As Received (A0G0628-17RE1)				**Matrix: Sediment**		**Batch: BIG0646**		
Batch: BIG0646								

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Portland, OR 97232	Project Manager: **Emily Hess**	**A0G0628 - 08 18 20 1544**

Analytical Resources, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

Wet Chemistry

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-40---As Received (A0G0628-17RE1)				**Matrix: Sediment**		**Batch: BIG0646**		
Sulfide	**392**	26.1	26.1	mg/kg dry	20	08/01/20 14:53	SM 4500-S2 D-00 (PSEP)	**D**
SE-41---As Received (A0G0628-19)				**Matrix: Sediment**		**Batch: BIG0596**		
Batch: BIG0596								
Total Solids, Sulfide	**42.34**	0.04	0.04	%	1	07/27/20 15:40	PSEP 1986	
SE-41---As Received (A0G0628-19RE1)				**Matrix: Sediment**		**Batch: BIG0646**		
Batch: BIG0646								
Sulfide	**567**	46.5	46.5	mg/kg dry	20	08/01/20 14:54	SM 4500-S2 D-00 (PSEP)	**D**

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Analytical Resources, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

Wet Chemistry

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-32---After Processing (A0G0628-02)				**Matrix: Water**		**Batch: BIH0004**		
Batch: BIH0004								
Sulfide	**0.076**	0.050	0.050	mg/L	1	08/01/20 13:52	SM 4500-S2 D-00	
Batch: BIH0034								
Salinity	**16.5**	0.10	0.10	ppt	1	08/03/20 14:22	SM 2520 B-00	
SE-33---After Processing (A0G0628-04)				**Matrix: Water**		**Batch: BIH0004**		
Batch: BIH0004								
Sulfide	**0.104**	0.050	0.050	mg/L	1	08/01/20 13:52	SM 4500-S2 D-00	
Batch: BIH0034								
Salinity	**15.3**	0.10	0.10	ppt	1	08/03/20 14:22	SM 2520 B-00	
SE-34---After Processing (A0G0628-06)				**Matrix: Water**		**Batch: BIH0004**		
Batch: BIH0004								
Sulfide	**0.153**	0.050	0.050	mg/L	1	08/01/20 13:52	SM 4500-S2 D-00	
Batch: BIH0034								
Salinity	**15.3**	0.10	0.10	ppt	1	08/03/20 14:22	SM 2520 B-00	
SE-35---After Processing (A0G0628-08)				**Matrix: Water**		**Batch: BIH0004**		
Batch: BIH0004								
Sulfide	ND	0.050	0.050	mg/L	1	08/01/20 13:53	SM 4500-S2 D-00	U
Batch: BIH0034								
Salinity	**15.6**	0.10	0.10	ppt	1	08/03/20 14:22	SM 2520 B-00	
SE-36---After Processing (A0G0628-10)				**Matrix: Water**		**Batch: BIH0004**		
Batch: BIH0004								
Sulfide	**0.060**	0.050	0.050	mg/L	1	08/01/20 13:53	SM 4500-S2 D-00	
Batch: BIH0034								
Salinity	**15.6**	0.10	0.10	ppt	1	08/03/20 14:22	SM 2520 B-00	
SE-37---After Processing (A0G0628-12)				**Matrix: Water**		**Batch: BIH0004**		
Batch: BIH0004								
Sulfide	**0.163**	0.050	0.050	mg/L	1	08/01/20 13:55	SM 4500-S2 D-00	
Batch: BIH0034								
Salinity	**13.3**	0.10	0.10	ppt	1	08/03/20 14:22	SM 2520 B-00	

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ANALYTICAL SAMPLE RESULTS (Subcontracted)

Wet Chemistry

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
SE-38---After Processing (A0G0628-14)				**Matrix: Water**			**Batch: BIH0004**	
Batch: BIH0004								
Sulfide	**0.103**	0.050	0.050	mg/L	1	08/01/20 13:55	SM 4500-S2 D-00	
Batch: BIH0034								
Salinity	**15.5**	0.10	0.10	ppt	1	08/03/20 14:22	SM 2520 B-00	
SE-40---After Processing (A0G0628-18)				**Matrix: Water**			**Batch: BIH0004**	
Batch: BIH0004								
Sulfide	**0.202**	0.050	0.050	mg/L	1	08/01/20 13:56	SM 4500-S2 D-00	
Batch: BIH0034								
Salinity	**12.2**	0.10	0.10	ppt	1	08/03/20 14:22	SM 2520 B-00	
SE-41---After Processing (A0G0628-20)				**Matrix: Water**			**Batch: BIH0004**	
Batch: BIH0004								
Sulfide	**0.071**	0.050	0.050	mg/L	1	08/01/20 13:56	SM 4500-S2 D-00	
Batch: BIH0034								
Salinity	**17.2**	0.10	0.10	ppt	1	08/03/20 14:22	SM 2520 B-00	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Ammonia by Plumb Extraction, Gas Diffusion and Colorimetric Detection

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0070727 - Plumb 1981 Ammonia (Acidified KCl Leach)							**Sediment**					
Blank (0070727-BLK1)			Prepared: 07/24/20 08:31		Analyzed: 07/24/20 15:45							
Plumb/SM 4500-NH3 G												
Ammonia as N	ND	0.100	0.100	mg/kg wet	1	---	---	---	---	---	---	
LCS (0070727-BS1)			Prepared: 07/24/20 08:31		Analyzed: 07/24/20 15:47							
Plumb/SM 4500-NH3 G												
Ammonia as N	11.2	0.100	0.100	mg/kg wet	1	10.0	---	112	80-120%	---	---	
Matrix Spike (0070727-MS1)			Prepared: 07/24/20 08:31		Analyzed: 07/24/20 16:24							
QC Source Sample: SE-32---As Received (A0G0628-01)												
Plumb/SM 4500-NH3 G												
Ammonia as N	28.9	0.214	0.214	mg/kg dry	1	21.4	7.61	100	75-125%	---	---	
Matrix Spike Dup (0070727-MSD1)			Prepared: 07/24/20 08:31		Analyzed: 07/24/20 16:26							
QC Source Sample: SE-32---As Received (A0G0628-01)												
Plumb/SM 4500-NH3 G												
Ammonia as N	29.1	0.211	0.211	mg/kg dry	1	21.1	7.61	102	75-125%	0.5	20%	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Demand Parameters

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0070753 - PSEP-5310B TOC							**Soil**					
Blank (0070753-BLK1)			Prepared: 07/24/20 11:36		Analyzed: 07/29/20 19:41							
EPA 9060Amod												
Total Organic Carbon	ND	200	200	mg/kg	1	---	---	---	---	---	---	
LCS (0070753-BS1)			Prepared: 07/24/20 11:36		Analyzed: 07/29/20 19:52							
EPA 9060Amod												
Total Organic Carbon	10000			mg/kg	1	10000	---	100	88-111%	---	---	
Duplicate (0070753-DUP1)			Prepared: 07/24/20 11:36		Analyzed: 07/29/20 20:35							
QC Source Sample: SE-32---As Received (A0G0628-01)												
EPA 9060Amod												
Total Organic Carbon	**11000**	200	200	mg/kg	1	---	11000	---	---	3	27%	
Duplicate (0070753-DUP2)			Prepared: 07/24/20 11:36		Analyzed: 07/29/20 20:46							
QC Source Sample: SE-32---As Received (A0G0628-01)												
EPA 9060Amod												
Total Organic Carbon	**11000**	200	200	mg/kg	1	---	11000	---	---	2	27%	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Solid and Moisture Determinations

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0070801 - Total Solids (SM2540G/PSEP)							**Sediment**					
Duplicate (0070801-DUP1)			Prepared: 07/27/20 13:22		Analyzed: 07/29/20 15:27							
QC Source Sample: SE-32---As Received (A0G0628-01)												
PSEP 1986												
Total Solids	**47.2**	1.00	1.00	%	1	---	46.4	---	---	2	20%	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Solid and Moisture Determinations

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0070942 - Total Volatile Solids (non-aq)							**Sediment**					
Duplicate (0070942-DUP1)			Prepared: 07/30/20 16:24		Analyzed: 08/04/20 18:00							
QC Source Sample: SE-32---As Received (A0G0628-01)												
SM 2540 G												
Total Volatile Solids	**6.51**	1.00	1.00	%	1	---	6.56	---	---	0.8	10%	H-06

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QUALITY CONTROL (QC) SAMPLE RESULTS

Wet Chemistry

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch BIG0596 - No Prep Wet Chem							**Solid**					
Blank (BIG0596-BLK1)			Prepared: 07/27/20 15:21		Analyzed: 07/27/20 15:40							
PSEP 1986												
Total Solids, Sulfide	ND	0.04	0.04	%	1	---	---	---	---	---	---	U
Duplicate (BIG0596-DUP1)			Prepared: 07/27/20 15:21		Analyzed: 07/27/20 15:40							
QC Source Sample: A0G0628-01 (A0G0628-01)												
PSEP 1986												
Total Solids, Sulfide	**44.72**	0.04	0.04	%	1	---	44.90	---	---	0.396	20%	

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Analytical Resources, Inc.

QUALITY CONTROL (QC) SAMPLE RESULTS

Wet Chemistry

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch BIG0646 - PSEP 1986							**Solid**					
Blank (BIG0646-BLK1)			Prepared: 07/29/20 18:50		Analyzed: 08/01/20 13:56							
SM 4500-S2 D-00 (PSEP)												
Sulfide	ND	1.00	1.00	mg/kg wet	1	---	---	---	---	---	---	U
LCS (BIG0646-BS1)			Prepared: 07/29/20 18:50		Analyzed: 08/01/20 13:57							
SM 4500-S2 D-00 (PSEP)												
Sulfide	151	10.0	10.0	mg/kg wet	10	181.21	---	83.1	75-125%	---	---	D
Duplicate (BIG0646-DUP1)			Prepared: 07/29/20 18:50		Analyzed: 08/01/20 14:00							
QC Source Sample: A0G0628-01 (A0G0628-01)												
SM 4500-S2 D-00 (PSEP)												
Sulfide	**355**	21.0	21.0	mg/kg dry	10	---	337	---	---	5.29	20%	D
Matrix Spike (BIG0646-MS3)			Prepared: 07/29/20 18:48		Analyzed: 08/01/20 14:51							
QC Source Sample: A0G0628-01 (A0G0628-01)												
SM 4500-S2 D-00 (PSEP)												
Sulfide	686	43.7	43.7	mg/kg dry	20	395.90	337	88.2	75-125%	---	---	D

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QUALITY CONTROL (QC) SAMPLE RESULTS

Wet Chemistry

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch BIH0004 - No Prep Wet Chem							**Water**					
Blank (BIH0004-BLK1)			Prepared: 08/01/20 13:14		Analyzed: 08/01/20 13:51							
SM 4500-S2 D-00												
Sulfide	ND	0.050	0.050	mg/L	1	---	---	---	---	---	---	U
LCS (BIH0004-BS1)			Prepared: 08/01/20 13:14		Analyzed: 08/01/20 13:51							
SM 4500-S2 D-00												
Sulfide	0.502	0.050	0.050	mg/L	1	0.50738	---	98.9	75-125%	---	---	
Duplicate (BIH0004-DUP1)			Prepared: 08/01/20 13:14		Analyzed: 08/01/20 13:53							
QC Source Sample: A0G0628-10 (A0G0628-10)												
SM 4500-S2 D-00												
Sulfide	**0.078**	0.050	0.050	mg/L	1	---	0.060	---	---	**26.1**	**20%**	L
Matrix Spike (BIH0004-MS1)			Prepared: 08/01/20 13:14		Analyzed: 08/01/20 13:54							
QC Source Sample: A0G0628-10 (A0G0628-10)												
SM 4500-S2 D-00												
Sulfide	0.305	0.050	0.050	mg/L	1	0.50738	0.060	**48.3**	**75-125%**	---	---	*

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QUALITY CONTROL (QC) SAMPLE RESULTS

Wet Chemistry

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch BIH0034 - No Prep Wet Chem							**Water**					
Blank (BIH0034-BLK1)			Prepared: 08/03/20 14:16		Analyzed: 08/03/20 14:22							
SM 2520 B-00												
Salinity	ND	0.10	0.10	ppt	1	---	---	---	---	---	---	U
LCS (BIH0034-BS1)			Prepared: 08/03/20 14:16		Analyzed: 08/03/20 14:22							
SM 2520 B-00												
Salinity	36.9	0.10	0.10	ppt	1	35.000	---	105	90-110%	---	---	
Duplicate (BIH0034-DUP1)			Prepared: 08/03/20 14:16		Analyzed: 08/03/20 14:22							
QC Source Sample: A0G0628-10 (A0G0628-10)												
SM 2520 B-00												
Salinity	**15.4**	0.10	0.10	ppt	1	---	15.6	---	---	1.29	20%	

Apex Laboratories



Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
3140 NE Broadway Street	Project Number: **1044.02.14**	**Report ID:**
Portland, OR 97232	Project Manager: **Emily Hess**	**A0G0628 - 08 18 20 1544**

SAMPLE PREPARATION INFORMATION

Ammonia by Plumb Extraction, Gas Diffusion and Colorimetric Detection

Prep: Plumb 1981 Ammonia (Acidified KCl Leach)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 0070727							
A0G0628-01	Sediment	Plumb/SM 4500-NH3 G	07/22/20 09:22	07/24/20 08:31	10.307g/50mL	10g/50mL	0.97
A0G0628-03	Sediment	Plumb/SM 4500-NH3 G	07/22/20 09:06	07/24/20 08:31	10.5829g/50mL	10g/50mL	0.95
A0G0628-05	Sediment	Plumb/SM 4500-NH3 G	07/22/20 08:56	07/24/20 08:31	10.2735g/50mL	10g/50mL	0.97
A0G0628-07	Sediment	Plumb/SM 4500-NH3 G	07/22/20 08:36	07/24/20 08:31	10.1202g/50mL	10g/50mL	0.99
A0G0628-09	Sediment	Plumb/SM 4500-NH3 G	07/22/20 07:56	07/24/20 08:31	10.2711g/50mL	10g/50mL	0.97
A0G0628-11	Sediment	Plumb/SM 4500-NH3 G	07/22/20 10:02	07/24/20 08:31	10.1943g/50mL	10g/50mL	0.98
A0G0628-13	Sediment	Plumb/SM 4500-NH3 G	07/22/20 10:16	07/24/20 08:31	10.4408g/50mL	10g/50mL	0.96
A0G0628-15	Sediment	Plumb/SM 4500-NH3 G	07/22/20 09:56	07/24/20 08:31	10.4805g/50mL	10g/50mL	0.95
A0G0628-17	Sediment	Plumb/SM 4500-NH3 G	07/22/20 07:16	07/24/20 08:31	10.3705g/50mL	10g/50mL	0.96
A0G0628-19	Sediment	Plumb/SM 4500-NH3 G	07/22/20 07:26	07/24/20 08:31	10.1749g/50mL	10g/50mL	0.98

Demand Parameters

Prep: PSEP-5310B TOC

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 0070753							
A0G0628-01	Sediment	EPA 9060Amod	07/22/20 09:22	07/24/20 11:36			NA
A0G0628-03	Sediment	EPA 9060Amod	07/22/20 09:06	07/24/20 11:36			NA
A0G0628-05	Sediment	EPA 9060Amod	07/22/20 08:56	07/24/20 11:36			NA
A0G0628-07	Sediment	EPA 9060Amod	07/22/20 08:36	07/24/20 11:36			NA
A0G0628-09	Sediment	EPA 9060Amod	07/22/20 07:56	07/24/20 11:36			NA
A0G0628-11	Sediment	EPA 9060Amod	07/22/20 10:02	07/24/20 11:36			NA
A0G0628-13	Sediment	EPA 9060Amod	07/22/20 10:16	07/24/20 11:36			NA
A0G0628-15RE1	Sediment	EPA 9060Amod	07/22/20 09:56	07/24/20 11:36			NA
A0G0628-17	Sediment	EPA 9060Amod	07/22/20 07:16	07/24/20 11:36			NA
A0G0628-19	Sediment	EPA 9060Amod	07/22/20 07:26	07/24/20 11:36			NA

Solid and Moisture Determinations

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3140 NE Broadway Street	Project Number: **1044.02.14**	**Report ID:**
Portland, OR 97232	Project Manager: **Emily Hess**	**A0G0628 - 08 18 20 1544**

SAMPLE PREPARATION INFORMATION

Solid and Moisture Determinations

Prep: Total Solids (SM2540G/PSEP)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 0070801							
A0G0628-01	Sediment	PSEP 1986	07/22/20 09:22	07/27/20 13:22			NA
A0G0628-03	Sediment	PSEP 1986	07/22/20 09:06	07/27/20 13:22			NA
A0G0628-05	Sediment	PSEP 1986	07/22/20 08:56	07/27/20 13:22			NA
A0G0628-07	Sediment	PSEP 1986	07/22/20 08:36	07/27/20 13:22			NA
A0G0628-09	Sediment	PSEP 1986	07/22/20 07:56	07/27/20 13:22			NA
A0G0628-11	Sediment	PSEP 1986	07/22/20 10:02	07/27/20 13:22			NA
A0G0628-13	Sediment	PSEP 1986	07/22/20 10:16	07/27/20 13:22			NA
A0G0628-15	Sediment	PSEP 1986	07/22/20 09:56	07/27/20 13:22			NA
A0G0628-17	Sediment	PSEP 1986	07/22/20 07:16	07/27/20 13:22			NA
A0G0628-19	Sediment	PSEP 1986	07/22/20 07:26	07/27/20 13:22			NA

Prep: Total Volatile Solids (non-aq)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 0070942							
A0G0628-01	Sediment	SM 2540 G	07/22/20 09:22	07/30/20 16:24			NA
A0G0628-03	Sediment	SM 2540 G	07/22/20 09:06	07/30/20 16:24			NA
A0G0628-05	Sediment	SM 2540 G	07/22/20 08:56	07/30/20 16:24			NA
A0G0628-07	Sediment	SM 2540 G	07/22/20 08:36	07/30/20 16:24			NA
A0G0628-09	Sediment	SM 2540 G	07/22/20 07:56	07/30/20 16:24			NA
A0G0628-11	Sediment	SM 2540 G	07/22/20 10:02	07/30/20 16:24			NA
A0G0628-13	Sediment	SM 2540 G	07/22/20 10:16	07/30/20 16:24			NA
A0G0628-15	Sediment	SM 2540 G	07/22/20 09:56	07/30/20 16:24			NA
A0G0628-17	Sediment	SM 2540 G	07/22/20 07:16	07/30/20 16:24			NA
A0G0628-19	Sediment	SM 2540 G	07/22/20 07:26	07/30/20 16:24			NA

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3140 NE Broadway Street	Project Number: **1044.02.14**	**Report ID:**
Portland, OR 97232	Project Manager: **Emily Hess**	**A0G0628 - 08 18 20 1544**

Analytical Resources, Inc.

SAMPLE PREPARATION INFORMATION

Wet Chemistry

Prep: No Prep Wet Chem

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: BIG0596							
A0G0628-01	Sediment	PSEP 1986	07/22/20 09:22	07/27/20 15:21	5g/5g	5g/5g	1.00
A0G0628-03	Sediment	PSEP 1986	07/22/20 09:06	07/27/20 15:21	5g/5g	5g/5g	1.00
A0G0628-05	Sediment	PSEP 1986	07/22/20 08:56	07/27/20 15:21	5g/5g	5g/5g	1.00
A0G0628-07	Sediment	PSEP 1986	07/22/20 08:36	07/27/20 15:21	5g/5g	5g/5g	1.00
A0G0628-09	Sediment	PSEP 1986	07/22/20 07:56	07/27/20 15:21	5g/5g	5g/5g	1.00
A0G0628-11	Sediment	PSEP 1986	07/22/20 10:02	07/27/20 15:21	5g/5g	5g/5g	1.00
A0G0628-13	Sediment	PSEP 1986	07/22/20 10:16	07/27/20 15:21	5g/5g	5g/5g	1.00
A0G0628-15	Sediment	PSEP 1986	07/22/20 09:56	07/27/20 15:21	5g/5g	5g/5g	1.00
A0G0628-17	Sediment	PSEP 1986	07/22/20 07:16	07/27/20 15:21	5g/5g	5g/5g	1.00
A0G0628-19	Sediment	PSEP 1986	07/22/20 07:26	07/27/20 15:21	5g/5g	5g/5g	1.00

Prep: PSEP 1986

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: BIG0646							
A0G0628-01	Sediment	SM 4500-S2 D-00 (PSEP)	07/22/20 09:22	07/29/20 18:50	5.011g/100mL	5g/100mL	1.00
A0G0628-03RE1	Sediment	SM 4500-S2 D-00 (PSEP)	07/22/20 09:06	07/29/20 18:48	5.006g/100mL	5g/100mL	1.00
A0G0628-05RE1	Sediment	SM 4500-S2 D-00 (PSEP)	07/22/20 08:56	07/29/20 18:48	5.035g/100mL	5g/100mL	0.99
A0G0628-07RE1	Sediment	SM 4500-S2 D-00 (PSEP)	07/22/20 08:36	07/29/20 18:48	5.185g/100mL	5g/100mL	0.96
A0G0628-09RE1	Sediment	SM 4500-S2 D-00 (PSEP)	07/22/20 07:56	07/29/20 18:48	5.48g/100mL	5g/100mL	0.91
A0G0628-11	Sediment	SM 4500-S2 D-00 (PSEP)	07/22/20 10:02	07/29/20 18:50	5.136g/100mL	5g/100mL	0.97
A0G0628-13	Sediment	SM 4500-S2 D-00 (PSEP)	07/22/20 10:16	07/29/20 18:50	5.068g/100mL	5g/100mL	0.99
A0G0628-15RE1	Sediment	SM 4500-S2 D-00 (PSEP)	07/22/20 09:56	07/29/20 18:48	5.524g/100mL	5g/100mL	0.91
A0G0628-17RE1	Sediment	SM 4500-S2 D-00 (PSEP)	07/22/20 07:16	07/29/20 18:48	5.206g/100mL	5g/100mL	0.96
A0G0628-19RE1	Sediment	SM 4500-S2 D-00 (PSEP)	07/22/20 07:26	07/29/20 18:48	5.074g/100mL	5g/100mL	0.99

Wet Chemistry

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3140 NE Broadway Street	Project Number: **1044.02.14**	**Report ID:**
Portland, OR 97232	Project Manager: **Emily Hess**	**A0G0628 - 08 18 20 1544**

Analytical Resources, Inc.

SAMPLE PREPARATION INFORMATION

Wet Chemistry

Prep: No Prep Wet Chem

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: BIH0004							
A0G0628-02	Water	SM 4500-S2 D-00	07/28/20 08:00	08/01/20 13:14	5mL/5mL	5mL/5mL	1.00
A0G0628-04	Water	SM 4500-S2 D-00	07/27/20 21:00	08/01/20 13:14	5mL/5mL	5mL/5mL	1.00
A0G0628-06	Water	SM 4500-S2 D-00	07/27/20 21:00	08/01/20 13:14	5mL/5mL	5mL/5mL	1.00
A0G0628-08	Water	SM 4500-S2 D-00	07/27/20 21:00	08/01/20 13:14	5mL/5mL	5mL/5mL	1.00
A0G0628-10	Water	SM 4500-S2 D-00	07/27/20 11:00	08/01/20 13:14	5mL/5mL	5mL/5mL	1.00
A0G0628-12	Water	SM 4500-S2 D-00	07/27/20 14:30	08/01/20 13:14	5mL/5mL	5mL/5mL	1.00
A0G0628-14	Water	SM 4500-S2 D-00	07/27/20 21:00	08/01/20 13:14	5mL/5mL	5mL/5mL	1.00
A0G0628-18	Water	SM 4500-S2 D-00	07/27/20 14:30	08/01/20 13:14	5mL/5mL	5mL/5mL	1.00
A0G0628-20	Water	SM 4500-S2 D-00	07/27/20 14:30	08/01/20 13:14	5mL/5mL	5mL/5mL	1.00
Batch: BIH0034							
A0G0628-02	Water	SM 2520 B-00	07/28/20 08:00	08/03/20 14:16	50mL/50mL	50mL/50mL	1.00
A0G0628-04	Water	SM 2520 B-00	07/27/20 21:00	08/03/20 14:16	50mL/50mL	50mL/50mL	1.00
A0G0628-06	Water	SM 2520 B-00	07/27/20 21:00	08/03/20 14:16	50mL/50mL	50mL/50mL	1.00
A0G0628-08	Water	SM 2520 B-00	07/27/20 21:00	08/03/20 14:16	50mL/50mL	50mL/50mL	1.00
A0G0628-10	Water	SM 2520 B-00	07/27/20 11:00	08/03/20 14:16	50mL/50mL	50mL/50mL	1.00
A0G0628-12	Water	SM 2520 B-00	07/27/20 14:30	08/03/20 14:16	50mL/50mL	50mL/50mL	1.00
A0G0628-14	Water	SM 2520 B-00	07/27/20 21:00	08/03/20 14:16	50mL/50mL	50mL/50mL	1.00
A0G0628-18	Water	SM 2520 B-00	07/27/20 14:30	08/03/20 14:16	50mL/50mL	50mL/50mL	1.00
A0G0628-20	Water	SM 2520 B-00	07/27/20 14:30	08/03/20 14:16	50mL/50mL	50mL/50mL	1.00

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QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

H-06	This sample was received, or the analysis requested, outside the recommended holding time.

Analytical Resources, Inc.

*****	Flagged value is not within established control limits.
D	The reported value is from a dilution
L	Analyte concentration is <=5 times the reporting limit and the replicate control limit defaults to +/- RL instead of 20% RPD
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).

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REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

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REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

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LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

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Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

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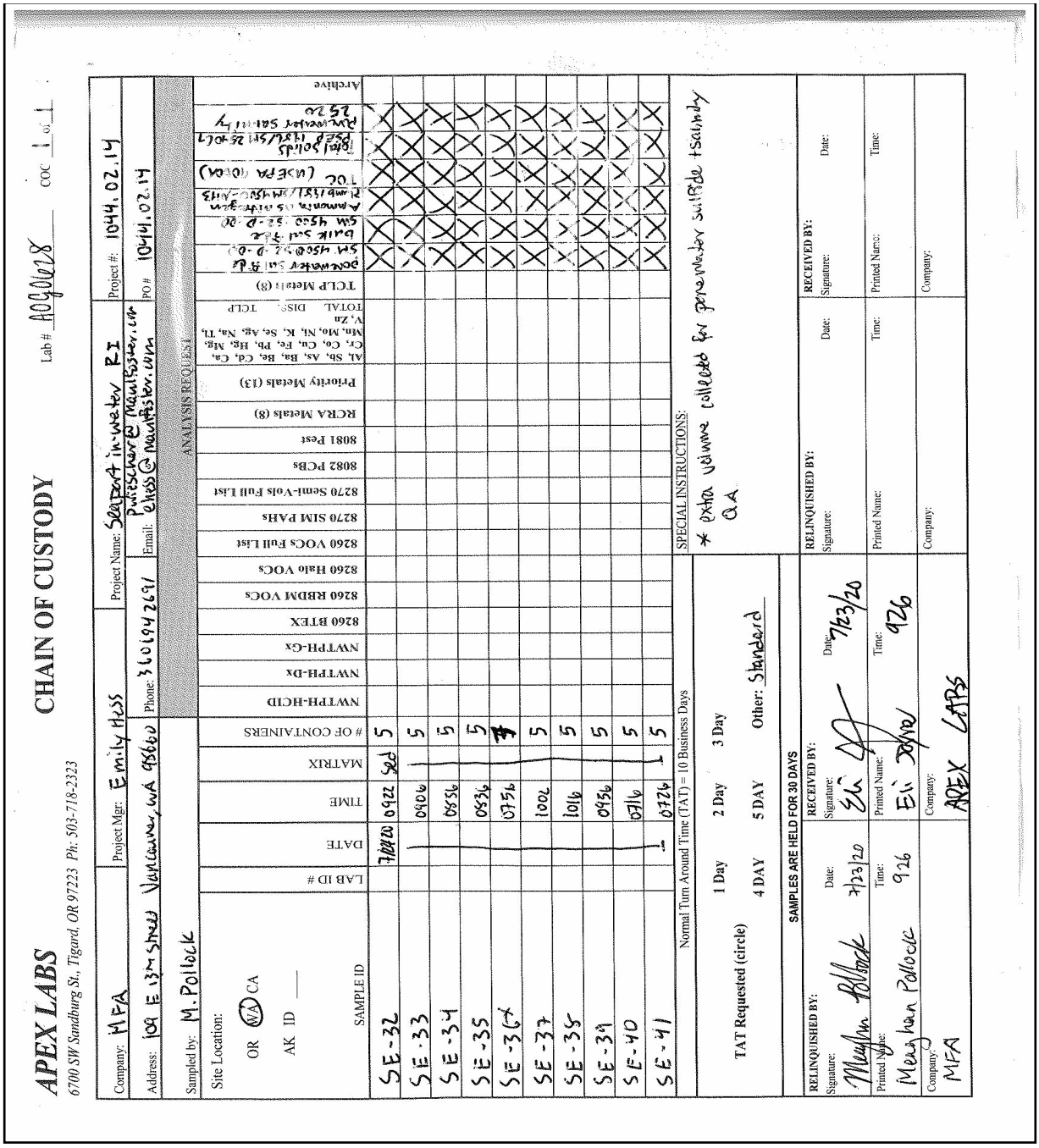

APEX LABS
6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

CHAIN OF CUSTODY

Lab # A0G0628 COC 1 of 1

Company: MFA | Project Mgr: Emily Hess | Project Name: Seaport in-water RI | Project #: 1044.02.14
Address: 109 E 13th Street Vancouver, WA 98660 | Phone: 3606942691 | Email: ehess@maulfoster.com | PO # 1044.02.14
Sampled by: M. Pollock
Site Location: OR (WA) CA AK ID ___

ANALYSIS REQUEST

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pest	RCRA Metals (8)	Priority Metals (13)	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TOTAL DISS TCLP	TCLP Metals (8)	Archive
SE-32		7/8/20	0922	Sed	5																
SE-33			0906		5																
SE-34			0856		5																
SE-35			0836		5																
SE-36			0756		4																
SE-37			1002		5																
SE-38			1016		5																
SE-39			0956		5																
SE-40			0716		5																
SE-41			0726		5																

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: Standard

SPECIAL INSTRUCTIONS:
* extra volume collected for pre-analysis silica gel cleanup
QA

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY:	Date:	Time:	RECEIVED BY:	Date:	Time:	RELINQUISHED BY:	Date:	Time:	RECEIVED BY:	Date:	Time:
Signature:	7/23/20		Signature:			Signature:			Signature:		
Printed Name: Meaghan Pollock		926	Printed Name: Eli Joyce		926	Printed Name:			Printed Name:		
Company: MFA			Company: APEX LABS			Company:			Company:		

Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
3140 NE Broadway Street	Project Number: **1044.02.14**	**Report ID:**
Portland, OR 97232	Project Manager: **Emily Hess**	**A0G0628 - 08 18 20 1544**

A0G0628

Cameron O'Brien

From: Philip Nerenberg
Sent: Thursday, July 30, 2020 11:36 AM
To: AddOns
Subject: FW: A0G0628 - add TVS

See below

-----Original Message-----
From: Mary Benzinger [mailto:mbenzinger@maulfoster.com]
Sent: Thursday, July 30, 2020 9:08 AM
To: Philip Nerenberg
Cc: Phil Wiescher; Emily Hess; Meaghan Pollock
Subject: A0G0628 - add TVS

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Philip,

Could we add analysis of Total Volatile Solids (TVS) by PSEP 1986 to all sediment samples in A0G0628?

SE-32
SE-33
SE-34
SE-35
SE-36
SE-37
SE-38
SE-39
SE-40
SE-41

Thank you,

MARY BENZINGER | MAUL FOSTER & ALONGI, INC.
m. 503 319 7132
I'm working from home in response to COVID-19. Maul Foster & Alongi, Inc. is fully operational and responsive to all projects. Please note there may be a delay if you send hard copy mail to our offices. We are happy to connect with you via email, phone, or videoconference at this time.

-----Original Message-----
From: Emily Hess <ehess@maulfoster.com>
Sent: Wednesday, July 29, 2020 2:33 PM
To: Mary Benzinger <mbenzinger@maulfoster.com>
Cc: Meaghan Pollock <mpollock@maulfoster.com>; Phil Wiescher <pwiescher@maulfoster.com>
Subject: FW: Apex Laboratories Login Notification: A0G0628

1

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **Seaport Tidelands**	
3140 NE Broadway Street	Project Number: **1044.02.14**	**Report ID:**
Portland, OR 97232	Project Manager: **Emily Hess**	**A0G0628 - 08 18 20 1544**

APEX LABS COOLER RECEIPT FORM

Client: MFA - Vanc Element WO#: A0G0628

Project/Project #: Seaport In-water RI 1044.02.14

Delivery Info:

Date/time received: 7/23/20 @ 926 By: EJ

Delivered by: Apex X Client ___ ESS ___ FedEx ___ UPS ___ Swift ___ Senvoy ___ SDS ___ Other ___

Cooler Inspection Date/time inspected: 7/23/20 @ 1030 By: EJ

Chain of Custody included? Yes X No ___ Custody seals? Yes ___ No X

Signed/dated by client? Yes X No ___

Signed/dated by Apex? Yes X No ___

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	1.)	3.1					
Received on ice? (Y/N)	Y	Y					
Temp. blanks? (Y/N)	Y	Y					
Ice type: (Gel/Real/Other)	Gel/Real	Gel					
Condition:	Good	Good					

Cooler out of temp? (Y/(N)) Possible reason why: ___

If some coolers are in temp and some out, were green dots applied to out of temperature samples? Yes/No/(NA)

Out of temperature samples form initiated? Yes/No/(NA)

Samples Inspection: Date/time inspected: 7/23/20 @ 1406 By: (8)

All samples intact? Yes X No ___ Comments: ___

Bottle labels/COCs agree? Yes X No ___ Comments: ___

COC/container discrepancies form initiated? Yes ___ No X

Containers/volumes received appropriate for analysis? Yes X No ___ Comments: ___

Do VOA vials have visible headspace? Yes ___ No ___ NA X

Comments ___

Water samples: pH checked: Yes ___ No ___ NA X pH appropriate? Yes ___ No ___ NA X

Comments: ___

Additional information: ___

Labeled by: (8) Witness: [illegible] Cooler Inspected by: (8) See Project Contact Form: Y

Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Philip Nerenberg

Philip Nerenberg, Lab Director

Interpretation of Pb-210, Ra-226 and Cs-137 Results

Flett Research Ltd.
440 DeSalaberry Ave. Winnipeg, MB R2L 0Y7
Fax/Phone: (204) 667-2505
Email: flett@flettresearch.ca Webpage: http://www.flettresearch.ca

Client: Paulik, Blair

Address:	2001 NW 19th Avenue, Suite 200, Portland, OR 97209
Core ID:	SE-08B
Transaction ID:	918
PO/Contract No.:	Contract signed Oct 24-19
Date Received:	10-Oct-19
Analysis Dates:	October 25, 2019 - January 15, 2020
Analysts:	L. Hesketh-Jost; X. Hu
Sampling Date:	24-Sep-19
Date Issued:	20-Jan-20

Results authorized by Dr. Robert J. Flett, Chief Scientist

INTERPRETATION

Observations:

The Pb-210 activities in this core are low. The maximum activity of 1.40 DPM/g observed in section 3 (extrapolated depth 1.5 - 3.5 cm) is about 1.5 times the lowest activity of 0.93 DPM/g in section 32 (extrapolated depth 42.5 - 55 cm) (Pages 2 & 3). Below section 25 (extrapolated depth 27 - 31 cm), the shape of the Pb-210 profile is nearly vertical.

The dry bulk densities vary between 0.596 - 0.852 g/cm^3 (Pages 2 & 4).

Ra-226 was measured at 0.58, 0.60 and 0.60 DPM/g in section 10 (depth 9 - 10 cm), section 25 (depth 28 - 30 cm) and section 37 (depth 70 - 75 cm), respectively (Pages 5 - 8). The nearly identical Ra-226 activities suggest that the composition of sediments may be consistent throughout the core.

The Pb-210 activities are significantly higher than the Ra-226 activities, indicating that the background Pb-210 activity level has not been achieved at the bottom of this core (depth 75 cm), and these sediments are probably less than 45 years old, the maximum age that can be estimated in this core.

Trace amount of Cs-137 was found in all four sections measured in the core interval of 32 - 75 cm, as well as a few sections above 32 cm (Pages 9 - 13), indicating that the sediments deposited at this sampling site are all more modern than 1963 (Pages 9 - 13). The Cs-137 in some sections is below the detection limit, which is likely a result of diliution due to the extremely high sediment accumulation rates.

Regression model of Unsupported Pb-210 activity vs. Cumulative Dry Weight (g/cm^2):

When applying the linear regression model, it is assumed that the input of Pb-210 and the sediment accumulation rate are constant. Although some variation in the sediment accumulation rate is apparent, the linear regression model was initially applied to the core interval of 0 - 31 cm (extrapolated depth), because it appears that the average sediment accumulation rate in this core interval may be reasonably estimated.

However, due to the extremely low unsupported Pb-210 and the irregular shape of the Pb-210 profile, R^2 of the model is poor (R^2 = 0.4328). Therefore, the average sediment accumulation rate in this core interval cannot be reliably estimated by the regression model.

CRS model of Age at bottom of Extrapolated section in years vs. Depth of bottom edge of current section in cm:

The CRS model assumes constant input of Pb-210 and a core that is long enough to include all of the measurable atmospheric source Pb-210, i.e. it contains a complete Pb-210 inventory. These assumptions are not satisfied, and therefore the model cannot be applied to the core.

Conclusion:

The irregular shape of Pb-210 profile in the upper 25 sections (extrapolated depth 0 - 31 cm) may indicate variable sediment accumulation rates at this sampling site. Below 31 cm (extrapolated depth), the vertical shape of both Pb-210 and Cs-137 profiles may suggest that the sediments (extrapolated depth 31 - 75 cm) were deposited in a very short period of time. The overall sediment accumulation rate is high.

It is impossible to confidently determine the date of deposition of any of the sediments, other than to say all sediments appear to be deposited after 1963.

Overall, the analytical quality of radioisotope data (based upon the recovery of spike, the recovery of CRM, the results of repeat analyses and blanks) is considered good.

Results of Pb-210 by Po-210 Analysis

Flett Research Ltd.
440 DeSalaberry Ave. Winnipeg, MB R2L 0Y7
Fax/Phone: (204) 667-2505
E-mail: flett@flettresearch.ca Webpage: http://www.flettresearch.ca

Client: Paulik, Blair

Address: 2001 NW 19th Avenue, Suite 200, Portland, OR 97209
Core ID: SE-08B
Date Received: 10-Oct-19
Sampling Date: 24-Sep-19
Date Issued: 17-Jan-20

Transaction ID: 918
PO/Contract No.: Contract signed Oct 24-19
Analysis Dates: October 25 - December 25, 2019
Analysts: L. Hesketh-Jost

Salt correction applied? No

Analytical Method: N20110 Determination of Lead-210 in Sediment, Soil and Peat by Alpha Spectrometry (Version 5)
Deviations from Method:

Comments:

Detection Limit: The method detection limit (MDL) for 0.25 - 0.5 g (dry wt.) sample is between 0.05 - 0.1 DPM Po-210/g dry sample at a 95% confidence level for 60,000 second counting time, and is based on greater than 20 method blanks. This can vary slightly and depends upon the amount of sample, detector and recovery efficiency of each sample.

Estimated Uncertainty: The estimated uncertainty for samples analyzed by this method (acid extraction) has been determined to be ± 11% at concentrations between 0.6 and 40 DPM/g at 95% confidence.

Results authorized by Dr. Robert J. Flett, Chief Scientist

Section Number	Sample ID	Upper Depth (cm)	Lower Depth (cm)	Extrapo-lated Upper Section Depth (cm)	Extrapo-lated Lower Section Depth (cm)	Dry Bulk Density (Dry wt./Wet vol.) (g/cm3)	% Loss on Drying	Mass in Extrapolated Section (g/cm2)	Cumulative Mass to Bottom of Current Section (g/cm2)	Plot-point of Cumulative Mass in Current Section (g/cm2)	Po-209 Counts Less Detector Back-ground	Po-210 Counts Less Detector Back-ground and Po-209 Spike Standard Blank	Weight of Sample Counted (g)	Count Time (sec)	Po-210 Total Activity (DPM/g)	Error Po-210 +/- 1 S.D. (DPM/g)	Po-210 Unsupported Activity (DPM/g)	Age at Bottom of Extrapolated Section in Years (CRS Model Estimate)	Depth of Bottom Edge of Current Section (cm)	DPM/cm^2 in Section - Unsupported	CRS Sediment Accumulation Rate (g/cm^2/yr)	Age at Bottom of Extrapolated Section in Years (Linear Regression Model Estimate)	Ra-226 Activity (DPM/g dry wt.)	Error Ra-226 +/- 1 S.D. (DPM/g dry wt.)	Comments Code for Pb-210 Analysis
																								Raw data are recorded in 'Ra-226 Summary ' and each individual Ra-226 sheet.		
1	SE-08B-0.000-0.033	0.0	1.0	0.00	1.50	0.805	46.51%	1.208	1.208	0.403	2023	161	0.639	60000	1.21	0.10									
3	SE-08B-0.066-0.099	2.0	3.0	1.50	3.50	0.730	49.90%	1.460	2.668	1.938	2444	167	0.476	60000	1.40	0.11									
5	SE-08B-0.131-0.164	4.0	5.0	3.50	7.00	0.758	48.72%	2.652	5.321	3.426					1.24	0.10									
10	SE-08B-0.295-0.328	9.0	10.0	7.00	10.00	0.755	48.83%	2.266	7.587	7.209	2140	118	0.475	60000	1.13	0.11							0.58	0.03	
11	SE-08B-0.328-0.361	10.0	11.0	10.00	11.50	0.852	44.84%	1.278	8.865	8.013	1705	120	0.586	60000	1.17	0.11									
13	SE-08B-0.394-0.427	12.0	13.0	11.50	13.50	0.779	47.79%	1.558	10.423	9.644	1775	129	0.533	60000	1.32	0.12									
15	SE-08B-0.459-0.492	14.0	15.0	13.50	15.50	0.721	50.38%	1.441	11.865	11.144	2394	145	0.489	60000	1.21	0.10									
17	SE-08B-0.525-0.558	16.0	17.0	15.50	17.50	0.740	49.57%	1.481	13.345	12.605					1.13	0.12									
19	SE-08B-0.591-0.623	18.0	19.0	17.50	19.50	0.770	48.35%	1.540	14.886	14.115	1713	94	0.543	60000	0.98	0.10									
21	SE-08B-0.656-0.722	20.0	22.0	19.50	23.00	0.709	50.53%	2.481	17.366	15.949	1680	122	0.549	60000	1.28	0.12									
23	SE-08B-0.787-0.853	24.0	26.0	23.00	27.00	0.774	48.09%	3.094	20.461	18.913	1908	101	0.518	60000	0.99	0.10									
25	SE-08B-0.919-0.984	28.0	30.0	27.00	31.00	0.714	50.70%	2.857	23.318	21.889	2131	115	0.501	60000	1.05	0.10							0.60	0.03	
27	SE-08B-1.050-1.115	32.0	34.0	31.00	36.00	0.707	51.09%	3.533	26.851	24.731	1798	94	0.491	60000	1.03	0.11									
30	SE-08B-1.247-1.312	38.0	40.0	36.00	42.50	0.596	57.22%	3.876	30.727	28.640	1973	98	0.502	60000	0.96	0.10									
32	SE-08B-1.476-1.640	45.0	50.0	42.50	55.00	0.669	53.33%	8.358	39.085	34.070	1479	72	0.509	60000	0.93	0.13									
35	SE-08B-1.969-2.133	60.0	65.0	55.00	67.50	0.718	50.59%	8.972	48.056	44.468	1731	85	0.489	60000	0.97	0.11									
37	SE-08B-2.297-2.461	70.0	75.0	67.50	75.00	0.684	52.15%	5.130	53.187	51.477	2624	126	0.480	60000	0.97	0.09							0.60	0.03	
Blank	Blank w/o Po-209 spike										0	-4													
Blank	Blank w/ Po-209 spike										2934	0													
Blank	Blank w/o Po-209 spike										-3	-3													
Blank	Blank w/ Po-209 spike										2131	1													
5	SE-08B-0.131-0.164	4.0	5.0			0.754	48.79%				2422	174	0.521	60000	1.34	0.10									
5 Dup	SE-08B-0.131-0.164 Duplicate	4.0	5.0			0.762	48.64%				2269	129	0.490	60000	1.13	0.10									
17	SE-08B-0.525-0.558	16.0	17.0			0.736	49.65%				1956	109	0.540	60000	1.00	0.10									
17 Dup	SE-08B-0.525-0.558 Duplicate	16.0	17.0			0.744	49.49%				1633	113	0.531	60000	1.26	0.13									
CRM	IAEA 447										2608	1443	0.330	60000	16.32	0.43		Po-210 in CRM on counting date (DPM/g):				18.60	Recovery:	87.76%	
CRM	IAEA 447										1939	1159	0.352	60000	16.48	0.49						18.53		88.93%	

Dup (duplicate): Two subsamples of the same sample were carried through the analytical procedure in an identical manner. Rep (replicate): Three or more subsamples of the same sample were carried through the analytical procedure in an identical manner.

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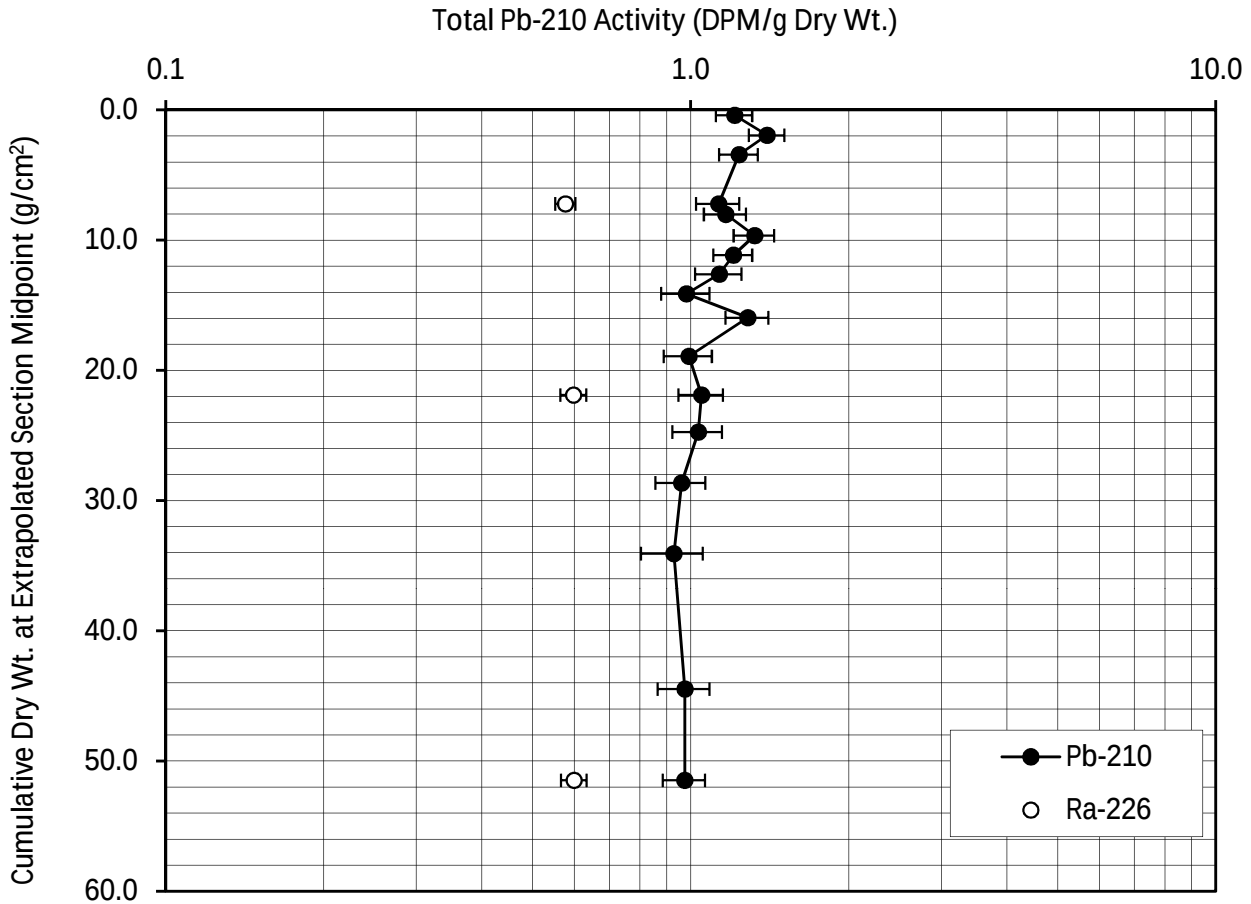
Note: Results relate only to the items tested.

Total Pb-210 Activity vs. Accumulated Sediment

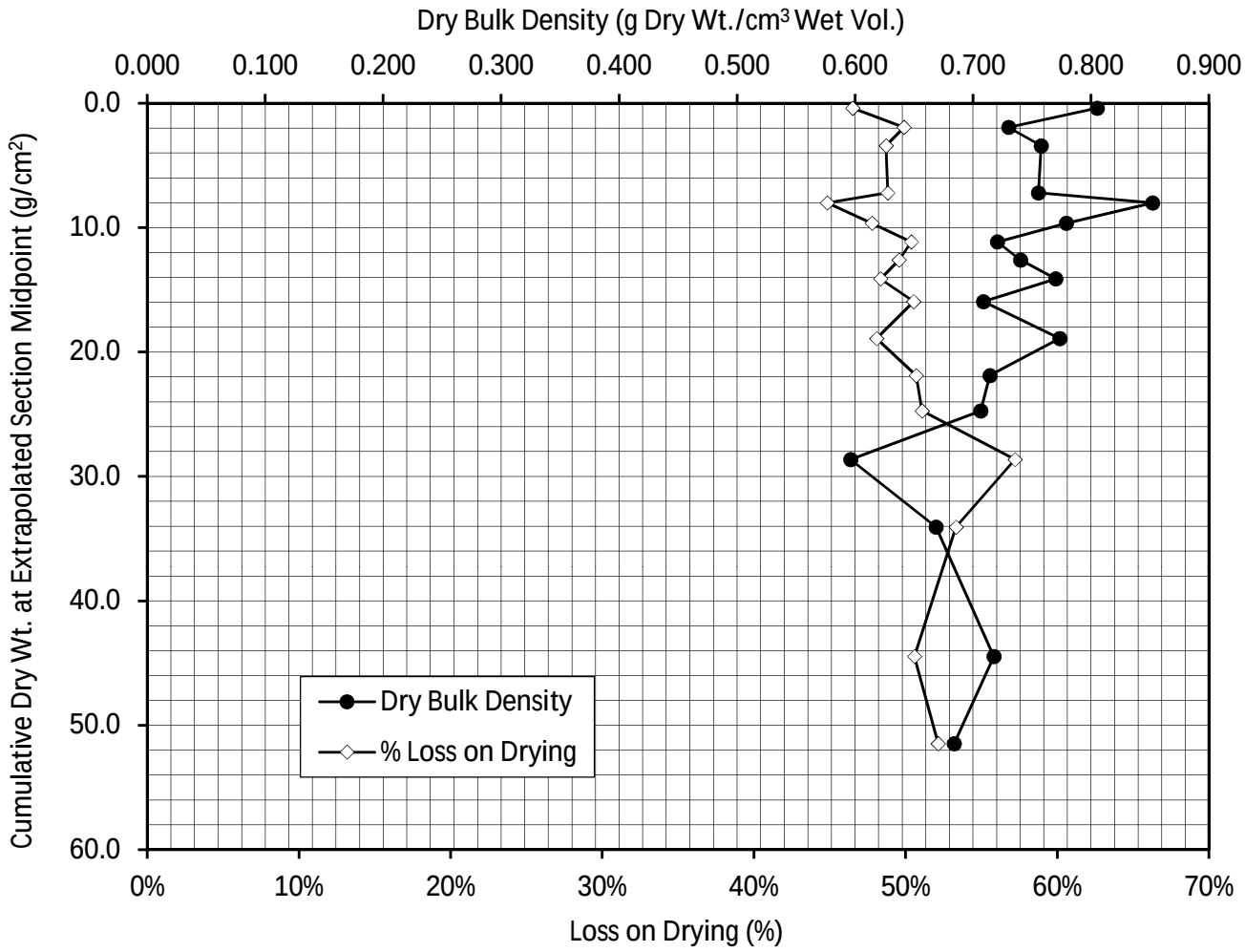
SE-08B



Q:\Clients M-Z\Paulik, Blair - Maul Foster & Alongi Inc\2019(918)\Radioisotopes\SE-08B\Pb-210, Ra-226 and Cs-137 Paulik SE-08B Jan 16-20 Final.xlsm

Dry Bulk Density and % Loss on Drying vs. Accumulated Sediment

SE-08B



Q:\Clients M-Z\Paulik, Blair - Maul Foster & Alongi Inc\2019(918)\Radioisotopes\SE-08B\Pb-210, Ra-226 and Cs-137 Paulik SE-08B Jan 16-20 Final.xlsm

Results of Ra-226 Analysis by Rn-222 Emanation

Flett Research Ltd.
440 DeSalaberry Ave., Winnipeg, MB R2L 0Y7
Fax/Phone: (204) 667-2505
Email: flett@flettresearch.ca Webpage: http://www.flettresearch.ca

Client: Paulik, Blair

Address: 2001 NW 19th Avenue, Suite 200, Portland, OR 97209

Core ID: SE-08B
Date Received: 10-Oct-19
Sampling Date: 24-Sep-19
Date Issued: 17-Jan-20

Transaction ID: 918
PO/Contract No.: Contract signed Oct 24-19
Analysis Dates: November 23 - December 27, 2019
Analysts: L. Hesketh-Jost
Salt Correction Applied? No

Analytical Method: N40110 Determination of Radium-226 in Sediment, Soil and Peat by Radon-222 Emanation (Version 3)

Comments:

Detection Limit: The method detection limit (MDL) is dependent on the amount of sample analyzed. For a 60,000 second counting time the MDL at 95% confidence for 2 g of dry sample is 0.1 DPM/g and for 0.5 g of dry sample is 0.5 DPM/g.

Estimated Uncertainty: The estimate of uncertainty of measurement for this method in this laboratory is approximately ±12% at 95% confidence level (approximately 40,000 counts in 60,000 seconds).

Results authorized by Dr. Robert J. Flett, Chief Scientist

Core ID	Sample ID	Ra-226 Activity (DPM/g Dry Wt.)	Combined Error: 1 SD (DPM/g Dry Wt.)	Comments Code for Ra-226 Analysis
SE-08B	SE-08B-0.295-0.328	0.58	0.03	
SE-08B	SE-08B-0.919-0.984	0.60	0.03	
SE-08B	SE-08B-2.297-2.461	0.60	0.03	

Q:\Clients M-Z\Paulik, Blair - Maul Foster & Alongi Inc\2019(918)\Radioisotopes\SE-08B\Pb-210, Ra-226 and Cs-137 Paulik SE-08B Jan 16-20 Final.xlsm
Duplicate: Two subsamples of the same sample were carried through the analytical procedure in an identical manner.
Re-count: The sample bottle was re-sealed after the initial analysis, and was re-counted after 11 or more days of Rn-222 ingrowth. Repeat counting was chosen over duplicate analysis due to insufficient sample material provided.

This test report shall not be reproduced, except in full, without written approval of the laboratory.

Note: Results relate only to the items tested.

ISO / IEC 17025:2005 Accredited with the Canadian Association for Laboratory Accreditation (CALA Accreditation No. A3306)

Radium Analysis by Rn-222 Emanation

Core ID	SE-08B
Sample ID	SE-08B-0.295-0.328
Lucas Cell No.	3
Number of days since Rn board last run	1
Dry weight of sample counted (g)	1.476
Total count in period	2652
Total count in period (carryover corrected)	2646
Cell Blank count (CPM)	0.516
System Blank (DPM)	0.398
System Efficiency	0.837
Count duration (minutes)	1000

Typical carryover is about 1 - 2 % of the net counts (gross counts less system background) of the sample counted on the previous day. The carryover is subtracted from the gross counts of current sample. This correction is not required if the sample is run after a blank.

Carryover correction?	Yes		
Gross counts of previous sample	1542	Mean of last 10 carryover measurements	0.84%
Counts carried over from previous sample	6	Mean of last 6 system background measurements	837

	Year	Month	Day	Hour	Minute	Second	Ingrowth time (Days)	Ingrowth factor	Decay correction
When sample last stripped	2019	11	26	14	39	0	14.02	0.92117	0.92490
When cell filled	2019	12	10	15	6	55			
Beginning time of count	2019	12	10	17	7	18			

Counts per minute	2.65				
Gross CPM less Cell Blank (CPM)	2.13				
CPM (decay during count corrected)	2.30				
DPM Sample +System (efficiency corrected)	2.75				
DPM sample	2.55	Error ± 1 SD	0.1116	DPM	
DPM/g	1.73				
Ra-226 DPM/g	0.58	Error ± 1 SD	0.0252	DPM/g	Error % = 4.4
Ra-226 pCi/g	0.26				

Chemist	XH
PMT High Voltage +ve	770
HV Power supply	Spectrum Technologies
Alpha Counter	Spectrum Technologies
Region of Interest Ch.#s	28-1022
PMT	6655A - #1
Preamp	Canberra 2007P tube base
Amp Gain	1

Radium Analysis by Rn-222 Emanation

Core ID	SE-08B
Sample ID	SE-08B-0.919-0.984
Lucas Cell No.	3
Number of days since Rn board last run	1
Dry weight of sample counted (g)	1.063
Total count in period	2102
Total count in period (carryover corrected)	n/a
Cell Blank count (CPM)	0.516
System Blank (DPM)	0.398
System Efficiency	0.837
Count duration (minutes)	1000

Typical carryover is about 1 - 2 % of the net counts (gross counts less system background) of the sample counted on the previous day. The carryover is subtracted from the gross counts of current sample. This correction is not required if the sample is run after a blank.

Carryover correction? No

	Year	Month	Day	Hour	Minute	Second	Ingrowth time (Days)	Ingrowth factor	Decay correction
When sample last stripped	2019	12	14	16	31	0	11.08	0.86579	0.92494
When cell filled	2019	12	25	18	30	0			
Beginning time of count	2019	12	25	20	30	0			

Counts per minute	2.10			
Gross CPM less Cell Blank (CPM)	1.59			
CPM (decay during count corrected)	1.71			
DPM Sample +System (efficiency corrected)	2.05			
DPM sample	1.91	Error ± 1 SD	0.1083	DPM
DPM/g	1.79			
Ra-226 DPM/g	0.60	Error ± 1 SD	0.0340	DPM/g
Ra-226 pCi/g	0.27			

Error % = 5.7

Chemist	RF
PMT High Voltage +ve	770
HV Power supply	Spectrum Technologies
Alpha Counter	Spectrum Technologies
Region of Interest Ch.#s	28-1022
PMT	6655A - #1
Preamp	Canberra 2007P tube base
Amp Gain	1

Radium Analysis by Rn-222 Emanation

Core ID	SE-08B
Sample ID	SE-08B-2.297-2.461
Lucas Cell No.	3
Number of days since Rn board last run	1
Dry weight of sample counted (g)	1.087
Total count in period	2178
Total count in period (carryover corrected)	2167
Cell Blank count (CPM)	0.516
System Blank (DPM)	0.398
System Efficiency	0.837
Count duration (minutes)	1000

Typical carryover is about 1 - 2 % of the net counts (gross counts less system background) of the sample counted on the previous day. The carryover is subtracted from the gross counts of current sample. This correction is not required if the sample is run after a blank.

Carryover correction?	Yes		
Gross counts of previous sample	2102	Mean of last 10 carryover measurements	0.84%
Counts carried over from previous sample	11	Mean of last 6 system background measurements	837

	Year	Month	Day	Hour	Minute	Second	Ingrowth time (Days)	Ingrowth factor	Decay correction
When sample last stripped	2019	12	14	16	30	0	12.07	0.88786	0.92494
When cell filled	2019	12	26	18	17	0			
Beginning time of count	2019	12	26	20	17	0			

Counts per minute	2.17				
Gross CPM less Cell Blank (CPM)	1.65				
CPM (decay during count corrected)	1.79				
DPM Sample +System (efficiency corrected)	2.13				
DPM sample	1.95	Error ± 1 SD	0.1084	DPM	
DPM/g	1.80				
Ra-226 DPM/g	0.60	Error ± 1 SD	0.0332	DPM/g	Error % = 5.5
Ra-226 pCi/g	0.27				

Chemist	RF
PMT High Voltage +ve	770
HV Power supply	Spectrum Technologies
Alpha Counter	Spectrum Technologies
Region of Interest Ch.#s	28-1022
PMT	6655A - #1
Preamp	Canberra 2007P tube base
Amp Gain	1

Results of Cs-137 Analysis

Flett Research Ltd.

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Client: Paulik, Blair

Address: 2001 NW 19th Avenue, Suite 200, Portland, OR 97209

Core ID: SE-08B
Date Received: 10-Oct-19
Sampling Date: 24-Sep-19
Date Issued: 17-Jan-20

Transaction ID: 918
PO/Contract No.: Contract signed Oct 24-19
Analysis Dates: December 9, 2019 - January 15, 2020
Analysts: X. Hu

Salt Correction? No

Analytical Method: N30120 Measurement of Gamma-Ray Emitting Radionuclides in Sediment/Soil Samples by Gamma Spectrometry Using HPGe Detectors (Version 2)

Deviation from Method:

Comments: <2SD: The measured Cs-137 activity is less than 2 counting errors (i.e. 2 SD), suggesting no significant presence of Cs-137 in this sample.

trace: There is an apparent peak properly positioned at the known energy level of 661.6 KeV of Cs-137, suggesting possible presence of trace amount of Cs-137.

Detection Limit: The method detection limit (MDL) is 0.3 DPM/g for an 80,000 seconds counting period when measuring a 9 g of dry sample at a 95% confidence level. The method detection limit can be decreased to 0.1 DPM/g if 32 g of sample is used.

Estimated Uncertainty: The estimated uncertainty of this method has been determined to be ± 10% at 95% confidence for samples with activities between 0.5 and 20 DPM/g, counting time 80,000 seconds and sample weights ranging from 9 to 32 grams. Method uncertainty can increase to 85% for samples with activities near detection limit (0.1 - 0.3 DPM/g).

Results authorized by Dr. Robert J. Flett, Chief Scientist

Sample ID	Upper Depth (cm)	Lower Depth (cm)	Day Sample Counted	Month Sample Counted	Year Sample Counted	Integral NET Cs-137 Peak	Counting Error 1 SD (Counts)	Count Time (seconds)	Dry Sample Weight (g)	Sample Thickness (mm)	CPM/g	Efficiency for Gammas Fractional	Gammas per min. per gram	Activity DPM/g (dry wt.) on Counting Date	Approx. Error DPM/g	Activity DPM/g (dry wt.) on Sampling Date	Approx. Error DPM/g	Activity pCi/g (dry wt.) on Sampling Date	Approx. Error pCi/g	Activity mBq/g (dry wt.) on Sampling Date	Approx. Error mBq/g	Detector Used	Comments Code for Cs-137 Analysis
SE-08B-0.000-0.033	0	1	9	12	2019	62	40	80000	15.584	4.10	0.0030	0.0282	0.1058	0.12	0.08	0.12	0.08	0.06	0.04	2.08	1.34	GMX	<2SD
SE-08B-0.033-0.066	1	2	10	12	2019	29	38	80000	13.784	3.95	0.0016	0.0258	0.0612	0.07	0.09	0.07	0.09	0.03	0.04	1.20	1.58	GEM	<2SD
SE-08B-0.131-0.164	4	5	10	12	2019	26	42	80000	13.641	3.50	0.0014	0.0286	0.0499	0.06	0.09	0.06	0.10	0.03	0.04	0.98	1.58	GMX	<2SD
SE-08B-0.197-0.230	6	7	13	12	2019	36	38	80000	12.513	3.68	0.0022	0.0285	0.0757	0.09	0.09	0.09	0.09	0.04	0.04	1.49	1.57	GMX	<2SD
SE-08B-0.295-0.328	9	10	11	12	2019	86	39	80000	12.313	3.60	0.0052	0.0286	0.1834	0.22	0.10	0.22	0.10	0.10	0.04	3.61	1.63	GMX	trace
SE-08B-0.394-0.427	12	13	3	1	2020	34	44	80000	15.288	4.18	0.0017	0.0281	0.0593	0.07	0.09	0.07	0.09	0.03	0.04	1.17	1.51	GMX	<2SD
SE-08B-0.525-0.558	16	17	3	1	2020	87	38	80000	9.488	2.73	0.0069	0.0430	0.1599	0.19	0.08	0.19	0.08	0.09	0.04	3.15	1.36	Canberra	
SE-08B-0.656-0.722	20	22	3	1	2020	45	36	80000	18.801	5.30	0.0018	0.0246	0.0729	0.09	0.07	0.09	0.07	0.04	0.03	1.44	1.15	GEM	<2SD; trace
SE-08B-0.787-0.853	24	26	13	1	2020	60	35	80000	20.002	5.30	0.0022	0.0246	0.0914	0.11	0.06	0.11	0.06	0.05	0.03	1.80	1.05	GEM	<2SD
SE-08B-0.919-0.984	28	30	13	1	2020	55	43	80000	13.752	4.43	0.0030	0.0279	0.1073	0.13	0.10	0.13	0.10	0.06	0.04	2.11	1.65	GMX	<2SD
SE-08B-1.050-1.115	32	34												0.26	0.06	0.26	0.06	0.12	0.03	4.29	1.06	Canberra	
SE-08B-1.476-1.640	45	50	6	1	2020	115	45	80000	13.245	4.13	0.0065	0.0282	0.2312	0.27	0.11	0.27	0.11	0.12	0.05	4.55	1.78	GMX	trace
SE-08B-1.969-2.133	60	65	6	1	2019	122	36	80000	17.175	5.10	0.0053	0.0248	0.2149	0.25	0.07	0.25	0.07	0.11	0.03	4.13	1.22	GEM	
SE-08B-2.297-2.461	70	75	14	1	2020	107	34	80000	15.491	4.33	0.0052	0.0255	0.2035	0.24	0.08	0.24	0.08	0.11	0.03	4.01	1.27	GEM	
Re-count																							
SE-08B-1.050-1.115	32	34	6	1	2020	149	36	80000	11.966	3.50	0.0093	0.0420	0.2225	0.26	0.06	0.26	0.06	0.12	0.03	4.38	1.05	Canberra	
SE-08B-1.050-1.115 Re-count	32	34	14	1	2020	143	36	80000	11.966	3.50	0.0090	0.0420	0.2135	0.25	0.06	0.25	0.06	0.11	0.03	4.21	1.06	Canberra	
Cs-137 Standards																							
GMX 32g 10 mm			11	10	2019	19725	142	5000	32.00	10.0	7.3969	0.0237	311.9975	366.19	2.64	957.04							
GMX 24g 7.5mm			10	10	2019	15972	128	5000	24.00	7.5	7.9860	0.0256	312.0171	366.22	2.93	957.04							
GMX 15g 5mm			10	10	2019	10817	105	5000	15.00	5.0	8.6536	0.0277	312.0171	366.22	3.55	957.04							
GMX 9g 3mm			10	10	2019	6727	83	5000	9.00	3.0	8.9693	0.0287	312.0171	366.22	4.52	957.04							
GMX 2.85g 0.8mm			11	10	2019	2281	49	5000	2.854	0.8	9.5907	0.0307	311.9975	366.19	7.87	957.04							
GEM 32g 10 mm			10	10	2019	17437	135	5000	32.00	10.0	6.5389	0.0210	312.0171	366.22	2.84	957.04							
GEM 24g 7.5mm			10	10	2019	14334	123	5000	24.00	7.5	7.1670	0.0230	312.0171	366.22	3.14	957.04							
GEM 15g 5mm			10	10	2019	9742	102	5000	15.00	5.0	7.7936	0.0250	312.0171	366.22	3.83	957.04							
GEM 9g 3mm			15	10	2019	6168	81	5000	9.00	3.0	8.2240	0.0264	311.9187	366.10	4.81	957.04							

GEM 2.85g 0.8mm			11	10	2019	2138	48	5000	2.854	0.8	8.9895	0.0288	311.9975	366.19	8.22	957.04							
Canberra 32g 10 mm			11	10	2019	28805	173	5000	32.00	10.0	10.8019	0.0346	311.9975	366.19	2.20	957.04							
Canberra 24g 7.5mm			11	10	2019	22852	153	5000	24.00	7.5	11.4260	0.0366	311.9975	366.19	2.45	957.04							
Canberra 15g 5mm			10	10	2019	15782	128	5000	15.00	5.0	12.6256	0.0405	312.0171	366.22	2.97	957.04							
Canberra 9g 3mm			10	10	2019	9971	102	5000	9.00	3.0	13.2947	0.0426	312.0171	366.22	3.74	957.04							
Canberra 2.85g 0.8mm			10	10	2019	3388	60	5000	2.854	0.8	14.2453	0.0457	312.0171	366.22	6.45	957.04							

Duplicate: Two subsamples of the same sample were carried through the analytical procedure in an identical manner.

Re-count: The entire available dry sample material was used for making the sample pancake, and then this sample pancake was counted twice on a HPGe detector. Repeat counting was chosen over duplicate analysis due to insufficient sample material provided.

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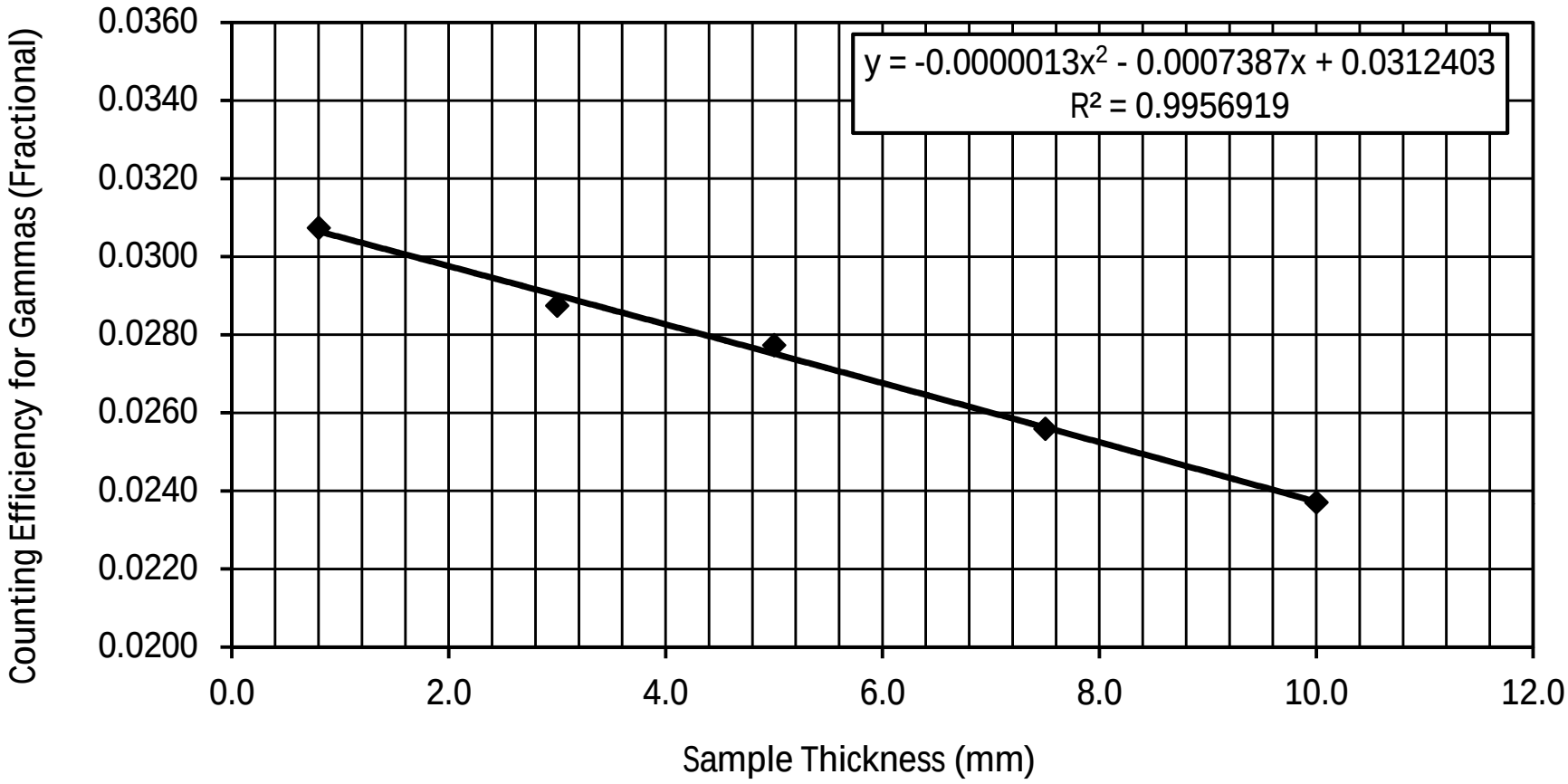
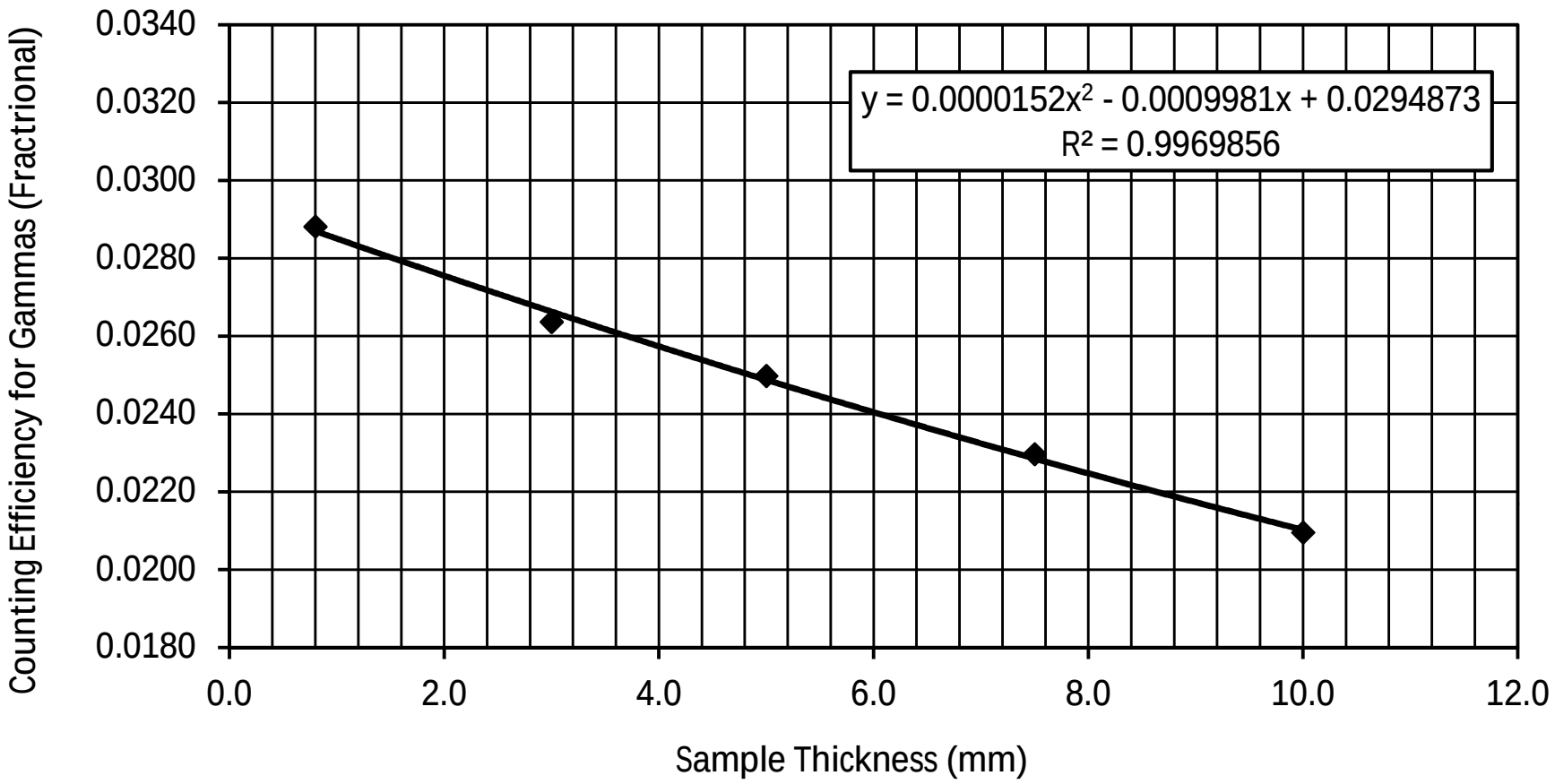
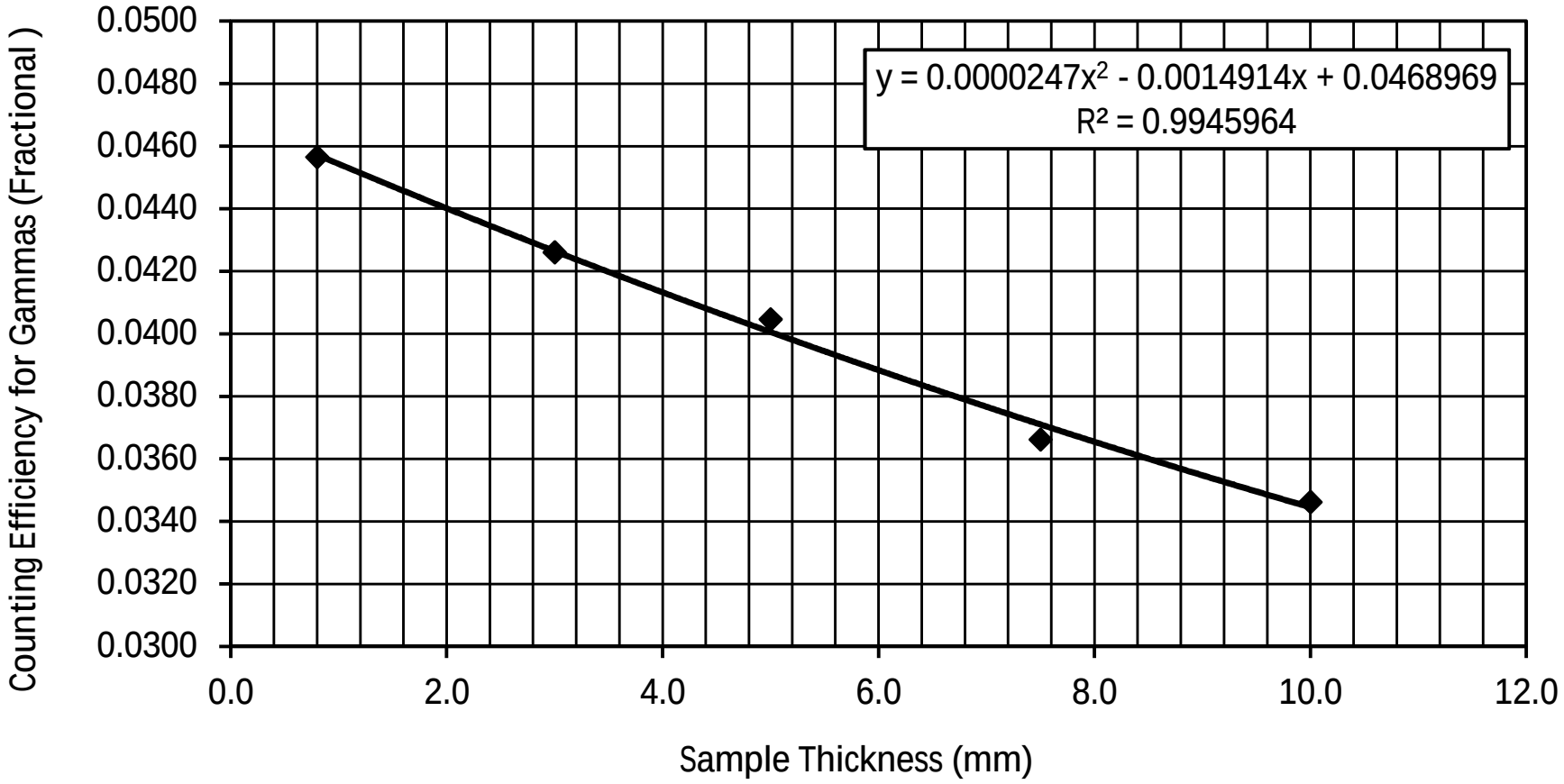
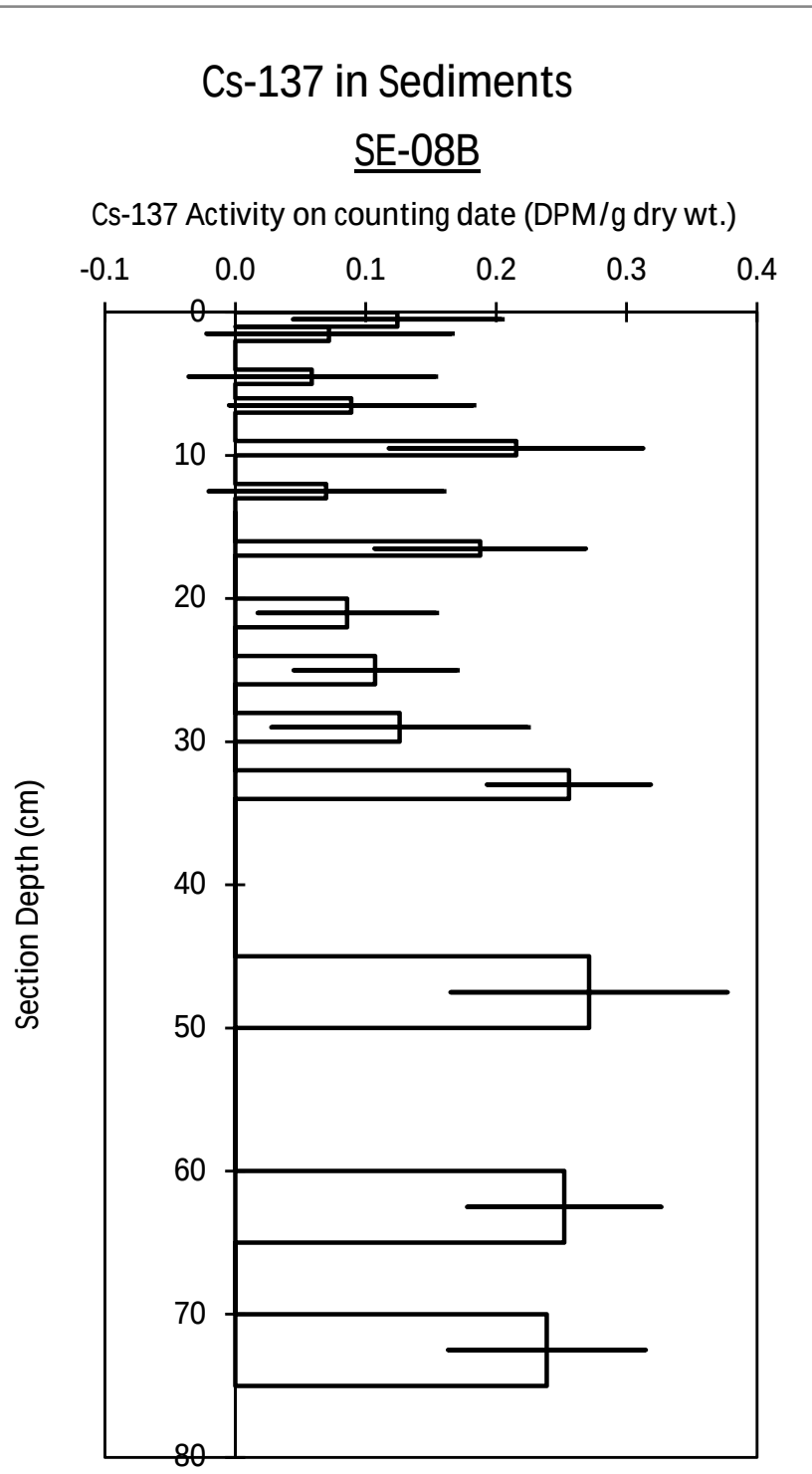

Cs-137 Counting Efficiency of Gammas vs. Sample Thickness (mm) GMX 25% Detector (Oct 10-11, 2019)
y = -0.0000013x² - 0.0007387x + 0.0312403
R² = 0.9956919
Counting Efficiency for Gammas (Fractional)
0.0360
0.0340
0.0320
0.0300
0.0280
0.0260
0.0240
0.0220
0.0200
0.0
2.0
4.0
6.0
8.0
10.0
12.0
Sample Thickness (mm)


Cs-137 Counting Efficiency of Gammas vs. Sample Thickness (mm) GEM 19% Detector (Oct 10-15, 2019)
y = 0.0000152x² - 0.0009981x + 0.0294873
R² = 0.9969856
Counting Efficiency for Gammas (Fractrional)
0.0340
0.0320
0.0300
0.0280
0.0260
0.0240
0.0220
0.0200
0.0180
0.0
2.0
4.0
6.0
8.0
10.0
12.0
Sample Thickness (mm)


Cs-137 Counting Efficiency of Gammas vs. Sample Thickness (mm)
Canberra 29% Detector (Oct 10-11, 2019)
y = 0.0000247x2 - 0.0014914x + 0.0468969
R² = 0.9945964
Counting Efficiency for Gammas (Fractional)
0.0500
0.0480
0.0460
0.0440
0.0420
0.0400
0.0380
0.0360
0.0340
0.0320
0.0300
0.0
2.0
4.0
6.0
8.0
10.0
12.0
Sample Thickness (mm)



Note: The bar plotted at the midpoint depth of each section represents +/- 1 standard deviation of the Cs-137 counting error.

Interpretation of Pb-210, Ra-226 and Cs-137 Results

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Client: Paulik, Blair

Address:	2001 NW 19th Avenue, Suite 200, Portland, OR 97209
Core ID:	SE-12
Transaction ID:	918
PO/Contract No.:	Contract signed Oct 24-19
Date Received:	10-Oct-19
Analysis Dates:	October 31, 2019 - January 15, 2020
Analysts:	L. Hesketh-Jost; X. Hu
Sampling Date:	25-Sep-19
Date Issued:	17-Jan-20

Results authorized by Dr. Robert J. Flett, Chief Scientist

INTERPRETATION

Observations:

The Pb-210 activities in this core are low, varying between 0.49 - 0.88 DPM/g. The shape of the Pb-210 profile is irregular, showing no consistant pattern (Pages 2 & 3).

Plenty of vegetation was mixed with sediment throughout the core. The dry bulk densities vary between 0.360 - 0.699 g/cm^3 (Pages 2 & 4).

Ra-226 was measured at 0.28, 0.46 and 0.48 DPM/g in section 10 (depth 9 - 10 cm), section 25 (depth 28 - 30 cm) and section 33 (depth 55 - 60 cm), respectively (Pages 5 - 8). The Pb-210 activities are significantly higher than the Ra-226 activities, indicating that the background Pb-210 activity level has not been achieved at the bottom of this core (depth 60 cm), and these sediments are probably less than 45 years old, the maximum age that can be estimated in this core.

Significant presence of Cs-137 was found in the bottom section (depth 55 - 60 cm) as well as all sections above, indicating that the sediments deposited at this sampling site are all more modern than 1963 (Pages 9 - 13).

Regression model of Unsupported Pb-210 activity vs. Cumulative Dry Weight (g/cm^2):

When applying the linear regression model, it is assumed that the input of Pb-210 and the sediment accumulation rate are constant. These assumptions are not satisfied, and therefore the model cannot be applied to the core.

CRS model of Age at bottom of Extrapolated section in years vs. Depth of bottom edge of current section in cm:

The CRS model assumes constant input of Pb-210 and a core that is long enough to include all of the measurable atmospheric source Pb-210, i.e. it contains a complete Pb-210 inventory. These assumptions are not satisfied, and therefore the model cannot be applied to the core.

Conclusion:

The irregular shape of Pb-210 profile may indicate highly variable sediment accumulation rates at this sampling site, and the overall sediment accumulation rate is high.

It is impossible to confidently determine the date of deposition of any of the sediments, other than to say all sediments appear to be deposited after 1963.

Overall, the analytical quality of radioisotope data (based upon the recovery of spike, the recovery of CRM, the results of repeat analyses and blanks) is considered good.

Results of Pb-210 by Po-210 Analysis

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Client: Paulik, Blair

Address: 2001 NW 19th Avenue, Suite 200, Portland, OR 97209
Core ID: SE-12
Date Received: 10-Oct-19
Sampling Date: 25-Sep-19
Date Issued: 17-Jan-20

Transaction ID: 918
PO/Contract No.: Contract signed Oct 24-19
Analysis Dates: October 31 - December 25, 2019
Analysts: L. Hesketh-Jost

Salt correction applied? No

Analytical Method: N20110 Determination of Lead-210 in Sediment, Soil and Peat by Alpha Spectrometry (Version 5)
Deviations from Method:

Comments:

Detection Limit: The method detection limit (MDL) for 0.25 - 0.5 g (dry wt.) sample is between 0.05 - 0.1 DPM Po-210/g dry sample at a 95% confidence level for 60,000 second counting time, and is based on greater than 20 method blanks. This can vary slightly and depends upon the amount of sample, detector and recovery efficiency of each sample.

Estimated Uncertainty: The estimated uncertainty for samples analyzed by this method (acid extraction) has been determined to be ± 11% at concentrations between 0.6 and 40 DPM/g at 95% confidence.

Results authorized by Dr. Robert J. Flett, Chief Scientist

Section Number	Sample ID	Upper Depth (cm)	Lower Depth (cm)	Extrapo-lated Upper Section Depth (cm)	Extrapo-lated Lower Section Depth (cm)	Dry Bulk Density (Dry wt./Wet vol.) (g/cm3)	% Loss on Drying	Mass in Extrapolated Section (g/cm2)	Cumulative Mass to Bottom of Current Section (g/cm2)	Plot-point of Cumulative Mass in Current Section (g/cm2)	Po-209 Counts Less Detector Back-ground	Po-210 Counts Less Detector Back-ground and Po-209 Spike Standard Blank	Weight of Sample Counted (g)	Count Time (sec)	Po-210 Total Activity (DPM/g)	Error Po-210 +/- 1 S.D. (DPM/g)	Po-210 Unsupported Activity (DPM/g)	Age at Bottom of Extrapolated Section in Years (CRS Model Estimate)	Depth of Bottom Edge of Current Section (cm)	DPM/cm^2 in Section - Unsupported	CRS Sediment Accumulation Rate (g/cm^2/yr)	Age at Bottom of Extrapolated Section in Years (Linear Regression Model Estimate)	Ra-226 Activity (DPM/g dry wt.)	Error Ra-226 +/- 1 S.D. (DPM/g dry wt.)	Comments Code for Pb-210 Analysis
																								Raw data are recorded in 'Ra-226 Summary ' and each individual Ra-226 sheet.		
1	SE-12-0.000-0.033	0.0	1.0	0.00	1.50	0.545	59.43%	0.817	0.817	0.272					0.82	0.09										
3	SE-12-0.066-0.099	2.0	3.0	1.50	3.00	0.569	58.02%	0.853	1.670	1.386	2014	86	0.507	60000	0.82	0.09										
4	SE-12-0.099-0.131	3.0	4.0	3.00	6.50	0.570	57.83%	1.997	3.667	1.956	2481	107	0.528	60000	0.80	0.08										
10	SE-12-0.295-0.328	9.0	10.0	6.50	10.50	0.360	70.20%	1.440	5.107	4.747	2241	102	0.501	60000	0.88	0.09								0.28	0.03	
12	SE-12-0.361-0.394	11.0	12.0	10.50	12.50	0.565	58.55%	1.130	6.237	5.672	1753	63	0.529	60000	0.66	0.09										
14	SE-12-0.427-0.459	13.0	14.0	12.50	14.00	0.546	59.03%	0.819	7.056	6.783	1800	64	0.504	60000	0.68	0.09										
15	SE-12-0.459-0.492	14.0	15.0	14.00	15.50	0.536	59.65%	0.804	7.860	7.324	2418	88	0.508	60000	0.70	0.08										
17	SE-12-0.525-0.558	16.0	17.0	15.50	17.50	0.459	64.89%	0.918	8.778	8.319	1597	42	0.516	60000	0.49	0.08										
19	SE-12-0.591-0.623	18.0	19.0	17.50	19.50	0.409	67.32%	0.818	9.595	9.187	1632	62	0.522	60000	0.71	0.09										
21	SE-12-0.656-0.722	20.0	22.0	19.50	23.00	0.457	64.50%	1.601	11.196	10.281	1449	55	0.599	60000	0.62	0.08										
23	SE-12-0.787-0.853	24.0	26.0	23.00	27.00	0.577	57.62%	2.306	13.502	12.349	1754	84	0.532	60000	0.87	0.10										
25	SE-12-0.919-0.984	28.0	30.0	27.00	31.00	0.697	52.25%	2.789	16.291	14.897	2264	91	0.500	60000	0.78	0.08								0.46	0.03	
27	SE-12-1.050-1.115	32.0	34.0	31.00	35.00	0.595	56.60%	2.381	18.672	17.482	3552	60	0.513	60000	0.64	0.09										
29	SE-12-1.181-1.247	36.0	38.0	35.00	39.00	0.570	57.94%	2.279	20.951	19.812	3359	57	0.532	60000	0.62	0.09										
31	SE-12-1.312-1.476	40.0	45.0	39.00	50.00	0.643	54.34%	7.075	28.026	23.202					0.60	0.09										
33	SE-12-1.804-1.969	55.0	60.0	50.00	60.00	0.699	51.69%	6.995	35.021	33.272	1995	80	0.534	60000	0.73	0.08								0.48	0.03	
Blank	Blank w/o Po-209 spike										0	-4														
Blank	Blank w/ Po-209 spike										2934	0														
Blank	Blank w/o Po-209 spike										-3	-3														
Blank	Blank w/ Po-209 spike										2131	1														
1	SE-12-0.000-0.033	0.0	1.0			0.548	59.36%				1752	83	0.607	60000	0.76	0.09										
1 Dup	SE-12-0.000-0.033 Duplicate	0.0	1.0			0.542	59.50%				2313	102	0.485	60000	0.89	0.09										
31	SE-12-1.312-1.476	40.0	45.0			0.645	54.36%				1548	45	0.508	60000	0.56	0.09										
31 Dup	SE-12-1.312-1.476 Duplicate	40.0	45.0			0.642	54.32%				1553	55	0.531	60000	0.65	0.09										
CRM	IAEA 447										2608	1443	0.330	60000	16.32	0.43			Po-210 in CRM on counting date (DPM/g):				18.60	Recovery:	87.76%	
CRM	IAEA 447										1939	1159	0.352	60000	16.48	0.49							18.53		88.93%	

Dup (duplicate): Two subsamples of the same sample were carried through the analytical procedure in an identical manner. Rep (replicate): Three or more subsamples of the same sample were carried through the analytical procedure in an identical manner.

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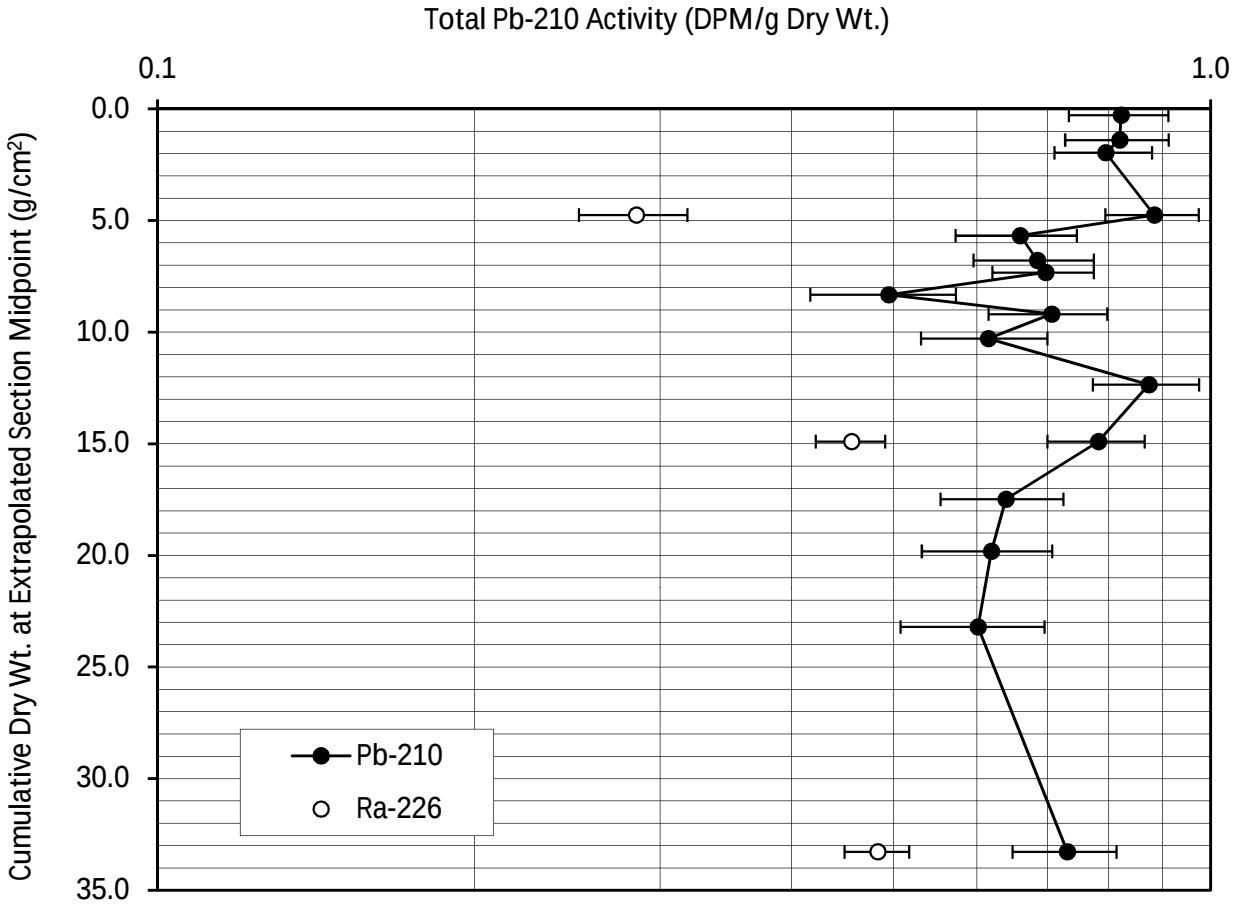
Note: Results relate only to the items tested.

Total Pb-210 Activity vs. Accumulated Sediment

SE-12



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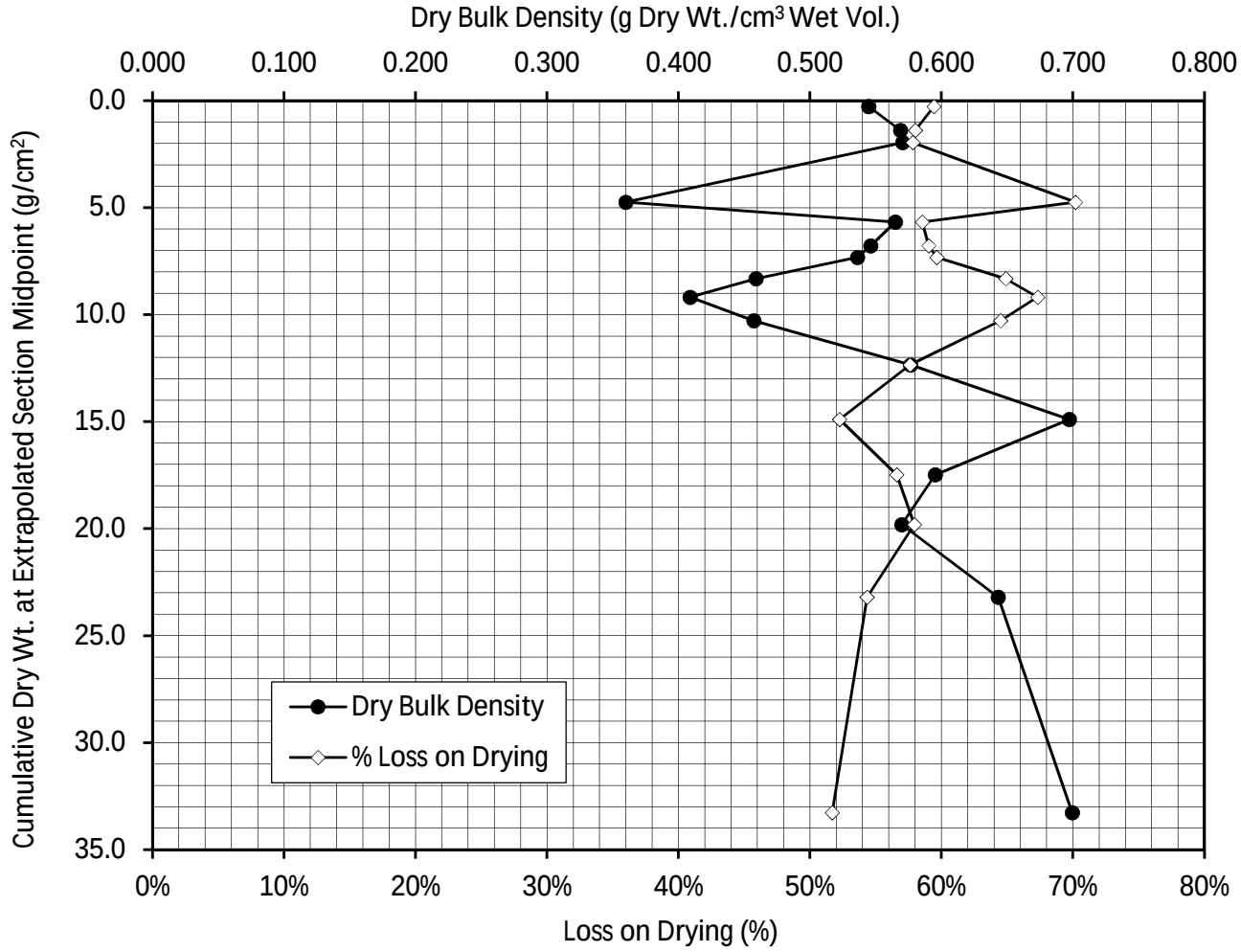
Dry Bulk Density and % Loss on Drying vs. Accumulated Sediment

SE-12



Results of Ra-226 Analysis by Rn-222 Emanation

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Transaction ID: 918
PO/Contract No.: Contract signed Oct 24-19
Analysis Dates: November 23 - December 29, 2019
Analysts: L. Hesketh-Jost; X. Hu
Salt Correction Applied? No

Analytical Method: N40110 Determination of Radium-226 in Sediment, Soil and Peat by Radon-222 Emanation (Version 3)

Comments:

Detection Limit: The method detection limit (MDL) is dependent on the amount of sample analyzed. For a 60,000 second counting time the MDL at 95% confidence for 2 g of dry sample is 0.1 DPM/g and for 0.5 g of dry sample is 0.5 DPM/g.

Estimated Uncertainty: The estimate of uncertainty of measurement for this method in this laboratory is approximately ±12% at 95% confidence level (approximately 40,000 counts in 60,000 seconds).

Results authorized by Dr. Robert J. Flett, Chief Scientist

Core ID	Sample ID	Ra-226 Activity (DPM/g Dry Wt.)	Combined Error: 1 SD (DPM/g Dry Wt.)	Comments Code for Ra-226 Analysis
SE-12	SE-12-0.295-0.328	0.28	0.03	
SE-12	SE-12-0.919-0.984	0.46	0.03	
SE-12	SE-12-1.804-1.969	0.48	0.03	

Q:\Clients M-Z\Paulik, Blair - Maul Foster & Alongi Inc\2019(918)\Radioisotopes\SE-12\Pb-210, Ra-226 and Cs-137 Paulik SE-12 Jan 16-20 Final.xlsm
Duplicate: Two subsamples of the same sample were carried through the analytical procedure in an identical manner.
Re-count: The sample bottle was re-sealed after the initial analysis, and was re-counted after 11 or more days of Rn-222 ingrowth. Repeat counting was chosen over duplicate analysis due to insufficient sample material provided.

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Note: Results relate only to the items tested.

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Radium Analysis by Rn-222 Emanation

Core ID	SE-12
Sample ID	SE-12-0.295-0.328
Lucas Cell No.	3
Number of days since Rn board last run	1
Dry weight of sample counted (g)	1.016
Total count in period	1459
Total count in period (carryover corrected)	1444
Cell Blank count (CPM)	0.516
System Blank (DPM)	0.398
System Efficiency	0.837
Count duration (minutes)	1000

Typical carryover is about 1 - 2 % of the net counts (gross counts less system background) of the sample counted on the previous day. The carryover is subtracted from the gross counts of current sample. This correction is not required if the sample is run after a blank.

Carryover correction?	Yes		
Gross counts of previous sample	2652	Mean of last 10 carryover measurements	0.84%
Counts carried over from previous sample	15	Mean of last 6 system background measurements	837

	Year	Month	Day	Hour	Minute	Second	Ingrowth time (Days)	Ingrowth factor	Decay correction
When sample last stripped	2019	11	27	12	8	0	14.05	0.92166	0.92490
When cell filled	2019	12	11	13	24	41			
Beginning time of count	2019	12	11	15	25	4			

Counts per minute	1.44				
Gross CPM less Cell Blank (CPM)	0.93				
CPM (decay during count corrected)	1.00				
DPM Sample +System (efficiency corrected)	1.20				
DPM sample	0.87	Error ± 1 SD	0.1026	DPM	
DPM/g	0.85				
Ra-226 DPM/g	0.28	Error ± 1 SD	0.0336	DPM/g	Error % = 11.8
Ra-226 pCi/g	0.13				

Chemist	XH
PMT High Voltage +ve	770
HV Power supply	Spectrum Technologies
Alpha Counter	Spectrum Technologies
Region of Interest Ch.#s	28-1022
PMT	6655A - #1
Preamp	Canberra 2007P tube base
Amp Gain	1

Radium Analysis by Rn-222 Emanation

Core ID	SE-12
Sample ID	SE-12-0.919-0.984
Lucas Cell No.	3
Number of days since Rn board last run	1
Dry weight of sample counted (g)	1.015
Total count in period	1809
Total count in period (carryover corrected)	1798
Cell Blank count (CPM)	0.516
System Blank (DPM)	0.398
System Efficiency	0.837
Count duration (minutes)	1000

Typical carryover is about 1 - 2 % of the net counts (gross counts less system background) of the sample counted on the previous day. The carryover is subtracted from the gross counts of current sample. This correction is not required if the sample is run after a blank.

Carryover correction?	Yes		
Gross counts of previous sample	2178	Mean of last 10 carryover measurements	0.84%
Counts carried over from previous sample	11	Mean of last 6 system background measurements	837

	Year	Month	Day	Hour	Minute	Second	Ingrowth time (Days)	Ingrowth factor	Decay correction
When sample last stripped	2019	12	14	16	30	0	13.01	0.90543	0.92494
When cell filled	2019	12	27	16	51	0			
Beginning time of count	2019	12	27	18	51	0			

Counts per minute	1.80			
Gross CPM less Cell Blank (CPM)	1.28			
CPM (decay during count corrected)	1.39			
DPM Sample +System (efficiency corrected)	1.66			
DPM sample	1.39	Error ± 1 SD	0.1052	DPM
DPM/g	1.37			
Ra-226 DPM/g	0.46	Error ± 1 SD	0.0345	DPM/g
Ra-226 pCi/g	0.21			

Error % = 7.6

Chemist	RF
PMT High Voltage +ve	770
HV Power supply	Spectrum Technologies
Alpha Counter	Spectrum Technologies
Region of Interest Ch.#s	28-1022
PMT	6655A - #1
Preamp	Canberra 2007P tube base
Amp Gain	1

Radium Analysis by Rn-222 Emanation

Core ID	SE-12
Sample ID	SE-12-1.804-1.969
Lucas Cell No.	3
Number of days since Rn board last run	1
Dry weight of sample counted (g)	1.034
Total count in period	1863
Total count in period (carryover corrected)	1855
Cell Blank count (CPM)	0.516
System Blank (DPM)	0.398
System Efficiency	0.837
Count duration (minutes)	1000

Typical carryover is about 1 - 2 % of the net counts (gross counts less system background) of the sample counted on the previous day. The carryover is subtracted from the gross counts of current sample. This correction is not required if the sample is run after a blank.

Carryover correction?	Yes		
Gross counts of previous sample	1809	Mean of last 10 carryover measurements	0.84%
Counts carried over from previous sample	8	Mean of last 6 system background measurements	837

	Year	Month	Day	Hour	Minute	Second	Ingrowth time (Days)	Ingrowth factor	Decay correction
When sample last stripped	2019	12	16	15	6	0	12.11	0.88854	0.92494
When cell filled	2019	12	28	17	41	0			
Beginning time of count	2019	12	28	19	41	0			

Counts per minute	1.85			
Gross CPM less Cell Blank (CPM)	1.34			
CPM (decay during count corrected)	1.45			
DPM Sample +System (efficiency corrected)	1.73			
DPM sample	1.50	Error ± 1 SD	0.1059	DPM
DPM/g	1.45			
Ra-226 DPM/g	0.48	Error ± 1 SD	0.0341	DPM/g
Ra-226 pCi/g	0.22			

Error % = 7.1

Chemist	RF
PMT High Voltage +ve	770
HV Power supply	Spectrum Technologies
Alpha Counter	Spectrum Technologies
Region of Interest Ch.#s	28-1022
PMT	6655A - #1
Preamp	Canberra 2007P tube base
Amp Gain	1

Results of Cs-137 Analysis

Flett Research Ltd.

440 DeSalaberry Ave. Winnipeg, MB R2L 0Y7

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Client: Paulik, Blair

Address: 2001 NW 19th Avenue, Suite 200, Portland, OR 97209

Core ID: SE-12
Date Received: 10-Oct-19
Sampling Date: 25-Sep-19
Date Issued: 17-Jan-20

Transaction ID: 918
PO/Contract No.: Contract signed Oct 24-19
Analysis Dates: December 11, 2019 - January 15, 2020
Analysts: X. Hu

Salt Correction? No

Analytical Method: N30120 Measurement of Gamma-Ray Emitting Radionuclides in Sediment/Soil Samples by Gamma Spectrometry Using HPGe Detectors (Version 2)

Deviation from Method:

Comments:

Detection Limit: The method detection limit (MDL) is 0.3 DPM/g for an 80,000 seconds counting period when measuring a 9 g of dry sample at a 95% confidence level. The method detection limit can be decreased to 0.1 DPM/g if 32 g of sample is used.

Estimated Uncertainty: The estimated uncertainty of this method has been determined to be ± 10% at 95% confidence for samples with activities between 0.5 and 20 DPM/g, counting time 80,000 seconds and sample weights ranging from 9 to 32 grams. Method uncertainty can increase to 85% for samples with activities near detection limit (0.1 - 0.3 DPM/g).

Results authorized by Dr. Robert J. Flett, Chief Scientist

Sample ID	Upper Depth (cm)	Lower Depth (cm)	Day Sample Counted	Month Sample Counted	Year Sample Counted	Integral NET Cs-137 Peak	Counting Error 1 SD (Counts)	Count Time (seconds)	Dry Sample Weight (g)	Sample Thickness (mm)	CPM/g	Efficiency for Gammas Fractional	Gammas per min. per gram	Activity DPM/g (dry wt.) on Counting Date	Approx. Error DPM/g	Activity DPM/g (dry wt.) on Sampling Date	Approx. Error DPM/g	Activity pCi/g (dry wt.) on Sampling Date	Approx. Error pCi/g	Activity mBq/g (dry wt.) on Sampling Date	Approx. Error mBq/g	Detector Used	Comments Code for Cs-137 Analysis
SE-12-0.000-0.033	**0**	**1**	**11**	**12**	**2019**	**221**	**39**	**80000**	**13.087**	**3.60**	**0.0127**	**0.0261**	**0.4854**	**0.57**	**0.10**	**0.57**	**0.10**	**0.26**	**0.05**	**9.54**	**1.68**	**GEM**	
SE-12-0.066-0.099	2	3	12	12	2019	264	42	80000	18.558	5.03	0.0107	0.0275	0.3880	0.46	0.07	0.46	0.07	0.21	0.03	7.63	1.21	GMX	
SE-12-0.131-0.164	4	5	12	12	2019	254	43	80000	24.148	6.60	0.0079	0.0236	0.3348	0.39	0.07	0.39	0.07	0.18	0.03	6.58	1.11	GEM	
SE-12-0.197-0.230	6	7	12	12	2019	327	40	80000	17.042	5.53	0.0144	0.0394	0.3652	0.43	0.05	0.43	0.05	0.19	0.02	7.18	0.87	Canberra	
SE-12-0.295-0.328	9	10	7	1	2020	89	35	80000	5.351	1.80	0.0125	0.0443	0.2816	0.33	0.13	0.33	0.13	0.15	0.06	5.55	2.18	Canberra	
SE-12-0.427-0.459	13	14	7	1	2020	200	36	80000	15.259	4.53	0.0098	0.0253	0.3888	0.46	0.08	0.46	0.08	0.21	0.04	7.66	1.38	GEM	
SE-12-0.591-0.623	18	19	7	1	2020	201	42	80000	10.939	3.80	0.0138	0.0284	0.4850	0.57	0.12	0.57	0.12	0.26	0.05	9.55	2.00	GMX	
SE-12-0.787-0.853	24	26	8	1	2020	151	35	80000	15.424	4.53	0.0073	0.0253	0.2904	0.34	0.08	0.34	0.08	0.15	0.04	5.72	1.33	GEM	
SE-12-1.050-1.115	32	34						80000						0.54	0.10	0.54	0.10	0.24	0.05	8.99	1.74		
SE-12-1.312-1.476	40	45	8	1	2020	280	45	80000	15.504	4.63	0.0135	0.0278	0.4873	0.57	0.09	0.58	0.09	0.26	0.04	9.60	1.54	GMX	
SE-12-1.804-1.969	55	60	14	1	2020	391	44	80000	13.990	3.93	0.0210	0.0283	0.7401	0.87	0.10	0.87	0.10	0.39	0.04	14.58	1.64	GMX	
Duplicates																							
SE-12-1.050-1.115	32	34	9	1	2020	228	36	80000	14.154	4.10	0.0121	0.0257	0.4710	0.55	0.09	0.56	0.09	0.25	0.04	9.28	1.46	GEM	
SE-12-1.050-1.115 Duplicate	32	34	9	1	2020	185	43	80000	10.931	3.38	0.0127	0.0287	0.4418	0.52	0.12	0.52	0.12	0.24	0.05	8.70	2.02	GMX	
Cs-137 Standards																							
GMX 32g 10 mm			11	10	2019	19725	142	5000	32.00	10.0	7.3969	0.0237	311.9975	366.19	2.64	957.04							
GMX 24g 7.5mm			10	10	2019	15972	128	5000	24.00	7.5	7.9860	0.0256	312.0171	366.22	2.93	957.04							
GMX 15g 5mm			10	10	2019	10817	105	5000	15.00	5.0	8.6536	0.0277	312.0171	366.22	3.55	957.04							
GMX 9g 3mm			10	10	2019	6727	83	5000	9.00	3.0	8.9693	0.0287	312.0171	366.22	4.52	957.04							
GMX 2.85g 0.8mm			11	10	2019	2281	49	5000	2.854	0.8	9.5907	0.0307	311.9975	366.19	7.87	957.04							
GEM 32g 10 mm			10	10	2019	17437	135	5000	32.00	10.0	6.5389	0.0210	312.0171	366.22	2.84	957.04							
GEM 24g 7.5mm			10	10	2019	14334	123	5000	24.00	7.5	7.1670	0.0230	312.0171	366.22	3.14	957.04							
GEM 15g 5mm			10	10	2019	9742	102	5000	15.00	5.0	7.7936	0.0250	312.0171	366.22	3.83	957.04							
GEM 9g 3mm			15	10	2019	6168	81	5000	9.00	3.0	8.2240	0.0264	311.9187	366.10	4.81	957.04							
GEM 2.85g 0.8mm			11	10	2019	2138	48	5000	2.854	0.8	8.9895	0.0288	311.9975	366.19	8.22	957.04							
Canberra 32g 10 mm			11	10	2019	28805	173	5000	32.00	10.0	10.8019	0.0346	311.9975	366.19	2.20	957.04							

Canberra 24g 7.5mm			11	10	2019	22852	153	5000	24.00	7.5	11.4260	0.0366	311.9975	366.19	2.45	957.04							
Canberra 15g 5mm			10	10	2019	15782	128	5000	15.00	5.0	12.6256	0.0405	312.0171	366.22	2.97	957.04							
Canberra 9g 3mm			10	10	2019	9971	102	5000	9.00	3.0	13.2947	0.0426	312.0171	366.22	3.74	957.04							
Canberra 2.85g 0.8mm			10	10	2019	3388	60	5000	2.854	0.8	14.2453	0.0457	312.0171	366.22	6.45	957.04							

Duplicate: Two subsamples of the same sample were carried through the analytical procedure in an identical manner.

Re-count: The entire available dry sample material was used for making the sample pancake, and then this sample pancake was counted twice on a HPGe detector. Repeat counting was chosen over duplicate analysis due to insufficient sample material provided.

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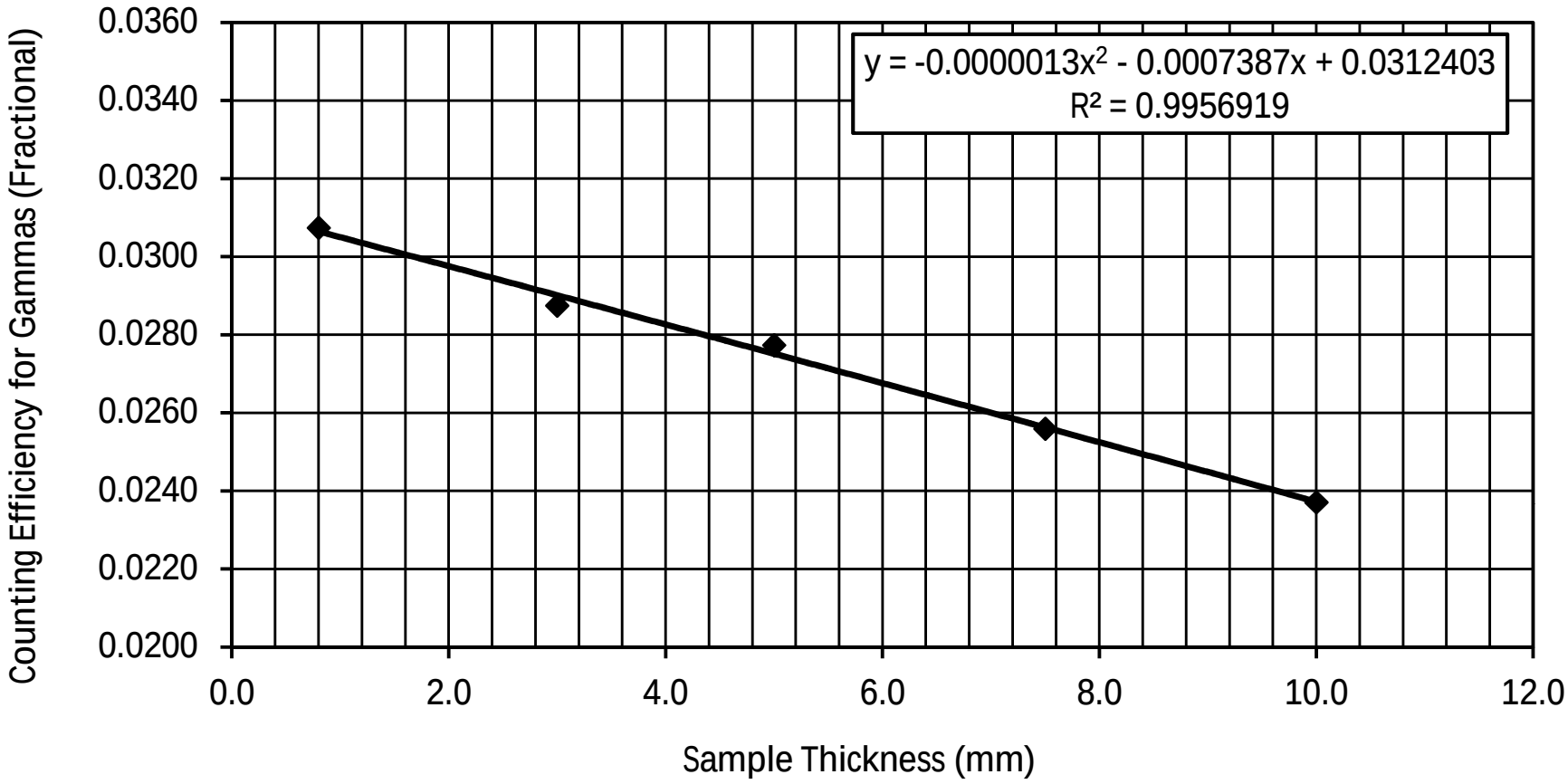
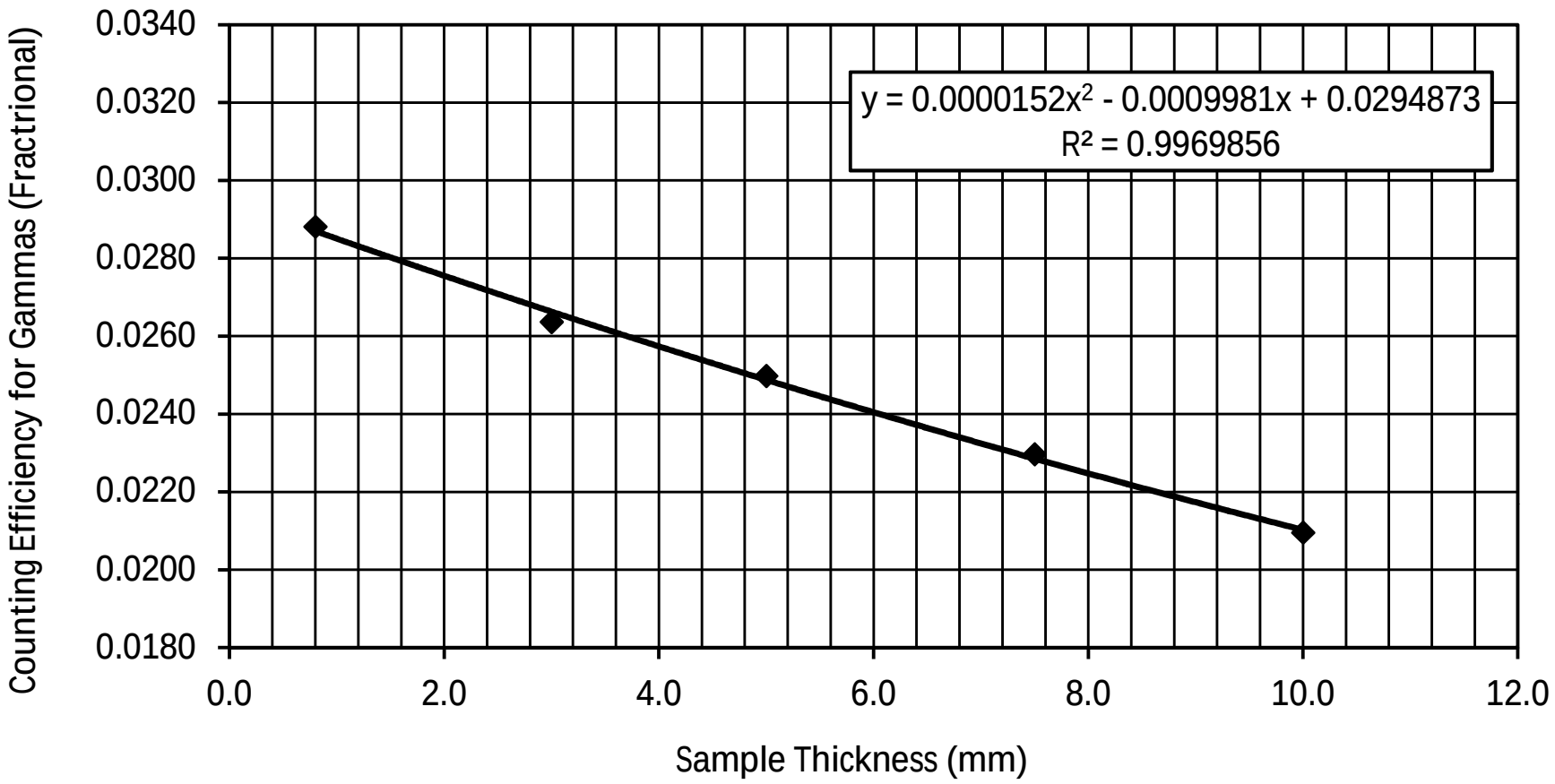
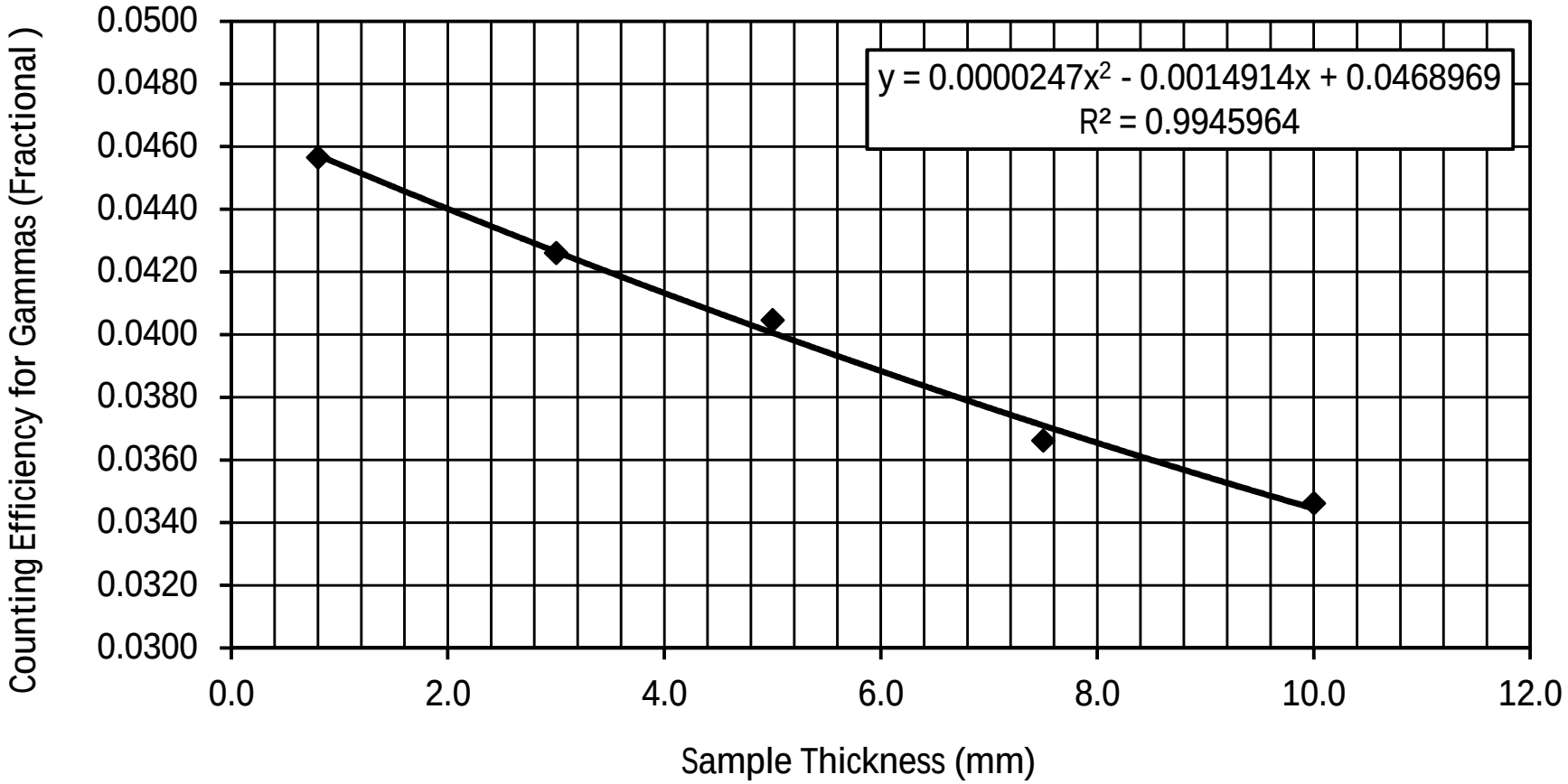
Note: Results relate only to the items tested.

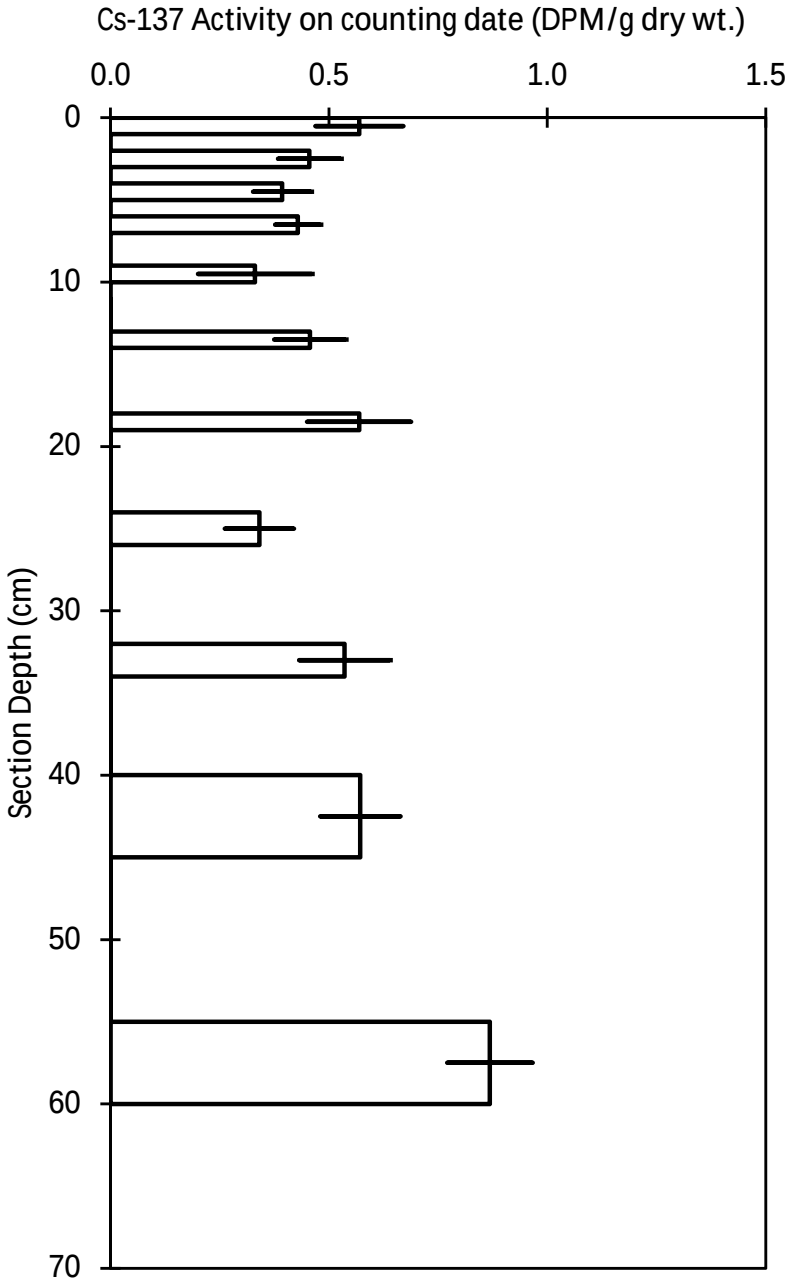

Cs-137 Counting Efficiency of Gammas vs. Sample Thickness (mm) GMX 25% Detector (Oct 10-11, 2019)
y = -0.0000013x² - 0.0007387x + 0.0312403
R² = 0.9956919
Counting Efficiency for Gammas (Fractional)
0.0360
0.0340
0.0320
0.0300
0.0280
0.0260
0.0240
0.0220
0.0200
0.0
2.0
4.0
6.0
8.0
10.0
12.0
Sample Thickness (mm)


Cs-137 Counting Efficiency of Gammas vs. Sample Thickness (mm) GEM 19% Detector (Oct 10-15, 2019)
y = 0.0000152x² - 0.0009981x + 0.0294873
R² = 0.9969856
Counting Efficiency for Gammas (Fractrional)
0.0340
0.0320
0.0300
0.0280
0.0260
0.0240
0.0220
0.0200
0.0180
0.0
2.0
4.0
6.0
8.0
10.0
12.0
Sample Thickness (mm)


Cs-137 Counting Efficiency of Gammas vs. Sample Thickness (mm)
Canberra 29% Detector (Oct 10-11, 2019)
y = 0.0000247x2 - 0.0014914x + 0.0468969
R² = 0.9945964
Counting Efficiency for Gammas (Fractional)
0.0500
0.0480
0.0460
0.0440
0.0420
0.0400
0.0380
0.0360
0.0340
0.0320
0.0300
0.0
2.0
4.0
6.0
8.0
10.0
12.0
Sample Thickness (mm)

Cs-137 in Sediments

SE-12



Note: The bar plotted at the midpoint depth of each section represents +/- 1 standard deviation of the Cs-137 counting error.

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EcoAnalysts, Inc.

BIOASSAY TESTING RESULTS

SEDIMENT QUALITY ANALYSIS: SEAPORT LANDING SITE ABERDEEN, WASHINGTON

Prepared for
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Prepared by
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EcoAnalysts Report ID:
PG112719.01

Submittal Date
December 26, 2019; Revised January 8, 2020

All testing reported herein was performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and EcoAnalysts is not responsible for use of less than the complete report. The test results summarized in this report apply only to the sample(s) evaluated.

APPROVED BY:

Brian Hester

_____

Brian Hester

Laboratory Director

Author:

Michelle Knowlen

CONTENTS

1. INTRODUCTION 1

2. METHODS 1
2.1 Sample Collection 1
2.2 Sample Grain Size and Reference Comparison 1
2.3 Bulk Sample Porewater Ammonia and Water Quality Measurements 2
2.4 10-day Amphipod Bioassay 3
2.5 20-day Juvenile Polychaete Bioassay 4
2.6 Larval Developmental Bioassay 5
2.7 Data Analysis and QA/QC 6

3. RESULTS 7
3.1 10-day Amphipod Bioassay 7
3.2 20-day Juvenile Polychaete Bioassay 13
3.2.1 Re-Test of Samples SE-15 and SE-20 13
3.3 Larval Development Bioassay 23

4. DISCUSSION 28
4.1 Amphipod Test Suitability Determination 28
4.2 Juvenile Polychaete Test Suitability Determination 29
4.3 Larval Test Suitability Determination 30

5. SUMMARY 31

6. REFERENCES 32

TABLES

Table 2-1. Sample and Reference Grain Size Comparison 2
Table 2-2. Reference Station Coordinates 2
Table 3-1. Test Results for *Eohaustorius estuarius* 8
Table 3-2. Water Quality Summary for *Eohaustorius estuarius* 9
Table 3-3. Ammonia Summary for *Eohaustorius estuarius* 10
Table 3-4. Sulfide Summary for *Eohaustorius estuarius* 11
Table 3-5.Test Condition Summary for *Eohaustorius estuarius* 12
Table 3-6. Test Results for *Neanthes arenaceodentata* 15
Table 3-7. Test Results for *Neanthes arenaceodentata*: Re-Test of Samples SE-15 and SE-20 17
Table 3-8. Water Quality Summary for *Neanthes arenaceodentata* 18
Table 3-9. Water Quality Summary for *Neanthes arenaceodentata*: Re-Test of Samples SE-15 and SE-20 18
Table 3-10. Ammonia Summary for *Neanthes arenaceodentata* 19
Table 3-11. Ammonia Summary for *Neanthes arenaceodentata*: Re-Test of Samples SE-15 and SE-20 19
Table 3-12. Sulfide Summary for *Neanthes arenaceodentata* 20
Table 3-13. Sulfide Summary for *Neanthes arenaceodentata*: Re-Test of Samples SE-15 and SE-20 20
Table 3-14. Test Condition Summary for *Neanthes arenaceodentata* 21
Table 3-15. Test Condition Summary for *Neanthes arenaceodentata*: (Re-Test of Samples SE-15 and SE-20) 22
Table 3-16. Test Results for *Mytilus galloprovincialis* 24
Table 3-17. Water Quality Summary for *Mytilus galloprovincialis* 25
Table 3-18. Ammonia and Sulfide Summary for *Mytilus galloprovincialis* 26
Table 3-19. Test Condition Summary for *Mytilus galloprovincialis* 27
Table 4-1. SMS Comparison for *Eohaustorius estuarius* 28
Table 4-2. SMS Comparison for *Neanthes arenaceodentata* 29
Table 4-3. SMS Comparison for *Neanthes arenaceodentata*: Samples SE-15 and SE-20 29
Table 4-4. SMS Comparison for *Mytilus galloprovincialis* 30
Table 5-1. Summary of SMS Evaluation 31

APPENDICES

Appendix A: Test Data, Statistical Comparisons, and Reference-Toxicant Test Results

Appendix B: Chain of Custody Forms, Logs, and Pre-Test Documents

ACRONYMS AND ABBREVIATIONS

AFDW:	Ash-free dry weight
cm:	Centimeter
CSL:	Cleanup Screening Level
°C:	Degrees Celsius
EC_{50}:	Effective Concentration that results in a 50% reduction in a sub-lethal endpoint
g:	Grams
LC_{50}:	Lethal Concentration that results in a 50% reduction in survival
L:	Liter
µm:	Micrometer
MFA:	Maul Foster & Alongi, Inc
mg:	Milligram
mg/L:	Milligrams per liter
mL:	Milliliter
mm:	Millimeter
NOEC:	No Observed Effect Concentration
OR:	Oregon
ppt:	parts per thousand
PSEP:	Puget Sound Estuary Protocols (PSEP 1995)
SCO:	Sediment Cleanup Objective
SCUM II:	Sediment Cleanup User's Manual II
SMS:	Sediment Management Standards
SOP:	Standard operation procedure
SMARM:	Sediment Management Annual Review Meeting
UIA:	Un-ionized ammonia
USACE:	United States Army Corps of Engineers
USEPA:	United States Environmental Protection Agency
WA:	Washington State
WAC:	Washington Administrative Code
WDOE:	Washington (State) Department of Ecology

1. INTRODUCTION

EcoAnalysts conducted biological toxicity testing with sediment samples collected by Maul Foster & Alongi, Inc (MFA) as part of the remedial investigation at the in-water portion of the Weyerhaeuser Sawmill Aberdeen/Seaport Landing site located in Aberdeen, WA. Sediments were evaluated for biological effects following guidance provided by the Washington State Department of Ecology (WDOE) Sediment Management Standards (SMS) under the Washington Administrative Code (WAC) 173-204-315. This report presents the results of the bioassay testing portion of the sediment investigation.

2. METHODS

This section summarizes the test methods followed for this biological characterization. Test methods followed guidance provided by the Puget Sound Estuary Program (PSEP 1995), the Sediment Cleanup User's Manual (SCUM; WDOE 2019), and the various updates presented during the Sediment Management Annual Review Meeting (SMARM). Sediment toxicity was evaluated using three standard PSEP bioassays; the 10-day amphipod test, the 20-day juvenile polychaete survival and growth test, and the benthic larval development test. Under SCUM guidance, this suite of tests was chosen to best represent the range of species and sensitive life stages that best comprise a benthic community. Together these bioassays are considered to be protective of benthic community organisms and, to a certain extent, other receptor groups that may interact with sediment-borne contaminants (WDOE 2019).

2.1 Sample Collection

Eight test sediments were collected via pneumatic power grab by MFA personnel on September 25 and 27, 2019 and were received at EcoAnalysts on September 28, 2019. Reference sediments from Carr Inlet, WA (CARR 14, 47, and 68) were collected by EcoAnalysts on October 11, 2019 and received on the same day. Sediment samples were stored in a walk-in cold room at 4 ± 2°C in the dark. The test sediment was not sieved prior to testing, with the exception of SE-15 and SE-20 for a re-test of the 20-day juvenile polychaete growth test (see section 2.5 for more details). Reference sediments were press-sieved to 2mm to remove the presence of native macrofauna that may have interfered with the testing process. Tests were conducted within the eight-week holding time with the exception of the 20-day polychaete growth re-test of samples SE-15 and SE-20, when SE-20 surpassed the expiration by one day. This test was initiated as per client approval.

Native *Eohaustorius estuarius* sediment from Yaquina Bay, Oregon was provided by Northwest Amphipod for use as control sediment treatments for the amphipod and juvenile polychaete tests.

2.2 Sample Grain Size and Reference Comparison

Sediment grain size is one of the characteristics used in selecting the appropriate reference sediment(s) to compare the chemical and biological responses of project sediments. The percent fines value is defined as the amount of sediment that passes through a 62.5-µm sieve, expressed as a percentage of the total sample analyzed. This is also the sum of the silt and clay fraction of sediment. Wet-sieve grain size results for the reference sample was conducted in the field (at the time of collection) and after receipt at the EcoAnalysts laboratory. The percent-fines determination of the project sediments is summarized in Table 2-1.

Table 2-1. Sample and Reference Grain Size Comparison

Treatment	Compared To	Percent Fines[1]
CARR 14		14
CARR 47		47
CARR 68		68
SE-15	CARR 47	38
SE-16	CARR 47	54
SE-17	CARR 68	78
SE-18	CARR 68	62
SE-20	CARR 68	60
SE-24	CARR 47	32
SE-26	CARR 14	0
SE-31	CARR 47	38

[1] Wet sieve results

For the purposes of evaluating the sediment under the sediment management standards, the project samples were compared to one of three Carr Inlet reference samples that most closely resembled the sample percent fines: CARR 14, CARR 47, or CARR 68. These samples were labelled as "CR21-West (14)", "Carr20 (47)", and CR02-South (68)" on all datasheets for clarity purposes.

Station coordinates for the reference samples are summarize in Table 2-2.

Table 2-2. Reference Station Coordinates

Station	Sample	Latitude	Longitude
CR21-West	CARR 14	47.33109	-122.67967
Carr20	CARR 47	47.33295	-122.66986
CR02-South	CARR 68	47.33429	-122.66425

2.3 Bulk Sample Porewater Ammonia, Sulfides, and Water Quality Measurements

Bulk sediment porewater ammonia and sulfides concentrations as well as interstitial salinity and pH were measured to determine whether any methods modifications or supplemental testing would be required (Table 2-3). Bulk sediments are homogenized test samples that have not been further processed for bioassay testing. Total ammonia measurements include both the amount of unionized ammonia (NH_3) and the ammonium ion (NH_4^+), while unionized ammonia concentrations are derived from total ammonia measurements. While most of the total ammonia encountered in a marine environment is in the ionized NH_4^+ form, it is unionized ammonia that usually causes greater toxicity (Greenstein et al. 1996). Both forms are presented to inform testing modification decisions, if needed. Ammonia and sulfide values were below what would be expected to cause toxicity upon preparation of the sediment for testing. No method modifications and/or supplemental testing were thus performed.

Table 2-3: Bulk Sediment Porewater Measurements

Sample	Matrix: Bulk Porewater					
	Total Ammonia (mg/L)	Unionized Ammonia (mg/L)	Salinity (ppt)	pH	Total Sulfides (mg/L Total)	Hydrogen Sulfide (mg/L)
SE-15	1.52	0.010	14	7.4	0.001	0.000
SE-16	2.98	0.019	16	7.4	0.027	0.006
SE-17	2.44	0.009	20	7.2	0.002	0.001
SE-18	4.07	0.025	21	7.4	0.375	0.085
SE-20	1.40	0.014	15	7.6	0.002	0.000
SE-24	1.61	0.002	15	6.7	ND	ND
SE-26	1.56	0.002	17	6.8	ND	ND
SE-31	2.66	0.016	20	7.4	ND	ND

2.4 10-day Amphipod Bioassay

The 10-day amphipod acute toxicity test was conducted with *Eohaustorius estuarius*. Test organisms were supplied by Northwest Amphipod in Newport, OR and held in native sediment at 15 ± 2°C prior to test initiation. Native sediment from Yaquina Bay, OR was provided by the organism supplier for use as the control treatment sediment in the test. This matrix has been used successfully in prior tests with this species and is known to support positive organism health and survival.

The amphipod bioassay was conducted as a 10-day static exposures with five replicates for each test treatment, reference treatment, and control. Two centimeters of sediment (approximately 175 mL) were placed into each 1-L glass chamber with 775 mL of overlying water. Trickle-flow aeration was provided through glass pipettes, and care was taken to avoid disturbing the sediment surface. Test chambers were placed into randomly assigned positions and allowed to equilibrate to test conditions overnight.

Prior to the test initiation, water quality measurements were taken in all replicates for each test treatment and included dissolved oxygen, temperature, salinity, and pH. Ammonia and sulfide concentrations were measured in both interstitial (porewater) and overlying water at initiation and termination. These measurements were made from a sacrificial surrogate chamber for each test treatment. Sediment porewater was extracted via centrifugation. During the test, water quality was monitored daily in one surrogate replicate per treatment. All water quality instruments were calibrated daily or on their recommended schedule. Records of instrument calibration were retained in the laboratory logs.

To initiate the test, organisms were randomly allocated to each of the test chambers. Initial stocking densities were 20 organisms per test chamber. Amphipods that did not bury within approximately one hour were replaced with healthy amphipods. No food was provided during the 10-day exposure for the amphipod test.

At test termination, sediment from each test chamber was sieved through a 0.5-mm screen to recover all organisms. The number of surviving and dead amphipods was then enumerated.

2.5 20-day Juvenile Polychaete Bioassay

The 20-day polychaete survival and growth test was conducted with juvenile polychaete worms (*Neanthes arenaceodentata*). Test organisms were obtained from Aquatic Toxicology Support in Bremerton, WA and held in seawater at 20°C (Neanthes were cultured in water-only and were not held in sediment prior to testing). Native sediment of the amphipod *Eohaustorius estuarius* from Yaquina Bay, OR was provided by Northwestern Aquatic Sciences for use as the control treatment sediment for the test. This coarse sand control sediment has been routinely tested in conjunction with this species at this laboratory and results from historical testing have demonstrated acceptable organism health and sediment quality.

The polychaete bioassay was conducted as a 20-day static-renewal test, with overlying exchanges of 300 mL of water occurring every third day. Each test treatment, reference treatment, and control consisted of five replicates of 1-L glass chambers, which were filled with two centimeters of sediment (approximately 175 mL) and 775 mL of overlying water. Trickle-flow aeration was provided through glass pipettes, and care was taken to avoid disturbing the sediment surface. Test chambers were then randomly assigned positions and allowed to equilibrate to test conditions overnight.

Prior to the test initiation, water quality measurements were taken in a surrogate chamber for each test treatment and included dissolved oxygen, temperature, salinity, and pH. Ammonia and sulfide concentrations were measured in both interstitial (porewater) and overlying water at initiation and termination. These measurements were made from a sacrificial surrogate chamber for each test treatment. Sediment porewater was extracted via centrifugation. During the test, water quality was monitored daily in one surrogate replicate per treatment. All water quality instruments were calibrated daily or on their recommended schedule. Records of instrument calibration were retained in the laboratory logs.

To initiate the test, organisms were randomly allocated to each of the test chambers. Initial stocking densities were five worms per test chamber. During the test, organisms were fed a diet of 40-mg of TetraMarin® slurry every other day (approximately 8-mg dry weight per worm). Pre-test initial biomass was determined by taking dry weight and ash-free dry weight (AFDW) measurements of three replicates of five worms each on Day 0.

At test termination, sediment from each test chamber was sieved through a 0.5-mm screen. All worms were recovered, enumerated, rinsed in deionized water (to remove salt), and transferred to pre-weighed aluminum foil weigh boats. After drying in an oven at 60°C for approximately 24 hours, each weigh-boat was removed, cooled in a desiccator and weighed to obtain dry weight measurements. They were then heated to 550°C for 2 hours to determine the ashed weight. AFDW were calculated to correct for the influence on weight of sediment grain size differences in the guts of the worms between treatments:

$$\text{AFDW} = \text{Dry weight} - \text{Ashed weight}$$

Both dry weight and AFDW were used to determine individual worm weight and growth rates. The dry weight growth rate is calculated using the following equation:

$$G = (DWTt_2 - DWTt_1) \div (t_2 - t_1)$$

Where: $DWTt_2$ = individual dry weight of surviving adults at test termination

$DWTt_1$ = mean individual dry weight of organisms at test initiation

$t_2 - t_1$ = duration of test (e.g. days)

The ash-free dry weight (AFDW) growth rate is calculated using the following equations:

AFDW = (Final Dry Weight – Final Ashed Weight) ÷ #Survivors

$G = (AFDWt_2 – AFDWt_1) ÷ (t_2 – t_1)$

Where: $AFDWt_2$ = individual ash-free dry weight of surviving adults at test termination

$AFDWt_1$ = mean individual ash-free dry weight of organisms at test initiation

$t_2 – t_1$ = duration of test (e.g. days)

The juvenile polychaete test was run a second time with samples SE-15 and SE-20 due to presence of native polychaetes within the sediment samples that may have affected growth of the test organisms. Samples SE-15 and SE-20 were press-sieved through a 2mm screen to obliterate any native fauna. The high amount of woody debris within these two samples required that material remaining on the 2mm screen be reintroduced into the sieved sediment and retested alongside their representative reference samples. Both the un-sieved and sieved sample results are included in the report appendix. However, analyses are only conducted on the sieved, re-tested material. Throughout the testing, results were communicated to representatives from MFA and WDOE. Both parties agreed that a re-test was warranted.

2.6 Larval Developmental Bioassay

The bivalve larval development test was conducted with the mussel, *Mytilus galloprovincialis*. Adult organisms were obtained from Taylor Shellfish in Shelton, WA and were held under flowing natural seawater at 15°C ± 2°C prior to spawning induction. Adult mussels were fed during the holding period a marine algal suspension ad libitum. The control treatment consisted of clean seawater only without the addition of any sediment.

The larval development bioassay was conducted as a static exposure with five replicates for each test treatment, reference treatment, and control. Approximately 18 g (±1 g) of sediment was placed into each 1-L glass chamber with 900 mL of overlying water. Test chambers were then shaken for 10 seconds and placed into randomly assigned positions. The larval test was performed without aeration unless dissolved oxygen levels fell below threshold levels for action. If required, trickle-flow aeration was provided through glass pipettes, and care was taken to avoid disturbing the sediment surface.

Prior to the test initiation, water quality measurements were taken in the surrogate chamber for each test treatment and included dissolved oxygen, temperature, salinity, and pH. Ammonia and sulfide concentrations were measured in the overlying water at initiation and termination. These measurements were made from a sacrificial surrogate chamber for each test treatment. During the test, water quality was monitored daily in one surrogate replicate per treatment. All water quality instruments were calibrated daily or on their recommended schedule. Records of instrument calibration were retained in the laboratory logs.

To obtain gametes for testing, adult mussels to be spawned were placed in clean seawater at 16°C (culture temperature) for approximately 30 - 60 minutes in the presence of dense marine algal suspension. The mussels were then transferred to containers with culture water adjusted to 20 -23°C for the purpose of inducing the release of gametes. The animals were held at the shocking temperature and were monitored for spawning individuals. Spawning females and males were removed from the water bath and placed in individual containers with seawater. These individuals were allowed to spawn until sufficient gametes were available to initiate the test. After the spawning period, eggs were transferred to fresh seawater and filtered through a 0.5 mm Nitex® mesh screen to remove large debris, feces, and excess gonadal matter. A composite was made of the sperm and diluted with fresh seawater. The fertilization process was initiated by adding sperm to the isolated egg containers. Egg-sperm solutions were periodically homogenized with a perforated plunger during the fertilization process and sub-

samples observed under the microscope for egg and sperm viability. Approximately one to one and a half hours after fertilization, embryo solutions were checked for fertilization rate. Only those embryo stocks with >90% fertilization were used to initiate the tests. Embryo solutions were rinsed free of excess sperm and then combined to create one embryo stock solution. Density of the embryo stock solution was determined by counting the number of embryos in a subsample of homogenized stock solution. This was used to determine the volume of embryo stock solution to deliver approximately 27,000 embryos to each test chamber.

The protocol calls for test termination when 95% of the embryos in the control have reached the prodissoconch I stage (approximately 48-60 hours). Six hours prior to termination, the larvae within each chamber were resuspended in the overlying water with a perforated plunger. At termination, the overlying seawater was decanted into a clean 1-L jar and mixed with a perforated plunger. From this container, a 10 mL subsample was transferred to a scintillation vial and preserved in 10% buffered formalin. Larvae were subsequently stained with a dilute solution of Rose Bengal in 70% alcohol to help visualization of larvae. The number of normal and abnormal larvae was enumerated on an inverted microscope. Normal larvae included all D-shaped prodissoconch I stage larvae. Abnormal larvae included abnormally shaped prodissoconch I larvae and all early stage larvae.

2.7 Data Analysis and QA/QC

All water quality and endpoint data were entered into Excel spreadsheets. Water quality parameters were summarized by calculating the mean, minimum, and maximum values for each test treatment. Endpoint data were calculated for each replicate and the mean values and standard deviations were determined for each test treatment.

All hand-entered data was reviewed for data entry errors, which were corrected prior to summary calculations. A minimum of 10% of all calculations and data sorting were reviewed for errors. Review counts were conducted on any apparent outliers.

For Sediment Cleanup Objective (SCO) and Cleanup Screening Level (CSL) suitability determinations, comparisons were made according to the Sediment Cleanup User's Manual (SCUM; WDOE 2019) and Fox et al. (2007), using BioStat software. Data reported as percent mortality or survival were transformed using an arcsine square root transformation prior to statistical analysis. All data were tested for normality using the Shapiro-Wilk test and equality of variance using Levene's test. Determinations of statistical significance were based on one-tailed Student's t-tests with an alpha of 0.05. A comparison of the larval endpoint relative to the reference was made using an alpha level of 0.10. For samples failing to meet assumptions of normality, a Mann-Whitney test was conducted to determine significance. For those samples failing to meet the assumptions of normality and equality of variance, a t-test on rankits was used.

To evaluate the relative sensitivity of the organisms, reference toxicity tests were performed using standard reference toxicants (Lee 1980). A water-only reference-toxicant test was conducted concurrently with the sediment tests using ammonium chloride. The ammonium chloride reference-toxicant test was used to ensure animals used in the test were healthy and of similar sensitivity to prior tests. This test also provided information on the sensitivity to ammonia concentrations that would possibly be present in the sediments.

Statistical analyses of all dose-response tests were performed using CETIS Comprehensive Toxicity Data Analysis and Database Software version 1.9.4.3. Comparisons between the lab control and each test concentration were performed following recommended USEPA decision matrices (USEPA 2002).

3. RESULTS

The results of the sediment testing, including a summary of test results and water quality observations are presented in this section. All data, laboratory bench sheets, and statistical analyses are provided in Appendix A while chain of custody forms and pre-test documents are supplied in Appendix B.

3.1 10-day Amphipod Bioassay

The bioassay test with *E. estuarius* was validated with 2% mortality in the native sediment control, which met the performance criterion of ≤10% mortality for SMS evaluations. This result indicates that the test conditions were suitable for adequate amphipod survival. Mean mortality in the reference treatments was 1-4%, which met the performance criteria (≤25% mortality) and indicated that all three reference sediments were acceptable for suitability determination. All endpoint results are summarized in Table 3-1. Summaries of water quality measurements, ammonia and sulfide concentrations, and test conditions are presented in Table 3-2 through Table 3-5.

Mean mortality in the project samples ranged from 2 to 50%. During test termination, it was noted that multiple test samples contained native Nereid polychaetes within the test chambers that coincided with poor survival. Two of these samples (SE-15 and SE-20) had mortality within test chambers that ranged between 0 and 100%. Upon discovery, test results were immediately conveyed to the client and WDOE personnel. Collectively it was decided that due to the presence of predatory native fauna, chambers exhibiting 95-100% mortality should be dropped from statistical analyses.

Water quality parameters were within the acceptable limits throughout the duration of the test (Table 3-2) with the exception of salinity which fell below the recommended parameter of 28 ± 1 ppt. It was still within the test organism's acceptable range, however, and is not expected to have affected test results.

A reference-toxicant test (positive control) was performed on the batch of test organisms utilized for this study. The LC_{50} value was within ±2 standard deviations from the laboratory historical mean. This result indicates that the test organisms used in this study were of similar sensitivity to those previously tested at EcoAnalysts.

Ammonia concentrations observed in the *E. estuarius* test were below the No Observed Effect Concentration (NOEC) value derived from the concurrent ammonia reference-toxicant test (Table 3-3; compare to NOEC of 78 mg/L). Values were also below the published threshold concentration of 15 mg/L total ammonia (Barton 2002). Therefore, ammonia concentrations within the sediment samples should not have been a contributor to any adverse biological effects observed in the test treatments. Initial and final sulfide concentrations within the overlying water and porewater were below the trigger value of 1.9 mg/L total sulfides (Inouye 2015).

Table 3-1. Test Results for *Eohaustorius estuarius*

Treatment	Replicate	Number Initiated	Number Surviving	Number Missing or Dead	Percentage Mortality	Mean Percentage Mortality	SD
Control	1	20	20	0	0	2	2.7
	2	20	19	1	5		
	3	20	19	1	5		
	4	20	20	0	0		
	5	20	20	0	0		
CARR 14	1	20	19	1	5	1	2.2
	2	20	20	0	0		
	3	20	20	0	0		
	4	20	20	0	0		
	5	20	20	0	0		
CARR 47	1	20	20	0	0	3	4.5
	2	20	20	0	0		
	3	20	19	1	5		
	4	20	20	0	0		
	5	20	18	2	10		
CARR 68	1	20	20	0	0	4	4.2
	2	20	20	0	0		
	3	20	19	1	5		
	4	20	18	2	10		
	5	20	19	1	5		
SE-15	1	20	13	7	35	17[1]	16.1[1]
	2	20	18	2	10		
	3	20	0	20	100		
	4	20	0	20	100		
	5	20	19	1	5		
SE-16	1	20	17	3	15	4	6.5
	2	20	20	0	0		
	3	20	19	1	5		
	4	20	20	0	0		
	5	20	20	0	0		
SE-17	1	20	19	1	5	21	19.8
	2	20	18	2	10		
	3	20	19	1	5		
	4	20	12	8	40		
	5	20	11	9	45		
SE-18	1	20	20	0	0	4	2.2
	2	20	19	1	5		
	3	20	19	1	5		
	4	20	19	1	5		
	5	20	19	1	5		
SE-20	1	20	20	0	0	13[1]	12.6[1]
	2	20	15	5	25		
	3	20	1	19	95		
	4	20	0	20	100		
	5	20	17	3	15		

Treatment	Replicate	Number Initiated	Number Surviving	Number Missing or Dead	Percentage Mortality	Mean Percentage Mortality	SD
SE-24	1	20	17	3	15	15	23.2
	2	20	20	0	0		
	3	20	20	0	0		
	4	20	19	1	5		
	5	20	9	11	55		
SE-26	1	20	20	0	0	2	2.7
	2	20	20	0	0		
	3	20	19	1	5		
	4	20	20	0	0		
	5	20	19	1	5		
SE-31	1	20	20	0	0	7	8.4
	2	20	16	4	20		
	3	20	19	1	5		
	4	20	20	0	0		
	5	20	18	2	10		

[1] Replicates with 95-100% mortality not included in mean results due to presence of predatory native fauna

Table 3-2. Water Quality Summary for *Eohaustorius estuarius*

Treatment	Dissolved Oxygen (mg/L) ≥5.1 mg/L			Temperature (°C) 15 ± 1°C			Salinity (ppt) 28 ± 1 ppt			pH 7 - 9 units		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Control	8.0	7.0	8.6	14.9	14.7	15.2	28	28	28	8.0	7.8	8.1
CARR 14	8.3	8.0	8.5	14.8	14.6	15.4	28	28	29	8.1	8.0	8.2
CARR 47	8.3	8.0	8.5	14.9	14.6	15.6	28	27	29	8.0	7.1	8.2
CARR 68	8.3	8.0	8.6	14.8	14.7	15.1	28	28	29	8.0	8.0	8.1
SE-15	8.4	8.2	8.6	14.8	14.6	15.2	**26**	**26**	27	7.8	7.6	7.9
SE-16	8.4	8.1	8.6	14.7	14.5	15.1	**26**	**26**	27	7.9	7.8	7.9
SE-17	8.4	8.1	8.6	14.8	14.7	15.2	27	27	27	8.0	7.9	8.0
SE-18	8.3	8.0	8.5	14.9	14.7	15.3	27	**26**	27	7.9	7.8	7.9
SE-20	8.4	8.0	8.6	14.8	14.6	15.1	27	**26**	27	7.8	7.6	8.0
SE-24	8.4	8.2	8.6	14.8	14.5	15.1	27	**26**	27	7.6	7.4	7.8
SE-26	8.2	6.3	8.5	15.2	14.8	16.1	27	27	27	7.4	7.2	7.7
SE-31	8.3	7.8	8.6	14.9	14.7	15.4	27	27	28	7.8	7.7	7.9

BOLD = value outside of recommended range

Table 3-3. Ammonia Summary for *Eohaustorius estuarius*

Treatment	Overlying				Interstitial			
	Total Ammonia (mg/L Total) NOEC = 78 mg/L[1]		Unionized Ammonia (mg/L) NOEC = 1.403[2]		Total Ammonia (mg/L Total) NOEC = 78 mg/L[1]		Unionized Ammonia (mg/L) NOEC = 1.403[2]	
	Day 0	Day 10	Day 0	Day 10	Day 0	Day 10	Day 0	Day 10
Control	0.218	0.176	0.004	0.005	0.440	0.110	0.004	0.001
CARR 14	0.420	1.62	0.010	0.055	3.36	3.14	0.019	0.028
CARR 47	0.723	0.403	0.016	0.014	5.94	1.86	0.068	0.013
CARR 68	0.298	0.171	0.007	0.004	1.78	1.01	0.016	0.009
SE-15	0.272	0.0328	0.005	0.000	1.24	0.637	0.005	0.001
SE-16	0.375	0.000	0.007	0.000	2.47	0.304	0.023	0.001
SE-17	0.693	0.0151	0.016	0.000	2.71	0.329	0.013	0.001
SE-18	0.773	0.0920	0.014	0.002	1.82	0.531	0.005	0.002
SE-20	0.906	0.000	0.021	0.000	2.26	0.281	0.017	0.001
SE-24	0.535	1.23	0.008	0.007	1.72	1.73	0.001	0.002
SE-26	0.227	0.573	0.002	0.002	0.672	0.988	0.000	0.000
SE-31	0.412	0.000	0.007	0.000	1.31	0.359	0.005	0.001

[1]NOEC (concurrent reference-toxicant test derived) = 78 mg/L total ammonia

[2]NOEC (concurrent reference-toxicant test derived) = 1.403 mg/L unionized ammonia

Table 3-4. Sulfide Summary for *Eohaustorius estuarius*

Treatment	Overlying				Interstitial			
	Total Sulfides (mg/L Total) Trigger Value = 1.9 mg/L[1]		Hydrogen Sulfide (mg/L)		Total Sulfides (mg/L Total) Trigger Value = 1.9 mg/L[1]		Hydrogen Sulfide (mg/L)	
	Day 0	Day 10	Day 0	Day 10	Day 0	Day 10	Day 0	Day 10
Control	ND	ND	ND	ND	0.015	ND	0.003	ND
CARR 14	0.004	0.000	0.000	0.000	0.159	0.115	0.041	0.021
CARR 47	ND	ND	ND	ND	0.016	0.161	0.002	0.035
CARR 68	0.001	ND	0.000	ND	0.072	0.003	0.013	0.001
SE-15	0.005	ND	0.000	ND	ND	0.004	ND	0.002
SE-16	0.007	ND	0.001	ND	ND	0.007	ND	0.002
SE-17	0.000	ND	0.000	ND	0.008	ND	0.003	ND
SE-18	0.003	ND	0.000	ND	ND	ND	ND	ND
SE-20	0.004	0.016	0.000	0.003	ND	ND	ND	ND
SE-24	0.001	ND	0.000	ND	0.083	0.001	0.064	0.001
SE-26	ND	ND	ND	ND	0.157	0.004	0.148	0.004
SE-31	0.006	ND	0.001	ND	ND	ND	ND	ND

[1]Inouye 2015: Total sulfide value 1.9 mg/L derived from hydrogen sulfide dissociation (0.122 mg/L H_2S @ 15°C, 28 ppt, and 8.1 pH)
ND = not detected; measurement below detection limit

Table 3-5.Test Condition Summary for *Eohaustorius estuarius*

Test Conditions: PSEP *E. estuarius*		
Date Sampled	September 25 and 27, 2019; October 11, 2019 (Ref Sed)	
Date Received	September 28 and October 11, 2019	
Test Dates	October 18 – 28, 2019	
Sample Storage Conditions	4°C, dark	
Days of Holding Recommended: ≤8 weeks (56 days)	23 Days	
Source of Control Sediment	Yaquina Bay, OR	
Test Species	*Eohaustorius estuarius*	
Supplier	Northwest Amphipod, Newport, OR	
Date Acquired	October 15, 2019	
Age Class	Mature adult, 3-5 mm	
Test Procedures	PSEP 1995 with SMARM revisions, SCUM (2019) SOP No. SED002.09	
Test Location	EcoAnalysts Port Gamble Laboratory	
Test Type/Duration	10-Day static	
Control Water	North Hood Canal seawater, 0.45µm filtered	
Test Lighting	50 – 100 foot candles (ambient and constant)	
Test Chamber	1-Liter Glass Chamber	
Replicates per Treatment	5 + 2 surrogates (one used for WQ measurements throughout the test)	
Organisms per Replicate	20	
Exposure Volume	175 mL sediment/ 775 mL water	
Feeding	None	
Water Renewal	None	
Test Dissolved Oxygen	Recommended: > 5.1 mg/L	Observed: 6.3 – 8.6 mg/L
Test Temperature	Recommended: 15 ± 1°C	Observed: 14.5 – 16.1°C
Test Salinity	Recommended: 28 ± 1 ppt	Observed: 26 – 29 ppt
Test pH	Recommended: 7 - 9	Observed: 7.1 – 8.2
Control Performance Standard SMS	Recommended: Control ≤ 10% mortality	Observed: 2% mortality; Pass
Reference Performance Standard SMS	Recommended: Reference ≤ 25% mortality	Observed mortality: 1-4%; Pass
Reference Toxicant LC_{50} (total ammonia)	LC_{50} = 206.9 mg/L	
Mean; Acceptable Range (total ammonia)	155.7; 81.45 – 297.4 mg/L	
NOEC (total ammonia)	78 mg/L	
NOEC (unionized ammonia)	1.403 mg /L	
Deviations from Test Protocol	Salinity	

3.2 20-day Juvenile Polychaete Bioassay

No mortality was observed in the *N. arenaceodentata* control sediment. Mean individual growth (MIG) in the control was 0.827 mg/ind/day (dry weight) and 0.536 mg/ind/day (AFDW). These values all fall within the test acceptability criteria of ≤10% mean mortality and ≥0.38 mg/ind/day AFDW (WDOE 2019), indicating that the test conditions were suitable for adequate polychaete survival and growth. A summary of the test results is shown in Table 3-6. Summaries of water quality measurements, ammonia and sulfide concentrations, and test conditions are presented in Table 3-8, Table 3-10, Table 3-12, and Table 3-14.

Mean mortality in the reference treatments was 0 and 8%, meeting the reference performance standard of ≤10% (WDOE 2019). Mean individual growth was 0.668-0.738 mg/ind/day (dry weight) and 0.429-0.479 mg/ind/day (AFDW). CARR 68 Rep 2 not included in mean results due to abnormal test organism growth. When compared to the control, MIG expressed as AFDW for the reference treatments was 0.80-0.89, which met the reference performance standard of ≥0.80 (WDOE 2019).

Mortality in the project sediments was 0-40%. Mean individual growth (as dry weight) was 0.201-0.694 mg/ind/day. Mean individual growth in the AFDW assessment, which removes variability caused by gut contents, was 0.156-0.526 mg/ind/day.

All water quality parameters were within the acceptable limits throughout the duration of the test (Table 3-8). Initial mean individual biomass (pretest) of the test organisms met the recommended criterion of 0.25 – 1.0 mg/individual at 0.721 mg/ind dry weight and 0.415 mg/ind AFDW.

A reference-toxicant test (positive control) was performed on the batch of test organisms utilized for this study. The LC_{50} value was within control chart limits (±2 standard deviations from the laboratory historical mean). This result indicates that the test organisms used in this study were of similar sensitivity to those previously tested at EcoAnalysts.

Ammonia concentrations observed in the *N. arenaceodentata* test were below the NOEC value derived from the concurrent ammonia reference-toxicant test (Table 3-10; compare to NOEC of 180 mg/L total ammonia). Initial and final sulfide concentrations in the interstitial and overlying water were below the trigger value of 3.4 mg/L total sulfides (Kendall and Barton 2004) for all samples (Table 3-12).

3.2.1 Re-Test of Samples SE-15 and SE-20

During test termination, it was noted that multiple test samples contained native Nereid polychaetes within the test chambers that coincided with poor survival and/or growth of test organisms. Upon discovery, test results were immediately conveyed to the client and WDOE personnel. Collectively it was decided that due to the presence of predatory native fauna that may have competed with or preyed upon test organisms, samples SE-15 and SE-20 should be press-sieved to remove native fauna and re-tested. Due to the high percentage of woody debris in these samples, “mashed” material that remained on the 2.0mm screen was re-introduced with the sieved material to create a homogenized, sieved sample free of native fauna. The results of these re-tested samples are presented in separate tables alongside the first test results. All statistical analyses were performed on the re-tested results for these two samples (see section 4.2).

In the re-test, 4% mortality was observed in the N. arenaceodentata control sediment. MIG in the control was 0.945 mg/ind/day (dry weight) and 0.552 mg/ind/day (AFDW). These values all fall within the test acceptability criteria of ≤10% mean mortality and ≥0.38 mg/ind/day AFDW (WDOE 2019), indicating that the test conditions were suitable for adequate polychaete survival and growth. A summary of the test results is shown in Table 3-7. Summaries of water quality measurements, ammonia

and sulfide concentrations, and test conditions are presented in Table 3-9, Table 3-11, Table 3-13, and Table 3-15.

Mean mortality in the reference treatments was 0%, meeting the reference performance standard of ≤10% (WDOE 2019). Mean individual growth was 0.929 and 0.900 mg/ind/day (dry weight) and 0.597 and 0.612 mg/ind/day (AFDW). When compared to the control, MIG expressed as AFDW for the reference treatment was 1.08 and 1.11, which met the reference performance standard of ≥0.80 (WDOE 2019).

Mortality in the sieved project sediments was 0%. Mean individual growth (as dry weight) was 0.724 and 0.674 mg/ind/day for SE-15 and SE-20, respectively. Mean individual growth in the AFDW assessment, which removes variability caused by gut contents, was 0.575 and 0.528 mg/ind/day.

All water quality parameters were within the acceptable limits throughout the duration of the test (Table 3-9). Initial mean individual biomass (pretest) of the test organisms met the recommended criterion of 0.25 – 1.0 mg/individual at 0.699 mg/ind dry weight and 0.445 mg/ind AFDW.

A separate reference-toxicant test (positive control) was performed on the batch of test organisms utilized for the re-test. The LC50 value was within control chart limits (±2 standard deviations from the laboratory historical mean). This result indicates that the test organisms used in this study were of similar sensitivity to those previously tested at EcoAnalysts.

Ammonia concentrations observed in the re-test were below the NOEC value derived from the concurrent ammonia reference-toxicant test (Table 3-11; compare to NOEC of 216 mg/L total ammonia). Initial and final sulfide concentrations in the interstitial and overlying water were below the trigger value of 3.4 mg/L total sulfides (Kendall and Barton 2004) for all samples (Table 3-13).

Table 3-6. Test Results for *Neanthes arenaceodentata*

Treatment	Rep	Number Initiated	Survivors	Mean Mortality (%)	Individual Growth (mg/ind/day)					
					Dry Weight	Mean	Std Dev	AFDW	Mean	Std Dev
Control	1	5	5	0	0.779	0.827	0.09	0.437	0.536	0.09
	2	5	5		0.740			0.470		
	3	5	5		0.940			0.646		
	4	5	5		0.899			0.587		
	5	5	5		0.776			0.540		
CARR 14	1	5	5	8	0.754	0.680	0.19	0.540	0.479	0.12
	2	5	4		0.555			0.473		
	3	5	5		0.855			0.594		
	4	5	5		0.818			0.501		
	5	5	4		0.418			0.288		
CARR 47	1	5	5	0	0.871	0.668	0.17	0.530	0.429	0.10
	2	5	5		0.504			0.380		
	3	5	5		0.806			0.529		
	4	8	8		0.522			0.313		
	5	6	6		0.637			0.390		
CARR 68[1]	1	5	5	0	0.770	0.738[1]	0.10	0.541	0.472[1]	0.06
	2	5	5		0.392[1]			0.049[1]		
	3	5	5		0.777			0.480		
	4	5	5		0.592			0.401		
	5	5	5		0.813			0.468		
SE-15[2]	1	5	0	40	--	0.433	0.14	--	0.315	0.10
	2	5	5		0.593			0.422		
	3	5	0		--			--		
	4	5	5		0.313			0.238		
	5	5	5		0.394			0.284		
SE-16	1	5	5	4	0.605	0.694	0.16	0.464	0.500	0.13
	2	5	5		0.810			0.541		
	3	5	5		0.485			0.360		
	4	5	4		0.900			0.624		
	5	5	5		0.671			0.509		
SE-17	1	5	5	4	0.591	0.503	0.17	0.429	0.366	0.06
	2	5	5		0.546			0.386		
	3	5	4		0.489			0.373		
	4	5	5		0.670			0.489		
	5	5	5		0.220			0.151		
SE-18	1	5	5	4	0.446	0.540	0.08	0.331	0.417	0.08
	2	5	5		0.527			0.402		
	3	5	5		0.656			0.507		
	4	5	4		0.520			0.416		
	5	5	5		0.551			0.430		

Treatment	Rep	Number Initiated	Survivors	Mean Mortality (%)	Individual Growth (mg/ind/day)					
					Dry Weight	Mean	Std Dev	AFDW	Mean	Std Dev
SE-20[2]	1	5	4	24	0.088	0.201	0.26	0.067	0.156	0.19
	2	6	6		0.154			0.127		
	3	5	3		0.021			0.018		
	4	5	3		0.088			0.070		
	5	5	4		0.653			0.497		
SE-24	1	5	5	4	0.545	0.434	0.09	0.436	0.341	0.08
	2	5	5		0.438			0.348		
	3	5	5		0.340			0.260		
	4	5	5		0.497			0.394		
	5	5	4		0.348			0.265		
SE-26	1	5	5	4	0.612	0.646	0.05	0.506	0.526	0.04
	2	5	5		0.731			0.589		
	3	5	5		0.650			0.526		
	4	5	5		0.638			0.511		
	5	5	4		0.598			0.500		
SE-31	1	5	5	0	0.574	0.642	0.10	0.429	0.465	0.06
	2	5	5		0.599			0.445		
	3	5	5		0.543			0.404		
	4	5	5		0.782			0.522		
	5	5	5		0.715			0.526		

[1]CARR 68 Rep 2 not included in mean results due to abnormal test organism growth

[2]Due to presence/abundance of predatory native fauna, samples SE-15 and SE-20 were re-tested with press-sieved test sediment (results in Table 3-7). Only re-tested results are included in further statistical analyses (section **4.2**)

Table 3-7. Test Results for *Neanthes arenaceodentata*: Re-Test of Samples SE-15 and SE-20

Treatment	Rep	Number Initiated	Survivors	Mean Mortality (%)	Individual Growth (mg/ind/day)					
					Dry Weight	Mean	Std Dev	AFDW	Mean	Std Dev
Control	1	5	4	4	1.098	0.945	0.13	0.659	0.552	0.08
	2	5	5	0	0.899			0.534		
	3	5	5	0	0.791			0.499		
	4	5	5	0	0.873			0.471		
	5	5	5	0	1.065			0.596		
CARR 47	1	5	5	0	1.068	0.929	0.16	0.719	0.597	0.08
	2	5	5	0	0.869			0.611		
	3	5	5	0	1.091			0.614		
	4	5	5	0	0.924			0.542		
	5	5	5	0	0.694			0.497		
CARR 68	1	5	5	0	0.935	0.900	0.11	0.589	0.612	0.09
	2	5	5	0	0.994			0.711		
	3	5	5	0	0.709			0.480		
	4	5	5	0	0.936			0.617		
	5	5	5	0	0.927			0.661		
SE-15	1	5	5	0	0.628	0.724	0.12	0.478	0.575	0.09
	2	5	5	0	0.701			0.586		
	3	5	5	0	0.735			0.584		
	4	5	5	0	0.918			0.713		
	5	5	5	0	0.639			0.512		
SE-20	1	5	5	0	0.598	0.674	0.08	0.490	0.528	0.05
	2	5	5	0	0.794			0.593		
	3	5	5	0	0.718			0.567		
	4	5	5	0	0.615			0.465		
	5	5	5	0	0.646			0.523		

Table 3-8. Water Quality Summary for *Neanthes arenaceodentata*

Treatment	Dissolved Oxygen (mg/L) ≥4.6 mg/L			Temperature (°C) 20 ± 1°C			Salinity (ppt) 28 ± 2 ppt			pH 7 - 9 units		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Control	7.4	7.2	7.7	19.8	19.2	20.3	28	27	28	7.8	7.0	8.0
CARR 14	7.3	6.6	7.7	19.7	19.1	20.2	28	27	29	7.9	7.0	8.2
CARR 47	7.4	7.0	7.7	20.0	19.3	20.6	28	27	29	8.0	7.9	8.1
CARR 68	7.4	6.7	7.7	19.8	19.3	20.3	28	27	28	7.9	7.6	8.0
SE-15	7.5	7.1	7.8	20.1	19.4	20.8	27	26	28	7.7	7.5	7.9
SE-16	7.4	7.1	7.8	20.1	19.4	20.7	27	26	28	7.8	7.7	8.0
SE-17	7.2	6.3	7.8	19.9	19.2	20.5	27	26	28	7.7	7.4	7.9
SE-18	7.5	7.1	7.7	19.8	19.3	20.3	27	26	28	7.9	7.2	8.0
SE-20	7.5	6.9	7.8	19.9	19.4	20.4	27	26	28	7.8	7.6	7.9
SE-24	7.5	7.1	7.8	20.1	19.5	20.7	27	26	28	7.7	7.4	7.8
SE-26	7.4	6.5	7.7	20.1	19.5	20.7	27	26	29	7.6	7.4	7.8
SE-31	7.3	6.6	7.7	19.9	19.2	20.6	28	26	29	7.7	7.2	7.9

Table 3-9. Water Quality Summary for *Neanthes arenaceodentata*: Re-Test of Samples SE-15 and SE-20

Treatment	Dissolved Oxygen (mg/L) ≥4.6 mg/L			Temperature (°C) 20 ± 1°C			Salinity (ppt) 28 ± 2 ppt			pH 7 - 9 units		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Control	7.3	6.5	7.6	20.9	20.5	21.2	28	28	29	7.9	7.8	8.0
CARR 47	7.2	6.7	7.5	20.8	20.5	21.2	28	28	28	8.0	7.7	8.3
CARR 68	7.2	6.9	7.5	20.7	20.3	21.0	28	28	28	8.0	7.8	8.1
SE-15	7.2	6.9	7.5	20.7	20.0	21.2	27	26	28	7.7	7.6	7.8
SE-20	6.9	5.4	7.4	20.8	19.9	21.1	27	26	28	7.6	7.3	7.8

Table 3-10. Ammonia Summary for *Neanthes arenaceodentata*

Treatment	Overlying				Interstitial			
	Total Ammonia (mg/L Total) NOEC = 180 mg/L[1]		Unionized Ammonia (mg/L) NOEC = 2.2[2]		Total Ammonia (mg/L Total) NOEC = 180 mg/L[1]		Unionized Ammonia (mg/L) NOEC = 2.2[2]	
	Day 0	Day 20	Day 0	Day 20	Day 0	Day 20	Day 0	Day 20
Control	0.005	6.61	0.000	0.175	0.220	6.890	0.002	0.047
CARR 14	0.295	0.654	0.009	0.017	2.41	1.57	0.020	0.005
CARR 47	0.544	0.513	0.014	0.014	3.02	0.873	0.040	0.003
CARR 68	0.108	0.608	0.003	0.016	3.12	0.760	0.032	0.003
SE-15	0.381	0.338	0.010	0.007	0.937	1.08	0.004	0.002
SE-16	0.361	0.448	0.012	0.010	1.27	0.619	0.007	0.003
SE-17	0.582	0.487	0.015	0.007	1.86	1.22	0.006	0.003
SE-18	0.362	0.393	0.007	0.010	1.39	0.798	0.007	0.004
SE-20	0.475	0.279	0.012	0.006	1.44	0.567	0.006	0.002
SE-24	0.322	0.332	0.007	0.007	1.53	1.68	0.002	0.004
SE-26	0.115	4.05	0.001	0.056	0.703	4.10	0.000	0.011
SE-31	0.309	0.406	0.008	0.007	1.19	0.860	0.006	0.003

[1]NOEC (concurrent reference-toxicant test derived) = 180 mg/L total ammonia
[2]NOEC (concurrent reference-toxicant test derived) = 2.2 mg/L unionized ammonia

Table 3-11. Ammonia Summary for *Neanthes arenaceodentata*: Re-Test of Samples SE-15 and SE-20

Treatment	Overlying				Interstitial			
	Total Ammonia (mg/L Total) NOEC = 216 mg/L[1]		Unionized Ammonia (mg/L) NOEC = 2.2[2]		Total Ammonia (mg/L Total) NOEC = 216 mg/L[1]		Unionized Ammonia (mg/L) NOEC = 2.2[2]	
	Day 0	Day 20	Day 0	Day 20	Day 0	Day 20	Day 0	Day 20
Control	0.0785	0.820	0.003	0.018	0.213	1.18	0.002	0.010
CARR 47	1.45	0.212	0.049	0.006	4.77	1.82	0.041	0.003
CARR 68	0.216	0.339	0.006	0.012	1.22	0.742	0.007	0.003
SE-15	0.688	0.0641	0.015	0.001	1.84	1.57	0.005	0.003
SE-20	0.881	0.227	0.019	0.004	3.61	0.996	0.016	0.004

[1]NOEC (concurrent reference-toxicant test derived) = 216 mg/L total ammonia
[2]NOEC (concurrent reference-toxicant test derived) = 2.2 mg/L unionized ammonia

Table 3-12. Sulfide Summary for *Neanthes arenaceodentata*

Treatment	Overlying				Interstitial			
	Total Sulfides (mg/L Total) Trigger Value = 3.4 mg/L[1]		Hydrogen Sulfide (mg/L)		Total Sulfides (mg/L Total) Trigger Value = 3.4 mg/L[1]		Hydrogen Sulfide (mg/L)	
	Day 0	Day 20	Day 0	Day 20	Day 0	Day 20	Day 0	Day 20
Control	0.001	ND	0.000	ND	0.008	ND	0.002	ND
CARR 14	ND	0.002	ND	0.000	0.000	0.021	0.000	0.009
CARR 47	ND	ND	ND	ND	0.016	0.001	0.002	0.000
CARR 68	0.003	0.000	0.000	0.000	0.022	ND	0.004	ND
SE-15	0.000	ND	0.000	ND	ND	0.014	ND	0.008
SE-16	0.003	0.000	0.000	0.000	ND	ND	ND	ND
SE-17	0.000	ND	0.000	ND	ND	ND	ND	ND
SE-18	ND	ND	ND	ND	ND	ND	ND	ND
SE-20	0.000	ND	0.000	ND	ND	ND	ND	ND
SE-24	0.000	0.001	0.000	0.000	0.005	0.010	0.003	0.005
SE-26	0.000	ND	0.000	ND	ND	0.001	ND	0.000
SE-31	ND	ND	ND	ND	ND	ND	ND	ND

[1]Kendall and Barton 2004
ND = not detected; measurement below detection limit

Table 3-13. Sulfide Summary for *Neanthes arenaceodentata*: Re-Test of Samples SE-15 and SE-20

Treatment	Overlying				Interstitial			
	Total Sulfides (mg/L Total) Trigger Value = 3.4 mg/L[1]		Hydrogen Sulfide (mg/L)		Total Sulfides (mg/L Total) Trigger Value = 3.4 mg/L[1]		Hydrogen Sulfide (mg/L)	
	Day 0	Day 20	Day 0	Day 20	Day 0	Day 20	Day 0	Day 20
Control	0.017	0.016	0.001	0.002	0.029	ND	0.006	ND
CARR 47	0.027	0.012	0.002	0.001	ND	0.288	ND	0.190
CARR 68	0.014	0.024	0.001	0.002	ND	0.018	ND	0.008
SE-15	0.008	0.015	0.001	0.002	ND	0.070	ND	0.042
SE-20	0.013	0.034	0.001	0.004	ND	0.006	ND	0.003

[1]Kendall and Barton 2004
ND = not detected; measurement below detection limit

Table 3-14. Test Condition Summary for *Neanthes arenaceodentata*

Test Conditions: PSEP *N. arenaceodentata*		
Date Sampled	September 25 and 27, 2019; October 11, 2019 (Ref Sed)	
Date Received	September 28 and October 11, 2019	
Test Dates	October 17 – November 6, 2019	
Sample Storage Conditions	4°C, dark	
Days of Holding Recommended: ≤8 weeks (56 days)	22 Days	
Source of Control Sediment	Yaquina Bay, OR	
Test Species	*Neanthes arenaceodentata*	
Supplier	Aquatic Toxicology Support	
Date Acquired	October 17, 2019	
Age Class	Juvenile; 17 days post-emergence	
Test Procedures	PSEP 1995 with SMARM revisions, SCUM (2019) SOP No. SED009.08	
Test Location	EcoAnalysts Port Gamble Laboratory	
Test Type/Duration	20-Day static renewal	
Control Water	North Hood Canal seawater, 0.45µm filtered	
Test Lighting	50 – 100 foot candles	
Test Chamber	1-Liter Glass Chamber	
Replicates per Treatment	5 + 4 surrogates (one used for WQ measurements throughout the test)	
Organisms per Replicate	5	
Exposure Volume	175 mL sediment/ 775 mL water	
Feeding	40 mg/jar every other day (8 mg/ind every other day)	
Water Renewal	Water renewed every third day (1/3 volume of exposure chamber)	
Test Dissolved Oxygen	Recommended: > 4.6 mg/L	Observed: 6.3 – 7.8 mg/L
Test Temperature	Recommended: 20 ± 1 °C	Observed: 19.1 – 20.8 °C
Test Salinity	Recommended: 28 ± 2 ppt	Observed: 26 – 29 ppt
Test pH	Recommended: 7 - 9	Observed: 7.0 – 8.2
Initial Biomass	Recommended: 0.5 - 1.0 mg Minimum: 0.25 mg (dry weight)	0.721 mg (dry weight) 0.415 mg (AFDW)
Control Performance Standard	Recommended: Control ≤ 10% mortality	Observed: 0%; Pass
	Recommended: ≥ 0.38 mg/ind/day (as AFDW)	Observed: 0.536 mg/ind/day; Pass
Reference Performance Standard (SMS)	Recommended: Mortality ≤20% $MIG_{Reference}/MIG_{Control} \geq 0.80$ (as AFDW)	0-8%; Pass 0.80-0.89; Pass
Reference Toxicant LC_{50} (total ammonia)	LC_{50} = 211.7 mg/L	
Mean; Acceptable Range (total ammonia)	189; 135 – 264.6 mg/L	
NOEC (total ammonia)	180 mg/L	
NOEC (unionized ammonia)	2.2 mg/L	
Deviations from Test Protocol	None	

Table 3-15. Test Condition Summary for *Neanthes arenaceodentata*: (Re-Test of Samples SE-15 and SE-20)

Test Conditions: PSEP *N. arenaceodentata*		
Date Sampled	September 25 and 27, 2019; October 11, 2019 (Ref Sed)	
Date Received	September 28 and October 11, 2019	
Test Dates	November 21 – December 11, 2019	
Sample Storage Conditions	4°C, dark	
Days of Holding Recommended: ≤8 weeks (56 days)	57 Days (SE-20)	
Source of Control Sediment	Yaquina Bay, OR	
Test Species	*Neanthes arenaceodentata*	
Supplier	Aquatic Toxicology Support	
Date Acquired	November 21, 2019	
Age Class	Juvenile; 17 days post-emergence	
Test Procedures	PSEP 1995 with SMARM revisions, SCUM (2019) SOP No. SED009.08	
Test Location	EcoAnalysts Port Gamble Laboratory	
Test Type/Duration	20-Day static renewal	
Control Water	North Hood Canal seawater, 0.45µm filtered	
Test Lighting	50 – 100 foot candles	
Test Chamber	1-Liter Glass Chamber	
Replicates per Treatment	5 + 4 surrogates (one used for WQ measurements throughout the test)	
Organisms per Replicate	5	
Exposure Volume	175 mL sediment/ 775 mL water	
Feeding	40 mg/jar every other day (8 mg/ind every other day)	
Water Renewal	Water renewed every third day (1/3 volume of exposure chamber)	
Test Dissolved Oxygen	Recommended: > 4.6 mg/L	Observed: 5.4 – 7.6 mg/L
Test Temperature	Recommended: 20 ± 1 °C	Observed: 19.9 – 21.2 °C
Test Salinity	Recommended: 28 ± 2 ppt	Observed: 26 – 29 ppt
Test pH	Recommended: 7 - 9	Observed: 7.3 – 8.3
Initial Biomass	Recommended: 0.5 - 1.0 mg Minimum: 0.25 mg (dry weight)	0.699 mg (dry weight) 0.445 mg (AFDW)
Control Performance Standard	Recommended: Control ≤ 10% mortality	Observed: 4%; Pass
	Recommended: ≥ 0.38 mg/ind/day (as AFDW)	Observed: 0.552 mg/ind/day; Pass
Reference Performance Standard (SMS)	Recommended: Mortality ≤20% $MIG_{Reference}/MIG_{Control} \geq 0.80$ (as AFDW)	0%; Pass 1.08 and 1.11; Pass
Reference Toxicant LC_{50} (total ammonia)	LC_{50} = 255.4 mg/L	
Mean; Acceptable Range (total ammonia)	192.5; 140.4 – 264.1 mg/L	
NOEC (total ammonia)	216 mg/L	
NOEC (unionized ammonia)	2.2 mg/L	
Deviations from Test Protocol	SE-20 one day past expiration	

3.3 Larval Development Bioassay

The larval development test with *M. galloprovincialis* was validated by 1.056 proportion normal survivorship, defined as the mean number of normal larvae within the seawater control divided by the stocking density. These values were within the SMS control acceptability criterion of ≥0.70. A summary of the test results for all samples is shown in Table 3-16. Summaries of water quality measurements, ammonia and sulfide concentrations, and test conditions are presented in Table 3-17 through Table 3-19.

Mean number normal of the reference sediments was 0.88-90 of the control response, which met the SMS reference acceptability criteria (N_R/N_C) of ≥0.65. This is defined as the number of normal larvae in the reference sample(s) divided by the number of normal larvae in the control. The test mean chamber stocking density (measured at test initiation) was 23.24 embryos/mL and was within the test objective of 20 – 40 embryos/mL.

Water quality parameters were within acceptable limits throughout the duration of the test (Table 3-17) with the exception of dissolved oxygen in several treatments on Day 1. Upon discovery, aeration was initiated on all test chambers for the remainder of the test.

A reference-toxicant test (positive control) was performed on the batch of test organisms utilized for this study. The LC_{50} value was within control chart limits (±2 standard deviations from the laboratory historical mean). This result indicates that the test organisms used in this study were of similar sensitivity to those previously tested at EcoAnalysts.

Ammonia concentrations observed in the *M. galloprovincialis* test were below the NOEC value derived from the concurrent ammonia reference-toxicant test (3.52 mg/L total ammonia; Table 3-18), with the exception of CARR 47 on Day 2 (5.77 mg/L total ammonia). Ammonia may have contributed to larval development in this reference sample; however, it still met test performance criteria. Initial total sulfide concentrations for the reference CARR 68 and test samples SE-15, SE-16, and SE-26 were above the trigger value of 0.009 mg/L; however, the undissociated hydrogen sulfide measurements were below the hydrogen sulfide trigger value of 0.003 mg/L (Inouye 2015) with the exception of sample SE-26. Sulfides may have contributed to larval development in this treatment. Final sulfide measurements on Day 2 were below the respective trigger values in all samples except SE-20, which contained total sulfides measuring 0.016 mg/L. Hydrogen sulfide in this sample was below the 0.003 mg/L trigger value.

Table 3-16. Test Results for *Mytilus galloprovincialis*

Treatment	Rep	Number Normal	Number Abnormal	Mean # Normal (N)	Std. Dev.	Control Normal Survival N_C/I	Reference Normal Survival Relative to Control N_R/N_C	Performance Standard
Seawater Control	1	262	5	245.4	15.9	1.056		≥0.70; Meets Criterion
	2	220	4					
	3	245	4					
	4	255	3					
	5	245	4					
CARR 14	1	224	3	219.4	19.5		219.4/245.4 = 0.89	≥0.65; Meets Criterion
	2	233	7					
	3	213	6					
	4	238	5					
	5	189	2					
CARR 47	1	233	7	215.4	13.0		215.4/245.4 = 0.88	≥0.65; Meets Criterion
	2	201	6					
	3	224	13					
	4	212	6					
	5	207	3					
CARR 68	1	213	15	221.8	18.2		221.8/245.4 = 0.90	≥0.65; Meets Criterion
	2	198	1					
	3	218	4					
	4	241	6					
	5	239	8					
SE-15	1	199	8	197.6	9.6	See Section 4.3 for Larval Test Suitability Determination		
	2	195	6					
	3	202	5					
	4	183	7					
	5	209	1					
SE-16	1	177	2	198.6	16.0			
	2	222	1					
	3	196	4					
	4	198	14					
	5	200	5					
SE-17	1	187	16	198.4	10.0			
	2	204	14					
	3	198	12					
	4	191	14					
	5	212	15					
SE-18	1	232	4	209.2	19.8			
	2	193	16					
	3	213	6					
	4	223	6					
	5	185	17					
SE-20	1	201	8	196.4	15.0			
	2	208	3					
	3	202	6					
	4	170	4					
	5	201	14					

Treatment	Rep	Number Normal	Number Abnormal	Mean # Normal (N)	Std. Dev.	Control Normal Survival N_C/I	Reference Normal Survival Relative to Control N_R/N_C	Performance Standard
SE-24	1	119	69	109.0	15.5	See Section 4.3 for Larval Test Suitability Determination		
	2	88	97					
	3	123	66					
	4	118	47					
	5	97	65					
SE-26	1	172	30	184.0	17.3			
	2	197	25					
	3	207	17					
	4	166	21					
	5	178	36					
SE-31	1	194	9	192.6	12.6			
	2	211	10					
	3	196	28					
	4	178	25					
	5	184	15					

I = Mean Initial count (Stocking density); 232.4
N_C = Mean Control Normal
N_R = Mean Reference Normal

Table 3-17. Water Quality Summary for *Mytilus galloprovincialis*

Treatment	Dissolved Oxygen (mg/L) >6.0 mg/L			Temperature (°C) 16± 1°C			Salinity (ppt) 28 ± 1 ppt			pH 7 - 9 units		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Seawater Control	7.5	7.2	7.8	16.5	15.7	17.0	29	29	29	8.0	7.9	8.0
CARR 14	7.3	6.6	7.9	16.6	15.9	17.0	29	29	29	7.9	7.9	8.0
CARR 47	7.1	**5.9**	8.1	16.5	15.6	17.0	29	29	29	7.9	7.9	8.0
CARR 68	7.1	6.2	8.0	16.6	15.8	17.0	29	29	29	7.9	7.9	7.9
SE-15	6.5	**5.9**	6.9	16.7	16.1	17.0	29	29	29	7.8	7.7	7.9
SE-16	6.6	**6.0**	7.4	17.0	17.0	17.0	29	28	29	7.8	7.8	7.8
SE-17	6.9	6.1	7.9	16.4	15.8	16.9	29	29	29	7.8	7.7	7.9
SE-18	7.7	7.6	7.7	16.4	15.7	16.9	29	29	29	7.8	7.7	7.9
SE-20	7.0	6.3	8.1	16.4	15.6	17.0	29	29	29	7.8	7.7	7.9
SE-24	7.5	7.0	7.8	16.7	16.3	17.0	29	29	29	7.5	7.4	7.8
SE-26	7.3	6.4	8.0	16.4	15.6	16.9	29	29	29	7.6	7.4	7.8
SE-31	6.6	**5.4**	7.8	16.7	16.4	17.0	29	29	29	7.7	7.7	7.8

BOLD=value outside of recommended range

Table 3-18. Ammonia and Sulfide Summary for *Mytilus galloprovincialis*

Treatment	Total Ammonia (mg/L Total) NOEC = 3.52 mg/L[1]		Unionized Ammonia (mg/L) NOEC = 0.058 mg/L[2]		Total Sulfides (mg/L Total) Trigger Value = 0.009 mg/L[3]		Hydrogen Sulfide (mg/L) Trigger Value = 0.003 mg/L[4]	
	Day 0	Final (Day 2)	Day 0	Final (Day 2)	Day 0	Final (Day 2)	Day 0	Final (Day 2)
Seawater Control	0.000	0.000	0.000	0.000	0.001	0.003	0.000	0.000
CARR 14	0.000	1.46	0.000	0.035	ND	0.008	ND	0.001
CARR 47	0.000	**5.77**	0.000	**0.135**	0.009	0.009	0.001	0.001
CARR 68	0.000	0.102	0.000	0.002	**0.016**	0.006	0.001	0.001
SE-15	0.000	0.0813	0.000	0.001	**0.011**	0.004	0.001	0.000
SE-16	0.000	0.202	0.000	0.003	**0.015**	0.001	0.002	0.000
SE-17	0.000	0.000	0.000	0.000	ND	ND	ND	ND
SE-18	0.000	0.0252	0.000	0.000	0.006	0.006	0.001	0.001
SE-20	0.000	0.000	0.000	0.000	0.007	**0.016**	0.001	0.002
SE-24	0.000	0.0179	0.000	0.000	ND	0.003	ND	0.000
SE-26	0.000	0.0377	0.000	0.001	**0.027**	0.009	**0.006**	0.001
SE-31	0.000	0.000	0.000	0.000	0.002	0.005	0.000	0.001

[1]NOEC (concurrent reference-toxicant test derived) = 3.52 mg/L total ammonia
[2]NOEC (concurrent reference-toxicant test derived) = 0.058 mg/L unionized ammonia
[3]Inouye 2015: Total sulfide value 0.009 mg/L derived from hydrogen sulfide dissociation (0.0025 mg/L H_2S @ 16°C, 28 ppt, and 7.7 pH)
[4]Inouye 2015: Hydrogen sulfide value 0.0025 mg/L
ND = Non-detect
BOLD = value above trigger value

Table 3-19. Test Condition Summary for *Mytilus galloprovincialis*

Test Conditions: PSEP *M. galloprovincialis*		
Date Sampled	September 25 and 27, 2019; October 11, 2019 (Ref Sed)	
Date Received	September 28 and October 11, 2019	
Test Dates	October 16 – 18, 2019	
Sample Storage Conditions	4°C, dark	
Holding Time Recommended: < 8 weeks (56 days)	21 Days	
Test Species	*Mytilus galloprovincialis*	
Supplier	Taylor Shellfish, Shelton, WA	
Date Acquired	October 4, August 27, and July 31, 2019	
Age Class	<4-h old embryos	
Test Procedures	PSEP 1995 with SMARM revisions, SCUM (2019) SOP No. SED005.06	
Test Location	EcoAnalysts Port Gamble Laboratory	
Test Type/Duration	48-60 Hour static test	
Control Water	North Hood Canal sea water, 0.45µm filtered	
Test Lighting	50 – 100 foot candles	
Test Chamber	1-Liter Glass Chamber	
Replicates per Treatment	5 + 1 surrogate (used for WQ measurements throughout the test)	
Exposure Volume	18 g sediment/ 900 mL water	
Feeding	None	
Water Renewal	None	
Test Dissolved Oxygen	Recommended: >6.0 mg/L	Observed: 5.4 – 8.1 mg/L
Test Temperature	Recommended: 16 ± 1 °C	Observed: 15.6 – 17.0 °C
Test Salinity	Recommended: 28 ± 1 ppt	Observed: 28 – 29 ppt
Test pH	Recommended: 7 – 9	Observed: 7.4 – 8.0
Stocking Density	Recommended: 20 – 40 embryos/mL	Observed: 23.24 embryos/mL
Control Performance Standard (SMS)	Recommended: Control normal survival ≥ 0.70	Observed: 1.056; Pass
Reference Performance Standard (SMS)	Recommended: Reference normal survival relative to sediment control ≥ 0.65	Observed: 0.88-90; Pass
Reference Toxicant Endpoint	Total Ammonia	Unionized Ammonia
Reference Toxicant EC_{50}	EC_{50} = 9.74 mg/L	EC_{50} = 0.192 mg/L
Mean; Acceptable Range	7.52; 3.92 – 14.45 mg/L	0.113; 0.050 – 0.256 mg/L
NOEC Combined Proportion Normal	3.52 mg/L	0.058 mg /L
Deviations from Test Protocol	Dissolved oxygen	

4. DISCUSSION

Sediments were evaluated based on SMS criteria. The biological criteria are based on both statistical significance (a statistical comparison) and the degree of biological response (a numerical comparison). The SMS criteria are derived from the Washington Department of Ecology's Sediment Cleanup User's Manual (SCUM; WDOE 2019). Comparisons were made for each treatment against the reference sample using BioStat software. Two numerical comparisons were made under SMS: the SCO and the CSL.

4.1 Amphipod Test Suitability Determination

Under the SMS program, a treatment will fail SCO if mean mortality in the test sediment is >25% and the difference between mean mortality in the treatment compared to mean mortality in the reference is statistically significant ($p < 0.05$). Treatments fail the CSL if mean mortality in the test treatment ≥30% relative to the reference sediment and the difference is statistically significant.

The mortality observed in all but one project sediment (SE-17) was not statistically different than that of the applicable reference treatment. Sample SE-17 was statistically different than its comparable reference (CARR 68); however, its mean mortality was 21%, which met SCO and CSL criteria. None of the project sediment fail the SCO and CSL criteria for the amphipod test as shown in Table 4-1.

Table 4-1. SMS Comparison for *Eohaustorius estuarius*

Treatment	Mean Mortality (%)	Compared To:	Statistically Different than Reference? (P<0.05)	Mortality Comparison to Reference M_T-M_R (%)	Fails SCO?[1] > 25 % (Absolute)	Fails CSL?[2] ≥ 30 % (M_T-M_R)
Control	2					
CARR 14	1					
CARR 47	3					
CARR 68	4					
SE-15 [3]	17	CARR 47	No	14	No	No
SE-16	4	CARR 47	No	1	No	No
SE-17	21	CARR 68	Yes	17	No	No
SE-18	4	CARR 68	No	0	No	No
SE-20 [3]	13	CARR 68	No	9	No	No
SE-24	15	CARR 47	No	12	No	No
SE-26	2	CARR 14	No	1	No	No
SE-31	7	CARR 47	No	4	No	No

[1]SCO: Statistical Significance and M_T >25%

[2]CSL: Statistical Significance and M_T-M_R >30%

[3]Outlier reps with 95-100% mortality due to native fauna are not included in analysis

M_T = Treatment Mortality

M_R = Reference Mortality

4.2 Juvenile Polychaete Test Suitability Determination

Suitability determinations for the juvenile polychaete test were based on MIG as AFDW. A test treatment fails SCO criteria if MIG is statistically lower in the test treatment, relative to the reference, and the ratio of the MIG in the test treatment is <0.70 that of the reference. The treatments will fail CSL criteria if the MIG is significantly lower than the reference treatment and the ratio between the MIG of the treatment and the MIG of the reference is <0.50.

All project sediments pass the SCO and CSL criteria when evaluated on a dry weight and AFDW basis (Table 4-2 and Table 4-3).

Table 4-2. SMS Comparison for *Neanthes arenaceodentata*

Treatment	MIG (mg/ind/day) AFDW	Comparison To:	Statistically Less than Reference? (p<0.05)	MIG Relative to Reference MIG_T/MIG_R	Fails SCO?[1] < 0.70	Fails CSL?[2] < 0.50
Control	0.536					
CARR 14	0.479					
CARR 47	0.429					
CARR 68	0.472					
SE-16	0.500	CARR 47	No	1.17	No	No
SE-17	0.366	CARR 68	No	0.775	No	No
SE-18	0.417	CARR 68	No	0.883	No	No
SE-24	0.341	CARR 47	No	0.795	No	No
SE-26	0.526	CARR 14	No	1.10	No	No
SE-31	0.465	CARR 47	No	1.08	No	No

[1]SCO: Statistical Significance and MIG_T/MIG_R <0.70
[2]CSL: Statistical Significance and MIG_T/MIG_R <0.50
MIG_T = Treatment Mean Individual Growth
MIG_R = Reference Mean Individual Growth

Table 4-3. SMS Comparison for *Neanthes arenaceodentata*: Samples SE-15 and SE-20

Treatment	MIG (mg/ind/day) AFDW	Comparison To:	Statistically Less than Reference? (p<0.05)	MIG Relative to Reference MIG_T/MIG_R	Fails SCO?[1] < 0.70	Fails CSL?[2] < 0.50
Control	0.552					
CARR 47	0.597					
CARR 68	0.612					
SE-15 [3]	0.575	CARR 47	No	0.96	No	No
SE-20 [3]	0.528	CARR 68	No	0.86	No	No

[1]SCO: Statistical Significance and MIG_T/MIG_R <0.70
[2]CSL: Statistical Significance and MIG_T/MIG_R <0.50
[3]Sample sieved to remove native fauna and re-tested alongside appropriate reference sample
MIG_T = Treatment Mean Individual Growth
MIG_R = Reference Mean Individual Growth

4.3 Larval Test Suitability Determination

Larval test treatments fail SCO criteria if the number of normal larvae in the test treatment is significantly lower ($p < 0.10$) than that of the reference and if the ratio between the normal larval development in the test treatment is less than 0.85 of the normal development in the reference. Treatments fail CSL criteria if the number of normal larvae in the test treatment is significantly lower ($p < 0.10$) than that of the reference and if the ratio between the normal larval development in the test treatment is less than 0.70 of the normal development in the reference.

The project sediments passed both the SCO and CSL criteria for larval bivalve development evaluation, except for sample SE-24 (which failed SCO and CSL criteria) and sample SE-26 (which failed SCO criteria but not CSL) (Table 4-4). Relative species sensitivity often varies among contaminants. Of the suite of bioassays conducted, the larval development test is the most sensitive endpoint. Water quality, as well as ammonia and sulfides concentrations, were below threshold values within the test, indicating a different source may have contributed to toxicity for SE-24. Chemistry results for that sample have indicated elevated concentrations of nickel may have been present, measured at 40.2 mg/kg (Phil Wiescher, Per. Comm.). Given the sample percent solids and bioassay exposure conditions, the estimated maximum possible dissolved nickel concentration within the larval test was 0.2854 mg/L for SE-24. This value is above the larval EC_{50} value of 0.15 mg/L dissolved nickel from the USEPA ECOTOX database (https://cfpub.epa.gov/ecotox/), indicating that nickel may have contributed to the observed toxicity. However, as metals were not measured in the actual bioassay exposure, this correlation can not be confirmed with certainty.

Table 4-4. SMS Comparison for *Mytilus galloprovincialis*

Treatment	Mean Number Normal	Compared To:	Statistically Less than Reference? (p<0.10)	Normal Survival to Reference N_T/N_R	Fails SCO?[1] <0.85	Fails CSL?[2] <0.70
Seawater Control	245.4					
CARR 14	219.4					
CARR 47	215.4					
CARR 68	221.8					
SE-15	197.6	CARR 47	Yes	0.917	No	No
SE-16	198.6	CARR 47	Yes	0.922	No	No
SE-17	198.4	CARR 68	Yes	0.894	No	No
SE-18	209.2	CARR 68	No	0.943	No	No
SE-20	196.4	CARR 68	Yes	0.885	No	No
SE-24	109.0	CARR 47	Yes	0.506	**Yes**	**Yes**
SE-26	184.0	CARR 14	Yes	0.839	**Yes**	No
SE-31	192.6	CARR 47	Yes	0.894	No	No

[1] SCO: Statistical Significance and (N_T/N_R) <0.85

[2] CSL: Statistical Significance and (N_T/N_R) <0.70

N_T =Treatment Mean Number Normal

N_R =Reference Mean Number Normal

5. SUMMARY

A summary of the biological tests conducted on the sediments evaluated under the SMS sediment quality criteria (Table 5-1) are provided below.

The project sediments that pass the SCO and CSL performance criteria for all tests performed are SE-15, SE-16, SE-17, SE-18, SE-20, and SE-31. One project sample (SE-26) failed SCO criteria for the larval test but passed larval Cleanup Screening Levels. Sample SE-24 failed both SCO and CSL criteria for the larval assessment. Preliminary chemistry results indicate that nickel may have contributed to toxicity in SE-24 for the larval test, however this correlation can not be confirmed with certainty.

Table 5-1. Summary of SMS Evaluation

Treatment	Sediment Cleanup Objectives			Cleanup Screening Levels		
	Amphipod	Polychaete	Larval	Amphipod	Polychaete	Larval
SE-15	Pass	Pass	Pass	Pass	Pass	Pass
SE-16	Pass	Pass	Pass	Pass	Pass	Pass
SE-17	Pass	Pass	Pass	Pass	Pass	Pass
SE-18	Pass	Pass	Pass	Pass	Pass	Pass
SE-20	Pass	Pass	Pass	Pass	Pass	Pass
SE-24	Pass	Pass	**Fail**	Pass	Pass	**Fail**
SE-26	Pass	Pass	**Fail**	Pass	Pass	Pass
SE-31	Pass	Pass	Pass	Pass	Pass	Pass

6. REFERENCES

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APPENDIX A. TEST DATA, STATISTICAL ANALYSES, AND REFERENCE TOXICANT TEST RESULTS

1. *EOHAUSTORIUS ESTUARIUS* 10-DAY TEST

1.1 *EOHAUSTORIUS ESTUARIUS* TEST DATA
1.2 *EOHAUSTORIUS ESTUARIUS* STATISTICAL RESULTS
1.3 *EOHAUSTORIUS ESTUARIUS* REFERENCE TOXICANT TEST RESULTS

2. *NEANTHES ARENACEODENTATA* SOLID-PHASE TEST

2.1 *NEANTHES ARENACEODENTATA* TEST DATA
2.2 *NEANTHES ARENACEODENTATA* STATISTICAL RESULTS
2.3 *NEANTHES ARENACEODENTATA* REFERENCE TOXICANT TEST RESULTS
2.4 *NEANTHES ARENACEODENTATA* TEST DATA: RE-TEST OF SAMPLES SE-15 AND SE-20
2.5 *NEANTHES ARENACEODENTATA* STATISTICAL RESULTS: RE-TEST OF SAMPLES SE-15 AND SE-20
2.6 *NEANTHES ARENACEODENTATA* REFERENCE TOXICANT TEST RESULTS: RE-TEST OF SAMPLES SE-15 AND SE-20

3. *MYTILUS GALLOPROVINCIALIS* WATER-COLUMN TEST

3.1 *MYTILUS GALLOPROVINCIALIS* TEST DATA
3.2 *MYTILUS GALLOPROVINCIALIS* STATISTICAL RESULTS
3.3 *MYTILUS GALLOPROVINCIALIS* REFERENCE TOXICANT TEST RESULTS

APPENDIX B. CHAIN-OF-CUSTODY FORMS, LOGS, AND PRE-TEST DOCUMENTS

APPENDIX A. TEST DATA, STATISTICAL ANALYSES, AND REFERENCE TOXICANT TEST RESULTS

1. *Eohaustorius estuarius* 10-day Test

1.1 *Eohaustorius estuarius* Test Data

ECO ANALYSTS

10 DAY SOLID PHASE TEST DATA

CLIENT	SPECIES	LABORATORY	LOCATION	TEST START DATE	
MFA	*Eohaustorius estuarius*	Port Gamble	Bath 8	18Oct19	
PROJECT		**PROJECT MANAGER**	**PROTOCOL**	**TEST END DATE**	
Seaport		Julia Baum	PSEP 1995	28Oct19	

WATER QUALITY DATA

TEST CONDITIONS				D.O. (mg/L) > 5.1		TEMP (°C) 15 ± 1		SALINITY (ppt) 28 ± 1		pH (pH units) 7-9		TECH.	Date
SAMPLE ID	DAY	REP	JAR	D.O.		TEMP		SALINITY		pH			
				meter	mg/L	meter	°C	meter	ppt	meter	unit		
Control /	0	Surr		9	7.5	9	15.1	9	28	9	7.9	DM	10/18/19
Control /	1	Surr		9	7.4	9	15.1	9	28	9	7.8	DM	10/19/19
Control /	2	Surr		8	8.3	8	15.0	8	28	8	8.0	NR	10/20/19
Control /	3	Surr		9	8.3	9	15.2	9	28	9	8.0	NR	10/21/19
Control /	4	Surr		8	8.6	8	14.9	8	28	8	8.0	MS	10/22
Control /	5	Surr		9	8.0	9	14.9	9	28	9	8.0	DM	10/23
Control /	6	Surr		9	7.0	9	15.1	9	28	9	7.8	DM	10/24
Control /	7	Surr		8	8.2	8	14.8	8	28	8	8.0	MS	10/25
Control /	8	Surr		9	8.1	9	14.8	9	28	9	7.9	DM	10/26
Control /	9	Surr		8	8.5	8	14.7	8	28	8	8.1	MS	10/27
Control /	10	Surr		8	8.4	8	14.7	8	28	8	8.1	MS	10/28
CR21-West (14) /	0	Surr		9	8.1	9	15.2	9	29	9	8.0	DM	10/18/19
CR21-West (14) /	1	Surr		9	8.0	9	15.0	9	29	9	8.1	DM	10/19/19
CR21-West (14) /	2	Surr		8	8.3	8	14.6	8	28	8	8.1	NR	10/20/19
CR21-West (14) /	3	Surr		9	8.3	9	14.8	9	28	9	8.1	NR	10/21/19
CR21-West (14) /	4	Surr		8	8.4	8	15.4	8	28	8	8.1	MS	10/22
CR21-West (14) /	5	Surr		9	8.5	9	14.7	9	28	9	8.1	DM	10/23
CR21-West (14) /	6	Surr		9	8.4	9	14.7	9	28	9	8.0	DM	10/24
CR21-West (14) /	7	Surr		8	8.4	8	14.9	8	28	8	8.1	MS	10/25
CR21-West (14) /	8	Surr		9	8.4	9	14.7	9	29	9	8.2	DM	10/26
CR21-West (14) /	9	Surr		8	8.5	8	14.6	8	28	8	8.2	MS	10/27
CR21-West (14) /	10	Surr		8	8.4	8	14.7	8	29	8	8.2	MS	10/28

ECO ANALYSTS

10 DAY SOLID PHASE TEST DATA

CLIENT	SPECIES	LABORATORY	LOCATION	TEST START DATE	
MFA	*Eohaustorius estuarius*	Port Gamble	Bath 8	18Oct19	
PROJECT		**PROJECT MANAGER**	**PROTOCOL**	**TEST END DATE**	
Seaport		Julia Baum	PSEP 1995	28Oct19	

WATER QUALITY DATA

TEST CONDITIONS				D.O. (mg/L) > 5.1		TEMP (°C) 15 ± 1		SALINITY (ppt) 28 ± 1		pH (pH units) 7-9		TECH.	Date
SAMPLE ID	DAY	REP	JAR	D.O. meter	D.O. mg/L	TEMP meter	TEMP °C	SALINITY meter	SALINITY ppt	pH meter	pH unit		
Carr20 (47) /	0	Surr		9	8.2	9	15.1	9	29	9	8.0	DM	10/18/19
Carr20 (47) /	1	Surr		9	8.0	9	15.0	9	① ~~28~~ 29	9	8.0	DM	10/19/19
Carr20 (47) /	2	Surr		8	8.3	8	14.6	8	28	8	8.1	NR	10/20/19
Carr20 (47) /	3	Surr		9	8.4	9	14.7	9	28	9	8.1	NR	10/21
Carr20 (47) /	4	Surr		8	8.3	8	15.6	8	27	8	8.1	MS	10/22
Carr20 (47) /	5	Surr		9	8.5	9	14.8	9	28	9	8.1	DM	10/22
Carr20 (47) /	6	Surr		9	8.3	9	15.0	9	28	9	7.1	DM	10/24
Carr20 (47) /	7	Surr		8	8.3	8	14.8	8	28	8	8.1	MS	10/25
Carr20 (47) /	8	Surr	②	~~8~~	~~8.5~~ 8.3	~~8~~	~~14.8~~ 14.6	8	~~26~~ 28	~~8~~	~~7.8~~ 8.2	DM	10/26
Carr20 (47) /	9	Surr		8	8.0	8	14.9	8	28	8	8.1	MS	10/27
Carr20 (47) /	10	Surr		8	8.5	8	14.7	8	28	8	8.2	MS	10/28
CR02-South (68) /	0	Surr		9	8.2	9	15.1	9	29	9	8.0	DM	10/18/19
CR02-South (68) /	1	Surr		9	8.0	9	14.9	9	29	9	8.0	DM	10/19/19
CR02-South (68) /	2	Surr		8	8.3	8	14.7	8	29	8	8.0	NR	10/20/19
CR02-South (68) /	3	Surr		9	8.4	9	14.8	9	28	9	8.0	NR	10/21
CR02-South (68) /	4	Surr		8	8.4	8	15.0	8	28	8	8.0	MS	10/22
CR02-South (68) /	5	Surr		9	8.5	9	14.9	9	28	9	8.0	DM	10/23
CR02-South (68) /	6	Surr		9	8.3	9	14.8	9	28	9	8.0	DM	10/24
CR02-South (68) /	7	Surr		8	8.3	8	14.8	8	28	8	8.0	MS	10/25
CR02-South (68) /	8	Surr		9	8.3	9	14.7	9	28	9	8.1	DM	10/26
CR02-South (68) /	9	Surr		8	8.6	8	14.7	8	28	8	8.0	MS	10/27
CR02-South (68) /	10	Surr		8	8.4	8	14.7	8	29	8	8.0	MS	10/28

① MR-Actual = 29 ppt - DM - 10/19/19 ② WP - MS 10/25

ECO ANALYSTS

10 DAY SOLID PHASE TEST DATA

CLIENT	SPECIES	LABORATORY	LOCATION	TEST START DATE	
MFA	*Eohaustorius estuarius*	Port Gamble	Bath 8	18Oct19	
PROJECT		**PROJECT MANAGER**	**PROTOCOL**	**TEST END DATE**	
Seaport		Julia Baum	PSEP 1995	28Oct19	

WATER QUALITY DATA

TEST CONDITIONS				D.O. (mg/L) > 5.1		TEMP (°C) 15 ± 1		SALINITY (ppt) 28 ± 1		pH (pH units) 7-9		TECH.	Date
SAMPLE ID	DAY	REP	JAR	D.O. meter	D.O. mg/L	TEMP meter	TEMP °C	SALINITY meter	SALINITY ppt	pH meter	pH unit		
SE 15 /	0	Surr		9	8.2	9	15.2	9	27	9	7.9	DM	10/18/19
SE 15 /	1	Surr		9	8.2	9	14.7	9	26	9	7.9	DM	10/19/19
SE 15 /	2	Surr		8	8.5	8	14.7	8	26	8	7.9	NR	10/20/19
SE 15 /	3	Surr		9	8.4	9	14.8	9	26	9	7.8	NR	10/21
SE 15 /	4	Surr		8	8.6	8	15.0	8	26	8	7.8	MS	10/22
SE 15 /	5	Surr		9	8.5	9	14.9	9	26	9	7.7	DM	10/23
SE 15 /	6	Surr		9	8.4	9	14.8	9	26	9	7.8	DM	10/24
SE 15 /	7	Surr		8	8.4	8	14.9	8	26	8	7.7	MS	10/25
SE 15 /	8	Surr		9	8.4	9	14.8	9	26	9	7.7	DM	10/26
SE 15 /	9	Surr		8	8.6	8	14.6	8	26	8	7.6	MS	10/27
SE 15 /	10	Surr		8	~~8.4~~ 8.5 ①	8	14.7	8	26	8	7.6	MS	10/28
SE 16 /	0	Surr		9	8.2	9	15.1	9	27	9	7.9	DM	10/18/19
SE 16 /	1	Surr		9	8.2	9	14.8	9	26	9	7.9	DM	10/19/19
SE 16 /	2	Surr		8	8.3	8	14.7	8	26	8	7.9	NR	10/20/19
SE 16 /	3	Surr		9	8.4	9	14.7	9	26	9	7.9	NR	10/21
SE 16 /	4	Surr		8	8.6	8	14.8	8	26	8	7.9	MS	10/22
SE 16 /	5	Surr		9	8.6	9	14.7	9	26	9	7.9	DM	10/23
SE 16 /	6	Surr		9	8.3	9	14.7	9	26	9	7.9	DM	10/24
SE 16 /	7	Surr		8	8.5	8	14.8	8	26	8	7.8	MS	10/25
SE 16 /	8	Surr		9	8.1	9	14.7	9	26	9	7.9	DM	10/26
SE 16 /	9	Surr		8	8.5	8	14.6	8	26	8	7.9	MS	10/27
SE 16 /	10	Surr		8	8.6	8	14.5	8	26	8	7.8	MS	10/28

① MR-MS 10/28

ECO ANALYSTS

10 DAY SOLID PHASE TEST DATA

CLIENT	SPECIES	LABORATORY	LOCATION	TEST START DATE	
MFA	*Eohaustorius estuarius*	Port Gamble	Bath 8	18Oct19	
PROJECT		**PROJECT MANAGER**	**PROTOCOL**	**TEST END DATE**	
Seaport		Julia Baum	PSEP 1995	28Oct19	

WATER QUALITY DATA

TEST CONDITIONS				D.O. (mg/L) > 5.1		TEMP (°C) 15 ± 1		SALINITY (ppt) 28 ± 1		pH (pH units) 7-9		TECH.	Date
SAMPLE ID	DAY	REP	JAR	D.O. meter	D.O. mg/L	TEMP meter	TEMP °C	SALINITY meter	SALINITY ppt	pH meter	pH unit		
SE 17 /	0	Surr		9	8.2	9	15.2	9	27	9	8.0	DM	10/18/19
SE 17 /	1	Surr		9	8.1	9	14.8	9	27	9	8.0	DM	10/19/19
SE 17 /	2	Surr		8	8.4	8	14.7	8	27	8	8.0	NR	10/20/19
SE 17 /	3	Surr		9	8.4	9	14.8	9	27	9	8.0	NR	10/21
SE 17 /	4	Surr		8	8.6	8	15.0	8	~~26~~ 27 ①	8	~~7.9~~ 8.0 ①	MS	10/22
SE 17 /	5	Surr		9	8.6	9	14.7	9	27	9	7.9	DM	10/23
SE 17 /	6	Surr		9	8.4	9	14.7	9	27	9	8.0	DM	10/24
SE 17 /	7	Surr		8	8.5	8	14.7	8	27	8	7.9	MS	10/25
SE 17 /	8	Surr		9	8.3	9	14.8	9	27	9	7.9	DM	10/26
SE 17 /	9	Surr		8	8.6	8	14.7	8	27	8	7.9	MS	10/27
SE 17 /	10	Surr		8	8.5	8	14.9	8	27	8	7.9	MS	10/28
SE 18 /	0	Surr		9	8.0	9	15.3	9	27	9	7.9	DM	10/18/19
SE 18 /	1	Surr		9	8.0	9	14.8	9	27	9	7.9	DM	10/19/19
SE 18 /	2	Surr		8	8.3	8	14.9	8	27	8	7.9	NR	10/20/19
SE 18 /	3	Surr		9	8.3	9	14.9	9	27	9	7.8	NR	10/21
SE 18 /	4	Surr		8	8.5	8	14.9	8	26	8	7.9	MS	10/22
SE 18 /	5	Surr		9	8.5	9	15.0	9	27	9	7.8	DM	10/23
SE 18 /	6	Surr		9	8.4	9	14.7	9	27	9	7.9	DM	10/24
SE 18 /	7	Surr		8	8.5	8	14.8	8	26	8	7.8	MS	10/25
SE 18 /	8	Surr		9	8.3	9	14.8	9	27	9	7.9	DM	10/26
SE 18 /	9	Surr		8	8.5	8	14.7	8	26	8	7.9	MS	10/27
SE 18 /	10	Surr		8	8.5	8	15.0	8	27	8	7.9	MS	10/28

① WN - MS 10/22

ECO ANALYSTS

10 DAY SOLID PHASE TEST DATA

CLIENT	SPECIES	LABORATORY	LOCATION	TEST START DATE	
MFA	*Eohaustorius estuarius*	Port Gamble	Bath 8	18Oct19	
PROJECT		**PROJECT MANAGER**	**PROTOCOL**	**TEST END DATE**	
Seaport		Julia Baum	PSEP 1995	28Oct19	

WATER QUALITY DATA

TEST CONDITIONS				D.O. (mg/L) > 5.1		TEMP (°C) 15 ± 1		SALINITY (ppt) 28 ± 1		pH (pH units) 7-9		TECH.	Date
SAMPLE ID	DAY	REP	JAR	D.O. meter	D.O. mg/L	TEMP meter	TEMP °C	SALINITY meter	SALINITY ppt	pH meter	pH unit		
SE 20 /	0	Surr		9	8.3	9	15.1	9	~~26~~ 27	9	8.0	DM	10/18/19
SE 20 /	1	Surr		9	8.0	9	14.8	9	27	9	7.9	DM	10/19/19
SE 20 /	2	Surr		8	8.3	8	14.6	8	27	8	7.9	NR	10/20/19
SE 20 /	3	Surr		9	8.4	9	14.8	9	27	9	7.9	NR	10/21/19
SE 20 /	4	Surr		8	8.5	8	15.0	8	26	8	7.9	MS	10/22
SE 20 /	5	Surr		9	8.6	9	14.8	9	27	9	7.8	DM	10/23
SE 20 /	6	Surr		9	8.5	9	14.7	9	27	9	7.8	DM	10/24
SE 20 /	7	Surr		8	8.5	8	14.7	8	26	8	7.8	MS	10/25
SE 20 /	8	Surr		9	8.4	9	14.7	9	27	9	7.7	DM	10/26
SE 20 /	9	Surr		8	8.6	8	14.7	8	26	8	7.7	MS	10/27
SE 20 /	10	Surr		8	8.6	8	14.6	8	27	8	7.6	MS	10/28
SE 24 /	0	Surr		9	8.2	9	15.1	9	27	9	7.8	DM	10/18/19
SE 24 /	1	Surr		9	8.2	9	15.1	9	27	9	7.8	DM	10/19/19
SE 24 /	2	Surr		8	8.4	8	14.9	8	26	8	7.8	NR	10/20/19
SE 24 /	3	Surr		9	8.4	9	14.8	9	27	9	7.8	NR	10/21
SE 24 /	4	Surr		8	8.6	8	14.8	8	26	8	7.7	MS	10/22
SE 24 /	5	Surr		9	8.6	9	14.7	9	27	9	7.6	DM	10/23
SE 24 /	6	Surr		9	8.4	9	14.7	9	27	9	7.6	DM	10/24
SE 24 /	7	Surr		8	8.4	8	15.1	8	26	8	7.5	MS	10/25
SE 24 /	8	Surr		9	8.3	9	14.7	9	27	9	7.6	DM	10/26
SE 24 /	9	Surr		8	8.6	8	14.5	8	26	8	7.4	MS	10/27
SE 24 /	10	Surr		8	8.5	8	14.5	8	27	8	7.4	MS	10/28

① All replicates renewed prior to test initiation. WQ remeasured. JB 10/18/19.

ECO ANALYSTS

10 DAY SOLID PHASE TEST DATA

CLIENT	SPECIES	LABORATORY	LOCATION	TEST START DATE	
MFA	*Eohaustorius estuarius*	Port Gamble	Bath 8	18Oct19	
PROJECT		**PROJECT MANAGER**	**PROTOCOL**	**TEST END DATE**	
Seaport		Julia Baum	PSEP 1995	28Oct19	

WATER QUALITY DATA

TEST CONDITIONS				D.O. (mg/L) > 5.1		TEMP (°C) 15 ± 1		SALINITY (ppt) 28 ± 1		pH (pH units) 7-9		TECH.	Date
SAMPLE ID	DAY	REP	JAR	D.O.		TEMP		SALINITY		pH			
				meter	mg/L	meter	°C	meter	ppt	meter	unit		
SE 26 /	0	Surr		9	8.2	9	15.2	9	27	9	7.5	DM	10/18/19
SE 26 /	1	Surr		9	8.1	9	15.2	9	27	9	7.4	DM	10/19/19
SE 26 /	2	Surr		8	8.5	8	15.9	8	27	8	7.7	NR	10/20/19
SE 26 /	3	Surr		9	8.3	9	16.1	9	27	9	7.7	NR	10/21
SE 26 /	4	Surr		8	6.3 ①	8	15.7	8	27	8	7.3	MS	10/22
SE 26 /	5	Surr		9	8.5	9	15.1	9	27	9	7.4	DM	10/23
SE 26 /	6	Surr		9	8.4	9	15.0	9	27	9	7.5	DM	10/24
SE 26 /	7	Surr		8	8.4	8	15.0	8	27	8	7.3	MS	10/25
SE 26 /	8	Surr		9	8.4	9	14.9	9	27	9	7.4	DM	10/26
SE 26 /	9	Surr		8	8.5	8	14.8	8	27	8	7.2	MS	10/27
SE 26 /	10	Surr		8	8.5	8	14.8	8	27	8	7.2	MS	10/28
SE 31 / .	0	Surr		9	8.1	9	15.1	9	28	9	7.9	DM	10/18/19
SE 31 / .	1	Surr		9	7.8	9	15.4	9	28	9	7.8	DM	10/19/19
SE 31 / .	2	Surr		8	8.3	8	14.8	8	27	8	7.9	NR	10/20/19
SE 31 / .	3	Surr		9	8.3	9	14.9	9	27	9	7.9	NR	10/21
SE 31 / .	4	Surr		8	8.5	8	14.8	8	27	8	7.8	MS	10/22
SE 31 / .	5	Surr		9	8.5	9	14.9	9	27	9	7.8	DM	10/23
SE 31 / .	6	Surr		9	8.4	9	14.8	9	27	9	7.8	DM	10/24
SE 31 / .	7	Surr		8	8.5	8	15.0	8	27	8	7.8	MS	10/25
SE 31 / .	8	Surr		9	8.2	9	14.9	9	27	9	7.7	DM	10/26
SE 31 / .	9	Surr		8	8.6	8	14.7	8	27	8	7.7	MS	10/27
SE 31 / .	10	Surr		8	8.5	8	14.8	8	27	8	7.7	MS	10/28

① Airline not connected; connected after reading - MS 10/22
↳ remeasured, DO = 7.9

ECO ANALYSTS

10 DAY SOLID PHASE TEST DATA

CLIENT	PROJECT	PROJECT NO.	PROJECT MAN.	LAB	PROTOCOL	SPECIES
MFA	Seaport	PG1313	Julia Baum	Port Gamble Bath 8	PSEP 1995	*Eohaustorius estuarius*

#S= Number on the Surface
#M= Number of Mortality
G=Growth (fungal,bacterial)
D=No Air Flow (DO?)
N=Normal
B=No Burrows
#FOS=Floating on Surface
#E=Emergent
C=Too cloudy to observe

INITIAL # OF ORGANISMS: 20

ENDPOINT DATA & OBSERVATIONS

SAMPLE ID	REP	JAR #	INITIAL #	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	DAY 8	DAY 9	DAY 10	NUMBER REMAINING	# Dead or Comments
				DATE 10/19	DATE 10/20	DATE 10/21	DATE 10/22	DATE 10/23	DATE 10/24	DATE 10/25	DATE 10/26	DATE 10/27	DATE 10/28		
				TECHNICIAN DM	TECHNICIAN NR	TECHNICIAN NR	TECHNICIAN MS	TECHNICIAN DM	TECHNICIAN DM	TECHNICIAN MS	TECHNICIAN DM	TECHNICIAN MS	TECHNICIAN MK / JR		
				OBSERVNS.	OBSERVNS.	OBSERVNS.	OBSERVNS.	OBSERVNS.	OBSERVNS.	OBSERVNS.	OBSERVNS.	OBSERVNS.	OBSERVNS.		
Control /	1			N	N	N	N	N	N	N	N	N	N	20	
	2			↓	↓	↓	1M	↓	↓	↓	↓	↓	↓	19	
	3						N							19	
	4						↓							20	
	5			↓	↓	↓		↓	↓	↓	↓	↓	↓	20	
CR21-West (14) /	1			N	N	N	N	G	G	1S	G	N	G	19	
	2			↓	↓	↓	↓	G	G	G	G	G	↓	20	
	3							N	G	G	G	G		20	
	4							G	G	G	N	N		20	
	5			↓	↓	↓	↓	N	G	N	G	G	↓	20	
Carr20 (47) /	1			N	N	N	N	N	N	1FOS	N	G	G	20	
	2			↓	↓	↓	↓	G	G	N	G	G	↓	20	
	3							N	N	N	N	N		19	
	4							G	G	N	G	N		20	
	5			↓	↓	↓	↓	G	G	G	G	G	↓	18	
CR02-South (68) /	1			N	N	N	1FOS	N	N	N	N	N	N	20	
	2			↓	↓	↓	N	↓	↓	↓	N	↓	↓	20	
	3						N				G			19	
	4				1FOS		N		G		G			18	
	5			↓	N	↓	1M	↓	N	↓	N	↓	↓	19	

ECO ANALYSTS

10 DAY SOLID PHASE TEST DATA

CLIENT	PROJECT	PROJECT NO.	PROJECT MAN.	LAB	PROTOCOL	SPECIES
MFA	Seaport	PG1313	Julia Baum	Port Gamble Bath 8	PSEP 1995	*Eohaustorius estuarius*

#S= Number on the Surface
#M= Number of Mortality
G=Growth (fungal,bacterial)
D=No Air Flow (DO?)
N=Normal
B=No Burrows
#FOS=Floating on Surface
#E=Emergent
C=Too cloudy to observe

INITIAL # OF ORGANISMS: 20

ENDPOINT DATA & OBSERVATIONS

SAMPLE ID	REP	JAR #	INITIAL #	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	DAY 8	DAY 9	DAY 10	NUMBER REMAINING	# Dead or Comments
				DATE 10/19	DATE 10/20	DATE 10/21	DATE 10/22	DATE 10/23	DATE 10/24	DATE 10/25	DATE 10/26	DATE 10/27	DATE 10/28		
				TECHNICIAN	TECHNICIAN	TECHNICIAN	TECHNICIAN	TECHNICIAN	TECHNICIAN	TECHNICIAN	TECHNICIAN	TECHNICIAN	TECHNICIAN		
				DM	NR	NR	MS	DM	DM	MS	DM	MS	MK / JB		
				OBSERVNS.	OBSERVNS.	OBSERVNS.	OBSERVNS.	OBSERVNS.	OBSERVNS.	OBSERVNS.	OBSERVNS.	OBSERVNS.	OBSERVNS.		
SE 15 /	1			N	N	N	N	N	N	N	N	N	N	13	
	2				3 FOS	3 FOS		3 FOS				1 FOS		18	
	3				N	N		N				N		0	①
	4							N						0	①
	5							N	G					19	
SE 16 /	1			N	N	N	N	N	N	N	N	N	N	17	
	2													20	
	3								G					19	
	4													20	
	5					1 FOS			G					20	
SE 17 /	1			2 FOS	N	N	1 FOS	1 FOS	N	N	N	1 FOS	N	19	
	2			1 FOS			N	N			N	N		18	
	3			N							G	G		19	
	4										N	N		12	①
	5										N			11	
SE 18 /	1			N	N	N	N	1 FOS	N	N	N	N	N	20	
	2						N	N			G	N	1E	19	
	3					4 FOS	1 FOS				N	1 FOS	1E	19	
	4					N	N		G			N	N	19	
	5					N	N					N	N	19	

① Nereid polychaete present (2" long). MK 10/28.

ECO ANALYSTS

10 DAY SOLID PHASE TEST DATA

CLIENT	PROJECT	PROJECT N0.	PROJECT MAN.	LAB	PROTOCOL	SPECIES
MFA	Seaport	PG1313	Julia Baum	Port Gamble Bath 8	PSEP 1995	*Eohaustorius estuarius*

#S= Number on the Surface
#M= Number of Mortality
G=Growth (fungal,bacterial)
D=No Air Flow (DO?)
N=Normal
B=No Burrows
#FOS=Floating on Surface
#E=Emergent
C=Too cloudy to observe

INITIAL # OF ORGANISMS: 20

ENDPOINT DATA & OBSERVATIONS

SAMPLE ID	REP	JAR #	INITIAL #	DAY 1 OBSERVNS.	DAY 2 OBSERVNS.	DAY 3 OBSERVNS.	DAY 4 OBSERVNS.	DAY 5 OBSERVNS.	DAY 6 OBSERVNS.	DAY 7 OBSERVNS.	DAY 8 OBSERVNS.	DAY 9 OBSERVNS.	DAY 10 OBSERVNS.	NUMBER REMAINING	# Dead or Comments
				DATE 10/19 TECHNICIAN DM	DATE 10/20 TECHNICIAN NR	DATE 10/21 TECHNICIAN NR	DATE 10/22 TECHNICIAN MS	DATE 10/23 TECHNICIAN DM	DATE 10/24 TECHNICIAN DM	DATE 10/25 TECHNICIAN MS	DATE 10/26 TECHNICIAN DM	DATE 10/27 TECHNICIAN MS	DATE 10/28 TECHNICIAN MK / JB		
SE 20 /	1			1FOS	N	N	1FOS	N	N	N	N	N	N	20	
	2			N		1FOS	N	G	G	N				15	1M ①
	3			2FOS		N	N	1FOS	N	2FOS				1	①
	4			2FOS		1FOS	1FOS	N	N	1FOS	1FOS			0	
	5			N		N	1FOS	N	G	N	N			17	
SE 24 /	1			N	4FOS	1FOS	N	N	N	N	N	N	N	17	
	2				1FOS	2FOS	N	2FOS	G		N			20	
	3				N	2FOS	1FOS	1FOS	1FOS		1FOS		1FOS	20	
	4				N	N	1FOS	N	N		N		N	19	
	5			3FOS	2FOS	3FOS	1M	N	N	1FOS	N		N	9	①
SE 26 /	1			1FOS	G	G	G	N	G	N	G	G	G	20	
	2			3FOS	1FOS	G	G	1FOS, G	G	G	N	N	N	20	
	3			N	2FOS	G	1FOS, G	N	N		G			19	
	4				N	G	G	N	N		N			20	
	5				G	2FOS, G	G	1FOS	N		1FOS			19	
SE 31 / .	1			N	N	N	N	N	N	N	N	N	N	20	
	2			1FOS							N		IE	16	
	3			N							1FOS		N	19	
	4				2FOS		1FOS				N			20	
	5				N	IE	N				N			18	1M

① Nereid polychaete(s) present. MK 10/28

Ammonia and Sulfide Analysis Record

Client/Project: MFA ① Terra Seaport | **Organism:** Eohs | **Test Duration (days):** 10 days

PRETEST / (INITIAL) / ~~FINAL~~ / OTHER (circle one) **DAY of TEST:** 0

OVERLYING (OV) / POREWATER (PW) (circle one) / Comments:

Calibration Standards Temperature		
Date: 10/18/19	**Temperature:** 22.4	Sample temperature should be within ±1°C of standards temperature at time and date of analysis.

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Meter #/ Temp (°C)	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. (µg/L)	Multi-plier	Calc-ulated Sulf. (µg/L)
OV SE 0	SUFF	10/18/19 MS/DM	0.218	T1 ~~20.4~~	10/18/19 DM/MS	N			10	ND		
CR20-WEST 14'.			0.920	21.9						4		
CARR 20 47'.			0.723	22.0						ND		
CR02 68'.			0.298	23.4						1		
SE-15			0.272	21.4						5		
-16			0.375	21.4						7		
-17			0.693	21.4						0		
-18			0.773	21.4						3		
-20			0.906	21.4						4		
-24			0.535	21.4						1		
-26			0.227	21.4						ND		
-31			0.412	21.4						6		
PW SE 0			0.440	22.0			7.6	30		~~3~~ 15		
CR20-WEST 14'.			3.36	22.3			7.4	29		~~8~~ 159		
CARR20-47'.			5.94	22.4			7.7	29		~~9~~ 16		
CR02-68'.			1.78	22.4			7.6	29		72		
SE-15			1.24	22.1			7.2	24		ND		
-16			2.47	22.2			7.6	24		ND		
-17			2.71	22.0			7.3	22		8		
-18			1.82	22.4			7.1	25		ND		
~~-19~~ 20①			2.26	22.2			7.5	24		ND		
-24			1.72	21.7			6.5	~~26~~ 23②		83		

① IE-MS 10/18/19 ② warmed up to 22.0 - DM-10/18/19 ③ MR-MS 10/18/19

Ammonia and Sulfide Analysis Record

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Meter #/ Temp (°C)		Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. µg (~~mg~~/L) ③	Multi-plier	Calc-ulated Sulf. (mg/L)
PW SE-26	SURR	10/18/19 MS/DM	0.672	T1	~~21.7~~ ①	10/18/19 DM/MS	N	6.0	②29 27	10	157	—	
↓ -31	↓	↓	1.31	T1		↓	↓	7.2	27	10	ND	—	

① WC - actual = 22.3 10/18/19 MS
② IE - actual = 27 10/18/19 MS
③ S^{2-} recorded as µg/L, not mg/L - MS 10/18/19

Ammonia and Sulfide Analysis Record

Client/Project: MFA / Seaport	Organism: Eohs	Test Duration (days): 10

PRETEST / INITIAL / (FINAL) / OTHER (circle one)

(OVERLYING (OV)) / (POREWATER (PW)) (circle one) / Comments: _____ DAY of TEST: 10

Calibration Standards Temperature		
Date: 10/28/19	Temperature: 22.4	Sample temperature should be within ±1°C of standards temperature at time and date of analysis.

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Meter # / Temp (°C)	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. (µg/L)	Multi-plier	Calc-ulated Sulf. (µg/L)
OV 0	SURR.	10/28/19 MS	0.176	T1 22.4	10/28/19 MS	Y (1)			10	ND		
CR21-West (14)			1.62	22.4						0		
Carr20 (47)			0.403	22.4						ND		
CR-02South (68)			0.171	22.4						ND		
SE-15			0.0328	22.4						ND		
-16			0.00	22.4						ND		
-17			0.0151	22.4						ND		
-18			0.0920	22.4						ND		
-20			0.00	22.4						16		
-24			1.23	22.4						ND		
-26			0.573	22.4						ND		
-31			0.00	22.4						ND		
PW 0			0.110	22.2			7.4	28		ND		
CR21-West (14)			3.14	22.2			7.6	29		115		
Carr20 (47)			1.86	22.2			7.5	29		161		
CR-02South (68)			1.01	22.4			7.6	29		3		
SE-15			0.637	22.4			6.9	26		4		
-16			0.304	22.2			7.3	27		7		
-17			0.329	22.4			7.2	27		ND		
-18			0.531	22.4			7.3	27		ND		
-20			0.281	22.4			7.0	27		ND		
-24			1.73	22.4			6.6	27		1		

(1) S^{2-} preserved on 10/28

Ammonia and Sulfide Analysis Record

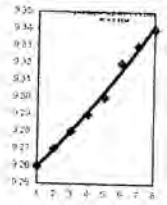
Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Meter #/ Temp (°C)		Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. (mg/L)	Multi-plier	Calc-ulated Sulf. (mg/L)
PW SE-26	SURR.	10/28/19 MS	0.988	T1	22.4	10/28/19 MS	Y ①	6.2	27	10	4		
↓ -31	↓	↓	0.359	↓	22.4	↓	↓	7.1	28	↓	ND		

① S^{2-} preserved on 10/28

CLIENT:	MFA	Test Date:	18-Oct-19
PROJECT:	Seaport	Test Type:	Eoh SP
COMMENTS:	Initial Ammonia		

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer: I-factor	
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
	9.34



	Sample	Mod	NH3T (mg/L)	salinity (ppt)	pH	temp (C)	temp (K)	i-factor	Mod	NH3U (mg/L)	
	Target / Sample Name		Actual	22.9	8.0	24.1	297.26	9.3053		#VALUE!	
	Example 3.5		2.000	10.0	7.5	5.0	278.16	9.2750		0.008	
1	Control		0.218	28	7.90	15.1	288.26	9.3187		0.004	OV Day 0
2	CR21-West (14%)		0.420	29	8.00	15.2	288.36	9.3214		0.010	
3	Carr20 (47%)		0.723	29	8.00	15.1	288.26	9.3214		0.016	
4	CR02-South (68%)		0.298	29	8.00	15.1	288.26	9.3214		0.007	
5	SE-15		0.272	27	7.90	15.2	288.36	9.3160		0.005	
6	SE-16		0.375	27	7.90	15.1	288.26	9.3160		0.007	
7	SE-17		0.693	27	8.0	15.2	288.36	9.3160		0.016	
8	SE-18		0.773	27	7.9	15.3	288.46	9.3160		0.014	
9	SE-20		0.906	27	8.0	15.1	288.26	9.3160		0.021	
10	SE-24		0.535	27	7.8	15.1	288.26	9.3160		0.008	
11	SE-26		0.227	27	7.50	15.2	288.36	9.3160		0.002	
12	SE-31		0.412	28	7.9	15.1	288.26	9.3187		0.007	
13	Control		0.440	30	7.6	15.1	288.26	9.3242		0.004	PW Day 0
14	CR21-West (14%)		3.36	29	7.4	15.2	288.36	9.3214		0.019	
15	Carr20 (47%)		5.94	29	7.7	15.1	288.26	9.3214		0.068	
16	CR02-South (68%)		1.78	29	7.6	15.1	288.26	9.3214		0.016	
17	SE-15		1.24	24	7.2	15.2	288.36	9.3081		0.005	
18	SE-16		2.47	24	7.6	15.1	288.26	9.3081		0.023	
19	SE-17		2.71	22	7.3	15.2	288.36	9.3030		0.013	
20	SE-18		1.82	25	7.1	15.3	288.46	9.3107		0.005	
21	SE-20		2.26	24	7.5	15.1	288.26	9.3081		0.017	
22	SE-24		1.72	23	6.5	15.1	288.26	9.3055		0.001	
23	SE-26		0.672	27	6.0	15.2	288.36	9.3160		0.000	
24	SE-31		1.31	27	7.2	15.1	288.26	9.3160		0.005	
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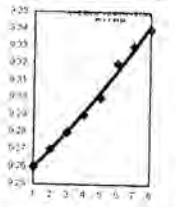
CLIENT:	MFA	Test Date:	18-Oct-19
PROJECT:	Seaport	Test Type:	Eoh SP
COMMENTS:	Final Ammonia		

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer: I-factor	
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
	9.34



	Sample	Mod	NH3T (mg/L)	salinity (ppt)	pH	temp (C)	temp (K)	i-factor	Mod	NH3U (mg/L)	
	Target / Sample Name		Actual	22.9	8.0	24.1	297.26	9.3053		#VALUE!	
	Example 3.5		2.000	10.0	7.5	5.0	278.16	9.2750		0.008	
1	Control		0.176	28	8.10	14.7	287.86	9.3187		0.005	OV Day 10
2	CR21-West (14%)		1.62	29	8.20	14.7	287.86	9.3214		0.055	
3	Carr20 (47%)		0.403	28	8.20	14.7	287.86	9.3187		0.014	
4	CR02-South (68%)		0.171	29	8.00	14.7	287.86	9.3214		0.004	
5	SE-15		0.0328	26	7.60	14.7	287.86	9.3133		0.000	
6	SE-16		0.000	26	7.80	14.5	287.66	9.3133		0.000	
7	SE-17		0.0151	27	7.9	14.9	288.06	9.3160		0.000	
8	SE-18		0.0920	27	7.9	15.0	288.16	9.3160		0.002	
9	SE-20		0.000	27	7.6	14.6	287.76	9.3160		0.000	
10	SE-24		1.23	27	7.4	14.5	287.66	9.3160		0.007	
11	SE-26		0.573	27	7.20	14.8	287.96	9.3160		0.002	
12	SE-31		0.000	27	7.7	14.8	287.96	9.3160		0.000	
13	Control		0.110	28	7.4	14.7	287.86	9.3187		0.001	PW Day 10
14	CR21-West (14%)		3.14	29	7.6	14.7	287.86	9.3214		0.028	
15	Carr20 (47%)		1.86	29	7.5	14.7	287.86	9.3214		0.013	
16	CR02-South (68%)		1.01	29	7.6	14.7	287.86	9.3214		0.009	
17	SE-15		0.637	26	6.9	14.7	287.86	9.3133		0.001	
18	SE-16		0.304	27	7.3	14.5	287.66	9.3160		0.001	
19	SE-17		0.329	27	7.2	14.9	288.06	9.3160		0.001	
20	SE-18		0.531	27	7.3	15.0	288.16	9.3160		0.002	
21	SE-20		0.281	27	7.0	14.6	287.76	9.3160		0.001	
22	SE-24		1.73	27	6.6	14.5	287.66	9.3160		0.002	
23	SE-26		0.988	27	6.2	14.8	287.96	9.3160		0.000	
24	SE-31		0.359	28	7.1	14.8	287.96	9.3187		0.001	
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Seaport - Eoh Sulfides

		Input				Output	
	Sample ID	Total Dissolved Sulfide (µg/L as S)	Temper-ature (°C)	Salinity (‰)	pH	Undissociated H2S (µg/L as H2S)	Weight Fraction (H2S/Total S)
OV Day 0	Control	ND	15.1	28	7.9	#VALUE!	#VALUE!
	CR21-West (14)	4	15.2	29	8.0	0.31	7.87%
	Carr20 (47)	ND	15.1	29	8.0	#VALUE!	#VALUE!
	CR02-South (68)	1	15.1	29	8.0	0.08	7.90%
	SE-15	5	15.2	27	7.9	0.49	9.81%
	SE-16	7	15.1	27	7.9	0.69	9.84%
	SE-17	0	15.2	27	8.0	0.00	#DIV/0!
	SE-18	3	15.3	27	7.9	0.29	9.77%
	SE-20	4	15.1	27	8.0	0.3187	7.97%
	SE-24	1	15.1	27	7.8	0.12	12.10%
	SE-26	ND	15.2	27	7.5	#VALUE!	#VALUE!
	SE-31	6	15.1	28	7.9	0.59	9.80%
PW Day 0	Control	15	15.1	30	7.6	2.67	17.77%
	CR21-West (14)	159	15.2	29	7.4	40.80	25.66%
	Carr20 (47)	16	15.1	29	7.7	2.35	14.67%
	CR02-South (68)	72	15.1	29	7.6	12.84	17.83%
	SE-15	ND	15.2	24	7.2	#VALUE!	#VALUE!
	SE-16	ND	15.1	24	7.6	#VALUE!	#VALUE!
	SE-17	8	15.2	22	7.3	2.50	31.27%
	SE-18	ND	15.3	25	7.1	#VALUE!	#VALUE!
	SE-20	ND	15.1	24	7.5	#VALUE!	#VALUE!
	SE-24	83	15.1	23	6.5	63.87	76.95%
	SE-26	157	15.2	27	6.0	148.48	94.57%
	SE-31	ND	15.1	27	7.2	#VALUE!	#VALUE!
OV Day 10	Control	ND	14.7	28	8.1	#VALUE!	#VALUE!
	CR21-West (14)	0	14.7	29	8.2	0.00	#DIV/0!
	Carr20 (47)	ND	14.7	28	8.2	#VALUE!	#VALUE!
	CR02-South (68)	ND	14.7	29	8.0	#VALUE!	#VALUE!
	SE-15	ND	14.7	26	7.6	#VALUE!	#VALUE!
	SE-16	ND	14.5	26	7.8	#VALUE!	#VALUE!
	SE-17	ND	14.9	27	7.9	#VALUE!	#VALUE!
	SE-18	ND	15.0	27	7.9	#VALUE!	#VALUE!
	SE-20	16	14.6	27	7.6	2.92	18.27%
	SE-24	ND	14.5	27	7.4	#VALUE!	#VALUE!
	SE-26	ND	14.8	27	7.2	#VALUE!	#VALUE!
	SE-31	ND	14.8	27	7.7	#VALUE!	#VALUE!
PW Day 10	Control	ND	14.7	28	7.4	#VALUE!	#VALUE!
	CR21-West (14)	115	14.7	29	7.6	20.77	18.06%
	Carr20 (47)	161	14.7	29	7.5	35.07	21.78%
	CR02-South (68)	3	14.7	29	7.6	0.54	18.06%
	SE-15	4	14.7	26	6.9	2.17	54.22%
	SE-16	7	14.5	27	7.3	2.18	31.21%
	SE-17	ND	14.9	27	7.2	#VALUE!	#VALUE!
	SE-18	ND	15.0	27	7.3	#VALUE!	#VALUE!
	SE-20	ND	14.6	27	7.0	#VALUE!	#VALUE!
	SE-24	1	14.5	27	6.6	0.72	71.81%
	SE-26	4	14.8	27	6.2	3.56	89.07%
	SE-31	ND	14.8	28	7.1	#VALUE!	#VALUE!

1.2 *Eohaustorius estuarius* Statistical Results

Project Name: Seaport Eohs % Mortality

Sample:	x1
Samp ID:	SE-15
Alias:	
Replicates:	3
Mean:	0.167
SD:	0.161
Tr Mean:	N/A
Trans SD:	N/A

Ref Samp:	x2
Ref ID:	Carr20 (47% fines)
Alias:	
Replicates:	5
Mean:	0.03
SD:	0.045
Tr Mean:	N/A
Trans SD:	N/A

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	0.534
SS:	5.422
K:	4
b:	2.089
Alpha Level:	0.1
Calculated Value:	0.8049
Critical Value:	<= 0.851
Normally Distributed:	No
Override Option:	Not Invoked

Levene's Results:

Test Residual Mean:	0.82
Test Residual SD:	0.443
Ref. Residual Mean:	0.742
Ref. Residual SD:	0.253
Deg. of Freedom:	6
Alpha Level:	0.1
Calculated Value:	0.3229
Critical Value:	>= 1.943
Variances Homogeneous:	Yes

Test Results:

Statistic:	Mann-Whitney
Balanced Design:	Yes
Transformation:	rank-order
Experimental Hypothesis	
Null:	x1 <= x2
Alternate:	x1 > x2
Mann-Whitney N1:	3
Mann-Whitney N2:	5
Degrees of Freedom:	
Experimental Alpha Level:	0.05
Calculated Value:	13
Critical Value:	>= 14.000
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0.35	8	0	2	1.23	0.619	2		-0.88
2	0.1	6.5	0	2	0.35	0.619	2		-0.619
3	0.05	4.5	0.05	4.5	0.88	0.663	2		-0.619
4			0	2		0.619	4.5		-0.619
5			0.1	6.5		1.193	4.5		-0.35
6							6.5		0.663
7							6.5		1.193
8							8		1.23
9							0		0
10							0		0

Project Name: Seaport Eohs % Mortality

Sample:	x1
Samp ID:	SE-16
Alias:	
Replicates:	5
Mean:	0.04
SD:	0.065
Tr Mean:	N/A
Trans SD:	N/A

Ref Samp:	x2
Ref ID:	Carr20 (47% fines)
Alias:	
Replicates:	5
Mean:	0.03
SD:	0.045
Tr Mean:	N/A
Trans SD:	N/A

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	0.613
SS:	7.129
K:	5
b:	2.336
Alpha Level:	0.05
Calculated Value:	0.7652
Critical Value:	<= 0.842
Normally Distributed:	No
Override Option:	Not Invoked

Levene's Results:

Test Residual Mean:	0.84
Test Residual SD:	0.383
Ref. Residual Mean:	0.742
Ref. Residual SD:	0.253
Deg. of Freedom:	8
Alpha Level:	0.1
Calculated Value:	0.4763
Critical Value:	>= 1.860
Variances Homogeneous:	Yes

Test Results:

Statistic:	Mann-Whitney
Balanced Design:	Yes
Transformation:	rank-order
Experimental Hypothesis	
Null:	x1 <= x2
Alternate:	x1 > x2
Mann-Whitney N1:	5
Mann-Whitney N2:	5
Degrees of Freedom:	
Experimental Alpha Level:	0.05
Calculated Value:	13
Critical Value:	>= 21.000
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0.15	10	0	3.5	1.519	0.619	3.5		-0.7
2	0	3.5	0	3.5	0.7	0.619	3.5		-0.7
3	0.05	7.5	0.05	7.5	0.581	0.663	3.5		-0.7
4	0	3.5	0	3.5	0.7	0.619	3.5		-0.619
5	0	3.5	0.1	9	0.7	1.193	3.5		-0.619
6							3.5		-0.619
7							7.5		0.581
8							7.5		0.663
9							9		1.193
10							10		1.519

Project Name: Seaport Eohs % Mortality

Sample:	x1
Samp ID:	SE-17
Alias:	
Replicates:	5
Mean:	0.21
SD:	0.198
Tr Mean:	2.369
Trans SD:	1.269

Ref Samp:	x2
Ref ID:	CR02-South (68% fines)
Alias:	
Replicates:	5
Mean:	0.04
SD:	0.042
Tr Mean:	0.875
Trans SD:	0.828

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	0.695
SS:	9.179
K:	5
b:	2.827
Alpha Level:	0.05
Calculated Value:	0.8707
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	1.093
Test Residual SD:	0.34
Ref. Residual Mean:	0.7
Ref. Residual SD:	0.269
Deg. of Freedom:	8
Alpha Level:	0.1
Calculated Value:	2.0304
Critical Value:	>= 1.860
Variances Homogeneous:	No

Test Results:

Statistic:	Approximate t
Balanced Design:	Yes
Transformation:	ArcSin
Experimental Hypothesis	
Null:	x1 <= x2
Alternate:	x1 > x2
Degrees of Freedom:	7
Experimental Alpha Level:	0.05
Calculated Value:	2.206
Critical Value:	>= 1.895
Accept Null Hypothesis:	No
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0.05	1.281	0	0	1.088	0.875			-1.088
2	0.1	1.812	0	0	0.557	0.875			-1.088
3	0.05	1.281	0.05	1.281	1.088	0.406			-0.875
4	0.4	3.626	0.1	1.812	1.257	0.937			-0.875
5	0.45	3.846	0.05	1.281	1.477	0.406			-0.557
6									0.406
7									0.406
8									0.937
9									1.257
10									1.477

Project Name: Seaport Eohs % Mortality

Sample:	x1
Samp ID:	SE-18
Alias:	
Replicates:	5
Mean:	0.04
SD:	0.022
Tr Mean:	N/A
Trans SD:	N/A

Ref Samp:	x2
Ref ID:	CR02-South (68% fines)
Alias:	
Replicates:	5
Mean:	0.04
SD:	0.042
Tr Mean:	N/A
Trans SD:	N/A

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	0.462
SS:	4.053
K:	5
b:	1.822
Alpha Level:	0.05
Calculated Value:	0.8192
Critical Value:	<= 0.842
Normally Distributed:	No
Override Option:	Not Invoked

Levene's Results:

Test Residual Mean:	0.41
Test Residual SD:	0.344
Ref. Residual Mean:	0.7
Ref. Residual SD:	0.269
Deg. of Freedom:	8
Alpha Level:	0.1
Calculated Value:	1.4847
Critical Value:	>= 1.860
Variances Homogeneous:	Yes

Test Results:

Statistic:	Mann-Whitney
Balanced Design:	Yes
Transformation:	rank-order
Experimental Hypothesis	
Null:	x1 <= x2
Alternate:	x1 > x2
Mann-Whitney N1:	5
Mann-Whitney N2:	5
Degrees of Freedom:	
Experimental Alpha Level:	0.05
Calculated Value:	13
Critical Value:	>= 21.000
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0	2	0	2	1.025	0.875	2		-1.025
2	0.05	6.5	0	2	0.256	0.875	2		-0.875
3	0.05	6.5	0.05	6.5	0.256	0.406	2		-0.875
4	0.05	6.5	0.1	10	0.256	0.937	6.5		0.256
5	0.05	6.5	0.05	6.5	0.256	0.406	6.5		0.256
6							6.5		0.256
7							6.5		0.256
8							6.5		0.406
9							6.5		0.406
10							10		0.937

Project Name: Seaport Eohs % Mortality

Sample:	x1
Samp ID:	SE-20
Alias:	
Replicates:	3
Mean:	0.133
SD:	0.126
Tr Mean:	1.695
Trans SD:	1.503

Ref Samp:	x2
Ref ID:	CR02-South (68% fines)
Alias:	
Replicates:	5
Mean:	0.04
SD:	0.042
Tr Mean:	0.875
Trans SD:	0.828

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	0.618
SS:	7.259
K:	4
b:	2.552
Alpha Level:	0.1
Calculated Value:	0.897
Critical Value:	<= 0.851
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	1.13
Test Residual SD:	0.586
Ref. Residual Mean:	0.7
Ref. Residual SD:	0.269
Deg. of Freedom:	6
Alpha Level:	0.1
Calculated Value:	1.4591
Critical Value:	>= 1.943
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	ArcSin

Experimental Hypothesis

Null:	x1 <= x2
Alternate:	x1 > x2
Degrees of Freedom:	6
Experimental Alpha Level:	0.05
Calculated Value:	1.0211
Critical Value:	>= 1.943
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0	0	0	0	1.695	0.875			-1.695
2	0.25	2.866	0	0	1.171	0.875			-0.875
3	0.15	2.22	0.05	1.281	0.524	0.406			-0.875
4			0.1	1.812		0.937			0.406
5			0.05	1.281		0.406			0.406
6									0.524
7									0.937
8									1.171
9									0
10									0

Project Name: Seaport Eohs % Mortality

Sample:	x1
Samp ID:	SE-24
Alias:	
Replicates:	5
Mean:	0.15
SD:	0.232
Tr Mean:	1.551
Trans SD:	1.777

Ref Samp:	x2
Ref ID:	Carr20 (47% fines)
Alias:	
Replicates:	5
Mean:	0.03
SD:	0.045
Tr Mean:	0.619
Trans SD:	0.868

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	0.907
SS:	15.644
K:	5
b:	3.79
Alpha Level:	0.05
Calculated Value:	0.9184
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	1.348
Test Residual SD:	0.941
Ref. Residual Mean:	0.742
Ref. Residual SD:	0.253
Deg. of Freedom:	8
Alpha Level:	0.1
Calculated Value:	1.3909
Critical Value:	>= 1.860
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	ArcSin
Experimental Hypothesis	
Null:	x1 <= x2
Alternate:	x1 > x2
Degrees of Freedom:	8
Experimental Alpha Level:	0.05
Calculated Value:	1.0539
Critical Value:	>= 1.860
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0.15	2.22	0	0	0.669	0.619			-1.551
2	0	0	0	0	1.551	0.619			-1.551
3	0	0	0.05	1.281	1.551	0.663			-0.619
4	0.05	1.281	0	0	0.27	0.619			-0.619
5	0.55	4.253	0.1	1.812	2.702	1.193			-0.619
6									-0.27
7									0.663
8									0.669
9									1.193
10									2.702

Project Name: Seaport Eohs % Mortality

Sample:	x1
Samp ID:	SE-26
Alias:	
Replicates:	5
Mean:	0.02
SD:	0.027
Tr Mean:	N/A
Trans SD:	N/A

Ref Samp:	x2
Ref ID:	CR21-West (14% fines)
Alias:	
Replicates:	5
Mean:	0.01
SD:	0.022
Tr Mean:	N/A
Trans SD:	N/A

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	0.416
SS:	3.283
K:	5
b:	1.578
Alpha Level:	0.05
Calculated Value:	0.7588
Critical Value:	<= 0.842
Normally Distributed:	No
Override Option:	Not Invoked

Levene's Results:

Test Residual Mean:	0.615
Test Residual SD:	0.14
Ref. Residual Mean:	0.41
Ref. Residual SD:	0.344
Deg. of Freedom:	8
Alpha Level:	0.1
Calculated Value:	1.2344
Critical Value:	>= 1.860
Variances Homogeneous:	Yes

Test Results:

Statistic:	Mann-Whitney
Balanced Design:	Yes
Transformation:	rank-order
Experimental Hypothesis	
Null:	x1 <= x2
Alternate:	x1 > x2
Mann-Whitney N1:	5
Mann-Whitney N2:	5
Degrees of Freedom:	
Experimental Alpha Level:	0.05
Calculated Value:	15
Critical Value:	>= 21.000
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0	4	0.05	9	0.513	1.025	4		-0.513
2	0	4	0	4	0.513	0.256	4		-0.513
3	0.05	9	0	4	0.769	0.256	4		-0.513
4	0	4	0	4	0.513	0.256	4		-0.256
5	0.05	9	0	4	0.769	0.256	4		-0.256
6							4		-0.256
7							4		-0.256
8							9		0.769
9							9		0.769
10							9		1.025

Project Name: Seaport Eohs % Mortality

Sample:	x1
Samp ID:	SE-31
Alias:	
Replicates:	5
Mean:	0.07
SD:	0.084
Tr Mean:	1.131
Trans SD:	1.129

Ref Samp:	x2
Ref ID:	Carr20 (47% fines)
Alias:	
Replicates:	5
Mean:	0.03
SD:	0.045
Tr Mean:	0.619
Trans SD:	0.868

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	0.653
SS:	8.108
K:	5
b:	2.702
Alpha Level:	0.05
Calculated Value:	0.9004
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	0.905
Test Residual SD:	0.5
Ref. Residual Mean:	0.742
Ref. Residual SD:	0.253
Deg. of Freedom:	8
Alpha Level:	0.1
Calculated Value:	0.649
Critical Value:	>= 1.860
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	ArcSin
Experimental Hypothesis	
Null:	x1 <= x2
Alternate:	x1 > x2
Degrees of Freedom:	8
Experimental Alpha Level:	0.05
Calculated Value:	0.8051
Critical Value:	>= 1.860
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0	0	0	0	1.131	0.619			-1.131
2	0.2	2.563	0	0	1.432	0.619			-1.131
3	0.05	1.281	0.05	1.281	0.15	0.663			-0.619
4	0	0	0	0	1.131	0.619			-0.619
5	0.1	1.812	0.1	1.812	0.681	1.193			-0.619
6									0.15
7									0.663
8									0.681
9									1.193
10									1.432

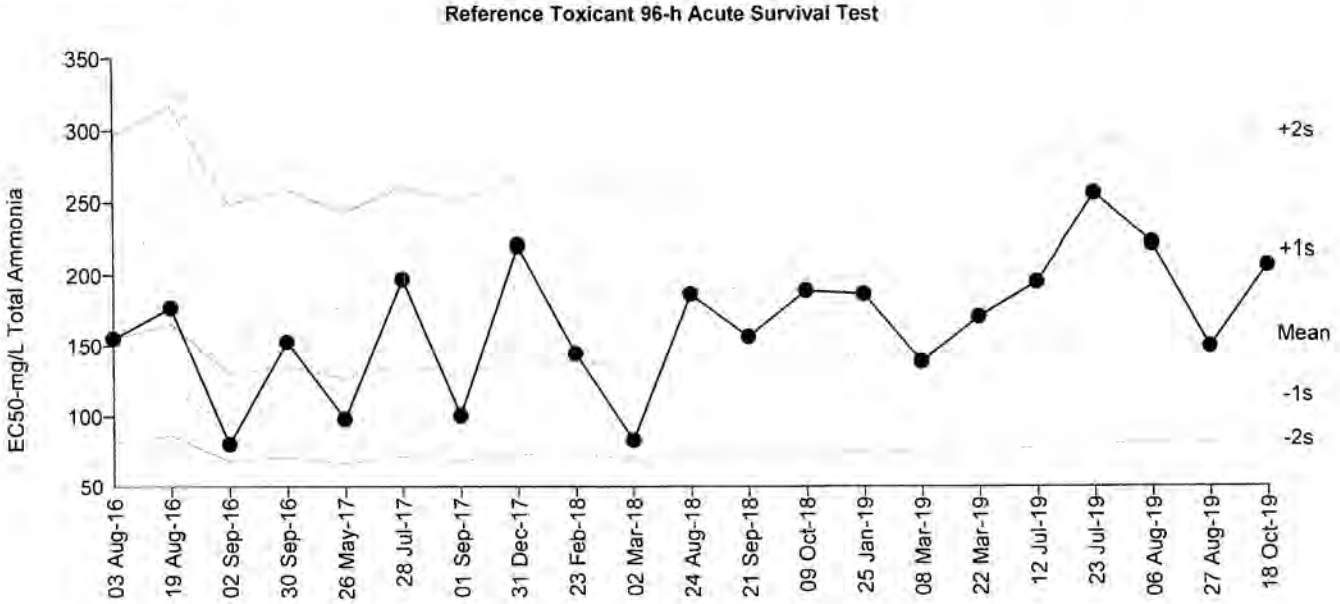
1.3 *Eohaustorius estuarius* Reference Toxicant Test Results

CETIS QC Plot

Report Date: 24 Oct-19 10:33 (1 of 1)

Reference Toxicant 96-h Acute Survival Test — **All Matching Labs**

Test Type: Survival | **Organism:** Eohaustorius estuarius (Amphipod) | **Material:** Total Ammonia
Protocol: EPA/600/R-94/025 (1994) | **Endpoint:** Proportion Survived | **Source:** Reference Toxicant-REF



Mean:	155.7	**Count:**	20	**-1s Warning Limit:**	112.6	**-2s Action Limit:**	81.45
Sigma:	n/a	**CV:**	33.20%	**+1s Warning Limit:**	215.2	**+2s Action Limit:**	297.4

Quality Control Data

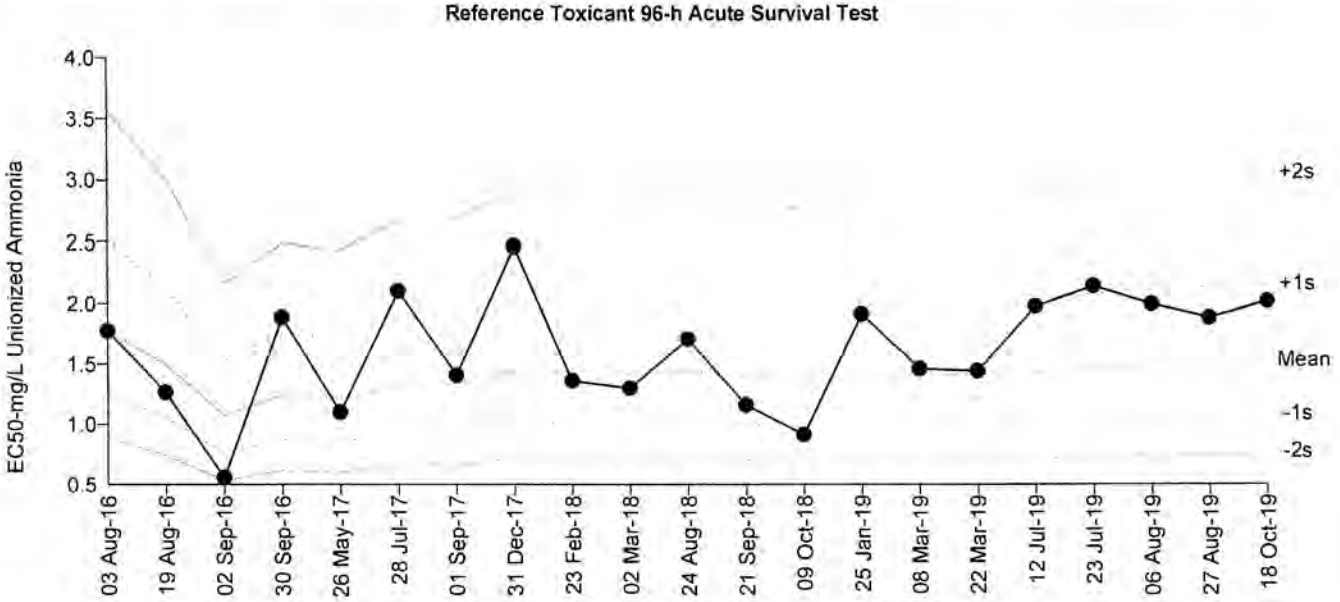
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2016	Aug	3	16:55	155	-0.6748	-0.01341			15-5854-7986	14-0317-8212	ENVIRON
2			19	14:25	177	21.25	0.3951			10-0746-9736	13-2092-5186	ENVIRON
3		Sep	2	16:25	80.2	-75.51	-2.049	(-)	(-)	06-2389-4542	16-8119-8926	ENVIRON
4			30	15:00	152.6	-3.063	-0.06135			16-2341-4864	11-2277-7148	ENVIRON
5	2017	May	26	13:00	97.99	-57.72	-1.43	(-)		06-2743-8362	04-6967-6524	EcoAnalysts
6		Jul	28	14:20	196.9	41.14	0.7241			14-8451-4586	00-9100-0373	EcoAnalysts
7		Sep	1	15:45	100.5	-55.24	-1.353	(-)		02-8963-0820	06-1020-6763	EcoAnalysts
8		Dec	31	15:47	220.3	64.6	1.072	(+)		09-7306-1854	08-4856-6308	EcoAnalysts
9	2018	Feb	23	13:35	144.3	-11.39	-0.2346			21-0530-3984	12-8139-0101	EcoAnalysts
10		Mar	2	11:45	83.01	-72.7	-1.943	(-)		11-4485-4691	17-1248-6929	EcoAnalysts
11		Aug	24	15:55	186.5	30.84	0.558			16-5739-3244	17-2559-2384	EcoAnalysts
12		Sep	21	14:35	156.5	0.8183	0.01619			04-4036-5270	08-2459-0313	EcoAnalysts
13		Oct	9	15:00	189.1	33.43	0.6007			20-4720-6933	11-3401-1593	EcoAnalysts
14	2019	Jan	25	13:35	186.7	31.04	0.5613			11-7689-4812	16-8013-2403	EcoAnalysts
15		Mar	8	15:05	138.7	-17.05	-0.3581			13-2397-9481	18-8307-3890	EcoAnalysts
16			22	14:35	170.7	15	0.2841			01-8305-5138	03-7924-8286	EcoAnalysts
17		Jul	12	15:00	195.3	39.55	0.699			11-8021-4502	08-1650-3490	EcoAnalysts
18			23	15:15	256.2	100.4	1.537	(+)		17-6815-2027	16-9000-1675	EcoAnalysts
19		Aug	6	15:55	221.9	66.18	1.094	(+)		04-7165-8948	01-3458-4366	EcoAnalysts
20			27	14:25	149.5	-6.218	-0.1259			16-1141-7710	18-3800-2446	EcoAnalysts
21		Oct	18	14:40	206.9	51.24	0.8785			10-1139-9672	04-6029-5418	EcoAnalysts

CETIS QC Plot

Report Date: 24 Oct-19 10:33 (1 of 1)

Reference Toxicant 96-h Acute Survival Test — **All Matching Labs**

Test Type:	Survival	**Organism:**	Eohaustorius estuarius (Amphipod)	**Material:**	Unionized Ammonia
Protocol:	EPA/600/R-94/025 (1994)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	1.513	**Count:**	20	**-1s Warning Limit:**	1.067	**-2s Action Limit:**	0.7523
Sigma:	n/a	**CV:**	36.00%	**+1s Warning Limit:**	2.145	**+2s Action Limit:**	3.042

Quality Control Data

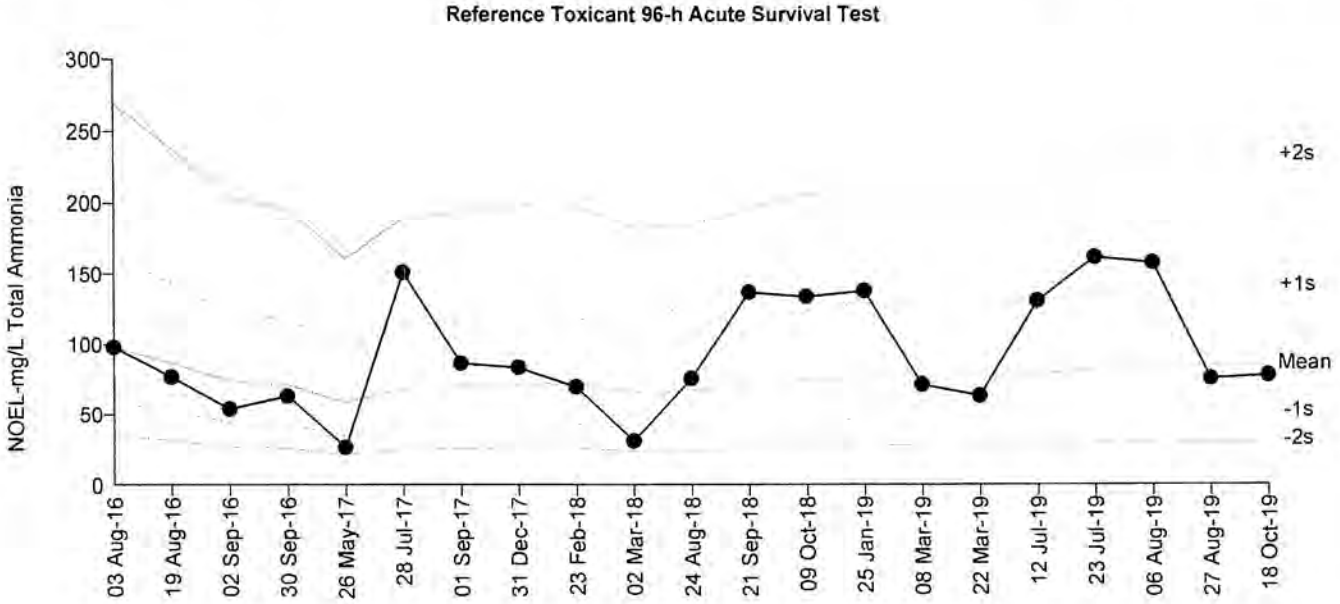
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2016	Aug	3	16:55	1.775	0.2617	0.4568			15-5470-2613	20-0153-1348	ENVIRON
2			19	14:25	1.264	-0.2492	-0.5152			11-7594-3529	18-2266-1841	ENVIRON
3		Sep	2	16:25	0.5558	-0.957	-2.867	(-)	(-)	20-2236-1025	01-7459-0032	ENVIRON
4			30	15:00	1.885	0.372	0.6294			12-0597-8760	12-1436-9613	ENVIRON
5	2017	May	26	13:00	1.101	-0.4123	-0.9108			15-8049-8093	00-1911-6893	EcoAnalysts
6		Jul	28	14:20	2.103	0.59	0.9427			11-4327-6237	03-7130-7368	EcoAnalysts
7		Sep	1	15:45	1.407	-0.1056	-0.2072			18-6405-8290	07-0280-8863	EcoAnalysts
8		Dec	31	15:47	2.466	0.9528	1.398	(+)		16-6781-4604	13-3844-2137	EcoAnalysts
9	2018	Feb	23	13:35	1.361	-0.152	-0.3032			00-2027-3508	17-9124-7622	EcoAnalysts
10		Mar	2	11:45	1.301	-0.212	-0.4321			02-5827-5523	13-4470-6509	EcoAnalysts
11		Aug	24	15:55	1.708	0.1953	0.3476			17-5739-4878	03-7944-2577	EcoAnalysts
12		Sep	21	14:35	1.16	-0.3526	-0.7597			06-8965-7235	18-4808-5804	EcoAnalysts
13		Oct	9	15:00	0.9139	-0.5989	-1.443	(-)		17-3069-9320	16-8151-1630	EcoAnalysts
14	2019	Jan	25	13:35	1.915	0.402	0.6746			00-5848-5748	19-2133-1629	EcoAnalysts
15		Mar	8	15:05	1.463	-0.0502	-0.0966			06-0570-4350	17-2978-1796	EcoAnalysts
16			22	14:35	1.444	-0.06853	-0.1327			08-8020-3971	15-7045-5745	EcoAnalysts
17		Jul	12	15:00	1.982	0.4689	0.7729			01-3966-5124	15-4747-7341	EcoAnalysts
18			23	15:15	2.151	0.6385	1.008	(+)		08-1022-0183	07-0772-7892	EcoAnalysts
19		Aug	6	15:55	2.002	0.4891	0.802			10-1925-5694	08-4274-3725	EcoAnalysts
20			27	14:25	1.888	0.375	0.634			18-5396-1387	02-7188-5010	EcoAnalysts
21		Oct	18	14:40	2.025	0.5117	0.8341			01-8678-8913	10-6861-7593	EcoAnalysts

CETIS QC Plot

Report Date: 24 Oct-19 10:34 (1 of 1)

Reference Toxicant 96-h Acute Survival Test — **All Matching Labs**

Test Type:	Survival	**Organism:**	Eohaustorius estuarius (Amphipod)	**Material:**	Total Ammonia
Protocol:	EPA/600/R-94/025 (1994)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	84.69	**Count:**	20	**-1s Warning Limit:**	51.1	**-2s Action Limit:**	30.84
Sigma:	n/a	**CV:**	53.90%	**+1s Warning Limit:**	140.3	**+2s Action Limit:**	232.5

Quality Control Data

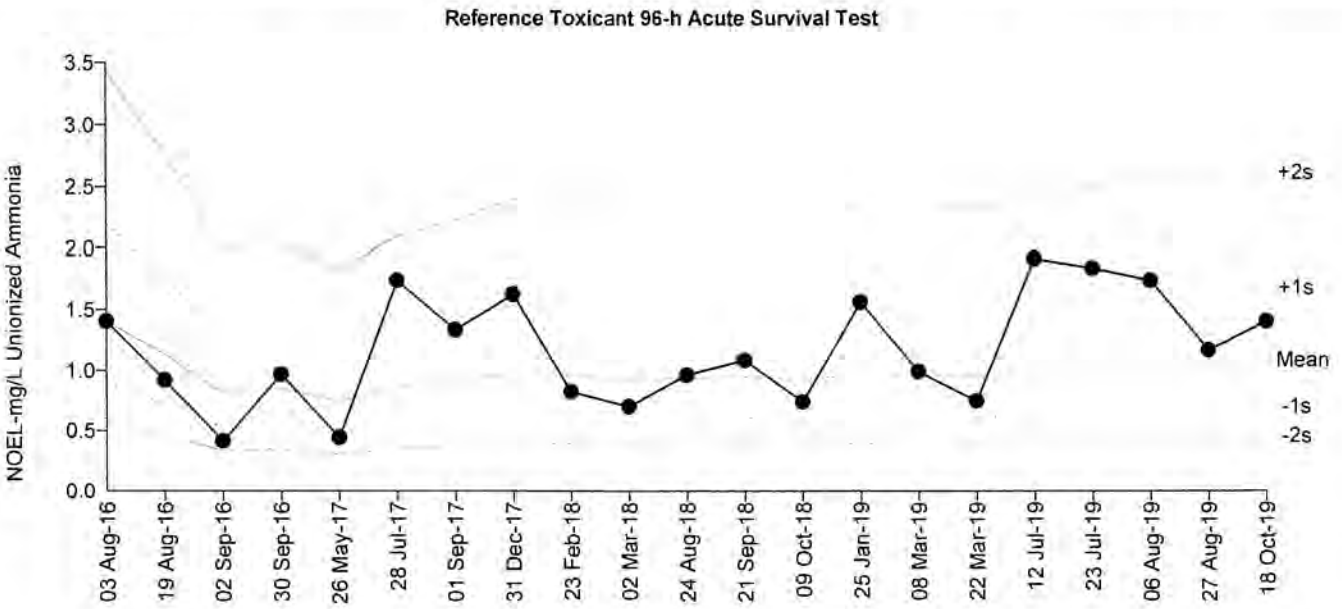
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2016	Aug	3	16:55	98	13.31	0.289			15-5854-7986	05-8855-9934	ENVIRON
2			19	14:25	76.9	-7.79	-0.1911			10-0746-9736	12-8850-4495	ENVIRON
3		Sep	2	16:25	54.1	-30.59	-0.8875			06-2389-4542	18-8647-7799	ENVIRON
4			30	15:00	63.2	-21.49	-0.5796			16-2341-4864	17-9345-6065	ENVIRON
5	2017	May	26	13:00	26.6	-58.09	-2.293	(-)	(-)	06-2743-8362	12-3565-7845	EcoAnalysts
6		Jul	28	14:20	151	66.31	1.145	(+)		14-8451-4586	09-8418-8824	EcoAnalysts
7		Sep	1	15:45	86.5	1.81	0.04187			02-8963-0820	17-0422-4621	EcoAnalysts
8		Dec	31	15:47	83.6	-1.09	-0.02566			09-7306-1854	06-1883-5465	EcoAnalysts
9	2018	Feb	23	13:35	69.7	-14.99	-0.3857			21-0530-3984	16-8514-1800	EcoAnalysts
10		Mar	2	11:45	31.2	-53.49	-1.977	(-)		11-4485-4691	15-7110-1336	EcoAnalysts
11		Aug	24	15:55	75.6	-9.09	-0.2248			16-5739-3244	15-9917-9528	EcoAnalysts
12		Sep	21	14:35	137	52.31	0.9524			04-4036-5270	14-1680-7805	EcoAnalysts
13		Oct	9	15:00	134	49.31	0.9086			20-4720-6933	14-7074-1873	EcoAnalysts
14	2019	Jan	25	13:35	138	53.31	0.9668			11-7689-4812	07-3953-2151	EcoAnalysts
15		Mar	8	15:05	71.3	-13.39	-0.3408			13-2397-9481	07-4616-8731	EcoAnalysts
16			22	14:35	63.6	-21.09	-0.5671			01-8305-5138	01-5094-6419	EcoAnalysts
17		Jul	12	15:00	131	46.31	0.8638			11-8021-4502	11-6723-5493	EcoAnalysts
18			23	15:15	162	77.31	1.284	(+)		17-6815-2027	16-9478-2247	EcoAnalysts
19		Aug	6	15:55	158	73.31	1.235	(+)		04-7165-8948	03-2243-7067	EcoAnalysts
20			27	14:25	75.8	-8.89	-0.2196			16-1141-7710	12-2316-3444	EcoAnalysts
21		Oct	18	14:40	78	-6.69	-0.163			10-1139-9672	05-2006-4501	EcoAnalysts

CETIS QC Plot

Report Date: 24 Oct-19 10:34 (1 of 1)

Reference Toxicant 96-h Acute Survival Test — **All Matching Labs**

Test Type:	Survival	**Organism:**	Eohaustorius estuarius (Amphipod)	**Material:**	Unionized Ammonia
Protocol:	EPA/600/R-94/025 (1994)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	1.061	**Count:**	20	**-1s Warning Limit:**	0.679	**-2s Action Limit:**	0.4347
Sigma:	n/a	**CV:**	46.90%	**+1s Warning Limit:**	1.657	**+2s Action Limit:**	2.588

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2016	Aug	3	16:55	1.404	0.3434	0.629			15-5470-2613	11-2111-0216	ENVIRON
2			19	14:25	0.919	-0.1416	-0.3213			11-7594-3529	06-9525-3086	ENVIRON
3		Sep	2	16:25	0.415	-0.6456	-2.104	(-)	(-)	20-2236-1025	20-1525-6837	ENVIRON
4			30	15:00	0.967	-0.09357	-0.2071			12-0597-8760	06-8089-0740	ENVIRON
5	2017	May	26	13:00	0.445	-0.6156	-1.947	(-)		15-8049-8093	18-0229-5291	EcoAnalysts
6		Jul	28	14:20	1.738	0.6774	1.107	(+)		11-4327-6237	11-4496-1419	EcoAnalysts
7		Sep	1	15:45	1.334	0.2734	0.5143			18-6405-8290	16-4129-3608	EcoAnalysts
8		Dec	31	15:47	1.626	0.5654	0.9581			16-6781-4604	02-2467-9837	EcoAnalysts
9	2018	Feb	23	13:35	0.825	-0.2356	-0.5632			00-2027-3508	11-7925-6381	EcoAnalysts
10		Mar	2	11:45	0.703	-0.3576	-0.922			02-5827-5523	14-9941-7186	EcoAnalysts
11		Aug	24	15:55	0.962	-0.09857	-0.2187			17-5739-4878	10-4999-0518	EcoAnalysts
12		Sep	21	14:35	1.086	0.02543	0.05312			06-8965-7235	16-3470-0349	EcoAnalysts
13		Oct	9	15:00	0.74	-0.3206	-0.807			17-3069-9320	05-9114-6332	EcoAnalysts
14	2019	Jan	25	13:35	1.561	0.5004	0.8666			00-5848-5748	04-1670-4578	EcoAnalysts
15		Mar	8	15:05	0.992	-0.06857	-0.1499			06-0570-4350	05-4558-3875	EcoAnalysts
16			22	14:35	0.748	-0.3126	-0.7829			08-8020-3971	02-0863-1050	EcoAnalysts
17		Jul	12	15:00	1.919	0.8584	1.33	(+)		01-3966-5124	09-4580-1187	EcoAnalysts
18			23	15:15	1.841	0.7804	1.237	(+)		08-1022-0183	07-2627-9819	EcoAnalysts
19		Aug	6	15:55	1.74	0.6794	1.11	(+)		10-1925-5694	11-7110-4221	EcoAnalysts
20			27	14:25	1.169	0.1084	0.2182			18-5396-1387	17-3719-5174	EcoAnalysts
21		Oct	18	14:40	1.403	0.3424	0.6274			01-8678-8913	18-9446-3335	EcoAnalysts

CETIS Summary Report

Reference Toxicant 96-h Acute Survival Test — EcoAnalysts

Batch ID:	04-8751-7158	**Test Type:**	Survival	**Analyst:**	
Start Date:	18 Oct-19 14:40	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	22 Oct-19 12:55	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	94h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scien **Age:**
Sample ID:	04-6043-4638	**Code:**	1B71ACCE	**Project:**	Reference Toxicant
Sample Date:	12 Jun-19	**Material:**	Total Ammonia	**Source:**	Reference Toxicant
Receipt Date:		**CAS (PC):**		**Station:**	P190612.48
Sample Age:	128d 15h	**Client:**	Internal Lab		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
05-2006-4501	Proportion Survived	Fisher Exact Test		78	165	113.4		n/a	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	mg/L	95% LCL	95% UCL	TU	S
04-6029-5418	Proportion Survived	Linear Interpolation (ICPIN)		EC5	67.67	48.81	111.2		1
				EC10	88.41	66.55	249.3		
				EC15	106.6	68.35	243.2		
				EC20	128.6	68.93	233.6		
				EC25	155	67.84	219.6		
				EC40	187.8	139.9	232.7		
				EC50	206.9	162.5	247.8		

Proportion Survived Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	3	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
19.8		3	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
44.1		3	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
78		3	0.9333	0.7899	1.0000	0.9000	1.0000	0.0333	0.0577	6.19%	6.67%
165		3	0.7333	0.2162	1.0000	0.5000	0.9000	0.1202	0.2082	28.39%	26.67%
336		3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Proportion Survived Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	D	1.0000	1.0000	1.0000
19.8		1.0000	1.0000	1.0000
44.1		1.0000	1.0000	1.0000
78		0.9000	1.0000	0.9000
165		0.5000	0.9000	0.8000
336		0.0000	0.0000	0.0000

Proportion Survived Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	D	10/10	10/10	10/10
19.8		10/10	10/10	10/10
44.1		10/10	10/10	10/10
78		9/10	10/10	9/10
165		5/10	9/10	8/10
336		0/10	0/10	0/10

CETIS Test Data Worksheet

Reference Toxicant 96-h Acute Survival Test — EcoAnalysts

Start Date:	18 Oct-19 14:40	**Species:**	Eohaustorius estuarius	**Sample Code:**	1B71ACCE
End Date:	22 Oct-19 12:55	**Protocol:**	EPA/600/R-94/025 (1994)	**Sample Source:**	Reference Toxicant
Sample Date:	12 Jun-19	**Material:**	Total Ammonia	**Sample Station:**	P190612.48

Conc-mg/L	Code	Rep	Pos	# Exposed	# Survived	Notes
0	D	1	13	10	10	
0	D	2	15	10	10	
0	D	3	17	10	10	
19.8		1	5	10	10	
19.8		2	11	10	10	
19.8		3	7	10	10	
44.1		1	9	10	10	
44.1		2	3	10	10	
44.1		3	4	10	10	
78		1	18	10	9	
78		2	12	10	10	
78		3	2	10	9	
165		1	1	10	5	
165		2	10	10	9	
165		3	16	10	8	
336		1	14	10	0	
336		2	8	10	0	
336		3	6	10	0	

CETIS Summary Report

Report Date: 24 Oct-19 10:32 (p 1 of 1)
Test Code/ID: B222C31 / 01-8678-8913

Reference Toxicant 96-h Acute Survival Test

EcoAnalysts

Batch ID:	04-8751-7158	Test Type:	Survival	Analyst:	
Start Date:	18 Oct-19 14:40	Protocol:	EPA/600/R-94/025 (1994)	Diluent:	Laboratory Seawater
Ending Date:	22 Oct-19 12:55	Species:	Eohaustorius estuarius	Brine:	Not Applicable
Test Length:	94h	Taxon:	Malacostraca	Source:	Northwestern Aquatic Scien Age:
Sample ID:	03-7212-7228	Code:	162E35FC	Project:	Reference Toxicant
Sample Date:	12 Jun-19	Material:	Unionized Ammonia	Source:	Reference Toxicant
Receipt Date:		CAS (PC):		Station:	P190612.48
Sample Age:	128d 15h	Client:	Internal Lab		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
18-9446-3335	Proportion Survived	Fisher Exact Test		1.403	1.858	1.615		n/a	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	mg/L	95% LCL	95% UCL	TU	S
10-6861-7593	Proportion Survived	Linear Interpolation (ICPIN)		EC5	1.235	0.9075	1.779		1
				EC10	1.473	1.325	2.281		
				EC15	1.583	1.353	2.22		
				EC20	1.697	1.379	2.154		
				EC25	1.817	1.371	2.084		
				EC40	1.952	1.536	2.122		
				EC50	2.025	1.675	2.169		

Proportion Survived Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	3	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
0.44		3	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
0.799		3	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
1.403		3	0.9333	0.7899	1.0000	0.9000	1.0000	0.0333	0.0577	6.19%	6.67%
1.858		3	0.7333	0.2162	1.0000	0.5000	0.9000	0.1202	0.2082	28.39%	26.67%
2.415		3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Proportion Survived Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	D	1.0000	1.0000	1.0000
0.44		1.0000	1.0000	1.0000
0.799		1.0000	1.0000	1.0000
1.403		0.9000	1.0000	0.9000
1.858		0.5000	0.9000	0.8000
2.415		0.0000	0.0000	0.0000

Proportion Survived Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	D	10/10	10/10	10/10
0.44		10/10	10/10	10/10
0.799		10/10	10/10	10/10
1.403		9/10	10/10	9/10
1.858		5/10	9/10	8/10
2.415		0/10	0/10	0/10

CETIS Test Data Worksheet

Reference Toxicant 96-h Acute Survival Test — EcoAnalysts

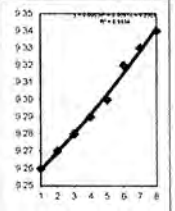
Start Date:	18 Oct-19 14:40	**Species:**	Eohaustorius estuarius	**Sample Code:**	162E35FC
End Date:	22 Oct-19 12:55	**Protocol:**	EPA/600/R-94/025 (1994)	**Sample Source:**	Reference Toxicant
Sample Date:	12 Jun-19	**Material:**	Unionized Ammonia	**Sample Station:**	P190612.48

Conc-mg/L	Code	Rep	Pos	# Exposed	# Survived	Notes
0	D	1	13	10	10	
0	D	2	5	10	10	
0	D	3	17	10	10	
0.44		1	15	10	10	
0.44		2	8	10	10	
0.44		3	12	10	10	
0.799		1	16	10	10	
0.799		2	10	10	10	
0.799		3	11	10	10	
1.403		1	2	10	9	
1.403		2	1	10	10	
1.403		3	9	10	9	
1.858		1	14	10	5	
1.858		2	7	10	9	
1.858		3	18	10	8	
2.415		1	6	10	0	
2.415		2	4	10	0	
2.415		3	3	10	0	

CLIENT:		Test Date:	18-Oct-19
PROJECT:		Test Type:	Eoh RT
COMMENTS:			

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer: I-factor	
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
	9.34



	Sample	Mod	NH3T (mg/L)	salinity (ppt)	pH	temp (C)	temp (K)	I-factor	Mod	NH3U (mg/L)
	Target / Sample Name		Actual	22.9	8.0	24.1	297.26	9.3053		#VALUE!
	Example 3.5		2.000	10.0	7.5	5.0	278.16	9.2750		0.008
1	0		0	29	8.10	15.0	288.16	9.3214		0.000
2	20		19.80	29	8.00	14.9	288.06	9.3214		0.440
3	40		44.10	29	7.90	15.2	288.36	9.3214		0.799
4	80		78.00	29	7.90	15.1	288.26	9.3214		1.403
5	160		165.00	29	7.70	14.9	288.06	9.3214		1.858
6	320		336.00	29	7.50	15.0	288.16	9.3214		2.415
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Ammonia Reference Toxicant Test Water Quality Data Sheet

EcoAnalysts

CLIENT	PROJECT		Laboratory	PROTOCOL
—	—	*Eohaustorius estuarius*	Port Gamble .	PSEP 1995

TEST ID	LOT #:	DILUTION PREP INITIALS:
P190612.48	18H1356763	MK

CHAMBER SIZE/TYPE	EXPOSURE VOLUME	TEST START DATE	INITIALS	TIME	TEST END DATE	TIME
250 mL Beaker	250 ml	18Oct19	MK RE	1440	22Oct19	1255

WATER QUALITY DATA

TEST CONDITIONS					DO (mg/L) > 5.1		TEMP(C) 15 ± 1		SAL (ppt) 28 ± 1		pH 7.8 ± 0.5		TECHNICIAN	AMMONIA		
SAMPLE ID	CONCENTRATION value	CONCENTRATION units	DAY	REP	D.O. meter	D.O. mg/L	TEMP. meter	TEMP. °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	WQ TECH/ DATE	AMMONIA METER	AMMONIA mg/L	Tech
Ref.Tox.-ammonia	0	mg/L	0	Stock	B	7.5	B	15.0	B	29	B	8.1	JB 10/18	10	0.00	MK
			4	1	B	7.4	B	14.9		28	B	7.9	NR 10/22			
Ref.Tox.-ammonia	20	mg/L	0	Stock	B	7.7	B	14.9	B	29	B	8.0	JB 10/18	10	19.8	MK
			4	1	B	7.8	B	14.6	B	28	B	7.9	NR 10/22			
Ref.Tox.-ammonia	40	mg/L	0	Stock	B	7.7	B	15.2	B	29	B	7.9	JB 10/18	10	44.1	MK
			4	1	B	7.7	B	14.7	B	28	B	7.9	NR 10/22			
Ref.Tox.-ammonia	80	mg/L	0	Stock	B	7.7	B	15.1	B	29	B	7.9	JB 10/18	10	78.0	MK
			4	1	B	7.9	B	14.7	B	28	B	7.9	NR 10/22			
Ref.Tox.-ammonia	160	mg/L	0	Stock	B	7.7	B	14.9	B	29	B	7.7	JB 10/18	10	165	MK
			4	1	B	8.0	B	15.0	B	28	B	7.9	NR 10/22			
Ref.Tox.-ammonia	320	mg/L	0	Stock	B	7.7	B	15.0	B	29	B	7.5	JB 10/18	10	336	MK
			4	1	B	—	B	—	B	—	B	—	NR 10/22			

EcoAnalysts **Ammonia Reference Toxicant Test Water Quality Data Sheet**

CLIENT	PROJECT	SPECIES		
—	—	*Eohaustorius estuarius*		
		PROJECT MANAGER: B. Hester	LABORATORY: Port Gamble	PROTOCOL: PSEP 1995

SURVIVAL & BEHAVIOR DATA

OBSERVATION KEY
N = Normal
LOE = Loss of equilibium
Q = Quinscent
DC = Discoloration
NB = No body
F = Floating on surface

INITIAL # OF ORGANISMS: 10

SAMPLE ID	CONC. value	CONC. units	REP	INITIAL NUMBER	DAY 1 DATE: 10/19/19 TECHNICIAN: DM			DAY 2 DATE: 10/20/19 TECHNICIAN: NR			DAY 3 DATE: 10/21/19 TECHNICIAN: NR			DAY 4 DATE: 10/22/19 TECHNICIAN: NR		
					#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS
Ref.Tox.- Ammonia	0	mg/L	1		10	0	3F,	10	0	1F	10	0	2F	10	0	1F
			2		10	0	2F	10	0	1F	10	0	1F	10	0	2F
			3		10	0	6F	10	0	3F	10	0	2F	10	0	3F
Ref.Tox.- Ammonia	20	mg/L	1		10	0	2F	10	0	N	10	0	2F	10	0	N
			2		10	0	3F	10	0	N	10	0	N	10	0	N
			3		10	0	3F	10	0	1F	10	0	N	10	0	N
Ref.Tox.- Ammonia	40	mg/L	1		10	0	4F	10	0	N	10	0	N	10	0	2F (2)
			2		10	0	1F	10	0	N	10	0	↓	10	0	N
			3		10	0	3F	10	0	1F	10	0	↓	10	0	1F
Ref.Tox.- Ammonia	80	mg/L	1		10	0	(1) 9F, 1Q	9	1	Q	9	0	1F, Q	9	0	1F, Q
			2		10	0	10Q	10	0	Q	10	0	Q	10	0	Q
			3		10	0	2F, 10Q	10	0	1F, Q	10	0	1F, Q	9	1	1F, Q
Ref.Tox.- Ammonia	160	mg/L	1		10	0	8F, 10Q	10	0	4F, Q	8	2	3F, Q	5	3	2F, Q
			2		10	0	6F, 10Q	10	0	Q	10	0	Q	9	1	2F, Q
			3		10	0	2F	10	0	Q	10	0	Q	8	2	1F, Q
Ref.Tox.- Ammonia	320	mg/L	1		10	0	10Q	0	10	—						
			2		8	2	8Q	0	8	—						
			3		2	8	1F, 2Q	0	2	—						

(1) 1E - 10Q - DM - 10/19/19

(2) babies present - NR 10/22

Ammonia Reference Toxicant
Spiking Worksheet

Reference Toxicant ID: P190612.48
Date Prepared: 10/18/19
Technician Initials: MK

Eoh NH_3 RT

Assumptions in Model
Stock ammonia concentration is 10,000 mg/L = 10 mg/mL

Date: 10/14/2019
Measurement: 13,767

Test Solutions			Volume of stock to reach desired concentration	
Measured Concentration	**Desired Concentration**	**Volume**		
mg/L	mg/L	mL	mL stock to increase	
			[redacted]	SALT WATER
19.8	**20**	750		**1.634**
44.1	**40**	750		**3.269**
78.0	**80**	750		**6.538**
165	**160**	750		**13.075**
336	**320**	750		**26.150**

2. *Neanthes arenaceodentata* Solid-Phase Test

2.1 *Neanthes arenaceodentata* Test Data

EcoAnalysts

CLIENT	PROJECT	JOB NO.	PROJECT MANAGER	LABORATORY / LOCATION	PROTOCOL	SPECIES
MFA	Seaport	PG1313	Julia Baum	Port Gamble / Bath 9	PSEP 1995	*Neanthes arenaceodentata*

ENDPOINT DATA & OBSERVATIONS

N = Normal
#E = Emergence
#M = Mortality
G = Growth
(fungal, bacterial, or algal)
D = No Air Flow (DO?)
F = Floating on Surface
TC = Too Cloudy
U=Excess food

INITIAL # OF ORGANISMS: 5

CLIENT/ ENVIRON ID	REP	JAR	INITIAL # (if differs)	Date and Initials	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	NUMBER REMAINING	TARE WEIGHT (mg)	TOTAL WEIGHT (mg)	ASHED WEIGHT (mg)
					MK 10/18	DM 10/19	JR 10/20	MS 10/21	10/22 MS	10/23 DM	10/24 DM	10/25 DM	10/26 DM	10/27 MS	10/28 MS	10/29 MS	10/30 DM	10/31 DM	11/1 JR	11/2 DM	11/3 JR	11/4 JR	11/5 MK	11/6 MK					
Control /	1				U	U	2E	N	U(1)	U,G	U,G	U,G	U	G	U	N	U,G	G	IE, G	IE, U	U	N	U	N	5	1 191.50	272.97	227.23
	2					U	U	N	U,G	U,G	U,G	U	U,G	G		N	U	N	N	U	U				5	2 195.12	272.75	223.68
	3							N	U,G (2)	U	U		U	N		U		U,G	G	U	IE				5	3 227.46	325.07	258.38
	4							U (3)	4E, G (4)				U			N		N	N	U	IE				5	4 207.70	301.17	240.41
	5							N	U			U,G	U,G			U	U,G	N	N	U	U (5)				5	5 224.15	305.38	249.26
CR21-West (14) /	1					U	U	G	U	U,G	U,G	U	U,G	G	U,G	G	U,G	G	G	U,G	G	G	G	G	5	6 201.81	280.85	224.77
	2					5E, U	5G, U	N	5E, G, U (6)	U,G	U,G	U,G		N	U,G	N	U,G	G	G	U,G	G	G	G		4	7 185.90	233.21	193.70
	3					U	U		U,G	U	U,G	U, IE (4)			U		U	N	N	IE, U	N	N			5	8 205.03	294.17	232.67
	4								U		U	U,G						N	N	U	N				5	9 185.51	270.95	218.78
	5								U		U	U,G						G	G	U	IE				4	10 200.31	236.64	211.92
Carr20 (47) /	1					U	U	U	U	U	U	U,G	U,G	G	U	N	U,G	U,G	G	U,G	G	G	G	G	5	11 355.59	446.32	391.23
	2							N			U	U	U	N	U		U	G		U	UF				5 (6)	12 333.10	387.06	347.01
	3							U			U,G	U,G	U,G	↓	IE, U	↓	U,G (4)			U,G	G				5	13 331.27	415.48	360.47
	4			8				N			U	U,G		G	U	U	U,G	G		U,G					8 (7)	14 327.21	416.50	363.06
	5			6				N			U	U		N	U	N	U,G	G		U,G					6	15 298.26	378.99	329.69

Biomass	Rep	Number	Tare Weight (mg)	Dry Weight (mg)	Ashed Weight (mg)
	1	5	174.62	178.30	176.23
	2	5	230.51	233.92	232.01
	3	5	148.15	151.87	149.63

(1) ~~entire bottom~~ top sediment layer black -MS > Increased air flow to chamber. JB 10/22/19.
(2) smell when taking off lid -MS
(3) we JB 10/22/19.
(4) IE - Actual = G, - DM - 10/31/19
(5) No air flow, replaced pipette NR 11/3
(6) One worm very small compared to others. MK 11/6
(7) Chamber initiated w/ 8 worms. MK 11/6.

ECO ANALYSTS ⑤ IE, actual total weight 423.63 mg - NR 11/11

CLIENT	PROJECT	JOB NO.	PROJECT MANAGER	LABORATORY / LOCATION	PROTOCOL	SPECIES
MFA	Seaport	PG1313	Julia Baum	Port Gamble / Bath 9	PSEP 1995	*Neanthes arenaceodentata*

ENDPOINT DATA & OBSERVATIONS

N = Normal
#E = Emergence
#M = Mortality
G = Growth (fungal, bacterial, or algal)
D = No Air Flow (DO?)
F = Floating on Surface
TC = Too Cloudy
U=Excess food

INITIAL # OF ORGANISMS: 5

CLIENT/ ENVIRON ID	REP	JAR	INITIAL # (if differs)	Date and Initials	1 MK 10/18	2 DM 10/19	3 NR 10/20	4 MS 10/21	5 10/22 MS	6 10/23 DM	7 10/24 DM	8 10/25 DM	9 10/26 DM	10 10/27 MS	11 10/28 MS	12 10/29 MS	13 10/30 DM	14 10/31 DM	15 11/1 NR	16 11/2 DM	17 11/3 NR	18 11/4 NR	19 11/5 MK	20 11/6 MK	NUMBER REMAINING	TARE WEIGHT (mg)	TOTAL WEIGHT (mg)	ASHED WEIGHT (mg)
CR02-South (68) /	1				U	U	U	G	U,G	U,G	U,G	U,G	UG	N	U	N	U	N	N	U,G	N	N	U	G	5	16 287.34	367.93	311.77
	2							G	U,G	U,G	U,G	U,G	UG					N	N	N	N				5	17 336.19	379.01	372.05
	3							U	U,G	U,G	U,G	U	U					G	G	U,G	N ②				5	18 342.30	~~361.92~~ ⑤	373.56
	4							N	U	U,G	U,G	U,G	U					N	N	U,G	N				5	19 336.38	399.23	357.02
	5							N	U	U,G	U,G	U,G	U					U,G	G		N ②				5	20 301.62	386.53	~~337.70~~
SE 15 /	1					U	U	N	U	U	U,G	U,G	UG	N	N	N	U	N	N	U	N	N	U	G	0 ③	21 378.96	—	—
	2							N	U,G	U,G	U,G	U,G	UG		U,1E		U			U					5	22 315.51	378.45	334.13
	3							N	U	U	U,G	U	U		N		U,G			N					0 ②	23 307.34	—	—
	4							U			U		UG		U		U,G	G	G	U,G					5	24 326.26	361.15	335.31
	5							N			U		UG		U		U	C	N	U,G	U				5	25 324.33	367.31	~~336.82~~
SE 16 /	1					U	U	N	U,G	U,G	U,G	U,G	UG	U,G	U,G	G	U	G	G	U,G	G	G	G	G	5	26 318.20	382.26	333.74
	2							U	U	U	U	U	U	N	U	N		N	N	N	N	N	U	Z	~~5~~	27 306.28	390.87	334.66
	3							N					U		U						N				5 ④	28 290.96	343.06	305.00
	4							N					UG		U						IE				4	29 295.45	370.37	~~320~~ ⑤ 319.79
	5							N					U,G	U,G	U,G	G	U,G	G	G	~~N~~ ①	G	G		G	5	30 302.32	373.02	326.09
SE 17 /	1					U	U	U	U	U,G	U,G	U,G	UG	N	U	N	U,G	G	G	U,G	G	G	G	G	5 ③	31 303.09	365.82	320.88
	2					U	U	U	U	U	U	U			U,G		U,G	G		U,G	G				5	32 310.15	368.33	327.65
	3					U,G	U,G	N	U,G	U,G	U,G	U,G			U		U,G	U,G		U,G	U,G				4	33 325.80	367.81	336.35
	4					U	U	N	U	U	U	U			U		U	N	N	N	N	N			5	34 383.62	454.20	403.21
	5					U	U	N	U	U	U	U			U		U	N	M	U,G	N	N			5 ③	35 386.40	412.05	394.84

① IE - Actual = U,G - DM - 11/2/19

② IE - NR 11/4

③ native nereid polychaete present. MK 11/6. Some 3" length.

④ one worm

⑤ exc - NR 11/17

ECO ANALYSTS

CLIENT	PROJECT	JOB NO.	PROJECT MANAGER	LABORATORY / LOCATION	PROTOCOL	SPECIES
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ENDPOINT DATA & OBSERVATIONS

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G = Growth
(fungal, bacterial, or algal)
D = No Air Flow (DO?)
F = Floating on Surface
TC = Too Cloudy
U=Excess food

INITIAL # OF ORGANISMS: 5

CLIENT/ ENVIRON ID	REP	JAR	INITIAL # (if differs)	Date and Initials	1 MK 10/18	2 DM 10/19	3 NR 10/20	4 MS 10/21	5 10/22/MS	6 10/23 DM	7 10/24 DM	8 10/25 DM	9 10/26 DM	10 10/27 MS	11 10/28 MS	12 10/29 MS	13 10/30 DM	14 10/31 DM	15 11/1 NR	16 11/2 DM	17 11/3 NR	18 11/4 NR	19 11/5 MK	20 11/6 MK	NUMBER REMAINING	TARE WEIGHT (mg)	TOTAL WEIGHT (mg)	ASHED WEIGHT (mg)
SE 18 /	1				U	W	U	N	U	U,G	U,G	U,G	UG	N	U,G	N	U	N	N	U,G	N	N	G	G	5	36	395.51	443.71	408.55
	2							U	U,G	U,G	U,G	U,G		G	U,G	G	U,G	U,G	G	U,G	G	G			5	37	377.85	434.19	391.89
	3							U	U	U,G	U,G	U,G		N	U	N	U	U,G		U,G					5	38	385.28	454.99	401.71
	4							U	U	U	U,G	U			U,G	U,G	U,G	G		U,G					⑤84	39	360.42	404.89	369.93
	5							U	U,G	U,G	U,G	U			U	N	U	N	N	IE,G U					5	40	341.14	399.87	354.78
SE 24 /	1					U,G	U,G	G	U,G	U,G	U,G	U,G	UG	G	U,G	G	U,G	G	G	U,G	U G	G	G	G	5 ②	41	329.26	387.37	341.65
	2					U	U,G	N	U	U,G	U,G	U,G		G		G	U,G	N	N	U,G	G				5	42	331.62	379.00	⑤342.17
	3						U	U	U,G	U,G	U,G	U,G		U,G		N	U,G	G	G	N	G				5 ③	43	322.96	360.60	332.55
	4							N	U,G	U,G	U,G	U,G		N		G	U,G	G	G	U,G	G				5	44	361.69	414.96	373.51
	5							N	U	U,G	U,G	U,G	U	N		G	U,G	N	N	U	G				⑤ ③ ④	45	355.00	385.70	362.84
SE 26 /	1					W	U,G	G	U,G	U,G	U,G	U,G	UG	G	G	G	U,G	U,G	G	U,G	G	G	U C	G	5	46	367.29	432.11	379.44
	2					U	U	N	U	U,G	U,G	U,G		G		G	U,G	G		U,G					5	47	332.06	408.72	347.74
	3					U,G	U,G	G	U	U,G	U,G	U,G		N		G	U,G	U,G		U,G					5	48	326.01	394.60	389.93
	4					U	U	G	U,G	U,G	U,G	U,G		G		G	U,G	G		U,G					5	49	340.30	407.73	354.56
	5					W	U,G	N	U	U,G	U,G	U,G		G		G	U,G	G		U,G					4	50	337.97	388.73	347.08
SE 31 /	1					U,G	U		U	U	U	U,G	UG	N	U	N	U	N	N	U	U	N	U	G	5	51	332.17	393.13	348.11
	2					U			U,G	U	U	U								N	N				5	52	383.55	447.07	400.54
	3								U	U,G	U,G	U,G								U,G	N				5	53	348.42	406.28	363.78
	4								U	U,G	U,G	U,G					U,G			U,G	G	G			5	54	363.16	444.93	390.63
	5								U	U,G	U,G	U,G					U			U	N	N			5	55	364.69	439.76	385.05

② one worm very small compared to others. MK 11/6.
③ Native nereid polychate(s) present RE 11/6
① WN RE 11/6
④ IE RE 11/6-4
⑤ IE, NR 11/17

ECO ANALYSTS

CLIENT	PROJECT	JOB NO.	PROJECT MANAGER	LABORATORY / LOCATION	PROTOCOL	SPECIES
MFA	Seaport	PG1313	Julia Baum	Port Gamble / Bath 9	PSEP 1995	*Neanthes arenaceodentata*

ENDPOINT DATA & OBSERVATIONS

N = Normal
#E = Emergence
#M = Mortality
G = Growth
(fungal, bacterial, or algal)
D = No Air Flow (DO?)
F = Floating on Surface
TC = Too Cloudy
U=Excess food

INITIAL # OF ORGANISMS: 5

CLIENT/ ENVIRON ID	REP	JAR	INITIAL # (if differs)	Date and Initials	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	NUMBER REMAINING	TARE WEIGHT (mg)	TOTAL WEIGHT (mg)	ASHED WEIGHT (mg)
									10/22 MS	10/23 DM	10/24 DM	10/25 DM	10/26 DM		10/28 MS	10/29 MS	10/30 DM	10/31 DM	11/1 NR	11/2 DM	11/3 NR	11/4 NR	11/5 MK	11/6 MK				
SE 20 /	1		2	U					N	U	U		U		N	N	U	N	N	N	N	N	U	U	4 ③	56 344.47	354.43	347.45
	2		6						U	↓	U,G		UG		↓	↓	↓	↓	↓	U,G	↓	↓	↓	↓	6	57 346.34	369.14	351.37
	3								N	↓	U	U,G	U		↓	↓	↓	↓	↓	N	↓	↓	↓	↓	3	58 355.32	358.75	356.42
	4								N	↓	↓		U		↓	↓	U,G	↓	↓	N	↓	↓	↓	↓	3	59 311.64	319.10	313.63
	5								U	↓	↓	U,G	UG		↓	↓	U,G	G	G	U,G	G	G	↓	↓	4	60 318.59	373.74	332.31

① days 1-4 no obs. sheet printed.
· discovered on 10/22 - MS

② WC mk 11/6.

③ many Native nereid polychaete(s) present. mk 11/6.
~~Survivors~~ surviving neanthes very small in comparison to other treatments.

EcoAnalysts

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
MFA	Seaport	1350 / 0900	FSW101519.01	PSEP 1995	17-Oct-2019
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY / LOCATION**	**ORGANISM BATCH**	**TEST SPECIES**	**TEST END DATE**
PG1313	Julia Baum	Port Gamble / Bath 9	ATS101719	*Neanthes arenaceodentata*	6-Nov-2019

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
				D.O.		TEMP		SALINITY		pH		WATER	Feeding	TECH/DATE
SAMPLE ID	DAY	REP	JAR	meter	mg/L	meter	°C	meter	ppt	meter	unit	RENEWAL		
Control /	0	Surr		9	7.6	9	19.6	9	28	9	8.0		MK	MK 10/17/19
Control /	1	Surr		8	7.7	8	19.2	8	28	8	7.8			MK 10/18
Control /	2	Surr		9	7.4	9	19.9	9	28	9	7.9		DM	DM 10/19
Control /	3	Surr		8	7.3	8	20.1	8	27	8	7.8	NR		NR 10/20
Control /	4	Surr		8	①~~7.4~~7.6	8	19.4	8	①~~26~~27	8	①~~7.~~8.0		MS	MS 10/21
Control /	5	Surr		8	7.4	8	19.9	8	27	8	7.8			MS 10/22
Control /	6	Surr		9	③~~7.4~~7.5	9	19.9	9	②~~29~~28	9	7.9	DM/MS	MS	DM 10/23
Control /	7	Surr		9	7.4	9	19.4	9	27	9	7.0			DM 10/24
Control /	8	Surr		9	④~~7.3~~7.4	9	④~~19.8~~20.2	9	④~~28~~27	9	④~~7.0~~7.3		MS	DM 10/25
Control /	9	Surr		9	7.3	9	20.3	9	28	9	7.8	DM		DM 10/26
Control /	10	Surr		8	7.7	8	19.4	8	27	8	7.9		MS	MS 10/27
Control /	11	Surr		8	7.5	8	19.8	8	28	8	7.9			MS 10/28
Control /	12	Surr		8	7.6	8	19.8	8	28	8	8.0	DM/MS	DM	MS 10/29
Control /	13	Surr		8	7.6	8	19.4	8	28	8	7.9			MS 10/30
Control /	14	Surr		9	7.4	9	19.6	9	28	9	7.9		DM	DM 10/31
Control /	15	Surr		9	7.4	9	20.3	9	28	9	7.9	NR		NR 11/1
Control /	16	Surr		9	7.4	9	19.6	9	28	9	7.9		DM	DM 11/2
Control /	17	Surr		8	7.3	8	19.8	8	28	8	7.8			NR 11/3
Control /	18	Surr		9	7.4	9	20.2	9	28	9	7.9	JB/RE	NR	JB 11/04
Control /	19	Surr		8	7.3	8	19.5	8	28	8	7.8			MK 11/5
Control /	20	Surr		8	7.2	8	20.3	8	28	8	7.9			NR 11/6

① WP - MS 10/21
② WC - DM - 10/23/19
③ WC - DM - 10/23/19
④ WC - DM - 10/25/19

EcoAnalysts

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
MFA	Seaport	—	FSW101519.01	PSEP 1995	17-Oct-2019
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY / LOCATION**	**ORGANISM BATCH**	**TEST SPECIES**	**TEST END DATE**
PG1313	Julia Baum	Port Gamble / Bath 9	ATS101719	*Neanthes arenaceodentata*	6-Nov-2019

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
				D.O.		TEMP		SALINITY		pH		WATER	Feeding	TECH/DATE
SAMPLE ID	DAY	REP	JAR	meter	mg/L	meter	°C	meter	ppt	meter	unit	RENEWAL		
CR21-West (14) /	0	Surr		9	7.4	9	19.7	9	28	9	8.0		MK	MK 10/17
CR21-West (14) /	1	Surr		8	7.5	8	19.6	8	28	8	7.7			MK 10/18
CR21-West (14) /	2	Surr		9	7.0	9	19.9	9	28	9	7.7		DM	DM 10/19
CR21-West (14) /	3	Surr		8	6.6	8	20.2	8	27	8	7.7	UR		UR 10/20
CR21-West (14) /	4	Surr		8	7.4	8	19.5	8	27	8	7.9		MS	MS 10/21
CR21-West (14) /	5	Surr		8	7.4	8	20.0	8	27	8	7.8			MS 10/22
CR21-West (14) /	6	Surr		9	7.2	9	19.5	9	27	9	8.0	MS/DM	MS	DM 10/23
CR21-West (14) /	7	Surr		9	7.1	9	19.2	9	28	9	8.0			DM 10/24
CR21-West (14) /	8	Surr		9	7.3	9	19.8	9	28	9	7.0		MS	DM 10/25
CR21-West (14) /	9	Surr		9	7.4	9	19.9	9	28	9	8.0	DM		DM 10/26
CR21-West (14) /	10	Surr		8	7.5	8	19.1	8	28	8	8.1		MS	MS 10/27
CR21-West (14) /	11	Surr		8	7.6	8	19.4	8	28	8	8.2			MS 10/28
CR21-West (14) /	12	Surr		8	7.7	8	19.4	8	29	8	8.2	DM/MS	DM	MS 10/29
CR21-West (14) /	13	Surr		8	7.7	8	19.1	8	29	8	8.1			MS 10/30
CR21-West (14) /	14	Surr		9	7.5	9	19.3	9	29	9	8.1		DM	DM 10/31
CR21-West (14) /	15	Surr		9	7.5	9	20.0	9	29	9	8.1	NR		NR 11/1
CR21-West (14) /	16	Surr		9	7.1	9	19.3	9	29	9	8.0		DM	DM 11/2
CR21-West (14) /	17	Surr		8	7.2	8	20.0	8	29	8	7.9			NR 11/3
CR21-West (14) /	18	Surr		9	7.1	9	20.2	9	29	9	7.9	JB/RE	NR	JB 11/04
CR21-West (14) /	19	Surr		8	7.5	8	19.5	8	29	8	7.9			MK 11/5
CR21-West (14) /	20	Surr		8	7.2	8	20.1	8	29	8	7.9			NR 11/6

EcoAnalysts

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
MFA	Seaport	/	FSW101519.01	PSEP 1995	17-Oct-2019
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY / LOCATION**	**ORGANISM BATCH**	**TEST SPECIES**	**TEST END DATE**
PG1313	Julia Baum	Port Gamble / Bath 9	ATS101719	*Neanthes arenaceodentata*	6-Nov-2019

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L)		TEMP (C)		SALINITY (ppt)		pH				
				> 4.6		20 ± 1		28 ± 2		8.0±1.0				
				D.O.		TEMP		SALINITY		pH		WATER		
SAMPLE ID	DAY	REP	JAR	meter	mg/L	meter	°C	meter	ppt	meter	unit	RENEWAL	Feeding	TECH/DATE
Carr20 (47) /	0	Surr		9	7.4	9	20.1	9	28	9	7.9		MK	MK 10/17
Carr20 (47) /	1	Surr		8	7.4	8	19.9	8	28	8	7.9			MK 10/18
Carr20 (47) /	2	Surr		9	7.3	9	20.4	9	28	9	8.0		DM	DM 10/19
Carr20 (47) /	3	Surr		8	7.0	8	20.3	8	27	8	7.9	NR		NR 10/20
Carr20 (47) /	4	Surr		8	7.5	8	19.5	8	27	8	8.0		MS	MS 10/21
Carr20 (47) /	5	Surr		8	7.5	8	20.0	8	27	8	7.9			MS 10/22
Carr20 (47) /	6	Surr		9	7.6	9	19.9	9	28	9	8.1	MS/DM	MS	DM 10/23
Carr20 (47) /	7	Surr		9	7.6	9	19.4	9	28	9	8.0			DM 10/24
Carr20 (47) /	8	Surr		9	7.4	9	20.4	9	28	9	8.1		MS	DM 10/25
Carr20 (47) /	9	Surr		9	7.4	9	20.3	9	28	9	8.1	DM		DM 10/26
Carr20 (47) /	10	Surr		8	7.6	8	19.3	8	27	8	8.1		MS	MS 10/27
Carr20 (47) /	11	Surr		8	7.4	8	20.1	8	28	8	8.0			MS 10/28
Carr20 (47) /	12	Surr		8	7.7	8	20.0	8	28	8	8.1	DM/MS	DM	MS 10/29
Carr20 (47) /	13	Surr		8	7.6	8	19.7	8	28	8	8.0			MS 10/30
Carr20 (47) /	14	Surr		9	7.5	9	20.0	9	28	9	8.0		DM	DM 10/31
Carr20 (47) /	15	Surr		9	7.4	9	20.4	9	28	9	8.0	NR		NR 11/1
Carr20 (47) /	16	Surr		9	7.4	9	19.7	9	28	9	8.0		DM	DM 11/2
Carr20 (47) /	17	Surr		8	7.4	8	20.2	8	29	8	7.9			NR 11/3
Carr20 (47) /	18	Surr		9	7.4	9	20.2	9	28	9	8.0	JB/RE	NR	JB 11/04
Carr20 (47) /	19	Surr		8	7.4	8	19.9	8	28	8	7.9			MK 11/5
Carr20 (47) /	20	Surr		8	7.3	8	20.6	8	28	8	7.9			NR 11/6

EcoAnalysts

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
MFA	Seaport	/	FSW101519.01	PSEP 1995	17-Oct-2019
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY / LOCATION**	**ORGANISM BATCH**	**TEST SPECIES**	**TEST END DATE**
PG1313	Julia Baum	Port Gamble / Bath 9	ATS101719	*Neanthes arenaceodentata*	6-Nov-2019

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L)		TEMP (C)		SALINITY (ppt)		pH				
				> 4.6		20 ± 1		28 ± 2		8.0±1.0				
				D.O.		TEMP		SALINITY		pH		WATER		
SAMPLE ID	DAY	REP	JAR	meter	mg/L	meter	°C	meter	ppt	meter	unit	RENEWAL	Feeding	TECH/DATE
CR02-South (68) /	0	Surr		9	7.5	9	19.7	9	28	9	8.0		MK	MK 10/17
CR02-South (68) /	1	Surr		8	7.4	8	19.5	8	28	8	7.7			MK 10/18
CR02-South (68) /	2	Surr		9	7.2	9	20.2	9	28	9	7.8		DM	DM 10/19
CR02-South (68) /	3	Surr		8	6.7	8	20.3	8	27	8	7.6	NR		NR 10/20
CR02-South (68) /	4	Surr		8	7.5	8	19.5	8	27	8	7.8		MS	MS 10/21
CR02-South (68) /	5	Surr		8	7.4	8	19.9	8	27	8	7.7			MS 10/22
CR02-South (68) /	6	Surr		9	7.5	9	19.7	9	28	9	7.9	DM/MS	MS	DM 10/23
CR02-South (68) /	7	Surr		9	7.5	9	19.4	9	27	9	7.9			DM 10/24
CR02-South (68) /	8	Surr		9	7.3	9	20.3	9	27	9	8.0		MS	DM 10/25
CR02-South (68) /	9	Surr		9	7.2	9	20.3	9	27	9	7.9	DM		DM 10/26
CR02-South (68) /	10	Surr		8	7.7	8	19.3	8	27	8	8.0		MS	MS 10/27
CR02-South (68) /	11	Surr		8	7.5	8	19.8	8	28	8	8.0			MS 10/28
CR02-South (68) /	12	Surr		8	7.4	8	19.9	8	28	8	8.0	DM/MS	DM	MS 10/29
CR02-South (68) /	13	Surr		8	7.6	8	19.3	8	28	8	7.9			MS 10/30
CR02-South (68) /	14	Surr		9	7.4	9	19.7	9	28	9	7.9		DM	DM 10/31
CR02-South (68) /	15	Surr		9	7.4	9	20.3	9	28	9	7.9	NR		NR 11/1
CR02-South (68) /	16	Surr		9	7.4	9	19.5	9	28	9	7.9		DM	DM 11/2
CR02-South (68) /	17	Surr		8	7.2	8	19.8	8	28	8	7.9			NR 11/3
CR02-South (68) /	18	Surr		9	7.4	9	20.2	9	28	9	8.0	JB/RE	NR	JB 11/04
CR02-South (68) /	19	Surr		8	7.3	8	19.5	8	28	8	7.9			MK 11/5
CR02-South (68) /	20	Surr		8	7.1	8	20.2	8	28	8	7.9			NR 11/6

ECO ANALYSTS

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
MFA	Seaport	/	FSW101519.01	PSEP 1995	17-Oct-2019
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY / LOCATION**	**ORGANISM BATCH**	**TEST SPECIES**	**TEST END DATE**
PG1313	Julia Baum	Port Gamble / Bath 9	ATS101719	*Neanthes arenaceodentata*	6-Nov-2019

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
SAMPLE ID	DAY	REP	JAR	D.O. meter	D.O. mg/L	TEMP meter	TEMP °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	WATER RENEWAL	Feeding	TECH/DATE
SE 15 /	0	Surr		9	7.5	9	20.2	9	27	9	7.9		MK	MK 10/17
SE 15 /	1	Surr		8	7.4	8	19.9	8	27	8	7.5			MK 10/18
SE 15 /	2	Surr		9	7.2	9	20.5	9	26	9	7.6		DM	DM 10/19
SE 15 /	3	Surr		8	7.1	8	20.3	8	26	8	7.6	NR		NR 10/20
SE 15 /	4	Surr		8	7.6	8	19.5	8	26	8	7.6		MS	MS 10/21
SE 15 /	5	Surr		8	7.5	8	20.1	8	26	8	7.5			MS 10/22
SE 15 /	6	Surr		9	7.7	9	20.0	9	26	9	7.7	DM/MS	DM/MS	DM 10/23
SE 15 /	7	Surr		9	7.7	9	19.5	9	27	9	7.8			DM 10/24
SE 15 /	8	Surr		9	7.5	9	20.4	9	27	9	7.8		MS	DM 10/25
SE 15 /	9	Surr		9	7.5	9	20.4	9	27	9	7.7	DM		DM 10/26
SE 15 /	10	Surr		8	7.8	8	19.4	8	27	8	7.8		MS	MS 10/27
SE 15 /	11	Surr		8	7.6	8	20.2	8	28	8	7.8			MS 10/28
SE 15 /	12	Surr		8	7.8	8	①~~20.7~~20.0	8	28	8	7.8	DM/MS	DM	MS 10/29
SE 15 /	13	Surr		8	7.6	8	19.7	8	28	8	7.8			MS 10/30
SE 15 /	14	Surr		9	7.6	9	20.0	9	28	9	7.8		DM	DM 10/31
SE 15 /	15	Surr		9	7.6	9	20.4	9	28	9	7.9	NR		NR 11/1
SE 15 /	16	Surr		9	7.6	9	19.7	9	28	9	7.9		DM	DM 11/2
SE 15 /	17	Surr		8	7.3	8	20.2	8	28	8	7.7			NR 11/3
SE 15 /	18	Surr		9	7.5	9	20.3	9	28	9	7.8	JB/RE	NR	JB 11/04
SE 15 /	19	Surr		8	7.4	8	20.1	8	28	8	7.8			MK 11/5
SE 15 /	20	Surr		8	7.6	8	20.8	8	28	8	7.8			NR 11/6

① WN - MS 10/29

EcoAnalysts

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
MFA	Seaport	— / —	FSW101519.01	PSEP 1995	17-Oct-2019
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY / LOCATION**	**ORGANISM BATCH**	**TEST SPECIES**	**TEST END DATE**
PG1313	Julia Baum	Port Gamble / Bath 9	ATS101719	*Neanthes arenaceodentata*	6-Nov-2019

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L)		TEMP (C)		SALINITY (ppt)		pH				
				> 4.6		20 ± 1		28 ± 2		8.0±1.0				
				D.O.		TEMP		SALINITY		pH		WATER		
SAMPLE ID	DAY	REP	JAR	meter	mg/L	meter	°C	meter	ppt	meter	unit	RENEWAL	Feeding	TECH/DATE
SE 16 /	0	Surr		9	7.5	9	20.2	9	27	9	8.0		MK	MK 10/17
SE 16 /	1	Surr		8	7.4	8	20.0	8	27	8	7.7			MK 10/18
SE 16 /	2	Surr		9	7.3	9	20.3	9	26	9	7.8		DM	DM 10/19
SE 16 /	3	Surr		8	7.1	8	20.2	8	26	8	7.7	NR		NR 10/20
SE 16 /	4	Surr		8	7.5	8	19.6	8	26	8	7.9		MS	MS 10/21
SE 16 /	5	Surr		8	7.5	8	20.1	8	26	8	7.8			MS 10/22
SE 16 /	6	Surr		9	7.6	9	20.1	9	26	9	7.8	DM/MS →		DM 10/23
SE 16 /	7	Surr		9	7.5	9	19.8	9	27	9	7.8			DM 10/24
SE 16 /	8	Surr		9	7.6	9	20.2	9	27	9	7.8		MS	DM 10/25
SE 16 /	9	Surr		9	7.3	9	20.3	9	27	9	7.8	DM		DM 10/26
SE 16 /	10	Surr		8	7.8	8	19.4	8	27	8	7.8		MS	MS 10/27
SE 16 /	11	Surr		8	7.4	8	20.1	8	28	8	7.8			MS 10/28
SE 16 /	12	Surr		8	7.7	8	19.9	8	28	8	7.8	DM/MS	DM	MS 10/29
SE 16 /	13	Surr		8	7.4	8	19.8	8	28	8	7.8			MS 10/30
SE 16 /	14	Surr		9	7.2	9	20.0	9	28	9	7.8		DM	DM 10/31
SE 16 /	15	Surr		9	7.3	9	20.2	9	28	9	7.8	NR		NR 11/1
SE 16 /	16	Surr		9	7.4	9	19.8	9	28	9	7.8		DM	DM 11/2
SE 16 /	17	Surr		8	7.1	8	20.2	8	28	8	7.7			NR 11/3
SE 16 /	18	Surr		9	7.3	9	20.2	9	28	9	7.9	JB/RE	NR	JB 11/04
SE 16 /	19	Surr		8	7.1	8	20.0	8	28	8	7.8			MK 4/5
SE 16 /	20	Surr		8	7.1	8	20.7	8	28	8	7.8			NR 11/6

EcoAnalysts

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
MFA	Seaport	/	FSW101519.01	PSEP 1995	17-Oct-2019
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY / LOCATION**	**ORGANISM BATCH**	**TEST SPECIES**	**TEST END DATE**
PG1313	Julia Baum	Port Gamble / Bath 9	ATS101719	*Neanthes arenaceodentata*	6-Nov-2019

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
SAMPLE ID	DAY	REP	JAR	D.O. meter	D.O. mg/L	TEMP meter	TEMP °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	WATER RENEWAL	Feeding	TECH/DATE
SE 17 /	0	Surr		9	7.6	9	20.2	9	27	9	7.9		MK	MK 10/17
SE 17 /	1	Surr		8	6.8	8	19.8	8	27	8	7.6			MK 10/18
SE 17 /	2	Surr		9	7.3	9	20.1	9	26	9	7.7		DM	DM 10/19
SE 17 /	3	Surr		8	6.9	8	20.1	8	26	8	7.6	NR		NR 10/20
SE 17 /	4	Surr		8	7.3	8	19.4	8	26	8	7.7		MS	MS 10/21
SE 17 /	5	Surr		8	6.5	8	19.8	8	26	8	7.6			MS 10/22
SE 17 /	6	Surr		9	7.7	9	19.8	9	26	9	7.8	DM/MS →		DM 10/23
SE 17 /	7	Surr		9	7.5	9	19.5	9	27	9	7.8			DM 10/24
SE 17 /	8	Surr		9	7.5	9	20.1	9	27	9	7.9		MS	DM 10/25
SE 17 /	9	Surr		9	7.5	9	20.0	9	27	9	7.8	DM		DM 10/26
SE 17 /	10	Surr		8	7.8	8	19.2	8	27	8	7.8		MS	MS 10/27
SE 17 /	11	Surr		8	7.4	8	19.8	8	28	8	7.7			MS 10/28
SE 17 /	12	Surr		8	7.1	8	19.5	8	28	8	7.8	DM/MS	DM	MS 10/29
SE 17 /	13	Surr		8	7.1	8	19.4	8	28	8	7.8			MS 10/30
SE 17 /	14	Surr		9	7.3	9	19.7	9	28	9	7.8		DM	DM 10/31
SE 17 /	15	Surr		9	7.2	9	20.1	9	28	9	7.8	NR		NR 11/1
SE 17 /	16	Surr		9	7.5	9	19.7	9	28	9	7.8		DM	DM 11/2
SE 17 /	17	Surr		8	6.6	8	20.1	8	28	8	7.41			NR 11/3
SE 17 /	18	Surr		9	6.7	9	20.2	9	28	9	7.5	JB/RE		JB 11/04
SE 17 /	19	Surr		8	6.3	8	20.0	8	28	8	7.5			MK 11/5
SE 17 /	20	Surr		8	7.2	8	20.5	8	28	8	7.6			NR 11/6

EcoAnalysts

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
MFA	Seaport	/	FSW101519.01	PSEP 1995	17-Oct-2019
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY / LOCATION**	**ORGANISM BATCH**	**TEST SPECIES**	**TEST END DATE**
PG1313	Julia Baum	Port Gamble / Bath 9	ATS101719	*Neanthes arenaceodentata*	6-Nov-2019

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
SAMPLE ID	DAY	REP	JAR	D.O. meter	D.O. mg/L	TEMP meter	TEMP °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	WATER RENEWAL	Feeding	TECH/DATE
SE 18 /	0	Surr		9	7.5	9	19.7	9	27	9	7.8		MK	MK 10/17
SE 18 /	1	Surr		8	7.6	8	19.6	8	27	8	7.8			MK 10/18
SE 18 /	2	Surr		9	7.3	9	20.0	9	27	9	7.9		DM	DM 10/19
SE 18 /	3	Surr		8	7.1	8	20.1	8	26	8	7.7	NR		NR 10/20
SE 18 /	4	Surr		8	7.7	8	19.4	8	26	8	8.0		MS	MS 10/21
SE 18 /	5	Surr		8	7.6	8	19.9	8	26	8	7.9			MS 10/22
SE 18 /	6	Surr		9	7.7	9	19.8	9	27	9	7.9	DM/MS		DM 10/23
SE 18 /	7	Surr		9	7.6	9	19.4	9	27	9	7.2			DM 10/24
SE 18 /	8	Surr		9	7.5	9	20.1	9	27	9	8.0		MS	DM 10/25
SE 18 /	9	Surr		9	7.5	9	20.1	9	27	9	7.9	DM		DM 10/26
SE 18 /	10	Surr		8	7.7	8	19.4	8	27	8	8.0		MS	MS 10/27
SE 18 /	11	Surr		8	7.5	8	19.6	8	28	8	7.9			MS 10/28
SE 18 /	12	Surr		8	7.7	8	19.6	8	28	8	8.0	DM/MS	DM	MS 10/29
SE 18 /	13	Surr		8	7.6	8	19.3	8	28	8	7.8			MS 10/30
SE 18 /	14	Surr		9	7.6	9	19.4	9	28	9	7.9		DM	DM 10/31
SE 18 /	15	Surr		9	7.4	9	20.2	9	28	9	7.9	NR		NR 11/1
SE 18 /	16	Surr		9	7.5	9	19.5	9	28	9	7.9		DM	DM 11/2
SE 18 /	17	Surr		8	7.3	8	19.8	8	28	8	7.8			NR 11/3
SE 18 /	18	Surr		9	7.4	9	20.1	9	28	9	7.9	JB/RE	NR	JB 11/04
SE 18 /	19	Surr		8	7.5	8	19.5	8	28	8	7.8			MK 11/5
SE 18 /	20	Surr		8	7.5	8	20.3	8	28	8	7.9			NR 11/6

EcoAnalysts

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
MFA	Seaport		FSW101519.01	PSEP 1995	17-Oct-2019
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY / LOCATION**	**ORGANISM BATCH**	**TEST SPECIES**	**TEST END DATE**
PG1313	Julia Baum	Port Gamble / Bath 9	ATS101719	*Neanthes arenaceodentata*	6-Nov-2019

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
SAMPLE ID	DAY	REP	JAR	D.O. meter	D.O. mg/L	TEMP meter	TEMP °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	WATER RENEWAL	Feeding	TECH/DATE
SE 20 /	0	Surr		9	7.7	9	19.6	9	27	9	7.9		MK	MK 10/17
SE 20 /	1	Surr		8	7.6	8	19.7	8	27	8	7.7			MK 10/18
SE 20 /	2	Surr		9	7.3	9	20.2	9	26	9	7.7		DM	DM 10/19
SE 20 /	3	Surr		8	6.9	8	20.2	8	26	8	7.6	NR		NR 10/20
SE 20 /	4	Surr		8	7.7	8	19.6	8	26	8	7.8		MS	MS 10/21
SE 20 /	5	Surr		8	7.6	8	20.0	8	26	8	7.7			MS 10/22
SE 20 /	6	Surr		9	7.6	9	20.0	9	26	9	7.7	DM/MS →		DM 10/23
SE 20 /	7	Surr		9	7.5	9	19.4	9	27	9	7.7			DM 10/24
SE 20 /	8	Surr		9	7.5	9	20.0	9	27	9	7.7		MS	DM 10/25
SE 20 /	9	Surr		9	7.5	9	20.2	9	27	9	7.6	DM		DM 10/26
SE 20 /	10	Surr		8	7.7	8	19.4	8	27	8	7.8		MS	MS 10/27
SE 20 /	11	Surr		8	7.6	8	19.8	8	27	8	7.8			MS 10/28
SE 20 /	12	Surr		8	7.7	8	19.7	8	27	8	7.8	DM/MS	DM	MS 10/29
SE 20 /	13	Surr		8	7.8	8	19.4	8	28	8	7.8			MS 10/30
SE 20 /	14	Surr		9	7.5	9	19.8	9	28	9	7.8		DM	DM 10/31
SE 20 /	15	Surr		9	7.5	9	20.3	9	28	9	7.8	NR		NR 11/1
SE 20 /	16	Surr		9	7.4	9	19.5	9	28	9	7.8		DM	DM 11/2
SE 20 /	17	Surr		8	7.4	8	20.0	8	28	8	7.8			NR 11/3
SE 20 /	18	Surr		9	7.4	9	20.3	9	28	9	7.7	JB/RE	NR	JB 11/04
SE 20 /	19	Surr		8	7.3	8	19.7	8	28	8	7.8			MK 11/5
SE 20 /	20	Surr		8	7.4	8	20.4	8	28	8	7.8			NR 11/6

EcoAnalysts

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
MFA	Seaport	1	FSW101519.01	PSEP 1995	17-Oct-2019
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY / LOCATION**	**ORGANISM BATCH**	**TEST SPECIES**	**TEST END DATE**
PG1313	Julia Baum	Port Gamble / Bath 9	ATS101719	*Neanthes arenaceodentata*	6-Nov-2019

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
				D.O.		TEMP		SALINITY		pH		WATER	Feeding	TECH/DATE
SAMPLE ID	DAY	REP	JAR	meter	mg/L	meter	°C	meter	ppt	meter	unit	RENEWAL		
SE 24 /	0	Surr		9	7.4	9	20.2	9	27	9	7.8		MK	MK 10/17
SE 24 /	1	Surr		8	7.4	8	20.0	8	27	8	7.5			MK 10/18
SE 24 /	2	Surr		9	7.2	9	20.3	9	26	9	7.5		DM	DM 10/19
SE 24 /	3	Surr		8	7.1	8	20.3	8	26	8	7.5	NR		NR 10/20
SE 24 /	4	Surr		8	7.6	8	19.6	8	26	8	7.8		MS	MS 10/21
SE 24 /	5	Surr		8	7.4	8	20.1	8	26	8	7.5			MS 10/22
SE 24 /	6	Surr		9	7.8	9	20.0	9	26	9	7.7	DM/MS →		DM 10/23
SE 24 /	7	Surr		9	7.6	9	19.6	9	27	9	7.7			DM 10/24
SE 24 /	8	Surr		9	7.5	9	20.5	9	27	9	7.8		MS	DM 10/25
SE 24 /	9	Surr		9	7.6	9	20.4	9	27	9	7.7	DM		DM 10/26
SE 24 /	10	Surr		8	7.8	8	19.5	8	27	8	7.8		MS	MS 10/27
SE 24 /	11	Surr		8	7.5	8	20.2	8	28	8	7.8			MS 10/28
SE 24 /	12	Surr		8	7.7	8	20.2	8	28	8	7.8	DM/MS	DM	MS 10/29
SE 24 /	13	Surr		8	7.5	8	19.9	8	28	8	7.8			MS 10/30
SE 24 /	14	Surr		9	7.5	9	20.1	9	28	9	7.7		DM	DM 10/31
SE 24 /	15	Surr		9	7.5	9	20.5	9	28	9	7.7	NR		NR 11/1
SE 24 /	16	Surr		9	7.5	9	19.8	9	28	9	7.8		DM	DM 11/2
SE 24 /	17	Surr		8	7.2	8	20.3	8	28	8	7.5			NR 11/3
SE 24 /	18	Surr		9	7.2	9	20.3	9	28	9	7.4	JB/RE	NR	JB 11/04
SE 24 /	19	Surr		8	7.2	8	19.9	8	28	8	7.8			MK 11/5
SE 24 /	20	Surr		8	7.3	8	20.7	8	28	8	7.8			NR 11/6

EcoAnalysts

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
MFA	Seaport		FSW101519.01	PSEP 1995	17-Oct-2019
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY / LOCATION**	**ORGANISM BATCH**	**TEST SPECIES**	**TEST END DATE**
PG1313	Julia Baum	Port Gamble / Bath 9	ATS101719	*Neanthes arenaceodentata*	6-Nov-2019

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
SAMPLE ID	DAY	REP	JAR	D.O. meter	D.O. mg/L	TEMP meter	TEMP °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	WATER RENEWAL	Feeding	TECH/DATE
SE 26 /	0	Surr		9	7.5	9	20.2	9	26	9	7.5		MK	MK 10/17
SE 26 /	1	Surr		8	7.5	8	20.0	8	27	8	7.5			MK 10/18
SE 26 /	2	Surr		9	7.3	9	20.5	9	26	9	7.4		DM	DM 10/19
SE 26 /	3	Surr		8	7.0	8	20.3	8	26	8	7.4	NR		NR 10/20
SE 26 /	4	Surr		8	7.6	8	19.6	8	26	8	7.6		MS	MS 10/21
SE 26 /	5	Surr		8	7.4	8	20.2	8	26	8	7.4			MS 10/22
SE 26 /	6	Surr		9	7.6	9	20.2	9	27	9	7.5	DM/MS →		DM 10/23
SE 26 /	7	Surr		9	7.5	9	19.8	9	27	9	7.5			DM 10/24
SE 26 /	8	Surr		9	7.2	9	20.6	9	27	9	7.6		MS	DM 10/25
SE 26 /	9	Surr		9	7.5	9	20.3	9	27	9	7.6	DM		DM 10/26
SE 26 /	10	Surr		8	7.7	8	19.6	8	27	8	7.7		MS	MS 10/27
SE 26 /	11	Surr		8	7.5	8	20.1	8	28	8	7.6			MS 10/28
SE 26 /	12	Surr		8	7.6	8	20.0	8	28	8	7.7	DM/MS	DM	MS 10/29
SE 26 /	13	Surr		8	7.5	8	19.8	8	28	8	7.7			MS 10/30
SE 26 /	14	Surr		9	6.5	9	19.5	9	28	9	7.7		DM	DM 10/31
SE 26 /	15	Surr		9	7.3	9	20.4	9	28	9	7.7	NR		NR 11/1
SE 26 /	16	Surr		9	7.5	9	20.0	9	28	9	7.8		DM	DM 11/2
SE 26 /	17	Surr		8	7.3	8	20.3	8	29	8	7.7			NR 11/3
SE 26 /	18	Surr		9	7.4	9	20.3	9	28	9	7.7	JB/RG	MK	JB 11/4
SE 26 /	19	Surr		8	7.2	8	20.1	8	28	8	7.6			MK 11/5
SE 26 /	20	Surr		8	7.4	8	20.7	8	28	8	7.6			NR 11/6

EcoAnalysts

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
MFA	Seaport		FSW101519.01	PSEP 1995	17-Oct-2019
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY / LOCATION**	**ORGANISM BATCH**	**TEST SPECIES**	**TEST END DATE**
PG1313	Julia Baum	Port Gamble / Bath 9	ATS101719	*Neanthes arenaceodentata*	6-Nov-2019

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
SAMPLE ID	DAY	REP	JAR	D.O. meter	D.O. mg/L	TEMP meter	TEMP °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	WATER RENEWAL	Feeding	TECH/DATE
SE 31 /	0	Surr		9	7.4	9	20.1	9	27	9	7.9		MK	MK 10/17
SE 31 /	1	Surr		8	7.0	8	20.1	8	27	8	7.6			MK 10/18
SE 31 /	2	Surr		9	7.3	9	20.2	9	27	9	7.7		DM	DM 10/19
SE 31 /	3	Surr		8	7.0	8	20.2	8	26	8	7.6	NR		NR 10/20
SE 31 /	4	Surr		8	7.4	8	19.5	8	26	8	7.8		MS	MS 10/21
SE 31 /	5	Surr		8	7.2	8	19.9	8	26	8	7.7			MS 10/22
SE 31 /	6	Surr		9	7.6	9	19.8	9	27	9	7.9	DM/MS		DM 10/23
SE 31 /	7	Surr		9	7.4	9	19.5	9	27	9	7.2			DM 10/24
SE 31 /	8	Surr		9	7.4	9	20.1	9	27	9	7.9		MS	DM 10/25
SE 31 /	9	Surr		9	7.3	9	19.9	9	28	9	7.8	DM		DM 10/26
SE 31 /	10	Surr		8	7.1	8	19.2	8	28	8	7.9		MS	MS 10/27
SE 31 /	11	Surr		8	7.3	8	19.8	8	28	8	7.8			MS 10/28
SE 31 /	12	Surr		8	7.5	8	19.6	8	28	8	7.9	DM/MS	DM	MS 10/29
SE 31 /	13	Surr		8	7.4	8	19.4	8	29	8	7.8			MS 10/30
SE 31 /	14	Surr		9	7.2	9	19.6	9	29	9	7.8		DM	DM 10/31
SE 31 /	15	Surr		9	7.2	9	20.0	9	29	9	7.8	NR		NR 11/1
SE 31 /	16	Surr		9	7.3	9	19.6	9	29	9	7.9		DM	DM 11/2
SE 31 /	17	Surr		8	7.0	8	20.1	8	29	8	7.6			NR 11/3
SE 31 /	18	Surr		9	7.2	9	20.2	9	29	9	7.7	JB/RE		JB 11/04
SE 31 /	19	Surr		8	6.6	8	20.0	8	29	8	7.6			MK 11/5
SE 31 /	20	Surr		8	7.2	8	20.6	8	28	8	7.7			NR 11/6

Ammonia and Sulfide Analysis Record

Client/Project:	Organism:	Test Duration (days):
MFA / Seaport	Neanthes	20

PRETEST / (INITIAL) / FINAL / OTHER (circle one) DAY of TEST: 0

(OVERLYING (OV)) / (POREWATER (PW)) (circle one) / Comments: _____

Calibration Standards Temperature		Sample temperature should be within ±1°C of standards temperature at time and date of analysis.
Date: 10/17/19	Temperature: 22.3	

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Meter #/ Temp (°C)		Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. (µg/L)	Multi-plier	Calculated Sulf. (µg/L)
OV													
Ø	SURR.	10/17/19 NR	0.0050	T1	22.2	10/17/19 MS	N			10	1		
14%.			0.295		22.3						ND		
47%.			0.544		22.3						ND		
68%.			0.108		22.0						3		
SE-15			0.381		22.0						0		
-16			0.361		22.0						3		
-17			0.582		22.2						0		
-18			0.362		22.0						ND		
-20			0.475		22.0						0		
-24			0.322		22.3						0		
-26			0.115		22.4						0		
-31			0.309		22.2						ND		
PW													
Ø		10/17/19 NR	0.220		22.5	10/17/19 NR/MS		7.5	28		8		
14%.			2.41		22.6			7.4	28		0		
47%.			3.02		22.4			7.6	28		16		
68%.			3.12		22.4			7.5	29		22		
SE-15			0.937		22.4			7.1	26		NO		
-16			1.27		22.4			7.2	24		NO		
-17			1.86		22.4			7.0	25		NO		
-18			1.39		22.4			7.2	25		NO		
-20			1.44		22.3			7.1	24		NO		
-24	↓	↓	1.53	↓	22.4	↓	↓	6.6	24	↓	5		

Ammonia and Sulfide Analysis Record

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Meter # / Temp (°C)		Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. (~~mg~~ µg/L)	Multi-plier	Calc-ulated Sulf. (mg/L)
PW ↓ SE-26	Surr	10/17/19 NR	0.703	T1	22.4	10/17/19 MS	N	6.0	25	10	ND		
SE-31	↓	↓	1.19	↓	22.4	↓	↓	7.2	26	↓	ND		

Ammonia and Sulfide Analysis Record

Client/Project:	Organism:	Test Duration (days):
MFA/Seaport	Nearthes	20

PRETEST / INITIAL / FINAL / OTHER (circle one) DAY of TEST: 20

OVERLYING (OV) / POREWATER (PW) (circle one) / Comments: _____

Calibration Standards Temperature		Sample temperature should be within ±1°C of standards temperature at time and date of analysis.
Date:	Temperature:	
11/6/19	22.4	

	Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Meter # / Temp (°C)	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. (µg/L)	Multi-plier	Calc-ulated Sulf. (µg/L)
OV	Ø	SWRR	11/6/19 NR/DM	6.61	T1 21.4	11/6/19 NR/DM	N			10	ND		
	REF 14%			0.654	21.4						2		
	REF 47%			0.513	21.4						ND		
	REF 68%			0.608	21.5						0		
	SE-15			0.338	21.4						ND		
	SE-16			0.448	21.4						0		
	SE-17			0.487	21.4						ND		
	SE-18			0.393	21.4						ND		
	SE-20			~~0.332~~ 0.279 (1)	21.5						ND		
	SE-24			0.332	22.2						1		
	SE-26			4.05	21.4						ND		
	SE-31			0.406	21.5						ND		
	Ø			6.89	21.4			7.3	28		ND		
PW	REF 14%			1.57	21.4			7.0	28		21		
	REF 47%			0.873	21.4			7.0	28		1		
	REF 68%			0.760	21.4			7.0	28		ND		
	SE-15			1.08	21.4			6.7	28		14		
	SE-16			0.619	21.4			7.1	28		ND		
	SE-17			1.22	21.4			6.9	28		ND		
	SE-18			0.798	21.4			7.2	28		ND		
	SE-20			0.567	21.4			6.9	28		ND		
	SE 24	↓	↓	1.68	↓ 21.4	↓	↓	6.8	28	↓	10		

(1) DWC- NR 11/6 (actual = 0.279)

Ammonia and Sulfide Analysis Record

Client/Project:	Organism:	Test Duration (days):
MFA / SEAPORT	Neanthes	20 days

PRETEST / INITIAL / FINAL / OTHER (circle one) DAY of TEST: 20

OVERLYING (OV) / POREWATER (PW) (circle one) / Comments: _____

Calibration Standards Temperature		Sample temperature should be within ±1°C of standards temperature at time and date of analysis.
Date:	Temperature:	
11/6/19	22.4	

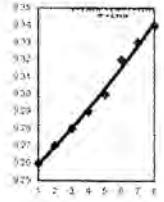
Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Meter #/ Temp (°C)		Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. (µg/L)	Multi-plier	Calc-ulated Sulf. (µg/L)
PW ↓ SE-26	SURR	11/6/19 NR/DM	4.10	T1	21.4	11/6/19 NR/DM	N	6.9	① 6.928	10	1		
SE-31	↓	↓	0.866	↓	21.4	↓	↓	7.0	29	↓	ND		

① WC - NR 11/6

CLIENT:	MFA	Test Date:	17-Oct-19
PROJECT:	Seaport	Test Type:	Neanthes SP
COMMENTS:	Initial Ammonia		

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer: I-factor	
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
	9.34



	Sample	Mod	NH3T (mg/L)	salinity (ppt)	pH	temp (C)	temp (K)	i-factor	Mod	NH3U (mg/L)	
	Target / Sample Name		Actual	22.9	8.0	24.1	297.26	9.3053		#VALUE!	
	Example 3.5		2.000	10.0	7.5	5.0	278.16	9.2750		0.008	
1	Control		0.005	28	8.00	19.6	292.76	9.3187		0.000	OV Day 0
2	CR21-West (14%)		0.295	28	8.00	19.7	292.86	9.3187		0.009	
3	Carr20 (47%)		0.544	28	7.90	20.1	293.26	9.3187		0.014	
4	CR02-South (68%)		0.108	28	8.00	19.7	292.86	9.3187		0.003	
5	SE-15		0.381	27	7.90	20.2	293.36	9.3160		0.010	
6	SE-16		0.361	27	8.00	20.2	293.36	9.3160		0.012	
7	SE-17		0.582	27	7.9	20.2	293.36	9.3160		0.015	
8	SE-18		0.362	27	7.8	19.7	292.86	9.3160		0.007	
9	SE-20		0.475	27	7.9	19.6	292.76	9.3160		0.012	
10	SE-24		0.322	27	7.8	20.2	293.36	9.3160		0.007	
11	SE-26		0.115	26	7.50	20.2	293.36	9.3133		0.001	
12	SE-31		0.309	27	7.9	20.1	293.26	9.3160		0.008	
13	Control		0.220	28	7.5	19.6	292.76	9.3187		0.002	PW Day 0
14	CR21-West (14%)		2.41	28	7.4	19.7	292.86	9.3187		0.020	
15	Carr20 (47%)		3.02	28	7.6	20.1	293.26	9.3187		0.040	
16	CR02-South (68%)		3.12	29	7.5	19.7	292.86	9.3214		0.032	
17	SE-15		0.937	26	7.1	20.2	293.36	9.3133		0.004	
18	SE-16		1.27	24	7.2	20.2	293.36	9.3081		0.007	
19	SE-17		1.86	25	7.0	20.2	293.36	9.3107		0.006	
20	SE-18		1.39	25	7.2	19.7	292.86	9.3107		0.007	
21	SE-20		1.44	24	7.1	19.6	292.76	9.3081		0.006	
22	SE-24		1.53	24	6.6	20.2	293.36	9.3081		0.002	
23	SE-26		0.703	25	6.0	20.2	293.36	9.3107		0.000	
24	SE-31		1.19	26	7.2	20.1	293.26	9.3133		0.006	
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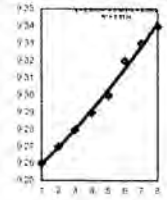
CLIENT:	MFA	Test Date:	17-Oct-19
PROJECT:	Seaport	Test Type:	Neanthes SP
COMMENTS:	Final Ammonia		

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer: I-factor	
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
	9.34



	Sample	Mod	NH3T (mg/L)	salinity (ppt)	pH	temp (C)	temp (K)	i-factor	Mod	NH3U (mg/L)	
	Target / Sample Name		Actual	22.9	8.0	24.1	297.26	9.3053		#VALUE!	
	Example 3.5		2.000	10.0	7.5	5.0	278.16	9.2750		0.008	
1	Control		6.61	28	7.90	20.3	293.46	9.3187		0.175	OV Day 20
2	CR21-West (14%)		0.654	29	7.90	20.1	293.26	9.3214		0.017	OV Day 20
3	Carr20 (47%)		0.513	28	7.90	20.6	293.76	9.3187		0.014	OV Day 20
4	CR02-South (68%)		0.608	28	7.90	20.2	293.36	9.3187		0.016	OV Day 20
5	SE-15		0.338	28	7.80	20.8	293.96	9.3187		0.007	OV Day 20
6	SE-16		0.448	28	7.80	20.7	293.86	9.3187		0.010	OV Day 20
7	SE-17		0.487	28	7.6	20.5	293.66	9.3187		0.007	OV Day 20
8	SE-18		0.393	28	7.9	20.3	293.46	9.3187		0.010	OV Day 20
9	SE-20		0.279	28	7.8	20.4	293.56	9.3187		0.006	OV Day 20
10	SE-24		0.332	28	7.8	20.7	293.86	9.3187		0.007	OV Day 20
11	SE-26		4.05	28	7.60	20.7	293.86	9.3187		0.056	OV Day 20
12	SE-31		0.406	28	7.7	20.6	293.76	9.3187		0.007	OV Day 20
13	Control		6.890	28	7.3	20.3	293.46	9.3187		0.047	PW Day 20
14	CR21-West (14%)		1.57	28	7.0	20.1	293.26	9.3187		0.005	PW Day 20
15	Carr20 (47%)		0.873	28	7.0	20.6	293.76	9.3187		0.003	PW Day 20
16	CR02-South (68%)		0.760	28	7.0	20.2	293.36	9.3187		0.003	PW Day 20
17	SE-15		1.08	28	6.7	20.8	293.96	9.3187		0.002	PW Day 20
18	SE-16		0.619	28	7.1	20.7	293.86	9.3187		0.003	PW Day 20
19	SE-17		1.22	28	6.9	20.5	293.66	9.3187		0.003	PW Day 20
20	SE-18		0.798	28	7.2	20.3	293.46	9.3187		0.004	PW Day 20
21	SE-20		0.567	28	6.9	20.4	293.56	9.3187		0.002	PW Day 20
22	SE-24		1.68	28	6.8	20.7	293.86	9.3187		0.004	PW Day 20
23	SE-26		4.10	28	6.9	20.7	293.86	9.3187		0.011	PW Day 20
24	SE-31		0.860	29	7.0	20.6	293.76	9.3214		0.003	PW Day 20
25											
26											
27											
28											
29											
30											
31											
32											
33											
34											
35											
36											
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41											
42											
43											
44											
45											
46											

Seaport: Neanthes Sulfides

		Input				Output	
	Sample ID	Total Dissolved Sulfide (µg/L as S)	Temper-ature (°C)	Salinity (‰)	pH	Undissociated H2S (µg/L as H2S)	Weight Fraction (H2S/Total S)
OV Day 0	Control	1	19.6	28	8	0.07	6.79%
	CR21-West (14)	ND	19.7	28	8.0	#VALUE!	#VALUE!
	Carr20 (47)	ND	20.1	28	7.9	#VALUE!	#VALUE!
	CR02-South (68)	3	19.7	28	8.0	0.20	6.77%
	SE-15	0	20.2	27	7.9	0.00	#DIV/0!
	SE-16	3	20.2	27	8	0.20	6.69%
	SE-17	0	20.2	27	7.9	0.00	#DIV/0!
	SE-18	ND	19.7	27	7.8	#VALUE!	#VALUE!
	SE-20	0	19.6	27	7.9	0.0000	#DIV/0!
	SE-24	0	20.2	27	7.8	0.00	#DIV/0!
	SE-26	0	20.2	26	7.5	0.00	#DIV/0!
	SE-31	ND	20.1	27	7.9	#VALUE!	#VALUE!
PW Day 0	Control	8	19.6	28	7.5	1.51	18.87%
	CR21-West (14)	0	19.7	28	7.4	0.00	#DIV/0!
	Carr20 (47)	16	20.1	28	7.6	2.45	15.32%
	CR02-South (68)	22	19.7	29	7.5	4.12	18.73%
	SE-15	ND	20.2	26	7.1	#VALUE!	#VALUE!
	SE-16	ND	20.2	24	7.2	#VALUE!	#VALUE!
	SE-17	ND	20.2	25	7	#VALUE!	#VALUE!
	SE-18	ND	19.7	25	7.2	#VALUE!	#VALUE!
	SE-20	ND	19.6	24	7.1	#VALUE!	#VALUE!
	SE-24	5	20.2	24	6.6	3.36	67.18%
	SE-26	ND	20.2	25	6.0	#VALUE!	#VALUE!
	SE-31	ND	20.1	26	7.2	#VALUE!	#VALUE!
OV Day 20	Control	ND	20.3	28	7.9	#VALUE!	#VALUE!
	CR21-West (14)	2	20.1	29	7.9	0.16	8.23%
	Carr20 (47)	ND	20.6	28	7.9	#VALUE!	#VALUE!
	CR02-South (68)	0	20.2	28	7.9	0.00	#DIV/0!
	SE-15	ND	20.8	28	7.8	#VALUE!	#VALUE!
	SE-16	0	20.7	28	7.8	0.00	#DIV/0!
	SE-17	ND	20.5	28	7.6	#VALUE!	#VALUE!
	SE-18	ND	20.3	28	7.9	#VALUE!	#VALUE!
	SE-20	ND	20.4	28	7.8	#VALUE!	#VALUE!
	SE-24	1	20.7	28	7.8	0.10	10.01%
	SE-26	ND	20.7	28	7.6	#VALUE!	#VALUE!
	SE-31	ND	20.6	28	7.7	#VALUE!	#VALUE!
PW Day 20	Control	ND	20.3	28	7.3	#VALUE!	#VALUE!
	CR21-West (14)	21	20.1	28	7	8.96	42.66%
	Carr20 (47)	1	20.6	28	7	0.42	42.20%
	CR02-South (68)	ND	20.2	28	7	#VALUE!	#VALUE!
	SE-15	14	20.8	28	6.7	8.42	60.17%
	SE-16	ND	20.7	28	7.1	#VALUE!	#VALUE!
	SE-17	ND	20.5	28	6.9	#VALUE!	#VALUE!
	SE-18	ND	20.3	28	7.2	#VALUE!	#VALUE!
	SE-20	ND	20.4	28	6.9	#VALUE!	#VALUE!
	SE-24	10	20.7	28	6.8	5.42	54.19%
	SE-26	1	20.7	28	6.9	0.48	48.08%
	SE-31	ND	20.6	29	7	#VALUE!	#VALUE!

2.2 *Neanthes arenaceodentata* Statistical Results

Project Name: Seaport Neanthes AFDW

Sample:	x1
Samp ID:	SE-16
Alias:	
Replicates:	5
Mean:	0.5
SD:	0.098
Tr Mean:	0.5
Trans SD:	0.098

Ref Samp:	x2
Ref ID:	Carr20 (47)
Alias:	
Replicates:	5
Mean:	0.428
SD:	0.097
Tr Mean:	0.428
Trans SD:	0.097

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	0.063
SS:	0.076
K:	5
b:	0.266
Alpha Level:	0.05
Calculated Value:	0.9385
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	0.07
Test Residual SD:	0.058
Ref. Residual Mean:	0.081
Ref. Residual SD:	0.035
Deg. of Freedom:	8
Alpha Level:	0.1
Calculated Value:	0.3566
Critical Value:	>= 1.860
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	No Transformation
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	8
Experimental Alpha Level:	0.05
Calculated Value:	-1.158
Critical Value:	>= 1.860
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0.464	0.464	0.53	0.53	0.036	0.102			-0.14
2	0.541	0.541	0.38	0.38	0.041	0.048			-0.115
3	0.36	0.36	0.529	0.529	0.14	0.101			-0.048
4	0.624	0.624	0.313	0.313	0.124	0.115			-0.038
5	0.509	0.509	0.39	0.39	0.009	0.038			-0.036
6									0.009
7									0.041
8									0.101
9									0.102
10									0.124

Project Name: Seaport Neanthes AFDW

Sample:	x1
Samp ID:	SE-17
Alias:	
Replicates:	5
Mean:	0.366
SD:	0.128
Tr Mean:	0.366
Trans SD:	0.128

Ref Samp:	x2
Ref ID:	CR02-South (68)
Alias:	
Replicates:	4
Mean:	0.473
SD:	0.057
Tr Mean:	0.473
Trans SD:	0.057

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	0.063
SS:	0.076
K:	4
b:	0.259
Alpha Level:	0.1
Calculated Value:	0.8872
Critical Value:	<= 0.859
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	0.086
Test Residual SD:	0.085
Ref. Residual Mean:	0.038
Ref. Residual SD:	0.037
Deg. of Freedom:	7
Alpha Level:	0.1
Calculated Value:	1.0381
Critical Value:	>= 1.895
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	No Transformation
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	7
Experimental Alpha Level:	0.05
Calculated Value:	1.5329
Critical Value:	>= 1.895
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0.429	0.429	0.541	0.541	0.063	0.069			-0.215
2	0.386	0.386	0.48	0.48	0.02	0.007			-0.072
3	0.373	0.373	0.401	0.401	0.007	0.072			-0.005
4	0.489	0.489	0.468	0.468	0.123	0.005			0.007
5	0.151	0.151			0.215				0.007
6									0.02
7									0.063
8									0.069
9									0.123
10									0

Project Name: Seaport Neanthes AFDW

Sample:	x1
Samp ID:	SE-18
Alias:	
Replicates:	5
Mean:	0.417
SD:	0.063
Tr Mean:	0.417
Trans SD:	0.063

Ref Samp:	x2
Ref ID:	CR02-South (68)
Alias:	
Replicates:	4
Mean:	0.473
SD:	0.057
Tr Mean:	0.473
Trans SD:	0.057

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	0.037
SS:	0.026
K:	4
b:	0.156
Alpha Level:	0.1
Calculated Value:	0.9408
Critical Value:	<= 0.859
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	0.041
Test Residual SD:	0.043
Ref. Residual Mean:	0.038
Ref. Residual SD:	0.037
Deg. of Freedom:	7
Alpha Level:	0.1
Calculated Value:	0.1114
Critical Value:	>= 1.895
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	No Transformation
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	7
Experimental Alpha Level:	0.05
Calculated Value:	1.3586
Critical Value:	>= 1.895
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0.331	0.331	0.541	0.541	0.086	0.069			-0.086
2	0.402	0.402	0.48	0.48	0.015	0.007			-0.072
3	0.507	0.507	0.401	0.401	0.09	0.072			-0.015
4	0.416	0.416	0.468	0.468	0.001	0.005			-0.005
5	0.43	0.43			0.013				-0.001
6									0.007
7									0.013
8									0.069
9									0.09
10									0

Project Name: Seaport Neanthes AFDW

Sample:	x1
Samp ID:	SE-24
Alias:	
Replicates:	5
Mean:	0.341
SD:	0.078
Tr Mean:	0.341
Trans SD:	0.078

Ref Samp:	x2
Ref ID:	Carr20 (47)
Alias:	
Replicates:	5
Mean:	0.428
SD:	0.097
Tr Mean:	0.428
Trans SD:	0.097

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	0.057
SS:	0.062
K:	5
b:	0.235
Alpha Level:	0.05
Calculated Value:	0.8942
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	0.062
Test Residual SD:	0.034
Ref. Residual Mean:	0.081
Ref. Residual SD:	0.035
Deg. of Freedom:	8
Alpha Level:	0.1
Calculated Value:	0.8412
Critical Value:	>= 1.860
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	No Transformation
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	8
Experimental Alpha Level:	0.05
Calculated Value:	1.5795
Critical Value:	>= 1.860
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0.436	0.436	0.53	0.53	0.095	0.102			-0.115
2	0.348	0.348	0.38	0.38	0.007	0.048			-0.081
3	0.26	0.26	0.529	0.529	0.081	0.101			-0.076
4	0.394	0.394	0.313	0.313	0.053	0.115			-0.048
5	0.265	0.265	0.39	0.39	0.076	0.038			-0.038
6									0.007
7									0.053
8									0.095
9									0.101
10									0.102

Project Name: Seaport Neanthes AFDW

Sample:	x1
Samp ID:	SE-26
Alias:	
Replicates:	5
Mean:	0.526
SD:	0.036
Tr Mean:	0.526
Trans SD:	0.036

Ref Samp:	x2
Ref ID:	CR21-West (14)
Alias:	
Replicates:	5
Mean:	0.479
SD:	0.116
Tr Mean:	0.479
Trans SD:	0.116

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	0.056
SS:	0.059
K:	5
b:	0.227
Alpha Level:	0.05
Calculated Value:	0.8707
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	0.025
Test Residual SD:	0.023
Ref. Residual Mean:	0.079
Ref. Residual SD:	0.075
Deg. of Freedom:	8
Alpha Level:	0.1
Calculated Value:	1.5279
Critical Value:	>= 1.860
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	No Transformation
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	8
Experimental Alpha Level:	0.05
Calculated Value:	-0.8674
Critical Value:	>= 1.860
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0.506	0.506	0.54	0.54	0.02	0.061			-0.191
2	0.589	0.589	0.473	0.473	0.063	0.006			-0.026
3	0.526	0.526	0.594	0.594	0	0.115			-0.02
4	0.511	0.511	0.501	0.501	0.015	0.022			-0.015
5	0.5	0.5	0.288	0.288	0.026	0.191			-0.006
6									0
7									0.022
8									0.061
9									0.063
10									0.115

Project Name: Seaport Neanthes AFDW

Sample:	x1
Samp ID:	SE-31
Alias:	
Replicates:	5
Mean:	0.465
SD:	0.056
Tr Mean:	0.166
Trans SD:	0.016

Ref Samp:	x2
Ref ID:	Carr20 (47)
Alias:	
Replicates:	5
Mean:	0.428
SD:	0.097
Tr Mean:	0.154
Trans SD:	0.029

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	0.015
SS:	0.005
K:	5
b:	0.065
Alpha Level:	0.05
Calculated Value:	0.9178
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	0.014
Test Residual SD:	0.005
Ref. Residual Mean:	0.024
Ref. Residual SD:	0.011
Deg. of Freedom:	8
Alpha Level:	0.1
Calculated Value:	1.9104
Critical Value:	>= 1.860
Variances Homogeneous:	No

Test Results:

Statistic:	Approximate t
Balanced Design:	Yes
Transformation:	Log10 (x + 1.0)
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	6
Experimental Alpha Level:	0.05
Calculated Value:	-0.7692
Critical Value:	>= 1.943
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0.429	0.155	0.53	0.185	0.011	0.031			-0.036
2	0.445	0.16	0.38	0.14	0.006	0.014			-0.018
3	0.404	0.147	0.529	0.184	0.018	0.03			-0.014
4	0.522	0.182	0.313	0.118	0.017	0.036			-0.011
5	0.526	0.184	0.39	0.143	0.018	0.011			-0.011
6									-0.006
7									0.017
8									0.018
9									0.03
10									0.031

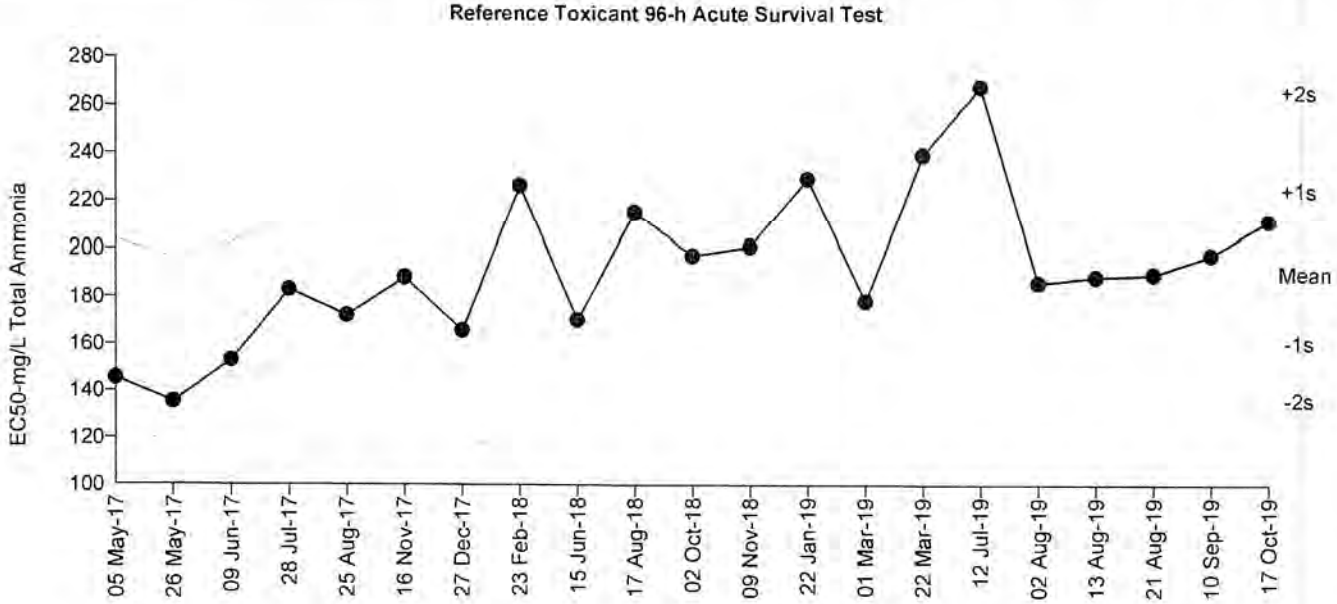
2.3 *Neanthes arenaceodentata* Reference Toxicant Test Results

CETIS QC Plot

Report Date: 25 Nov-19 09:59 (1 of 1)

Reference Toxicant 96-h Acute Survival Test — All Matching Labs

Test Type:	Survival	**Organism:**	Neanthes arenaceodentata (Polycha	**Material:**	Total Ammonia
Protocol:	PSEP (1995)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	189	**Count:**	20	**-1s Warning Limit:**	159.7	**-2s Action Limit:**	135
Sigma:	n/a	**CV:**	16.90%	**+1s Warning Limit:**	223.6	**+2s Action Limit:**	264.6

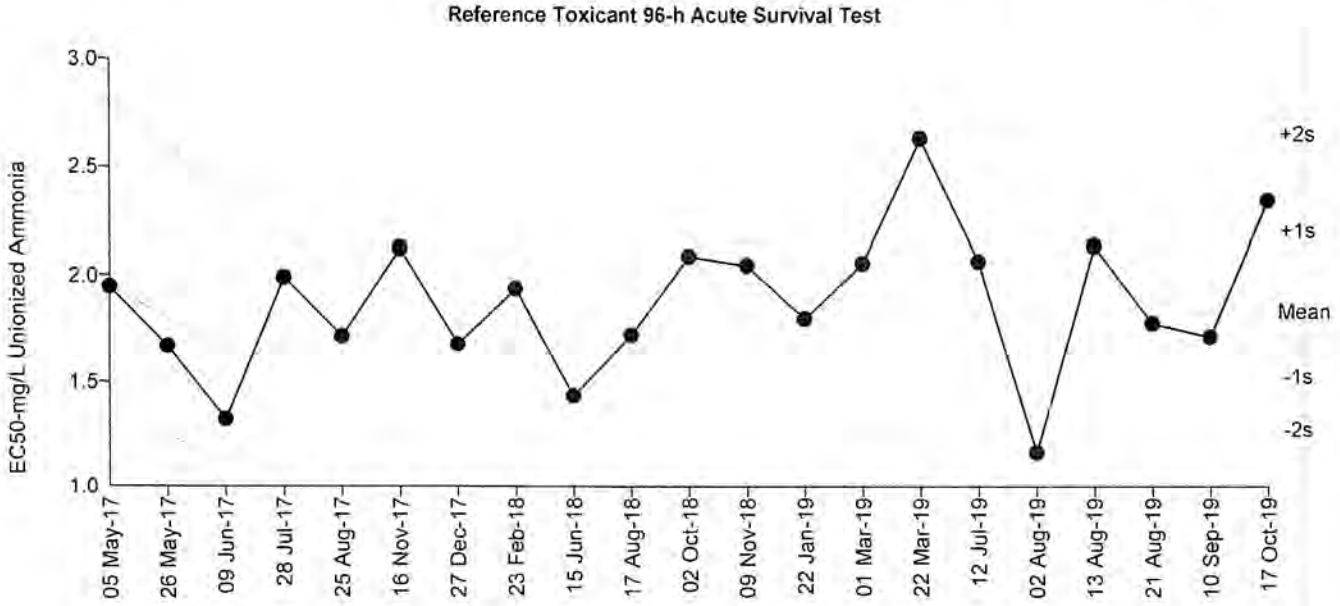
Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2017	May	5	11:10	145.4	-43.61	-1.559	(-)		19-9695-8635	12-9907-4132	EcoAnalysts
2			26	11:20	135.4	-53.62	-1.983	(-)		02-4398-8901	19-3251-4383	EcoAnalysts
3		Jun	9	13:12	152.9	-36.13	-1.261	(-)		06-5936-3810	21-1385-6147	EcoAnalysts
4		Jul	28	10:45	183.1	-5.964	-0.1906			04-6413-3650	06-5419-2075	EcoAnalysts
5		Aug	25	10:40	172.2	-16.82	-0.5539			03-6651-4426	03-4165-4995	EcoAnalysts
6		Nov	16	13:40	188.2	-0.8346	-0.02631			03-0415-6136	04-9955-5124	EcoAnalysts
7		Dec	27	15:35	165.8	-23.2	-0.7786			01-8821-8905	08-9204-3617	EcoAnalysts
8	2018	Feb	23	16:20	226.4	37.37	1.072	(+)		13-7905-8989	13-7098-6720	EcoAnalysts
9		Jun	15	14:35	170.5	-18.59	-0.6156			04-1274-1602	03-0642-1993	EcoAnalysts
10		Aug	17	14:15	215.3	26.21	0.7718			07-8700-6256	13-3406-4651	EcoAnalysts
11		Oct	2	14:10	197.3	8.229	0.2533			21-2226-7904	00-1709-8680	EcoAnalysts
12		Nov	9	14:15	201.1	12.08	0.3684			00-5577-1542	07-1368-3232	EcoAnalysts
13	2019	Jan	22	15:17	229.4	40.38	1.151	(+)		19-6608-0675	00-2421-4186	EcoAnalysts
14		Mar	1	13:44	178.5	-10.57	-0.3422			16-4352-7409	14-8196-0068	EcoAnalysts
15			22	15:20	239.3	50.2	1.4	(+)		12-8564-4292	03-0035-4512	EcoAnalysts
16		Jul	12	14:30	267.7	78.67	2.069	(+)	(+)	21-0917-4708	00-5307-6948	EcoAnalysts
17		Aug	2	15:20	186.2	-2.83	-0.08967			17-0846-5905	16-9911-4308	EcoAnalysts
18			13	15:55	188.8	-0.2532	-0.007968			08-6399-0477	04-6509-2576	EcoAnalysts
19			21	13:30	189.7	0.6934	0.02177			21-2736-4211	02-0545-5733	EcoAnalysts
20		Sep	10	14:45	197.8	8.74	0.2687			15-3198-9821	13-4571-7808	EcoAnalysts
21		Oct	17	15:45	211.7	22.61	0.6717			00-3306-4323	18-7634-5789	EcoAnalysts

Analyst: NR QA: MK

Reference Toxicant 96-h Acute Survival Test **All Matching Labs**

Test Type: Survival **Organism:** Neanthes arenaceodentata (Polycha **Material:** Unionized Ammonia
Protocol: PSEP (1995) **Endpoint:** Proportion Survived **Source:** Reference Toxicant-REF



Mean:	1.822	**Count:**	20	**-1s Warning Limit:**	1.514	**-2s Action Limit:**	1.258
Sigma:	n/a	**CV:**	18.70%	**+1s Warning Limit:**	2.192	**+2s Action Limit:**	2.638

Quality Control Data

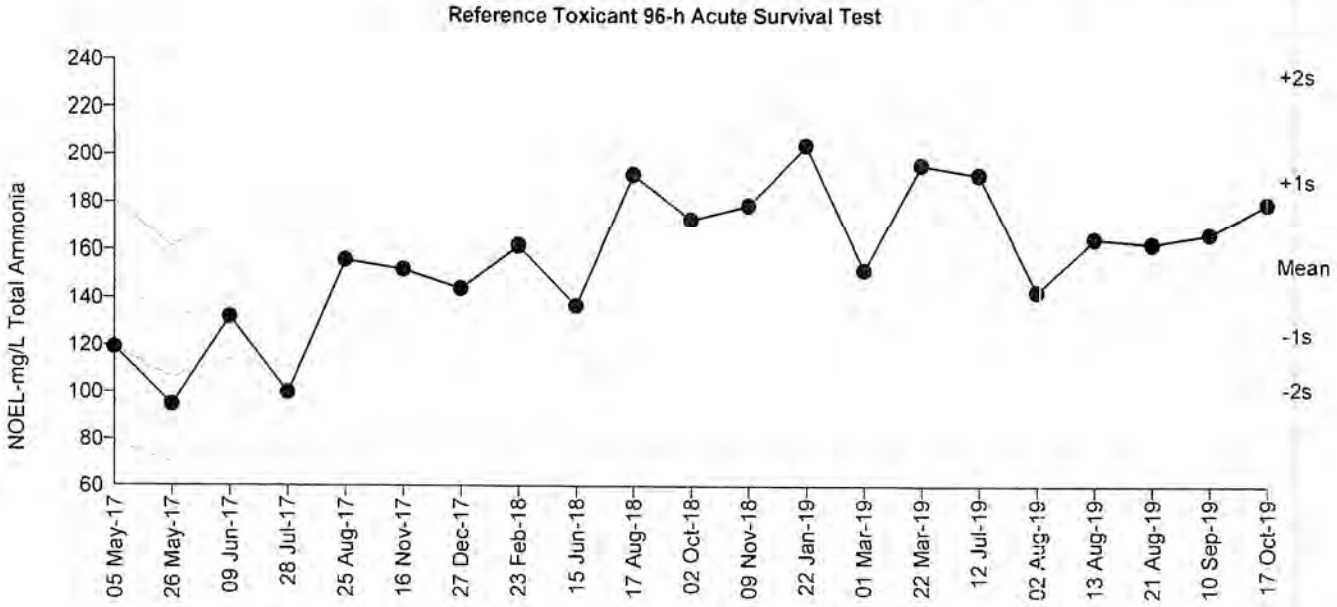
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2017	May	5	11:10	1.947	0.1256	0.3601			06-1983-2716	10-6060-2702	EcoAnalysts
2			26	11:20	1.668	-0.1536	-0.4758			11-9977-1019	12-2648-7955	EcoAnalysts
3		Jun	9	13:12	1.32	-0.5013	-1.739	(-)		20-5746-1828	16-2628-9369	EcoAnalysts
4		Jul	28	10:45	1.989	0.1675	0.4753			11-9488-2902	14-7043-7154	EcoAnalysts
5		Aug	25	10:40	1.716	-0.106	-0.3238			04-3451-1040	00-3615-6317	EcoAnalysts
6		Nov	16	13:40	2.122	0.3004	0.8247			21-2485-6236	15-8866-6943	EcoAnalysts
7		Dec	27	15:35	1.678	-0.1437	-0.4439			14-3251-3795	10-3688-8341	EcoAnalysts
8	2018	Feb	23	16:20	1.939	0.117	0.3362			08-4313-9079	15-8743-9749	EcoAnalysts
9		Jun	15	14:35	1.432	-0.3895	-1.3	(-)		13-9420-2469	11-6483-4489	EcoAnalysts
10		Aug	17	14:15	1.721	-0.1005	-0.3067			16-0114-0602	19-8752-3439	EcoAnalysts
11		Oct	2	14:10	2.087	0.2657	0.7356			02-7017-5318	01-2654-4798	EcoAnalysts
12		Nov	9	14:15	2.046	0.2243	0.6272			05-1575-7697	05-2999-6855	EcoAnalysts
13	2019	Jan	22	15:17	1.799	-0.02305	-0.06881			03-5816-0405	12-4945-6418	EcoAnalysts
14		Mar	1	13:44	2.055	0.2339	0.6527			04-3242-1896	16-4131-9540	EcoAnalysts
15			22	15:20	2.63	0.8084	1.984	(+)		00-7345-5138	15-2870-1632	EcoAnalysts
16		Jul	12	14:30	2.065	0.2437	0.6783			19-1480-3456	07-7235-5107	EcoAnalysts
17		Aug	2	15:20	1.163	-0.6587	-2.425	(-)	(-)	10-1976-9391	00-8421-1808	EcoAnalysts
18			13	15:55	2.137	0.3154	0.8628			00-5853-2505	10-3089-9902	EcoAnalysts
19			21	13:30	1.779	-0.04274	-0.1283			14-7963-5363	12-5100-5995	EcoAnalysts
20		Sep	10	14:45	1.715	-0.1068	-0.3264			08-0609-5167	04-3709-1344	EcoAnalysts
21		Oct	17	15:45	2.345	0.5234	1.364	(+)		10-0475-9886	14-9451-4606	EcoAnalysts

CETIS QC Plot

Report Date: 25 Nov-19 09:59 (1 of 1)

Reference Toxicant 96-h Acute Survival Test — All Matching Labs

Test Type:	Survival	**Organism:**	Neanthes arenaceodentata (Polycha	**Material:**	Total Ammonia
Protocol:	PSEP (1995)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	153.1	**Count:**	20	**-1s Warning Limit:**	124.3	**-2s Action Limit:**	100.9
Sigma:	n/a	**CV:**	21.10%	**+1s Warning Limit:**	188.6	**+2s Action Limit:**	232.3

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2017	May	5	11:10	119	-34.09	-1.209	(-)		19-9695-8635	08-7557-3106	EcoAnalysts
2			26	11:20	94.7	-58.39	-2.305	(-)	(-)	02-4398-8901	20-6641-5688	EcoAnalysts
3		Jun	9	13:12	132	-21.09	-0.7111			06-5936-3810	02-9842-7509	EcoAnalysts
4		Jul	28	10:45	99.9	-53.19	-2.048	(-)	(-)	04-6413-3650	18-1225-7941	EcoAnalysts
5		Aug	25	10:40	156	2.914	0.09048			03-6651-4426	09-2206-9228	EcoAnalysts
6		Nov	16	13:40	152	-1.086	-0.03416			03-0415-6136	18-4343-4696	EcoAnalysts
7		Dec	27	15:35	144	-9.086	-0.2936			01-8821-8905	01-3003-6293	EcoAnalysts
8	2018	Feb	23	16:20	162	8.914	0.2716			13-7905-8989	16-4206-5191	EcoAnalysts
9		Jun	15	14:35	137	-16.09	-0.5327			04-1274-1602	00-8204-0817	EcoAnalysts
10		Aug	17	14:15	192	38.91	1.087	(+)		07-8700-6256	00-3442-0298	EcoAnalysts
11		Oct	2	14:10	173	19.91	0.5868			21-2226-7904	05-0269-1791	EcoAnalysts
12		Nov	9	14:15	179	25.91	0.7504			00-5577-1542	13-6278-1952	EcoAnalysts
13	2019	Jan	22	15:17	204	50.91	1.378	(+)		19-6608-0675	11-6507-6917	EcoAnalysts
14		Mar	1	13:44	152	-1.086	-0.03416			16-4352-7409	00-8230-2760	EcoAnalysts
15			22	15:20	196	42.91	1.186	(+)		12-8564-4292	05-5287-2854	EcoAnalysts
16		Jul	12	14:30	192	38.91	1.087	(+)		21-0917-4708	13-0093-2104	EcoAnalysts
17		Aug	2	15:20	143	-10.09	-0.327			17-0846-5905	19-7316-2458	EcoAnalysts
18			13	15:55	165	11.91	0.3596			08-6399-0477	02-9565-0844	EcoAnalysts
19			21	13:30	163	9.914	0.3011			21-2736-4211	17-5434-7893	EcoAnalysts
20		Sep	10	14:45	167	13.91	0.4174			15-3198-9821	19-4980-7373	EcoAnalysts
21		Oct	17	15:45	180	26.91	0.7771			00-3306-4323	14-6485-5861	EcoAnalysts

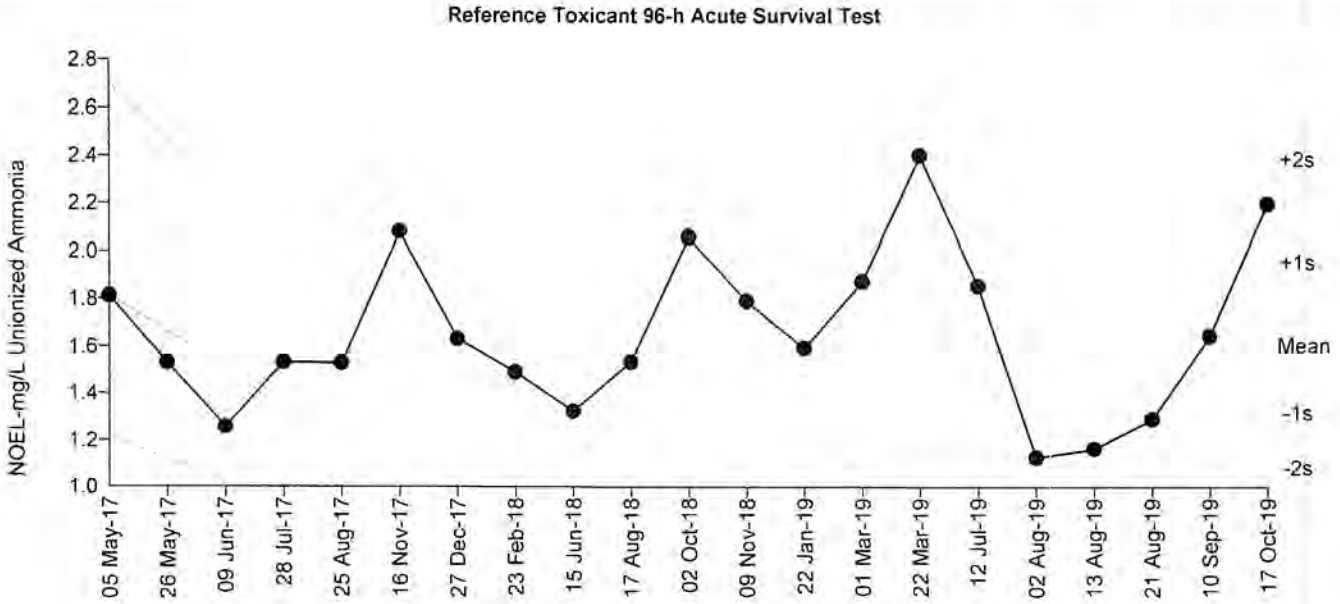
Analyst: NL QA: MK

CETIS QC Plot

Report Date: 25 Nov-19 09:59 (1 of 1)

Reference Toxicant 96-h Acute Survival Test — **All Matching Labs**

Test Type:	Survival	**Organism:**	Neanthes arenaceodentata (Polycha	**Material:**	Unionized Ammonia
Protocol:	PSEP (1995)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	1.597	**Count:**	20	**-1s Warning Limit:**	1.309	**-2s Action Limit:**	1.073
Sigma:	n/a	**CV:**	20.10%	**+1s Warning Limit:**	1.948	**+2s Action Limit:**	2.376

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2017	May	5	11:10	1.812	0.2154	0.6368			06-1983-2716	14-3198-2813	EcoAnalysts
2			26	11:20	1.529	-0.06764	-0.2178			11-9977-1019	08-2373-9544	EcoAnalysts
3		Jun	9	13:12	1.258	-0.3386	-1.2	(-)		20-5746-1828	13-3286-2330	EcoAnalysts
4		Jul	28	10:45	1.532	-0.06464	-0.208			11-9488-2902	00-8692-4177	EcoAnalysts
5		Aug	25	10:40	1.53	-0.06664	-0.2146			04-3451-1040	07-6966-4955	EcoAnalysts
6		Nov	16	13:40	2.079	0.4824	1.329	(+)		21-2485-6236	00-9775-4668	EcoAnalysts
7		Dec	27	15:35	1.633	0.03636	0.1133			14-3251-3795	04-4998-7500	EcoAnalysts
8	2018	Feb	23	16:20	1.491	-0.1056	-0.3445			08-4313-9079	12-5767-7210	EcoAnalysts
9		Jun	15	14:35	1.325	-0.2716	-0.9385			13-9420-2469	12-4705-5925	EcoAnalysts
10		Aug	17	14:15	1.535	-0.06164	-0.1981			16-0114-0602	03-4717-2264	EcoAnalysts
11		Oct	2	14:10	2.059	0.4624	1.28	(+)		02-7017-5318	12-2051-3096	EcoAnalysts
12		Nov	9	14:15	1.794	0.1974	0.5866			05-1575-7697	20-2944-5206	EcoAnalysts
13	2019	Jan	22	15:17	1.595	-0.001638	-0.005165			03-5816-0405	03-5029-6568	EcoAnalysts
14		Mar	1	13:44	1.875	0.2784	0.8088			04-3242-1896	17-0781-9299	EcoAnalysts
15			22	15:20	2.403	0.8064	2.057	(+)	(+)	00-7345-5138	17-9862-0450	EcoAnalysts
16		Jul	12	14:30	1.858	0.2614	0.763			19-1480-3456	01-8740-2353	EcoAnalysts
17		Aug	2	15:20	1.127	-0.4696	-1.753	(-)		10-1976-9391	08-7104-1750	EcoAnalysts
18			13	15:55	1.165	-0.4316	-1.586	(-)		00-5853-2505	06-3471-0420	EcoAnalysts
19			21	13:30	1.292	-0.3046	-1.065	(-)		14-7963-5363	20-8907-8030	EcoAnalysts
20		Sep	10	14:45	1.648	0.05136	0.1593			08-0609-5167	00-6589-3953	EcoAnalysts
21		Oct	17	15:45	2.2	0.6034	1.613	(+)		10-0475-9886	00-3718-6473	EcoAnalysts

CETIS Summary Report

Reference Toxicant 96-h Acute Survival Test — EcoAnalysts

Batch ID:	09-9283-7335	Test Type:	Survival	Analyst:	
Start Date:	17 Oct-19 15:45	Protocol:	PSEP (1995)	Diluent:	Laboratory Seawater
Ending Date:	21 Oct-19 14:00	Species:	Neanthes arenaceodentata	Brine:	Not Applicable
Test Length:	94h	Taxon:	Polychaeta	Source:	Aquatic Toxicology Support Age:
Sample ID:	06-6583-0241	Code:	27AFC361	Project:	Reference Toxicant
Sample Date:	12 Jun-19	Material:	Total Ammonia	Source:	Reference Toxicant
Receipt Date:	12 Jun-19	CAS (PC):		Station:	P190612.46
Sample Age:	127d 16h	Client:	Internal Lab		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
14-6485-5861	Proportion Survived	Fisher Exact Test		180	221	199.4		n/a	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	mg/L	95% LCL	95% UCL	TU	S
18-7634-5789	Proportion Survived	Linear Interpolation (ICPIN)		EC5	182.9	182.3	183.3		1
				EC10	185.9	184.7	186.6		
				EC15	189	187.1	190		
				EC20	192.1	189.6	193.5		
				EC25	195.2	192	197		
				EC40	204.9	199.6	208		
				EC50	211.7	204.9	215.7		

Proportion Survived Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	3	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
89.4		3	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
133		3	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
180		3	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
221		3	0.3667	0.2232	0.5101	0.3000	0.4000	0.0333	0.0577	15.75%	63.33%
265		3	0.0333	0.0000	0.1768	0.0000	0.1000	0.0333	0.0577	173.21%	96.67%

Proportion Survived Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	D	1.0000	1.0000	1.0000
89.4		1.0000	1.0000	1.0000
133		1.0000	1.0000	1.0000
180		1.0000	1.0000	1.0000
221		0.3000	0.4000	0.4000
265		0.1000	0.0000	0.0000

Proportion Survived Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	D	10/10	10/10	10/10
89.4		10/10	10/10	10/10
133		10/10	10/10	10/10
180		10/10	10/10	10/10
221		3/10	4/10	4/10
265		1/10	0/10	0/10

CETIS Test Data Worksheet

Reference Toxicant 96-h Acute Survival Test — EcoAnalysts

Start Date:	17 Oct-19 15:45	**Species:**	Neanthes arenaceodentata
End Date:	21 Oct-19 14:00	**Protocol:**	PSEP (1995)
Sample Date:	12 Jun-19	**Material:**	Total Ammonia
Sample Code:	27AFC361		
Sample Source:	Reference Toxicant		
Sample Station:	P190612.46		

Conc-mg/L	Code	Rep	Pos	# Exposed	# Survived	Notes
0	D	1	15	10	10	
0	D	2	4	10	10	
0	D	3	9	10	10	
89.4		1	12	10	10	
89.4		2	11	10	10	
89.4		3	7	10	10	
133		1	14	10	10	
133		2	3	10	10	
133		3	18	10	10	
180		1	16	10	10	
180		2	10	10	10	
180		3	2	10	10	
221		1	6	10	3	
221		2	8	10	4	
221		3	1	10	4	
265		1	17	10	1	
265		2	13	10	0	
265		3	5	10	0	

CETIS Summary Report

Reference Toxicant 96-h Acute Survival Test — **EcoAnalysts**

Batch ID:	09-9283-7335	**Test Type:**	Survival	**Analyst:**	
Start Date:	17 Oct-19 15:45	**Protocol:**	PSEP (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	21 Oct-19 14:00	**Species:**	Neanthes arenaceodentata	**Brine:**	Not Applicable
Test Length:	94h	**Taxon:**	Polychaeta	**Source:**	Aquatic Toxicology Support **Age:**
Sample ID:	07-3317-2284	**Code:**	2BB3523C	**Project:**	Reference Toxicant
Sample Date:	12 Jun-19	**Material:**	Unionized Ammonia	**Source:**	Reference Toxicant
Receipt Date:	12 Jun-19	**CAS (PC):**		**Station:**	P190612.46
Sample Age:	127d 16h	**Client:**	Internal Lab		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
00-3718-6473	Proportion Survived	Fisher Exact Test		2.2	2.356	2.277		n/a	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	mg/L	95% LCL	95% UCL	TU	S
14-9451-4606	Proportion Survived	Trimmed Spearman-Kärber		EC50	2.345	2.309	2.381		1

Proportion Survived Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	3	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
1.381		3	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
1.625		3	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
2.2		3	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
2.356		3	0.3667	0.2232	0.5101	0.3000	0.4000	0.0333	0.0577	15.75%	63.33%
2.579		3	0.0333	0.0000	0.1768	0.0000	0.1000	0.0333	0.0577	173.21%	96.67%

Proportion Survived Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	D	1.0000	1.0000	1.0000
1.381		1.0000	1.0000	1.0000
1.625		1.0000	1.0000	1.0000
2.2		1.0000	1.0000	1.0000
2.356		0.3000	0.4000	0.4000
2.579		0.1000	0.0000	0.0000

Proportion Survived Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	D	10/10	10/10	10/10
1.381		10/10	10/10	10/10
1.625		10/10	10/10	10/10
2.2		10/10	10/10	10/10
2.356		3/10	4/10	4/10
2.579		1/10	0/10	0/10

CETIS Test Data Worksheet

Reference Toxicant 96-h Acute Survival Test — EcoAnalysts

Start Date:	17 Oct-19 15:45	**Species:**	Neanthes arenaceodentata	**Sample Code:**	2BB3523C
End Date:	21 Oct-19 14:00	**Protocol:**	PSEP (1995)	**Sample Source:**	Reference Toxicant
Sample Date:	12 Jun-19	**Material:**	Unionized Ammonia	**Sample Station:**	P190612.46

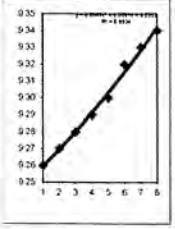
Conc-mg/L	Code	Rep	Pos	# Exposed	# Survived	Notes
0	D	1	16	10	10	
0	D	2	17	10	10	
0	D	3	3	10	10	
1.381		1	12	10	10	
1.381		2	18	10	10	
1.381		3	4	10	10	
1.625		1	5	10	10	
1.625		2	9	10	10	
1.625		3	6	10	10	
2.2		1	7	10	10	
2.2		2	8	10	10	
2.2		3	14	10	10	
2.356		1	10	10	3	
2.356		2	15	10	4	
2.356		3	11	10	4	
2.579		1	1	10	1	
2.579		2	13	10	0	
2.579		3	2	10	0	

Un-ionized Ammonia Calculator

CLIENT:	Internal	Date of Test:	October 17, 2019
PROJECT:	Ammonia RT	Test Type:	*Neanthes arenaceodentata*
COMMENTS:			

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer:	I-factor
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34



	Sample	Mod	*NH3T (mg/L)*	*salinity (ppt)*	*pH*	*temp (C)*	temp (K)	i-factor	Mod	NH3U (mg/L)
	Target / Sample Name		Actual	22.9	8.0	24.1	297.26	9.3053		#VALUE!
	Example 3.5		2.000	10.0	7.5	5.0	278.16	9.2750		0.008
1										
2										
3	90		89.4	29	7.7	19.2	292.36	9.3214		1.381
4	130		133	29	7.6	19.1	292.26	9.3214		1.625
5	170		180	29	7.6	19.1	292.26	9.3214		2.200
6	210		221	29	7.5	19.1	292.26	9.3214		2.356
7	250		265	29	7.5	19.1	292.26	9.3214		2.579
8										
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CLIENT	PROJECT	SPECIES	LABORATORY		PROTOCOL
--	--	*Neanthes arenaceodentata*	Port Gamble Bath 9		PSEP 1995
JOB NUMBER	**PROJECT MANAGER**	**TEST START DATE:**	**TIME**	**TEST END DATE**	**TIME**
3737514A	M.Knowlen	17Oct19	1545	21Oct19	1400
Test ID	**LOT #:**				
P190612.46	18H1356763				

WATER QUALITY DATA

DILTIN.WAT.BATCH	TEMP REC#	REFERENCE TOX. MATERIAL	REFERENCE TOXICANT
FSW101519.02		ammonium chloride	ammonia - TAN

TEST CONDITIONS	DO (mg/L)	TEMP(C)	SAL (ppt)	pH	TECHNICIAN
	> 4.6	20 ± 1	28 ± 2	7 - 9	

CLIENT/ ENVIRON ID		CONCENTRATION value	CONCENTRATION units	DAY	REP	D.O. meter	D.O. mg/L	TEMP. meter	TEMP. °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	WQ TECH
Ref.Tox.-ammonia - TAN	Target:	0	mg/L	0	Stock	9	7.7	9	19.2	9	29	9	8.0	MK 10/17
	Actual:			4	Rep	8	6.8	8	19.6	8	29	8	8.0	NR 10/21
Ref.Tox.-ammonia - TAN	Target:	~~15~~ 90	mg/L	0	Stock	9	7.7	9	19.2	9	29	9	7.7	MK 10/17
	Actual:			4	Rep	8	7.1	8	19.9	8	29	8	7.9	NR 10/21
Ref.Tox.-ammonia - TAN	Target:	~~30~~ 130	mg/L	0	Stock	9	7.6	9	19.1	9	29	9	7.6	MK 10/17
	Actual:			4	Rep	8	7.2	8	19.2	8	30	8	7.8	NR 10/21
Ref.Tox.-ammonia - TAN	Target:	~~60~~ 170	mg/L	0	Stock	9	7.6	9	19.1	9	29	9	7.6	MK 10/17
	Actual:			4	Rep	8	7.0	8	19.7	8	29	8	7.8	NR 10/21
Ref.Tox.-ammonia - TAN	Target:	~~120~~ 210	mg/L	0	Stock	9	7.7	9	19.1	9	29	9	① ~~7.8~~ 7.5	MK 10/17
	Actual:			4	Rep	8	7.1	8	19.7	8	29	8	7.8	NR 10/21
Ref.Tox.-ammonia - TAN	Target:	~~240~~ 250	mg/L	0	Stock	9	7.7	9	19.1	9	29	9	7.5	MK 10/17
	Actual:			4	Rep	8	7.2	8	19.8	8	29	8	7.8	NR 10/21

① MR. MK 10/17.

CLIENT	PROJECT	JOB NUMBER	SPECIES	PROJECT MANAGER	LABORATORY	PROTOCOL
--	--		*Neanthes arenaceodentata*	M.Knowlen	Port Gamble Bath 9	PSEP 1995

SURVIVAL & BEHAVIOR DATA

OBSERVATIONS KEY
N = normal
Q = quiescent
D = Discolored
F = Floating on surface

INITIAL # OF ORGANISMS: 10

CLIENT/ ENVIRON ID	CONC. value	CONC. units	REP	INITIAL # if differs	DAY 1 DATE: 10/18/19 TECHNICIAN: MK #ALIVE	DAY 1 #DEAD	DAY 1 OBS	DAY 2 DATE: 10/19/19 TECHNICIAN: DM #ALIVE	DAY 2 #DEAD	DAY 2 OBS	DAY 3 DATE: 10/20/19 TECHNICIAN: NR #ALIVE	DAY 3 #DEAD	DAY 3 OBS	DAY 4 DATE: 10/21/19 TECHNICIAN: NR #ALIVE	DAY 4 #DEAD	DAY 4 OBS
Ref.Tox.- ammonia - TAN	0	mg/L	1		10	0	N	10	0	N	10	0	IF	10	0	N
			2		10	0	"	10	0	N	10	0	N	10	0	"
			3		10	0	"	10	0	N	10	0	N	10	0	"
Ref.Tox.- ammonia - TAN	~~15~~ 90	mg/L	1		10	0	N	10	0	N	10	0	N	10	0	N
			2		10	0	"	10	0	N	10	0	"	10	0	"
			3		10	0	"	10	0	N	10 (1)	0	"	10	0	"
Ref.Tox.- ammonia - TAN	~~30~~ 130	mg/L	1		10	0	N	10	0	N	10	0	N	10	0	N
			2		10	0	"	10	0	N	10	0	"	10	0	"
			3		10	0	"	10	0	N	10	0	"	10	0	"
Ref.Tox.- ammonia - TAN	~~60~~ 170	mg/L	1		10	0	N	10	0	N	10	0	N	10	0	N
			2		10	0	"	10	0	N	10	0	"	10	0	"
			3		10	0	"	10	0	N	10	0	"	10	0	"
Ref.Tox.- ammonia - TAN	~~120~~ 210	mg/L	1		10	0	Q	10	0	7Q	10	0	10Q	3	7	Q
			2		10	0	"	10	0	6Q	10	0	10Q	4	6	Q
			3		10	0	"	10	0	2Q	10	0	10Q	8 (3)	2 (3)	Q
Ref.Tox.- ammonia - TAN	~~240~~ 250	mg/L	1		10	0	Q	10	0	10Q	5	5	5Q	1	4	Q
			2		10	0	"	10	0	10Q	6	4	6Q	0	6	—
			3		10	0	"	10	0	10Q	2	8	2Q	0	2	—

(1) SM - NR 10/20

(2) IE - NR 10/21

Ammonia Reference Toxicant
Spiking Worksheet

Reference Toxicant ID: P190612.46
Date Prepared: 10/17/19
Technician Initials: MK

Neanthes NH_3 RT

Assumptions in Model
Stock ammonia concentration is 10,000 mg/L = 10 mg/mL

Date: 10/14/2019
Measurement: 13766.66

Test Solutions			Volume of stock to reach desired concentration	
Measured Concentration	**Desired Concentration**	**Volume**		
mg/L	mg/L	mL	mL stock to increase	
			FRESH WATER (mL)	SALT WATER (mL)
89.4	**90**	750	[redacted]	7.35
133	**130**	750		10.62
180	**170**	750		13.89
221	**210**	750		17.16
265	**250**	750		20.43

2.4 *Neanthes arenaceodentata* Test Data: Re-Test of Samples SE-15 and SE-20

EcoAnalysts

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
MFA	Seaport	1045 /	FSW111819.01	PSEP 1995	21-Nov-2019
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY / LOCATION**	**ORGANISM BATCH**	**TEST SPECIES**	**TEST END DATE**
PG1313	Julia Baum	Port Gamble / Bath 4	ATS112119	*Neanthes arenaceodentata*	11-Dec-2019

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L)		TEMP (C)		SALINITY (ppt)		pH				
				> 4.6		20 ± 1		28 ± 2		8.0±1.0				
SAMPLE ID	DAY	REP	JAR	D.O.		TEMP		SALINITY		pH		WATER RENEWAL	Feeding	TECH/DATE
				meter	mg/L	meter	°C	meter	ppt	meter	unit			
Control /	0	Surr		9	7.6	9	20.7	9	28	9	8.0		NR	MK 11/21
Control /	1	Surr		9	7.3	9	21.0	9	28	9	7.8			DM 11/22
Control /	2	Surr		9	7.4	9	21.2	9	28	9	8.0		DM	DM 11/23
Control /	3	Surr		8	7.1	8	20.9	8	29	8	7.9	NR		NR 11/24
Control /	4	Surr		8	7.4	8	20.6	8	28	8	7.9		①	NR 11/25
Control /	5	Surr		8	7.1	8	20.7	8	28	8	7.9			MS 11/26
Control /	6	Surr		9	7.3	9	21.1	9	28	9	8.0	DM	DM	DM 11/27
Control /	7	Surr		9	7.1	9	21.1	9	28	9	7.8			DM 11/28
Control /	8	Surr		9	7.4	9	20.8	9	28	9	8.0		MS	MS 11/29
Control /	9	Surr		9	7.3	9	21.1	9	28	9	7.9	DM		DM 11/30
Control /	10	Surr		8	7.4	8	20.5	8	28	8	8.0		NR	NR 12/1
Control /	11	Surr		9	7.3	9	20.9	9	28	9	7.9			MS 12/2
Control /	12	Surr		8	7.5	8	20.9	8	28	8	7.9	MS	MS	MS 12/3
Control /	13	Surr		9	7.3	9	20.6	9	28	9	7.9			MS 12/4
Control /	14	Surr		8	7.3	8	20.8	8	28	8	7.8		NR	NR 12/5
Control /	15	Surr		9	7.2	9	21.0	9	28	9	7.8	MS		MS 12/6
Control /	16	Surr		9	7.2	9	21.0	9	28	9	7.9		DM	DM 12/7
Control /	17	Surr		8	7.2	8	21.0	8	28	8	7.8			NR 12/8
Control /	18	Surr		9	7.4	9	21.1	9	28	9	7.8	NR	MS	MS 12/9
Control /	19	Surr		8	7.3	8	20.6	8	28	8	7.8			DM 12/10
Control /	20	Surr		9	6.5	9	20.6	9	28	9	7.8			MS 12/11

① Feeding skipped due to food growth - NR 11/25

EcoAnalysts

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
MFA	Seaport	/	FSW111819.01	PSEP 1995	21-Nov-2019
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY / LOCATION**	**ORGANISM BATCH**	**TEST SPECIES**	**TEST END DATE**
PG1313	Julia Baum	Port Gamble / Bath 4	ATS112119	*Neanthes arenaceodentata*	11-Dec-2019

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L)		TEMP (C)		SALINITY (ppt)		pH				
				> 4.6		20 ± 1		28 ± 2		8.0±1.0				
SAMPLE ID	DAY	REP	JAR	D.O.		TEMP		SALINITY		pH		WATER RENEWAL	Feeding	TECH/DATE
				meter	mg/L	meter	°C	meter	ppt	meter	unit			
Carr20 (47) /	0	Surr		9	7.5	9	20.6	9	28	9	8.0		NR	MK 11/21
Carr20 (47) /	1	Surr		9	7.2	9	20.8	9	28	9	7.7			DM 11/22
Carr20 (47) /	2	Surr		9	7.2	9	21.1	9	28	9	7.9		DM	DM 11/23
Carr20 (47) /	3	Surr		8	7.1	8	20.9	8	28	8	7.9	NR		NR 11/24
Carr20 (47) /	4	Surr		8	7.5	8	20.5	8	28	8	8.0		①	NR 11/25
Carr20 (47) /	5	Surr		8	7.3	8	20.6	8	28	8	8.2			MS 11/26
Carr20 (47) /	6	Surr		9	7.1	9	21.0	9	28	9	8.2	DM	DM	DM 11/27
Carr20 (47) /	7	Surr		9	6.9	9	21.2	9	28	9	8.1			DM 11/28
Carr20 (47) /	8	Surr		9	7.0	9	20.8	9	28	9	8.3		MS	MS 11/29
Carr20 (47) /	9	Surr		9	7.1	9	20.9	9	28	9	8.2	DM		DM 11/30
Carr20 (47) /	10	Surr		8	7.3	8	20.6	8	28	8	8.2		NR	NR 12/1
Carr20 (47) /	11	Surr		9	6.9	9	20.9	9	28	9	8.0			MS 12/2
Carr20 (47) /	12	Surr		8	7.5	8	20.8	8	28	8	8.1	MS	MS	MS 12/3
Carr20 (47) /	13	Surr		9	7.2	9	20.6	9	28	9	8.0			MS 12/4
Carr20 (47) /	14	Surr		8	7.2	8	20.6	8	28	8	8.0		NR	NR 12/5
Carr20 (47) /	15	Surr		9	6.7	9	21.0	9	28	9	8.0	MS		MS 12/6
Carr20 (47) /	16	Surr		9	7.2	9	21.1	9	28	9	8.0		DM	DM 12/7
Carr20 (47) /	17	Surr		8	7.2	8	21.0	8	28	8	7.9			NR 12/8
Carr20 (47) /	18	Surr		9	7.4	9	21.0	9	28	9	7.9	NR	MS	MS 12/9
Carr20 (47) /	19	Surr		8	7.2	8	20.6	8	28	8	7.8			DM 12/10
Carr20 (47) /	20	Surr		9	7.2	9	20.9	9	28	9	7.9			MS 12/11

① Feeding skipped due to food growth -NR 11/25

EcoAnalysts

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
MFA	Seaport	/	FSW111819.01	PSEP 1995	21-Nov-2019
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY / LOCATION**	**ORGANISM BATCH**	**TEST SPECIES**	**TEST END DATE**
PG1313	Julia Baum	Port Gamble / Bath 4	ATS112119	*Neanthes arenaceodentata*	11-Dec-2019

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
SAMPLE ID	DAY	REP	JAR	D.O. meter	D.O. mg/L	TEMP meter	TEMP °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	WATER RENEWAL	Feeding	TECH/DATE
CR02-South (68) /	0	Surr		9	7.5	9	20.7	9	28	9	7.9		NR	MK 11/21
CR02-South (68) /	1	Surr		9	7.3	9	20.6	9	28	9	7.8			DM 11/22
CR02-South (68) /	2	Surr		9	7.2	9	20.9	9	28	9	7.9		DM	DM 11/23
CR02-South (68) /	3	Surr		8	7.1	8	20.8	8	28	8	7.9	NR		NR 11/24
CR02-South (68) /	4	Surr		8	7.3	8	20.4	8	28	8	7.9		①	NR 11/25
CR02-South (68) /	5	Surr		8	7.3	8	20.5	8	28	8	8.1			MS 11/26
CR02-South (68) /	6	Surr		9	7.1	9	20.9	9	28	9	8.1	DM	DM	DM 11/27
CR02-South (68) /	7	Surr		9	7.0	9	21.0	9	28	9	8.0			DM 11/28
CR02-South (68) /	8	Surr		9	7.3	9	20.6	9	28	9	8.1		MS	MS 11/29
CR02-South (68) /	9	Surr		9	7.1	9	20.9	9	28	9	8.1	DM		DM 11/30
CR02-South (68) /	10	Surr		8	7.4	8	20.4	8	28	8	8.1		NR	NR 12/1
CR02-South (68) /	11	Surr		9	6.9	9	20.8	9	28	9	8.0			MS 12/2
CR02-South (68) /	12	Surr		8	7.4	8	20.8	8	28	8	8.1	MS	MS	MS 12/3
CR02-South (68) /	13	Surr		9	7.2	9	20.4	9	28	9	8.0			MS 12/4
CR02-South (68) /	14	Surr		8	7.2	8	20.6	8	28	8	8.0		NR	NR 12/5
CR02-South (68) /	15	Surr		9	7.2	9	20.8	9	28	9	8.0	MS		MS 12/6
CR02-South (68) /	16	Surr		9	7.2	9	21.0	9	28	9	8.1		DM	DM 12/7
CR02-South (68) /	17	Surr		8	7.2	8	21.0	8	28	8	7.9			NR 12/8
CR02-South (68) /	18	Surr		9	7.4	9	20.9	9	28	9	8.0	NR	MS	MS 12/9
CR02-South (68) /	19	Surr		8	7.3	8	20.3	8	28	8	7.8			DM 12/10
CR02-South (68) /	20	Surr		9	7.3	9	20.8	9	28	9	8.0			MS 12/11

① Feeding skipped due to food growth -NR 11/25

EcoAnalysts

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
MFA	Seaport	/	FSW111819.01	PSEP 1995	21-Nov-2019
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY / LOCATION**	**ORGANISM BATCH**	**TEST SPECIES**	**TEST END DATE**
PG1313	Julia Baum	Port Gamble / Bath 4	ATS112119	*Neanthes arenaceodentata*	11-Dec-2019

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
SAMPLE ID	DAY	REP	JAR	D.O. meter	D.O. mg/L	TEMP meter	TEMP °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	WATER RENEWAL	Feeding	TECH/DATE
SE 15 (sieved) /	0	Surr		9	7.5	9	20.8	9	27	9	7.8		NR	MK 11/21
SE 15 (sieved) /	1	Surr		9	7.1	9	20.5	9	27	9	7.6			DM 11/22
SE 15 (sieved) /	2	Surr		9	7.1	9	20.8	9	26	9	7.6		DM	DM 11/23
SE 15 (sieved) /	3	Surr		8	7.3	8	20.7	8	27	8	7.6	NR		NR 11/24
SE 15 (sieved) /	4	Surr		8	7.4	8	20.5	8	27	8	7.7		①	NR 11/25
SE 15 (sieved) /	5	Surr		8	7.5	8	20.6	8	27	8	7.8			MS 11/26
SE 15 (sieved) /	6	Surr		9	7.1	9	20.8	9	27	9	7.6	DM	DM	DM 11/27
SE 15 (sieved) /	7	Surr		9	7.0	9	21.2	9	27	9	7.6			DM 11/28
SE 15 (sieved) /	8	Surr		9	6.9	9	20.7	9	27	9	7.7		MS	MS 11/29
SE 15 (sieved) /	9	Surr		9	7.1	9	20.8	9	27	9	7.6	DM		DM 11/30
SE 15 (sieved) /	10	Surr		8	7.4	8	20.0	8	27	8	7.8		NR	NR 12/1
SE 15 (sieved) /	11	Surr		9	7.2	9	21.0	9	28	9	7.7			MS 12/2
SE 15 (sieved) /	12	Surr		8	7.2	8	20.6	8	28	8	7.6	MS	MS	MS 12/3
SE 15 (sieved) /	13	Surr		9	7.1	9	20.5	9	28	9	7.7			MS 12/4
SE 15 (sieved) /	14	Surr		8	7.3	8	20.6	8	28	8	7.6		NR	NR 12/5
SE 15 (sieved) /	15	Surr		9	7.2	9	20.8	9	28	9	7.7	MS		MS 12/6
SE 15 (sieved) /	16	Surr		9	7.2	9	21.1	9	28	9	7.8		DM	DM 12/7
SE 15 (sieved) /	17	Surr		8	7.2	8	21.0	8	28	8	7.6			NR 12/8
SE 15 (sieved) /	18	Surr		9	②~~7.5~~ 7.4	9	21.0	9	28	9	7.8	NR	MS	MS 12/9
SE 15 (sieved) /	19	Surr		8	7.2	8	20.6	8	28	8	7.7			DM 12/10
SE 15 (sieved) /	20	Surr		9	~~6.~~ 7.0②	9	20.7	9	28	9	7.8			MS 12/11

① Feeding skipped due to food growth - NR 11/25

②MR - MS 12/9
-MS 12/11

EcoAnalysts

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
MFA	Seaport		FSW111819.01	PSEP 1995	21-Nov-2019
JOB NUMBER	**PROJECT MANAGER**	**LABORATORY / LOCATION**	**ORGANISM BATCH**	**TEST SPECIES**	**TEST END DATE**
PG1313	Julia Baum	Port Gamble / Bath 4	ATS112119	*Neanthes arenaceodentata*	11-Dec-2019

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
				D.O.		TEMP		SALINITY		pH		WATER	Feeding	TECH/DATE
SAMPLE ID	DAY	REP	JAR	meter	mg/L	meter	°C	meter	ppt	meter	unit	RENEWAL		
SE 20 (sieved) /	0	Surr		9	7.4	9	20.8	9	27	9	7.8		NR	MK 11/21
SE 20 (sieved) /	1	Surr		9	6.8	9	20.6	9	26	9	7.5			DM 11/22
SE 20 (sieved) /	2	Surr		9	6.8	9	21.0	9	26	9	7.6		DM	DM 11/23
SE 20 (sieved) /	3	Surr		8	7.0	8	20.9	8	26	8	7.6	NR		NR 11/24
SE 20 (sieved) /	4	Surr		8	7.2	8	20.6	8	26	8	7.6		①	NR 11/25
SE 20 (sieved) /	5	Surr		8	7.4	8	20.7	8	26	8	7.7			MS 11/26
SE 20 (sieved) /	6	Surr		9	6.8	9	21.0	9	26	9	7.6	DM	DM	DM 11/27
SE 20 (sieved) /	7	Surr		9	6.3	9	~~20~~ 21.0②	9	27	9	7.4			DM 11/28
SE 20 (sieved) /	8	Surr		9	7.0	9	20.8	9	27	9	7.7		MS	MS 11/29
SE 20 (sieved) /	9	Surr		9	6.2	9	19.9	9	27	9	7.5	DM		DM 11/30
SE 20 (sieved) /	10	Surr		8	7.3	8	20.4	8	28	8	7.9		NR	NR 12/1
SE 20 (sieved) /	11	Surr		9	5.4	9	21.0	9	27	9	7.3			MS 12/2
SE 20 (sieved) /	12	Surr		8	7.3	8	20.8	8	27	8	7.6	MS	MS	MS 12/3
SE 20 (sieved) /	13	Surr		9	7.0	9	20.6	9	28	9	7.6			MS 12/4
SE 20 (sieved) /	14	Surr		8	7.2	8	20.7	8	28	8	7.6		NR	NR 12/5
SE 20 (sieved) /	15	Surr		9	7.2	9	20.9	9	28	9	7.6	MS		MS 12/6
SE 20 (sieved) /	16	Surr		9	7.0	9	21.0	9	28	9	7.7		DM	DM 12/7
SE 20 (sieved) /	17	Surr		8	7.2	8	21.1	8	28	8	7.6			NR 12/8
SE 20 (sieved) /	18	Surr		9	7.4	9	21.0	9	28	9	7.7	NR	MS	MS 12/9
SE 20 (sieved) /	19	Surr		8	6.2	8	20.6	8	28	8	7.5			DM 12/10
SE 20 (sieved) /	20	Surr		9	7.2	9	20.9	9	28	9	7.7			MS 12/11

① feeding skipped due to food growth - NR 11/25

② MR - DM - 11/28/19

EcoAnalysts

CLIENT	PROJECT	JOB NO.	PROJECT MANAGER	LABORATORY / LOCATION	PROTOCOL	SPECIES
MFA	Seaport	PG1313	Julia Baum	Port Gamble / Bath 4	PSEP 1995	*Neanthes arenaceodentata*

ENDPOINT DATA & OBSERVATIONS

N = Normal
#E = Emergence
#M = Mortality
G = Growth
(fungal, bacterial, or algal)
D = No Air Flow (DO?)
F = Floating on Surface
TC = Too Cloudy
U=Excess food

INITIAL # OF ORGANISMS: 5

CLIENT/ ENVIRON ID	REP	JAR	INITIAL # (if differs)	Date and Initials 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	NUMBER REMAINING	TARE WEIGHT (mg)	TOTAL WEIGHT (mg)	ASHED WEIGHT (mg)	Boat #
				11/22 DM	11/23 DM	11/24 NR	11/25 NR	11/26 MS	11/27 NR	11/28 DM	11/29 MS	11/30 DM	12/1 NR	12/2 MS	12/3 MS	12/4 NR	12/5 NR	12/6 MS	12/7 DM	12/8 NR	12/9 NR	12/10 DM	12/11 MK					
Control /	1			U	U	U	U	U	N	U	U	U⑥	N	N	N	N	N	G	G	N	N	N	4	392.25	482.91	428.42	14
	2			↓	↓	↓	↓	U	↓	U	U	U③	IE	↓	↓	↓	IE	N	↓	↓	↓	↓	↓	5	379.37	472.78	417.15	21
	3			↓	↓	↓	↓	U	↓	②	②④	U②	⑤	↓	↓	↓	N	↓	↓	↓	↓	↓	↓	5	307.39	389.95	337.80	23
	4			↓	↓	↓	↓	U	↓	U	U	U①	N	↓	↓	↓	N	↓	↓	↓	↓	↓	↓	5	425.79	516.54	467.22	33
	5			↓	↓	↓	↓	U	↓	⑤	③	U③	G	↓	G	①	G⑤	↓	↓	IE	↓	↓	↓	5	442.07	552.09	490.29	34
Carr20 (47) /	1			U	U	U	N	G②	N	②	②	U②	U	U,G	G	U,G	U,G	G	G	G	G	G	G	5	369.70	480.00	405.92	35
	2			↓	↓	↓	↓	G	↓	U	U	U	N	IE	↓	↓	G	↓	↓	↓	↓	↓	↓	5	349.13	439.52	376.20	36
	3			↓	↓	↓	↓	U	↓	U	U	U③	G	U,G	↓	↓	↓	↓	↓	↓	↓	↓	↓	5	384.15	496.74	433.11	37
	4			↓	↓	↓	↓	U	↓	③	③	U③	G	↓	↓	↓	↓	U,G	↓	↓	↓	↓	↓	5	462.96	558.88	502.49	38
	5			↓	↓	↓	↓	G②	↓	②	②	U②	U	↓	↓	↓	↓	G	↓	↓	↓	↓	↓	5	407.16	480.06	428.09	39
CR02-South (68) /	1			U	U	U	U①	U①	N	U	U	U③	N	U,G	N	G	G	N	G	G	G	G	G	5	426.28	523.28	462.16	40
	2			↓	↓	↓	↓	U	↓	②	↓	↓	G	↓	IE	N	G IE	G	↓	↓	↓	↓	↓	5	352.71	455.62	382.27	41
	3			↓	↓	↓	↓	U	↓	U	↓	↓	↓	↓	G	U,G	G	↓	↓	↓	↓	↓	↓	5	469.51	543.94	493.71	42
	4			↓	↓	↓	①↓	U①	G①	↓	↓	U	↓	↓	↓	G	↓	↓	↓	↓	↓	↓	↓	5	326.29	423.43	359.52	43
	5			↓	↓	↓	N	U	G②	↓	↓	U③	↓	↓	↓	U,G	U,G	U,G	↓	↓	↓	↓	↓	5	423.02	519.25	~~450.89~~ ⑥	44

Boat #		Rep	Number	Tare Weight (mg)	Dry Weight (mg)	Ashed Weight (mg)
99	Initial Biomass	1	5	357.50	361.25	359.08
121		2	5	287.70	290.70	288.42
122		3	5	292.78	296.51	294.28

① coloration on surface likely from excess food. - NR 11/25
② anoxic-like growth MS 11/26
③ orange growth on surface. DM 11/28.
④ increased air flow. MS 11/29
⑤ Checked DO = 7.2 mg/L NR 12/1.

⑥ MR. Actual = 450.93 mg MK 12/13.

EcoAnalysts

CLIENT	PROJECT	JOB NO.	PROJECT MANAGER	LABORATORY / LOCATION	PROTOCOL	SPECIES
MFA	Seaport	PG1313	Julia Baum	Port Gamble / Bath 4	PSEP 1995	*Neanthes arenaceodentata*

ENDPOINT DATA & OBSERVATIONS

N = Normal
#E = Emergence
#M = Mortality
G = Growth
(fungal, bacterial, or algal)
D = No Air Flow (DO?)
F = Floating on Surface
TC = Too Cloudy
U=Excess food

INITIAL # OF ORGANISMS: 51

CLIENT/ ENVIRON ID	REP	JAR	INITIAL # (if differs)	Date and Initials	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	NUMBER REMAINING	TARE WEIGHT (mg)	TOTAL WEIGHT (mg)	ASHED WEIGHT (mg)	Boat #
				11/22 DM	11/23 DM	11/24 NR	11/25 NR	11/26 MS	11/27 NR	11/28 DM	11/29 MS	11/30 DM	12/1 NR	12/2 MS	12/3 MS	12/4 NR	12/5 NR	12/6 MS	12/7 DM	12/8 NR	12/9 NR	12/10 DM	12/11 MK						
SE 15 (sieved) /	1			U	U	C	C④	U	G	U	③,U	U④	G	U,G	G	G	G	G	G	G	G	G	F	5	431.27	497.55	447.50	45
	2			C	U	G		U	G		U	③U	G			U,G	G E	U,G	③	↓		③		5	387.11	460.74	399.91	46
	3			C①	U②	G②	↓	U	U,④		U	U,④	G			G	U,G		U,G		G			5	327.11	404.07	343.45	47
	4			C	U	U,G	④	④	U,④		④	U,④	G E			G	G		G					5	281.08	376.36	302.86	48
	5			C①	U②	②	U	U	U,④		U	U,④	G	↓	↓	↓	G	↓	U,G	↓	↓	↓	↓		5	222.46	289.84	236.41	58
SE 20 (sieved)	1			U	U	C	C	U	U	U	U	U,④	G	U,G	G	U,G	G	G	G	G	⑤,G	G	G	G	5	255.05	318.33	267.13	69
	2			↓	↓	↓	N	U	C	U	U	U,④	↓	↓	↓	↓	↓	↓	↓	LE	↓	↓	↓	↓	5	239.65	308.84	307.33	70
	3			↓	↓	↓	C	U,G③	G,U	④	④	U,④	↓	↓	↓	↓	↓	↓	↓	↓	⑤,G	↓	↓	↓	5	285.95⑥	314.93	256.05	73
	4			↓	↓	↓	C	U	G,U	U	U	U,④	G	↓	↓	↓	↓	↓	↓	↓	G	↓	↓	↓	5	283.11	348.13	299.40	123
	5			↓	↓	↓	C	U	C	U	U	U④	G,U	↓	↓	↓	↓	U,G	↓	↓	⑤,G	↓	↓	↓	5	224.64	292.26	237.69	x3
SE 24 (sieved) ①	1																												
	2																												
	3																												
	4																												
	5																												

① SE-24 not re-tested MK 11/21

② Pink coloration on surface, likely from excess food. Feeding ~~in these reps~~ skipped
- NR 11/25
- MS 11/26

③ anoxic-like growth - MS 11/26
- MS 11/29

④ orange growth on sediment surface - DM · 11/28/19
- 11/29/19 MS

⑤ wc - NR 12/8

⑥ switch tare weight values for DOCS 70 + 73 - NR 12/11

Ammonia and Sulfide Analysis Record

Client/Project:	Organism:	Test Duration (days):
MFA / Seaport	Nereithes	20

PRETEST / INITIAL / FINAL / OTHER (circle one) DAY of TEST: 0

OVERLYING (OV) / POREWATER (PW) (circle one) / Comments: _____

Calibration Standards Temperature	
Date:	Temperature:
11/21/19	22.4°C

Sample temperature should be within ±1°C of standards temperature at time and date of analysis.

	Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Meter # / Temp (°C)		Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. (µg/L)	Multi-plier	Calc-ulated Sulf. (µg/L)
OV	Ø	Surr	11/21/19 NR	0.0785	T1	21.4°	11/21/19 NR	N			10	17		
	47%			1.45								27		
	68%			0.216								14		
	SE-15			0.688								8		
	SE-20			0.881								13		
PW	Ø	Surr	11/21/19 NR	0.813	T1	21.4	11/21/19	N	7.4	29	10	29		
	47%			4.77					7.4	29		ND		
	68%			1.22					7.2	29		ND		
	SE-15			1.84					6.9	29		ND		
	SE-20			3.61					7.1	24		ND		

Ammonia and Sulfide Analysis Record

Client/Project:	Organism:	Test Duration (days): 20

PRETEST / INITIAL / FINAL / OTHER (circle one) DAY of TEST: 20

OVERLYING (OV) / POREWATER (PW) (circle one) / Comments: _____

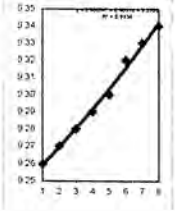
Calibration Standards Temperature		Sample temperature should be within ±1°C of standards temperature at time and date of analysis.
Date:	Temperature:	
12/11/19	22.1	

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Meter # / Temp (°C)		Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. (µg/L)	Multi-plier	Calc-ulated Sulf. (µg/L)
OV													
Ø	SURR	12/11/19 MS/DM	0.820	J1	21.5	12/11/19 MS/DM	N			10	116		
47%			0.212		21.4						12		
100%			0.339		21.9						24		
SE-15			0.0641		22.0						15		
SE-20			0.227		21.5						34		
PW													
Ø	SURR	12/11/19 MS/DM	1.18		22.4			7.4	28	10	ND		
47%			1.82		22.3			6.6	28		288		
100%			0.742		22.2			7.0	28		18		
SE-15			1.57		22.2			6.7	28		70		
SE-20			0.996		22.0			7.0	28		6		

CLIENT:	MFA	Test Date:	21-Nov-19
PROJECT:	Seaport	Test Type:	Neanthes SP
COMMENTS:	Initial Ammonia		

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer: I-factor	
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
	9.34



	Sample	Mod	NH3T (mg/L)	salinity (ppt)	pH	temp (C)	temp (K)	i-factor	Mod	NH3U (mg/L)	
	Target / Sample Name		Actual	22.9	8.0	24.1	297.26	9.3053		#VALUE!	
	Example 3,5		2.000	10.0	7.5	5.0	278.16	9.2750		0.008	
1	Control		0.0785	28	8.00	20.7	293.86	9.3187		0.003	OV Day 0
2	Carr20 (47%)		1.450	28	8.00	20.6	293.76	9.3187		0.049	
3	CR02-South (68%)		0.216	28	7.90	20.7	293.86	9.3187		0.006	
4	SE-15 sieved		0.688	27	7.80	20.8	293.96	9.3160		0.015	
5	SE-20 sieved		0.881	27	7.80	20.8	293.96	9.3160		0.019	
6											
7											
8											
9											
10											
11											
12											
13	Control		0.213	29	7.4	20.7	293.86	9.3214		0.002	PW Day 0
14	Carr20 (47%)		4.77	29	7.4	20.6	293.76	9.3214		0.041	
15	CR02-South (68%)		1.22	29	7.2	20.7	293.86	9.3214		0.007	
16	SE-15 sieved		1.84	29	6.9	20.8	293.96	9.3214		0.005	
17	SE-20 sieved		3.610	24	7.1	20.8	293.96	9.3081		0.016	
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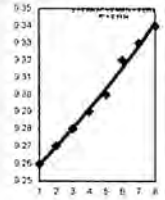
CLIENT:	MFA	Test Date:	21-Nov-19
PROJECT:	Seaport	Test Type:	Neanthes SP
COMMENTS:	Initial Ammonia		

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer: I-factor	
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
	9.34



	Sample	Mod	NH3T (mg/L)	salinity (ppt)	pH	temp (C)	temp (K)	I-factor	Mod	NH3U (mg/L)	
	Target / Sample Name		Actual	22.9	8.0	24.1	297.26	9.3053		#VALUE!	
	Example 3.5		2.000	10.0	7.5	5.0	278.16	9.2750		0.008	
1	Control		0.82	28	7.80	20.6	293.76	9.3187		0.018	OV Day 20
2	Carr20 (47%)		0.212	28	7.90	20.9	294.06	9.3187		0.006	
3	CR02-South (68%)		0.339	28	8.00	20.8	293.96	9.3187		0.012	
4	SE-15 sieved		0.064	28	7.80	20.7	293.86	9.3187		0.001	
5	SE-20 sieved		0.227	28	7.70	20.9	294.06	9.3187		0.004	
6											
7											
8											
9											
10											
11											
12											
13	Control		1.180	28	7.4	20.6	293.76	9.3187		0.010	PW Day 20
14	Carr20 (47%)		1.82	28	6.6	20.9	294.06	9.3187		0.003	
15	CR02-South (68%)		0.74	28	7.0	20.8	293.96	9.3187		0.003	
16	SE-15 sieved		1.57	28	6.7	20.7	293.86	9.3187		0.003	
17	SE-20 sieved		0.996	28	7.0	20.9	294.06	9.3187		0.004	
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19											
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Seaport: Neanthes 20-day Re-Test Sulfides

		Input				Output	
	Sample ID	Total Dissolved Sulfide (µg/L as S)	Temperature (°C)	Salinity (‰)	pH	Undissociated H2S (µg/L as H2S)	Weight Fraction (H2S/Total S)
OV Day 0	Control	17	20.7	28	8	1.11	6.55%
	Carr20 (47)	27	20.6	28	8.0	1.77	6.57%
	CR02-South (68)	14	20.7	28	7.9	1.14	8.11%
	SE-15	8	20.8	27	7.8	0.80	10.03%
	SE-20	13	20.8	27	7.8	1.30	10.03%
PW Day 0	Control	29	20.7	29	7.4	6.36	21.93%
	Carr20 (47)	ND	20.6	29	7.4	#VALUE!	#VALUE!
	CR02-South (68)	ND	20.7	29	7.2	#VALUE!	#VALUE!
	SE-15	ND	20.8	29	6.9	#VALUE!	#VALUE!
	SE-20	ND	20.8	24	7.1	#VALUE!	#VALUE!
OV Day 20	Control	16	20.6	28	7.8	1.61	10.05%
	Carr20 (47)	12	20.9	28	7.9	0.97	8.06%
	CR02-South (68)	24	20.8	28	8	1.57	6.52%
	SE-15	15	20.7	28	7.8	1.50	10.01%
	SE-20	34	20.9	28	7.7	4.16	12.23%
PW Day 20	Control	ND	20.6	28	7.4	#VALUE!	#VALUE!
	Carr20 (47)	288	20.9	28	6.6	190.01	65.98%
	CR02-South (68)	18	20.8	28	7	7.56	42.02%
	SE-15	70	20.7	28	6.7	42.18	60.26%
	SE-20	6	20.9	28	7	2.52	41.93%

2.5 *Neanthes arenaceodentata* Statistical Results: Re-Test of Samples SE-15 and SE-20

Project Name: Seaport Neanthes AFDW Re-Test

Sample:	x1
Samp ID:	SE-15 sieved
Alias:	
Replicates:	5
Mean:	0.575
SD:	0.09
Tr Mean:	0.575
Trans SD:	0.09

Ref Samp:	x2
Ref ID:	Carr20 (47)
Alias:	
Replicates:	5
Mean:	0.597
SD:	0.084
Tr Mean:	0.597
Trans SD:	0.084

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	0.057
SS:	0.061
K:	5
b:	0.234
Alpha Level:	0.05
Calculated Value:	0.8998
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	0.064
Test Residual SD:	0.056
Ref. Residual Mean:	0.062
Ref. Residual SD:	0.048
Deg. of Freedom:	8
Alpha Level:	0.1
Calculated Value:	0.0607
Critical Value:	>= 1.860
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	No Transformation
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	8
Experimental Alpha Level:	0.05
Calculated Value:	0.3983
Critical Value:	>= 1.860
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0.478	0.478	0.719	0.719	0.097	0.122			-0.1
2	0.586	0.586	0.611	0.611	0.011	0.014			-0.097
3	0.584	0.584	0.614	0.614	0.009	0.017			-0.063
4	0.713	0.713	0.542	0.542	0.138	0.055			-0.055
5	0.512	0.512	0.497	0.497	0.063	0.1			0.009
6									0.011
7									0.014
8									0.017
9									0.122
10									0.138

Project Name: Seaport Neanthes AFDW Re-Test

Sample:	x1
Samp ID:	SE-20 sieved
Alias:	
Replicates:	5
Mean:	0.528
SD:	0.053
Tr Mean:	0.528
Trans SD:	0.053

Ref Samp:	x2
Ref ID:	CR02-South (68)
Alias:	
Replicates:	5
Mean:	0.612
SD:	0.087
Tr Mean:	0.612
Trans SD:	0.087

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	0.047
SS:	0.041
K:	5
b:	0.201
Alpha Level:	0.05
Calculated Value:	0.9798
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	0.042
Test Residual SD:	0.024
Ref. Residual Mean:	0.062
Ref. Residual SD:	0.053
Deg. of Freedom:	8
Alpha Level:	0.1
Calculated Value:	0.7591
Critical Value:	>= 1.860
Variances Homogeneous:	Yes

Test Results:

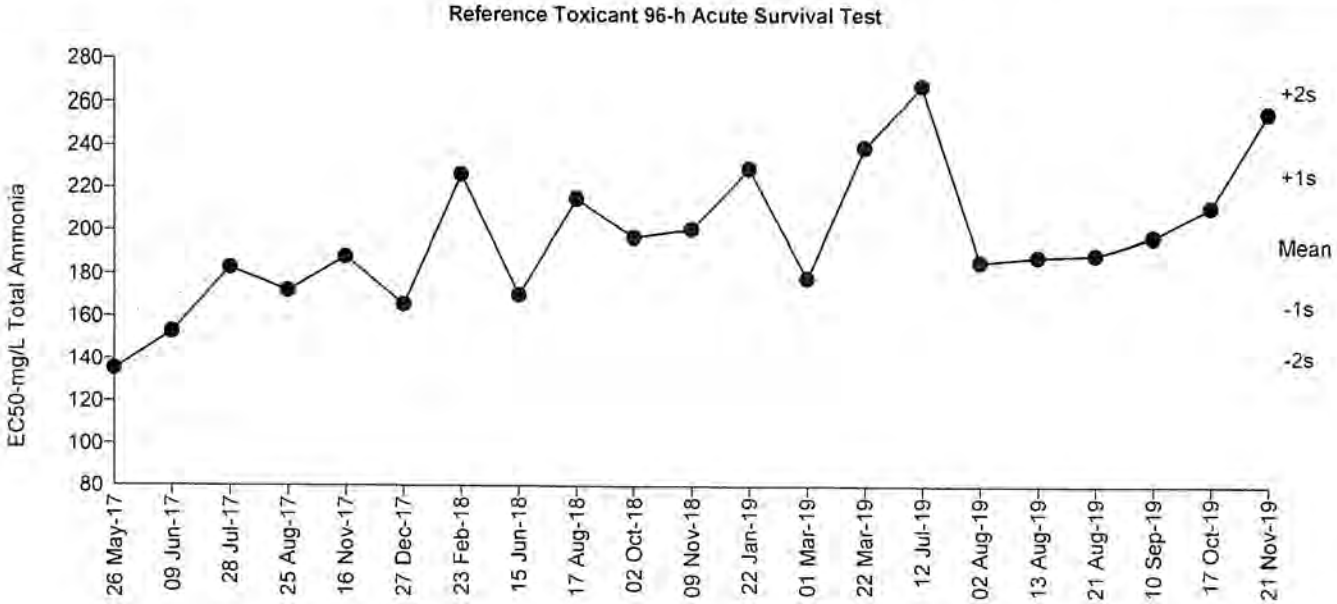
Statistic:	Student's t
Balanced Design:	Yes
Transformation:	No Transformation
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	8
Experimental Alpha Level:	0.05
Calculated Value:	1.8471
Critical Value:	>= 1.860
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0.49	0.49	0.589	0.589	0.038	0.023			-0.132
2	0.593	0.593	0.711	0.711	0.065	0.099			-0.063
3	0.567	0.567	0.48	0.48	0.039	0.132			-0.038
4	0.465	0.465	0.617	0.617	0.063	0.005			-0.023
5	0.523	0.523	0.661	0.661	0.005	0.049			-0.005
6									0.005
7									0.039
8									0.049
9									0.065
10									0.099

2.6 *Neanthes arenaceodentata* Reference Toxicant Test Results: Re-Test of Samples SE-15 and SE-20

Reference Toxicant 96-h Acute Survival Test All Matching Labs

Test Type:	Survival	**Organism:**	Neanthes arenaceodentata (Polycha	**Material:**	Total Ammonia
Protocol:	PSEP (1995)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	192.5	**Count:**	20	**-1s Warning Limit:**	164.4	**-2s Action Limit:**	140.4
Sigma:	n/a	**CV:**	15.90%	**+1s Warning Limit:**	225.5	**+2s Action Limit:**	264.1

Quality Control Data

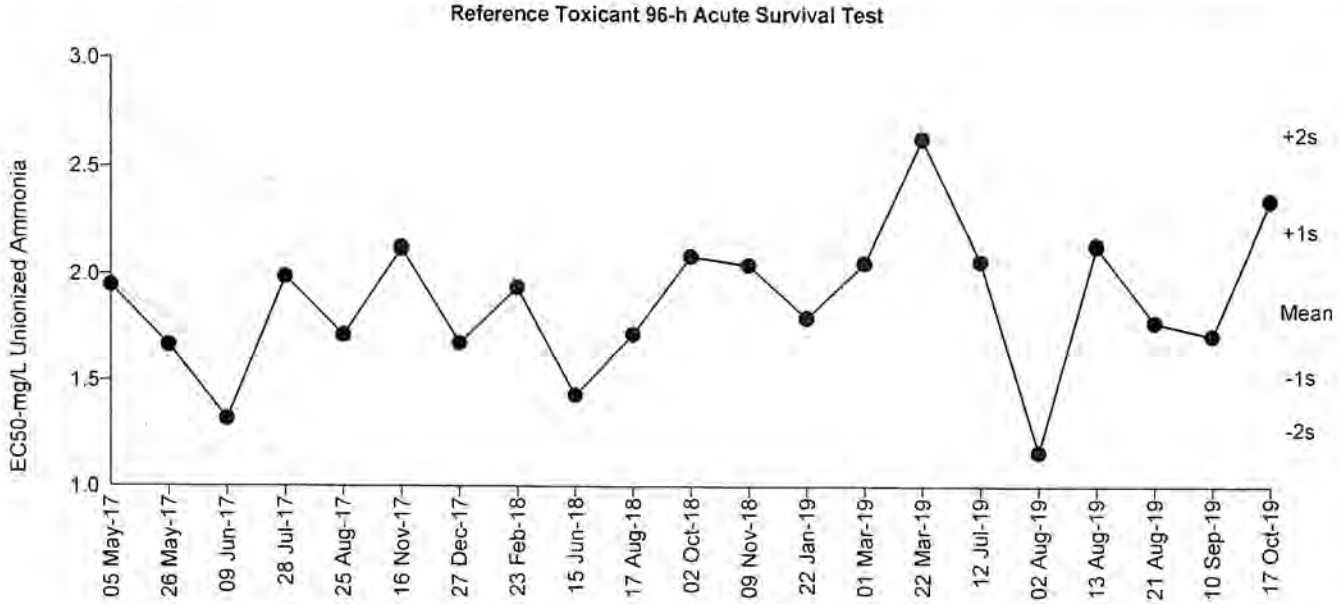
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2017	May	26	11:20	135.4	-57.06	-2.225	(-)	(-)	02-4398-8901	19-3251-4383	EcoAnalysts
2		Jun	9	13:12	152.9	-39.56	-1.456	(-)		06-5936-3810	21-1385-6147	EcoAnalysts
3		Jul	28	10:45	183.1	-9.398	-0.3168			04-6413-3650	06-5419-2075	EcoAnalysts
4		Aug	25	10:40	172.2	-20.25	-0.7035			03-6651-4426	03-4165-4995	EcoAnalysts
5		Nov	16	13:40	188.2	-4.268	-0.1419			03-0415-6136	04-9955-5124	EcoAnalysts
6		Dec	27	15:35	165.8	-26.64	-0.9428			01-8821-8905	08-9204-3617	EcoAnalysts
7	2018	Feb	23	16:20	226.4	33.93	1.028	(+)		13-7905-8989	13-7098-6720	EcoAnalysts
8		Jun	15	14:35	170.5	-22.03	-0.7692			04-1274-1602	03-0642-1993	EcoAnalysts
9		Aug	17	14:15	215.3	22.77	0.7077			07-8700-6256	13-3406-4651	EcoAnalysts
10		Oct	2	14:10	197.3	4.796	0.1558			21-2226-7904	00-1709-8680	EcoAnalysts
11		Nov	9	14:15	201.1	8.65	0.2782			00-5577-1542	07-1368-3232	EcoAnalysts
12	2019	Jan	22	15:17	229.4	36.94	1.111	(+)		19-6608-0675	00-2421-4186	EcoAnalysts
13		Mar	1	13:44	178.5	-14.01	-0.4782			16-4352-7409	14-8196-0068	EcoAnalysts
14			22	15:20	239.3	46.77	1.377	(+)		12-8564-4292	03-0035-4512	EcoAnalysts
15		Jul	12	14:30	267.7	75.24	2.088	(+)	(+)	21-0917-4708	00-5307-6948	EcoAnalysts
16		Aug	2	15:20	186.2	-6.264	-0.2094			17-0846-5905	16-9911-4308	EcoAnalysts
17			13	15:55	188.8	-3.687	-0.1224			08-6399-0477	04-6509-2576	EcoAnalysts
18			21	13:30	189.7	-2.74	-0.09075			21-2736-4211	02-0545-5733	EcoAnalysts
19		Sep	10	14:45	197.8	5.307	0.1721			15-3198-9821	13-4571-7808	EcoAnalysts
20		Oct	17	15:45	211.7	19.18	0.6011			00-3306-4323	18-7634-5789	EcoAnalysts
21		Nov	21	13:15	255.4	62.87	1.789	(+)		08-1679-8006	07-2089-5036	EcoAnalysts

CETIS QC Plot

Report Date: 26 Nov-19 15:12 (1 of 1)

Reference Toxicant 96-h Acute Survival Test — All Matching Labs

Test Type:	Survival	**Organism:**	Neanthes arenaceodentata (Polycha	**Material:**	Unionized Ammonia
Protocol:	PSEP (1995)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	1.822	**Count:**	20	**-1s Warning Limit:**	1.514	**-2s Action Limit:**	1.258
Sigma:	n/a	**CV:**	18.70%	**+1s Warning Limit:**	2.192	**+2s Action Limit:**	2.638

Quality Control Data

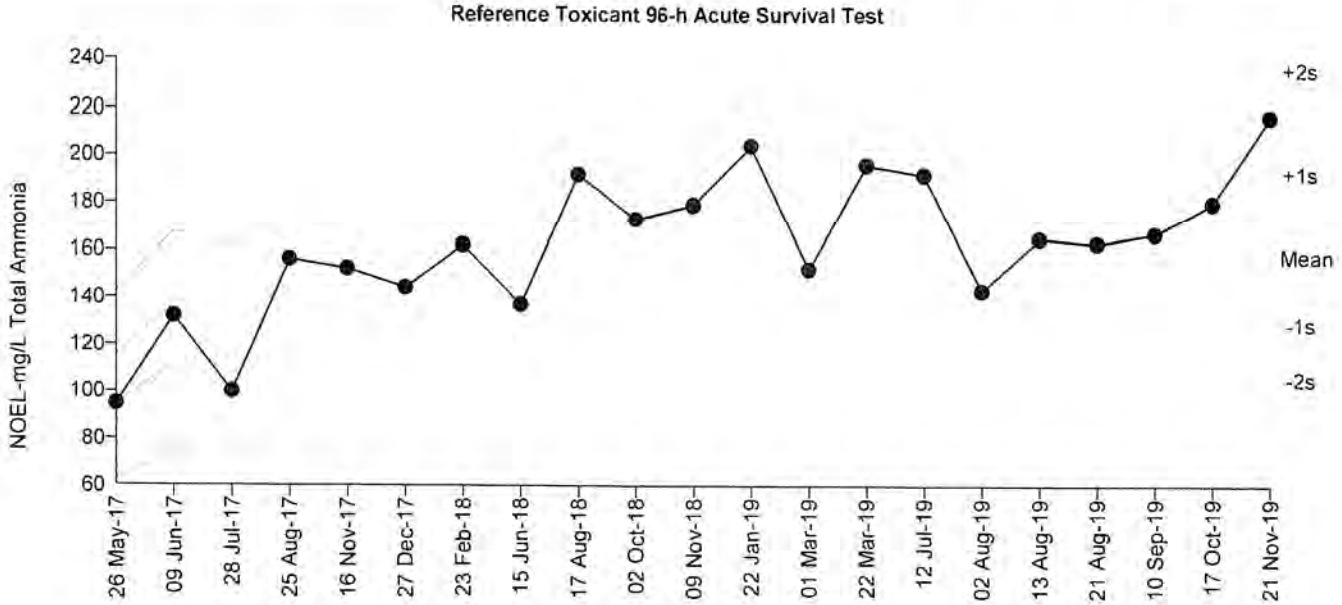
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2017	May	5	11:10	1.947	0.1256	0.3601			06-1983-2716	10-6060-2702	EcoAnalysts
2			26	11:20	1.668	-0.1536	-0.4758			11-9977-1019	12-2648-7955	EcoAnalysts
3		Jun	9	13:12	1.32	-0.5013	-1.739	(-)		20-5746-1828	16-2628-9369	EcoAnalysts
4		Jul	28	10:45	1.989	0.1675	0.4753			11-9488-2902	14-7043-7154	EcoAnalysts
5		Aug	25	10:40	1.716	-0.106	-0.3238			04-3451-1040	00-3615-6317	EcoAnalysts
6		Nov	16	13:40	2.122	0.3004	0.8247			21-2485-6236	15-8866-6943	EcoAnalysts
7		Dec	27	15:35	1.678	-0.1437	-0.4439			14-3251-3795	10-3688-8341	EcoAnalysts
8	2018	Feb	23	16:20	1.939	0.117	0.3362			08-4313-9079	15-8743-9749	EcoAnalysts
9		Jun	15	14:35	1.432	-0.3895	-1.3	(-)		13-9420-2469	11-6483-4489	EcoAnalysts
10		Aug	17	14:15	1.721	-0.1005	-0.3067			16-0114-0602	19-8752-3439	EcoAnalysts
11		Oct	2	14:10	2.087	0.2657	0.7356			02-7017-5318	01-2654-4798	EcoAnalysts
12		Nov	9	14:15	2.046	0.2243	0.6272			05-1575-7697	05-2999-6855	EcoAnalysts
13	2019	Jan	22	15:17	1.799	-0.02305	-0.06881			03-5816-0405	12-4945-6418	EcoAnalysts
14		Mar	1	13:44	2.055	0.2339	0.6527			04-3242-1896	16-4131-9540	EcoAnalysts
15			22	15:20	2.63	0.8084	1.984	(+)		00-7345-5138	15-2870-1632	EcoAnalysts
16		Jul	12	14:30	2.065	0.2437	0.6783			19-1480-3456	07-7235-5107	EcoAnalysts
17		Aug	2	15:20	1.163	-0.6587	-2.425	(-)	(-)	10-1976-9391	00-8421-1808	EcoAnalysts
18			13	15:55	2.137	0.3154	0.8628			00-5853-2505	10-3089-9902	EcoAnalysts
19			21	13:30	1.779	-0.04274	-0.1283			14-7963-5363	12-5100-5995	EcoAnalysts
20		Sep	10	14:45	1.715	-0.1068	-0.3264			08-0609-5167	04-3709-1344	EcoAnalysts
21		Oct	17	15:45	2.345	0.5234	1.364	(+)		10-0475-9886	14-9451-4606	EcoAnalysts

CETIS QC Plot

Report Date: 26 Nov-19 15:13 (1 of 1)

Reference Toxicant 96-h Acute Survival Test — All Matching Labs

Test Type:	Survival	**Organism:**	Neanthes arenaceodentata (Polycha	**Material:**	Total Ammonia
Protocol:	PSEP (1995)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	156.3	**Count:**	20	**-1s Warning Limit:**	127.7	**-2s Action Limit:**	104.3
Sigma:	n/a	**CV:**	20.50%	**+1s Warning Limit:**	191.4	**+2s Action Limit:**	234.4

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2017	May	26	11:20	94.7	-61.63	-2.475	(-)	(-)	02-4398-8901	20-6641-5688	EcoAnalysts
2		Jun	9	13:12	132	-24.33	-0.8355			06-5936-3810	02-9842-7509	EcoAnalysts
3		Jul	28	10:45	99.9	-56.43	-2.212	(-)	(-)	04-6413-3650	18-1225-7941	EcoAnalysts
4		Aug	25	10:40	156	-0.3348	-0.01059			03-6651-4426	09-2206-9228	EcoAnalysts
5		Nov	16	13:40	152	-4.335	-0.1389			03-0415-6136	18-4343-4696	EcoAnalysts
6		Dec	27	15:35	144	-12.33	-0.4059			01-8821-8905	01-3003-6293	EcoAnalysts
7	2018	Feb	23	16:20	162	5.665	0.1758			13-7905-8989	16-4206-5191	EcoAnalysts
8		Jun	15	14:35	137	-19.33	-0.6519			04-1274-1602	00-8204-0817	EcoAnalysts
9		Aug	17	14:15	192	35.67	1.015	(+)		07-8700-6256	00-3442-0298	EcoAnalysts
10		Oct	2	14:10	173	16.67	0.5002			21-2226-7904	05-0269-1791	EcoAnalysts
11		Nov	9	14:15	179	22.67	0.6686			00-5577-1542	13-6278-1952	EcoAnalysts
12	2019	Jan	22	15:17	204	47.67	1.314	(+)		19-6608-0675	11-6507-6917	EcoAnalysts
13		Mar	1	13:44	152	-4.335	-0.1389			16-4352-7409	00-8230-2760	EcoAnalysts
14			22	15:20	196	39.67	1.117	(+)		12-8564-4292	05-5287-2854	EcoAnalysts
15		Jul	12	14:30	192	35.67	1.015	(+)		21-0917-4708	13-0093-2104	EcoAnalysts
16		Aug	2	15:20	143	-13.33	-0.4403			17-0846-5905	19-7316-2458	EcoAnalysts
17			13	15:55	165	8.665	0.2664			08-6399-0477	02-9565-0844	EcoAnalysts
18			21	13:30	163	6.665	0.2062			21-2736-4211	17-5434-7893	EcoAnalysts
19		Sep	10	14:45	167	10.67	0.3259			15-3198-9821	19-4980-7373	EcoAnalysts
20		Oct	17	15:45	180	23.67	0.6961			00-3306-4323	14-6485-5861	EcoAnalysts
21		Nov	21	13:15	216	59.67	1.596	(+)		08-1679-8006	16-1846-4388	EcoAnalysts

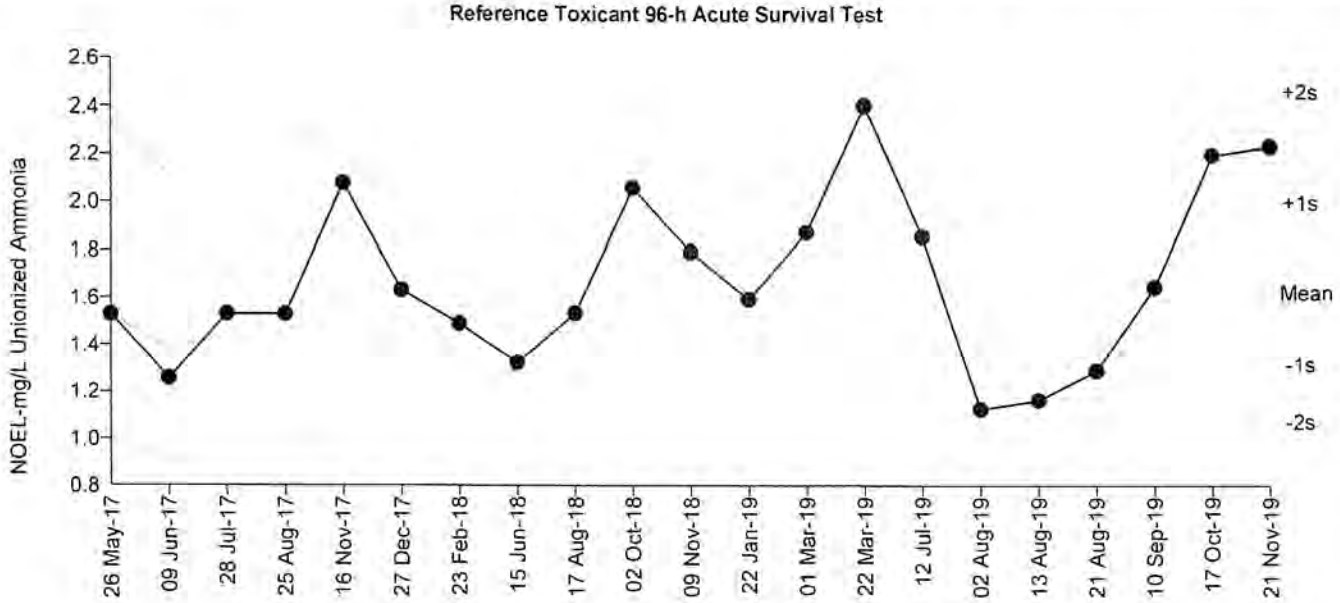
Analyst: MK QA: JB

CETIS QC Plot

Report Date: 26 Nov-19 15:12 (1 of 1)

Reference Toxicant 96-h Acute Survival Test — All Matching Labs

Test Type:	Survival	**Organism:**	Neanthes arenaceodentata (Polycha	**Material:**	Unionized Ammonia
Protocol:	PSEP (1995)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	1.612	**Count:**	20	**-1s Warning Limit:**	1.307	**-2s Action Limit:**	1.06
Sigma:	n/a	**CV:**	21.20%	**+1s Warning Limit:**	1.988	**+2s Action Limit:**	2.452

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2017	May	26	11:20	1.529	-0.0832	-0.2528			11-9977-1019	08-2373-9544	EcoAnalysts
2		Jun	9	13:12	1.258	-0.3542	-1.184	(-)		20-5746-1828	13-3286-2330	EcoAnalysts
3		Jul	28	10:45	1.532	-0.0802	-0.2434			11-9488-2902	00-8692-4177	EcoAnalysts
4		Aug	25	10:40	1.53	-0.0822	-0.2497			04-3451-1040	07-6966-4955	EcoAnalysts
5		Nov	16	13:40	2.079	0.4668	1.213	(+)		21-2485-6236	00-9775-4668	EcoAnalysts
6		Dec	27	15:35	1.633	0.0208	0.06116			14-3251-3795	04-4998-7500	EcoAnalysts
7	2018	Feb	23	16:20	1.491	-0.1212	-0.3729			08-4313-9079	12-5767-7210	EcoAnalysts
8		Jun	15	14:35	1.325	-0.2872	-0.936			13-9420-2469	12-4705-5925	EcoAnalysts
9		Aug	17	14:15	1.535	-0.0772	-0.2341			16-0114-0602	03-4717-2264	EcoAnalysts
10		Oct	2	14:10	2.059	0.4468	1.167	(+)		02-7017-5318	12-2051-3096	EcoAnalysts
11		Nov	9	14:15	1.794	0.1818	0.5098			05-1575-7697	20-2944-5206	EcoAnalysts
12	2019	Jan	22	15:17	1.595	-0.0172	-0.05117			03-5816-0405	03-5029-6568	EcoAnalysts
13		Mar	1	13:44	1.875	0.2628	0.7205			04-3242-1896	17-0781-9299	EcoAnalysts
14			22	15:20	2.403	0.7908	1.904	(+)		00-7345-5138	17-9862-0450	EcoAnalysts
15		Jul	12	14:30	1.858	0.2458	0.677			19-1480-3456	01-8740-2353	EcoAnalysts
16		Aug	2	15:20	1.127	-0.4852	-1.708	(-)		10-1976-9391	08-7104-1750	EcoAnalysts
17			13	15:55	1.165	-0.4472	-1.55	(-)		00-5853-2505	06-3471-0420	EcoAnalysts
18			21	13:30	1.292	-0.3202	-1.056	(-)		14-7963-5363	20-8907-8030	EcoAnalysts
19		Sep	10	14:45	1.648	0.0358	0.1048			08-0609-5167	00-6589-3953	EcoAnalysts
20		Oct	17	15:45	2.2	0.5878	1.483	(+)		10-0475-9886	00-3718-6473	EcoAnalysts
21		Nov	21	13:15	2.237	0.6248	1.563	(+)		17-3983-7570	18-0011-8937	EcoAnalysts

Analyst: ML QA: JB

CETIS Summary Report

Reference Toxicant 96-h Acute Survival Test — EcoAnalysts

Batch ID:	08-9268-3916	Test Type:	Survival	Analyst:	
Start Date:	21 Nov-19 13:15	Protocol:	PSEP (1995)	Diluent:	Laboratory Seawater
Ending Date:	25 Nov-19 13:22	Species:	Neanthes arenaceodentata	Brine:	Not Applicable
Test Length:	4d 0h	Taxon:	Polychaeta	Source:	Aquatic Toxicology Support Age:
Sample ID:	12-3537-3236	Code:	49A24CB4	Project:	Reference Toxicant
Sample Date:	12 Jun-19	Material:	Total Ammonia	Source:	Reference Toxicant
Receipt Date:	12 Jun-19	CAS (PC):		Station:	P190612.53
Sample Age:	162d 13h	Client:	Internal Lab		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
16-1846-4388	Proportion Survived	Fisher Exact Test		216	270	241.5		n/a	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	mg/L	95% LCL	95% UCL	TU	S
07-2089-5036	Proportion Survived	Linear Interpolation (ICPIN)		EC5	219.6	218.4	221		1
				EC10	223.4	220.7	226.1		
				EC15	227.1	223.2	231.4		
				EC20	231	225.6	236.7		
				EC25	234.9	228	242.2		
				EC40	247	235.5	259.3		
				EC50	255.4	240.6	271.4		

Proportion Survived Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	3	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
96		3	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
129		3	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
174		3	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
216		3	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
270		3	0.3333	0.0000	0.7128	0.2000	0.5000	0.0882	0.1528	45.83%	66.67%

Proportion Survived Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	D	1.0000	1.0000	1.0000
96		1.0000	1.0000	1.0000
129		1.0000	1.0000	1.0000
174		1.0000	1.0000	1.0000
216		1.0000	1.0000	1.0000
270		0.2000	0.5000	0.3000

Proportion Survived Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	D	10/10	10/10	10/10
96		10/10	10/10	10/10
129		10/10	10/10	10/10
174		10/10	10/10	10/10
216		10/10	10/10	10/10
270		2/10	5/10	3/10

CETIS Test Data Worksheet

Report Date: 26 Nov-19 15:00 (p 1 of 1)
Test Code/ID: 30AF5936 / 08-1679-8006

Reference Toxicant 96-h Acute Survival Test				EcoAnalysts
Start Date:	21 Nov-19 13:15	**Species:**	Neanthes arenaceodentata	**Sample Code:** 49A24CB4
End Date:	25 Nov-19 13:22	**Protocol:**	PSEP (1995)	**Sample Source:** Reference Toxicant
Sample Date:	12 Jun-19	**Material:**	Total Ammonia	**Sample Station:** P190612.53

Conc-mg/L	Code	Rep	Pos	# Exposed	# Survived	Notes
0	D	1	15	10	10	
0	D	2	4	10	10	
0	D	3	5	10	10	
96		1	13	10	10	
96		2	3	10	10	
96		3	18	10	10	
129		1	9	10	10	
129		2	17	10	10	
129		3	2	10	10	
174		1	6	10	10	
174		2	11	10	10	
174		3	12	10	10	
216		1	16	10	10	
216		2	8	10	10	
216		3	7	10	10	
270		1	1	10	2	
270		2	10	10	5	
270		3	14	10	3	

CETIS Summary Report

Report Date: 26 Nov-19 15:07 (p 1 of 1)
Test Code/ID: 67B3D082 / 17-3983-7570

Reference Toxicant 96-h Acute Survival Test — EcoAnalysts

Batch ID:	08-9268-3916	Test Type:	Survival	Analyst:	
Start Date:	21 Nov-19 13:15	Protocol:	PSEP (1995)	Diluent:	Laboratory Seawater
Ending Date:	25 Nov-19 13:22	Species:	Neanthes arenaceodentata	Brine:	Not Applicable
Test Length:	4d 0h	Taxon:	Polychaeta	Source:	Aquatic Toxicology Support Age:
Sample ID:	10-5766-4729	Code:	3F0AAED9	Project:	Reference Toxicant
Sample Date:	12 Jun-19	Material:	Unionized Ammonia	Source:	Reference Toxicant
Receipt Date:	12 Jun-19	CAS (PC):		Station:	P190612.53
Sample Age:	162d 13h	Client:	Internal Lab		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
18-0011-8937	Proportion Survived	Fisher Exact Test		2.237	2.764	2.487		n/a	1

Proportion Survived Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	3	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
1.548		3	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
1.646		3	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
2.211		3	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
2.237		3	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
2.764		3	0.3333	0.0000	0.7128	0.2000	0.5000	0.0882	0.1528	45.83%	66.67%

Proportion Survived Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	D	1.0000	1.0000	1.0000
1.548		1.0000	1.0000	1.0000
1.646		1.0000	1.0000	1.0000
2.211		1.0000	1.0000	1.0000
2.237		1.0000	1.0000	1.0000
2.764		0.2000	0.5000	0.3000

Proportion Survived Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	D	10/10	10/10	10/10
1.548		10/10	10/10	10/10
1.646		10/10	10/10	10/10
2.211		10/10	10/10	10/10
2.237		10/10	10/10	10/10
2.764		2/10	5/10	3/10

CETIS Test Data Worksheet

Report Date: 26 Nov-19 15:06 (p 1 of 1)
Test Code/ID: 67B3D082 / 17-3983-7570

Reference Toxicant 96-h Acute Survival Test — EcoAnalysts

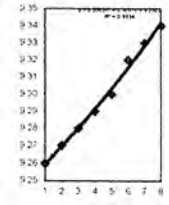
Start Date:	21 Nov-19 13:15	**Species:**	Neanthes arenaceodentata	**Sample Code:**	3F0AAED9
End Date:	25 Nov-19 13:22	**Protocol:**	PSEP (1995)	**Sample Source:**	Reference Toxicant
Sample Date:	12 Jun-19	**Material:**	Unionized Ammonia	**Sample Station:**	P190612.53

Conc-mg/L	Code	Rep	Pos	# Exposed	# Survived	Notes
0	D	1	9	10	10	
0	D	2	12	10	10	
0	D	3	14	10	10	
1.548		1	2	10	10	
1.548		2	17	10	10	
1.548		3	7	10	10	
1.646		1	5	10	10	
1.646		2	16	10	10	
1.646		3	3	10	10	
2.211		1	6	10	10	
2.211		2	18	10	10	
2.211		3	1	10	10	
2.237		1	8	10	10	
2.237		2	13	10	10	
2.237		3	10	10	10	
2.764		1	11	10	2	
2.764		2	4	10	5	
2.764		3	15	10	3	

CLIENT:	MFA	Test Date:	21-Nov-19
PROJECT:	Seaport	Test Type:	Neanthes
COMMENTS:			

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer: I-factor	
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
	9.34



	Sample	Mod	NH3T (mg/L)	salinity (ppt)	pH	temp (C)	temp (K)	i-factor	Mod	NH3U (mg/L)
	Target / Sample Name		Actual	22.9	8.0	24.1	297.26	9.3053		#VALUE!
	Example 3.5		2.000	10.0	7.5	5.0	278.16	9.2750		0.008
1	0		0	28	8.00	19.5	292.66	9.3187		0.000
2	90		96.00	28	7.70	19.7	292.86	9.3187		1.548
3	130		129.00	28	7.60	19.6	292.76	9.3187		1.646
4	170		174.00	28	7.60	19.7	292.86	9.3187		2.237
5	210		216.00	28	7.50	19.7	292.86	9.3187		2.211
6	250		270.00	28	7.50	19.7	292.86	9.3187		2.764
7										
8										
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Ammonia Reference Toxicant Test Survival Data Sheet

CLIENT	PROJECT	SPECIES		LABORATORY	PROTOCOL
MFA	Seaport	*Neanthes arenaceodentata*		Port Gamble .	USACE 1991
TEST ID	**LOT #:**	**TEST START DATE**	**TIME**	**4-DAY END DATE**	**TIME**
PP0612.53	18H1356763	21Nov19	1315	25Nov19	1322
CHAMBER SIZE/TYPE	**EXPOSURE VOLUME**				
Glass pint jar	250 mL				

WATER QUALITY DATA

TEST CONDITIONS					DO (mg/L)		TEMP(C)		SAL (ppt)		pH		TECHNICIAN	AMMONIA			SULFIDES		
					> 4.6		20 ± 1		30 ± 2		7.8 ± 0.5								
CLIENT/ENVIRON ID	CONCENTRATION value	CONCENTRATION units	DAY	REP	D.O. meter	D.O. mg/L	TEMP. meter	TEMP. °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	WQ TECH/ DATE	AMMONIA METER	AMMONIA mg/L	Tech	SULFIDES meter	SULFIDES mg/L	Tech
Ref.Tox.-ammonia	0	mg/L	0	Stock	9	7.6	9	19.5	9	28	9	8.0	DM 11/21	10	0.00				NR
			4	1	8	7.0	8	20.6	8	28	8	7.9	NR 11/25						
Ref.Tox.-ammonia	90	mg/L	0	Stock	9	7.8	9	19.7	9	28	9	7.7	DM 11/21	10	96.0				NR
			4	1	8	7.4	8	19.9	8	29	8	7.8	NR 11/25						
Ref.Tox.-ammonia	130	mg/L	0	Stock	9	7.7	9	19.6	9	28	9	7.6	DM 11/21	10	129				NR
			4	1	8	7.4	8	20.2	8	29	8	7.8	NR 11/25						
Ref.Tox.-ammonia	170	mg/L	0	Stock	9	7.7	9	19.7	9	28	9	7.6	DM 11/21	10	174				NR
			4	1	8	7.4	8	20.3	8	28	8	7.8	NR 11/25						
Ref.Tox.-ammonia	210	mg/L	0	Stock	9	7.7	9	19.7	9	28	9	7.5	DM 11/21	10	216				NR
			4	1	8	7.3	8	20.3	8	28	8	7.7	NR 11/25						
Ref.Tox.-ammonia	250	mg/L	0	Stock	9	7.7	9	19.7	9	28	9	7.5	DM 11/21	10	270				NR
			4	1	8	7.4	8	20.3	8	28	8	7.8	NR 11/25						

Ammonia Reference Toxicant Test Survival Data Sheet

CLIENT	PROJECT	TEST ID	SPECIES		
			Neanthes arenaceodentata		
			PROJECT MANAGER	LABORATORY	PROTOCOL
MFA	Seaport	P190612.53	B. Hester	Port Gamble .	USACE 1991

SURVIVAL & BEHAVIOR DATA

OBSERVATION KEY
N = Normal
LOE = Loss of equilibium
Q = Quinscent
DC = Discoloration
NB = No body
F = Floating on surface

INITIAL # OF ORGANISMS: 10

				DAY 1			DAY 2			DAY 3			DAY 4		
				DATE: 11/22			DATE: 11/23			DATE: 11/24			DATE: 11/25		
				TECHNICIAN: DM			TECHNICIAN: DM			TECHNICIAN: NR			TECHNICIAN: MS		
CLIENT/ENVIRON ID	CONC. value	CONC. units	REP	INITIAL NUMBER	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS
Ref.Tox.- Ammonia	0	mg/L	1		10	0	N	10	0	N	10	0	N	10	0	N
			2		10	0	N	10	0	N	10	0	F	10	0	Q
			3		10	0	N	10	0	N	10	0	N	10	0	Q
Ref.Tox.- Ammonia	90	mg/L	1		10	0	N	10	0	N	10	0	N	10	0	Q
			2		10	0	N	10	0	N	10	0	N	10	0	Q
			3		10	0	N	10	0	N	10	0	N	10	0	Q
Ref.Tox.- Ammonia	130	mg/L	1		10	0	N	10	0	N	10	0	N	10	0	Q
			2		10	0	N	10	0	N	10	0	N	10	0	Q
			3		10	0	N	10	0	N	10	0	N	10	0	Q
Ref.Tox.- Ammonia	170	mg/L	1		10	0	N	10	0	N	10	0	N	10	0	Q
			2		10	0	N	10	0	N	10	0	N	10	0	Q
			3		10	0	N	10	0	N	10	0	N	10	0	Q
Ref.Tox.- Ammonia	210	mg/L	1		10	0	N	10	0	N	10	0	Q	10	0	Q
			2		10	0	N	10	0	N	10	0	Q	10	0	Q
			3		10	0	N	10	0	N	10	0	Q	10	0	Q
Ref.Tox.- Ammonia	250	mg/L	1		10	0	N	10	0	10 Q	2	8	Q	2	0	Q
			2		10	0	N	10	0	10 Q	5	5	Q	5	0	Q
			3		10	0	N	10	0	10 Q	3	7	Q	3	0	Q

① IE - MS 11/25

Ammonia Reference Toxicant
Spiking Worksheet

Reference Toxicant ID: P190612.53
Date Prepared: 11/21/19
Technician Initials: DM

Neanthes NH_3 RT

Assumptions in Model
Stock ammonia concentration is 10,000 mg/L = 10 mg/mL

Date: 10/14/2019
Measurement: 13766.66

Test Solutions			Volume of stock to reach desired concentration	
Measured Concentration	**Desired Concentration**	**Volume**		
mg/L	mg/L	mL	mL stock to increase	
			FRESH WATER (mL)	SALT WATER (mL)
96.0	**90** ✓	750	[redacted]	7.35
129	**130** ✓	750		10.62
174	**170** ✓	750		13.89
216	**210** ✓	750		17.16
270	**250** ✓	750		20.43

3. *Mytilus galloprovincialis* Water-Column Test

3.1 *Mytilus galloprovincialis* Test Data

EcoAnalysts

CLIENT	PROJECT	SPECIES		LAB / LOCATION	PROTOCOL
MFA	Seaport	*Mytilus sp*		Port Gamble / Bath 1	PSEP (1995)
JOB NUMBER	**PROJECT MANAGER**	**TEST START DATE**	**TIME**	**TEST END DATE**	**TIME**
PG1313	Julia Baum	16Oct19	1620 JB	18Oct19	1652

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >6.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA		TECH	DATE
				D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE mg/L			
SAMPLE ID	DAY	Random #	REP	meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total		
Control /	0		WQ Surr	9	7.5	9	17.0	9	29	9	7.9	NR	0.00	DM	1	JB	10/16
Control /	1		WQ Surr	8	7.2	8	16.8	8	29	8	8.0					DM	10/17
Control /	2		WQ Surr	9	7.8	9	15.7	9	29	9	8.0	DM	0.00	MS	3	MK	10/18
CR21-West (14) /	0		WQ Surr	9	7.3	9	17.0	9	29	9	7.9	NR	0.00	DM	ND	JB	10/16
CR21-West (14) /	1		WQ Surr	8	6.6	8	16.8	8	29	8	7.9					DM	10/17
CR21-West (14) /	2		WQ Surr	9	7.9	9	15.9	9	29	9	8.0	DM	1.46	MS	8	MK	10/18
Carr20 (47) /	0		WQ Surr	9	7.3	9	17.0	9	29	9	7.9	NR	0.00	DM	9	JB	10/16
Carr20 (47) /	1		WQ Surr	8	5.9①	8	16.9	8	29	8	7.9					DM	10/17
Carr20 (47) /	2		WQ Surr	9	8.1	9	15.6	9	29	9	8.0	DM	5.77	MS	9	MK	10/18
CR02-South (68) /	0		WQ Surr	9	7.2	9	17.0	9	29	9	7.9	NR	0.00	DM	16	JB	10/16
CR02-South (68) /	1	~~4~~	WQ Surr	8	6.2	8	16.9	8	29	8	7.9					DM	10/17
CR02-South (68) /	2		WQ Surr	9	8.0	9	15.8	9	29	9	7.9	DM	0.102	MS	6	MK	10/18
SE-15 /	0		WQ Surr	9	6.8	9	17.0	9	29	9	7.9	NR	0.00	DM	11	JB	10/16
SE-15 /	1	4	WQ Surr	8	5.9①	8	17.0	8	29	8	7.7					DM	10/17
SE-15 /	2		WQ Surr	9	6.9	9	16.1	9	29	9	7.8	DM	0.0813	MS	4	MK	10/18
SE-16 /	0		WQ Surr	9	6.5	9	17.0	9	29	9	7.8	NR	0.00	DM	15	JB	10/16
SE-16 /	1		WQ Surr	8	6.0	8	17.0	8	29	8	7.8					DM	10/17
SE-16 /	2		WQ Surr	9	7.4	9	17.0	9	28	9	7.8	DM	0.202	MS	1	MK	10/18

① Aeration initiated to test chambers. MK 10/17.

ECO ANALYSTS

CLIENT	PROJECT	SPECIES		LAB / LOCATION	PROTOCOL
MFA	Seaport	*Mytilus sp*		Port Gamble / Bath 1	PSEP (1995)
JOB NUMBER	**PROJECT MANAGER**	**TEST START DATE**	**TIME**	**TEST END DATE**	**TIME**
PG1313	Julia Baum	16Oct19	1620 JB	18Oct19	

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >6.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA		TECH	DATE
SAMPLE ID	DAY	Random #	REP	D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE			
				meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total		
SE-17 /	0		WQ Surr	9	6.7	9	16.5	9	29	9	7.7	NR	0.00	DM	ND	JB	10/16
SE-17 /	1		WQ Surr	8	6.1	8	16.9	8	29	8	7.7					DM	10/17
SE-17 /	2		WQ Surr	9	7.9	9	15.8	9	29	9	7.9	MS	0.00	MS	ND	MK	10/18
SE-18 /	0		WQ Surr	9	~~5.9~~ 7.7 ①	9	16.9	9	29	9	7.7	NR	0.00	DM	6	JB	10/16
SE-18 /	1		WQ Surr	8	7.7	8	16.6	8	29	8	7.7					DM	10/17
SE-18 /	2		WQ Surr	9	7.6	9	15.7	9	29	9	7.9	MS	0.0252	MS	6	MK	10/18
SE-20 /	0		WQ Surr	9	6.7	9	16.5	9	29	9	7.7	NR	0.00	DM	7	JB	10/16
SE-20 /	1		WQ Surr	8	6.3	8	17.0	8	29	8	7.7					DM	10/17
SE-20 /	2		WQ Surr	9	8.1	9	15.6	9	29	9	7.9	MS	0.00	MS	16	MK	10/18
SE-24 /	0		WQ Surr	9	~~6.0~~ 7.8 ①	9	17.0	9	29	9	7.4	NR	0.00	DM	ND	JB	10/16
SE-24 /	1		WQ Surr	8	7.0	8	16.9	8	29	8	7.4					DM	10/17
SE-24 /	2		WQ Surr	9	7.8	9	16.3	9	29	9	7.8	MS	0.0179	MS	3	MK	10/18
SE-26 /	0		WQ Surr	9	7.5	9	16.9	9	29	9	7.5	NR	0.00	DM	27	JB	10/16
SE-26 /	1		WQ Surr	8	6.4	8	16.8	8	29	8	7.4					DM	10/17
SE-26 /	2		WQ Surr	9	8.0	9	15.6	9	29	9	7.8	MS	0.0377	MS	9	MK	10/18

① Aerated prior to test initiation 10.16.19 BH

EcoAnalysts

CLIENT	PROJECT	SPECIES		LAB / LOCATION	PROTOCOL
MFA	Seaport	*Mytilus sp*		Port Gamble / Bath 1	PSEP (1995)
JOB NUMBER	**PROJECT MANAGER**	**TEST START DATE**	**TIME**	**TEST END DATE**	**TIME**
PG1313	Julia Baum	16Oct19	1620 JB	18Oct19	

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >6.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA		TECH	DATE
SAMPLE ID	DAY	Random #	REP	D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE			
				meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total		
SE-31 /	**0**		WQ Surr	9	6.6	9	17.0	9	29	9	7.8	MR	0.00	DM	2	JB	10/16
SE-31 /	**1**		WQ Surr	8	5.4①	8	16.7	8	29	8	7.7					~~DM~~	10/17
SE-31 /	**2**		WQ Surr	9	7.8	9	16.4	9	29	9	7.7	MS	0.00	MS	5	MS	10/18
SE-31 /	**3**		WQ Surr														
SE-31 /	**4**		WQ Surr														

① Aeration added to all test chambers. MC 10/17.

EcoAnalysts

CLIENT	PROJECT	JOB NUMBER	PROJECT MANAGER	LABORATORY	PROTOCOL
MFA	Seaport	PG1313	Julia Baum	Port Gamble Bath 1	PSEP (1995)

TEST ORGANISM SPAWNING DATA

SPECIES			
Mytilus sp			
SUPPLIER: Taylor Shellfish			ORGANISM BATCH: TS073119 TS100419 TS082719
SPAWNING METHOD			
MALES: 3	FEMALES: 9	SPERM VIABILITY: ✓	EGG CONDITION: ✓
INITIAL SPAWNING TIME	BEGIN FERTILIZATION	CONDITION OF EMBRYOS: ✓	

SAMPLE STORAGE	4 Degrees Celsius - dark
SEDIMENT TREATMENT	none
TEST CHAMBERS	1 L Mason Jars
EXPOSURE VOLUME	900mL seawater / 18g Sediment
TIME OF SHAKE	1120
TIME OF INITIATION	— 1620 JB

SPECIAL CONDITIONS

UV LIGHT EXPOSURE (YES/NO)	AERATION FROM TEST INITIATION (YES/NO)
N	N
SCREEN TUBE TEST (YES/NO)	**OTHER (EXPLAIN)**
N	

EMBRYO DENSITY CALCULATIONS

$27 \times 100 = 2700$

$\frac{27000}{2700} = 0.996$ mL per chamber

RT: $\frac{2700}{2700} = 0.0996 \times 40$mL

4mL egg stock / 36mL FSW

deliver 100mL

EcoAnalysts

CLIENT	PROJECT	JOB NUMBER	SPECIES	LAB / LOCATION	PROTOCOL
MFA	Seaport	PG1313	*Mytilus sp* PROJECT MANAGER: Julia Baum	Port Gamble / Bath 1	PSEP (1995)

LARVAL OBSERVATION DATA

CLIENT/ ID	REP	NUMBER NORMAL	NUMBER	DATE	TECHNICIAN	COMMENTS
STOCKING DENSITY	1		244	11/1/19	MK	
	2		195	↓	↓	
	3		222			
	4		273			
	5		228			
Control /	1	262	5	10.19.19	BH	
	2	220	4	11/1/19	MK	QA March N 223 A 5
	3	245	4	↓	↓	
	4	255	3			
	5	245	4			
CR21-West (14) /	1	224	3			
	2	233	7			
	3	213	6			
	4	238	5			
	5	189	2			
Carr20 (47) /	1	233	7			
	2	201	6			
	3	224	13			
	4	212	6			QA March N 216 A 5
	5	207	3	↓	↓	

EcoAnalysts

CLIENT	PROJECT	JOB NUMBER	SPECIES	PROJECT MANAGER	LAB / LOCATION	PROTOCOL
MFA	Seaport	PG1313	*Mytilus sp*	Julia Baum	Port Gamble / Bath 1	PSEP (1995)

LARVAL OBSERVATION DATA

CLIENT/ ID	REP	NUMBER NORMAL	NUMBER	DATE	TECHNICIAN	COMMENTS
CR02-South (68) /	1	213	15	11/21/19	MK	
	2	198	1			
	3	① ~~218~~ 218	4			
	4	241	6			
	5	239	8			
SE-15 /	1	199	8	11/13/19		
	2	195	6			
	3	202	5			
	4	~~[illegible]~~ ② 183	② ~~4~~ 7			
	5	209	1			QA/QC N A 202 1
SE-16 /	1	~~150~~ ② 177	② ~~20~~ 2			
	2	222	1			
	3	196	4			
	4	198	14			
	5	200	5			
SE-17 /	1	187	16			
	2	② ~~165~~ 204	② ~~24~~ 14			
	3	198	12			QA/QC N A 200 2 ③
	4	191	14			
	5	212	15			

① illegible - MK 11/21.
② IE. MK 11/21.
③ Several barnacle larvae present, may have been scored as abnormal in original count. 11/26/19 MK

EcoAnalysts

CLIENT	PROJECT	JOB NUMBER	SPECIES	PROJECT MANAGER	LAB / LOCATION	PROTOCOL
MFA	Seaport	PG1313	*Mytilus sp*	Julia Baum	Port Gamble / Bath 1	PSEP (1995)

LARVAL OBSERVATION DATA

CLIENT/ ID	REP	NUMBER NORMAL	NUMBER	DATE	TECHNICIAN	COMMENTS
SE-18 /	1	232	4	11/14	MK	
	2	193	16			
	3	213	6			
	4	223	6			
	5	185	17			
SE-20 /	1	201	8			
	2	208	3			
	3	202	6			QA March N A 193 5
	4	170	4			
	5	201	14			
SE-24 /	1	119	69	11/20		
	2	88	97			
	3	123	66			
	4	118	47			
	5	97	65			
SE-26 /	1	172	30			
	2	197	25			QA March N A 199 25
	3	207	17			
	4	166	21			
	5	178	36			

EcoAnalysts

CLIENT	PROJECT	JOB NUMBER	SPECIES	PROJECT MANAGER	LAB / LOCATION	PROTOCOL
MFA	Seaport	PG1313	*Mytilus sp*	Julia Baum	Port Gamble / Bath 1	PSEP (1995)

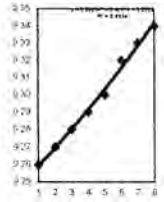
LARVAL OBSERVATION DATA

CLIENT/ ID	REP	NUMBER NORMAL	NUMBER	DATE	TECHNICIAN	COMMENTS
SE-31 /	1	194	9	11/21/19	MK	
	2	211	10	↓	↓	
	3	196	28	↓	↓	
	4	178	25	↓	↓	
	5	184	15	↓	↓	

CLIENT:	MFA	Test Date:	16-Oct-19
PROJECT:	Seaport	Test Type:	Larval
COMMENTS:			

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer: I-factor	
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
	9.34



	Sample	Mod	NH3T (mg/L)	salinity (ppt)	pH	temp (C)	temp (K)	i-factor	Mod	NH3U (mg/L)	
	Target / Sample Name		Actual	22.9	8.0	24.1	297.26	9.3053		#VALUE!	
	Example 3.5		2.000	10.0	7.5	5.0	278.16	9.2750		0.008	
1	Control		0	29	7.90	17.0	290.16	9.3214		0.000	Initial
2	CR21-West (14)		0.00	29	7.90	17.0	290.16	9.3214		0.000	
3	Carr20 (47)		0.00	29	7.90	17.0	290.16	9.3214		0.000	
4	CR02-South (68)		0.00	29	7.90	17.0	290.16	9.3214		0.000	
5	SE-15		0.00	29	7.90	17.0	290.16	9.3214		0.000	
6	SE-16		0.00	29	7.80	17.0	290.16	9.3214		0.000	
7	SE-17		0.000	29.0	7.7	16.5	289.66	9.3214		0.000	
8	SE-18		0.000	29.0	7.7	16.9	290.06	9.3214		0.000	
9	SE-20		0.000	29.0	7.7	16.5	289.66	9.3214		0.000	
10	SE-24		0.000	29.0	7.4	17.0	290.16	9.3214		0.000	
11	SE-26		0	29	7.50	16.9	290.06	9.3214		0.000	
12	SE-31		0	29	7.8	17.0	290.16	9.3214		0.000	
13	Control		0	29	8.0	15.7	288.86	9.3214		0.000	Final
14	CR21-West (14)		1.46	29	8.0	15.9	289.06	9.3214		0.035	
15	Carr20 (47)		5.77	29	8.0	15.6	288.76	9.3214		0.135	
16	CR02-South (68)		0.102	29	7.9	15.8	288.96	9.3214		0.002	
17	SE-15		0.0813	29	7.8	16.1	289.26	9.3214		0.001	
18	SE-16		0.202	28	7.8	17.0	290.16	9.3187		0.003	
19	SE-17		0	29	7.9	15.8	288.96	9.3214		0.000	
20	SE-18		0.0252	29	7.9	15.7	288.86	9.3214		0.000	
21	SE-20		0.00	29	7.9	15.6	288.76	9.3214		0.000	
22	SE-24		0.0179	29	7.8	16.3	289.46	9.3214		0.000	
23	SE-26		0.0377	29	7.8	15.6	288.76	9.3214		0.001	
24	SE-31		0.0	29	7.7	16.4	289.56	9.3214		0.000	
25											
26											
27											
28											
29											
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31											
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44											
45											
46											

Seaport : Larval Sulfides

		Input				Output	
	Sample ID	Total Dissolved Sulfide (µg/L as S)	Temper-ature (°C)	Salinity (‰)	pH	Undissociated H2S (µg/L as H2S)	Weight Fraction (H2S/Total S)
Initial	Control	1	17	29	7.9	0.09	9.14%
	CR21-West (14)	ND	17	29	7.9	#VALUE!	#VALUE!
	Carr20 (47)	9	17	29	7.9	0.82	9.14%
	CR02-South (68)	16	17	29	7.9	1.46	9.14%
	SE-15	11	17	29	7.9	1.00	9.14%
	SE-16	15	17	29	7.8	1.69	11.25%
	SE-17	ND	16.5	29	7.7	#VALUE!	#VALUE!
	SE-18	6	16.9	29	7.7	0.83	13.83%
	SE-20	7	16.5	29	7.7	0.9809	14.01%
	SE-24	ND	17	29	7.4	#VALUE!	#VALUE!
	SE-26	27	16.9	29	7.5	5.50	20.37%
	SE-31	2	17	29	7.8	0.23	11.25%
Final	Control	3	15.7	29	8	0.23	7.73%
	CR21-West (14)	8	15.9	29	8	0.61	7.68%
	Carr20 (47)	9	15.6	29	8	0.70	7.76%
	CR02-South (68)	6	15.8	29	7.9	0.57	9.52%
	SE-15	4	16.1	29	7.8	0.46	11.60%
	SE-16	1	17	28	7.8	0.11	11.30%
	SE-17	ND	15.8	29	7.9	#VALUE!	#VALUE!
	SE-18	6	15.7	29	7.9	0.57	9.55%
	SE-20	16	15.6	29	7.9	1.53	9.59%
	SE-24	3	16.3	29	7.8	0.35	11.52%
	SE-26	9	15.6	29	7.8	1.06	11.79%
	SE-31	5	16.4	29	7.7	0.70	14.06%

3.2 *Mytilus galloprovincialis* Statistical Results

Project Name: Seaport Larval Normality

Sample:	x1
Samp ID:	SE-15
Alias:	
Replicates:	5
Mean:	197.6
SD:	9.633
Tr Mean:	197.6
Trans SD:	9.633

Ref Samp:	x2
Ref ID:	Carr20 (47)
Alias:	
Replicates:	5
Mean:	215.4
SD:	12.973
Tr Mean:	215.4
Trans SD:	12.973

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	7.414
SS:	1044.4
K:	5
b:	31.724
Alpha Level:	0.05
Calculated Value:	0.9637
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	6.88
Test Residual SD:	5.799
Ref. Residual Mean:	10.48
Ref. Residual SD:	5.569
Deg. of Freedom:	8
Alpha Level:	0.1
Calculated Value:	1.0012
Critical Value:	>= 1.860
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	No Transformation
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	8
Experimental Alpha Level:	0.1
Calculated Value:	2.4632
Critical Value:	>= 1.397
Accept Null Hypothesis:	No
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	199	199	233	233	1.4	17.6			-14.6
2	195	195	201	201	2.6	14.4			-14.4
3	202	202	224	224	4.4	8.6			-8.4
4	183	183	212	212	14.6	3.4			-3.4
5	209	209	207	207	11.4	8.4			-2.6
6									1.4
7									4.4
8									8.6
9									11.4
10									17.6

Project Name: Seaport Larval Normality

Sample:	x1
Samp ID:	SE-16
Alias:	
Replicates:	5
Mean:	198.6
SD:	15.994
Tr Mean:	198.6
Trans SD:	15.994

Ref Samp:	x2
Ref ID:	Carr20 (47)
Alias:	
Replicates:	5
Mean:	215.4
SD:	12.973
Tr Mean:	215.4
Trans SD:	12.973

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	9.449
SS:	1696.4
K:	5
b:	40.664
Alpha Level:	0.05
Calculated Value:	0.9747
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	9.92
Test Residual SD:	11.524
Ref. Residual Mean:	10.48
Ref. Residual SD:	5.569
Deg. of Freedom:	8
Alpha Level:	0.1
Calculated Value:	0.0978
Critical Value:	>= 1.860
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	No Transformation

Experimental Hypothesis

Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	8
Experimental Alpha Level:	0.1
Calculated Value:	1.8241
Critical Value:	>= 1.397
Accept Null Hypothesis:	No
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	177	177	233	233	21.6	17.6			-21.6
2	222	222	201	201	23.4	14.4			-14.4
3	196	196	224	224	2.6	8.6			-8.4
4	198	198	212	212	0.6	3.4			-3.4
5	200	200	207	207	1.4	8.4			-2.6
6									-0.6
7									1.4
8									8.6
9									17.6
10									23.4

Project Name: Seaport Larval Normality

Sample:	x1
Samp ID:	SE-17
Alias:	
Replicates:	5
Mean:	198.4
SD:	10.015
Tr Mean:	198.4
Trans SD:	10.015

Ref Samp:	x2
Ref ID:	CR02-South (68)
Alias:	
Replicates:	5
Mean:	221.8
SD:	18.185
Tr Mean:	221.8
Trans SD:	18.185

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	9.526
SS:	1724
K:	5
b:	40.613
Alpha Level:	0.05
Calculated Value:	0.9567
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	7.68
Test Residual SD:	5.155
Ref. Residual Mean:	14.56
Ref. Residual SD:	8.106
Deg. of Freedom:	8
Alpha Level:	0.1
Calculated Value:	1.6015
Critical Value:	>= 1.860
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	No Transformation
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	8
Experimental Alpha Level:	0.1
Calculated Value:	2.5204
Critical Value:	>= 1.397
Accept Null Hypothesis:	No
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	187	187	213	213	11.4	8.8			-23.8
2	204	204	198	198	5.6	23.8			-11.4
3	198	198	218	218	0.4	3.8			-8.8
4	191	191	241	241	7.4	19.2			-7.4
5	212	212	239	239	13.6	17.2			-3.8
6									-0.4
7									5.6
8									13.6
9									17.2
10									19.2

Project Name: Seaport Larval Normality

Sample:	x1
Samp ID:	SE-18
Alias:	
Replicates:	5
Mean:	209.2
SD:	19.829
Tr Mean:	209.2
Trans SD:	19.829

Ref Samp:	x2
Ref ID:	CR02-South (68)
Alias:	
Replicates:	5
Mean:	221.8
SD:	18.185
Tr Mean:	221.8
Trans SD:	18.185

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	12.345
SS:	2895.6
K:	5
b:	51.345
Alpha Level:	0.05
Calculated Value:	0.9105
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	16.16
Test Residual SD:	8.171
Ref. Residual Mean:	14.56
Ref. Residual SD:	8.106
Deg. of Freedom:	8
Alpha Level:	0.1
Calculated Value:	0.3108
Critical Value:	>= 1.860
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	No Transformation
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	8
Experimental Alpha Level:	0.1
Calculated Value:	1.0472
Critical Value:	>= 1.397
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	232	232	213	213	22.8	8.8			-24.2
2	193	193	198	198	16.2	23.8			-23.8
3	213	213	218	218	3.8	3.8			-16.2
4	223	223	241	241	13.8	19.2			-8.8
5	185	185	239	239	24.2	17.2			-3.8
6									3.8
7									13.8
8									17.2
9									19.2
10									22.8

Project Name: Seaport Larval Normality

Sample:	x1
Samp ID:	SE-20
Alias:	
Replicates:	5
Mean:	196.4
SD:	15.043
Tr Mean:	196.4
Trans SD:	15.043

Ref Samp:	x2
Ref ID:	CR02-South (68)
Alias:	
Replicates:	5
Mean:	221.8
SD:	18.185
Tr Mean:	221.8
Trans SD:	18.185

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	10.829
SS:	2228
K:	5
b:	45.181
Alpha Level:	0.05
Calculated Value:	0.9162
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	10.56
Test Residual SD:	9.322
Ref. Residual Mean:	14.56
Ref. Residual SD:	8.106
Deg. of Freedom:	8
Alpha Level:	0.1
Calculated Value:	0.724
Critical Value:	>= 1.860
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	No Transformation
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	8
Experimental Alpha Level:	0.1
Calculated Value:	2.4065
Critical Value:	>= 1.397
Accept Null Hypothesis:	No
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	201	201	213	213	4.6	8.8			-26.4
2	208	208	198	198	11.6	23.8			-23.8
3	202	202	218	218	5.6	3.8			-8.8
4	170	170	241	241	26.4	19.2			-3.8
5	201	201	239	239	4.6	17.2			4.6
6									4.6
7									5.6
8									11.6
9									17.2
10									19.2

Project Name: Seaport Larval Normality

Sample:	x1
Samp ID:	SE-24
Alias:	
Replicates:	5
Mean:	109
SD:	15.508
Tr Mean:	109
Trans SD:	15.508

Ref Samp:	x2
Ref ID:	Carr20 (47)
Alias:	
Replicates:	5
Mean:	215.4
SD:	12.973
Tr Mean:	215.4
Trans SD:	12.973

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	9.277
SS:	1635.2
K:	5
b:	38.818
Alpha Level:	0.05
Calculated Value:	0.9215
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	13.2
Test Residual SD:	4.764
Ref. Residual Mean:	10.48
Ref. Residual SD:	5.569
Deg. of Freedom:	8
Alpha Level:	0.1
Calculated Value:	0.8299
Critical Value:	>= 1.860
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	No Transformation
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	8
Experimental Alpha Level:	0.1
Calculated Value:	11.7671
Critical Value:	>= 1.397
Accept Null Hypothesis:	No
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	119	119	233	233	10	17.6			-21
2	88	88	201	201	21	14.4			-14.4
3	123	123	224	224	14	8.6			-12
4	118	118	212	212	9	3.4			-8.4
5	97	97	207	207	12	8.4			-3.4
6									8.6
7									9
8									10
9									14
10									17.6

Project Name: Seaport Larval Normality

Sample:	x1
Samp ID:	SE-26
Alias:	
Replicates:	5
Mean:	184
SD:	17.335
Tr Mean:	184
Trans SD:	17.335

Ref Samp:	x2
Ref ID:	CR21-West (14)
Alias:	
Replicates:	5
Mean:	219.4
SD:	19.476
Tr Mean:	219.4
Trans SD:	19.476

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	11.963
SS:	2719.2
K:	5
b:	50.97
Alpha Level:	0.05
Calculated Value:	0.9554
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	14.4
Test Residual SD:	6.427
Ref. Residual Mean:	14.72
Ref. Residual SD:	10.414
Deg. of Freedom:	8
Alpha Level:	0.1
Calculated Value:	0.0585
Critical Value:	>= 1.860
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	No Transformation
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	8
Experimental Alpha Level:	0.1
Calculated Value:	3.036
Critical Value:	>= 1.397
Accept Null Hypothesis:	No
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	172	172	224	224	12	4.6			-30.4
2	197	197	233	233	13	13.6			-18
3	207	207	213	213	23	6.4			-12
4	166	166	238	238	18	18.6			-6.4
5	178	178	189	189	6	30.4			-6
6									4.6
7									13
8									13.6
9									18.6
10									23

Project Name: Seaport Larval Normality

Sample:	x1
Samp ID:	SE-31
Alias:	
Replicates:	5
Mean:	192.6
SD:	12.641
Tr Mean:	192.6
Trans SD:	12.641

Ref Samp:	x2
Ref ID:	Carr20 (47)
Alias:	
Replicates:	5
Mean:	215.4
SD:	12.973
Tr Mean:	215.4
Trans SD:	12.973

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	8.311
SS:	1312.4
K:	5
b:	34.788
Alpha Level:	0.05
Calculated Value:	0.9221
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	9.28
Test Residual SD:	7.222
Ref. Residual Mean:	10.48
Ref. Residual SD:	5.569
Deg. of Freedom:	8
Alpha Level:	0.1
Calculated Value:	0.2942
Critical Value:	>= 1.860
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	No Transformation

Experimental Hypothesis

Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	8
Experimental Alpha Level:	0.1
Calculated Value:	2.8146
Critical Value:	>= 1.397
Accept Null Hypothesis:	No
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	194	194	233	233	1.4	17.6			-14.6
2	211	211	201	201	18.4	14.4			-14.4
3	196	196	224	224	3.4	8.6			-8.6
4	178	178	212	212	14.6	3.4			-8.4
5	184	184	207	207	8.6	8.4			-3.4
6									1.4
7									3.4
8									8.6
9									17.6
10									18.4

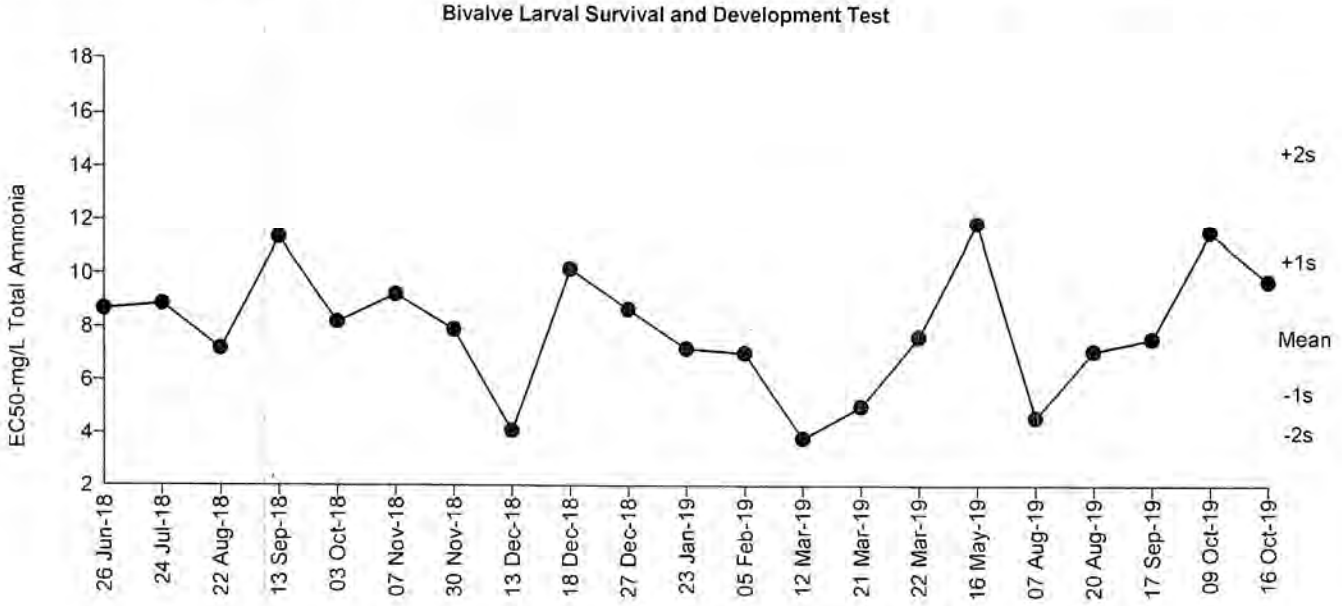
3.3 *Mytilus galloprovincialis* Reference Toxicant Test Results

CETIS QC Plot

Report Date: 26 Nov-19 14:51 (1 of 1)

Bivalve Larval Survival and Development Test — **All Matching Labs**

Test Type:	Development-Survival	**Organism:**	Mytilus galloprovincialis (Bay Mussel)	**Material:**	Total Ammonia
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Combined Proportion Normal	**Source:**	Reference Toxicant-REF



Mean:	7.523	**Count:**	20	**-1s Warning Limit:**	5.431	**-2s Action Limit:**	3.919
Sigma:	n/a	**CV:**	33.50%	**+1s Warning Limit:**	10.43	**+2s Action Limit:**	14.45

Quality Control Data

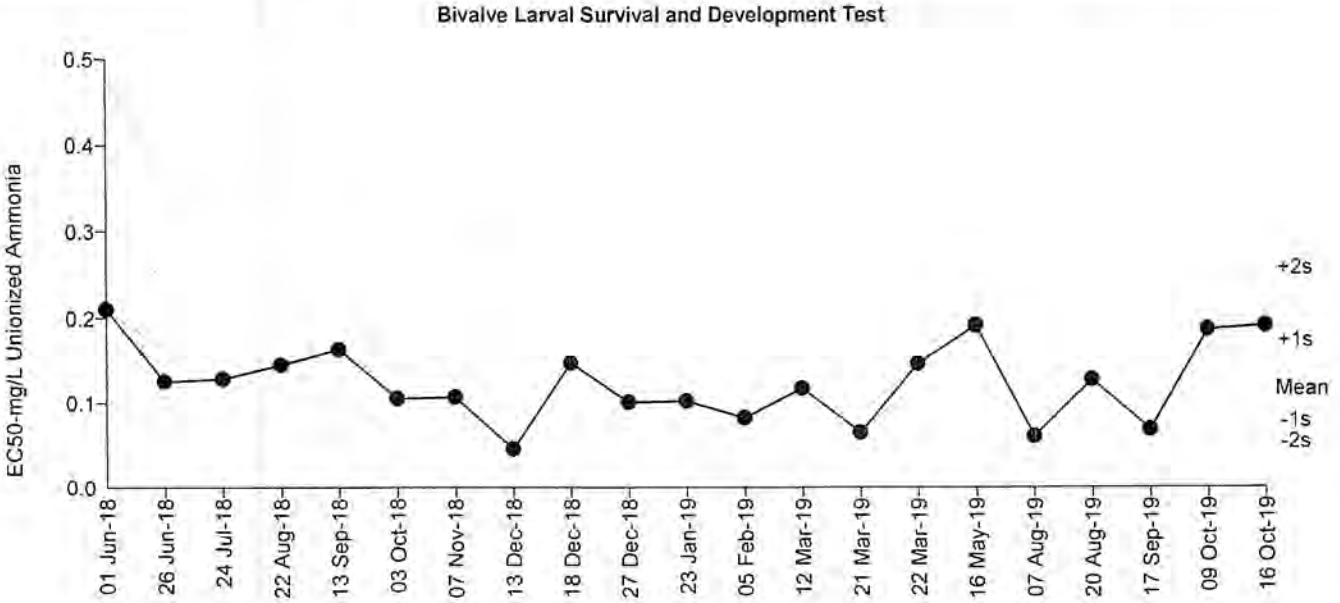
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2018	Jun	26	19:10	8.678	1.155	0.4377			17-9894-2551	06-4820-9232	EcoAnalysts
2		Jul	24	14:29	8.87	1.346	0.5047			03-7590-2196	04-9004-0822	EcoAnalysts
3		Aug	22	17:20	7.194	-0.3289	-0.137			16-3013-6338	06-6775-4461	EcoAnalysts
4		Sep	13	14:35	11.31	3.787	1.25	(+)		01-6059-1010	10-3453-2996	EcoAnalysts
5		Oct	3	16:45	8.195	0.6718	0.2622			12-1625-9203	05-0256-3584	EcoAnalysts
6		Nov	7	16:30	9.232	1.708	0.6273			18-8445-1794	01-7154-3646	EcoAnalysts
7			30	16:15	7.912	0.3883	0.1543			08-9628-8669	10-9562-1026	EcoAnalysts
8		Dec	13	17:15	4.088	-3.436	-1.87	(-)		02-5107-8586	13-2935-1649	EcoAnalysts
9			18	13:45	10.17	2.651	0.9255			05-9743-4123	08-2986-6785	EcoAnalysts
10			27	17:55	8.682	1.159	0.4393			20-5834-3973	06-3380-4265	EcoAnalysts
11	2019	Jan	23	16:50	7.2	-0.3233	-0.1347			01-3143-2267	12-8726-6037	EcoAnalysts
12		Feb	5	16:40	7.033	-0.4901	-0.2065			07-7484-3747	07-2651-6673	EcoAnalysts
13		Mar	12	16:42	3.807	-3.716	-2.088	(-)	(-)	16-7636-2372	18-4260-6750	EcoAnalysts
14			21	16:35	5.014	-2.509	-1.244	(-)		00-6726-4861	04-4433-8982	EcoAnalysts
15			22	15:22	7.643	0.1197	0.0484			05-2194-2268	19-0448-6516	EcoAnalysts
16		May	16	16:33	11.87	4.342	1.397	(+)		09-3888-0201	09-7288-8962	EcoAnalysts
17		Aug	7	17:50	4.599	-2.924	-1.509	(-)		03-5717-3338	03-1729-1939	EcoAnalysts
18			20	14:30	7.113	-0.4106	-0.1721			03-9071-1098	10-9698-8580	EcoAnalysts
19		Sep	17	16:45	7.58	0.05662	0.02299			04-9239-0885	17-1518-8274	EcoAnalysts
20		Oct	9	16:32	11.54	4.014	1.311	(+)		15-3196-0400	00-5854-2935	EcoAnalysts
21			16	16:10	9.739	2.216	0.7914			00-6600-5589	12-8699-0346	EcoAnalysts

CETIS QC Plot

Report Date: 26 Nov-19 14:51 (1 of 1)

Bivalve Larval Survival and Development Test — **All Matching Labs**

Test Type:	Development-Survival	**Organism:**	Mytilus galloprovincialis (Bay Mussel)	**Material:**	Unionized Ammonia
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Combined Proportion Normal	**Source:**	Reference Toxicant-REF



Mean:	0.1129	**Count:**	20	**-1s Warning Limit:**	0.075	**-2s Action Limit:**	0.04983
Sigma:	n/a	**CV:**	42.60%	**+1s Warning Limit:**	0.1699	**+2s Action Limit:**	0.2557

Quality Control Data

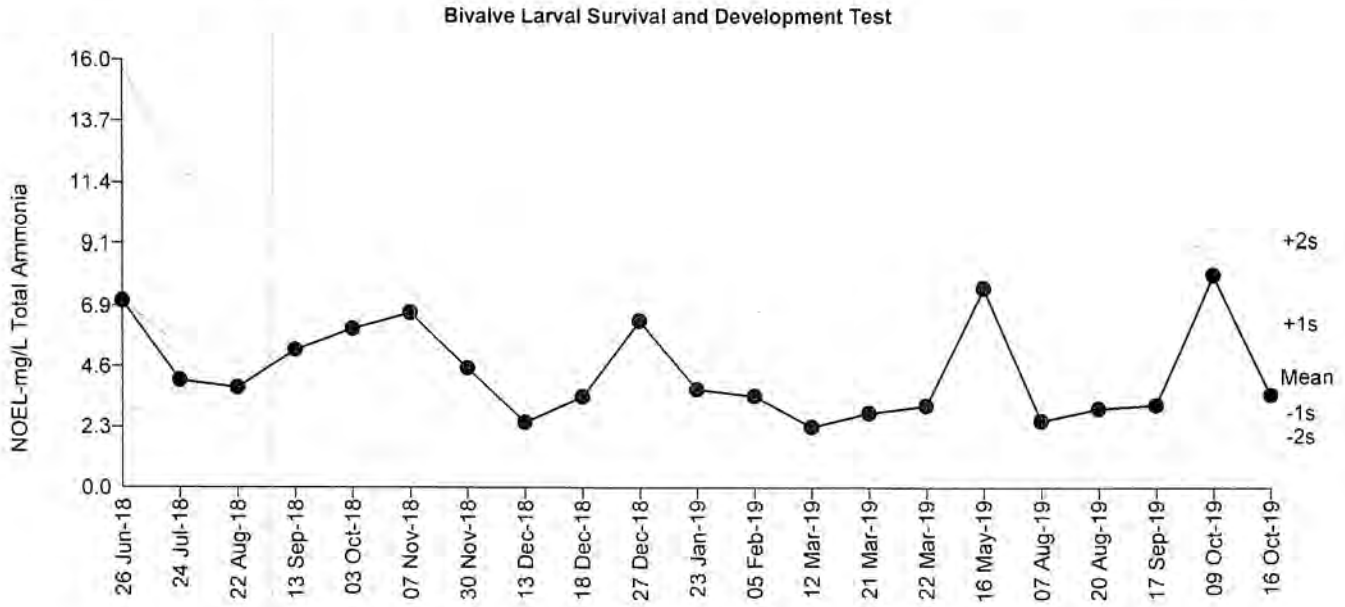
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2018	Jun	1	18:20	0.2103	0.09736	1.521	(+)		05-1801-7066	04-7994-1641	EcoAnalysts
2			26	19:10	0.1255	0.01255	0.2578			06-7139-6937	06-3245-7683	EcoAnalysts
3		Jul	24	14:29	0.1286	0.01566	0.3178			16-0134-7952	19-7798-4523	EcoAnalysts
4		Aug	22	17:20	0.1449	0.03194	0.6092			07-1087-5324	12-5339-9193	EcoAnalysts
5		Sep	13	14:35	0.1632	0.05032	0.9015			13-4913-4836	01-9378-4348	EcoAnalysts
6		Oct	3	16:45	0.1056	-0.007328	-0.1641			01-0403-3220	16-2351-0172	EcoAnalysts
7		Nov	7	16:30	0.1072	-0.00573	-0.1274			19-6967-7694	10-9733-6078	EcoAnalysts
8		Dec	13	17:15	0.04585	-0.06708	-2.205	(-)	(-)	08-7264-5404	13-5759-9152	EcoAnalysts
9			18	13:45	0.1473	0.0344	0.6504			21-4303-2112	16-4607-0947	EcoAnalysts
10			27	17:55	0.1012	-0.01176	-0.2691			02-0452-1897	14-1502-0285	EcoAnalysts
11	2019	Jan	23	16:50	0.1023	-0.01068	-0.2429			03-6716-4793	04-6739-1093	EcoAnalysts
12		Feb	5	16:40	0.08252	-0.03041	-0.7673			14-3580-4225	15-0794-6822	EcoAnalysts
13		Mar	12	16:42	0.1173	0.004414	0.0938			13-3144-3638	15-4861-0438	EcoAnalysts
14			21	16:35	0.06516	-0.04777	-1.345	(-)		06-4106-6442	03-4179-5928	EcoAnalysts
15			22	15:22	0.1465	0.0336	0.6372			01-0752-6416	02-4664-9643	EcoAnalysts
16		May	16	16:33	0.1919	0.07896	1.297	(+)		07-0061-1769	04-6166-1891	EcoAnalysts
17		Aug	7	17:50	0.06086	-0.05207	-1.512	(-)		15-8779-1180	02-3303-2773	EcoAnalysts
18			20	14:30	0.1278	0.0149	0.3031			06-4832-5208	10-5428-1743	EcoAnalysts
19		Sep	17	16:45	0.06876	-0.04417	-1.214	(-)		09-4282-9709	18-3806-6707	EcoAnalysts
20		Oct	9	16:32	0.1871	0.07413	1.235	(+)		15-1529-2166	12-8322-4318	EcoAnalysts
21			16	16:10	0.1915	0.07855	1.292	(+)		11-6436-0310	03-5301-7660	EcoAnalysts

CETIS QC Plot

Report Date: 26 Nov-19 14:51 (1 of 1)

Bivalve Larval Survival and Development Test — **All Matching Labs**

Test Type:	Development-Survival	**Organism:**	Mytilus galloprovincialis (Bay Mussel)	**Material:**	Total Ammonia
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Combined Proportion Normal	**Source:**	Reference Toxicant-REF



Mean:	4.121	**Count:**	20	**-1s Warning Limit:**	2.763	**-2s Action Limit:**	1.852
Sigma:	n/a	**CV:**	41.70%	**+1s Warning Limit:**	6.149	**+2s Action Limit:**	9.173

Quality Control Data

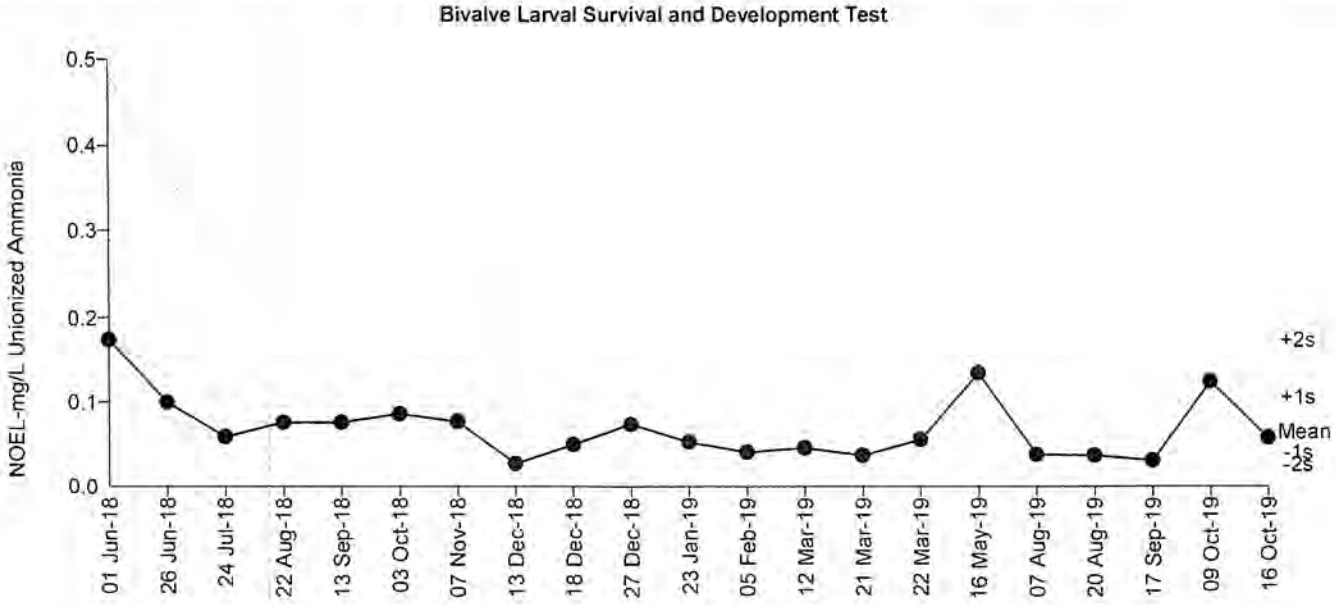
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2018	Jun	26	19:10	7.04	2.919	1.339	(+)		17-9894-2551	00-8683-5940	EcoAnalysts
2		Jul	24	14:29	4.05	-0.07061	-0.04321			03-7590-2196	16-4897-6151	EcoAnalysts
3		Aug	22	17:20	3.77	-0.3506	-0.2223			16-3013-6338	05-9641-9153	EcoAnalysts
4		Sep	13	14:35	5.2	1.079	0.5816			01-6059-1010	13-0371-9861	EcoAnalysts
5		Oct	3	16:45	6.01	1.889	0.9436			12-1625-9203	13-5762-5882	EcoAnalysts
6		Nov	7	16:30	6.61	2.489	1.181	(+)		18-8445-1794	02-9565-7369	EcoAnalysts
7			30	16:15	4.51	0.3894	0.2257			08-9628-8669	09-3129-9816	EcoAnalysts
8		Dec	13	17:15	2.46	-1.661	-1.29	(-)		02-5107-8586	00-4152-9471	EcoAnalysts
9			18	13:45	3.43	-0.6906	-0.4586			05-9743-4123	01-2584-9444	EcoAnalysts
10			27	17:55	6.32	2.199	1.069	(+)		20-5834-3973	18-8197-1468	EcoAnalysts
11	2019	Jan	23	16:50	3.72	-0.4006	-0.2557			01-3143-2267	14-2023-7810	EcoAnalysts
12		Feb	5	16:40	3.47	-0.6506	-0.4296			07-7484-3747	20-0253-6343	EcoAnalysts
13		Mar	12	16:42	2.3	-1.821	-1.458	(-)		16-7636-2372	04-2647-6439	EcoAnalysts
14			21	16:35	2.82	-1.301	-0.9482			00-6726-4861	04-9186-0751	EcoAnalysts
15			22	15:22	3.1	-1.021	-0.7115			05-2194-2268	00-9861-7903	EcoAnalysts
16		May	16	16:33	7.55	3.429	1.514	(+)		09-3888-0201	11-6771-6470	EcoAnalysts
17		Aug	7	17:50	2.53	-1.591	-1.219	(-)		03-5717-3338	11-0747-7205	EcoAnalysts
18			20	14:30	3	-1.121	-0.7935			03-9071-1098	12-1928-0933	EcoAnalysts
19		Sep	17	16:45	3.13	-0.9906	-0.6874			04-9239-0885	15-2734-6977	EcoAnalysts
20		Oct	9	16:32	8.05	3.929	1.674	(+)		15-3196-0400	07-4286-2299	EcoAnalysts
21			16	16:10	3.52	-0.6006	-0.3938			00-6600-5589	20-3352-7258	EcoAnalysts

CETIS QC Plot

Report Date: 26 Nov-19 14:51 (1 of 1)

Bivalve Larval Survival and Development Test — All Matching Labs

Test Type:	Development-Survival	**Organism:**	Mytilus galloprovincialis (Bay Mussel)	**Material:**	Unionized Ammonia
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Combined Proportion Normal	**Source:**	Reference Toxicant-REF



Mean:	0.06148	**Count:**	20	**-1s Warning Limit:**	0.03692	**-2s Action Limit:**	0.02216
Sigma:	n/a	**CV:**	54.50%	**+1s Warning Limit:**	0.1024	**+2s Action Limit:**	0.1706

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	Laboratory
1	2018	Jun	1	18:20	0.174	0.1125	2.039	(+)	(+)	05-1801-7066	00-0472-0630	EcoAnalysts
2			26	19:10	0.1	0.03852	0.9534			06-7139-6937	00-3402-6456	EcoAnalysts
3		Jul	24	14:29	0.059	-0.002483	-0.08079			16-0134-7952	12-3548-9987	EcoAnalysts
4		Aug	22	17:20	0.076	0.01452	0.4155			07-1087-5324	19-8244-5254	EcoAnalysts
5		Sep	13	14:35	0.076	0.01452	0.4155			13-4913-4836	13-9376-6554	EcoAnalysts
6		Oct	3	16:45	0.086	0.02452	0.6578			01-0403-3220	16-6521-7341	EcoAnalysts
7		Nov	7	16:30	0.077	0.01552	0.4411			19-6967-7694	14-0187-1629	EcoAnalysts
8		Dec	13	17:15	0.027	-0.03448	-1.613	(-)		08-7264-5404	11-0232-4157	EcoAnalysts
9			18	13:45	0.05	-0.01148	-0.4052			21-4303-2112	19-7204-1962	EcoAnalysts
10			27	17:55	0.074	0.01252	0.3632			02-0452-1897	00-4497-0178	EcoAnalysts
11	2019	Jan	23	16:50	0.053	-0.008483	-0.291			03-6716-4793	03-7446-6496	EcoAnalysts
12		Feb	5	16:40	0.041	-0.02048	-0.7942			14-3580-4225	08-5494-8584	EcoAnalysts
13		Mar	12	16:42	0.046	-0.01548	-0.5686			13-3144-3638	19-4910-1502	EcoAnalysts
14			21	16:35	0.037	-0.02448	-0.9954			06-4106-6442	15-4223-6168	EcoAnalysts
15			22	15:22	0.056	-0.005483	-0.1831			01-0752-6416	20-3069-3159	EcoAnalysts
16		May	16	16:33	0.135	0.07352	1.542	(+)		07-0061-1769	00-8726-9146	EcoAnalysts
17		Aug	7	17:50	0.038	-0.02348	-0.9431			15-8779-1180	08-2296-8329	EcoAnalysts
18			20	14:30	0.037	-0.02448	-0.9954			06-4832-5208	16-0215-7949	EcoAnalysts
19		Sep	17	16:45	0.031	-0.03048	-1.342	(-)		09-4282-9709	19-4589-1387	EcoAnalysts
20		Oct	9	16:32	0.125	0.06352	1.391	(+)		15-1529-2166	11-0317-3036	EcoAnalysts
21			16	16:10	0.058	-0.003483	-0.1143			11-6436-0310	09-3064-2620	EcoAnalysts

Analyst: MK QA: JYB

Bivalve Larval Survival and Development Test — EcoAnalysts

Batch ID:	15-2246-0909	**Test Type:**	Development-Survival	**Analyst:**			
Start Date:	16 Oct-19 16:10	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater		
Ending Date:	18 Oct-19 15:03	**Species:**	Mytilus galloprovincialis	**Brine:**	Not Applicable		
Test Length:	47h	**Taxon:**		**Source:**	Taylor Shellfish	**Age:**	
Sample ID:	01-5953-6186	**Code:**	982543A	**Project:**	Reference Toxicant		
Sample Date:	12 Jun-19	**Material:**	Total Ammonia	**Source:**	Reference Toxicant		
Receipt Date:	12 Jun-19	**CAS (PC):**		**Station:**	P190612.45		
Sample Age:	126d 16h	**Client:**	Internal Lab				

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
20-3352-7258	Combined Proportion Norma	Dunnett Multiple Comparison Test	✓	3.52	7.5	5.138		8.38%	1
03-2874-8147	Proportion Normal	Dunnett Multiple Comparison Test	✓	3.52	7.5	5.138		3.22%	1
14-8206-5639	Proportion Survived	Dunnett Multiple Comparison Test		21.6	>21.6	n/a		10.7%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	mg/L	95% LCL	95% UCL	TU	S
12-8699-0346	Combined Proportion Norma	Linear Interpolation (ICPIN)		EC5	4.387	n/a	6.923		1
				EC10	6.585	1.747	8.679		
				EC15	7.675	5.965	8.018		
				EC20	7.943	7.453	8.276		
				EC25	8.22	7.749	8.541		
				EC40	9.104	8.685	9.385		
				EC50	9.739	9.368	9.987		

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
03-2874-8147	Proportion Normal	Control Resp	0.9757	0.9	>>	Yes	Passes Criteria
14-8206-5639	Proportion Survived	Control Resp	0.9153	0.5	>>	Yes	Passes Criteria
20-3352-7258	Combined Proportion Norma	PMSD	0.0838	<<	0.25	No	Passes Criteria

Bivalve Larval Survival and Development Test
EcoAnalysts

Combined Proportion Normal Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	3	0.8931	0.7687	1.0000	0.8417	0.9417	0.0289	0.0501	5.61%	0.00%
0.522		3	0.8639	0.8050	0.9227	0.8375	0.8833	0.0137	0.0237	2.74%	3.27%
1.49		3	0.8667	0.7407	0.9926	0.8333	0.9250	0.0293	0.0507	5.85%	2.95%
3.52		3	0.8833	0.7885	0.9782	0.8417	0.9167	0.0221	0.0382	4.32%	1.09%
7.5		3	0.7889	0.7400	0.8378	0.7667	0.8042	0.0114	0.0197	2.50%	11.66%
12.1		3	0.1556	0.1436	0.1675	0.1500	0.1583	0.0028	0.0048	3.09%	82.58%
21.6		3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Proportion Normal Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	3	0.9757	0.9621	0.9892	0.9712	0.9817	0.0032	0.0055	0.56%	0.00%
0.522		3	0.9703	0.9451	0.9955	0.9617	0.9815	0.0059	0.0102	1.05%	0.55%
1.49		3	0.9745	0.9289	1.0000	0.9615	0.9955	0.0106	0.0184	1.88%	0.12%
3.52		3	0.9684	0.9370	0.9997	0.9554	0.9806	0.0073	0.0126	1.30%	0.75%
7.5		3	0.8780	0.8143	0.9417	0.8558	0.9061	0.0148	0.0257	2.92%	10.01%
12.1		3	0.1687	0.1333	0.2041	0.1552	0.1836	0.0082	0.0143	8.44%	82.71%
21.6		3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Proportion Survived Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	3	0.9153	0.7909	1.0000	0.8667	0.9667	0.0289	0.0501	5.47%	0.00%
0.522		3	0.8903	0.8484	0.9321	0.8708	0.9000	0.0097	0.0168	1.89%	2.73%
1.49		3	0.8889	0.8021	0.9757	0.8667	0.9292	0.0202	0.0349	3.93%	2.88%
3.52		3	0.9125	0.7949	1.0000	0.8583	0.9458	0.0273	0.0473	5.19%	0.30%
7.5		3	0.8986	0.8670	0.9302	0.8875	0.9125	0.0073	0.0127	1.42%	1.82%
12.1		3	0.9250	0.7881	1.0000	0.8625	0.9667	0.0318	0.0551	5.96%	-1.06%
21.6		3	0.8694	0.7137	1.0000	0.8042	0.9292	0.0362	0.0627	7.21%	5.01%

Bivalve Larval Survival and Development Test — EcoAnalysts

Combined Proportion Normal Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	D	0.8958	0.8417	0.9417
0.522		0.8833	0.8375	0.8708
1.49		0.8333	0.8417	0.9250
3.52		0.9167	0.8917	0.8417
7.5		0.7958	0.8042	0.7667
12.1		0.1500	0.1583	0.1583
21.6		0.0000	0.0000	0.0000

Proportion Normal Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	D	0.9817	0.9712	0.9741
0.522		0.9815	0.9617	0.9676
1.49		0.9615	0.9665	0.9955
3.52		0.9692	0.9554	0.9806
7.5		0.8721	0.9061	0.8558
12.1		0.1552	0.1836	0.1674
21.6		0.0000	0.0000	0.0000

Proportion Survived Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	D	0.9125	0.8667	0.9667
0.522		0.9000	0.8708	0.9000
1.49		0.8667	0.8708	0.9292
3.52		0.9458	0.9333	0.8583
7.5		0.9125	0.8875	0.8958
12.1		0.9667	0.8625	0.9458
21.6		0.9292	0.8750	0.8042

Bivalve Larval Survival and Development Test EcoAnalysts

Combined Proportion Normal Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	D	215/240	202/240	226/240
0.522		212/240	201/240	209/240
1.49		200/240	202/240	222/240
3.52		220/240	214/240	202/240
7.5		191/240	193/240	184/240
12.1		36/240	38/240	38/240
21.6		0/240	0/240	0/240

Proportion Normal Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	D	215/219	202/208	226/232
0.522		212/216	201/209	209/216
1.49		200/208	202/209	222/223
3.52		220/227	214/224	202/206
7.5		191/219	193/213	184/215
12.1		36/232	38/207	38/227
21.6		0/223	0/210	0/193

Proportion Survived Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	D	219/240	208/240	232/240
0.522		216/240	209/240	216/240
1.49		208/240	209/240	223/240
3.52		227/240	224/240	206/240
7.5		219/240	213/240	215/240
12.1		232/240	207/240	227/240
21.6		223/240	210/240	193/240

CETIS Test Data Worksheet

Report Date: 26 Nov-19 14:41 (p 1 of 1)
Test Code/ID: 3EF2A55 / 00-6600-5589

Bivalve Larval Survival and Development Test — EcoAnalysts

Start Date:	16 Oct-19 16:10	Species:	Mytilus galloprovincialis	Sample Code:	982543A
End Date:	18 Oct-19 15:03	Protocol:	EPA/600/R-95/136 (1995)	Sample Source:	Reference Toxicant
Sample Date:	12 Jun-19	Material:	Total Ammonia	Sample Station:	P190612.45

Conc-mg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	D	1	17	240	219	219	215	
0	D	2	5	240	208	208	202	
0	D	3	3	240	232	232	226	
0.522		1	19	240	216	216	212	
0.522		2	6	240	209	209	201	
0.522		3	18	240	216	216	209	
1.49		1	15	240	208	208	200	
1.49		2	10	240	209	209	202	
1.49		3	4	240	223	223	222	
3.52		1	1	240	227	227	220	
3.52		2	16	240	224	224	214	
3.52		3	9	240	206	206	202	
7.5		1	7	240	219	219	191	
7.5		2	8	240	213	213	193	
7.5		3	13	240	215	215	184	
12.1		1	20	240	232	232	36	
12.1		2	12	240	207	207	38	
12.1		3	11	240	227	227	38	
21.6		1	14	240	223	223	0	
21.6		2	2	240	210	210	0	
21.6		3	21	240	193	193	0	

0 Ad on NIA sheet

CETIS Summary Report

Bivalve Larval Survival and Development Test — EcoAnalysts

Batch ID:	15-2246-0909	**Test Type:**	Development-Survival	**Analyst:**			
Start Date:	16 Oct-19 16:10	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater		
Ending Date:	18 Oct-19 15:03	**Species:**	Mytilus galloprovincialis	**Brine:**	Not Applicable		
Test Length:	47h	**Taxon:**		**Source:**	Taylor Shellfish	**Age:**	
Sample ID:	01-8862-1173	**Code:**	B3E2175	**Project:**	Reference Toxicant		
Sample Date:	12 Jun-19	**Material:**	Unionized Ammonia	**Source:**	Reference Toxicant		
Receipt Date:	12 Jun-19	**CAS (PC):**		**Station:**	P190612.45		
Sample Age:	126d 16h	**Client:**	Internal Lab				

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
09-3064-2620	Combined Proportion Norma	Dunnett Multiple Comparison Test	✓	0.058	0.124	0.08481		8.38%	1
20-6977-1567	Proportion Normal	Dunnett Multiple Comparison Test	✓	0.058	0.124	0.08481		3.22%	1
00-4661-6866	Proportion Survived	Dunnett Multiple Comparison Test		0.358	>0.358	n/a		10.7%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	mg/L	95% LCL	95% UCL	TU	S
03-5301-7660	Combined Proportion Norma	Linear Interpolation (ICPIN)		EC5	0.07594	n/a	0.1181		1
				EC10	0.1118	0.0286	0.1441		
				EC15	0.1297	0.09545	0.1417		
				EC20	0.1383	0.1226	0.1496		
				EC25	0.147	0.1323	0.1575		
				EC40	0.1735	0.1617	0.1819		
				EC50	0.1915	0.1814	0.1988		

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
20-6977-1567	Proportion Normal	Control Resp	0.9757	0.9	>>	Yes	Passes Criteria
00-4661-6866	Proportion Survived	Control Resp	0.9153	0.5	>>	Yes	Passes Criteria
09-3064-2620	Combined Proportion Norma	PMSD	0.0838	<<	0.25	No	Passes Criteria

Bivalve Larval Survival and Development Test EcoAnalysts

Combined Proportion Normal Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	3	0.8931	0.7687	1.0000	0.8417	0.9417	0.0289	0.0501	5.61%	0.00%
0.009		3	0.8639	0.8050	0.9227	0.8375	0.8833	0.0137	0.0237	2.74%	3.27%
0.025		3	0.8667	0.7407	0.9926	0.8333	0.9250	0.0293	0.0507	5.85%	2.95%
0.058		3	0.8833	0.7885	0.9782	0.8417	0.9167	0.0221	0.0382	4.32%	1.09%
0.124		3	0.7889	0.7400	0.8378	0.7667	0.8042	0.0114	0.0197	2.50%	11.66%
0.252		3	0.1556	0.1436	0.1675	0.1500	0.1583	0.0028	0.0048	3.09%	82.58%
0.358		3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Proportion Normal Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	3	0.9757	0.9621	0.9892	0.9712	0.9817	0.0032	0.0055	0.56%	0.00%
0.009		3	0.9703	0.9451	0.9955	0.9617	0.9815	0.0059	0.0102	1.05%	0.55%
0.025		3	0.9745	0.9289	1.0000	0.9615	0.9955	0.0106	0.0184	1.88%	0.12%
0.058		3	0.9684	0.9370	0.9997	0.9554	0.9806	0.0073	0.0126	1.30%	0.75%
0.124		3	0.8780	0.8143	0.9417	0.8558	0.9061	0.0148	0.0257	2.92%	10.01%
0.252		3	0.1687	0.1333	0.2041	0.1552	0.1836	0.0082	0.0143	8.44%	82.71%
0.358		3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Proportion Survived Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	3	0.9153	0.7909	1.0000	0.8667	0.9667	0.0289	0.0501	5.47%	0.00%
0.009		3	0.8903	0.8484	0.9321	0.8708	0.9000	0.0097	0.0168	1.89%	2.73%
0.025		3	0.8889	0.8021	0.9757	0.8667	0.9292	0.0202	0.0349	3.93%	2.88%
0.058		3	0.9125	0.7949	1.0000	0.8583	0.9458	0.0273	0.0473	5.19%	0.30%
0.124		3	0.8986	0.8670	0.9302	0.8875	0.9125	0.0073	0.0127	1.42%	1.82%
0.252		3	0.9250	0.7881	1.0000	0.8625	0.9667	0.0318	0.0551	5.96%	-1.06%
0.358		3	0.8694	0.7137	1.0000	0.8042	0.9292	0.0362	0.0627	7.21%	5.01%

Bivalve Larval Survival and Development Test
EcoAnalysts

Combined Proportion Normal Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	D	0.8958	0.8417	0.9417
0.009		0.8833	0.8375	0.8708
0.025		0.8333	0.8417	0.9250
0.058		0.9167	0.8917	0.8417
0.124		0.7958	0.8042	0.7667
0.252		0.1500	0.1583	0.1583
0.358		0.0000	0.0000	0.0000

Proportion Normal Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	D	0.9817	0.9712	0.9741
0.009		0.9815	0.9617	0.9676
0.025		0.9615	0.9665	0.9955
0.058		0.9692	0.9554	0.9806
0.124		0.8721	0.9061	0.8558
0.252		0.1552	0.1836	0.1674
0.358		0.0000	0.0000	0.0000

Proportion Survived Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	D	0.9125	0.8667	0.9667
0.009		0.9000	0.8708	0.9000
0.025		0.8667	0.8708	0.9292
0.058		0.9458	0.9333	0.8583
0.124		0.9125	0.8875	0.8958
0.252		0.9667	0.8625	0.9458
0.358		0.9292	0.8750	0.8042

Bivalve Larval Survival and Development Test — EcoAnalysts

Combined Proportion Normal Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	D	215/240	202/240	226/240
0.009		212/240	201/240	209/240
0.025		200/240	202/240	222/240
0.058		220/240	214/240	202/240
0.124		191/240	193/240	184/240
0.252		36/240	38/240	38/240
0.358		0/240	0/240	0/240

Proportion Normal Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	D	215/219	202/208	226/232
0.009		212/216	201/209	209/216
0.025		200/208	202/209	222/223
0.058		220/227	214/224	202/206
0.124		191/219	193/213	184/215
0.252		36/232	38/207	38/227
0.358		0/223	0/210	0/193

Proportion Survived Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3
0	D	219/240	208/240	232/240
0.009		216/240	209/240	216/240
0.025		208/240	209/240	223/240
0.058		227/240	224/240	206/240
0.124		219/240	213/240	215/240
0.252		232/240	207/240	227/240
0.358		223/240	210/240	193/240

CETIS Test Data Worksheet

Bivalve Larval Survival and Development Test — EcoAnalysts

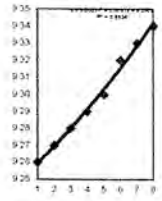
Start Date:	16 Oct-19 16:10	**Species:**	Mytilus galloprovincialis
End Date:	18 Oct-19 15:03	**Protocol:**	EPA/600/R-95/136 (1995)
Sample Date:	12 Jun-19	**Material:**	Unionized Ammonia
Sample Code:	B3E2175		
Sample Source:	Reference Toxicant		
Sample Station:	P190612.45		

Conc-mg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	D	1	19	240	219	219	215	
0	D	2	18	240	208	208	202	
0	D	3	13	240	232	232	226	
0.009		1	4	240	216	216	212	
0.009		2	2	240	209	209	201	
0.009		3	14	240	216	216	209	
0.025		1	6	240	208	208	200	
0.025		2	15	240	209	209	202	
0.025		3	11	240	223	223	222	
0.058		1	10	240	227	227	220	
0.058		2	9	240	224	224	214	
0.058		3	21	240	206	206	202	
0.124		1	5	240	219	219	191	
0.124		2	20	240	213	213	193	
0.124		3	16	240	215	215	184	
0.252		1	8	240	232	232	36	
0.252		2	17	240	207	207	38	
0.252		3	7	240	227	227	38	
0.358		1	12	240	223	223	0	
0.358		2	1	240	210	210	0	
0.358		3	3	240	193	193	0	

CLIENT:	--	Test Date:	16-Oct-19
PROJECT:	--	Test Type:	Mytilus sp
COMMENTS:			

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer: I-factor	
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
	9.34



	Sample	Mod	NH3T (mg/L)	salinity (ppt)	pH	temp (C)	temp (K)	i-factor	Mod	NH3U (mg/L)
	Target / Sample Name		Actual	22.9	8.0	24.1	297.26	9.3053		#VALUE!
	Example 3.5		2.000	10.0	7.5	5.0	278.16	9.2750		0.008
1	0		0	27	7.80	16.8	289.96	9.3160		0.000
2	0.75		0.522	28	7.80	17.0	290.16	9.3187		0.009
3	1.5		1.49	28	7.80	17.0	290.16	9.3187		0.025
4	3		3.52	28	7.80	17.0	290.16	9.3187		0.058
5	6		7.50	28	7.80	17.0	290.16	9.3187		0.124
6	12		12.10	28	7.90	17.0	290.16	9.3187		0.252
7	18		21.6	28.0	7.8	17.0	290.16	9.3187		0.358
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48 Hour Bivalve Development Reference Toxicant Test

Test ID: P190612.45	Replicates: 3	Study Director: J. Baum	Location: Bath 1
Dilution Water Batch: FSW 101819.02	Organism Batch: TS082719, 073119, 100419	Associated Test(s): —	Organism: Mytilus sp.
Chamber Size/Type: 30 ml shell vial	Exposure Volume: 10 ml		
Toxicant: Ammonium Chloride:	Lot #: 18H13567763	Date Prepared: 10/16/19	Initials: MK
Target Concentrations: **See spiking worksheet**		Quantity of Stock: Target: See spiking worksheet	Quantity of Diluent: Target: 200 mL
See spiking worksheet		Actual: See spiking worksheet	Actual: ↓

0 Hours Date: 10/16/19 WQ Time: 1400 MK STOCK Start Time: 1610 Initials: JB, JW

	Control	0.75	1.5	3	6	12	18
D.O. (%) (>3.3 mg/L)	7.6	7.8	7.8	7.9	7.8	7.9	7.9
Temperature (16 ± 1°C)	16.8	17.0	17.0	17.0	17.0	17.0	17.0
Salinity (~~20~~ 28 ± ~~2~~ ppt)	27	28	28	28	28	28	28
pH (7.8 ± 0.5)	7.8	7.8	7.8	7.8	7.8	7.9	7.8

Day 1 Temperature (16 ± 1°C): 16.3

Final Day Date: 10/18/19 WQ Time: 1110 MK STOCK End Time: 1503 Initials: BH

	Control	0.75	1.5	3	6	12	18
D.O. (%) (>3.3 mg/L)	7.0	7.7	7.9	8.0	8.0	8.1	8.1
Temperature (16 ± 1°C)	16.3	15.7	15.6	15.6	15.6	15.6	15.6
Salinity (~~20~~ 28 ± ~~2~~ ppt)	27	27	27	27	27	28	28
pH (7.8 ± 0.5)	7.9	8.0	8.0	8.0	8.0	8.0	8.0

Notes:

48 Hour Bivalve Development Reference Toxicant Test

Conc.	Rep	Number Normal	Number Abnormal	Date	Initials
Control	1	215	4	4/22/19	MK
	2	202	6		
	3	226	6		
0.75	1	212	4		
	2	201	8		
	3	209	7		
1.5	1	200	8		
	2	①~~207~~ 202	7		
	3	222	1		
3	1	220	7		
	2	214	10		
	3	202	4		
6	1	191	28		
	2	193	20		
	3	184	31		
12	1	36	196		
	2	38	169		
	3	38	189		
18	1	0	223		
	2	0	210		
	3	0	193		

Stocking Density

Rep		Count	Init.
1	255		MK
2	213		
3	253		
	Mean:	240.3	

QA Count Checks: #1 conc/rep 0 2 # normal 206 # abnormal 3	#2 conc/rep 6 2 # normal 186 # abnormal 22	#3 conc/rep 18 2 # normal 0 # abnormal 216	#4 conc/rep 1.5 3 # normal 217 # abnormal 1
Tech. Init. JB	Tech. Init. JB	Tech. Init. JB	Tech. Init. JB
Calc. $\frac{202}{208} = 0.97$ $\frac{206}{209} = 0.99$	$\frac{186}{208} = 0.89$ $\frac{193}{213} = 0.91$	$\frac{0}{216} = 0$ $\frac{0}{210} = 0$	$\frac{222}{223} = 0.996$ $\frac{217}{218} = 0.995$

QA Check Acceptability: ☑ <5% difference in means of QA & orig. counts

① IE. MK 4/22.

Ammonia Reference Toxicant
Spiking Worksheet

Reference Toxicant ID: P190612.45
Date Prepared: 10/16/19
Technician Initials: MC

Biv / Echino NH_3 RT

Assumptions in Model
Stock ammonia concentration is 9,000 mg/L = 9 mg/mL

Date: 10/14/2019
Measurement: 13766.66

Test Solutions			Volume of stock to reach desired concentration	
Measured Concentration	**Desired Concentration**	**Volume**		
mg/L	mg/L	mL	mL stock to increase	
			[redacted]	SALT WATER
0.522	**0.75**	200		**0.016**
1.49	**1.5**	200		**0.033**
3.52	**3**	200		**0.065**
7.50	**6**	200		**0.131**
12.1	**12**	200		**0.262**
21.6	**18**	200		**0.392**

APPENDIX B. CHAIN-OF-CUSTODY FORMS, LOGS, AND PRE-TEST DOCUMENTS

CHAIN OF CUSTODY

ECO ANALYSTS
LIFE IN WATER

EcoAnalysts, Inc.
4770 NE View Dr., Port Gamble, WA. 98364
Tel: (360) 297-6040

Destination: EcoAnalyst	Sample Originator (Organization): MFA	Report Results To: ~~Emily Hess~~ MFA	Phone: —
Destination Contact: Julia Baum	PERSON WHO COLLECTED SAMPLE: Meaghan Pollock & Amy DeVita-McBride	Contact Name: Emily Hess	Fax: —
Date: 9/27/2019	Address: 109 E 13th St. Vancouver, WA 98660	Lab Address: see previous	Email: ehess@mavfoster.com
Turn-Around-Time: Standard.			
Project Name: Seaport In-water RI 1044.02.00	Phone: (360) 433-0249	Analyses: Biocassay	Invoicing To: MFA
Contract/PO:	Fax: —		Comments or Special Instructions:
	E-mail: ehess@mavfoster.com		

No.	Sample ID	Matrix	Volume & Type of Container	Date & Time	Biocassay	Preservation	Sample Temp Upon Receipt	LAB ID
1	SE-20-0-0.33	Sed	250 poly bag	9/25, 18:15	X	N/A	4.4	P190928.05
2	SE-24-0-0.33	Sed		9/27; 13:13	X	N/A	4.4	P190928.06
3	SE-31-0-0.33	Sed		9/27; 1210	X	N/A	4.8	P190928.08
4	SE-18-0-0.33	Sed		9/27; 11:54	X	N/A	4.8	P190928.04
5	SE-15-0-0.33	Sed		9/27; 1124	X	N/A	6.0	P190928.01
6	~~SE-19-0-0.33~~			9/27; 0830				
7	SE-17-0-0.33	Sed		9/27; 9:47	X	N/A	5.2	P190928.03
8	SE-10-0-0.33	Sed		9/27; 0900	X	N/A	5.2	P190928.02
9	SE-26-0-0.33	Sed	250 poly bag	9/27; 1725	X	N/A	6.0	P190928.07
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

Relinquished by:	Received by:	Relinquished by:	Received by:
Print Name: Meaghan Pollock	Print Name: ERIC BARKER	Print Name: ERIC BARKER	Print Name: Brian Hester
Signature: Meaghan Pollock	Signature:	Signature:	Signature:
Affiliation: MFA	Affiliation: RAS	Affiliation: RAS	Affiliation: EcoAnalysts
Date/Time: 9/27/19 1745	Date/Time: 9/27/19 1745	Date/Time: 9/28/19 10:16	Date/Time: 9.28.19 1016

Matrix Codes

FW = Fresh Water
SB = Salt & Brackish Water
SS = Soil & Sediment

SAMPLE RECEIPT LOG FOR SEDIMENTS IN COOLERS

Client/Project:	MFA- Grays Harbor Seaport
Date/Time Received:	9.28.19 1016
Delivery Method:	FedEx / UPS / Hand Delivered / ~~Other~~ Picked up from Eric Parker / RSS
Airbill #:	NA
Received By:	Brian Hester

*Notify project manager or study director if temperatures exceed 6°C. Client must be notified ASAP.

Cooler #	Client ID	Lab ID	Sample Type (Sediment, Sitewater, Soil, Other)	#/Type & Volume of Container	Custody Seal Intact? Intact / Broken / Not Present	Condition of Container	Condition of Wet or Blue Ice: Frozen (Ice Present) / Ice-Water Mix / Water (Thawed)	Corrected Temperature (°C) Instrument #: T15
1	SE-31	P190928.08	Sed	1 Poly Bag ~6L	Not Present	Good	Ice/water	4.8
1	SE-18	" ".04	↓	↓	↓	↓	Ice/water	4.8
2	SE-20	.05	↓	↓	↓	↓	↓	4.4
2	SE-24	.06	↓	↓	↓	↓	↓	4.4
3	SE-17	.03	↓	↓	↓	↓	↓	5.2
3	SE-16	.02	↓	↓	↓	↓	↓	5.2
4	SE-15	.01	↓	↓	↓	↓	↓	6.0
4	SE-26	.07	↓	↓	↓	↓	↓	6.0

Ammonia and Sulfide Analysis Record

Client/Project: MFA/GraysHarbor	Organism: NA	Test Duration (days): NA

PRETEST / INITIAL / FINAL / OTHER (circle one)
OVERLYING (OV) / POREWATER (PW) (circle one) / Comments: Bulk

DAY of TEST: —

Calibration Standards Temperature		
Date: 10/1/19	Temperature: 22.0	Sample temperature should be within ±1°C of standards temperature at time and date of analysis.

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Meter # / Temp (°C)	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. (mg/L)	Multi-plier	Calc-ulated Sulf. (mg/L)
SE-15	Bulk	10/1/19 MS	1.52	T7 21.4	10/1/19 DM/MS	N	7.4	14	10	~~0.01~~ ②	NA	0.001
SE-16	↓	↓	2.98	21.3	↓	↓	7.4	16	↓	~~0.27~~	↓	0.027
SE-17			2.44	21.5			7.2	20		~~0.02~~		0.002
SE-18			4.07	21.6			7.4	21.		~~0.375~~ ①		0.375
SE-20			1.40	22.0			7.6	15		~~0.02~~		0.002
SE-24			1.61	21.8			6.7	15		~~ND~~		ND
SE-26			1.56	21.2			6.8	17		~~ND~~		ND
SE-31	↓	↓	2.66	21.4	↓	↓	7.4	20	↓	~~ND~~	↓	ND

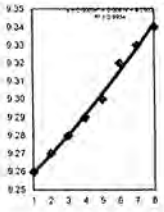
① WN-DM-10/1/19

② wrong conversion of units 10.1.19 BH

CLIENT:	MFA	Test Date:	01-Oct-19
PROJECT:	Seaport	Test Type:	
COMMENTS:	Bulk Ammonia		

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer: I-factor	
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
	9.34



	Sample	Mod	NH3T (mg/L)	salinity (ppt)	pH	temp (C)	temp (K)	i-factor	Mod	NH3U (mg/L)
	Target / Sample Name		Actual	22.9	8.0	24.1	297.26	9.3053		#VALUE!
	Example 3.5		2.000	10.0	7.5	5.0	278.16	9.2750		0.008
1	SE-15		1.52	14	7.40	15.1	288.26	9.2838		0.010
2	SE-16		2.980	16	7.40	15.2	288.36	9.2884		0.019
3	SE-17		2.440	20	7.20	15.1	288.26	9.2980		0.009
4	SE-18		4.070	21	7.40	15.1	288.26	9.3005		0.025
5	SE-20		1.400	15	7.60	15.2	288.36	9.2861		0.014
6	SE-24		1.610	15	6.70	15.1	288.26	9.2861		0.002
7	SE-26		1.560	17	6.8	15.2	288.36	9.2908		0.002
8	SE-31		2.660	20	7.4	15.3	288.46	9.2980		0.016
9										
10										
11										
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Bulk sulfides – hydrogen sulfide

		Input				Output	
	Sample ID	Total Dissolved Sulfide (µg/L as S)	Temper-ature (°C)	Salinity (‰)	pH	Undissociated H2S (µg/L as H2S)	Weight Fraction (H2S/Total S)
Bulk	SE-15	1	21.4	14	7.4	0.24	23.60%
	SE-16	27	21.3	16	7.4	6.28	23.26%
	SE-17	2	21.5	20	7.2	0.63	31.69%
	SE-18	375	21	21	7.4	84.87	22.63%
	SE-20	2	22	15	7.6	0.32	15.79%
	SE-24	ND	21.8	15	6.7	#VALUE!	#VALUE!
	SE-26	ND	21.2	17	6.8	#VALUE!	#VALUE!
	SE-31	ND	21.4	20	7.4	#VALUE!	#VALUE!

CHAIN OF CUSTODY

EcoAnalysts, Inc.
4770 NE View Dr., Port Orchard, WA. 98364
Tel: (360) 297-6040

ECO ALYSTS
LIFE IN WATER

Destination: EcoAnalyst	Sample Originator (Organization): Blanton Environmental	Report Results To: NA	Phone:
Destination Contact: J. Baum	PERSON WHO COLLECTED SAMPLE: Lauren Brandkamp / Marisa Seibert	Contact Name:	Fax:
Date: 10/11/19	Address:	Address:	Email:
Turn-Around-Time:			
Project Name: Harbor Whatcom Waterway MPA Groays Harbor	Phone:		
Contract/PO:	Fax:		
	E-mail		

No.	Sample ID	Matrix	Volume & Type of Container	Date & Time
1	CARR 80	Sed	N3140 sed. bag	10/11/19 1326
2	CARR 14	↓	↓	1209
3	CARR 47			1530
4	CARR 68			1424
5	CARR 32			1550
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

Analyses:

Invoicing To:

Comments or Special Instructions:

Preservation	Sample Temp Upon Receipt	LAB ID
None	①	P191011-01
↓	↓	.02
		.03
		.04
		.05

Relinquished by:	Received by:	Relinquished by:	Received by:
Print Name: Marisa Seibert	Print Name: Julia Baum	Print Name:	Print Name:
Signature:	Signature:	Signature:	Signature:
Affiliation: EcoAnalysts	Affiliation: EcoAnalysts	Affiliation:	Affiliation:
Date/Time: 10/11/19 1815	Date/Time: 10/11/19 1815	Date/Time:	Date/Time:

Matrix Codes
FW = Fresh Water
SB = Salt & Brackish Water
SS = Soil & Sediment

① NA, transported directly from field to lab in cooler

Version 1.0, Effective 7/1/14

PAGE ___ of ___

ECO ANALYSTS
LIFE IN WATER

STATION COORDINATE LOG
For Van Veen

Project: Carr Collection Recorder: L. Brandkamp

DATE	TIME	STATION	DROP NO.	LATITUDE	LONGITUDE	DEPTH (ft)	RECOVERY DEPTH (cm)	Tidal Height	COMMENTS
10/11/16	1209	CR21-West	2-12	47.33109	122.67967	26			14% fines
	1326	CR022	B-14	47.34329	122.69073	156			80% fines
	1424	CR02-South	15-17	47.33429	122.66425	56			68% fines, homogenize sample
	1530	CARR20	18-20	47.33295	122.66956	32			47% fines
	1550	CR20	21-31	47.33194	122.6706	7			32% fines

Wet-Sieve Procedure for Determining Percent Fines (<63 µm) of Sediment

DATE:	CLIENT:	PROJECT:
10/11/19	Multiple	Multiple

Procedure:

1. Collect 50 mL of sediment to be analyzed
2. Transfer sediment to a #230 (63 µm) testing sieve
3. Rinse sieve thoroughly with a stream of water until water flowing through the sieve is clear
4. Transfer all retained material to a 100mL graduated cylinder using a small funnel and DI squirt bottle
5. Allow sediment to settle. Record the volume of sediment retained below.

Site	SAMPLE ID:	INITIAL VOLUME OF SEDIMENT (mL)	VOLUME OF SEDIMENT RETAINED (mL)	(INIT VOL - VOL RETAINED) * 2	Estimated Percent Fines
CR21		50	41	9 x 2 =	18
CR21 west by 20ft	CARR14	50	43	7 x 2 =	14
CR022	CARR80	50	10	40 x 2 =	80
CR02 south by 20ft	CARR68	50	16	34 x 2 =	68
CARR20	CARR47	50	26.5	23.5 x 2 =	47
CR20	CARR32	50	34	16 x 2 =	32
				=	
				=	
				=	
				=	
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				=	

Wet-Sieve Procedure for Determining Percent Fines (<63 µm) of Sediment

DATE: 10/01/19	CLIENT: MFA	PROJECT: Seaport

Procedure:

1. Collect 50 mL of sediment to be analyzed
2. Transfer sediment to a #230 (63 µm) testing sieve
3. Rinse sieve thoroughly with a stream of water until water flowing through the sieve is clear
4. Transfer all retained material to a 100mL graduated cylinder using a small funnel and DI squirt bottle
5. Allow sediment to settle. Record the volume of sediment retained below.

SAMPLE ID:	INITIAL VOLUME OF SEDIMENT (mL)	VOLUME OF SEDIMENT RETAINED (mL)	(INIT VOL - VOL RETAINED) * 2		Estimated Percent Fines
SE-15	50	31 ③	19	=	38
16		23	27	=	54
17		11	39	=	78
18		19	31	=	62
20 ①		20	30	=	60
24		34	16	=	32
26		60 ②		=	0
31		31	19	=	38
				=	
				=	
				=	
				=	
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				=	
				=	
				=	
				=	

① worms present 10.1.19 BH/NR

② ~50 mL woody debris. 10mL sediment settled on top - NR 10/2

③ ~ ~~18~~ 19 mL woody debris, 12 mL sediment on top - NR 10/2

ORGANISM RECEIPT LOG

Date:	Time:	Batch No.
10/15/19	1230	NWA101519

Organism: Eohaustorius estuarius

Source / Supplier: Northwest Amphipod

No. Ordered:	No. Received:	Source Batch: Collection date, hatch date, etc.):
1785	1785 +10%	collected 10/13/19

Condition of Organisms:	Approximate Size or Age: (Days from hatch, life stage, size class, etc.):
good	3-5mm
Shipper: FedEx	**B of L (Tracking No.)** 8137 7831 5477
Condition of Container: good	**Received By:** NR

Container	D.O. (mg/L)	Temp. (°C)	Cond. or Sal. (Include Units)	pH (Units)	# Dead	% Dead*	Tech. (Initials)
* →	→	11.9	* →			→	NR

*if >10% contact lab manager

Notes: * received dry (moist sand, no standing water)

Northwest Amphipod, LLC
3101 SE Ferry Slip Rd #803, P.O. Box 542, Newport, OR 97365
Tel: 541-867-7225, nwamphipod@gmail.com

SUBJECT: Animal Collection Data Sheet (shipping)

SOLD TO:

EcoAnalysts
4770 NE View Dr.
P.O. Box 216
Port Gamble WA 98364

Brian Hester/Collin Ray/Hillary Eicholer, Lauren Brandkamp
360.297.6040
Julia Baum
360.509.4141

FedEx# 1817-5747-7

P.O. # PGL

DATE OF SHIPMENT: 10-14-19

ANIMAL HISTORY

Species	Age/Size	Number Shipped
Eohaustorius estuarius	3-5mm	1785 + 10%

WATER QUALITY AT TIME OF SHIPMENT

Temperature (°C): 14.9	pH: 8.1	Salinity (ppt): 30.0	D.O. (mg/L): 8.6
Other:			

PACKAGED BY: Yves Watahomo **DATE:** 10-14-19

FIELD COLLECTION/CULTURE NOTES

Collected 10-13-19 from Yaquina Bay, OR.
Interstitial WQ: Temp 7.5 °C, Salinity 33.0 ppt; salinity adjusted ~5 ppt up or down as needed.
Held at ~15°C in aerated water.

ADDITIONAL COMMENTS

2-liters of 0.5 mm sieved home sediment included.

PLEASE RETURN ALL SHIPPING MATERIALS Thank you!

If you have any questions, please call Gary Buhler or Gerald Irissarri at (541) 867-7225. Thank You.

ORGANISM RECEIPT LOG

Date:	Time:	Batch No.
10/17/19	1150	ATS101719

Organism: Neanthes

Source / Supplier: Aquatic Toxicology Support

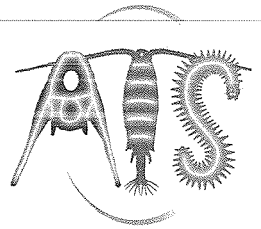
No. Ordered:	No. Received:	Source Batch: Collection date, hatch date, etc.):
910 + 10%.	1,001	emerge date: 9/30/19

Condition of Organisms:	Approximate Size or Age: (Days from hatch, life stage, size class, etc.):
good	17 day post-emergence
Shipper: Courier	**B of L (Tracking No.)** NA
Condition of Container: good	**Received By:** MK

Container	D.O. (mg/L)	Temp. (°C)	Cond. or Sal. (Include Units)	pH (Units)	# Dead	% Dead*	Tech. (Initials)
1 ①	13	19.8	31 ppt	7.2	—		MK

*if >10% contact lab manager

Notes:
① Composite from 10 containers.



Aquatic Toxicology Support
1849 Charleston Beach Road West
Bremerton, Washington 98312
(360) 813-1202

Order Summary

Species: *Neanthes arenaceodentata**	Emerge Date: 30 Sept '19
Number Ordered: 910	Number Shipped: 910 + 10%
Date Shipped: 17 Oct '19	Salinity (ppt): 32

*Smith 1964. CSU Long Beach strain. Feed upon arrival.

ORGANISM RECEIPT LOG

Date:	Time:	Batch No.
11/21/19	0950	ATS112119

Organism: Neanthes arenaceodentata

Source / Supplier: ATS

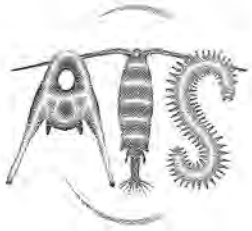
No. Ordered:	No. Received:	Source Batch: Collection date, hatch date, etc.):
400	440	emmerge 11/4/19

Condition of Organisms:	Approximate Size or Age: (Days from hatch, life stage, size class, etc.):
Good	17 days post emergence
Shipper: Courier	**B of L (Tracking No.):** NA
Condition of Container: Good	**Received By:** MK

Container	D.O. (mg/L)	Temp. (°C)	Cond. or Sal. ppt (Include Units)	pH (Units)	# Dead	% Dead*	Tech. (Initials)
1	15.6	18.1	31	7.3	—		MK

*if >10% contact lab manager

Notes:



Aquatic Toxicology Support
1849 Charleston Beach Road West
Bremerton, Washington 98312
(360) 813-1202

Order Summary

Species: *Neanthes arenaceodentata**	Emerge Date: 4 Nov '19
Number Ordered: 400	Number Shipped: 400 + 10%
Date Shipped: 21 Nov '19	Salinity (ppt): 31

*Smith 1964. CSU Long Beach strain. Feed upon arrival.

ORGANISM RECEIPT LOG

Date:	Time:	Batch No.
10/4/19	1225	TS100419.

Organism: Mytilus sp.

Source / Supplier: Taylor Shellfish Farms

No. Ordered:	No. Received:	Source Batch: Collection date, hatch date, etc.):
10 lbs.	10 lbs.	Collected: 10/03/19

Condition of Organisms:	Approximate Size or Age: (Days from hatch, life stage, size class, etc.):
Good	Adult

Shipper:	B of L (Tracking No.)
FedEx	7764 5722 8160

Condition of Container:	Received By:
Good	JB/MS

Container	D.O. (mg/L)	Temp. (°C)	Cond. or Sal. (Include Units)	pH (Units)	# Dead	% Dead*	Tech. (Initials)
1	\	1.5	\	\	0	0	MS

*if >10% contact lab manager

Notes: received dry

TAYLOR SHELLFISH FARMS
SE 130 LYNCH RD, SHELTON, WA 98584
PH: (360)426-6178 FAX: (360)426-3643
WASHINGTON CERTIFICATION # WA 46SP

10.00 lbs net
MS TOTTEN INLET MUSSEL REGULAR 10LB/BAG

Original Harvesters Cert#: WA 46 SP
Original Harvest Date: 10/01/2019
Final Harvest Date 10/03/2019
Harvested In: Washington State
Harvest Area: Totten Inlet - A8
Wet Stored: WS1.102414

Airbill #
Lot # 9274004.WS1.102414

SHIP TO:
ECOANALYSTS
4729 NE VIEW DRIVE

PORT GAMBLE, WA 98364

PO #
ITEM # 10264A

ORD # 431958

(01)90000000102646(11)191003(3202)001000(21)35010718

PERISHABLE KEEP REFRIGERATED
PRODUCT OF USA

ORGANISM RECEIPT LOG

Date: 8/27/19	Time: 1230	Batch No. TS082719
Organism: Mytilus gallo.		
Source / Supplier: Taylor Shellfish		
No. Ordered: 8 lbs	No. Received: 8 lbs	Source Batch: Collection date, hatch date, etc.): Collected 8/26 Totten Inlet
Condition of Organisms: Good	Approximate Size or Age: (Days from hatch, life stage, size class, etc.): Adult	
Shipper: Fed Ex	B of L (Tracking No.) 7893 7472 0406	
Condition of Container: Good	Received By: JB	

Container	D.O. (mg/L)	Temp. (°C)	Cond. or Sal. (Include Units)	pH (Units)	# Dead	% Dead*	Tech. (Initials)
*							JB

*if >10% contact lab manager

Notes: * received Dry

TAYLOR SHELLFISH FARMS
SE 130 LYNCH RD, SHELTON, WA 98584
PH: (360)426-6178 FAX: (360)426-3643
WASHINGTON CERTIFICATION # WA 46SP

8.00 lbs net
MS FZ NEWFOUNDLAND 8LB/BAG

Airbill #
Lot # 9238003

Original Harvesters Cert#: WA 46 SP
Original Harvest Date: 08/26/2019
Final Harvest Date 08/26/2019
Harvested In: Washington State
Harvest Area: Totten Inlet – 610
Wet Stored:

SHIP TO:
ECOANALYSTS
4729 NE VIEW DRIVE

PORT GAMBLE, WA 98364

PO #
ITEM # 101090

ORD # 428954

(01)90000000101090(11)190826(3202)000800(21)35004147

PERISHABLE KEEP REFRIGERATED
PRODUCT OF USA

ORGANISM RECEIPT LOG

Date: 7/31/19	Time: 0750	Batch No. TS073119
Organism: Mytilus		
Source / Supplier: Taylor Shellfish		
No. Ordered: 8 lbs	**No. Received:** 8 lbs	**Source Batch:** Collection date, hatch date, etc.): Field Collected
Condition of Organisms: Good	**Approximate Size or Age:** (Days from hatch, life stage, size class, etc.): Adult	
Shipper: Taylor Courier	**B of L (Tracking No.)** NA	
Condition of Container: Good	**Received By:** JB	

Container	D.O. (mg/L)	Temp. (°C)	Cond. or Sal. (Include Units)	pH (Units)	# Dead	% Dead*	Tech. (Initials)
*							JB

*if >10% contact lab manager

Notes: * received Dry

MAINTENANCE LOG FOR CULTURES

ORGANISM: Eohs

LOCATION: Bath 1

Batch Number: NWA101519	Date Received: 10/15/19	Initial # of Organisms: ~1980

Date	Feed AM/PM	Tub No.	D.O.	Temp (°C)	Cond/ (Sal) ppt	pH	H_2O Change	Organisms appear healthy (Y/N)	# Mort	% Mort*	Init.	Comments
10/16/19	+	1	7.4	15.5	28	7.9	①~~N~~ Y	Y	14	0.7	MS	
10/17	←	1	7.9	15.5	29	8.0	Y	Y	16	0.8	JB	
10/18	—	1	8.0	15.4	28	8.0	N	Y	5	0.3	JB	
10/19	——	1	7.6	15.4	28	7.8	N	Y	——	——	DM	

END OF CULTURE

FT = Flow-through

**if >10% notify lab manager*

① IE-MS 10/16

MAINTENANCE LOG FOR CULTURES

ORGANISM: Mussels
LOCATION: TS100419 bath 1

Batch Number: TS100419	Date Received: 10/4/19	Initial # of Organisms: 10 lbs

Date	Feed AM	Feed PM	Tub No.	D.O.	Temp (°C)	Cond/ (Sal) ppt	pH	H_2O Change	Organisms appear healthy (Y/N)	# Mort	% Mort*	Init.	Comments
10/4/19	—	—	(1)	5.0	13.3	31	7.2	~~FT~~	Y	—	—	~~BM~~	
10/7/19		✓	1	4.8	13.9	30	7.4	FT	Y	0	0	MS	
10/11/19		✓	1	6.4	12.9	31	7.5	~~FT~~	Y			JB	
10/15/19	✓		1	6.8	13.8	32	7.4	FT	Y	0	—	NR	
10/18/19		✓	1	6.6	15.9	31	7.6	FT	Y	0	-	MS	
				END	OF		CULTURE						

FT = Flow-through
**if >10% notify lab manager*

MAINTENANCE LOG FOR CULTURES

ORGANISM: mussels
LOCATION: T5082719 bath 1

Batch Number: T5082719	Date Received: 8/27/19	Initial # of Organisms: —

Date	Feed AM	Feed PM	Tub No.	D.O.	Temp (°C)	Cond/ (Sal) ppt	pH	H_2O Change	Organisms appear healthy (Y/N)	# Mort	% Mort*	Init.	Comments
8/28/19		✓	1	5.7	15.9	31	7.5	FT	Y	0	0	NR	
9/02/19		✓	1	5.6	16.1	31	7.4	FT	Y	0	—	VB	
9/4/19		✓	1	6.1	15.2	31	7.4	FT	Y	2	÷	MS	
9/6/19		✓	1	7.2	14.9	31	7.4	FT	Y	1	-	MS	
9/09		✓	1	6.5	15.8	31	7.7	FT	Y	0	—	VB	
9/11/19			1	6.7	15.7	31	7.5	FT	Y	0	—	DM	
9/13/19		✓	1	6.7	15.7	31	7.5	FT	Y	0	—	MS	
9/16/19	✓	✓	1	7.1	15.2	32	7.6	FT	Y	0	—	MS	
9/18/19	✓		1	7.0	15.2	32	7.7	FT	Y	0	-	MS	
9/23/19		✓	1	7.3	15.3	31	7.7	FT	Y	0	—	VB	
9/25/19		✓	1	7.2	15.1	31	7.7	FT	Y	0	—	VB	
9/27		✓	1	6.6	14.7	32	7.7	FT	Y		—	VB	
9/30		✓	1	7.4	14.3	32	7.7	FT	Y	0	—	NR	
10/2	✓		1	7.1	13.4	32	7.9	FT	Y	0	—	MS/DM	
10/4/19	✓		1	7.0	13.9	32	7.8	FT	Y	0	—	DM	
10/7/19		✓	1	7.7	14.1	31	7.8	FT	Y	0	-	MS	
10/9/19		✓	1	7.9	13.3	31	7.7	FT	Y	0	—	NR	
10/11/19		✓	1	7.8	13.5	31	7.7	FT	Y	0	—	VB	

FT= Flow-through
**if >10% notify lab manager* DIE MS 9/16

MAINTENANCE LOG FOR CULTURES

ORGANISM: Mussels
LOCATION: bath 1

Batch Number: TS082719	Date Received: 8/27/19	Initial # of Organisms:

Date	Feed AM/PM		Tub No.	D.O.	Temp (°C)	Cond/ (Sal) Ppt	pH	H_2O Change	Organisms appear healthy (Y/N)	# Mort	% Mort*	Init.	Comments
10/15/19	✓		1	6.4	14.1	31	7.8	FT	Y	0	–	NR	
				END	OF	CULTURE							

FT = Flow-through
**if >10% notify lab manager*

MAINTENANCE LOG FOR CULTURES

ORGANISM: Mussels
LOCATION: Bath 1

Batch Number: TS073119	Date Received: 7/31/19	Initial # of Organisms:

Date	Feed AM	Feed PM	Tub No.	D.O.	Temp (°C)	Cond/Sal ppt	pH	H_2O Change	Organisms appear healthy (Y/N)	# Mort	% Mort*	Init.	Comments
8/02/19		✓	1	5.7	15.9	31	7.6	FT	Y	0	—	JB	
8/5/19		✓	1	5.0	15.5	31	7.5	FT	Y	0	—	MC	
8/7/19		✓	1	2.9①	15.5	31	7.3	FT	Y	0	—	MS	
8/9/19		✓	1	4.0	16.2	32	7.3	FT	Y	0	—	DM	
8/12/19	✓	②✓	1	2.7	16.1	31	7.3	FT	Y	0	-	MS	
8/13/19	—		1	3.8	15.8	31	7.1	FT	Y	0	—	MS	
8/14/19			1	5.4	15.1	31	7.4	FT	Y	0	—	MS	
8/16/19			1	4.4	15.5	31	6.9	FT	Y	0	—	MS	
8/17/19	—		1	4.2	15.3	31	7.3	FT	Y	0	—	DM	
8/19/19	✓		1	5.1	15.5	31	7.5	FT	Y	1	—	NR	
8/21/19	✓		1	5.③4.9	15.5	31	7.5	FT	Y	0	-	MS	
8/23/19		✓	1	4.6	16.7	31	7.4	FT	Y	0	—	DM	
8/26/19		✓	1	6.0	16.1	31	7.4	FT	Y	0	—	JB	
8/28/19		✓	1	5.9	15.8	31	7.5	FT	Y	0	-	NR	
9/02		③✓	1	4.9	15.9	31	7.6	FT	④	0	—	JB	
9/4		✓	1	4.7	15.0	31	7.4	FT	Y	4	-	MS	
9/6		✓	1	3.8	14.8	31	7.2	FT	Y	2	-	MS	
9/09		✓	1	5.4	15.8	31	7.4	FT	Y	2	—	JB	

FT = Flow-through
*if >10% notify lab manager

① added another airline
② IE MS 8/12/19
③ IE MS 8/21, 9/4
④ Infestation of copepods(?) present. JB 9/02.

MAINTENANCE LOG FOR CULTURES

ORGANISM: Mussels
LOCATION: Bath 1

Batch Number: TS073119	Date Received: 7/31/19	Initial # of Organisms:

Date	Feed AM	Feed PM	Tub No.	D.O.	Temp (°C)	Cond/ Sal ppt	pH	H_2O Change	Organisms appear healthy (Y/N)	# Mort	% Mort*	Init.	Comments
9/11/19			1	4.8	15.9	31	7.2	FT	Y	0	—	DM	
9/13/19		✓	1	4.7	15.5	31	7.3	FT	Y	0	-	MS	
9/16/19	✓		1	6.4	15.0	32	7.4	FT	Y	0	-	MS	
9/18/19	✓		1	5.5	15.1	32	7.2	FT	Y	0	—	MS	
9/23		✓	1	5.9	15.3	31	7.4	FT	Y	2	—	JB	
9/25		✓	1	6.8	14.9	31	7.5	FT	Y	1	—	JB	
9/27		✓	1	6.2	14.4	32	7.5	FT	Y	0	—	JB	
9/30		✓	1	7.5	14.0	32	7.7	FT	Y	0	—	JB	
10/2	✓		1	6.5	13.4	32	7.9	FT	Y	0	-	MS/DM	
10/4	✓		1	7.0	13.7	32	7.7	FT	Y	0	—	DM	
10/7		✓	1	7.3	14.0	31	7.7	FT	Y	0	-	MS	
10/9		✓	1	7.4	13.1	30	7.7	FT	Y	0	-	JB	
10/11		✓	1	7.5	13.2	31	7.7	FT	Y	0	—	JB	
10/15	✓		1	7.9	13.6	32	7.7	FT	Y	0	-	JB	
10/18		✓	1	~~6.9~~ 7.0	15.1	31	7.6	FT	Y	0	-	MS	
10/21		✓	1	7.4	15.0	31	7.6	FT	Y	0	-	MS	
11/6			1	8.1	12.6	30	7.9	FT	Y	0	-	MS	
11/13/19		✓	1	7.6	13.3	31	7.7	FT	Y	—	—	JB	

FT = Flow-through
if >10% notify lab manager

① MR - actual 7.0 - MS 10/18/19

MAINTENANCE LOG FOR CULTURES

ORGANISM: Mussels

LOCATION: Bath 1

Batch Number: TS073119	Date Received: 7/31/19	Initial # of Organisms:

Date	Feed AM	Feed PM	Tub No.	D.O.	Temp (°C)	Cond/ (Sal)	pH	H_2O Change	Organisms appear healthy (Y/N)	# Mort	% Mort*	Init.	Comments
11/15/19	✓		1	7.2	13.1	31	7.2	FT	Y	0	0	MS	
11/18/19		✓	1	7.6	17.1	31	7.6	FT	Y	1	—	CB	
11/20/19		✓		7.6	13.0	31	7.7	FT	Y	0	—	MS	
11/22/19	✓		1	①D.O. 7.1	12.5	31	7.6	FT	Y	—	—	DM	

FT = Flow-through

**if >10% notify lab manager*

① IE- DM- 11/22/19

APPENDIX J

DATA VALIDATION MEMORANDA



DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. 1044.02.14 | NOVEMBER 19, 2019 | GRAYS HARBOR HISTORICAL SEAPORT AUTHORITY

Maul Foster & Alongi, Inc. (MFA) conducted an independent review of the quality of analytical results for sediment samples collected in September 2019 at the Seaport Landing tidelands.

Apex Laboratories, LLC (Apex), Analytical Resources, Inc. (ARI), and Cape Fear Analytical (CFA) performed the analyses. Apex report numbers A9I0822, A9I0893, A9J0006, A9L0191 (the last containing sediment sample results with time-stamp 01 30 20 1620), and A0D0095; and CFA report numbers WO15579, WO15582, and WO15951 were reviewed. Samples collected on September 23 and 24 were submitted directly to ARI for mercury and sulfide analysis, and results were appended to report A9I0822. Apex subcontracted the remaining samples requiring mercury and sulfide analysis to ARI and the samples requiring U.S. Environmental Protection Agency (EPA) 1613B analysis to CFA. Samples originally submitted to Apex for report A9L0191 were split into two separate reports at the request of the MFA project manager. The associated subcontract CFA lab report WO15951 was similarly split. The report time-stamp is referenced below to distinguish it from the split laboratory report containing upland results, which are validated in a separate memorandum. Sample SE-07A-0-1.0, originally submitted for report A9I0893, was logged to new report A0D0095 for additional Northwest Total Petroleum Hydrocarbon (NWTPH)-Dx analysis. The analyses performed and samples analyzed are listed below. Samples submitted to the laboratory on hold are also indicated.

Analysis	Reference
Ammonia	Plumb/SM 4500-NH3-G
Dioxin and Furans	EPA 1613B
Diesel- and Oil-Range-Hydrocarbons with Acid/Silica-Gel Cleanup	NWTPH-Dx/SG
Gasoline-Range Hydrocarbons	NWTPH-Gx
Grain Size	ASTM D422-modified
Percent Dry Weight	EPA 8000C
Polychlorinated Biphenyls as Aroclors	EPA 8082A
Semivolatile Organic Compounds	EPA 8270D
Sulfide	SM 4500-S2-D-00
Sulfide—Pore Water	SM 4500-S2-D-00
TCLP Mercury	EPA 1311/7470A
TCLP Metals and Mercury	EPA 1311/6010C
Total Mercury	EPA 7470A/7471B
Total Metals	EPA 6020A

Analysis	Reference
Total Organic Carbon	EPA 9060A-modified/SM 5310C
Total Solids	PSEP 1986/SM 2540G
Total Volatile Solids	SM 2540G

NOTES:
ASTM = ASTM International.
EPA = U.S. Environmental Protection Agency.
NWTPH = Northwest Total Petroleum Hydrocarbon.
PSEP = Puget Sound Estuary Protocol.
SG = silica-gel cleanup.
SM = Standard Methods for the Treatment of Water and Wastewater.

Samples Analyzed			
Report A9I0822	**Report A9I0893/A0D0095**	**Report A9J0006**	**Report A9L0191 01 30 20 1620/WO15951**
SE05a-2.0-3.0	SE-01A-1.0-2.0	SE-24-0-0.33	RAU2-GA2-SO-10.75 (hold)
SE-29-0-2.0	SE-01B-0.5-1.5 (hold)	SE-24-0-0.33 (pore water)	RAU2-GA2-SO-15.75 (hold)
SE-08a-0-1.0	SE-01C-2.0-3.0 (hold)	SE-14-0-0.33	RAU2-GA2-SO-20.75 (hold)
SE-08b-0-1.0 (hold)	SE-01D-0-1.0 (hold)	SE-14-0-0.33 (pore water)	RAU2-GA2-SO-25.75 (hold)
SE-08c-3.2-4.2	SE-03A-0-1.0	SE-23-0-0.33	RAU2-GA1-SO-3.25
SE-08d-2.0-3.0 (hold)	SE-03B-1.0-2.0 (hold)	SE-17-0-0.33	RAU2-GA1-SO-5.75
-	SE-06A-0.5-1.5	SE-15-0-0.33	RAU2-GA1-SO-8.25
-	SE-20-0-0.33	SE-21-0-0.33	RAU2-GA1-SO-10.75 (hold)
-	SE-07A-0-1.0	SE-25-0-0.33	RAU2-GA1-SO-15.5 (hold)
-	SE-07B-0-1.0 (hold)	SE-28-0-0.33	RAU2-GA1-SO-20.25 (hold)
-	SE-02A-2.5-3.5	SE-28-0-0.33 (pore water)	RAU2-GA1-SO-25.75 (hold)
-	SE-06B-3.0-4.0 (hold)	SE-26-0-0.33	RAU2-GA2-SO-3.25
-	SE-10-2.0-3.7	SE-26-0-0.33 (pore water)	RAU2-GA2-SO-5.75
-	SE-30-2.5-4.5	SE-18-0-0.33	RAU2-GA2-SO-8.25
-	SE-30-0-2.0 (hold)	SE-18-0-0.33 (pore water)	RAU2-GA2-SO-10.75
-	SE-30-4.5-5.5 (hold)	SE-31-0-0.33	-
-	SE-05B-2.5-3.5 (hold)	SE-16-0-0.33	-
-	rinsate blank	SE-19-0-0.33	-
-	SE-20-0-0.33 (pore water)	SE-22-0-0.33	-
-	-	SE-27-0-0.33	-
-	-	SE-27-0-0.33-Dup	-
-	-	SE-16-0-0.33 (pore water)	-

DATA QUALIFICATIONS

Analytical results were evaluated according to applicable sections of EPA procedures (EPA, 2014, 2016, 2017a,b) and appropriate laboratory and method-specific guidelines (Apex, 2019; ARI, 2018; CFA, 2018; EPA, 1986).

Data validation procedures were modified, as appropriate, to accommodate quality-control requirements for methods not specifically addressed by the EPA procedures (e.g., NWTPH-Dx).

Apex noted that, to minimize matrix interference, EPA Method 8082A samples and associated batch quality control samples were processed with sulfuric acid/permanganate cleanup by EPA Method 3665A, sulfur cleanup by EPA Method 3660B, and florisil cleanup by EPA Method 3620B. No action was required.

According to report A9I0822, the NWTPH-Dx lube-oil-range hydrocarbon result for sample SE-29-0-2.0 was elevated because of the presence of individual analyte peaks that did not resemble a fuel hydrocarbon chromatographic pattern. The result was quantitated within the lube-oil range and reported as oil-range hydrocarbons; thus, qualification was not required.

According to reports A9I0822 and A9J0006, Apex flagged the EPA Method 8270D phenol result for samples SE-29-0-2.0 and SE-15-0-0.33 as estimated because of matrix interference. The results have been qualified by the reviewer with "J" as estimated.

Report	Sample	Component	Original Result (mg/kg)	Qualified Result (mg/kg)
A9I0822	SE-29-0-2.0	Phenol	0.571	0.571 J
A9J0006	SE-15-0-0.33	Benzo(k)fluoranthene	0.0365	0.0365 J
		Phenol	0.0583	0.0583 J
NOTES: J = result is estimated. mg/kg = milligrams per kilogram.				

According to reports A9I0893 and A9J0006, some EPA Method 8082A Aroclor 1254 and Aroclor 1260 results were flagged by Apex as estimated because of the presence of overlapping polychlorinated biphenyl Aroclors. The results have been qualified by the reviewer with "J," as estimated.

Report	Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
A9I0893	SE-10-2.0-3.7	Aroclor 1254	5.86	5.86 J
		Aroclor 1260	7.17	7.17 J
A9J0006	SE-22-0-0.33	Aroclor 1260	4.43	4.43 J
NOTES: J = result is estimated. ug/kg = micrograms per kilogram.				

EPA Method 1613B laboratory-flagged estimated maximum potential concentration (EMPC) results were qualified by the reviewer as estimated and not detected at the reported

concentration, in accordance with EPA Region 10 guidance for data validation of polychlorinated dibenzodioxins and polychlorinated dibenzo-furans (EPA, 2014) and EPA national functional guidelines for high-resolution Superfund methods data review (EPA, 2016).

EPA Method 1613B results reported by CFA as EMPCs that were also associated with method blank detections requiring qualification are discussed in the method blank section of this validation report but are not discussed in the EMPC qualification tables below.

EPA Method 1613B total homolog results flagged as EMPCs by the laboratory were qualified by the reviewer with "UJ" as estimated, not detected, at the reported concentration when all associated congeners were reported by the laboratory as either EMPCs or were non-detect. However, when one or more associated congener was reported as a detection without an EMPC qualifier, the total homolog result was qualified by the reviewer with "J," as estimated. Total homolog results already flagged with J by CFA because of detection below the reporting limit did not require additional qualification. Results flagged by CFA due to quantitative interference, as indicated in the table below, did not require additional qualification. The following table shows the reviewer's qualifications:

Report	Sample	Component	Original Result (pg/g)	Qualified Result (pg/g)
WO15582	SE-14-0-0.33	1,2,3,7,8-PeCDD	2.46 JK	2.46 UJK
		Total PeCDD	33.8 JK	33.8 UJK
		Total PeCDF	22.2 JK	22.2 UJK
	SE-21-0-0.33	2,3,7,8-TCDF	0.575 JK	0.575 UJK
		Total TeCDD	0.404 JK	0.404 UJK
		Total TeCDF	3.19 JK	3.19 UJK
		Total PeCDF	3.70 JK	3.70 UJK
		Total HxCDF	8.49 JK	8.49 UJK
WO15951	RAU2-GA1-SO-3.25	1,2,3,4,7,8,9-HpCDF	0.415 JK	0.415 UJK
		1,2,3,7,8,9-HxCDD	0.869 JK	0.869 UJK
		Total TeCDD	3.80 JK	3.80 UJK
		Total PeCDD	5.48 JK	5.48 UJK
		Total HxCDD	12.1 JK	12.1 UJK
		Total TeCDF	21.7 JK	21.7 UJK
		Total PeCDF	19.7 JK	19.7 UJK
		Total HpCDF	36.3 JK	36.3 UJK
	RAU2-GA1-SO-5.75	Total TeCDD	3.56 JK	3.56 UJK
		Total PeCDD	7.36 JK	7.36 UJK
		Total HxCDD	10.1 JK	10.1 UJK
		Total TeCDF	24.3 JK	24.3 UJK
		Total PeCDF	26.1 JK	26.1 UJK
		Total HxCDF	15.5 JK	15.5 UJK
	RAU2-GA1-SO-8.25	2,3,7,8-TCDD	0.333 JK	0.333 UJK
		2,3,4,6,7,8-HxCDF	0.191 JK	0.191 UJK

Report	Sample	Component	Original Result (pg/g)	Qualified Result (pg/g)
		1,2,3,4,7,8,9-HpCDF	0.103 JK	0.103 UJK
		Total TeCDD	3.05 JK	3.05 UJK
		Total PeCDD	3.52 JK	3.52 UJK
		Total HxCDD	7.88 JK	7.88 UJK
		Total TeCDF	2.72 JK	2.72 UJK
		Total PeCDF	3.44 JK	3.44 UJK
		Total HxCDF	2.50 JK	2.50 UJK
		Total HpCDF	4.30 JK	4.30 UJK
	RAU2-GA2-SO-3.25	1,2,3,7,8-PeCDF	2.86 JK	2.86 UJK
		2,3,4,6,7,8-HxCDF	7.24 JK	7.24 UJK
		Total TeCDD	3.07 JK	3.07 UJK
		Total PeCDD	33.9 JKQ	33.9 UJK
		Total TeCDF	7.00 JK	7.00 UJK
		Total PeCDF	150 JKQ	150 UJK
		Total HxCDF	260 JK	260 UJK
	RAU2-GA2-SO-5.75	2,3,4,7,8-PeCDF	1.59 JK	1.59 UJK
		1,2,3,7,8-PeCDF	1.16 JK	1.16 UJK
		1,2,3,6,7,8-HxCDF	1.18 JK	1.18 UJK
		Total TeCDD	3.63 JK	3.63 UJK
		Total PeCDD	10.6 JK	10.6 UJK
		Total TeCDF	18.3 JK	18.3 UJK
		Total PeCDF	23.7 JK	23.7 UJK
		Total HxCDF	44.6 JK	44.6 UJK
	RAU2-GA2-SO-8.25	2,3,7,8-TCDD	0.550 JK	0.550 UJK
		2,3,7,8-TCDF	0.804 JK	0.804 UJK
		2,3,4,6,7,8-HxCDF	0.570 JK	0.570 UJK
		Total TeCDD	3.80 JK	3.80 UJK
		Total HpCDD	62.3 JK	62.3 UJK
		Total TeCDF	7.13 JK	7.13 UJK
		Total PeCDF	8.46 JK	8.46 UJK
		Total HxCDF	12.0 JK	12.0 UJK

NOTES:
JK = result is estimated and an estimated maximum potential concentration.
JKQ = result is estimated and an estimated maximum potential concentration with quantitative interference.
pg/g = picograms per gram
UJK = result is non-detect at an estimated detection limit, at the estimated maximum potential concentration.

According to report WO15582, EPA Method 1613B 2,3,7,8-TCDF results detected above the reporting limit were confirmed by analysis on a secondary analytical column. Confirmation analysis results are the results of record.

According to report A9L0191 01 30 20 1620, Apex flagged an EPA Method 8270D result for sample RAU2-GA2-SO-3.25 as estimated because of insufficient chromatographic peak separation. The result has been qualified by the reviewer with "J," as estimated.

Report	Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
A9L0191 01 30 20 1620	RAU2-GA2-SO-3.25	Benzo(k)fluoranthene	1,340	1,340 J
NOTES: J = result is estimated. ug/kg = milligrams per kilogram.				

The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

Holding Times

According to report A9I0822, the SM 4500-S2-D sulfide analysis was performed three days after the recommended seven-day holding time for all samples. Report A9I0893 states that the SM 4500-S2-D analysis was performed one day after the recommended seven-day holding time for samples SE-01A-1.0-2.0 and SE-03A-0-1.0 and the pore water extract of sample SE-20-0-0.33. The reviewer confirmed that the samples were appropriately preserved and were extracted within seven days of collection and that the recommended holding time is seven days from collection to analysis. The results have been qualified by the reviewer with "J," as estimated.

Report	Sample	Component	Units	Original Result	Qualified Result
A9I0822	SE-05a-2.0-3.0	Sulfide	mg/kg	4,040	4,040 J
	SE-29-0-2.0			1,510	1,510 J
	SE-08a-0-1.0			153	153 J
	SE-08c-3.2-4.2			124	124 J
A9I0893	SE-01A-1.0-2.0			865	865 J
	SE-03A-0-1.0			856	856 J
	SE-20-0-0.33 (pore water)		mg/L	0.059	0.059 J
NOTES: J = result is estimated. mg/kg = milligrams per kilogram. mg/L = milligrams per liter.					

According to report A9I0893, the Plumb/SM 4500-NH3-G ammonia as nitrogen analysis was performed 13 days after the recommended seven-day holding time for samples SE-01A-1.0-2.0, SE-03A-0-1.0, and SE-06A-0.5-1.5, and 14 days after the recommended seven-day holding time for samples SE-07A-0-1.0 and SE-02A-2.5-3.5. The reviewer confirmed that the analysis

was added to all five samples on October 11, 2019, which was eight to nine days after the recommended seven-day holding time. The results have been qualified by the reviewer with "J," as estimated.

Report	Sample	Component	Original Result (mg/kg)	Qualified Result (mg/kg)
A9I0893	SE-01A-1.0-2.0	Ammonia as Nitrogen	290	290 J
	SE-03A-0-1.0		168	168 J
	SE-06A-0.5-1.5		408	408 J
	SE-07A-0-1.0		7.73	7.73 J
	SE-02A-2.5-3.5		230	230 J
NOTES: J = result is estimated. mg/kg = milligrams per kilogram.				

According to report A9I0893, the SM 2540G total volatile solids analysis was performed eight days after the recommended 14-day holding time for samples SE-01A-1.0-2.0, SE-03A-0-1.0, and SE-06A-0.5-1.5, and seven days after the recommended 14-day holding time for samples SE-07A-0-1.0 and SE-02A-2.5-3.5. The matrix spike/matrix spike duplicate (MS/MSD) prepared with sample SE-03A-0-1.0 was also flagged by Apex because of the holding time exceedance. The reviewer confirmed that the analysis was added to all five samples by MFA on October 11, 2019, which was two to three days after the recommended 14-day holding time. The results have been qualified by the reviewer with "J," as estimated.

Report	Sample	Component	Original Result (percent)	Qualified Result (percent)
A9I0893	SE-01A-1.0-2.0	Total Volatile Solids	11.9	11.9 J
	SE-03A-0-1.0		8.11	8.11 J
	SE-06A-0.5-1.5		9.92	9.92 J
	SE-07A-0-1.0		20.7	20.7 J
	SE-02A-2.5-3.5		7.94	7.94 J
NOTE: J = result is estimated.				

According to report A0D0095, the NWTPH-Dx extraction for sample SE-07A-0-1.0 was performed within the method-recommended holding time because the holding time was extended by sample storage at -18°C. Apex also noted that the total time in 4°C storage for sample SE-07A-0-1.0 met holding time requirements.

The remaining extractions and analyses were performed within the recommended holding time criteria.

Preservation and Sample Storage

The samples were preserved and stored appropriately. Apex noted on the sample login forms associated with report A9I0893 that more containers than were noted on the chain of custody (COC) were received for samples SE-01A-1.0-2.0, SE-03A-0-1.0, and SE-06A-0.5-1.5. No action was required.

Apex noted on the cooler receipt form associated with report A9L0191 01 30 20 1620 that some volatile organic analysis vials had head space and/or sediment. Apex also noted that some samples had a pH of 8 when they should have been greater than 9 standard units. All noted samples were reported in a separate split report, A9L0191 01 30 20 1613, as they were associated with the upland sampling investigation. These samples are validated in a separate memorandum.

BLANKS

Method Blanks

Laboratory method blank analyses were performed at the required frequencies. For purposes of data qualification, the method blanks were associated with all samples prepared in the analytical batch. Where an analyte was detected in a sample and in the associated method blank, the sample result was qualified if the concentration was less than ten times the method blank concentration for EPA Methods 6020A, 7470A, and 7471B results and less than five times the method blank concentration for the remaining results. EPA Method 1613B sample results were qualified by the reviewer with "U," as not detected at the sample result value, when the result was less than five times the associated method blank EMPC concentration.

For methods other than EPA 1613B, if an analyte was detected between the method detection limit and the method reporting limit (MRL) in both the sample and the associated method blank, the sample result was qualified U, as not detected at the MRL. If an analyte was detected above the MRL and at less than ten times the method blank concentration (for EPA Methods 6020A, 7470A, and 7471B) or less than five times the method blank concentration (for all other methods), the result was qualified U, as not detected at the sample value.

According to report WO15579, the EPA Method 1613B batch 42013 laboratory method blank had several analyte detections below MRLs. Associated rinsate blank sample results that were less than five times the method blank detections were qualified as follows:

Report	Sample	Component	Method Blank Result (pg/L)	Original Result (pg/L)	Qualified Result (pg/L)
WO15579	Rinsate Blank	1,2,3,4,6,7,8-HpCDD	2.44 J	3.78 JK	3.78 UJ
		1,2,3,4,6,7,8,9-OCDD	8.42 JK	82.6 J	82.6 UJ
		1,2,3,4,6,7,8-HpCDF	1.98 J	1.4 J	1.4 UJ
		1,2,3,4,6,7,8,9-OCDF	4.28 J	7.32 J	7.32 UJ
		Total HpCDD	2.44 J	3.78 JK	3.78 UJ
		Total HpCDF	4.00 J	3.09 J	3.09 UJ

NOTES:
J = result is estimated.
JK = result is estimated and an estimated maximum potential concentration.
pg/L = picograms per liter,
UJ = result is non-detect at an estimated detection limit.

According to report WO15579, the EPA Method 1613B batch 42013 laboratory method blank had some detections below MRLs. Associated sample results less than five times the method blank detections were qualified as follows:

Report	Sample	Component	Method Blank Result (pg/g)	Original Result (pg/g)	Qualified Result (pg/g)
WO15582	SE-14-0-0.33	1,2,3,7,8-PeCDF	0.458 JK	1.26 J	1.26 UJ
		1,2,3,4,7,8-HxCDF	0.61 J	2.61 J	2.61 UJ
		1,2,3,6,7,8-HxCDF	0.496 J	1.66 J	1.66 UJ
		2,3,4,6,7,8-HxCDF	0.496 JK	1.85 J	1.85 UJ
		1,2,3,4,7,8,9-HpCDF	0.790 J	2.34 JK	2.34 UJ
	SE-21-0-0.33	2,3,4,7,8-PeCDF	0.442 JK	0.315 JK	0.315 UJ
		1,2,3,4,7,8-HxCDF	0.61 J	0.376 JK	0.376 UJ
		1,2,3,6,7,8-HxCDF	0.496 J	0.346 JK	0.346 UJ
		2,3,4,6,7,8-HxCDF	0.496 JK	0.414 JK	0.414 UJ
		1,2,3,4,7,8,9-HpCDF	0.790 J	0.462 J	0.462 UJ
	SE-22-0-0.33	1,2,3,7,8-PeCDF	0.458 JK	1.16 J	1.16 UJ
		1,2,3,7,8,9-HxCDF	0.618 J	1.15 J	1.15 UJ

NOTES:
J = result is estimated.
JK = result is estimated and an estimated maximum potential concentration.
pg/g = picograms per gram.
UJ = result is non-detect at an estimated detection limit.

According to report WO15951, the EPA Method 1613B batch 42595 laboratory method blank had some detections below MRLs. Associated sample results less than five times the method blank detections were qualified as follows:

Report	Sample	Component	Method Blank Result (pg/g)	Original Result (pg/g)	Qualified Result (pg/g)
W015951	RAU2-GA1-SO-3.25	1,2,3,7,8-PeCDD	0.13 J	0.566 JK	0.566 UJ
	RAU2-GA1-SO-8.25			0.505 JK	0.505 UJ
	RAU2-GA1-SO-5.75	1,2,3,4,7,8-HxCDD	0.122 JK	0.162 JK	0.162 UJ
	RAU2-GA1-SO-8.25			0.111 JK	0.111 UJ
	RAU2-GA1-SO-5.75	1,2,3,7,8,9-HxCDD	0.152 J	0.604 J	0.604 UJ
	RAU2-GA1-SO-5.75	1,2,3,7,8-PeCDF	0.16 J	0.183 JK	0.183 UJ
	RAU2-GA1-SO-8.25			0.119 JK	0.119 UJ
	RAU2-GA1-SO-8.25	2,3,4,7,8-PeCDF	0.148 J	0.323 JK	0.323 UJ
	RAU2-GA1-SO-8.25	1,2,3,4,7,8-HxCDF	0.106 JK	0.115 J	0.115 UJ
	RAU2-GA2-SO-8.25			0.503 JK	0.503 UJ
	RAU2-GA1-SO-3.25	1,2,3,6,7,8-HxCDF	0.148 J	0.457 JK	0.457 UJ
	RAU2-GA1-SO-5.75			0.583 JK	0.583 UJ
	RAU2-GA1-SO-8.25			0.127 JK	0.127 UJ
	RAU2-GA1-SO-3.25	1,2,3,7,8,9-HxCDF	0.152 JK	0.223 J	0.223 UJ
	RAU2-GA1-SO-5.75			0.259 J	0.259 UJ

NOTES:
J = result is estimated.
JK = result is estimated and an estimated maximum potential concentration.
pg/g = picograms per gram.
UJ = result is non-detect at an estimated detection limit.

All remaining laboratory method blanks were non-detect.

Trip Blanks

Trip blanks were not required for this sampling event.

Equipment Rinsate Blanks

An equipment rinsate blank (Rinsate Blank) was submitted to Apex with samples associated with report A9I0893 for NWTPH-Dx, NWTPH-Gx, EPA Method 8082A, EPA Method 8270D, EPA Method 6020A, SM4500-NH3-G, SM 5310C, EPA 7470A, and SM 4500-S2-D-00 analyses. The rinsate blank was subcontracted by Apex to CFA for EPA Method 1613B analysis and reported in WO15579. The rinsate blank was also subcontracted by Apex to ARI for EPA Method 7470A and SM 4500-S2-D-00 analyses, and results were appended to report A9I0893. The rinsate blank was associated with all sample results reported in A9I0822, A9I0893, and A9J006. Qualification was not required when associated sample results were greater than five times the rinsate blank concentration.

The rinsate blank had a detection of SM 5310C total organic carbon (TOC) at 1.66 milligrams per liter. The associated sediment sample TOC results were greater than five times the rinsate blank concentration; thus, qualification was not required. The rinsate blank also had EPA Method 8270D detections of naphthalene and phenanthrene. Associated sample results were

compared to five times the rinsate blank detections, as shown in the following table. Qualification was not required, as all associated naphthalene and phenanthrene results were either non-detect or greater than five times the associated rinsate blank concentration. The rinsate blank naphthalene detection was also associated with a laboratory method blank detection of naphthalene; qualification is documented in the method blank section above.

Report	Sample	Analyte	Rinsate Blank (ug/L = ppb)	5 x Rinsate Blank (mg/kg = ppm)	Sample Result (mg/kg)
A9I0822	SE-29-0-2.0	Naphthalene	0.097	0.000485	0.491
A9J0006	SE-24-0-0.33				0.0698
	SE-17-0-0.33				0.0770
	SE-21-0-0.33				0.0492
	SE-26-0-0.33				0.0752
	SE-31-0-0.33				0.0742
	SE-16-0-0.33				0.0136 J
	SE-27-0-0.33				0.0181 J
	SE-29-0-2.0	Phenanthrene	0.0163 J	0.000815	0.491
	SE-30-2.5-4.5				0.148
	SE-24-0-0.33				0.0768
	SE-14-0-0.33				0.0398
	SE-23-0-0.33				0.213
	SE-17-0-0.33				0.575
	SE-15-0-0.33				0.0243
	SE-21-0-0.33				0.0195
	SE-25-0-0.33				0.0648
	SE-26-0-0.33				0.112
	SE-31-0-0.33				0.0289

NOTES:
J = result is estimated.
mg/kg = milligrams per kilogram.
ppb = parts per billion.
ppm = parts per million.
ug/L = micrograms per liter.

According to report A9I0893, the EPA Method 8270D batch 9110614 laboratory method blank had a detection of naphthalene between the detection limit and the reporting limit, at 0.0216 micrograms per liter. The associated sample result had a detection of naphthalene above the reporting limit but within five times the method blank concentration. The associated sample result has been qualified by the reviewer with "J," as estimated. The associated sample result was from an equipment rinsate blank, the results of which are evaluated against project sediment samples in the equipment rinsate blank section above.

Report	Sample	Component	Original Result (ug/L)	Qualified Result (ug/L)
A9I0893	Rinsate Blank	Naphthalene	0.0597	0.0597 J
NOTES: J = result is estimated. ug/L = micrograms per liter.				

According to report WO15579, the equipment rinsate blank had some EPA Method 1613B detected results. No qualifications were necessary, as all detected equipment rinsate blank results were qualified by the reviewer based on associated laboratory method blank detections.

All remaining equipment rinsate blank results were non-detect to detection limits.

SURROGATE RECOVERY RESULTS

The samples were spiked with surrogate compounds to evaluate laboratory performance on individual samples. The laboratory appropriately documented and qualified surrogate outliers. Associated batch quality assurance/quality control for samples with surrogate outliers was within acceptance criteria, except for the EPA 8082A MS (9120838-MS1) from report A9L0191, which is discussed in the MS section below.

According to report A9I0893, the EPA Method 8270D surrogate 2-fluorobiphenyl result for sample Rinsate Blank was below the lower percent recovery acceptance limit of 44 percent, at 37 percent. The remaining five surrogates had acceptable percent recoveries; thus, qualification was not required.

According to report A9J0006, the EPA Method 8082A surrogate decachlorobiphenyl result for sample SE-14-0-0.33 was below the lower percent recovery acceptance limit of 60 percent, at 59 percent. The associated sample results have been qualified by the reviewer with "J," as estimated. Non-detect results were qualified with J, for a final qualification of UJ as non-detect and estimated. Results already qualified because of detection below the reporting limit did not require additional qualification.

Report	Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
A9J0006	SE-14-0-0.33	Aroclor 1016	5.75 U	5.75 UJ
		Aroclor 1221	5.75 U	5.75 UJ
		Aroclor 1232	5.75 U	5.75 UJ
		Aroclor 1242	5.75 U	5.75 UJ
		Aroclor 1248	5.75 U	5.75 UJ
		Aroclor 1254	5.75 U	5.75 UJ
		Aroclor 1260	8.41 J	8.41 J

NOTES:
J = result is estimated.
U = result is non-detect at the detection limit.
ug/kg = micrograms per kilogram.
UJ = result is non-detect at an estimated detection limit.

According to report A9J0006, the EPA Method 8270D surrogate p-terphenyl-d14 result for sample SE-21-0-0.33 was below the lower percent recovery acceptance limit of 54 percent, at 52 percent. The remaining five surrogates had acceptable percent recoveries; thus, qualification was not required.

According to report A9J0006, the EPA Method 8270D surrogate p-terphenyl-d14 result for sample SE-27-0-0.33 was below the lower percent recovery acceptance limit of 54 percent, at 41 percent. The surrogate 2-fluorobiphenyl result was below the lower percent recovery acceptance limit of 44 percent, at 37 percent. The remaining four surrogates had acceptable percent recoveries; thus, qualification was not required.

According to report A9L0191 01 30 20 1620, the EPA Method 8270D surrogate p-terphenyl-d14 result for sample RAU2-GA2-SO-5.75 was below the lower percent recovery acceptance limit of 54 percent, at 48 percent. The remaining four surrogates had acceptable percent recoveries; thus, qualification was not required.

According to report A9L0191 01 30 20 1620, EPA Method 8270D surrogates 2-fluorobiphenyl and p-tertphenyl-d14 had results below the lower acceptance limit of 44 and 54 percent, respectively, at 36 percent and 40 percent, respectively, for sample RAU2-GA2-SO-8.25. The EPA Method 8270D analytes associated with these basic surrogate compounds have been qualified by the reviewer with J, as estimated, in the table below.

Report	Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
A9L0191 01 30 20 1620	RAU2-GA2-SO-8.25	1,2,4-Trichlorobenzene	151 U	151 UJ
		1,2-Dichlorobenzene	151 U	151 UJ
		1,2-Dinitrobenzene	1510 U	1510 UJ
		1,3-Dichlorobenzene	151 U	151 UJ
		1,3-Dinitrobenzene	1,510 U	1,510 UJ

Report	Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
		1,4-Dichlorobenzene	151 U	151 UJ
		1,4-Dinitrobenzene	1,510 U	1,510 UJ
		1-Methylnaphthalene	121 U	121 UJ
		2,2'-Oxybis(1-Chloropropane)	151 U	151 UJ
		2,4-Dinitrotoluene	603 U	603 UJ
		2,6-Dinitrotoluene	603 U	603 UJ
		2-Chloronaphthalene	60.3 U	60.3 UJ
		2-Methylnaphthalene	121 U	121 UJ
		2-Nitroaniline	1,210 U	1,210 UJ
		3-Nitroaniline	1,210 U	1,210 UJ
		3,3'-Dichlorobenzidine	1,210 U	1,210 UJ
		4-Bromophenyl-phenylether	151 U	151 UJ
		4-Chloroaniline	151 U	151 UJ
		4-Chloro-phenyl-phenyl ether	151 U	151 UJ
		4-Nitroaniline	1,210 U	1,210 UJ
		Acenaphthene	60.3 U	60.3 UJ
		Acenaphthylene	60.3 U	60.3 UJ
		Aniline	302 U	302 UJ
		Anthracene	60.3 U	60.3 UJ
		Azobenzene	151 U	151 UJ
		Benzo(a)anthracene	60.3 U	60.3 UJ
		Benzo(a)pyrene	91.6 J	91.6 J
		Benzo(b)fluoranthene	90.7 U	90.7 UJ
		Benzo(g,h,i)perylene	60.3 U	60.3 UJ
		Benzo(k)fluoranthene	90.7 U	90.7 UJ
		bis(2-Chloroethoxy)methane	151 U	151 UJ
		bis(2-Chloroethyl)ether	151 U	151 UJ
		bis(2-Ethylhexyl) adipate	1,510 U	1,510 UJ
		bis(2-Ethylhexyl)phthalate	907 U	907 UJ
		Butylbenzylphthalate	603 U	603 UJ
		Carbazole	90.7 U	90.7 UJ
		Chrysene	60.3 U	60.3 UJ
		Dibenzo(a,h)anthracene	60.3 U	60.3 UJ
		Dibenzofuran	60.3 U	60.3 UJ
		Diethylphthalate	603 U	603 UJ
		Dimethylphthalate	603 U	603 UJ
		Di-n-butylphthalate	603 U	603 UJ
		Di-n-octylphthalate	603 U	603 UJ
		Fluoranthene	60.3 U	60.3 UJ

Report	Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
		Fluorene	60.3 U	60.3 UJ
		Hexachlorobenzene	60.3 U	60.3 UJ
		Hexachlorobutadiene	151 U	151 UJ
		Hexachlorocyclopentadiene	302 U	302 UJ
		Hexachloroethane	151 U	151 UJ
		Indeno(1,2,3-cd)pyrene	60.3 U	60.3 UJ
		Isophorone	151 U	151 UJ
		Naphthalene	121 U	121 UJ
		Nitrobenzene	603 U	603 UJ
		N-Nitrosodimethylamine	151 U	151 UJ
		n-Nitroso-di-n-propylamine	151 U	151 UJ
		n-Nitrosodiphenylamine	151 U	151 UJ
		Phenanthrene	60.3 U	60.3 UJ
		Pyrene	60.3 U	60.3 UJ
		Pyridine	302 U	302 UJ

NOTES:
J = result is estimated.
U = result is non-detect.
ug/kg = micrograms per kilogram.
UJ = result is non-detect at an estimated detection limit.

All remaining surrogate recoveries were within acceptance limits.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

MS/MSD results are used to evaluate laboratory precision and accuracy. All MS/MSD samples were extracted and analyzed at the required frequency. When MS/MSD percent recoveries and relative percent differences (RPDs) were outside acceptance limits because of high concentrations of analyte in the sample and MS/MSD exceedances were flagged by the laboratory because of high concentrations of analyte, no qualifications were made by the reviewer. Where MS/MSD results were not reported, batch precision was evaluated with laboratory duplicate or laboratory control sample/laboratory control sample duplicate (LCS/LCSD) sample results.

According to reports A9I0822, A9I0893, and A9J0006, the EPA Method 8270D batch 9100490 MS/MSD (9100490-MS1/MSD1) exceeded some upper and lower percent recovery acceptance limits. The MS and MSD were diluted 1:10 for analysis so that some detection limits and reporting limits were raised above spike concentration. The dilution required for analysis did not necessitate qualification of associated sample results.

According to reports A9I0822, A9I0893, and A9J0006, the EPA Method 8270D batch 9100490 MS/MSD (9100490-MS2/MSD2) exceeded some upper and lower percent recovery

acceptance limits. The MS/MSD were prepared with a sample from an unrelated project; thus, qualification was not required.

According to report A9I0822, the EPA Method 6020A batch 9100517 MS (9100517-MS1) results for copper exceeded the upper percent recovery acceptance limits of 125 percent, at 133 percent. The associated MSD had acceptable percent recovery and RPD; thus, qualification was not required. The MS exceeded the upper percent recovery acceptance limit for lead of 125 percent, at 334 percent, and the MS/MSD (9100517-MSD1) exceeded the RPD control limit of 40 percent, at 91 percent; thus, the associated sample result was qualified by the reviewer with "J," as estimated.

Report	Sample	Component	Original Result (mg/kg)	Qualified Result (mg/kg)
A9I0822	SE-29-0-2.0	Lead	16.2	16.2 J
NOTES: J = result is estimated. mg/kg = milligrams per kilogram.				

According to report A9I0822, the Plumb/SM 4500-NH3-G MS (9091360-MS2) result for ammonia as nitrogen was below the lower percent recovery acceptance limit of 75 percent, at 70 percent. The associated MSD result was within percent recovery acceptance limits and the MS/MSD RPD met the control limit; thus, qualification was not required.

According to report A9I0822, the EPA Method 7471B batch BHI0876 MSD exceeded the upper percent recovery acceptance limit of 125 percent, at 126 percent. The exceedance was minor, the MS result was within percent recovery acceptance limits, and the MS/MSD RPD met the control limit; thus, qualification was not required.

According to report A9I0822, the SM 4500-S2-D-00 batch BHI0893 MSD result for sulfide exceeded the upper percent recovery acceptance limit of 125 percent, at 132 percent. The associated MSD result had acceptable percent recovery and the MS/MSD RPD met the control limit; thus, qualification was not required.

According to reports A9I0893 and A9J0006, the EPA Method 6020A batch 9100629 MS (9100629-MS1) results for copper exceeded the upper percent recovery acceptance limit of 125 percent, at 148 percent. The associated MSD had acceptable percent recovery and the MS/MSD RPD met the control limit; thus, qualification was not required.

According to report A9I0893, the Plumb/SM 4500-NH3-G MS/MSD (9100459-MS1/MSD1) results for ammonia as nitrogen were below the lower percent recovery acceptance limit of 75 percent, at 74 percent and 71 percent, respectively. The associated sample result was qualified by the reviewer with "J," as estimated.

Report	Sample	Component	Original Result (mg/kg)	Qualified Result (mg/kg)
A9I0893	SE-10-2.0-3.7	Ammonia as Nitrogen	5.37	5.37 J
NOTES: J = result is estimated. mg/kg = milligrams per kilogram.				

According to report A9I0893, the EPA Method 7471B batch BHJ0281 MS (BHJ0281-MS1) results for mercury exceeded the upper percent recovery acceptance limit of 125 percent, at 139 percent. The associated MSD had acceptable percent recovery, and the MS/MSD RPD met the control limit; thus, qualification was not required.

According to report A9I0893, the SM 4500-S2-D-00 batch BHJ0054 MS/MSD results for sulfide were below the lower percent recovery acceptance limit of 75 percent, at 73.2 percent and 21.0 percent, respectively. The MS/MSD were analyzed at a 1:20 dilution; however, the spike concentration was adjusted for the dilution. The associated sample result was qualified by the reviewer with "J," as estimated.

Report	Sample	Component	Original Result (mg/kg)	Qualified Result (mg/kg)
A9I0893	SE-10-2.0-3.7	Sulfide	228	228 J
NOTES: J = result is estimated. mg/kg = milligrams per kilogram.				

According to report A9I0893, the SM 4500-S2-D-00 batch BHJ0145 MS result for sulfide was below the lower percent recovery acceptance limit of 75 percent, at 56.9 percent. The associated sample result, for the sample used to prepare the MS was qualified by the reviewer with "J," as estimated. Based on holding time exceedance, the reviewer assigned a final qualification of J to the associated sample result.

Report	Sample	Component	Original Result (mg/L)	Qualified Result (mg/L)
A9I0893	SE-20-0-0.33	Sulfide	0.059	0.059 J
NOTES: J = result is estimated. mg/L = milligrams per liter.				

According to report A9J0006, the EPA Method 8082A batch 9100667 MS result for Aroclor 1016 was below the lower percent recovery acceptance limit of 47 percent, at 46 percent. The sample used to prepare the MS, and the associated field sample, were qualified as follows:

Report	Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
A9J0006	SE-27-0-0.33	Aroclor 1016	2.07 U	2.07 UJ
	SE-27-0-0.33-Dup		1.92 U	1.92 UJ
NOTES: J = result is estimated. ug/kg = micrograms per kilogram. UJ = result is non-detect at an estimated detection limit.				

According to report A9J0006, the EPA Method 8270D batch 9100740 MS (9100740-MS1) was non-detect for 2,4-dinitrophenol and benzoic acid. The MS was diluted 1:4 for analysis, but spike concentrations were still above detection limits. The associated sample result for benzoic acid was non-detect and has been qualified by the reviewer with "J," as estimated, with final qualification of "UJ," as non-detect and estimated. Qualification of 2,4-dinitrophenol was not required, as results were not reported in associated samples. The MS result for 3,3'-dichlorobenzidine was above the upper percent recovery acceptance limit of 121 percent, at 123 percent; results were not reported in associated samples; thus, qualification was not required.

Report	Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
A9J0006	SE-24-0-0.33	Benzoic acid	1.85 U	1.85 UJ
NOTES: J = result is estimated. ug/kg = micrograms per kilogram. UJ = result is non-detect at an estimated detection limit.				

According to report A9L0191 01 30 20 1620, the EPA Method 8082A batch 9120838 MS (9120838-MS1) Aroclor 1016 result was below the lower percent recovery acceptance limit of 47 percent, at 42 percent. Additionally, the surrogate decachlorobiphenyl result was below the lower percent recovery acceptance limit of 60 percent, at 56 percent. The validator qualified the non-detect Aroclor 1016 result in the sample used to prepare the MS with "J," as estimated, for a final qualification of UJ as non-detect and estimated.

Report	Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
A9L0191 01 30 20 1620	RAU2-GA2-SO-8.25	Aroclor 1016	8.98 U	8.98 UJ
NOTES: U = result is non-detect. ug/kg = micrograms per kilogram. UJ = result is non-detect at an estimated detection limit.				

According to report A9L0191 01 30 20 1620, the EPA Method 8270D batch 9120967 MS (9120967-MS2) di-n-octyl phthalate exceeded the upper percent recovery acceptance limit of 140 percent, at 147 percent; benzyl alcohol exceeded the upper percent recovery acceptance limit of 122 percent, at 125 percent; and bis(2-ethylhexyl) adipate exceeded the upper percent recovery acceptance limit of 121 percent, at 141 percent. The associated sample results (sample RAU2-GA2-SO-8.25) were non-detect; thus, qualification was not required. The MS result for

benzoic acid did not have measurable recovery; however, the MS spike concentration was below the detection limit because of a dilution. Qualification based on benzoic acid recovery was not required.

All remaining MS/MSD results were within acceptance limits for percent recovery and RPDs.

LABORATORY DUPLICATE RESULTS

Duplicate results are used to evaluate laboratory precision. All duplicate samples were extracted and analyzed at the required frequency. Laboratory duplicate results within five times the MRL were not evaluated for precision.

In reports A9I0822, A9I0893, and A9J0006, the EPA Method 8270D batch 9100490 laboratory duplicate results for fluoranthene, phenanthrene, and pyrene exceeded the RPD control limit of 30 percent, at 78, 63, and 81 percent, respectively. Associated sample results have been qualified by the reviewer with "J," as estimated. Additional laboratory duplicate results flagged by Apex because of RPD exceedances did not require qualification, as the results either were not reported in associated samples or were detected at concentrations less than five times the reporting limit.

Report	Sample	Component	Original Result (mg/kg)	Qualified Result (mg/kg)
A9I0822	SE-29-0-2.0	Fluoranthene	1.15	1.15 J
		Phenanthrene	0.491	0.491 J
		Pyrene	0.823	0.823 J
NOTES: J = result is estimated. mg/kg = milligrams per kilogram.				

According to reports A9I0822 and A9I0893, the SM 2540G batch 9091474 laboratory duplicate (9091474-DUP1) exceeded the RPD control limit of 10 percent for total volatile solids, at 28 percent. The associated sample result has been qualified by the reviewer with "J," as estimated.

Report	Sample	Component	Original Result (percent)	Qualified Result (percent)
A9I0822	SE-29-0-2.0	Total Volatile Solids	27.4	27.4 J
NOTE: J = result is estimated.				

In reports A9I0822 and A9I0893, the PSEP/SM 2540G batch 9091443 laboratory duplicate (9091433-DUP1) results were reported twice. One set of results was the original batch performed by Apex, with the RPD exceeding the control limit of 10 percent, at 12 percent. The second set of results was associated with the subcontracted total volatile solids results from ARI, with the RPD within a control limit of 20 percent. The associated sample result has been qualified by the reviewer with "J," as estimated.

Report	Sample	Component	Original Result (percent)	Qualified Result (percent)
A9I0822	SE-29-0-2.0	Total Solids	42.9	42.9 J
NOTE: J = result is estimated.				

According to report A9I0893, the EPA 9060A-modified/SM 5310C batch 9100512 laboratory duplicate (9100512-DUP1) exceeded the RPD control limit of 20 percent for TOC, at 23 percent. The associated sample result has been qualified by the reviewer with "J," as estimated.

Report	Sample	Component	Original Result (mg/kg)	Qualified Result (mg/kg)
A9I0893	SE-10-2.0-3.7	Total Organic Carbon	79,000	79,000 J
NOTES: J = result is estimated. mg/kg = milligrams per kilogram.				

According to report A9I0893, the SM 4500-S2-D-00 batch BHJ0054 laboratory duplicate (BHJ0054-BS1) exceeded the RPD control limit of 20 percent for sulfide, at 32.8 percent. The laboratory duplicate was reanalyzed the following day with acceptable RPD, at 15.8 percent; qualification was not required.

According to report A9J0006, the NWTPH-Gx batch 9100509 laboratory duplicate (9100509-DUP2) exceeded the RPD control limit of 30 percent, at 33 percent. The laboratory duplicate was prepared with a sample from an unrelated project; thus, qualification was not required.

According to report A9J0006, the PSEP/SM 2540G batch 9100520 laboratory duplicate (9100520-DUP1) exceeded the RPD control limit of 20 percent for total solids, at 25 percent. The laboratory duplicate results were reported a second time with an RPD control limit of 10 percent. The associated sample results have been qualified by the reviewer with "J," as estimated.

Report	Sample	Component	Original Result (percent)	Qualified Result (percent)
A9J0006	SE-24-0-0.33	Total Solids	35.5	35.5 J
NOTES: J = result is estimated.				

According to report A9J0006, the SM 2540G batch 9100558 laboratory duplicate (9100558-DUP1) exceeded the RPD control limit of 10 percent for total volatile solids, at 38 percent. The associated sample results have been qualified by the reviewer with "J," as estimated.

Report	Sample	Component	Original Result (percent)	Qualified Result (percent)
A9J0006	SE-24-0-0.33	Total Volatile Solids	18.9	18.9 J
NOTES: J = result is estimated.				

According to report A9J0006, the PSEP/SM 2540G batch 9100571 laboratory duplicate (9100571-DUP1) exceeded the RPD control limit of 20 percent for total solids, at 31 percent. The laboratory duplicate results were reported a second time with an RPD control limit of 10 percent. The associated sample results have been qualified by the reviewer with "J," as estimated.

Report	Sample	Component	Original Result (percent)	Qualified Result (percent)
A9J0006	SE-25-0-0.33	Total Solids	40.6	40.6 J
NOTES: J = result is estimated.				

All remaining laboratory duplicate RPDs were within acceptance limits.

LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

An LCS/LCSD is spiked with target analytes to provide information on laboratory precision and accuracy. The LCS/LCSD samples were extracted and analyzed at the required frequency.

According to reports A9I0822, A9I0893, and A9J0006, the EPA Method 8270D batch 9100490 LCS result for 3,3'-dichlorobenzidine exceeded the upper percent recovery acceptance limit of 121 percent, at 124 percent. Apex also noted that the associated continuing calibration verification (CCV) standard recovery was below the lower percent recovery acceptance limit, indicating a potential low bias in the LCS. The associated sample results were non-detect; thus, qualification was not required.

According to report A9I0893, the EPA Method 8270D batch 9100614 LCS/LCSD exceeded the RPD control limit of 30 percent for hexachlorocyclopentadiene, at 31 percent. The associated sample result was non-detect; thus, qualification was not required.

According to report A9J0006, the EPA Method 8270D batch 9100740 LCS exceeded the upper percent recovery acceptance limit of 121 percent for 3,3'-dichlorobenzidine, at 203 percent. The associated sample results were non-detect; thus, qualification was not required.

All remaining LCS/LCSD results were within acceptance limits for percent recovery and RPD.

FIELD DUPLICATE RESULTS

Field duplicate samples measure both field and laboratory precision. One field duplicate was submitted for analysis (MW2-112807/MW2-112807-Dup). MFA uses acceptance criteria of

100 percent RPD for results that are less than five times the MRL, or 50 percent RPD for results that are greater than five times the MRL. Non-detect data are not used in the evaluation of field duplicate results. All analytes were within the acceptance criteria.

CONTINUING CALIBRATION VERIFICATION RESULTS

CCV results are used to demonstrate instrument precision and accuracy through the end of the sample batch. Apex did not report CCV results. Quality control results flagged by Apex based on CCV exceedances required no action from the reviewer if the quality control results met percent recovery acceptance criteria.

REPORTING LIMITS

Apex and ARI reported non-detect results to detection limits. CFA reported non-detect results to estimated detection limits. Samples requiring dilutions because of high analyte concentrations and/or matrix interferences were reported with raised detection limits and reporting limits. Results between the detection limit and the reporting limit were qualified by Apex with "J," as estimated.

The reviewer confirmed that NWTPH-Gx sediment results were reported with a base dilution factor of 1:50 because of a dilution required for analysis.

Apex raised some reporting limits and detection limits because of matrix interference. Results were flagged appropriately, and qualification was not required.

DATA PACKAGE

The data packages were reviewed for transcription errors, omissions, and anomalies.

According to report A9I0893, PSEP/SM 4500-NH3-G ammonia, EPA Method 9060A modified TOC, PSEP 1986 total solids, and SM 2540G total volatile solids analyses were added to SE-01A-1.0-2.0, SE-02A-2.5-3.5, SE-03A-0-1.0, SE-06A-0.5-1.5, and SE-07A-0-1.0 after samples were received by Apex. The reviewer confirmed that the analyses were added after the recommended seven-day holding time for ammonia was exceeded. Associated ammonia results are qualified in the holding time section above.

According to report A9I0893, EPA Method 7471B mercury analysis was canceled for SE-01A-1.0-2.0 and SE-03A-0-1.0 after the samples were received by the laboratory.

According to reports A9I0893 and A9J0006, EPA Method 8082A analysis was performed on air-dried sediment samples SE-20-0-0.33, SE-10-2.0-3.7, SE-30-2.5-4.5, SE-17-0-0.33, SE-18-0-0.33, SE-16-0-0.33, SE-22-0-0.33, SE-27-0-0.33, and SE-27-0-0.33-Dup. The reviewer confirmed that the preparation method, EPA Method 3546, allows air drying before extraction. No qualification was required.

EPA Method 8270D aqueous batch 9100456 results were included in the quality control section of report A9I0893, but no associated analytical results were reported. The reviewer

confirmed that project samples were originally analyzed in batch 9100456 but were reanalyzed in batch 9100614. No action was required for any batch 9100456 quality control exceedances.

According to report A9J0006, Apex noted on a sample login form that sample SE-15-0-0.33 collection time was recorded on all containers as 11:14 but was recorded as 11:44 on the COC. The laboratory reported sample collection time based on the COC. Apex also noted that the container received for sample SE-28-0-0.33 for sulfide analysis did not have a label and was identified by the process of elimination. Apex noted that three containers received for sample SE-26-0-0.33 were labeled as SE-06-0-0.33 and did not include a sample collection time. The reviewer confirmed that the sample containers were matched to the correct sample based on the bag in which they had been submitted. No additional action was required.

No other issues were found.

REFERENCES

Apex. 2019. Quality systems manual. Rev. 7. Apex Laboratories, LLC, Tigard, Oregon. February 11.

ARI. 2018. Quality assurance plan. Rev. 16.1. Analytical Resources, Inc., Tukwila, Washington. November 12.

CFA. 2018. Quality assurance plan. Rev. 15. Cape Fear Analytical, LLC, Wilmington, North Carolina. December 1.

EPA. 1986. Test methods for evaluating solid waste, physical/chemical methods. EPA publication SW-846. 3d ed. U.S. Environmental Protection Agency. Final updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), V (2015), VI phase I (2017), VI phase II (2018), and VI phase III (2019).

EPA. 2014. R10 data validation and review guidelines for polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofuran data (PCDD/PCDF) using Method 1613B and SW846 Method 8290A. EPA-910-R-14-003. U.S. Environmental Protection Agency, Office of Environmental Assessment. May.

EPA. 2016. EPA contract laboratory program, national functional guidelines for high resolution Superfund methods data review. EPA 542-B-16-001. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. April.

EPA. 2017a. EPA contract laboratory program, national functional guidelines for inorganic Superfund methods data review. EPA 540-R-2017-001. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. January.

EPA. 2017b. EPA contract laboratory program, national functional guidelines for Superfund organic methods data review. EPA 540-R-2017-002. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. January.

DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. 1044.02.14 | DECEMBER 3, 2020 | GRAYS HARBOR HISTORICAL SEAPORT AUTHORITY

Maul Foster & Alongi, Inc., conducted an independent review of the quality of analytical results for sediment samples collected in July 2020 at Seaport Landing tidelands.

Apex Laboratories, LLC (Apex) and Analytical Resources, Inc. (ARI) performed the analyses. Apex report number A0G0628 was reviewed. Apex subcontracted ARI to perform sulfide and salinity analyses. The analyses performed and samples analyzed are listed below.

Analysis	Reference
Ammonia	Plumb/SM 4500-NH3-G
Salinity—Pore Water	SM 2520-B-00
Sulfide	SM 4500-S2-D-00
Sulfide—Pore Water	SM 4500-S2-D-00
Total Organic Carbon	EPA 9060A-modified
Total Solids	PSEP 1986
Total Volatile Solids	SM 2540G
NOTES: EPA = U.S. Environmental Protection Agency. PSEP = Puget Sound Estuary Protocol. SM = Standard Methods for the Treatment of Water and Wastewater.	

Samples Analyzed	
Report A0G0628	
SE-32	SE-37
SE-33	SE-38
SE-34	SE-39
SE-35	SE-40
SE-36	SE-41

DATA QUALIFICATIONS

Analytical results were evaluated according to applicable sections of U.S. Environmental Protection Agency (EPA) procedures (EPA, 2017a,b) and appropriate laboratory and method-specific guidelines (Apex, 2019; ARI, 2020; EPA, 1986).

Data validation procedures were modified, as appropriate, to accommodate quality-control requirements for methods not specifically addressed by the EPA procedures (e.g., Plumb/SM 4500-NH3-G).

The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

Holding Times

According to report A0G0628, Apex flagged all SM 2540G total volatile solids results because of holding time exceedances. The reviewer confirmed that all analyses had been performed 13 days after sample collection, which is within the 14-day holding time recommended by the Washington State Department of Ecology sediment management standard guidelines (Ecology, 2019). The laboratory referenced the original SM 2540G holding time, which is seven days for water, wastewater, and sludge analysis. The SM 2540G analyses met the recommended project holding time; thus, qualification was not required.

According to report A0G0628, all SM 4500-S2-D sulfide analyses were performed three days after the recommended seven-day holding time for all sediment samples. The results have been qualified by the reviewer with "J," as estimated.

Report	Sample	Component	Original Result (mg/kg)	Qualified Result (mg/kg)
A0G0628	SE-32	Sulfide	337	337 J
	SE-33		473	473 J
	SE-34		921	921 J
	SE-35		447	447 J
	SE-36		546	546 J
	SE-37		204	204 J
	SE-38		365	365 J
	SE-39		2,110	2,110 J
	SE-40		392	392 J
	SE-41		567	567 J

NOTES:
J = result is estimated.
mg/kg = milligrams per kilogram.

The remaining extractions and analyses were performed within the recommended holding time criteria.

Preservation and Sample Storage

The samples were preserved and stored appropriately.

BLANKS

Method Blanks

Laboratory method blank analyses were performed at the required frequencies. For purposes of data qualification, the method blanks were associated with all samples prepared in the analytical batch.

All laboratory method blanks were non-detect to method reporting limits (MRLs).

Trip Blanks

Trip blanks were not required for this sampling event.

Equipment Rinsate Blanks

An equipment rinsate blank was not submitted to Apex for analysis.

SURROGATE RECOVERY RESULTS

Surrogates were not required for the analyses reviewed in report A0G0628.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Matrix spike/matrix spike duplicate (MS/MSD) results are used to evaluate laboratory precision and accuracy. All MS/MSD samples were extracted and analyzed at the required frequency. Where MS/MSD results were not reported, batch precision was evaluated with laboratory duplicate or laboratory control sample/laboratory control sample duplicate (LCS/LCSD) sample results.

According to report A0G0628, the SM 4500-S2-D-00 batch BIH0004 MS result for pore water sulfide was below the lower percent recovery acceptance limit of 75 percent, at 48.3 percent. The associated sample result, i.e., for the sample used to prepare the MS/MSD, was qualified by the reviewer with J, as estimated.

Report	Sample	Component	Original Result (mg/L)	Qualified Result (mg/L)
A0G0628	SE-10-2.0-3.7	Sulfide	0.060	0.060 J

NOTES:
J = result is estimated.
mg/L = milligrams per liter.

All remaining MS/MSD results were within acceptance limits for percent recovery and relative percent differences (RPDs).

LABORATORY DUPLICATE RESULTS

Duplicate results are used to evaluate laboratory precision. All duplicate samples were extracted and analyzed at the required frequency. Laboratory duplicate results within five times the MRL were not evaluated for precision.

All laboratory duplicate results met the RPD acceptance criteria.

LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

An LCS/LCSD) is spiked with target analytes to provide information on laboratory precision and accuracy. The LCS/LCSD samples were extracted and analyzed at the required frequency.

All LCS/LCSD results were within acceptance limits for percent recovery and RPD.

FIELD DUPLICATE RESULTS

Field duplicate samples measure both field and laboratory precision. Field duplicate samples were not submitted to Apex for analysis.

CONTINUING CALIBRATION VERIFICATION RESULTS

Continuing calibration verification (CCV) results are used to demonstrate instrument precision and accuracy through the end of the sample batch. Apex did not report CCV results.

REPORTING LIMITS

Apex and ARI reported non-detect results to MRLs. Samples requiring dilutions because of high analyte concentrations and/or matrix interferences were reported with raised detection limits and reporting limits.

DATA PACKAGE

The data packages were reviewed for transcription errors, omissions, and anomalies.

According to report A0G0628, all sediment samples except SE-39 were processed for pore water extraction upon receipt by Apex, and the pore water results were associated with sample names appended with "---After Processing." The analyses performed on the original sediment samples were associated in the report with sample names appended with "---As Received." The reviewer confirmed that pore water analyses for sample SE-39 had been canceled because insufficient pore water volume was extracted.

According to report A0G0628, SM 2540G total volatile solids analysis was added to all samples after samples had been received by Apex. No action was required by the reviewer.

No additional issues were found.

REFERENCES

Apex. 2019. Quality systems manual. Rev. 7. Apex Laboratories, LLC, Tigard, Oregon. February 11.

ARI. 2020. Quality assurance plan. Rev. 16.4. Analytical Resources, Inc., Tukwila, Washington. February 12.

Ecology. 2019. Sediment cleanup user's manual (SCUM). Guidance for implementing the cleanup provisions of the sediment management standards, Chapter 173-204 WAC. 12-09-057. Washington State Department of Ecology. December.

EPA. 1986. Test methods for evaluating solid waste, physical/chemical methods. EPA publication SW-846. 3d ed. U.S. Environmental Protection Agency. Final updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), V (2015), VI phase I (2017), VI phase II (2018), and VI phase III (2019).

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EPA. 2017b. EPA contract laboratory program, national functional guidelines for Superfund organic methods data review. EPA 540-R-2017-002. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. January.